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NUTRITION CAUSAL ANALYSIS

ACF

Canadian International Development Agency

European Union Humanitarian Aid & Civil Protection

PAKISTAN

THATTA AND DADU DISTRICT, SINDH PROVINCE

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FINAL REPORT

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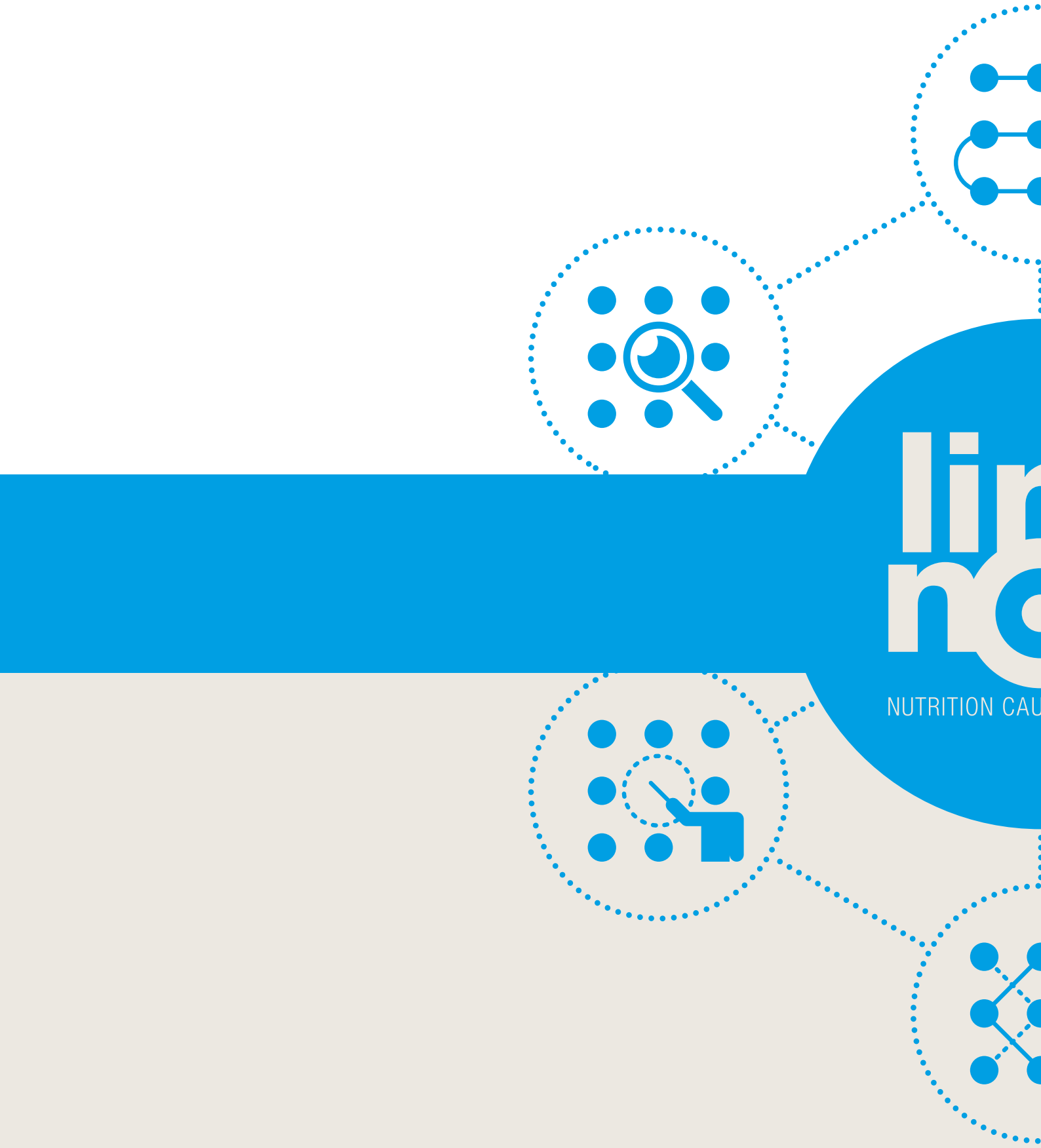
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Nutrition Causal Analysis

Thatta and Dadu District, Sindh Province, Pakistan

January – May 2012

Action Against Hunger-USA

Canadian International Development Agency

EUROPEAN COMMISSION
Humanitarian Aid

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Canadian International Development Agency

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ABBREVIATIONS

ACF USA	Action Against Hunger-USA
ARI	Acute Respiratory Infection
BCG	Bacille Calmette-Guerin
C MAM	Community Management of Acute Malnutrition
CBHA	Consortium of British Humanitarian Agencies
CERF	Central Emergency Response Fund
CV	Curriculum Vitae
DPT	Diphtheria, Pertusis, Tetanus
FANS	Flood Affected Nutrition Survey
FAO	Food and Agriculture Organization of the United Nations
GOP	Government of Pakistan
HDDS	Household Dietary Diversity Score
HH	Household
MCH	Maternal and Child Health
MDG	Millenium Development Goals
MSNA	Multi-Sector Needs Assessment
N	Number
NCA	Nutrition Causal Analysis
NGO	Non-Governmental Organization
NNS	National Nutrition Survey-Pakistan
OCHA	Office for the Coordination of Humanitarian Affairs (United Nations)
OTP	Outpatient Therapeutic Programme
PEFSA	Pakistan Emergency and Food Security Alliance
PINS	Pakistan Integrated Nutrition Strategy
PKR	Pakistan Rupee
PPS	Proportional to Population Size
RHC	Rural Health Centre
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transition
U5	Under 5 children
UNICEF	United Nations Children Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WHZ	Weight-for-Height z-score
GAM	Global Acute Malnutrition
SAM	Severe Acute Malnutrition

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EXECUTIVE SUMMARY

In 2010, Pakistan was hit by the worst floods in living memory. 18 million people were affected, with more than 1,500 dying, and 14 million were in need of direct assistance. The National Nutrition Survey revealed that 38% of households in Sindh are food insecure with moderate hunger and 16.8% with severe hunger. In lower Sindh, Global Acute Malnutrition (GAM) rates were critically high (above WHO emergency thresholds of 15%) even before floods hit the province. FAN survey in October/November 2010 showed that 23% of children in northern Sindh and 21% of children in southern Sindh were acutely malnourished which indicates a critical nutrition situation.

ACF intervention areas are located in Thatta and Dadu District of Southern Sindh Province. To develop its understanding of the nutrition situation in the intervention areas and its underlying causal factors, ACF carried out a Nutrition Causal Analysis (NCA) study in its PEFSA and CIDA/EU intervention areas based on a draft methodology developed by ACF France and the results of field tests in Bangladesh, Zimbabwe and South Sudan.

Malnutrition is one of the most important health and welfare problems among infants and young children in Sindh Province, resulting in serious health and economic consequences for both the individual and the family. Based on these and other related findings, this study arrives at the following conclusions to improve children nutritional status in the areas.

- In total 787 children aged between 6 and 59 months were surveyed and the prevalence of global acute malnutrition was estimated at 12.2 % (10.1-14.7 95% C.I.), with the prevalence of severe acute malnutrition estimated at 3.4 % (2.4 -4.9 95% C.I.). Although the magnitude of wasting decreases in comparison with earlier surveys, the overall nutritional status of children under five years is classified as serious considering the presence of aggravating factors such as poor child care practices, high levels of childhood morbidity and acute water shortage.

- Overall, this study has unveiled knowledge on appropriate feeding practice such as importance of colostrum and frequent and more breastfeeding during and after child illness and access to adequate potable water are the principal risk factors that brought short-term nutritional deprivation (wasting) among under-five children in the study area

- A range of socio-economic, health and child care and feeding practices were found to influence the nutritional status of children in the area.

    - Lack of alternative income source at household level negatively affect the nutritional status of children

    - Breastfeeding is universal in the area. But continuous and frequenct breastfeeding during and after illness is not well practiced.

    - Inappropriate child feeding practices such as late introduction of complementary foods and failure to feed children more often (poor child

dietary diversity) are conspicuous threats to the nutritional status of children in the area

- Lack of knowledge on duration of exclusive breastfeeding, signs of malnutrition and prevention of diarrhea significantly contribute to high incidence of wasting among under-five children in the survey area.
- In most cases, as the types of food offered to children are of poor quality (mostly cereal sources) which are deficient in quality protein is also other area of concern that can exacerbate the existing childhood malnutrition and needs the due attention.
- Incidence of illness such as fever, whooping cough and diarrhea are significantly detrimental to short-term nutritional status (wasting) of children in the study area.
- This study led to the realization that poor household hygiene and sanitation practices such not using soap/ashes and non-treatment of drinking water are some of the areas of concern that needs appropriate intervention as these factors have significantly affect the nutrition status of children.
- The health and nutrition education activity was inadequate to address the issue of malnutrition in the districts.

In general based on the survey results, this study led to the conclusion that an integrated multi-sectoral approach is required by non-governmental groups, community and government to increase efforts to improve nutrition, health and food insecurity problems of the study communities. Nutrition education and awareness creation on appropriate feeding practice through community-based nutrition programs, promotion of hygiene and environmental sanitation, access to adequate potable water, income generating activities and sound development strategies and policies on off farm activities are critical to accelerate improvement in children nutritional status in the area.

The following are specific recommendations:-

1. *Based on the anthropometric findings there is a need to strengthen the therapeutic and supplementary feeding programme in place*
2. *Support initiatives that enhance the own production of nutritious food and increase the resilience through the diversification of income, like alternative income generating opportunities within the province*
3. *Strengthen water, sanitation and hygiene (WASH) programming.*
4. *There is an urgent need to strengthen linkages amongst the various ACF programmes affecting nutrition.*

5. *Strengthen the capacity of the health system through technical, logistical and financial support to implement the nutrition programme.*
6. *Promotion of family planning programme.*
7. *Enhancing dietary diversification:.*
8. *Provision of sustained nutrition education.*
9. *Strengthen advocacy, social mobilization and program communication.*
10. *Strengthen nutrition information system.*
11. *Improving the nutritional status of mother's.*

1. INTRODUCTION

1.1. Context

Malnutrition

In Sindh, Global Acute Malnutrition (GAM) rates were critically high even before the 2011 floods. The Flood Affected Nutrition Survey (FANS) conducted in November 2010 showed that 23% and 21 % of children in Northern Sindh and Southern Sindh, respectively, were acutely malnourished (Table 1).

Table 1.1: Prevalence of malnutrition in Sindh Province

Indicators	North Sindh	South Sindh
Global Acute Malnutrition (<-2 z-score and/or oedema)	22.9 % (19.0 – 27.4 95% C.I.)	21.2 % (17.3 – 25.6 95% C.I.)
Severe Acute malnutrition (<-3 z-score and/or oedema)	6.1 % (3.9 – 9.3 95% C.I.)	2.9 % (1.7 – 5.1 95% C.I.)
Chronic Malnutrition (<-2 z-score)	53.9 % (46.2 – 61.5 95% C.I.)	51.8 % (44.5 – 59.0 95% C.I.)
Child Morbidity	54.2% (45.8 – 62.7 95% CI)	42.8% (33.5 – 52.1 95% CI)
Maternal malnutrition (Moderate Malnutrition)	11.2 % (7.1 – 15.3 95% C.I.)	10.1% (5.1-15.1 95% CI)
Maternal malnutrition (Severe Malnutrition)	1.9 % (0.1- 3.6 95% C.I.)	0 % (0.0- 0.0 95% CI)

Source: FAN survey October 29th - November 4th, 2010

The draft report of the National Nutrition Survey (NNS 2011)[1] showed that Sindh had one of the highest rates of malnutrition in the country (Table 2) which indicates a critical nutrition situation.

Table 1.2: Nutritional status of under five year children

Indicators	NNS 2011		NNS 2001-2	
	Country	Sindh	Country	Sindh
Stunting	43.7	49.8	41.6	49.2
Wasting	15.1	17.5	14.3	21.3
Underweight	31.5	40.5	31.5	49

Source: Draft report NNS 2011

General livelihoods

Before 2007 flood, 65.5% of HHs depended on their own production to accede to food, followed by 34.5 % of HHs that purchased it in the markets and 0.5% of HHs that depended gifts or remittances (ACF, 2007 a). Local village markets are not much used because the availability is low and prices are high. 96% of households prefer to go to markets in towns like Shahdadkot,

[1] Final report of National Nutrition Survey 2011 is still pending.

Warah, K.N. Shah, and Johi if they need to purchase food (ACF, 2007 a). In flood affected areas, accessibility to food could be a problem even when food is available in the markets. The draft NNS 2011 report shows that Sindh has the lowest index of food security (28.2 %) (National figure is 41.9 %). The situation can only be expected to have gotten worse with the onset of 2011 floods and the resulting loss of property, food stocks and the damage to standing crops (GOP, Aga Khan University and UNICEF, 2011). Livelihoods of Sindh especially in coastal areas like Thatta and Badin are constantly under threat of a number of factors like recurring natural disasters, decreased flow of fresh water to the Indus delta, increase in water salinity, inability of infrastructure to drain off storm water, and inequities in land and water distribution (World Bank and Government of Sindh 2005). 96 % of the households listed "food" as the first item that they would purchase when they have cash in hand while the main source of the cash is "selling products/produce from farm land" (44 % of the total) and "casual labor wages" (44 % of the total). 12 % of the population has diversified sources of income (ACF-Pakistan, 2009). Problems faced by the farmers are "seed" as the number one followed by fertilizer, salty soils, pesticides, seeds storage and the marketing of basic products. Three most frequent coping mechanisms are limiting food portion, relying on less preferred and less expensive food, and buying on credit (ACF-Pakistan, 2009).

Cyclical natural disaster

Sindh Province faces recurrent natural disasters like flood and cyclone. Flood of 2010 and 2011 were major in last decade.

Floods in July/August 2010

Across the country floods affected the lives of over 18 million people, washing away communities and livelihoods, and forcing millions to flee from their homes. The crisis took the lives of a confirmed 1,980 people and left an estimated 14 million in need of humanitarian assistance (OCHA, 28 July 2010). According to the FAN survey 2010, Sindh was the worst affected province followed by Punjab, Khyber Pakhtunkhwa, and Balochistan. As of 2010 December 14th, the Government of Sindh reported that more than 7,300,000 people were affected and 876,000 houses were damaged. The number of people who had to leave to Government relief camps was 1,816,000. Twelve thousand villages and 2,611,305 acres of crops were affected. Thatta and Dadu were included among the eight severely affected districts, and in addition, there were nine moderately affected districts. The humanitarian response was organized through the Clusters approach and was composed of relief and early recovery interventions. The types of support provided to the affected population are: 1) **Emergency relief**, **shelter and winter preparedness, food aid, food security and agriculture -** food-for-work, supplementary feeding and school feeding programs and agriculture inputs were provided, and government also provided Watan cards allowing households to withdraw 20,000 PKR; 2) **WASH -** hygiene interventions and NFI distributions were provided and the WHO conducted water testing to follow water quality; 3) **Health - ARI,** skin disease, acute diarrhea, suspected malaria, bloody diarrhea, and unexplained fever were major health problems. Dengue cases were also reported in the province. Training sessions were organized by the

health cluster on dengue case management and nursing care; 4) **Nutrition – in South Sindh,** implemented by OTPs and SFPs covering 170 sites that provide emergency nutrition services. A total of 44,452 children aged 6 to 59 months old were screened for acute malnutrition: 3,884 detected as severely malnourished and 7,672 as moderately malnourished. These children were admitted in OTPs and SFP depending on their status. Also, 3,085 pregnant and lactating women were registered. **In Northern Sindh**, a total of 9,215 severely malnourished and 17,062 moderately malnourished children were admitted to nutrition programs from the end of September, 2010 to January 4, 2011 (GOS, UNICEF and ACF, 2010).

2011 flood

The Central Emergency Response Fund (CERF) has allocated US$17.6 million **(**PKR 1.54 billion) to provide water, food, shelter and healthcare to thousands of families devastated by floods in Pakistan (OCHA New York, 7 October 2011). According to a recently completed joint UN-Government Multi – Sector Needs Assessments (MSNA) 2011-Pakistan, in strata 4[2] the four top priorities of communities are housing, health, education and clean water in descending order. According to MSNA, more than five million people are in need of humanitarian assistance in Sindh and Balochistan. In addition to that, 4.3 million people are food-insecure - 2.2 million people severely food-insecure and 2.1 million people moderately food-insecure - in the flood-affected areas of Sindh and Balochistan. Access to safe drinking water and sanitation facilities remains a critical issue. Findings indicate that the floods reduced access to piped drinking water among the affected people and increased the number of people relying on unprotected and untreated sources of water and open defecation (OCHA Pakistan, 24 November 2011 sitrep). According to UNICEF Pakistan update on 23 November 2011, overview situation of Sindh is as below:

- 4.8 million of people had been affected by the floods, of which 2.4 million are children and 1.2 million women,
- 57 % of affected villages were still flooded and expecting to take several weeks to clear,
- Most affected and in need of assistance were the poor (40 %), especially children (21 %) and women (17%),
- 46 % of the health facilities had been damaged by the floods,
- Breast feeding frequency was reduced from five to four times a day in flood-affected areas,
- Open pit latrine use decreased roughly by 10% and open defecation increased by 11-17 %, increasing exposure to disease,
- Over 733,000 children had been pushed out of school due to the impact of floods, and
- 60% of the schools had been damaged.

[2] There are four districts - Badin, Tando Allahyar, Tando Mohammand Khan and Thatta – in strata four.

An assessment conducted by the FAO to be used as a base of discussion in the Food Security Cluster[3] indicated that 80 percent of the people in the affected areas relied on agriculture as a source of food and income. The floods have destroyed over 880,000 hectares of crops. Millions of Pakistanis have lost their productive assets and livelihoods, especially farmers who have lost their current and future sources of food and income. For many communities, the crisis has compounded losses from the previous year's floods, which receded too late in many areas of Sindh to allow for planting of the Rabi (spring) wheat crop. Damage to irrigation was also a major concern as around 80percent of wheat planted in Sindh is irrigated. This was the second consecutive year in which floods had disrupted or destroyed significant amounts of the Kharif harvest and preparations for the Rabi 2011/ 12 crops were either delayed or not feasible.

In addition to the almost 79,000 dead livestock, around 5 million surviving animals had been directly affected. Surviving livestock remained without shelter, at heightened risk of disease and worm infestation from standing water, and without feed as a result of flooded pastures and destroyed feed stocks.

Food stock were completely destroyed or damaged by the floods, resulting in a very low food security level for the population in the short term. The level of damage that the floods caused to the agriculture and livestock, main livelihoods of the local population, highly affected their capacity of recovery rendering them potentially food and nutrition secure in the medium term.

Underlying causes of undernutrtion

According to FAN survey 2010, 51% HHs practiced open defecation. Of those who had access to a toilet, a majority (68%) used flush/pour flush toilet and 32% used pit latrines. More than half of the interviewed HHs did not dispose of proper child excreta and drops of children and livestock were identified dispersed everywhere around the houses and villages during field observations.

According to ACF pre and post KAP survey of WASH interventions in Thatta district, most people don't have the habit of using latrines, safe disposal of solid waste and other hygiene practices. Before ACF´s intervention, 63% people used tube wells with hand pump for water which was increased to 98 % after the intervention. Also, before interventions, 68 % HHs washed hands only with water, and after that, 87 % HHs washed hands with soap. Open defecation is one of main causes why diarrhea and gestroenteritis spread in epidemics in the villages. Before the ACF´s intervention, 29 % HHs burnt and disposed their waste while the disposal increased to 69 % after hygiene education. Diarrhea was reduced from 48 % to 27 % after ACF interventions (ACF, 2011a).

[3] Mollet, M., 2011 flood effects at household level of some of the affected districts in Sindh and Balochistan province, Pakistan, Working Document for the Food Security Cluster, FAO, November 2011

ACF conducted different surveys in different area which findings are given in Table 4. From the analysis of the different nutrition surveys conducted in Sindh, it can be concluded that no significant progress was achieved in the last 10 years in reducing the prevalence of undernutrition in Sindh.

Table 1.4: Prevalence of undernutrition in selected Talukas of Dadu and Thatta

Year of study	District and Talukas	Prevalence of undernutrition (%)			
		GAM	SAM	Stunting	Under weight
2011 Nov ACF	Mirpur Bathoro (Thatta)	12	1.9	41.5	32.9
2011 October ACF	KN Shah (Dadu)	19.1	4.6	51.3	46.2
	Mehar (Dadu)	19.9	5.9	54.1	52.6
2008 June ACF	Dadu district average	22.7	3.7	-	-
2007 Nov ACF	Dadu district average	17.8	3.2	-	-

Based on the above facts, a summary of underlying factors for undernutrition is listed below:

- Poor household access to sufficient food,
- Poor household access to safe food and nutritious food - poor household access to diversified nutritious food, food is monotonous, normal food is being provided to children dominated by carbohydrates and poor in vegetable and fruits (micronutrients) and protein as per the requirement of children (U5),
- Low awareness of PLWs regarding the antenatal care, breastfeeding practices, complimentary feed quality and quantity selection.
- Inadequate child care practices - care of children and lactating and pregnant mother are not in their knowledge and priorities, grandmother plays vital and influential role,
- Maternal and child health (MCH) care is poor and traditional practices and social taboos are dominant,
- Poor hygiene and sanitation knowledge, attitudes and practices – basic awareness on health, hygiene and nutrition - is strongly lacking, open defecation and throwing of garbage in open spaces is common practice. Similarly, personal, domestic and food hygiene are poor,
- Poor potable water quality – sources of potable water are boreholes, canals and ponds; the water from canals and ponds being often contaminated and not safe to drink, and
- Poor access to health services and shortage of staff in health facilities.

1.2. Objectives

The main objective of the NCA is to identify and understand the causes of acute malnutrition in the study area in order to improve advocacy and design of appropriate and relevant programs.
Specific objectives of the study are as below:

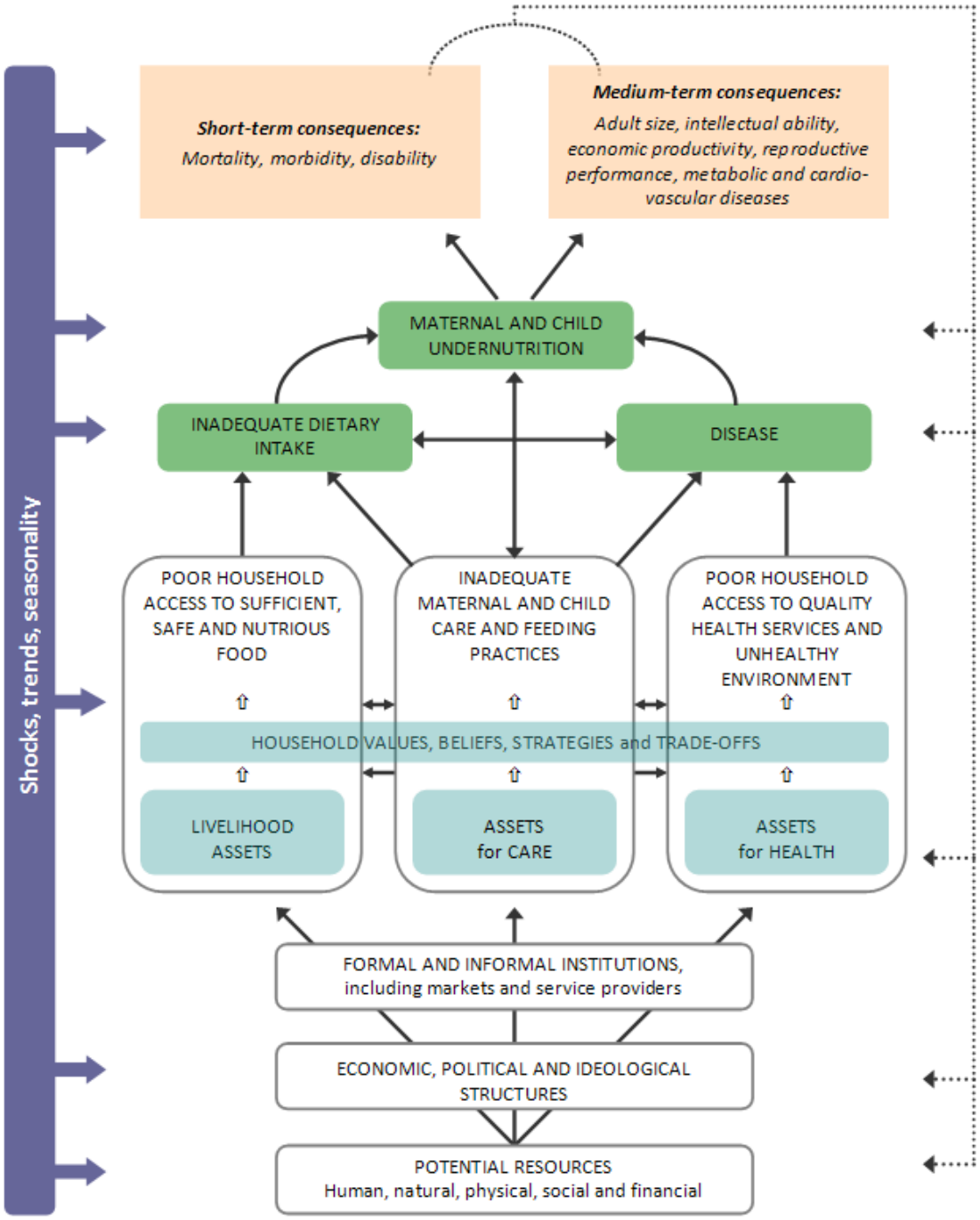
- To estimate the prevalence of acute malnutrition among children aged 6-59 months (65-110 cm height/length)

- Identify and rank the main risk factors and causal pathways of undernutrition in the study area and
- Contribute to a broader understanding of the underlying causes of acute malnutrition among key stakeholders through the dissemination of the study report and the delivery of a workshop sharing major study findings.

1.3. The nutrition causal framework as study framework

A causality framework serves as a guide in assessing and analyzing the causes of the nutrition problem and helps in identifying the most appropriate mixture of actions. The framework shows that causes of malnutrition are multisectoral, embracing food, health and caring practices. They are also classified as immediate, underlying, and basic, whereby factors at one level influence other levels. In this model, malnutrition is viewed as one important manifestation of a larger development problem that reaches across multiple sectors and social, political, economic, and cultural institutions. The conceptual framework for the causes of child malnutrition was used in the NCA study to facilitate a logical assessment and analysis of the causes of malnutrition in Sindh Province, Pakistan.

Figure 1: NCA study framework (based on UNICEF conceptual framework on the causes of malnutrition)



2. METHODOLOGY

2.1. Rationale for selecting Dadu and Thatta

In 2010, Pakistan was hit by the worst floods in living memory. 18 million people were affected, with more than 1,500 dying, and 14 million were in need of direct assistance. The National Nutrition Survey revealed that 38% of households in Sindh are food insecure with moderate hunger and 16.8% with severe hunger. In lower Sindh, Global Acute Malnutrition (GAM) rates were critically high (above WHO emergency thresholds of 15%) even before floods hit the province. FAN survey in October/November 2010 showed that 23% of children in northern Sindh and 21% of children in southern Sindh were acutely malnourished which indicates a critical nutrition situation.

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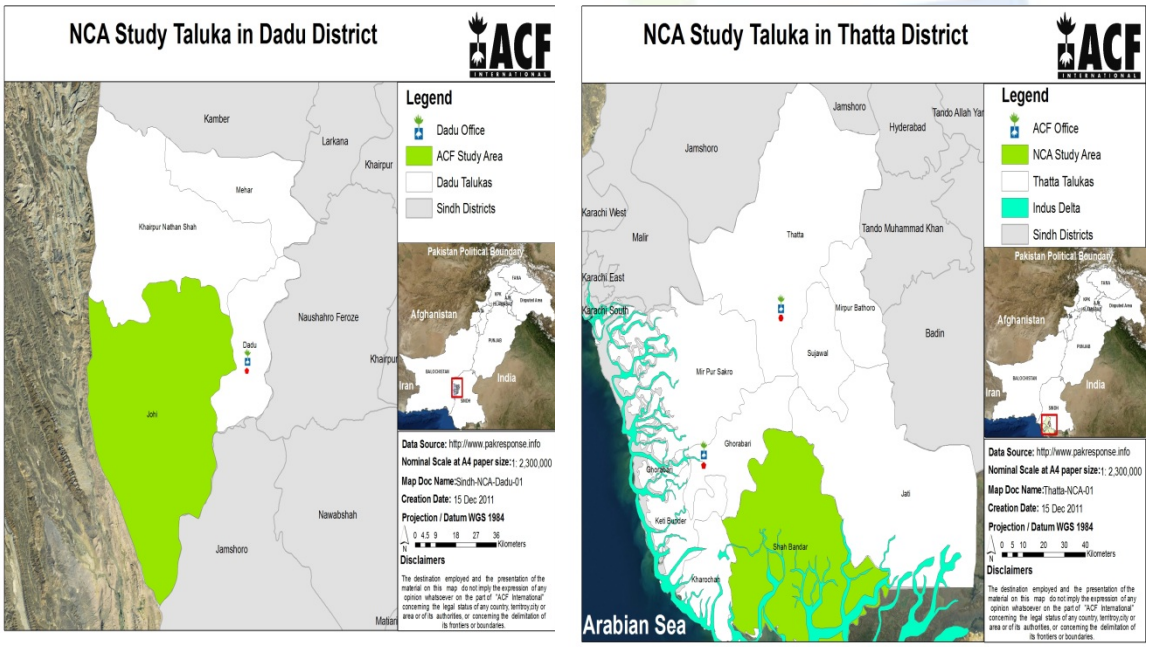
2.2. Location and population of study area

The study was conducted in Johi Taluka of Dadu district and Shah Bunder Taluka of Thatta Districts, Sindh Province.

Figure 2: Map of the study area



Johi is subdivided in 10 Unions Councils, while Shah Bunder, in five. According to 1998 census, total population for Johi and Shah Bunder is 207, 383 and 100, 575 respectively (http://www.districtthatta.gos.pk/TalukaAdministration.htm).

2.3. Study design

The study design was cross-sectional in nature and followed the fourteen key steps in conducting SMART anthropometric surveys.

2.4. Sample-size

Sampling method for the NCA survey in Sindh selected using probability random sampling techniques in order to make sample size representative of the survey population. The NCA survey area selected Thatta and Dadu districts based on secondary information of higher malnutrition prevalence among different vulnerable groups and the households with children <5 years in survey area. The calculation of sample size for the survey is performed based on the statistical formula mentioned below:

$$n = \frac{Z^2 \; p \; q \; N}{e^2 \; (N-1) + Z^2 \; p \; q}$$

Here,

n = sample size
N = survey population (15276; childern[4] <5)
Z = standard distribution of reliability desired (Z-score corresponding to the degree of confidence set at 1.96 corresponding to a confidence level of α =95%)
p = probability of selecting a sampling unit (0.5)
q = probability of not selecting the sampling unit (q = 1- p = 0.5)
e = degree of accuracy/margin of error (0.05, precision level)

Thus, estimated base sample size, n = 375

Design effect

The design effect provides a correction for the loss of sampling efficiency resulting from the use of cluster sampling instead of random sampling. It may be thought of as the factor by which the sample size for cluster (Taluka/UC/Village) sample would have to be increased in order to produce survey estimates with the same precision level as a random sample. The magnitude of design effect depends upon mainly two factors: i) the degree of similarity or homogeneity of sampling units (HHs) within the clusters, ii) the number of households units to be taken from

[4] children <5 population is 13.4 % according to Pakistan demographic and household survey (DHS) 2007

each cluster. The design effect (D) is assumed to be 2.0 for the Sindh NCA survey based on cluster-sampling methodology.

Therefore, considering design effect the sample size, n = 375 × D = 375 × 2.0 = 750

Sample Contingency

In order to ensure that target sample size for the survey are reached it required contingency. Allowances such as non-responses, recording errors, etc. during data collection are usually happen. Therefore, the sample is further increased by 5% to account for contingencies such as non-response, calculation or recording errors etc.

The sample size for NCA HHs survey, n + 5% = 750 × 1.05 = **787** (approx)

2.5. Sampling Procedure

2.5.1. Selection of clusters

Clusters were selected using the probability proportional to population size (PPS) methodology. After obtaining the complete list of all villages and their respective populations, clusters were selected using systematic random procedure by calculating the sample interval (using the cumulative total population), a random number was drawn between one and the sampling interval for the assignment of the first cluster, and using the sampling interval for assignment of all other clusters. The clusters with their respective population figures were entered into the SMART software and the computer automatically assigned the required number of clusters. No replacement clusters were considered as all inaccessible clusters were removed during planning and no selected cluster was found inaccessible due to any reasons beyond the scope of the survey team. Estimated sample is distributed among clusters according proportion to size is the following.

District		Union Council (UC)		Village	
Name	**Sample**	**Name**	**Sample**	**Name**	**Sample**
Thatta	302	Ladiyoon	55	-Haji Shafi Muhammad Jat -Bachal Chandio -Rabdino Mallah	15 20 20
		Jungo Jalbani	95	-Faqir Abdullah Mandrio -Haji Siddiq Jat (Faqeerani) -Rajan Thaheem -Haji Usman Jat (Gianch) -Haji Ali Muhammad Jat	20 20 20 15 20
		Doulat Purr	37	-Saleh Mallah -Haji Allah Din Mehandro	20 17
		Chouhar jamali	45	-Nawab Rind	15

District		Union Council (UC)		Village	
Name	Sample	Name	Sample	Name	Sample
				-Mallah Mohalla Near RHC -Near post Guard	15 15
		Goongani	70	-Allah Dad Solangi -Suhno Khan Jatt -Aali Baran -Allah Dino Solangi	20 15 20 15
Dadu	485	Kamal Khan	54	-Jumo Khan Laghari -Allah Rakhio Channo - Sukhio Channa	18 18 18
		Phulji Village	47	-Adam Panhwar -Fakir Mohammad Jamali -Ahmed Babar	15 17 15
		Bahawalpur	46	-Bajhi Khan Lund -Assam Bux Jatoi -Mubarak Faqir Gopang	15 15 16
		Pat Gul Mohammad	38	-Haji Baharo Laghari -Ghulam Haider Jamali	20 18
		Drigh Bala	52	-Faiz Mohammad Dadani -Sher Mohammad Babar -Bachal Laghari	18 18 16
		Tando Rahim Khan	94	-Chhinni -Fazul Jamali -Paryo Khan Jamali -Allah Dito jamali - Paryal Jamali	20 18 18 20 18
		Torr	80	-Dhani Bux Shahani -Torr -Barri -Jalab Dero	22 22 18 18
		Sawaro	74	-Kando Babar -Fatih Mohammad Birohi -Qasim Rodenani -Mohammad Khan Rodenani	18 18 20 18

2.5.2. Selection of households and Children

The survey teams visited the selected cluster location and met village leaders. The team leader explained the purpose of the survey and survey procedures. After obtaining the initial permission of village leaders, participation from each household was requested. Five hundred and seventy-two households with children under five participated within the identified clusters.

After the cluster location was identified, the team leader walked the boundary of the cluster with the community leader. The total numbers of households were divided by the number of households required for providing the sampling interval. The team leader then identified each selected household and after obtaining initial consent from a household member marked the household with a board marker. Teams attempted to collect data from 20 households[5] per cluster. In case desired sample HHs no. (with child <5) not available in a village, the adjacent village was selected. All chosen households were selected to answer the household questions if they contained a child 6–59 months of age (i.e., the household excluded if there was no child <5). If household members were not present during the survey, the team revisited the household at least three times in an effort to interview and measure the eligible household members, unless security or logistical constraints prohibited the amount of time spent in a cluster. In situations where the members of a household had departed permanently or were not expected to return before the survey team had to leave the cluster, that particular household was skipped and not replaced. In households with one or more eligible children age between 6-59 months old, the index child identified by lottery method, and the related questions focused to the index child.

2.6. Recruitment and training of enumerators

2.6.1. Recruitment

ACF human resources in Thatta and Dadu guiding the whole recruitment process and identified candidates with good credentials for examination. After the human resource made announcement for the position of field assistants and received the CV of the candidates, interviews were conducted to select 36 data collectors (each of the six teams would have 1 team leader and five data collectors). The recruitment criteria was based on applicants' previous experience in similar field surveys, completion of secondary level of school education, knowledge of Sindh and English language, physical fitness (due to long walking distances during data collection), good character, and preferably those who have lived in the area for at least two years.

2.6.2. Training

Three days (*from January 23rd to 25th, 2012*) of training was provided to the selected enumerators by the NCA survey manager. For the first two days, the group was trained on the theory sessions such as definition of malnutrition, causes, classification and UNICEF framework, and basic concepts of sampling methodology, that was followed by a practical exercise on the important nutrition data collection procedures, the survey methodology of anthropometric measurement techniques, recognition of the signs and symptoms of malnutrition including nutritional oedema, how to identify selected households and interview techniques, how to fill

[5] A household was defined as persons routinely sharing food from the same cooking pot and living in the same compound or physical location. Members of a household may not necessarily be relatives by blood or marriage. A polygamous family living and eating together was considered to be one household.

questionnaire, complete interviewing households, edit questionnaires, avoid/minimize errors and how to compile the data files. As a means to verify anthropometric skills of enumerators, anthropometric standardization test was carried out during the third day of the training as the main purpose is qualifying measurers. Ten children were measured twice by a supervisor and each of the 12 enumerators. The measurement values were entered into the training SMART soft ware to check the accuracy and precision of each trainee. Extra training and support was given based on the scores attained by each enumerator during the standardization test. A piloting survey was also conducted at the end of the training day. Pre-testing was aimed at evaluating the skills, efficiency and performance of enumerators in addition to the appropriateness and suitability of the questionnaires. The pre-testing was also taken as an opportunity to enhance hands on experience of the enumerators including demonstration of children with oedema, before the actual data collection. The results of the pre-test were discussed by the enumerators and the NCA survey manager and relevant adjustments was made when necessary. Guidance and counseling was given to the enumerators during and after the pre-testing exercise. Team leaders' final selection was based on merit, commitment and performance shown during training.

2.6.3. Survey team composition

Six teams were trained for the survey and each team consisted of 5 members - two male and two female measurers and interviewers and one team leader. Females collected information from the mothers and conducted weight and height measurements of the children and women. Male members carried the instruments, arranged and helped in anthropometric measurements and conducted the market key informant's interviews.

2.7. Data collection tools/survey instruments

The survey instruments used for the study include questionnaire and anthropometric measurement equipment such as height length measuring board and weighing scales each instrument is briefly described in the following sections.

2.7.1. Questionnaire

A per-tested structured questionnaire was used to collect relevant information on the factors associated with child malnutrition in the study areas and a section in data sheet format was specifically integrated into the questionnaire to allow for recording of anthropometric measurement data. The household questionnaire contained standard questions on the following 7 sections:-

- Household composition
- Breastfeeding and complementary feeding for index child
- Immunization
- Childhood illness and management
- Health facility

- Food security and livelihood
- Water, sanitation and hygiene

2.7.2. Weighing and Measuring Equipment

Anthropometrics measurements consisting of weight and height were taken from the study subjects together with date of birth and their sex. The height/ length of the study children was measured using standard length/height boards designed to measure children under 2 years of age lying down (recumbent) and older children standing up whereas, weight was measured using 25kg salter scales; accuracy +/-100g. All the survey equipments were portable and durable.

2.7.3. Interviewer field materials

The checklist below includes the equipment and materials interviewers have had with them in the field.

- Equipment bag
- List of assigned clusters and their addresses (location)
- Pre-numbered households questionnaires
- Spare questionnaires
- Water proof envelopes for blank and completed questionnaires
- Salter weighing scale
- Storage box for scales
- Height /length measuring board
- Sliding head/foot pieces
- Clipboard
- Stapler and box of staples
- Pencils and pencil sharpener
- Eraser
- Pens
- Spare paper

2.8. Data collection methods[6]

2.8.1. Anthropometric measurements

Anthropometric measurements and oedema were measured to index children aged between 6 and 59 months.

Height/Length: Children's length was taken were measured lying horizontally on the height measuring board for children below two years or below 85 cm, while standing height was taken

[6] Data collection methods followed those outlined in the SMART guideline

for children aged two years and above. Height and length was measured using standard height boards. Before taking the height/length, caretakers were requested to take off shoes (if any) and heavy clothes from the selected children and stand in a plank fort position against the height board, on flat level surface. Height was recorded in the nearest 0.1cm.

Weight was measured by using salter hanging scales and recorded to the nearest 0.1kg. All subjects were weighed nude or nearly nude with adjustment made to control for light clothing.

Oedema was diagnosed by applying a moderate finger pressure just above the ankle on the inside of the leg where the shin bone is below the skin, or on the tops of the feet. If there is oedema, an impression remains for some time (at least a few seconds) where the oedema fluid has been pressed out of the tissue. The child was only be recorded as oedematous if both feet clearly had oedema. Any oedema diagnosed case were reported and verified by the survey team leader or supervisor.

2.8.2. Household Questionnaire

Household composition: Household information was collection on the care giver relationship with index child, total number of family members, head of household, marital status of head of HH, relationship of HH to index child, occupation and education of caregiver.

Breastfeeding and complementary feeding for index child: Breastfeeding status, initiation of breastfeeding for the newborn, duration of exclusive breastfeeding, feeding colostrum, knowledge on the importance of colostrum, benefits of breastfeeding, the signs of malnutrition, babies first additional food with breast milk, and meal frequency for 6-23 months children and age of introduction of complementary foods acquired through recall of the mother.

Immunization: Immunization coverage was obtained only from child health card in order to avoid mothers' recall bias and obtain reliable and accurate information. BCG immunisation coverage was assessed among all among under-five children in the survey area by observing a scar on the left arm in addition to the child health card. Vitamin A supplementation coverage was asked by demonstrating the blue capsule and asking mothers whether their child had received this capsule in the six month period prior to the survey. This information may give some indication of the success of the immunization programme in reaching out to all population subgroups Additionally, information on immunization coverage from child card is important for the monitoring and evaluation of the immunization programme.

Childhood illness and management: Retrospective morbidity information was collected on selected illness (diarrhoea, fever, measles, cough or other) within a 14 day recall period. Morbidity information relies on the mothers' perception and memory of the child/children's illness and is therefore considered to be very subjective. The information on breastfeeding during illness, amount of liquid/solids offered during illness and treatment of diarrhea illness was collected through interview with mothers. Moreover, information on knowledge on the causes and prevention of diarrhea were collected from mothers'.

Health facility: Information on access to health services, mode of transport, distance of nearest health facility and satisfaction on the health service was assessed through recall of the mothers using the household questionnaire.

Food security and livelihood: Household dietary diversity score (HDDS) was employed to measure the food security status at the household level using the standard HDDS tool. Other food security and livelihood information that were collected included: type of housing, land ownership, distance to market, main source of staple food for the household, proportion of harvest kept for household consumption, source of income to purchase food and livestock ownership.

Water, sanitation and hygiene: The information on main source of drinking water during dry and rainy season, time to fetch water, water treatment practice, knowledge on water borne illnesses, hand washing practice, type of toilet facility and method of garbage disposal were all assessed through interviews with the mothers.

The household questionnaire used for this NCA is attached in Annex 3.

2.8.3. Focus Group Discussion

Discussion groups at the level of the community were done by the team leader or supervisor in each cluster. This interview has covered the information which complemented the information gathered through household questionnaire. A verbal consent was taken from participants prior to discussion. The survey team had full understanding of Urdu and local languages. Notes were taken in Urdu, transcription was done by the research team at the earliest and report has been written and translated into English.

The Focus Group Discussion guidelines are attached in Annex 4.

2.8.4. Stakeholders' consultation

ACF conducted a broad stakeholders' consultation at the initial phases of the study as well as after having finalized the first draft. The objective of these consultations was to receive feedback, at the first stage, on the methodology and tools to be used, as well as to build the causal pathway that would be the base of the survey. After the first draft was finalized, a second consultation was conducted with the objective of validating the results of the survey. The comments received on this round of consultation are integrated in the last version of the report.

The stakeholders' consulted along the survey are:
Shaista Jabeen, Nutrition Advisor, Oxfam GB
Wisal Muhammad, TL-EFSL, Oxfam GB
Milton Zhakata, EFSL PM, ACF

S. Senthilkumaran, FSL PM, ACF
Dr. Aftab Bhotti, Nutrition Coordinator, Save the Children
Arais A. Alemon, Program Manager, AIDF
Dr. Mashar Alan, Program Officer Nutrition, UNWFP
Adnan Ahmed, Manager MER, MDF
Eleonora Genovese, Child Survival and Development Specialist, UNICEF
Dr. Dureshewar, Nutrition Program Manager, Government of Sindh
Mr. Zekarias, Nutrition Specialist, UNICEF

Also, the methodology and objectives of the NCA in Pakistan was presented in the Nutrition Cluster Meeting conducted on November 30th, 2011 in Karachi, with attendance from representatives of UNICEF, WFP, Health Department of Sindh, SALBWS, IRP, PAVHNA, SRSP, PNHWH, WWVI, Hands, NDS, MNCH, Blessing Welfare, Help, Hope, WHO, Merlin and SACP.

2.9. Data quality control measures

Data quality control measures that were employed the data collection are discussed in the following sections

2.9.1. Ensuring accuracy of anthropometric measurements

Accuracy of measurements was achieved through good training and supervision by the NCA survey manager and team leaders during height and weight measurement. To avoid observer bias and assure validity of anthropometric measurements, two measurements were taken on the same child and were averaged. When the measurements were vastly different from each other the measurements were disregarded and the measuring was started again. Largest acceptable differences between repeated measurements are shown on table 3.1

Table 2.1: Largest acceptable differences between repeated measurements

Anthropometric measurement	largest acceptable difference
Weight	0.5kg
Height	1.0 cm

Source- Cogil, 2003

2.9.2. Standardization/calibration of instruments

Each weight scale was numbered and calibrated every morning prior to the field work with known weights to minimize instrument bias and to ensure the scales were sturdy tillable and accurate.

2.9.3. Cautious recruitment and thorough training of enumerators

For efficient and effective data collection, experienced enumerators were sought and employed. The fact that the interviewers' were female who had lived in the study area for at least three years contributed to better understanding between them and the interviewed mothers, hence more valid information. Thorough training was given to the enumerators to ensure quality in data collection. Enumerators' daily experiences and problems were reviewed at the end of data collection as part of quality control measures.

2.9.4. Reviewing of questionnaires

The questionnaires completed each day were cross-checked for anomaly daily. The NCA survey manager and team leaders examined the questionnaires in the field to check for completeness of data, consistency of answers and measurements obtained and for correct filling of the questions. Concurrent crosschecks of the data was also collected by interviewers was to be performed by team supervisors in a random sample of households. Any error which might be overlooked and mistakenly recorded was corrected. When the questionnaires were incomplete or the measurements or responses looked suspicious, the households were revisited.

2.9.5. Supervision

Constant supervision and monitoring of all field activities by the NCA survey manager and participating in some of the exercise like anthropometric measurement contributed to the collection of quality data. Finally procedures used to ensure quality data collection include progress review and by checklist, pre-testing of research tools, good training of field assistants and careful implementation of the study.

2.9.6. Data cleaning

Data cleaning and editing of the completed questionnaires was done by data analysis before data entry. Random check of the data entry of questionnaire (10%) was done by the data analysis using the Microsoft access programme to ensure that data had been entered correctly in to the computer frequencies were running to check for missing data, any error occurred during data entry and consistency of responses between questions and all the necessary correction were made. For key informant interviews time was taken in collecting the relevant data to explain the objective and the purpose of the study to reduce subjective biases in their responses.

2.10. Data analysis and interpretation

For data entry, databases and entry screens were developed using Microsoft Access. The entry screens employed range and consistency checks and skips to minimize entry of erroneous data. Special arrangements were made to enforce referential integrity of the database so that all data tables related to each other without problem. After completion of the entries the data

analysis cross-checked each other entry for quality assurance. Data cleaning was carried out in MS Access by sorting records to filter out extreme values and SQL queries to check logical errors.

2.10.1. Data analysis

For data analysis, the data tables were converted to SPSS version 16 and to ENA software for nutritional data analysis. Stepwise univariate, bivariate and multivariate analyses were done to link explanatory variables with acute malnutrition based on the analysis output from ENA for anthropometry analysis. The whole data analysis was done in three steps:

Firstly, standard tabulation and exploratory tests were done to obtain probability plots (stem-and-leaf plot) and to spot outliers and rectify errors. All the outliers were selected and filtered out before the data analysis. At the indices conversion stage, checks were made using the plausibility function of the ENA software. The descriptive statistics (chart, frequency tables, percentages and mean) including graphs were used to describe the general characteristics of the study population and households.

In the bivariate analysis, the chi-square test was employed to see the association between each of the independent variables under study and the nutritional status of children as measured by wasting, and p-values less than 0.05 are considered as significant. The chi-square bivariate analysis does not consider confounding effects; therefore, the net effects of each independent variable are estimated controlling other factors using the logistic regression multivariate analysis.

Finally, the multivariate analysis is employed to identify the determinants of wasting in children. This analysis focus on two outcomes of nutritional status for children; whether they are undernourished or not. Since the interest is in identifying children at risk of malnutrition, the dependent variables are coded as 1 if the child is undernourished and coded as 0 if not. The odds ratio, which is determined from the logistic regression coefficients, tells us the increased or decreased chance of malnutrition given a set level of the independent variable while controlling for the effects of the other variables in the model. Estimates of odds greater than 1.0 indicate that the risk of malnutrition is greater than that for the reference category. Estimates less than 1.0 indicate that the risk of malnutrition is less than that for the reference category of each variable.

2.10.2. Data interpretation

The interpretation of the prevalence of low anthropometry (<-2 SD) is based on the WHO classification presented in Table 2. This classification takes into account not only the prevalence of malnutrition, but also other aggravating factors. The classification of population malnutrition rates is intended to help interpret the seriousness of a situation by considering a variety of indicators, and consequently suggesting alert stages. The prevalence of low

anthropometry is provided based on z-scores (<-2 and <-3 SD), and by percent of median. A child with oedema was classified as SAM.

Table 2.2: Classification of malnutrition level

Indicators	Stage of alert
Global acute malnutrition prevalence> 20% **and/or**	
Severe acute malnutrition prevalence >=5%	
Global acute malnutrition prevalence 15-19% **and**	CRITICAL
Aggravating factors	
Global acute malnutrition prevalence 15-19%	
Global acute malnutrition prevalence 10-14% **and**	SERIOUS
Aggravating factors	
Global acute malnutrition prevalence 10-14%	
Global acute malnutrition prevalence 5-9% **and**	POOR
Aggravating factors	
Global acute malnutrition prevalence 2-9%	Typical for chronically food insecure population

2.10.3. Limitations to the analysis

Access and visa issues for the study practitioners in the target areas delayed the roll-out of the study and led to a smaller sample size than intended. The sample selected for the study was too small to allow the conduction of the bivariate analysis for Dadu and Thatta separately. As a consequence, the bivariate analysis was done on the joint sample, complementing the individual analysis with the results of the univariate analysis and the information gathered through FGDs and stakeholders interviews.

3. RESULTS

The result of the analysis is divided into two parts: first part presents the result from descriptive and univariate analysis and the second part present the results from bivariate and multivariate analysis.

3.1. Response rates

Mothers with children under five were the primary sources of information within the sampled households. A total of 787 households were selected for the survey, of which 98.1% (n=772) were mothers and 1.9% (n=15) were eligible care takers of the children used in this study.

3.2. Descriptive and univariate analysis

This section provides a descriptive summary of some demographic and socio-economic characteristics of the households that were sampled for the survey. Also, examined are housing characteristics, breastfeeding and complementary feeding practices, immunization and health status of children, such as incidence of illnesses and level of malnutrition for the districts. The information provided in this part is intended to facilitate interpretation of key findings.

3.2.1. Household composition

Information about the composition of household by sex of the head of the household and size of the household is presented in Table 4.1. As shown in Table 4.1, women head very low number of households in Sindh. The average household size was 6.65 persons, with the average number of members lower in Dadu district (6.43) than in Thatta district (7.01). Households with 10 or more members account for 10.7 percent of Dadu households, compared with 17.9 percent of Thatta households. Similarly, the proportion of two person households is higher in Thatta households (0.7 percent) than in Dadu households (0 percent).

Table 3.1: Household composition

Percent distribution of households by sex of head of household and by household size, according to place of residence, Pakistan

	Place of residence		
Characteristics	**Dadu district**	**Thatta district**	**Total**
Sex of household head			
Male >= 18 years	99.2	88.7	95.2
Female >= 18 years	0.8	11.3	4.8
Total	100	100	100
Number of usual family members			
2	0	0.7	0.3
3	8	8.3	8.1
4	14	13.6	13.9
5	20.2	11.6	16.9
6	16.5	12.9	15.1
7	12.6	14.6	13.3
8	10.5	9.6	10.2
9	7.4	10.9	8.8
10+	10.7	17.9	13.5
Number of households	485	302	787
Mean family size	6.43	7.01	6.65

Note: table is based on de jure family members (i.e., usual members)

3.2.2. Characteristics of household head

The background characteristics of the household heads' in both districts combined is presented in table 4.2. More than 99 percent of the heads of household were married or living in a formal union with a spouse. Only 0.5 percent of the household was divorced, while 0.2 percent was either single or living in an informal union (cohabitating).

At the time of the survey, the main occupation of the household heads' was daily wage labour (41.9 percent). Just over a quarter (26.6 percent) of them were farmers. The other occupation for generating household income includes: agricultural work in own land (11.6 percent), fishering (10.5 percent), driving (2.0 percent) and salary wage (1.5%).

Table 3.2: Background characteristics of household head

Percent distribution of household head by background characteristics, Sindh, Pakistan		
	Household head	
Background characteristics	Number	Percent
Marital status		
Married	781	99.2
Cohabitating (not married)	1	0.1
Widow or widower	4	0.5
Single	1	0.1
Occupation		
Agricultural work in own land	91	11.6
Daily Wage Labourer	330	41.9
Driver	16	2.0
Fisherman	83	10.5
Service/salaried wage	12	1.5
Farmer	209	26.6
Others*	46	5.8

*includes Teacher, Donkey/Animal cart, Share-cropper, Household work, unemployed, Beggar, Hawker, Small Trader

3.2.3. Education level of child caregivers'

In 98.1% of the households, the mothers' were the main caregivers of the child. The education level of the mothers' in both districts combined is presented in table 4.3. Illiteracy was the most common. Overall, the percentage of mothers' who completed an increasing number of school grades deceased steadily.

Table 3.3: Education level of caregivers'

Percent distribution of households by completed school years of the caregivers' by district, Sindh, Pakistan

	District		
School years	**Dadu**	**Thatta**	**Total**
No schooling	89.8	96.9	92.5
Some primary	6.4	0.3	4.1
Completed primary (1-5 grade)	2.9	1.7	2.5
Some secondary (6-8)	0.2	0.7	0.4
Completed secondary (9-12)	0.6	0	0.4
Completed university	0	0.3	0.1

3.2.4. Food security and livelihood

3.2.4.1. Main food source for the household

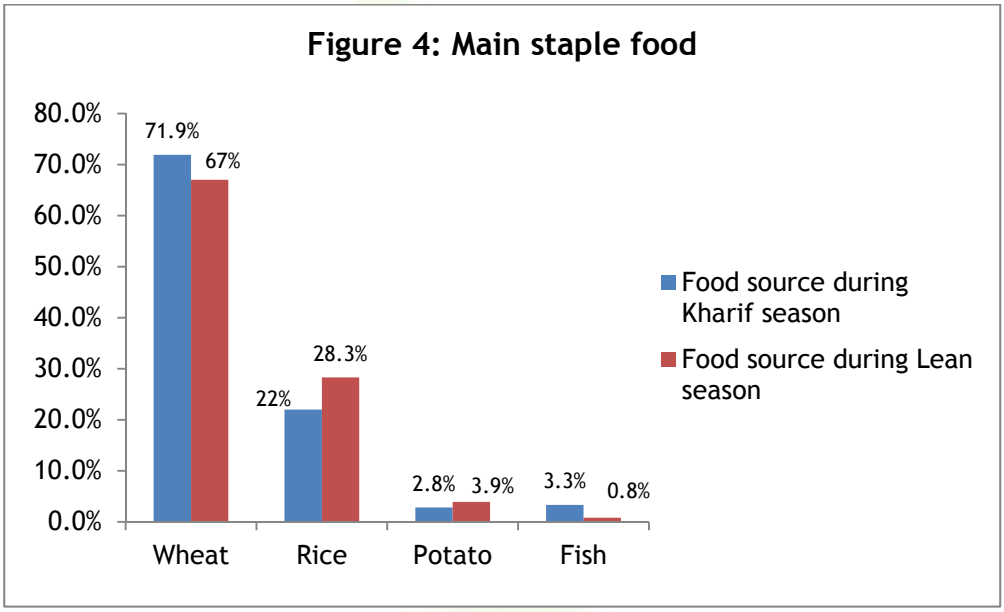
As illustrated on figure 3, the main sources of food for the majority of the households are the local market (69.3%) and own production (29.5%). This information illustrates that **purchasing power is a major factor** in ensuring adequate consumption for these households and quite a few households use their own food products throughout the year. By district, households in the Thatta district (88.4%) relied more on purchases as compared to the households in Dadu district (57.3%). Reliance on food aid/donation, shared production and borrowing is insignificant in the surveyed households. Only 1.3% of the sampled households reported receiving food aid or borrowing food as their main source of food throughout the year.

However, it must be noted that even when households do not *borrow food* they get cyclically indebted either to produce in their small plots or to buy food during the lean season. The cycle of indebtedness, which has been aggravated by the floods, had the double effect of wiping out capital, livestock and production, obliging the most vulnerable households to increase their indebtedness to satisfy their basic needs.

3.2.4.2. Main staple food for the household

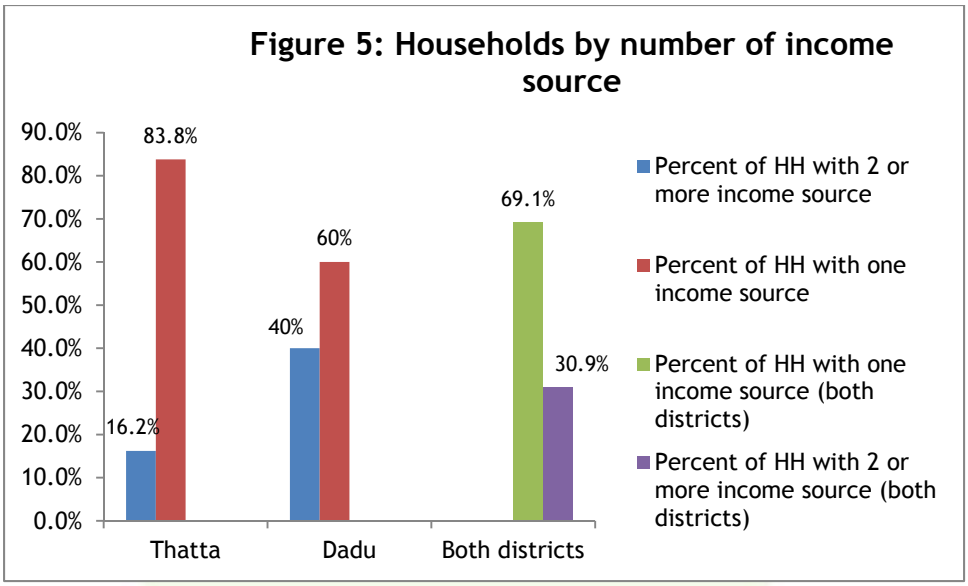
As depicted on figure 4, the main staple foods are wheat and rice that most of the communities depend on with wheat being the most important staple crop. Interestingly these are crops that

are considered both food and cash, reinforcing the fact that households rely strongly in the market.



3.2.4.3. Source of income

As shown on figure 5 below, the majority of households dependent majorly on a single income source (69.1%). Few of the sampled households (30.9%) had two or more income source. The percentage of households with two or more income sources in Thatta (16.2%) is significantly lower than Dadu (40%). Added to the fact that a higher percentage of households depends on purchase as main source of food for households, this indicates the level of vulnerability of the population, whose reduced number of sources of limited income and the dependency on the market remain highly at risk of external shocks and trends.

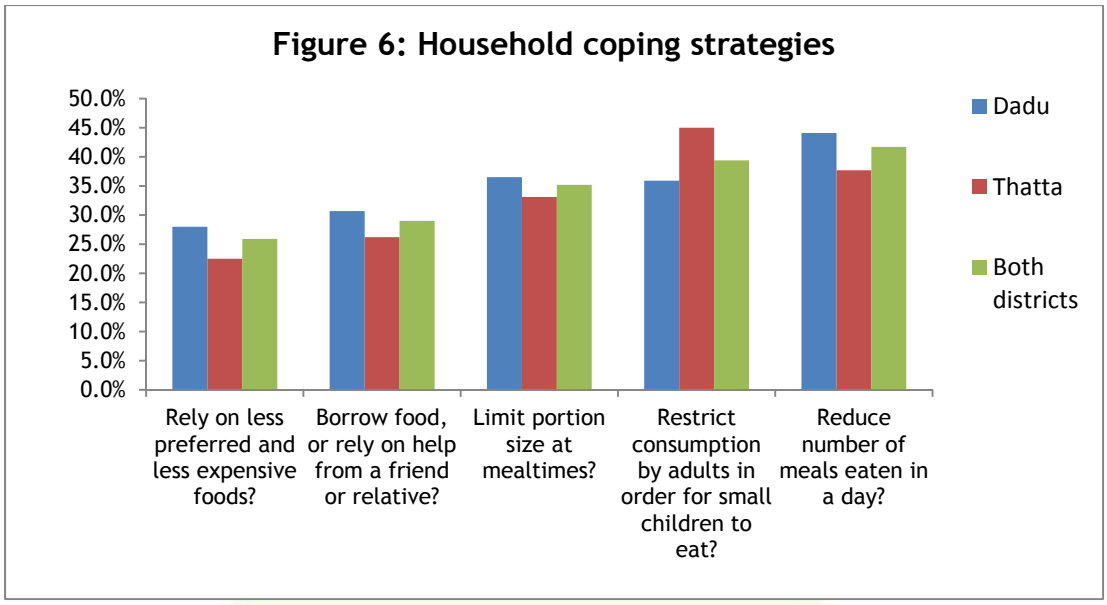


Major sources of income to purchase the main staple food are unskilled wage labour (35.2%), skilled wage labour (32.3%) and sale of agricultural products (13.4%) for both districts, while in Thatta, the household income sources also came from sale of fish (19.9%) and fishing products (3.7%). The dependence of majority of households on selling their labour indicates the general importance of wage labour earnings to the livelihoods of the population in the districts. In addition, the fact that the majority of the households depend more on casual labour within agriculture suggests the prevailing household food insecurity situation during the survey period, the growing period of the Rabi season.

3.2.4.4. Coping strategies

Figure 6 presents a list of coping strategies used by the surveyed households with in the seven days prior to the survey. Reducing number meals eaten in day is widely practiced (41.7%). Restricted consumption by adults is practiced by more than one-third of households across the surveyed districts (39.4). More than quarters (25.9%) have shifted their consumption to less preferred foods and borrowing is practiced by little less than one-third of households (29.0%). Limiting portion size at meal times is also widely practiced, with more than one third (35.2) reported reduced meal portion within the seven days prior to the survey.

These finding on coping strategy clearly indicate that the significant proportion of households did not have enough food or money to buy food in the past seven days prior to the survey date what reinforces the idea of the increased food insecurity due to the fact that the survey was conducted in the growing period of the Rabi season. The finding also illustrates the prevailing food insecurity situation in the households whose sources of income are constrained and whose home production is insufficient to meet consumption.



3.2.4.5. Land Ownership

Access to use of agricultural land is one of the necessary conditions of the food security system for the surveyed community. As shown in Table 3.4, Less than one-third of all households (30%) reported owning some land used for agriculture, of which more than two-third (69.5%), reported to have land with a size less than five acre. It is observed that the average land holding for the majority was small, indicating also a high inequality in the distribution. In addition to that, most of the small farmers have access to small cultivable plots through the sharecropping system, by which they pay back around 70% of the yields to the owner of the land. Since the study areas are one of the densely populated areas in the country, high population density might have reduced the land holdings to a size, which can hardly support a household. Therefore, a strong promotion of family planning should be one of the priority interventions to stop the steady population growth in the study areas. In addition, various income generating activities has to be designed to decrease pressure on land is also equally needed.

Table 3.4: Land ownership

Percent distribution of households by land ownership by district, Sindh, Pakistan

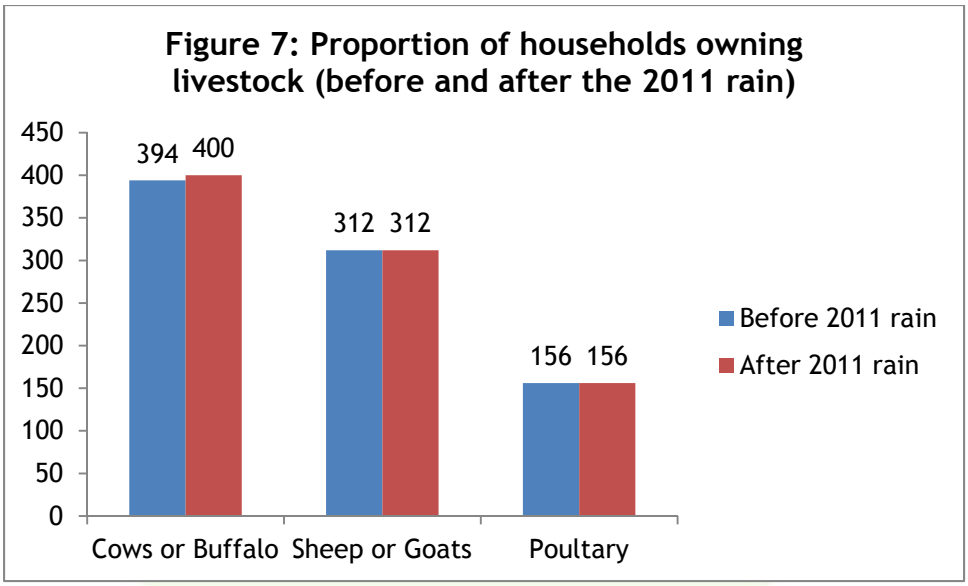
	District		
Land ownership	**Dadu**	**Thatta**	**Total**
Yes	38.4	16.6	30
No	61.6	83.4	70
Total land in acre			
1 – 5 acre	67.2	78.0	69.5
6 – 10 acre	21.5	14.0	19.9
11 – 15 acre	4.3	6.0	4.7
16 acre +	7.0	2.0	5.9

3.2.4.6. Food stocks and reserves

The vast majority (83.5%) of the surveyed households in the area have methods of ensuring storage of strategic grain reserves on-hand to buffer against the hunger/lean season when the price of food stuff especially staples are at their highest. The proportion of the harvest the households stored varied considerably (5 % to 100%). Among the households reported to have stored their harvest, the vast majority (12.5% of households) stored 50% of their harvest produce. More than a half (53.5%) of household reported to have own storage in the house. The household stocks/reserves during the last years lasted for an average of 4.7 months. Only 16.5% of households reported that they have no food stocks. Although the losses of the household storage system were not studied in this survey, consultation with farmers in the area indicated that the technologies available cause high post-harvesting losses to the households. In addition to that, the floods that hit the zone in 2010 and 2011 wiped out all the food reserves of the population, increasing their food security but also implying serious loss of capital. Farmers sell a substantial part of their production to pay back the loans acquired during the planting seasons.

3.2.4.7. Livestock ownership

62.5% of households reported owning at least one piece of livestock. Because of the limited access to land and the low agricultural yields, households rely on livestock as a direct source of food, savings and cash. Livestock represents 14% percent of households' income.



The 2011 rain did not cause a decrease in livestock assets among the populations. In fact, the number of households owning cows or buffalo increased after the 2011 rain. However, 2010 floods had already severely decreased the livestock in the affected areas. In Dadu, which is a semi-arid area which had been particularly hit by the drought of 2008, households had already lost a large portion of their stock of livelihoods.. Based on the results of the DLA conducted in 2010[7], livelihoods in Sindh could not recover from the 2010 floods. The floods of 2010 and 2011 affected a population that was already vulnerable, rendering them more at-risk.

3.2.4.8. Household Food Consumption and Dietary Diversity

Household food consumption and diversity was estimated by the 24 hour food consumption recall data. Household respondents were asked to recall what food items were consumed by members of their household in the previous 24 hours or the preceding day.

The 24-hour recall food frequency data shows that majority of the households (more than 97%) in both Thatta and Dadu districts consume staple[8] on a daily basis. More than half of the surveyed households (53.7%) consume around one source of protein[9] per day. The consumption of vegetables was less than once a day while the daily consumption of fruit was very less. Milk and milk products consumption was reported as quite high (70.5%) but this result should be taken with caution as milk in tea was also considered dairy consumption and culturally tea is drunk frequently.

Low consumption of specific food groups, especially fruits and meat, across all the survey areas is of concern. This has implications for development of micronutrient deficiencies.

[7] FAO, Detailed Livelihoods Assessment, January 2011
[8] Staple defined as rice or wheat
[9] Protein source defined as meat/fish, legumes, eggs

Table 3.5: Household food consumption (24 hour recall)

Percent distribution of households by type of food consumed by district, Sindh, January 2012

Food groups	District		
	Dadu	Thatta	Total
Cereals	95.3	100.0	97.1
White roots & tubers	43.7	38.7	41.8
Legumes, nuts and seeds	8.5	18.5	12.3
Dark green leafy vegetables	46.2	10.6	32.5
Vitamin A rich vegetables	23.3	5.3	16.4
Other vegetables	68.5	84.4	74.6
Oils & fats	69.3	83.4	74.7
Milk & milk products	75.1	63.2	70.5
Fish and sea food	11.5	43.4	23.8
Eggs	14.8	8.9	12.6
Organ of meat	0.8	0.7	0.8
Flesh meats	4.1	4.3	4.2
Vitamin 'A' rich fruit	4.5	1.0	3.2
Other fruits	1.6	0.3	1.1
Sweets	70.9	90.1	78.3
Spices, condiments & beverage	94.4	96.4	95.2
Infant formula	40.0	15.6	30.6

Household dietary diversity was assessed on the basis of 17 different food groups. See Table below for a profile of household diets by dietary diversity tercile in the assessed households.

Table 3.6: Profile of household diets by diversity tercile

	Lowest diversity (4-5 groups)	Medium diversity (6- 12 groups)	Highest diversity (13-17 groups)
1	**Cereals:** bread, rice noodles, biscuits, or any other foods made from rice, wheat and maize	**Cereals:** bread, rice noodles, biscuits, or any other foods made from rice, wheat and maize	**Cereals:** bread, rice noodles, biscuits, or any other foods made from rice, wheat and maize
2	**Other vegetables:** tomato, onion, egg plant, lady finger, bitter guard, bottle guard, etc	**Other vegetables:** tomato, onion, egg plant, lady finger, bitter guard, bottle guard, etc	**Other vegetables:** tomato, onion, egg plant, lady finger, bitter guard, bottle guard, etc
3	**Oils & fats:** oil, fat, or butter added in food or used for cooking.	**Oils & fats:** oil, fat, or butter added in food or used for cooking.	**Oils & fats:** oil, fat, or butter added in food or used for cooking.
4	**Sweets**: sugar, honey or cake, sweeted juices, jaggery foods.	**Sweets**: sugar, honey or cake, sweeted juices, jaggery foods.	**Sweets**: sugar, honey or cake, sweeted juices, jaggery foods.
5	**Spices, condiments & beverage:** condiments, coffee, tea	**Spices, condiments & beverage:** condiments, coffee, tea	**Spices, condiments & beverage:** condiments, coffee, tea
6		**Milk & milk products:** cheese, yogurt, milk or other milk products	**Milk & milk products:** cheese, yogurt, milk or other milk products
7		**White roots & tubers:** white potatoes, white yam, or other foods from root	**White roots & tubers:** white potatoes, white yam, or other foods from root
8		**Dark green leafy vegetables**	**Dark green leafy vegetables**
9		**Fish and sea food**	**Fish and sea food**
10		**Organ of meat:** liver, kidney, heart.	**Organ of meat:** liver, kidney, heart.
11		**Eggs**	**Eggs**
12		**Flesh meats:** beef, lamb, goat, chicken, duck, or any other meats	**Flesh meats:** beef, lamb, goat, chicken, duck, or any other meats
13		**Legumes, nuts and seeds:** beans, peas, lentils, or nuts and food prepare from these items	**Legumes, nuts and seeds:** beans, peas, lentils, or nuts and food prepare from these items
14			**Vitamin A rich vegetables:** pumpkin, carrot, sweat potato.
15			**Infant formula:** milk other than breast milk and milk and milk products
16			**Vitamin 'A' rich fruit:** mango, apricot, ripe papaya and fruit
17			**Other fruits:** including wild fruits and fruits juices made from these fruits.

A score of 1 was assigned to the food group if one or more items from that group had been consumed; and 0 if it had not. The resulting Household Dietary Diversity Score (HDDS) ranges up to a maximum of 17 points. Higher scores reflect greater diversity in the diet, and also tend to correlate with better quality diet and higher economic status.

HDDS indicated that the diet of the population is highly concentrated in the cereals locally produced[10]. Because the diet of the population depends highly on markets and at the same time most of the population's access to income is based on wage seasonal labour, their choice of the food to consume is done on the availability of cash. As a consequence, their diet is rather

[10] Because of the challenges faced in the translation of the food groups to Urdu, and the resulting lack of confidence in the data gathered in the field, the indicator of the HDDS was not calculated. However, some information gathered through the tool, cross verified with the FGDs, give rise to interesting indications of the composition of the data of the population.

monotonous. Wheat and rice are the main crops seasonally available in the area. They constitute the main dish for the vulnerable households, who complement them with cheap vegetables like potatoes and chili, also produced locally. Sources of nutrients, mainly Vitamin A and Iron, are rarely consumed in the area.

Livestock remain a main source of milk for the households. And especially in the coastal area of Thatta, fish is widely consumed within the families for whom fisheries is a main livelihoods.

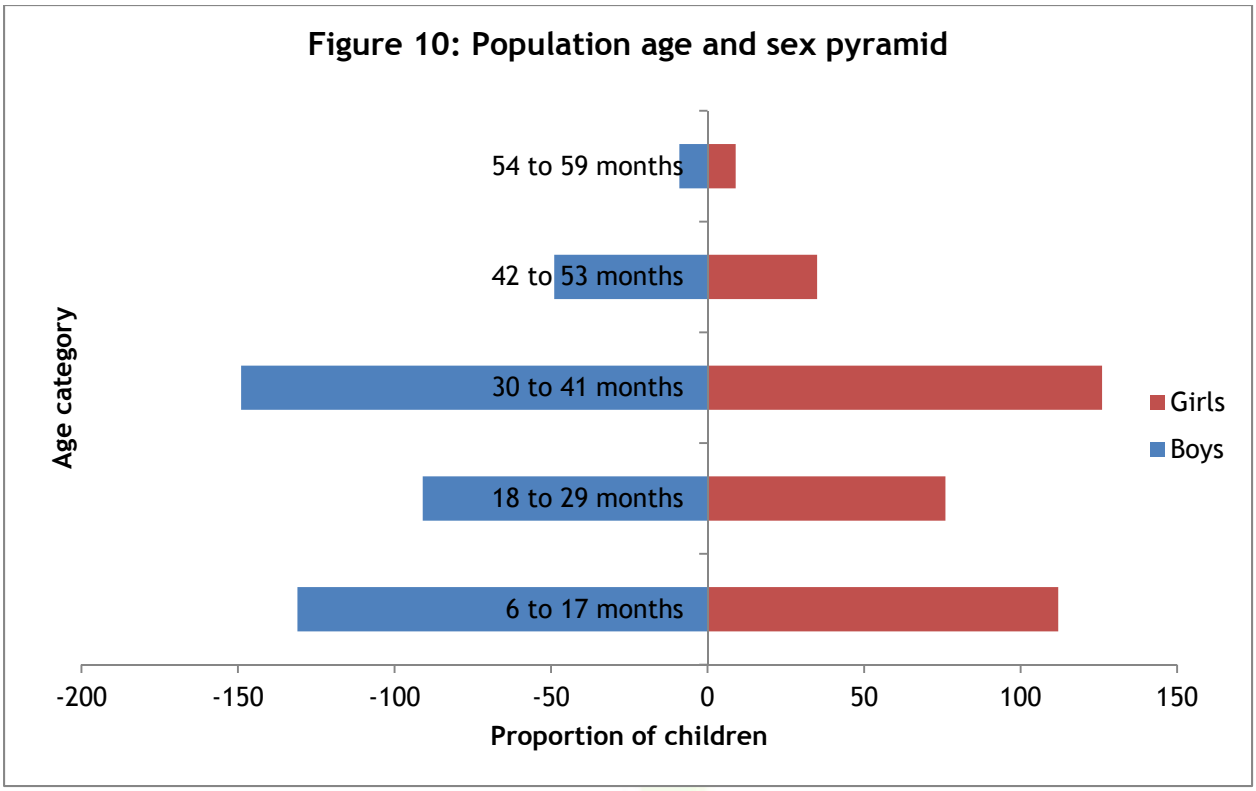
3.2.5. Anthropometric results

3.2.5.1. Age and sex composition of children in study

Table 3.7: Distribution of age and sex of sample (n=787)

Age	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17 months	131	53.9	112	46.1	243	30.9	1.2
18-29 months	91	54.5	76	45.5	167	21.2	1.2
30-41 months	149	54.2	126	45.8	275	34.9	1.2
42-53 months	49	58.3	35	41.7	84	10.7	1.4
54-59 months	9	50.0	9	50.0	18	2.3	1.0
Total	429	54.5	358	45.5	787	100.0	1.2

Among the children surveyed 429 (54.5%) were boys and 358 (45.5%) girls, with a mean ratio of 1.2 indicating that the sample exhibits bias with boys being slightly over represented. It is not clear why this has happened, but it is still within the plausible range (0.8-1.2). Similarly, the overall age distribution exhibits slight bias with the 6-29:30-59 month ratio score of 1.11. It is within the acceptable range of 0.78-1.18 and was found to be acceptable.



3.2.5.2. Acute Malnutrition[11]

In total 787 children aged between 6 and 59 months were surveyed and no records were flagged for WHZ using SMART. As shown on table 3.8a, the prevalence of global acute malnutrition was estimated at 12.2% (10.1-14.7 C.I.) a prevalence of severe acute malnutrition estimated at 3.4% (2.4- 4.9 C.I.). The prevalence of oedema is 0.0 %. Malnutrition was found to be more prevalent in boys, but the difference was not found to be significant.

[11] Global Acute Malnutrition (GAM) was defined as having oedema ***or*** a low weight-for-height Z-score (WHZ) i.e., <-2 SD that includes <-3SD which means that the prevalence of global acute malnutrition includes both moderate and severe categories of wasting. Whereas, Severe Acute Malnutrition (SAM) is defined as <-3z scores weight-for-height and/or oedema

Table 3.8a: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (n=787), January 2012 using WHO 2006 standards[12]

	All n = 787	Boys n = 429	Girls n = 358
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(96) 12.2 % (10.1 - 14.7 95% C.I.)	(55) 12.8 % (10.0 - 16.3 95% C.I.)	(41) 11.5 % (8.6 - 15.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(69) 8.8 % (7.0 - 10.9 95% C.I.)	(38) 8.9 % (6.5 - 11.9 95% C.I.)	(31) 8.7 % (6.2 - 12.0 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(27) 3.4 % (2.4 - 4.9 95% C.I.)	(17) 4.0 % (2.5 - 6.3 95% C.I.)	(10) 2.8 % (1.5 - 5.1 95% C.I.)

As indicated on Table 3.8b, a high proportion of severely malnourished children were found in the youngest age group with 12 cases aged between 6 and 17 months. This is not surprising since young children are highly susceptible to childhood illness and to morbidity at this age as complementary and mixed foods are introduced in the diet. Frequent bouts of diarrhoea for example can quickly result in loss of weight and deterioration of the nutrition status of the young child.

Table 3.8b: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema, (n=787), January 2012 using WHO 2006 standards

Age		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	243	12	4.9	31	12.8	200	82.3	0	0.0
18-29	167	6	3.6	17	10.2	144	86.2	0	0.0
30-41	275	6	2.2	13	4.7	256	93.1	0	0.0
42-53	84	3	3.6	6	7.1	75	89.3	0	0.0
54-59	18	0	0.0	2	11.1	16	88.9	0	0.0
Total	787	27	3.4	69	8.8	691	87.8	0	0.0

As can be seen on table 3.8c, no cases of kwashiorkor were observed in the sample. Severe cases of malnutrition were presented as marasmus only.

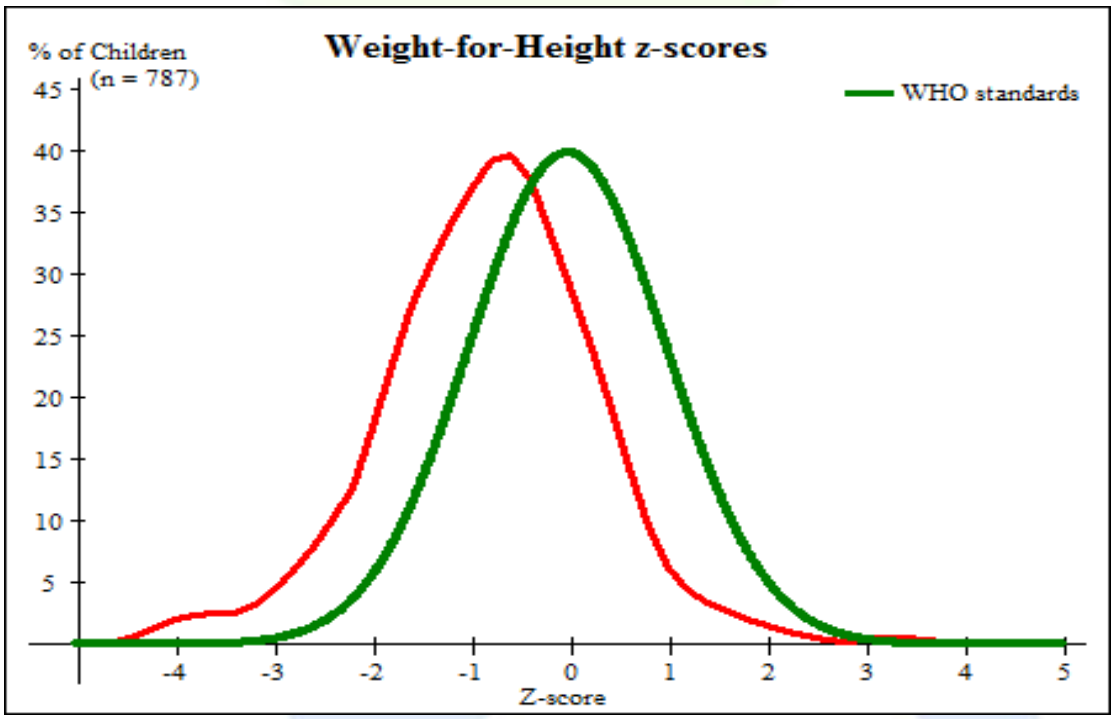
[12] The surveyed areas have been selected taking into consideration the prevalence of undernutrition **and** the interventions being implemented by ACF. It would have been interesting to analyze the prevalence of undernutrition in those UCs where ACF is implementing CMAM program separately from those ones where this intervention is not taking place. However, due to some inconsistencies in the disaggregated data, the analysis could not be conducted in detail.

Table 3.8c: Distribution of acute malnutrition and oedema based on weight-for-height z-scores, (n=787), January 2012 using WHO 2006 standards

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 27 (3.4 %)	Not severely malnourished No. 760 (96.6 %)

As shown in figure 10, the distribution of W/H z-scores of the 787 sampled children is shifted to the left of that of the reference population (see Figure 9) with a mean W/H z-score below the reference mean (zero) at -0.82 (±1.10 standard deviation). This indicates that the population of the sample frame is more malnourished compared to the reference population.

Figure 11: Frequency distribution of W/H z-scores for children 6-59 months old (n=787), January 2012 using WHO 2006 standards



3.2.6. Health care practices

3.2.6.1. Access to health facility

Access to health services related with the health seeking behavior and household economic status subsequently it positively affects the nutrition status of children.

Interestingly, all of the surveyed households seek treatment outside of the home. The majority of the surveyed households 73.6% accessed health services from a private clinic. 22.1% of the respondents reported that they seek health service from the government Basic Health Unit (BHU), while the remaining 4.3% seek treatment from Rural Health Centre (RHC). The most common mode of transport of the community populations to seek treatment was reportedly: public bus (63.3%), on foot (22.1%) and others (16.35). There was a range of responses to the distance of the nearest health facility: the majority of the surveyed households (58.4%) reported that the distance to the nearest household is more than 8km, suggesting that some communities are isolated. However, the finding suggested that the health seeking practices as reported by the proportion of households seeking treatment from health facilities was generally encouraging.

Although it was not reflected in the HH survey, it was broadly discussed in the FGDs that households rely on traditional healers. Many households still take their children to traditional healers as first choice, and even when they visit health facilities, they still rely on them as a second choice. It is not only the fact of the reliance on the traditional healers, but also their beliefs about what can improve the nutritional situation of the child: to bath the child with a cat or with a serpent, to cross the child below a camel, or even to bury the child for some minutes. This information indicates that still the causes, prevention and cure of the malnutrition is widely unknown in the area.

Many factors can prevent women from getting medical advice or treatment for themselves when they are sick. Information on such factors is particularly important in understanding and addressing the barriers women may face in seeking care during pregnancy and at the time of delivery.

3.2.6.2. Immunization

Universal immunization coverage for children is attained if they have received tuberculosis, diphtheria, whooping cough, tetanus, polio and measles vaccines. According to the guidelines developed by the World Health Organization, children are considered fully vaccinated when they have received a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, and a measles vaccination by the age of 12 months. BCG should be given at birth or at first clinical contact, DPT and polio require three vaccinations at approximately 4, 8, and 12 weeks of age, and measles should be given at or soon after reaching 9 months of age.

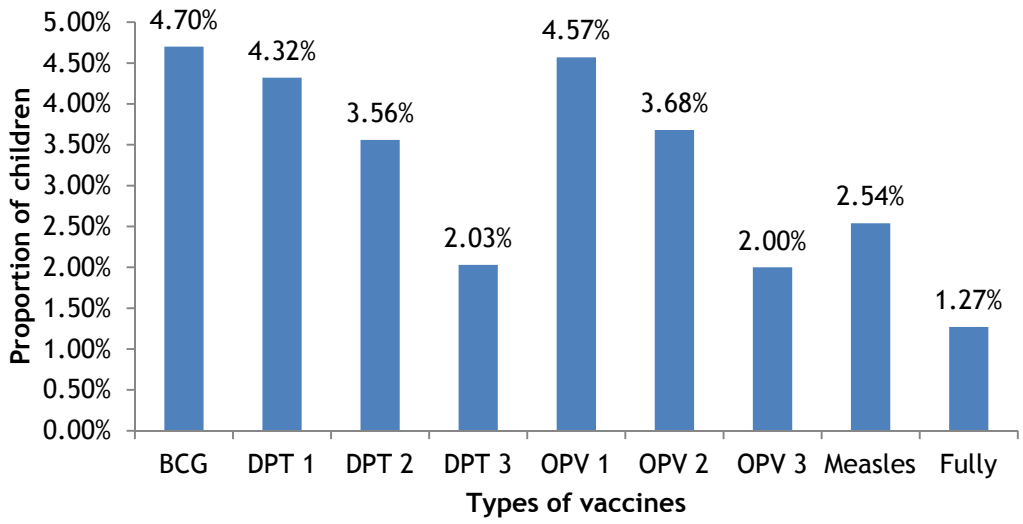
Information on vaccination coverage was collected only from vaccination cards. [13] If the cards were available, the interviewer copied the vaccination dates directly onto the questionnaire.

[13] The information about the vaccination of the children was very hard to get and the discussion around if relying on vaccination cards was long held. The possibility of not considering the vaccination card was discussed within the survey team, but because of the lack of understanding of the population about the vaccines, the answers got were too biased. It is understood that asking for the vaccination card also biases the answers, because some vaccinated children do not have them, but the information in the vaccination card was considered more reliable.

Therefore, the vaccination results presented on table 4.8 are only from the vaccination card. Only 5.8% of the surveyed households had vaccination card for the child.

Only 1.27% of children were fully vaccinated at the time of the survey, 4.70% had received the BCG vaccination, and 2.54% had been vaccinated against measles. The coverage for the first dose of DPT is 4.32%. However, only 2.03% went on to receive the third dose of DPT. Even though DPT and polio vaccines are often administered at the same time, polio coverage is a little higher than DPT coverage. 4.57% of children received the first dose of polio, 3.56% received the second dose, and 2.00% received the third dose. The dropout between the first and third doses of polio is marked—a 98 percent decline. Since the immunization information was collected from vaccination card only, it may not give precise indication of the success of the immunization programme in reaching out to all population subgroups. The actual percentage of children who have a vaccination card may be higher because in many rural households, the cards often get lost and in some areas the cards are kept at the health centre and not by mothers.

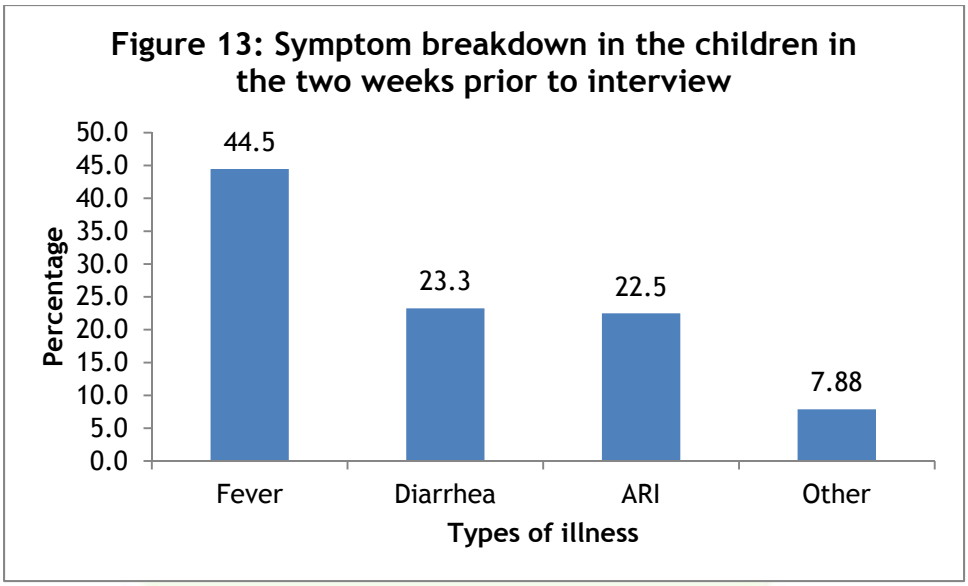
Figure 12: Percentage of children who received specific vaccines at any time before the survey, by vaccination card



3.2.6.3. Childhood illness and treatment

3.2.6.3.1. Prevalence of illness

The overall morbidity rate in children was high estimated at 57.7 %. Figure 12 presents the reported causes of illness, multiple responses were accepted. Major diseases were cough, fever and diarrhoea related, of which fever was the most prevalent illness reported. It should be noted that the morbidity data collected are subjective in the sense that they are based on the mother's perception of illness without validation by medical personnel.



3.2.6.3.1.1. Fever

Fever is a major manifestation of malaria and other acute infections in children. Malaria and fever contribute to high levels of malnutrition and mortality. While fever can occur year-round, malaria is more prevalent after the end of the rainy season. For this reason, temporal factors must be taken into account when interpreting fever as an indicator of malaria prevalence.

Table 3.9 shows the percentage of children under five with fever during the two weeks preceding the survey and the percentage and the percentage with fever who were breastfed and with change in the intake of food. Forty four percent of children under five were reported to have had fever in the two weeks preceding the survey. The prevalence of fever varies by age of child. Children age 12-23 months and 24-35 months are more commonly sick with fever (18.6% and 11.7%%, respectively) than other children. Ninety two percent of children with fever ate less than usual. Younger children aged 6-23 months are more commonly eat less than the usual when sick with fever. Eighty two percent of children was less breastfed than the usual amount when they are sick with fever. Younger children (aged 6-23 months) are most commonly breastfed less than usual when they are sick (62%).

Table 3.9: Prevalence of fever

Among children under age five, the percentage who had a fever in the two weeks preceding the survey and the percentage with fever by feeding practices, by age group, Sindh, January 2012

			Children under age five with fever						
			Amount of food/fluids offered			How was the breastfeeding?			
	Children under age five								
Age in months	Percentage with fever	Number of children	Less than usual	About same amount	More than usual	Less than usual	About same amount	More than usual	Not breastfed
6-11	5.72	45	11.8	0.59	0.30	18.7	1.1	0.5	2.1
12-23	18.6	146	39.3	2.07	0.89	43.3	4.3	0.5	3.2
24-35	11.7	92	24.9	2.07	0.0	16.6	2.7	2.1	0.5
36-47	5.21	41	9.17	1.48	0.30	2.7	0.0	0.0	0.0
48-59	3.30	26	6.80	0.30	0.0	1.1	0.0	0.0	0.5
Total	44.5	350	92.0	6.51	1.48	82.4	8.0	3.2	6.4

3.2.6.3.1.2. ARI

Acute respiratory infection (ARI) is among the leading causes of childhood morbidity and mortality throughout the world. Early diagnosis and treatment with antibiotics can prevent a large proportion of deaths caused by ARI. In the NCA study, the prevalence of ARI was estimated by asking mothers whether their children under age five had been ill with a cough accompanied by short, rapid breathing in the two weeks preceding the survey. These symptoms are compatible with ARI.

Table 3.10 shows that 22.5% of children under five years of age showed symptoms of ARI at some time in the two weeks preceding the survey. Prevalence of ARI varies by age of child. Children age 12-23 months are most likely to show symptoms of ARI (9.3%), compared with children in the other age groups. 89.6% of children with cough and rapid breathing given less than usual. Younger children aged 12-23 months are more commonly eat less than the usual when sick with ARI. 84.2% of children breastfed less than the usual amount when they are sick with ARI. Again, younger children (aged 12-23 months) are most commonly breastfed less than usual when they are sick (42.6%).

Table 3.10: Prevalence of symptoms of ARI

Among children under age five, the percentage who had symptoms of acute respiratory infection (ARI) in the two weeks preceding the survey and the percentage with symptoms of ARI by feeding practices, by age group, Sindh, January 2012

	Children under age five		Children under age five with symptoms of ARI						
			Amount of food/fluids offered			How was the breastfeeding?			
Age in months	Percentage with ARI	Number of children	Less than usual	About same amount	More than usual	Less than usual	About same amount	More than usual	Not breastfed
6-11	4.1	32	16.2	1.7	0.0	24.8	2.0	0.0	1.0
12-23	9.3	73	39.3	1.7	1.2	42.6	5.0	0.0	2.0
24-35	5.3	42	23.7	0.6	0.0	12.9	2.0	3.0	0.0
36-47	2.4	19	5.8	4.0	0.6	4.0	0.0	0.0	0.0
48-59	1.4	11	4.6	0.6	0.0	0.0	0.0	0.0	1.0
Total	22.5	177	89.6	8.7	1.7	84.2	8.9	3.0	4.0

3.2.6.3.1.3. Diarrhea

Dehydration caused by severe diarrhea is a major cause of morbidity and mortality among young children although the condition can be easily treated with oral rehydration therapy (ORT). Exposure to diarrhea-causing agents is frequently related to the use of contaminated water and to unhygienic practices in food preparation and disposal of excreta. In interpreting the findings of the NCA study, it should be borne in mind that prevalence of diarrhea varies seasonally. Table 3.11 shows the percentage of children under five with diarrhea in the two weeks preceding the survey according to selected background characteristics. Overall, 23.3% of all children under five had diarrhea. The occurrence of diarrhea varies by age of the child. Young children ages 6-23 months are more prone to diarrhea than children in the other age groups.

Mothers of children who had diarrhea were asked about what was done to treat the illness. 89.6% of children with diarrhea were taken to a health provider. There is notable difference of diarrhea treatment by age. Mothers tend to take younger children to health facility for treatment than old children. 90.7% of children with diarrhea were treated with oral rehydration

solution (ORS). There are also marked differences between by age of child. Younger children are more likely to receive ORS than others. Breast feeding is to be promoted and top up milk is to be avoided in case of diarrhea as the children suffer from temporary Lactose intolerance. Yogurt, Banana, khitchri (cooked Mashed rice + pulses in soft consistency) and boiled Potato are preferred foods during diarrhea for children which are easily available and produced in Sindh.

Mothers are encouraged to continue feeding children with diarrhea normally and to increase the amount of fluids. These practices help to reduce dehydration and minimize the adverse consequences of diarrhea on the child's nutritional status. Mothers were asked whether they gave the child less, the same amount, or more fluids/food and breast milk than usual when their child had diarrhea. 94.4% of children who had diarrhea were given less than usual, 3.9% were given same amount and, only 1.7% were given more. Younger children aged 12-23 months are more commonly eat less than the usual when sick with diarrhea. 42.8% of children aged 12-23 months were given less amount when they are sick with diarrhea. Similarly, higher percentage (83.7%) of children received breast milk less than the usual amount when they are sick with diarrhea. Again, younger children (aged 12-23 months) are most commonly breastfed less than usual when they are sick (48.0%).

Table 3.11: Prevalence and treatment of Diarrhea

Among children under age five, the percentage who had diarrhea in the two weeks preceding the survey and the percentage with diarrhea by feeding practices, and the percentage with diarrhea for whom treatment was sought from a health facility or provider, or who took ORS by age group, Sindh, January 2012

			Children under age five with diarrhea							Treatment	
	Children under age five		Amount of food/fluids offered			How was the breastfeeding?					
Age in months	Percentage of children with diarrhea	Number of children	Less than usual	About same amount	More than usual	Less than usual	About same amount	More than usual	Not breast fed	Percentage of children with diarrhoea taken to a health provider	ORS packets or prepackaged liquid
6-11	3.6	28	14.4	0.6	0.6	21.4	2.0	0.0	1.0	13.1	14.2
12-23	10.2	80	42.8	1.1	0.0	48.0	2.0	1.0	4.1	39.9	38.8
24-35	5.6	44	22.8	1.7	0.0	11.2	2.0	2.0	1.0	21.9	21.3
36-47	2.7	21	9.4	0	0.6	2.0	0.0	0.0	0.0	10.9	11.5
48-59	1.3	10	5.0	0.6	0.6	1.0	0.0	0.0	1.0	3.8	4.9
Total	23.3	183	94.4	3.9	1.7	83.7	6.1	3.1	7.1	89.6	90.7

3.2.7. Feeding practices

Breast milk is the only food or drink that a newborn child needs in the first 6 months of his life[14].20 Adhering to the recommendation of exclusive breastfeeding during this period is important to help protect babies from dangerous illnesses. Giving other foods or liquids increases the risk of morbidity as a baby's exposure to pathogens and contaminants is

[14]Breastfeeding Key Messages: What Every Family and Community has a Right to Know http://www.factsforlifeglobal.org/04/messages.html

increased. It is recommended that babies be put to breast within one hour of birth and that they are fed the first milk, or colostrum, which is full of nutrients and antibodies. After 6 months, the child can be introduced to appropriate complementary foods, but it is recommended that they continue breastfeeding along with the complimentary food until 24 months of age. It is also recommended to achieve the dietary diversity goal when the child is of 9 months age i.e. the child should be consuming at least 4 essential food groups per day.

3.2.7.1. Breastfeeding by age

Most of the children have been breastfed at one point in their life (Table 3.12). Reported rates of children who had ever been breastfed were high at 97.1% overall for children under the age of 24 months. 48% of children received the colostrum. When the mothers who had not fed their child the colostrum were asked the reason they throw away the colostrum, the majority (42.8%) responded that "it's not good for child", while 26.9% said elders advice and 23.0% mentioned yellowish color as the reason not giving colostrum to the new born. Almost three-quarter (75.6%) of children under 2 years old were still being breastfed.

Table 3.12: Breastfeeding by age

Percent distribution of children born in the two years preceding the survey by breastfeeding status, according to age, Sindh, January 2012

Age in months	Ever breastfed	Still breastfed	Received colostrum	N*
6-11	96 (100%)	90 (93.4%)	48 (50%)	96
12-23	270 (96.1%)	195 (69.4%)	133 (47.3%)	281
Total	366 (97.1%)	285 (75.6%)	181 (48.0%)	377

Note: Still breastfeeding status refers to a "24-hour" period (yesterday and last night)

3.2.7.2. Complementary feeding

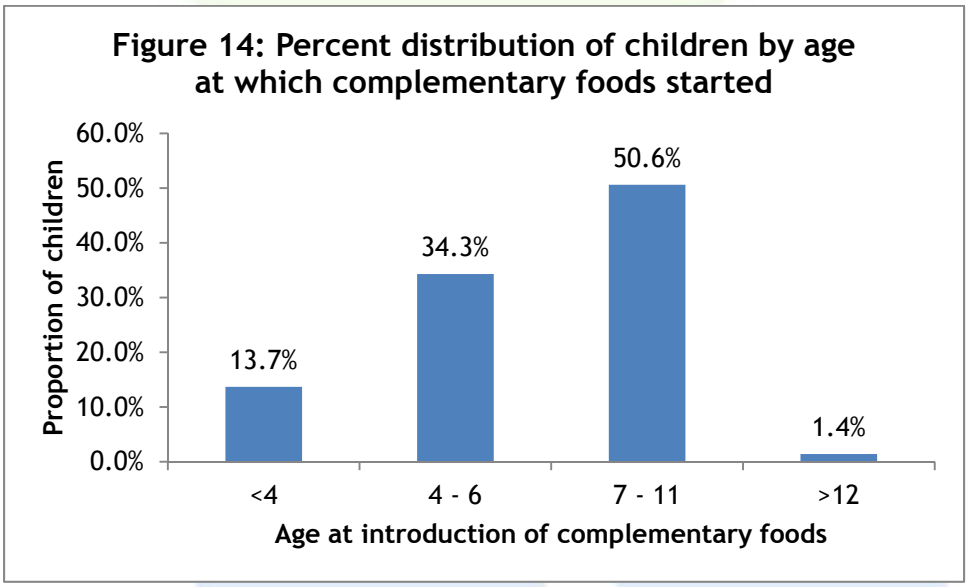
UNICEF and WHO recommend that children be exclusively breastfed during the first 6 months of life and that children be given solid or semisolid complementary food in addition to continued breastfeeding from six months on. Exclusive breastfeeding is recommended because breast milk is uncontaminated and contains all the nutrients necessary for children in the first few months of life. In addition, the mother's antibodies in breast milk provide immunity to disease. Early introduction of complementary foods is discouraged for several reasons. First, it exposes infants to pathogens and increases their risk of infection, especially disease. Second, it decreases infants' intake of breast milk and therefore suckling, which reduces breast milk production. Third, in a harsh socioeconomic environment, complementary food is often nutritionally inferior.

3.2.7.2.1. Time of introduction of complementary foods

Information on age of introduction of complementary foods was obtained by asking mothers after how many months of exclusive breastfeeding did they first give other liquids and/or foods to the child. Figure 13 shows the percent distribution of children at which complementary foods started according to child age category.

Contrary to WHO's recommendations, more than half (50.6%) of the children were introduced to complementary foods between 7-11 months. On the other hand, complementary foods were introduced earlier than 4 months to 13.7% of all children. It was also found that only 34.3% of the mothers gave their children complementary foods at the recommended age of 4-6 month. Surprisingly, about 1.4% started in receiving the complementary feeding later than 12 months.

The NCA results also indicate that complementary foods are not introduced in a timely fashion for many children.



3.2.7.2.2. Minimum dietary diversity and meal frequency of children

The minimum dietary diversity for children 6 to 23 months of age is being reported as those who consumed at least 4 different food groups in the previous 24 hours. According to WHO, eating at least 4 groups is associated with a better quality diet[15]. The results are being reported separately for breastfed (Table 3.13a) and non-breastfed (Table 3.13b) children, since breast milk is not included as a food group, and therefore does not allow for comparison between the two groups.

[15]Indicators for Assessing Infant and Young Child Feeding Practices: Conclusions of a Consensus Meeting Held 6–8 November 2007 in Washington D.C., USA, WHO, 2008

Table 3.13a: Dietary diversity and minimum meal frequency of children 6 to 23 months old still breastfeeding

Percentage of *still breast feeding children*, 6 to 23 months old, who received foods from 4 or more food groups and who received the minimum number of times, Sindh, Pakistan

Age Group	Dietary Diversity		Meal Frequency	
Age	Received 4 or more food groups	N	Received minimum* number of meals	N
6-11	70.8	63	30.3	27
12-17	92.7	115	12.9	16
18-23	95.8	69	11.1	8
Total	86.7	247	17.9	51

*Minimum defined as 2 times for breastfed infants 6-8 months, 3 times for breastfed infants 9-23 months, 4 times for non-breastfed infants 6-23 months

The minimum meal frequency for infants is a proxy indicator for energy intake from foods other than breast milk. It is defined as 2 times for breastfed children 6 to 8 months of age, 3 times for breastfed children aged 9 to 23 months and 4 times for non-breastfed children aged 6 to 23 months. This is also being reported separately for breastfed and non-breastfed children.

Among those children 6 to 23 months of age and still breastfeeding (Table 3.13a), 86.7% consumed a minimum of 4 different food groups in the 24 hours previous to data collection. Children aged 18 to 23 months were more likely to have received more than 4 food groups (95.8%) in the previous day than children 6 to 11 months of age (70.8%) and children 12 to 17 months of age (92.7%). 17.9% of children 6 to 23 months of age and still breastfeeding received the minimum number of meals. It was higher among the younger children, with 30.3% of the 6 to 11 month old children receiving the minimum number of meals. 12.9% of children 12 to 17 month of age and 11.1% of the 18 to 23 month olds received the minimum number of meals.

Table 3.13b: Dietary diversity and minimum meal frequency of children 6 to 23 months old non breastfeeding

Percentage of *non breast feeding children*, 6 to 23 months old, who received foods from 4 or more food groups and who received the minimum number of times, Sindh, Pakistan

Age Group	Dietary Diversity		Meal Frequency	
Age	Received 4 or more food groups	N	Received minimum* number of meals	N
6-11	33.3	2	0	0
12-17	100.0	24	4.2	1
18-23	100.0	70	2.9	2
Total	96	96	3.0	3

*Minimum defined as 2 times for breastfed infants 6-8 months, 3 times for breastfed infants 9-23 months, 4 times for non-breastfed infants 6-23 months

Among the children 6 to 23 months of age who were no longer breastfeeding (Table 3.13b), 96% had consumed at least 4 food groups. The older children were more likely to have received the minimum number of meals (100%) compared to 33% of 6 to 11 month olds. Overall, only 3% of non-breastfed children received the minimum number of meals for their age in the previous day. This finding has serious implications on the knowledge of surveyed households in regards to appropriate child feeding practices as well food security situation. Overall, the finding clearly indicates a troublesome situation.

3.2.8. Nutrition-related knowledge of mothers

Knowledge of child care givers are the major determinants of whether the child will be well nourished or not. Particularly, mother's knowledge about the appropriate infant and young child feeding and her understanding on the causal factors of diseases has very powerful effect on a child's well-being. For example, starving of children during illnesses has been found to be a common detrimental practice that often reduces the child's chance of recovery.

The questions that sought to find out knowledge of the mothers comprises of both closed and open ended questions. As shown on table 3.14a and 3.14b, the questions with multiple option were awarded one point for each correct point mentioned, hence the highest scored expected was 36 points. The rest of the questions were awarded one point for each question answered correctly, the total score expected was 2 points. Therefore, the maximum score expected in the knowledge assessment was 38. From these scores, percentages were derived and a grading system established to classify them (2/3 of the total score was taken as the cutoff point). The grading system to analyze the knowledge level was as follows:-

All scores 25 points and above the expected score of 38 points [above 2/3 of the total 38]	= Adequate knowledge
All scores between 13 and 25 points of the expected score of 38 points [between 1/3 & 2/3 of the total 38]	= Inadequate knowledge
All scores 12 points and below the expected score of 38 points [below 1/3 of the total 38]	= Critically inadequate knowledge

Table 3.14a: Expected responses for assessing mother's knowledge about infant feeding and malnutrition

What are the benefits of breastfeeding?	How long after delivery should a mother initiate breastfeeding for the newborn	How long should a mother breastfeed her child exclusively?	What is the importance of colostrum for the newborn?	What are the signs that a child with malnutrition?
1 Child growth	Within first hour	4 to 6 months	First immunization	1 Thin
2 Child health			Child growth and development	2 Short
3 Child food				3 Old man face
4 Comfort (not crying)				4 Irritable
5 Mother health				5 Change of hair color
6 Preventing pregnancy [child spacing]				6 Sunken Eye Ball,
7 Others				7 Leg Edema
builds bond between mother & child				8 Other Skin changes Pot belly Loss of appetite
The maximum score for this question is 8	The maximum score for this question is 1	The maximum score for this question is 1	The maximum score for this question is 2	The maximum score for this question is 10

1 score = Mentioned correctly 0 score = Not mentioned/incorrect responses

Table 3.14b: Expected responses for assessing mother's knowledge about disease causes and prevention			
Can you list the major causes of diarrhea?		Do you know how diarrhea can be prevented?	
1	Dirty/contaminated water/liquid	1	Use of safe foods
2	Spoiled, stale food	2	Use of safe fluids
3	Not washing hands before taking meal	3	Washing hands before taking foods
4	Not washing hands with soap after defecating	4	Washing hands with soap after defecation
5	Not washing hands with ash/mud after defecating	5	Washing with ash/mud after defecation
6	Not using sanitary latrine	6	Using sanitary latrine
7	Not continuing breastfeeding up to 2 years	7	Continue breastfeeding up to 2 years
8	Not giving immunization properly	8	Proper immunization
The maximum score for this question is 8		The maximum score for this question is 8	
1 score = Mentioned correctly		0 score = Not mentioned	

Even when the analysis was based mainly on the knowledge, some qualitative information is included about practices. Even when knowledge is an important factor, it was found that the practices do not follow this knowledge for many reasons, explained in each section.

3.2.8.1. Knowledge about infant feeding and malnutrition

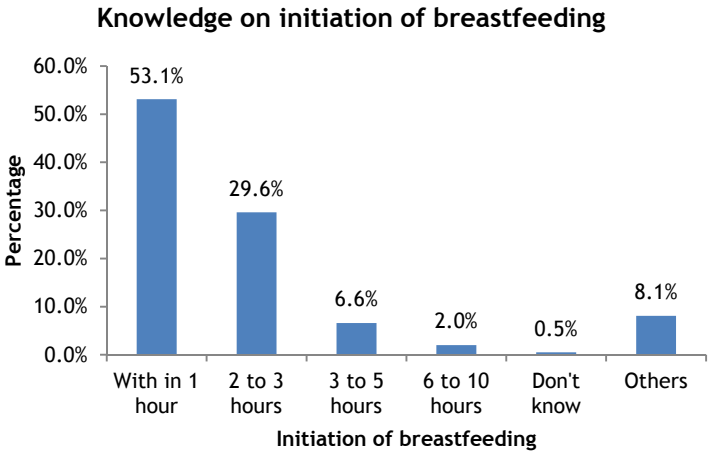
Knowledge about infant feeding and malnutrition affects how mothers provide appropriate care for their children.

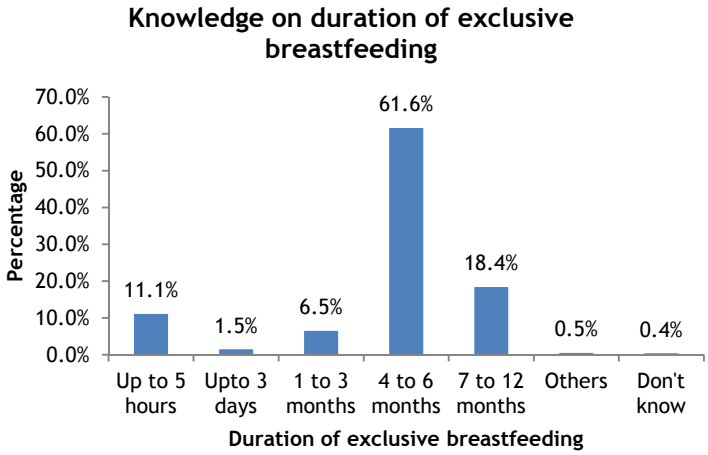
3.2.8.1.1. Knowledge about initiation of breastfeeding and duration of exclusive breastfeeding

Figure 14 shows the distribution of knowledge about initiation of breastfeeding and duration of exclusive breastfeeding by scores attained. As the figure shows, over half (53.1%) of the women correctly responded that a mother should start initiating breastfeeding for the newborn 'with in 1 hour' after delivery while 29.6% reported that it should be 'after 2-3 hours.

When asked about duration of exclusive breastfeeding, most of the respondents (61.4%) reported correctly that the duration of exclusive breastfeeding should be between 4 to 6 months, while 18.4% said they infants should be exclusively breastfed 7 to 12 months. Surprisingly, 11.1% responded that the duration for exclusive breastfeeding is only up to 5 hours.

Figure 15: Knowledge on duration and Initiation of breastfeeding





3.2.8.1.2. Knowledge about benefits of breastfeeding, importance of colostrum for the newborn and signs of malnourished child

Regarding the advantages of breastfeeding, none of the respondents scored 4 out of the expected 8 maximum points. Slightly over one-third (35.1%) scored 3 points by naming three advantages of breastfeeding. 42.5% scored 2 points, while the rest (22.1%) scored 1 point. The mean score was 2.13. Child health and child growth were the benefits of breastfeeding that were mentioned by the majority of respondents (77.9% and 75.9%, respectively). Other benefits that were frequently mentioned were, child food (33.0%) and comfort/for not crying (18.3%) and mother health (5.6%). Practice of breastfeeding is limited by many factors as the availability of milk, the woman getting pregnant within a short period after the birth of the breastfed baby and the seasonal working of the women in the harvesting in some areas. In those cases, complementary feeding is introduced at early stages, added to the fact that the baby is left with the elderly in the house.

As for the colostrum, the respondents were expected to correctly name at least two importance of colostrum to the newborn. None of the respondents scored the maximum score of 2 points. Slightly less than half (46.5%) scored 1 point. The mean score was 0.47. Child growth was the major importance of colostrums mentioned by 42.7% of respondents, while first immunization was mentioned only by 3.8% of respondents. Within the discussions held in the FGDs, some households still expressed that they did not give the colostrum to the baby as they considered it as *yellow milk* which was harmful for the baby's health.

When asked about the signs and symptoms of malnutrition, the majority scored 2 points (49.4%), while (38.9%) of respondents scored 1 point. The mean score was 1.73. Thinness is the sign of malnutrition that was cited by the majority of respondents (85.1%). Other signs and

symptoms of malnourished child shortness (33.0%), irritability (21.3%) and old man's face (10.7%). Only 3.4% cited oedema as sign of malnutrition.

Table 3.15a: Distribution of mother's knowledge scores about benefits of breastfeeding, importance of colostrum for the newborn and signs of malnourished child

Scores	Benefits of breastfeeding (Total score = 8)	Importance of colostrums (Total score = 2)	Signs of malnourished child (Total score = 10)
1	174	366	306
2	337	0	389
3	276	-	87
4	0	-	5
Mean	2.13	0.47	1.73

3.2.8.2. Knowledge of diarrhea causes and prevention

A mother who has the appropriate knowledge about the cause of illnesses and infections is better able to seek appropriate care and treatment of her children. If her knowledge is inaccurate or wrong, it can lead to incorrect treatment and prevent recovery from illness.

When asked about the causes of diarrhea, the vast majority (42.8%) of the respondents scored 2 points, while 35.1% scored 3 points and 22.1% scored 1 point. Almost half (49%) of all women responded that the cause of diarrhea was from spoiled/stale food. 38% listed dirty or contaminated water as the cause of diarrhea. 37.5% said that it could be caused by not washing hands before taking meal. Only 21.1% said that it could be caused by not washing hands with soap after defecating.

Concerning the prevention of diarrhea, 45.4% scored 1 point by naming only one way to prevent diarrhea. 29.6% scored 3 points, while the rest (24.3%) scored 2 points. The mean score was 1.83. Slightly less than half (47.1%) of all women responded that the use of safe foods would prevent diarrhea while only 19.3% mentioned the use of safe fluids would prevent diarrhea. 42.8% of women responded that washing hands before eating foods would prevent diarrhea. More than a quarter (26.4%) responded that washing hands with soap after using the toilet would prevent diarrhea, however only 3.6% stated that using sanitary latrine would prevent diarrhea.

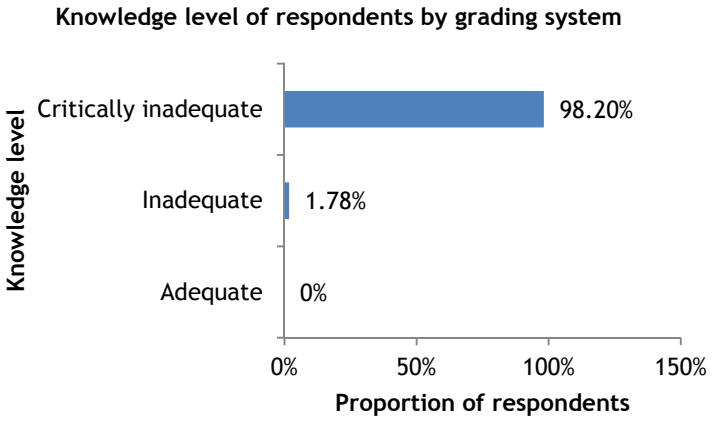
Table 3.15b: Distribution of mother's knowledge scores about the causes and prevention of diarrhea

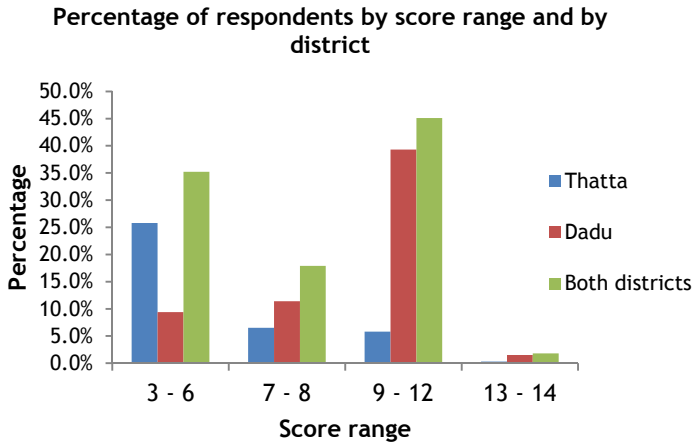
Scores	Causes of diarrhea (Total score = 8)	Prevention of diarrhea (Total score = 8)
1	329	358
2	302	191
3	141	233
4	14	0
Mean	1.79	1.83

3.2.8.3. Total knowledge performance

The knowledge scores for the respondents ranged between 3-14 points with none of them scoring above 25 of the expected score of 38 points while less than 2% scored between 13 and 25 points out of the expected score. The mean score for all the respondents was 7.95. Figure 15 shows the distribution of respondents score by knowledge level and categorical presentation of the total score on knowledge of the respondents.

Figure 16: Distribution of respondents score by knowledge level and categorical presentation of the total score by district





Respondents from Dadu had significantly better knowledge level with a mean of 9.02, compared to their counter parts from Thatta district who had a mean of 6.23 ($p<0.001$)

3.2.9. Water, sanitation and hygiene

The quality of the household drinking water source and the type of toilet facility the household uses is commonly used as a socio-economic status proxy. In addition, they are both useful for their relationship to health outcomes (diarrhoea, illness, etc). The time taken to collect drinking water is important in assessing the general welfare of the household as well as those who collect it, such as pregnant women and young children (not measured in the NCA study). What a household does to treat drinking water, the method of waste disposal and hygiene practices are indicators of a household's knowledge and practices about appropriate and safe health behaviors.

3.2.9.1. Household drinking water and safe water practices

Table 3.16 shows that among all households, approximately three quarters of the population used safe or improved sources[16] of drinking water during dry season, with nearly two third using hand pump. While, during rainy season almost two-third of the population used safe water, with more than 58% using hand pump. In both districts, hand pump was the most common source of drinking water.

The amount of water used per day per family ranged from 20 to 40 liters per household in the majority of the surveyed households (42.8). Differences become apparent when comparing Dadu with Thatta. Higher percentage (58.5%) of households in Thatta collected more water (>40 liter) for drinking purposive than residents in Dadu (only 18.8%). This is consequent with the overall availability of water in both districts. While most of the territory of Dadu is a semi-arid area, Thatta has a more reliable access to water, even when it is seasonal.

More than two-third (70.4%) of households were using a water source located within ½ hour walking distance and a further 22.4% within a one-hour walk.

When asked whether they treat water prior to drinking, an overwhelming majority of households (75%) do not treat drinking water. Few households treat water for drinking purposes (25.1%). Of those households that do treat, most strain it through a cloth (69.3%) or boil it (18.1%), with fewer households add bleach/chlorine/water agar (5.5%) or let it stand and settle (6.5%).

[16] Hand pump, tap stand, tap in house, spring, supplied by govt./NGO, water point- hence these are mentioned as improved source of drinking water in some places of the report.

Table 3.16: Household drinking water

Percent distribution of households by source, time to collect, and treatment of water, according to place of residence, Sindh, January 2012

	Dadu	Thatta	Total
Improved water source during rainy season	61.2	67.9	63.8
Improved water source during dry season	65.6	85.1	73.1
Type of water source during rainy season			
Hand pump	54.4	65.1	58.5
Unprotected well	12.4	6.0	9.9
River	8.2	11.3	9.4
Pooled flood water	1.4	12.0	5.5
Protected well	6.6	0.3	4.2
Others	16.9	5.4	12.5
Type of water source during dry season			
Hand pump	57.5	80.8	66.5
Unprotected well	11.5	4.3	8.8
River	7.6	8.3	7.9
Protected well	7.6	0.0	4.7
Others	15.7	6.6	12.2
Quantity of water collected per day			
Up to 2o litre	29.3	13.2	23.1
20 to 40 liter	52.0	28.1	42.8
40 to 60 liter	18.4	33.1	24.0
60 to 80 liter	0.4	22.8	9.0
Others	0.0	2.6	1.0
Time taken to collect drinking water (round trip)			
Within ½ hour	73.6	65.2	70.4
½ hour to 1 hour	22.3	22.5	22.4
1 hour to 1 ½ hour	2.7	6.6	4.2

1 ½ hour to 2 hour	1.4	5.6	3.0
Water treatment for drinking			
Yes, always	13.6	14.2	13.9
Yes, sometimes	14.2	6.3	11.2
No	72.2	79.5	75.0
Type of Treatment			
Boil	14.1	26.6	18.1
Add bleach/chlorine/water agar	3.0	10.9	5.5
Strain through a cloth	77.8	51.6	69.3
Let it stand and settle	4.4	10.9	6.5

3.2.9.2. Sanitation source and safe hygiene practices

Table 3.17 presents information on household sanitation facilities and practices by district. More than half (57.9%) of the households do not have a toilet facility and use open field. Overall, a small proportion (12.7%) of households use pour flush toilet. Almost similar proportion of households (12.1%) uses pit latrine. Marked differences are apparent between Dadu households (19.6%) using pour flush toilet compared to Thatta households (1.7%).

The majority of households were disposing of the garbage by dumping it outside their compound (89.8%) while the rest of the households reportedly set the garbage on fire when disposing (10.2%). Slightly more percentage of Dadu households was to dump it in the street as compared to Thatta.

Hand washing practices among the communities surveyed were highest before eating (82.0%), before preparing food (65.4%) and after defecation (58.7%) with little difference between Dadu and Thatta communities. Less than 10% of the people reportedly wash their hands before feeding a baby. Hand washing after disposing of children's feces is also low (12.5%).

Nearly one third (32.5%) of the populations surveyed washed their hands with soap. Dadu population reported higher use of soap to wash hands (42.7%) than Thatta population (16.6%). More than third-quarter (75.2%) of the households surveyed disposed child faeces on open field. Soap represents an expenditure for the household, so the availability of soap depends on the availability of cash, or on the distributions of soap, broadly done by NGOs in the area as a response to the floods. Even when population are aware of the necessity of using soap, because of their difficulties of acquiring them, many families expressed during the FGDs that they only use the soap in the *most important moments*, like after defecation, while during the rest of the day they only use water.

Hand washing practices after cleaning child's bottom in general was good. Nearly all households (93.2%) reported that they wash their hands after cleaning child's bottom, with notable difference between Dadu (98.4%) and Thatta (76.2%) households.

Table 3.17: Household sanitation facilities and practices

Percent distribution of households by type of toilet/latrine facilities, methods of waste disposal, and handwashing practices, according to place of residence, Sindh, January 2012

	Dadu	Thatta	Total
Type of toilet facility			
Pour flush toilet	19.6	1.7	12.7
Pit latrine	12.0	12.3	12.1
Open field	40.4	86.1	57.9
Other	28.0	0.0	17.3
Method of garbage disposal			
Set on fire	3.1	21.5	10.2
Throw outside	96.9	78.5	89.8
When do you wash your hands			
Before eating	83.9	78.8	82.0
Before preparing food	67.0	62.9	65.4
After defecation	66.8	45.7	58.7
Before feeding children	12.4	2.6	8.6
After disposing of children faeces	14.8	8.6	12.5
Hand washing with soap			
Yes, always	42.7	16.6	32.7
Yes, sometimes	48.2	46.5	47.6
No	9.1	36.9	19.7
Hand washing after cleaning child's bottom			
Yes, always	98.4	76.2	93.2

Yes, sometimes	1.6	19.0	5.7
Child faeces disposal			
Pour flush toilet	14.6	2.0	9.8
Pit latrine	7.2	11.3	8.8
Open field	68.0	86.8	75.2

3.3. Bivariate and multivariate analysis

Investigation of the risk factors of wasting was made by carrying out step-wise analysis involved the use of both bivariate and multivariate analysis.

3.3.1. Demographic variables associated with wasting

As can be seen in Table 3.18, the bivariate analysis was performed using a chi-square (X^2) test and the results of this NCA study showed that except for child's age, there was no significant association between acute malnutrition and all of the other demographic explanatory variables under study. Analyzing the magnitude of acute malnutrition at different ages reveals how nutritional status changes during the first five years of life. The result of the analysis showed that the highest proportion of wasted children observed were in age group 12-23 months (45.8%) followed by age group 6-11 months (19.8%), while wasting was lowest among older children in the age group of 48-59 months (7.3%).

Table 3.18: Bivariate relationship of demographic factors with acute malnutrition of children, Sindh, January 2012

Demographic variables	Proportion of Wasted children	X^2-value and level of significance
Sex of Child		
Male	55 (57.3)	(0.341, 0.559)
Female	41 (42.7)	
Child's age in months		
6-11	19 (19.8)	**(14.100, 0.007)****
12-23	44 (45.8)	

24-35	16 (16.7)	
36-47	10 (10.4)	
48-59	7 (7.3)	
Sex of household head		
Male >= 18 years	88 (91.7)	(2.923, 0.087)
Female >= 18 years	8 (8.3)	
Occupation of household head		
Daily wage labourer	45 (46.9)	(2.904, 0.574)
Farmer	25 (26.0)	
Fisherman	11 (11.5)	
Agriculture on own land	10 (10.4)	
Marital status of household head		
Married	96 (100)	(0.840, 0.359)
Education of care givers		
No education	87 (90.6)	(1.793, 0.408)
Up to primary level	7 (7.3)	
Secondary and above	2 (2.1)	
Household size		
1-3 members	12 (12.5)	(2.503, 0.286)
4-7 members	53 (55.2)	
8 and above members	31 (32.5)	

Numbers in parenthesis are percentages

*significant at 5%, **significant at 1%, ***significant at 0.1%, unmarked=not significant

3.3.2. Socio-economic and food security variables associated with wasting

Findings from the bivariate analysis of the association between socio-economic and food security variables and wasting are presented in Table 3.19. The result of the analysis showed

that there was significant association between number of income sources and acute malnutrition ($p<0.01$). Significantly higher level of wasting was observed among households with one income source (83.3%) compared to households with 2 or more sources of income (16.7%). Although there was no significant association with acute malnutrition, the result of the bivariate analysis revealed a higher proportion of wasted children found in families who have no land and lives in mud houses.

Table 3.19: Bivariate relationship of socio-economic and food security factors with acute malnutrition of children, Sindh, January 2012

Socio-economic and food security variables	Proportion of Wasted children	X^2-value and level of significance
Type of housing[1]		
Mud/mud brick	58 (60.4)	(4.437, 0.350)
Stone/concrete/brick	8 (8.3)	
Thatch	27 (28.1)	
Plastic shelter	1 (1.0)	
Family own land		
Yes	25 (26.0)	(0.811, 0.368)
No	71 (74.0)	
Land size owned (in acre)		
1-5	21 (84.0)	(3.043, 0.385)
6-10	2 (8.0)	
11-15	1 (4.0)	
16+	1 (4.0)	
Source of income		
One income source	80 (83.3)	**(10.669, 0.001)****
Two or more income sources	16 (16.7)	
Do you store harvest for own consumption?		

Yes	47 (49.0)	(0.264, 0.607)
No	49 (51.0)	
Family own livestock		
Yes	58 (60.4)	(0.206, 0.650)
No	38 (39.6)	
Main food source for the household		
Own production	26 (27.1)	(0.367, 0.832)
Purchase	69 (71.9)	

[1]Housing characteristics are included in the analysis because they can be used as indicators of the socio-economic status of the household

Numbers in parenthesis are percentages

*significant at 5%, **significant at 1%, ***significant at 0.1%, unmarked=not significant

3.3.3. Health and health related factors associated with wasting, bivariate results

As hypothesized, analysis was made to test whether health related factors affect acute malnutrition. The bivariate analysis showed that quantity of water collected by the household/day, treatment of water before household consumption, hand washing with soap and ashes and incidence of illness two weeks prior to the study, were significantly associated with wasting (Table 3.20). Surprisingly, the bivariate analysis reveals a lower proportion of wasting in households who reportedly using unsafe water source, but the association was not statistically significant ($p>0.05$). Although not statistically significant, the analysis also showed that children were less malnourished in households with the nearest distance to the health facility.

Table 3.20: Bivariate relationship of health and health related factors with acute malnutrition of children, Sindh, January 2012

Health and health related variables	Proportion of Wasted children	X^2-value and level of significance
Drinking water source during rainy season		
Improved (safe) water source	57 (59.4)	(0.921, 0.337)
Unsafe water source	39 (40.6)	
Drinking water source during rainy season		
Improved (safe) water source	67 (69.8)	(0.594, 0.441)
Unsafe water source	29 (30.2)	
Quantity of water collected per day		
Up 20 litre	53 (55.2)	**(64.118, 0.000)*** **
20 to 40 litre	25 (26.0)	
40 to 60 litre	14 (14.6)	
60 to 80 litre	3 (3.1)	
Time taken to fetch drinking water		
With in 1 hour	67 (69.8)	(2.410, 0.492)
½ hour to 1 hour	25 (26.0)	

1 hour to 1 ½ hour	3 (3.1)	
1 ½ hour to 2 hour	1 (1.0)	
Water treatment for drinking		
Yes, always	5 (5.2)	**(10.961, 0.004)****
Yes, sometimes	6 (6.2)	
No	85 (88.5)	
Type of toilet facility		
Pour flush toilet	5 (5.2)	(6.476, 0.091)
Pit latrine	10 (10.4)	
Open field	61 (63.5)	
Other	20 (20.8)	
Child faeces disposal		
Pour flush toilet	5 (5.2)	(4.475, 0.215)
Pit latrine	7 (7.3)	
Open field	75 (78.1)	
Other	9 (9.4)	
Distance to the nearest health facility		
Within 1 km	7 (7.3)	(6.842, 0.077)
1-4 km	25 (26.0)	
4-8 km	19 (19.8)	
8km+	45 (46.9)	
Vaccination		
Fully		
Partially		
Heard about water borne illnesses		
Yes	58 (60.4)	(2.892, 0.236)

No	18 (18.8)	
Hand washing with soap		
Yes, always	17 (17.7)	**(27.914, 0.000)*** **
Yes, sometimes	42 (43.8)	
No	37 (38.5)	
Illness in the two weeks before the survey		
Yes	68 (70.8)	**(7.7141, 0.005)** **
No	28 (29.2)	

Numbers in parenthesis are percentages

*significant at 5%, **significant at 1%, ***significant at 0.1%, unmarked=not significant

3.3.4. Diet related care practices associated with wasting

Findings from bivariate analyses of the association between diet-related care practices and acute malnutrition are presented in Table 3.21. The result of the analysis showed that child still breastfeeding, age at which complementary food introduced, child dietary diversity, breastfeeding during illness, knowledge on duration of exclusive breastfeeding, knowledge on importance of colostrum, knowledge on the signs of malnutrition and knowledge on the prevention of diarrhea are significantly associated with acute malnutrition.

As can be seen from Table 3.21, a significantly higher proportion of wasted children (58.3%) were found among children who are still breastfeeding. The prevalence of wasting was significantly higher among children who had started complementary feeding between 7-11 months of age as compared to other groups. The occurrence of wasting was significantly higher in children who received 4 food groups. It was also observed that significantly higher proportion of wasted children found among children who breastfed less than usual during illness. The proportion of wasted children was significantly lower for those whose mothers scored 2-3 on the knowledge of the signs of malnutrition and prevention of diarrhea as compared to mother's who scored only 1. A significantly higher prevalence of wasting was observed among children whose mothers' are not aware of the importance of colostrum. Surprisingly, the proportion of malnourished children was significantly higher among mothers' who know the duration of exclusive breastfeeding (4-6 months).

Table 3.21: Bivariate relationship of diet related care practices with acute malnutrition of children, Sindh, January 2012

Diet and care related variables	Proportion of Wasted children	X^2-value and level of significance
Received colostrum		
Yes	45 (46.9)	(1.366, 0.505)
No	51 (53.1)	
Child still breastfeed		
Yes	56 (58.3)	**(5.497, 0.019)***
No	40 (41.7)	
Child ever breastfeed		
Yes	92 (95.8)	(2.301, 0.129)
No	4 (4.2)	
Age complementary food started		
<4 months	17 (17.7)	**(17.001, 0.001)****
4-6 months	15 (15.6)	
7-11 months	62 (64.6)	
>=12 months	2 (2.1)	
Child dietary diversity		
Received 4 or more food groups	83 (86.5)	**(6.831, 0.009)****
Received less than 4 food groups	13 (13.5)	
Child illness and breastfeeding		
Less than usual	52 (94.5)	**(17.519, 0.004)****
About the same	2 (3.6)	
More than usual	1 (1.8)	
Child illness and amount of foods/fluids		

Less than usual	50 (87.7)	(2.748, 0.432)
About the same amount	5 (8.8)	
More than usual	2 (3.5)	
Knowledge on duration of exclusive breastfeeding		
<4 months	27 (28.1)	**(22.870, 0.000)*** **
4-6 months	38 (39.6)	
>6 months	31 (32.3)	
Knowledge on initiation of breastfeeding		
Within 1 hour	36 (94.7)	(0.549, 0.760)
Knowledge on benefits of breastfeeding		
1 score	17 (17.7)	(1.296, 0.255)
2-3 scores	79 (82.3)	
Knowledge on importance of colostrum		
First immunization	1 (2.2)	**(48.841, 0.000)*** **
Child growth	18 (40.0)	
Don't know	26 (57.8)	
Knowledge on signs of malnutrition		
1 score	49 (51.0)	**(7.254, 0.027)***
2-3 scores	47 (49.0)	
Knowledge on the causes of diarrhea		
1 score	44 (45.8)	(2.044, 0.306)
2-3 scores	49 (51.0)	
>=4 scores	3 (3.1)	
Knowledge on the prevention of diarrhea		
1 score	54 (56.2)	**(4.779, 0.029)***
2-3 scores	42 (43.8)	

Numbers in parenthesis are percentages

*significant at 5%, **significant at 1%, ***significant at 0.1%, unmarked=not significant

3.3.5. Determinants of wasting, multivariate analysis

Multivariate analysis of logistic regression was performed to examine the net effect of each independent/explanatory variable in the model on wasting in children.

As can be seen in Table 3.22, the logistic regression analysis identified the most important explanatory variables of wasting among children in the study area. In this model, quantity of water collected per day, breastfeeding during illness and knowledge on the importance of colostrum were found to be determinants of wasting among children.

The analysis showed that the risk of being malnourished for those children who are from households that collect more than 20 litre per day is lower by 56.3% when compared to those children who are from households that collect up to 20 litre water per day. The likelihood of being malnourished for those children who were breastfed more than usual when they were sick decreased by 81.9% when compared to children who were breastfed less than usual when they were sick. The study finding also showed that, children whose mothers don't know the importance of colostrum were 1.2 times more likely to be wasted compared to children whose mother know the importance of colostrum.

Table 3.22: Logistic regression estimates of the effect of the explanatory variables on wasting, Sindh, January 2012

				95% C.I for Exp (ß)	
Explanatory variables	**ß**	**Sig.**	**Exp (ß)**	**Lower**	**Upper**
Child's age in months	-0.548	0.076	0.578	0.316	1.058
Source of income	-1.719	0.116	0.179	0.021	1.532
Quantity of water collected per day	-0.829	**0.029***	0.437	0.207	0.919
Water treatment for drinking	0.472	0.288	1.604	0.671	3.832
Hand washing with soap	0.723	0.112	2.060	0.845	5.020
Illness in the two weeks before the survey	-18.169	0.999	0.000	0.000	
Child still breastfeed	0.524	0.385	1.689	0.517	5.520
Age complementary food started	0.952	0.067	2.591	0.934	7.189

Child dietary diversity	0.376	0.646	1.456	0.293	7.230
Child illness and breastfeeding	-0.853	**0.049***	0.426	0.181	1.007
Knowledge on duration of exclusive breastfeeding	-0.274	0.623	0.760	0.255	2.268
Knowledge on the importance of colostrum	1.331	**0.023***	3.786	1.205	11.899
Knowledge on the signs of malnutrition	-0.759	0.273	0.468	0.120	1.819
Knowledge on the prevention of diarrhea	-0.152	0.828	0.859	0.217	3.391

*Significant at 5%, unmarked= not significant

B – regression coefficient, Sig. – Level of significance, Exp (ß) – Odds ratio

HYPOTHETICAL MODEL

Study Hypotheses: When discussing factors contributing to the high rate of malnutrition in Sindh Province, it is appropriate to view them in terms of the conceptual framework of malnutrition developed by the UNICEF (figure 1). As portrayed in the figure, the cause of malnutrition is a complex concept and various factors associated with the nutritional status of children. As generally hypothesized, the present investigation made emphasis on inadequate dietary intake, poor access to quality health services, and healthy environment and inadequate maternal and child care and feeding practices.

Although the bivariate analysis of the relationship between the access to a diversified diet and the prevalence of undernutrition could not be done in this survey because of the deficiencies found in the measurement of the indicator, the qualitative information gathered from the FGDs and interviews with stakeholders, added to the results of the numerous surveys that were mentioned in the text of this survey, indicated a strong relationship between the two variables. This can be reinforced by the fact that a high correlation was found between the diversity of sources of income and the prevalence of undernutrition.

Among the variables of health and environmental factors that were included in this study, only quantity of water collected by household per day was found to be significantly associated with the risk of acute malnutrition. Hence, the general hypothesis “there are significant associations between health and environmental factors and risk of wasting among under-five children’ is partially rejected. The result of the study showed that the specific hypothesis that “there is strong and significant association between lack of awareness on hygiene and sanitation and

poor practices and wasting of children" is accepted because the risk of being wasted significantly reduced for those children who are from households that collect more than 20 litre per day when compared to those children who are from households that collect up to 20 litre water per day.

The general hypotheses given in this study that "there are significant relationship between inadequate maternal and child care and feeding knowledge and acute malnutrition of children aged below five years" is partially accepted considering the fact that two of the variables investigated in this study showed significant associated with the risk of wasting. Among the child care and feeding knowledge investigated in this study, knowledge on the importance of colostrum and breastfeeding during illness show significant association with wasting in the regression model. Therefore, the specific hypothesis that "lack of mother's awareness about complementary and supplementary feeding and feeding during illnesses and food requirements for pregnant and lactating mother has strong and significant association with wasting" is accepted because children who were breastfed less than usual when they were sick are at higher risk of acute malnutrition compared to children who were breastfed more than usual and children whose mothers don't know the importance of colostrum were at higher risk of malnutrition compared to children whose mother know the importance of colostrum.

Based on the results of this NCA study, it is appropriate to conclude that lack of knowledge on appropriate child care and feeding practices and lack of enough potable water have a higher contribution to the nutritional status of children under-five years of age in the surveyed areas. This due to the fact that among the explanatory variables included in the regression analysis of this study, only '*lack of knowledge on colostrum*' and '*breastfeeding during illness*' and '*quantity of water collected per day for household consumption*' showed a signification association with the risk of wasting among children.

Level of wasting: It is well recognized that malnutrition is a public health problem in Sindh Province. Numerous nutrition surveys have shown that the malnutrition situation is at a critical level. According to the findings of the 2001-02 Pakistan National Nutrition Survey[17], the prevalence of wasting was found to be highest in the *Sindh* Province (18.2%), more than the WHO emergency threshold of 15 percent, while the prevalence of severe acute malnutrition was 5% in *Sindh. N*o major progress has been made in reducing the prevalence of child malnutrition over the last 10 years and the problem of child malnutrition is still worrisome in Sindh Province as a whole. In the October/November 2010 Flood Affected Nutrition Surveys of Pakistan[18], Sindh Province had by far the highest prevalence of wasting in the country. By that time, the prevalence of acute malnutrition in Sindh Province was 22.9%, much more than the WHO emergency threshold of 15%. A number of other studies[19] conducted in pocket areas of

[17]National Nutrition Survey (NNS), 2001/2002. Pakistan

[18] Department of Health – Government of Sindh. Fllod Affected Nutrition Surveys (FANS) – Sindh Province. October/November 2010.

[19] ACF Integrated assessment Survey / Mirpur Bathoro Thaluka / Sindh Province, Pakistan, December 2010

Sindh Province on the prevalence of malnutrition indicate that acute malnutrition is a major problem of public health significance.

The results of this NCA study reveal that there is a substantial decrease in the prevalence of wasting in Sindh Province. This may be attributed to the social and human developments efforts and successful public health interventions undertaken by the government and humanitarian organizations. In response to a humanitarian crisis that affected over 20 million people in Pakistan following the flood disaster in July 2010, emergency nutrition interventions led by UNICEF were triggered in September 2010 across the four provinces to save lives, in view of the serious levels of acute malnutrition, before the floods. A comprehensive *Sindh* Strategic Nutrition Response Plan [20] has been developed by the *Sindh* department of health in collaboration with UNICEF articulating the needs and response strategies for curbing the high prevalence of acute malnutrition in *Sindh* province as well response monitoring. As part of the Nutrition response plan, the district authorities assigned a Nutrition Focal Person to oversee and facilitate all the nutrition intervention programs and ensure that coordination structures are in place to respond to present and future nutrition crises in the districts. As part of the government effort to tackle the staggering level of acute malnutrition, the Pakistan Integrated Nutrition Strategy (PINS) has also been developed. The document outlines comprehensive and integrated strategy to short term, medium term and longer term programmes addressing both the acute and chronic malnutrition. The PINS built on the concept of Programmatic Complementarities in line with the Strategic Nutrition Response Plan. These initiatives showed that tackling malnutrition among children and women is considered as one of the foundations for Pakistan's aspiration for achieving all other MDGs. ACF also supports and has adopted the policies supporting the integration and rolling-out of Community Management Acute Malnutrition (CMAM) programming in Thatta and Dadu districts since January 2011. All these efforts suggested some explanation for how improvements in child malnutrition occur in the area.

Despite the improvements in the prevalence of wasting in the past one year in Sindh Province, the magnitude in the NCA study [12.2%] is one of the highest in the country and still the existing problem which needs urgent attention to over-come and improves it. The problem of wasting in the areas is paralleled by high levels morbidity, lack of potable water, lack of awareness on child care and feeding, poor immunization, low income and various aggravating factors.

Demographic and socio-economic factors: The bivariate analysis of the NCA study showed that there was significant association between number of income sources and acute malnutrition ($p<0.01$). In general, the diversity of the sources of income has shown very positive associations with wasting. The reason behind this could be, those households who had more than one income source had a better chance to provide food items that contained the necessary nutrients required by children at different ages and also could provide better child care, hence

[20] Sindh Strategic Nutrition Response Plan. Reunion against malnutrition. Nutrition sector. Sindh Department of Health. 27/01/2011

the children have a better balanced growth and development performance than with those children from households who had one income source. Based on the information gathered from the FGDs, the level of income has a strong impact on the food that the care takers buy for their children. Although participants from the FGDs showed some understanding in the importance of a diversified diet their comment indicated that their level of poverty did not allow them to accede to a diversified basket. A more diversified income does not only imply higher level of cash to buy food in the market, and eventually less impacted by seasonality as diversified sources of income tend to be complementary, but also means that the population are less vulnerable to external shocks as they have more coping strategies. As it was indicated in the univariate analysis, households without alternative coping strategies tend to reduce the food consumption to face eventual shocks that affect the access to food.

The involvement in such activities and other casual labor and income earned by mothers through employment could help increase the total household income and may raise a household's effective demand for food, which may play a positive role in improving the household food security. Though the bivariate analysis shows significant association between source of income and wasting, this difference disappears in the multivariate model. This shows that in the presence of important health and child care related variables, income alone is not a predictor of nutritional status of children.

Age is an important demographic variable and is the primary basis of demographic classification in surveys. According to the bivariate analysis of the present NCA study, child's age is significantly associated with wasting in the study sample. The risk of wasting is the highest among children in the age group 12-23 months. The observed high rates of morbidity at this age group[21], may suggest why these group of children are more malnourished than others. Although the significance of this variable disappears in the multivariate model, this finding highlights the first year of life as the most critical period for health related intervention suggesting the need to institute programs to improve the nutritional status of most vulnerable children in the first years of life. Children younger than 24 months of age respond much more rapidly to the improvement than older children[22]

Child care and feeding related factors: This study found evidence that knowledge on child care and feeding practice have a significant influence on the odds of acute malnutrition in children. The logistic regression analysis revealed that *lack of knowledge on colostrum* and *breastfeeding during illness* are important determinants of acute malnutrition among children 6-59 months old. In most societies, colostrum is recognized to differ from breast milk because of its color and its creamy consistency, but its enormous value to the baby is not universally acknowledged[23]. The univariate analysis indicated that more than half of the surveyed population doesn't know the importance of colostrum to the newborn and similar proportion of

[21]Fever, ARI and Diarrhea prevalence (*18.6%, 9.3% and 10.2%, respectively*) of the 12-23 months age of children was the highest as compared to other age groups.

[22] ACC/SCN (1997). Third Report on the World Nutrition Situation. ACC/SCN

[23] Latham MC (1997). Human Nutrition in Developing World. (FAO Food and Nutrition Series – No 29). Rome

children (52%) did not receive the colostrum. This is because the majority of the mother's who don't understand the importance of colostrums to the newborn didn't administered the very first food for the newborn. On the contrary, a baseline survey of care and feeding practices conducted in four provinces of Pakistan[24] including Sindh province indicated that Colostrum was given in almost all areas of this study because it was considered to be nutritious, full of proteins, and thought to keep the child healthy. However, the study also revealed that male participants from Sindh did not agree and opined that in their areas, colostrum was not administered as it caused abdominal pain and was hard to digest.

The logistic model of the study finding also showed that, children whose mothers don't know the importance of colostrum were 1.2 times more likely to be wasted compared to children whose mother know at least one of the importance of colostrum. This is probably because colostrum provides protective effect to the newly born and infants who did not receive colostrum may have high incidence, duration and severity of illness such as diarrhea which contributes to malnutrition.

When the mothers who had not fed their child the colostrum were asked the reason they throw away the colostrum, the majority (42.8%) responded that "it's not good for child", while 26.9% said elders advice and 23.0% mentioned yellowish color as the reason not giving colostrums to the new born. It has been proved that material education has an important effect on the use of colostrum and on advocating better feeding practices[25] (Piechulek et al., 1998). This shows that one opportunity to improve child-feeding behavior lies in material education. Thus, emphasis should be given to nutrition education on the value of colostrum to mothers the study area. Since more than one-quarter of the surveyed mother's throw away colostrum by elders advice, which indicates the widespread lack of awareness of its qualities and its key role in contributing to the health and growth of the newborn. Therefore, awareness creation programmes on appropriate child feeding and care practices should target elderly as well. Special emphasis should be given on feeding colostrum in the first hour is the first step and it is imperative that every newborn must receive the very first food first to get ahead in the race against malnutrition.

On average, breast-fed babies have fewer infections in their early life. The main reason for this is that antibodies[26] are passed in the breast milk from mother to baby. Breast-fed babies have less diarrhoea and vomiting, and less childhood illness as compared with babies who are not breast-fed. Therefore, continuing breastfeeding during illness constitute a major component of child caring practices. The multivariate logistic regression analysis identified breastfeeding during illness as determinant of wasting among children. The analysis indicated that the risk of being malnourished for those children who were breastfed more than usual when they were sick

[24] Complementary Feeding Practices in Pakistan: a baseline survey of care and feeding practices and development of an intervention strategy. [Final Report]. Naila Baig-Ansari, Imtiaz Hussain, Gul Nawaz, Aatekah Owais, Arjumand Rizvi, Sajid Soofi, Zulfiqar A. Bhutta

[25] Piechulek H, Aldana JM and Hasan MdN (1999). Feeding practices and malnutrition in children in rural Bangladesh. Food and Nutrition Bulletin; 20 (4). 395-400

[26] Antibodies are proteins that help to fight infection.

decreased significantly when compared to children who were breastfed less than usual when they were sick. Even for children who are only mildly malnourished, the risk of death from a bout of illness is twice that of well-nourished children[27]. Therefore, even though in Sindh, breastfeeding is widely accepted, the key areas that still require due attention include the concept of continuation of breastfeeding during and after illness. Sick children appear to prefer breast milk to other foods[28], so continued, frequent breastfeeding during illness is advisable. In this regard, it is important to launch an educational campaign to inform women about the benefits of continuing breastfeeding and to increase frequency during and after periods when their children are ill. In addition, exclusive breastfeeding up until 6 months of age and the proper timing of introduction of complementary foods to children should be addressed in such campaigns.

Recommendations for complementary feeding revealed that mothers should start to introduce complementary foods to their children sometime between 4 and 6 months of age[29]. Contrary to WHO's recommendations, more than half (50.6%) of the children were introduced to complementary foods between 7-11 months. Unsurprisingly, the bivariate analysis of this study showed that the prevalence of wasting was significantly higher among children who had started complementary feeding between 7-11 months of age as compared to other groups. The result further strengthens the fact breast milk alone provides a proper balance and quantity of nutrients ideal for the first four to six months of life. Even though, the significance of this variable disappears in the multivariate model, in areas like Sindh, the age at introduction of complementary foods is of public health importance because of the risk of diseases, particularly diarrhea, from contaminated complementary foods and the risk of growth faltering and malnutrition from delayed introduction of complementary foods. This study has also indicated that the timely introduction of complementary foods at about 6 months is not widely practiced. Therefore, education with this regard is also important intervention. It is a general consensus that a focus on complementary feeding, combined with continued attention to protection, promotion and support of breast-feeding, will address an important cause of malnutrition. Programs must put special emphasis on the crucial period from birth to 18 months[30].

It seems paradox that, a significantly higher prevalence of wasting was observed among children whose mothers' are aware of duration of exclusive breastfeeding (4-6 months) and children who are still breastfeeding (bivariate analysis). This Cleary indicated that knowledge on duration of an appropriate infant and young child feeding do not necessary give a guarantee to adequate nutritional status of children without appropriate attitude and practice. It is therefore necessary to undertake further research on these groups of women that involves their

[27] Guiding principles for feeding infants and young children during emergencies. WHO (2004). Geneva

[28] Brown KH, et al. Effects of common illnesses on infants' energy intakes from breast milk and other foods during longitudinal community-based studies in Huascar (Lima), Peru. Am J Clin Nutr 1990;52:1005-13.

[29] PAHO/WHO (2003). Guiding principles for complementary feeding of the breastfed child. Pan American Health Organization/World Health Organization. Division of health promotion and protection. Food and Nutrition Program. Celebrating 100 years of health.

[30] WHO (1996). Child malnutrition. Fact sheet No. 119. Geneva.

behavior, feeding, workload and child care practices. On the other hand, even if, it's not clear why more malnourished children are found among children who are still breastfeeding, it might be due to the health and nutrition situation of the women. It is thus important that mothers are advised to maintain breastfeeding frequency even when they are ill. Mothers should be reassured that milk quality is unchanged during illness, and that it is not the cause of their child's illness. Further research on the relationship between maternal and child nutritional status, food preference, feeding during pregnancy and other related factors which are important components of improved nutrition is suggested.

Child health and health related factors: Unfavourable health environment caused by inadequate water and sanitation can increase the probability of infectious diseases and indirectly cause certain types of malnutrition [31,32]. The logistic regression analysis identified quantity of water collected per day as one of the most important explanatory variables determining the nutritional status of children in the study area. The analysis showed that the risk of being malnourished for those children who are from households that collect more than 20 litre per day is significantly decreased when compared to those children who are from households that collect less than 20 litre water per day.

Although it has never been clearly defined the average quantity of water necessary to keep somebody in good health, this basic quantity of water necessary includes the water for keeping the body moisturizing (drinkable water) and the water for basic hygiene. It would seem that 7 liters of water be the least to remain in good health (with moderate physical activity at room temperature a little above average). Considering the average family size was found to be 6.43, at least 42 litre per family seems the minimum quantity of water that can assure both consumption as well as hygiene. The finding of this NCA study suggests that ensuring hygiene (hand washing and basic food hygiene, laundry/bathing) is difficult unless carried out at the source. Improving water quantity has a positive effect and a reduction of around 20% in the risk of contracting a diarrhoeic infection. The high prevalence of diarrhoea as found in this survey could be related/associated with inadequate quantity of water. Therefore, increasing the volume of use does bring significantly proportionate gains in the nutritional status among children. Although the main source of water listed as hand pump is considered as 'safe', the finding of this study justifies the importance to increase the water quantities taken back to the homes per head through creation of a new and additional safe water point.

It is well known that infections and malnutrition have a synergistic effect on health. Diarrhea and other infectious diseases manifested in the form of fever affect both dietary intake and utilization, which may have a negative effect on improved child nutritional status. Although the significance disappears in the multivariate mode, the bivariate analysis of this study showed that illness within the two weeks preceding the survey significantly associated with child stunting. The finding indicated that wasting was highest among children with recent illness. It

[31] United Nations Children's Fund (UNICEF). 1990. *Strategies of improving nutrition of children and women in developing countries*. New York: UNICEF.

[32] Engle, P.L. 1992. Care and child nutrition. Theme paper for the international conference on nutrition (ICN): Paper prepared for nutrition section, UNICEF, New York

is, therefore, important to share and act on information about disease management with mothers in the study area. Prevention is important because once disease occurs; the body is weekend and becomes susceptible to malnutrition. Therefore, improving water and sanitation should be a primary focus to interrupt or reduce the transmission of disease agents that cause diarrhea and fever. Follow-up study to examine disease influence rate in the study community and risk factors for occurrence of the diseases is also recommended in order to design appropriate intervention for the control of the problem.

The bivariate analysis also showed that treatment of water before household consumption, and hand washing with soap and were significantly associated with wasting. The prevalence of wasting among children of households who don't treat water before drinking was significantly higher as compared with those who do treat. Similarly, the use of soap/ash and child wasting were also inversely related; i.e., as the use of soap increases the prevalence of wasting deceases. Therefore, any hygiene promotion programme in the target community should focus on promoting the importance on the use of soap and treatment of drinking water before consumption.

Dietary factors: The univariate results on the 24-hour recall food frequency data shows that majority of the households consume cereal based staple on a daily basis. The consumption of animal products, vegetables and fruits was very low. In the Sindh community, homemade foods are likely to be composed of cereal based product and in these circumstances the choice of additional ingredients is often severely limited and the ability to mix the food into a nutritious combination is hampered by the mother's lack of knowledge. The findings of the study suggest that children are fed on bulky diets with low nutrient density. Therefore, Nutrition education programs should be strengthened at community level, with emphasis on the importance of enriching complementary diet. Infant and young child feeding of grains can be improved by germinating grains.

4. CONCLUSION

Malnutrition is one of the most important health and welfare problems among infants and young children in Sindh Province, resulting in serious health and economic consequences for both the individual and the family. Based on these and other related findings, this study arrives at the following conclusions to improve children nutritional status in the areas.

- In total 787 children aged between 6 and 59 months were surveyed and the prevalence of global acute malnutrition was estimated at 12.2 % (10.1-14.7 95% C.I.), with the prevalence of severe acute malnutrition estimated at 3.4 % (2.4 -4.9 95% C.I.). Although the magnitude of wasting decreases in comparison with earlier surveys, the overall nutritional status of children under five years is classified as serious considering the presence of aggravating factors such as poor child care practices, high levels of childhood morbidity and acute water shortage.
- Overall, this study has unveiled knowledge on appropriate feeding practice such as importance of colostrum and frequent and more breastfeeding during and after child

illness and access to adequate potable water are the principal risk factors that brought short-term nutritional deprivation (wasting) among under-five children in the study area

- A range of socio-economic, health and child care and feeding practices were found to influence the nutritional status of children in the area.
    - Lack of alternative income source at household level negatively affect the nutritional status of children
    - Breastfeeding is universal in the area. But continuous and frequenct breastfeeding during and after illness is not well practiced.
    - Inappropriate child feeding practices such as late introduction of complementary foods and failure to feed children more often (poor child dietary diversity) are conspicuous threats to the nutritional status of children in the area
    - Lack of knowledge on duration of exclusive breastfeeding, signs of malnutrition and prevention of diarrhea significantly contribute to high incidence of wasting among under-five children in the survey area.
    - In most cases, as the types of food offered to children are of poor quality (mostly cereal sources) which are deficient in quality protein is also other area of concern that can exacerbate the existing childhood malnutrition and needs the due attention.
    - Incidence of illness such as fever, whooping cough and diarrhoea are signficantly detrimental to short-term nutrtional status (wasting) of childern in the study area.
    - This study led to the realization that poor household hygiene and sanitation practices such not using soap/ashes and non-treatment of drinking water are some of the areas of concern that needs appropriate intervention as these factors have significantly affect the nutrition status of children.
    - The health and nutrition education activity was inadequate to address the issue of malnutrition in the districts.

In general based on the survey results, this study led to the conclusion that an integrated multi-sectoral approach is required by non-governmental groups, community and government to increase efforts to improve nutrition, health and food insecurity problems of the study communities. Nutrition education and awareness creation on appropriate feeding practice through community-based nutrition programs, promotion of hygiene and environmental sanitation, access to adequate potable water, income generating activities and sound development strategies and policies on off farm activities are critical to accelerate improvement in children nutritional status in the area.

5. RECOMMENDATION

The study revealed that the causes of acute malnutrition in the areas are multi-faceted, and to improve nutrition sustainably simultaneous action may be required in many ways.

The following are specific recommendations:-

12. *Based on the anthropometric findings there is a need to strengthen the therapeutic and supplementary feeding programme in place:* Strengthen the performance and coverage of the current CMAM (therapeutic and supplementary feeding programme) supported by ACF International to cap a rise in moderate malnutrition and prevent an increase in severe acute malnutrition in the most vulnerable groups, targeting children U5 and PLW in the months ahead. Consider expanding the programme to additional Union Councils, monitoring the performance and nutrition situation closely. Review OTP site selection to ensure that access is maximized and high coverage achieved and strengthen the referral linkage between each component of the CMAM programme and strengthen early case identification through community mobilization.

13. *Support initiatives that enhance the own production of nutritious food and increase resilience through the diversification of income, like alternative income generating opportunities within the province:* Since the study revealed that households are having one income source have higher level of acute malnutrition, improvement of household resources through diversification of agriculture, promotion of irrigation and initiation of income generating livelihood options is recommended. One suggestion to the surveyed communities is modernizing the primitive agricultural system for households having the lowest income and owning some agricultural land, should be provided with improved seeds, fertilizers and irrigation facilities such as loan for digging wells and supply of electricity for irrigation on subsidized basis by the government and different agencies. These measures would help the poor households to produce more food grains and hence have an increased income.

14. *Strengthen water, sanitation and hygiene (WASH) programming.* Since the study has shown that lack of adequate potable water is the principal risk factor of acute malnutrition, efforts should be made to continue development and maintenance of safe of water sites to improve both access to and quality of water for both human and livestock consumption. The high rates of current childhood illness reportedly caused by fever and diarrhoeal disease can largely be attributed to poor access to safe water, sanitation and hygiene practices. A community education campaign on water treatment methods to safe guard against the spread of disease from suboptimal sources of water. Training of mothers on home management and knowing where and when to refer a sick child should be a strong component of any community health education messages delivered in the Woreda.

15. *There is an urgent need to strengthen linkages amongst the various ACF programmes affecting nutrition.* Food security, nutrition security, and health security are complementary, but currently, these programs operate in a manner largely independent of one another. Target Thalukas or Union Councils, for any one program are currently often chosen with little consideration of the coverage of other programs

impacting nutrition. There are typically no linkages between different systems of identification of household beneficiaries; one does not know if WASH or food security beneficiary is also a beneficiary of targeted supplementary feeding or of the government's food security program, for example. Therefore, household food security or nutrition and health actions need to be implemented in a coordinated way to bring down malnutrition. Furthermore, there is a lack of an adequate system to track nutritional outcomes over time that needs to be strengthened.

16. *Strengthen the capacity of the health system through technical, logistical and financial support to implement the nutrition programme*. One of the challenges in nutrition projects is the capacity constraints likely to inhibit the delivery of project services or the support systems necessary for these services

    - Training and follow up of health facilities staff to support and deliver enhanced community awareness raising and mobilization for early detection and SAM cases and OTP referral. Emphasis should be also given to care of sick child especially relating to home management of diarrhoea, and use of ORS.
    - Enlist and train community health workers to identify malnourished children in community, refer them to health facilities and follow up children progress after discharge.

17. *Promotion of family planning programme:* Given that the study communities are densely populated, high population density might have impacted on the food and nutrition situation by reducing the land holdings to a size, which can hardly support a household. Hence, a strong and sustainable promotion of family planning programme should be one of the priority interventions to stop the steady population growth in the study areas.

18. *Enhancing dietary diversification:* In view of the poor animal product and fruit intake, promotion of household garden to supply food such as fruits and vegetables that are particularly rich in vitamin A and iron are recommended. A number of such food items can be produced at home or at community plot and ensures food supply even during crop failure. Household dietary diversity can also be improved through community education on planting diversification, appropriate cropping community nutrition information to promote a diversified nutritious diet.

19. *Provision of sustained nutrition education:* The study has disclosed that inappropriate child feeding is one of the threats of child nutrition thus, demonstrative and sustained nutrition education on appropriate infant feeding practices and preparation of appropriate diets is strongly recommended. Improvement of maternal health, through safe motherhood program is also recommended to make them able to provide optimal care for their children

20. *Strengthen advocacy, social mobilization and program communication:* Addressing the multiple causes of child malnutrition in Sindh depend on the active participation of a large number of stakeholders at different levels, and strong multi-sectoral linkages. The results of the NCA study needs to capture the attention of policy decision makers and the public at large. It also needs to support the community-based behavioral change efforts through strengthening the communications skills of frontline health workers, and reinforcing their efforts through well targeted mass media efforts. Local radio programs or newspapers may be particularly effective

21. *Strengthen nutrition information system:* Explore ways to better monitor the nutrition situation in the region, incorporating key health and food security factors identified through causal analysis. Develop the specific skills within the district to manage this information, ultimately resulting in a more effective multi-sectoral surveillance system.

22. *Improving the nutritional status of mothers:* Although, mothers' nutritional status is not included in this study, it is clearly known that this in turn affects children nutritional status (since child malnutrition starts in the womb), therefore improving the nutritional status of mothers is very important for the normal and balanced growth performance of children.

Annex 1: ToRs for NCA

Context

In Sindh, Global Acute Malnutrition (GAM) rates were critically high even before the 2011 floods. A flood affected nutrition (FAN) survey conducted in November 2010 showed that 23% and 21 % of children in Northern Sindh and Southern Sindh, respectively, were acutely malnourished (Table 1).

Table 1: Prevalence of undernutrition

Indicators	North Sindh	South Sindh
Global Acute Malnutrition (<-2 z-score and/or oedema)	22.9 % (19.0 - 27.4 95% C.I.)	21.2 % (17.3 - 25.6 95% C.I.)
Severe Acute malnutrition (<-3 z-score and/or oedema)	6.1 % (3.9 - 9.3 95% C.I.)	2.9 % (1.7 - 5.1 95% C.I.)
Chronic Malnutrition (<-2 z-score)	53.9 % (46.2 - 61.5 95% C.I.)	51.8 % (44.5 - 59.0 95% C.I.)
Child Morbidity	54.2% (45.8 - 62.7 95% CI)	42.8% (33.5 - 52.1 95% CI)
Maternal malnutrition (Moderate Malnutrition)	11.2 % (7.1 - 15.3 95% C.I.)	10.1% (5.1-15.1 95% CI)
Maternal malnutrition (Severe Malnutrition)	1.9 % (0.1- 3.6 95% C.I.)	0 % (0.0- 0.0 95% CI)

Source: FAN survey October 29th - November 4th, 2010

The draft report of the National Nutrition Survey (NNS 2011)[33] showed that Sindh had one of the highest rates of malnutrition in the country (Table 2) which indicates a critical nutrition situation.

Table 2: Nutritional status of under five year children ()

Indicators	NNS 2011		NNS 2001 - 2	
	Country	Sindh	Country	Sindh
Stunting	43.7	49.8	41.6	49.2
Wasting	15.1	17.5	14.3	21.3
Underweight	31.5	40.5	31.5	49

Source: Draft report NNS 2011

General livelihoods

Before 2007 flood, 65.5% of HHs depended on their own production to accede to food, followed by 34.5 % of HHs that purchased it in the markets and 0.5% of HHs that depended gifts or remittances (ACF, 2007 a). Local village markets are not much used because the availability is low and prices are high. 96% of households prefer to go to markets in towns like Shahdadkot, Warah, K.N. Shah, and Johi if they need to purchase food (ACF, 2007 a). In flood affected areas, accessibility to food could be a problem even when food is available in the markets. The draft NNS 2011 report shows that Sindh has the lowest index of food security (28.2 %) (National figure is 41.9 %). The situation can only be expected to have gotten worse with the onset of 2011 floods and the resulting loss of property, food stocks and the damage to standing crops

[33] Final report of National Nutrition Survey 2011 is still pending.

(GOP, Aga Khan University and UNICEF, 2011). Livelihoods of Sindh especially in coastal areas like Thatta and Badin are constantly under threat of a number of factors like recurring natural disasters, decreased flow of fresh water to the Indus delta, increase in water salinity, inability of infrastructure to drain off storm water, and inequities in land and water distribution (World Bank and Government of Sindh 2005). 96 % of the households listed "food" as the first item that they would purchase when they have cash in hand while the main source of the cash is "selling products/produce from farm land" (44 % of the total) and "casual labor wages" (44 % of the total). 12 % of the population has diversified sources of income (ACF-Pakistan, 2009). Problems faced by the farmers are "seed" as the number one followed by fertiliser, salty soils, pesticides, seeds storage and the marketing of basic products. Three most frequent coping mechanisms are limiting food portion, relying on less preferred and less expensive food, and buying on credit (ACF-Pakistan, 2009).

Cyclical natural disaster

Sindh Province faces recurrent natural disasters like flood and cyclone. Flood of 2010 and 2011 were major in last decade.

Floods in July/August 2010

Across the country floods affected the lives of over 18 million people, washing away communities and livelihoods, and forcing millions to flee from their homes. The crisis took the lives of a confirmed 1,980 people and left an estimated 14 million in need of humanitarian assistance (OCHA, 28 July 2010). According to a FAN survey 2010, Sindh was the worst affected province followed by Punjab, Khyber Pakhtunkhwa, and Balochistan. As of 2010 December 14th, the Government of Sindh reported that more than 7,300,000 people were affected and 876,000 houses were damaged. The number of people who had to leave to Government relief camps was 1,816,000. Twelve thousand villages and 2,611,305 acres of crops were affected. Thatta and Dadu were included among the eight severely affected districts, and in addition, there were nine moderately affected districts. The humanitarian response was organized through the cluster approach and was composed of relief and early recovery interventions. The types of support provided to the affected population are: 1) **Emergency relief**, **shelter and winter preparedness, food aid, food security and agriculture -** food-for-work, supplementary feeding and school feeding programs and agriculture inputs were provided, and government also provided Watan cards allowing households to withdraw 20,000 PKR; 2) **WASH -** hygiene interventions and NFI distributions were provided and the WHO conducted water testing to follow water quality; 3) **Health - ARI,** skin disease, acute diarrhea, suspected malaria, bloody diarrhea, and unexplained fever were major health problems. Dengue cases were also reported in the province. Training sessions were organized by the health cluster on dengue case management and nursing care; 4) **Nutrition - in South Sindh,** implemented by OTPs and SFPs covering 170 sites that provide emergency nutrition services. A total of 44,452 children aged 6 to 59 months old were screened for acute malnutrition: 3,884 detected as severely malnourished and 7,672 as moderately malnourished. These children were admitted in OTPs and SFP depending on their status. Also, 3,085 pregnant and lactating women were registered. **In Northern Sindh**, a total of 9,215 severely malnourished and 17,062 moderately malnourished

children were admitted to nutrition programs from the end of September, 2010 to January 4, 2011 (GOS, UNICEF and ACF, 2010).

2011 flood

The Central Emergency Response Fund (CERF) has allocated US$17.6 million (PKR 1.54 billion) to provide water, food, shelter and healthcare to thousands of families devastated by floods in Pakistan (OCHA New York, 7 October 2011). According to a recently completed joint UN-Government Multi – Sector Needs Assessments (MSNA) 2011-Pakistan, in strata 4[34] the four top priorities of communities are housing, health, education and clean water in descending order. According to MSNA, more than five million people are in need of humanitarian assistance in Sindh and Balochistan. In addition to that, 4.3 million people are food-insecure - 2.2 million people severely food-insecure and 2.1 million people moderately food-insecure - in the flood-affected areas of Sindh and Balochistan. Access to safe drinking water and sanitation facilities remains a critical issue. Findings indicate that the floods reduced access to piped drinking water among the affected people and increased the number of people relying on unprotected and untreated sources of water and open defecation (OCHA Pakistan, 24 November 2011 sitrep). According to UNICEF Pakistan update on 23 November 2011, overview situation of Sindh is as below:

- 4.8 million of people have been affected by the floods, of which 2.4 million are children and 1.2 million women,
- 57 % of affected villages are still flooded and expecting to take several weeks to clear,
- Most affected and in need of assistance are the poor (40 %), especially children (21 %) and women (17%),
- 46 % of the health facilities were damaged by the floods,
- Breast feeding frequency was reduced from five to four times a day in flood-affected areas,
- Open pit latrine use decreased roughly by 10% and open defecation increased by 11-17 %, increasing exposure to disease,
- Over 733,000 children were pushed out of school due to the impact of floods, and
- 60% of the schools have been damaged.

Table 3: Dimension of the Emergency

Description	Magnitude of affect
No. of Houses damaged (average HHs size 8.6)	750,000 to 900,000
Flood affected areas still under water in villages	33 %
% of families returned to their own homes (mostly destroyed/damaged)	76%
% of food insecure population (out of affected population)	43% (59% Female & 33% Male)
Female headed households dependency rate is (adult females per dependent children (0 to 17 years and elderly over 65 years)	70 %
Staple food crops lost	70 %
Livestock lost	49 %
Livestock sold	14 %
Latrines not present in settlements	80 %

[34] There are four districts - Badin, Tando Allahyar, Tando Mohammand Khan and Thatta – in strata four.

Damages to health facilities across all stratas on average	46 %
Unavailability of schools and teachers due to recent flooding	60 %
% of the households, post floods, that do not have important civil documentation	85 %

Source: Multi – sector needs assessments 2011

According to MSNA 2011, the overall situation has changed compared to pre-flood situations. In strata 4, since the floods there is a 10 % decrease in number of people getting water from protected sources; more than 5% decrease in piped water sources and about 10 % decrease in the share of people using improved dry pit latrines in strata 4. Majority of HHs use open areas for defecation.

On the preceding day from the survey, on average young children were only fed 1 time/day, (young children are supposed to be fed 3-5 times/day). Poor infant and young child feeding practices, poor food diversity and consumption score, high morbidity and poor food security indicators, worsening of nutritional situation and related higher mortality and morbidity are the expected outcomes.

Underlying causes of undernutrtion

According to FAN survey 2010, 51% HHs practiced open defecation. Of those who had access to a toilet, a majority (68%) used flush/pour flush toilet and 32% used pit latrines. More than half of the interviewed HHs did not dispose of proper child excreta and drops of children and livestock were identified dispersed everywhere around the houses and villages during field observations.

According to ACF pre and post KAP survey of WASH interventions in Thatta district, most people don't have the habit of using latrines, safe disposal of solid waste and other hygiene practices. Before ACF´s intervention, 63% people used tube wells with hand pump for water which was increased to 98 % after the intervention. Also, before interventions, 68 % HHs washed hands only with water, and after that, 87 % HHs washed hands with soap. Open defecation is one of main causes why diarrhea and gestroenteritis spread in epidemics in the villages. Before the ACF´s intervention, 29 % HHs burnt and disposed their waste while the disposal increased to 69 % after hygiene education. Diarrhea was reduced from 48 % to 27 % after ACF interventions (ACF, 2011a).

ACF conducted different surveys in different area which findings are given in Table 4. From the analyses of the different nutrition surveys conducted in Sindh, it can be concluded that no significant progress was achieved in the last 10 years in reducing the prevalence of undernutrition in Sindh.

Table 4: Prevalence of undernutrition in selected Talukas of Dadu and Thatta

Year of study	District and Talukas	Prevalence of undernutrition (%)			
		GAM	SAM	Stunting	Under weight
2011 Nov ACF	Mirpur Bathoro (Thatta)	12	1.9	41.5	32.9
2011 October ACF	KN Shah (Dadu)	19.1	4.6	51.3	46.2
	Mehar (Dadu)	19.9	5.9	54.1	52.6
2008 June ACF	Dadu district average	22.7	3.7	-	-

2007 Nov ACF	Dadu district average	17.8	3.2	-	-

Based on the above facts, a summary of underlying factors for undernutrition is listed below:

- Poor household access to sufficient food,
- Poor household access to safe food and nutritious food - poor household access to diversified nutritious food, food is monotonous, normal food is being provided to children, dominated by carbohydrates and poor in vegetable and protein as per the requirement of children (U5),
- Inadequate child care practices - care of children and lactating and pregnant mother are not in their knowledge and priorities, grandmother plays vital and influential role,
- Maternal and child health (MCH) care is poor and traditional practices and social taboos are dominant,
- Poor hygiene and sanitation knowledge, attitudes and practices – basic awareness on health, hygiene and nutrition - is strongly lacking, open defecation and throwing of garbage in open spaces is common practice. Similarly, personal, domestic and food hygiene are poor,
- Poor potable water quality – sources of potable water are boreholes, canals and ponds; the water from canals and ponds being often contaminated and not safe to drink, and
- Poor access to health services and shortage of staff in health facilities.

ACF Presence and Strategy in Sindh Province

ACF International is a humanitarian organization committed to ending world hunger. Recognized as a leader in the fight against malnutrition, ACF works to save the lives of malnourished children while providing communities with access to safe water and sustainable solutions to hunger. With over 30 years of expertise in emergency situations of conflict, natural disaster, and chronic food insecurity, ACF runs life-saving programs in some 40 countries benefiting five million people each year.

In September 2010, six INGOs (including ACF), formed the 'Pakistan Emergency Food Security Alliance (PEFSA)' in order to maximize effectiveness in the response through jointly exploring different modalities adapted to the specific circumstances in the affected areas. In December 2011, the 'Consortium of British Humanitarian Agencies' came together to provide early recovery support to flood affected communities in Pakistan and facilitate the sustainable return of families to their villages. The initial emergency response operations focused on distribution of dry food and cash vouchers for fresh food while later on shifted to cash for work, conditional and unconditional grants for small farmers, wage labourers, most vulnerable and micro businesses. In Sindh, ACF is currently implementing five projects:

- Emergency nutrition program in **Dadu** funded by CIDA for the period of April 2011 – March2012,
- Emergency food security and nutrition support to 2010 flood affected populations in **Thatta** (PEFSA II) funded by ECHO for the period of July 2011 - March 2012,
- Improving living conditions in a changing environment in **Thatta** funded by the World Bank and Japan Social Development Fund for the period of December 2009- December 2012,
- Emergency humanitarian water, sanitation and hygiene (WaSH) response in **Thatta** funded by CIDA for the period of February 2011 - November 2011,

- Emergency relief fund nutrition project in **Thatta,** funded by UNOCHA for the period of April 2011 – November 2011.

ACF developed a standardized NCA method for analyzing the causes of malnutrition in order to inform the design of programming and improve the relevance, appropriateness and effectiveness of activities aimed at preventing malnutrition. The methodology was tested and refined in 2010-2011 across a number of contexts with a high prevalence of malnutrition including Bangladesh, Zimbabwe and South Sudan, and adapted for practical use by field teams. The nutrition causal analysis (NCA) is also intended to be useful as a platform for informing the broader stakeholder response, and for ensuring that this response reflects an appropriate contextualized understanding of malnutrition's complex multi-causality.

The NCA is based upon the UNICEF framework of malnutrition (cf. Appendix 2). ACF is one of the few NGOs that regularly conduct comprehensive NCAs, either as part of ongoing programmes where expected reductions in malnutrition have not been achieved, or to lay the groundwork for strategy development in new areas of engagement.

ACF will lead an NCA in the proposed study area in order to increase knowledge and understanding of the underlying causes of malnutrition and to inform future design of programmatic strategies. These can include infant and young child feeding practices; food traditions and beliefs; food access and dietary diversity; micronutrient deficiencies; and access to health services, clean water and sanitation.

Pakistan integrated nutrition strategy (PINS) operation plan (July 2011- December 2012) identified three action areas, 1) Actions to prevent and treat acute and chronic malnutrition, 2) Interventions that address the underlying causes of malnutrition with a multi-sector approach, and 3) Interventions that address basic causes - advocacy, awareness raising, policy and planning, coordination, M&E, financing. The NCA will especially focus on the second point to identify detailed causes, their relative importance and interaction. The results of the study are likely to be used by the government and agencies or clusters to design the appropriate programme interventions to improve the nutritional status in the study area. In addition to that, it will be a guiding document for further replication of NCA in other Districts and Provinces.

Objectives

The main objective of the NCA is to identify and understand the causes of acute malnutrition in the study area in order to improve advocacy and design of appropriate and relevant programs.

Specific objectives of the study are as below:

- Identify and rank the main risk factors and causal pathways of undernutrition in the study area and
- Contribute to a broader understanding of the underlying causes of acute malnutrition among key stakeholders through the dissemination of the study report and the delivery of a workshop sharing major study findings.

Basic methodology

Process of the study

Bottom up participatory and appreciative inquiry approach will be adopted by using ACF NCA guidelines. The study methodology will be developed and finalized in consultation with government, clusters and technical experts from Nutrition, Care Practices, Food security and livelihood (FSL) and WASH sectors. The study hypothesis will be endorsed by government agencies and clusters from Province and Federal levels, and the study report will be shared through workshop accordingly.

Research protocols

The study will follow the following steps:

- Defining and describing the case - objectives of the NCA, population of interest, sampling frame, and magnitude and severity of the undernutrition, etc,
- Developing hypothesis (research hypothesis is given in Appendix 1),
- Gathering evidence,
- Weighing and understanding the evidence - descriptive and correlational analysis of statistical data to identify prevalence and distribution of the undernutrition, magnitude and severity of risk factors, cluster of statistical data to identify clusters of risk factors and their association with malnutrition, etc.,
- Determining the relative importance of causes, and
- Understanding the dynamics of causes.

Conceptual and study framework

An adapted version of the UNICEF framework of malnutrition will be used as a conceptual framework for the study (Appendix 2).

Study design

Qualitative and quantitative approaches will be used to gather information, including through stakeholder workshops, focus groups, key informant interviews and a cross-sectional household survey. Possibilities of using stratified sampling will also be considered. Under probability sampling technique, random and cluster sampling will be used to select the study units. Anthropometric measurement will be undertaken and regression analysis will be done to correlate undernutrition with different risk factors.

Expected outcomes

The NCA will contribute to improving the nutritional status of children and pregnant and lactating women by increasing understanding of the underlying factors of undernutrition in the specific study areas. It will further guide stakeholders including ACF to design its programmes in an effective and efficient way to address the causes for undernutrition through empowering staff, partners and rights holders.

Calendar of operation

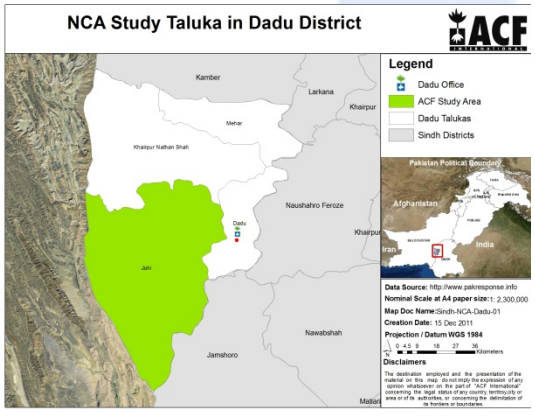
The study has been planned from November 2011 to March 2012 and a brief plan is provided below:

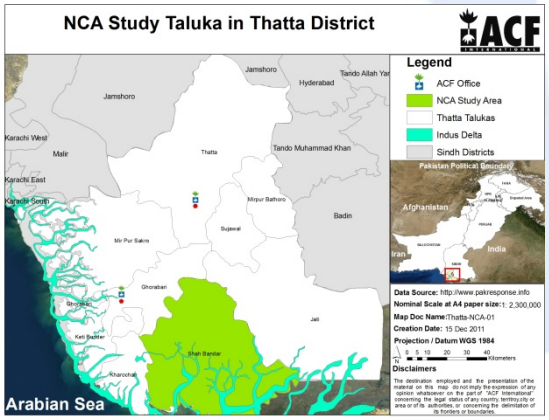
Table 1: Plan of action for NCA

SN	Main activities	Months									
		Nov		Dec		Jan		Feb		March	
		I	II	I	II	I	II	I	II	I	II
1	Literature review										
2	Preparation and validation of TOR for NCA implementation										
3	Development of NCA hypothesis										
4	Hiring of staff										
5	Validation of NCA hypothesis - through stakeholders workshop at Province and Islamabad										
6	Designing the study - sample, study clusters, data collection tools, indicators, etc										
7	Validation of indicators and tools										
8	Designing and finalization of study questionnaire										
9	Training of field study team										
10	Pretesting and finalization of questionnaire										
11	Field study										
12	Data entry and analysis										
13	Preparation of draft report										
14	Preparation of final report after incorporating feedback										
15	Presentation of NCA report to clusters - Hyderabad and Islamabad										

Location and population of study area

The study will be conducted in Johi Taluka of Dadu district and Shah Bunder Taluka of Thatta Districts, Sindh Province.





Johi is subdivided in 10 Unions Councils, while Shah Bunder, in five. According to 1998 census, total population for Johi and Shah Bunder is 207, 383 and 100, 575 respectively (http://www.districtthatta.gos.pk/TalukaAdministration.htm).

Appendix 1: Hypothesis for study

- Inadequate (quantity and quality) food intake by infant, young children and pregnant and lactating women,
- Poor diet diversity of the children and pregnant and lactating mother,
- Limited food availability at households (HHs),
- Limited HHs income and high price inflation,
- Lack of social safety nets,
- Insufficient potable water,
- High prevalence of open defecation,
- Poor hygiene and sanitation knowledge, attitude and practices (food, household and personal),
- Poor immunization coverage,
- Lack of required health services/facilities,
- Lack of exclusive breast feeding,
- Lack of mother's awareness about complementary and supplementary feeding and feeding during illnesses, and care and food requirements for pregnant and lactating mother,
- Cultural traditions, habits and beliefs affecting infant feeding and care practices, and
- Poor psychological care of children.

Annex 2: Household Questionnaire

PAKISTAN
NUTRITION CAUSAL ANALYSIS
HOUSEHOLD QUESTIONNAIRE (6 -59 Months child)
January 2012

INSTRUCTION TO ENUMERATOR	
Greet the household first and then introduce yourself as follows: "We are from ACF. We are conducting nutrition causal analysis to assess the causes for malnutrition which would help us to design the prograr improving the nutritional status of the population. We would like to talk with you about this and we will also weigh and measure children younge years of age. The interview will take **about 60 minutes.** All the information we obtain will remain strictly confidential and your answers will n disclosed to anyone else. This is voluntary and you can choose not to answer any or all of the questions. However your participation is importan success of this survey. During this time I would like to speak with the household head and mothers or others who take care of children in the hou May I start now?" ☐ Yes ☐ No **(If permission is granted, begin the interview if not, thank him/her and complete SECTION I. Inform your team leader about the situation.)**	
Q NO:1	**SECTION 1: IDENTIFICATION**
Date of Interview ___ ___/ ___ ___/2012 Day Month	Name of Respondent: _____ HH No: _____
Name of Interviewer: _____	Team #: _____
Area/Location:	I) Province: Sindh II) District: Thatta/Dadu III) Taluka: Shah Bunder/Johi IV) Union Council: _____ V) Unit/'Deh': _____

VI) Village/Cluster No: _____ Village/Cluster Name: _____

Note: First index child should be identified by lottery method in case of more than one child of age between 6 – 59 months old, and related questions should be focused to index child.

Q No: 2 **SECTION 2: HOUSEHOLD COMPOSITION:**

<table>
<tr><td>2.1= What is the care giver relationship with index child</td><td colspan="7">1=Mother, 2=Father, 3=Aunty, 4=Brother, 5=Sister, 6=Grandmother, 7=Neighbour, 8=Maid, 9=Other (Specify):</td><td></td></tr>
<tr><td rowspan="2">2.2= Total number of family members</td><td></td><td colspan="6">AGE (MONTH/ year)</td><td rowspan="2">If >12 years mention main Occupation</td></tr>
<tr><td>< 6 months</td><td>6 – 23 months</td><td>24 – 59 months</td><td>6 - 11 years</td><td>12- 17 years</td><td>18-49 years</td><td>>50 years</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">2.3= Cast: 1 = Babar, 2= Baran, 3= Marri, 4= Brohi, 5= Bohar, 6= Chandio, 7=Channa, 8=Jhareja, 9= Chinjini, 10=Dadani, 11= Dhandhal, 12=Gadihi, 13= Ghuno, 14=Gopang, 15= Gumb, 16= Jamali, 17= Jat, 18= Jatoi, 19= Khaskheli, 20= Khokhar, 21= Khoso, 22= Kori, 23= Kumbhar, 24= Laghari, 25=Lashari, 26= Lund, 27= Machi, 28=Mallah, 29= Mandrio, 30=Manjirio, 31=Morio, 32= Otho, 33=Panhwar, 34=Panjabi, 35=Parreri, 36=Qambrani, 37=Qazi, 38=Ratta, 39=Rind, 40=Rodnani, 41=Rustemani, 42=Samejo, 43=Shah, 44=Shahani, 45=Sheikh, 46=Solangi, 47=Thaheem, 48=Zangejo, 49=Other (specify).</td><td></td></tr>
<tr><td>2.4= Head of Household</td><td colspan="6">1=Male ≥ 18 years, 2=Female ≥18 years, 3=Male < 18 years, 4=Female < 18 years</td><td></td></tr>
<tr><td>2.5= Marital Status of Head of HH</td><td colspan="6">1= Married, 2 = Cohabitating (not married), 3 = Divorced, 4 = Living apart, not divorced, 5 = Widow or widower, 6 = Single</td><td></td></tr>
<tr><td>2.6= Relationship of HoH to index child:</td><td colspan="6">1=Son, 2=Daughter, 3 = Niece / Nephew, 4=Grandchild</td><td></td></tr>
<tr><td>2.7= Occupation: (Make</td><td colspan="6">1 = Agricultural work in own land, 2 = Daily Wage Labourer, 3 = Driver 4= Teacher, 5 = Maid,
6= Donkey/Animal cart, 7 = Fisherman, 8 = Share-cropper, 9 = Service/salaried wage, 10</td><td>Pr.1
Pr.2</td><td></td></tr>
</table>

Priorities)	**= Household work, 11 = Student, 12 =Unemployed, 13 = Beggar, 14= Hawker, 15=Small Trader, 16=Farmer, 17= Other (Specify).....**	**Pr.3**	
2.8= Displaced:	**1=loss of shelter after floods & 2011 heavy rains, 2=loss of harvest (floods/rain), 3=lack of economic opportunity/labour, 4=Not Displaced**		
2.9= Education of caregiver:	**1=No schooling, 2 = Some primary, 3= Completed primary (1-5 grade), 4 = Some secondary (6-8), 5= Completed secondary (9-12), 6 = Vocational, 7 = Some university, 8 = Completed university**		

QNO.3 INDEX CHILD	**SECTION 3: BREASTFEEDING AND COMPLEMENTARY FEEDING FOR**			
3.1	HAS THIS CHILD EVER BEEN BREASTFEED AT ANY TIME IN HIS/HER LIFE? **1=YES 2= NO**			
3.2	DO YOU KNOW HOW LONG AFTER DELIVERY SHOULD A MOTHER INITIATE BREASTFEEDING FOR THE NEWBORN? **1= Within 1 Hour, 2 = 2 to 3 Hours, 3 = 3 to 5 Hours, 4 = 6 to 10 Hours, 5= Don't Know, 6 = Other (specify) .....**			
3.3	HOW LONG SHOULD A MOTHER BREASTFEED HER CHILD EXCLUSIVELY (THAT IS, GIVE ONLY BREASTMILK AND NO OTHER LIQUIDS OR FOODS)? **1 = Up to 5 Hours, 2 = Up to 3 Days, 3 = 1 to 3 Months, 4= 4 to 6 Months, 5= 7 to 12 Months, 6= Other(Specify), 7 = Don't know**			
3.4	WHAT DID YOU DO WITH THE FIRST MILK (COLOSTRUM) WHEN CHILD WAS BORN? **COLOSTRUM IS THE FIRST YELLOW MILK. 1=GIVE TO CHILD, 2= THROW AWAY, 3= DO NOT KNOW**			
3.4 A	IF THROW AWAY, WHAT IS THE REASON? **1= Not Good for Child, 2=Yellowish Colour, 3= Tradition, 4= Elders Advice**			
3.4 B	IF YES WHAT IS THE IMPORTANCE OF COLOSTRUM FOR THE NEWBORN? DO NOT READ THE CHOICES, ASK: ANY THING ELSE?, Record all items mentioned **1 = First immunization, 2 = Child growth, 3= Don't Know, 4 = Other (specify)...**			
3.5	WHAT ARE THE BENEFITS OF BREASTFEEDING FOR THE INFANT/YOUNG CHILD AND MOTHER? DO NOT READ THE CHOICES, ASK: ANY THING ELSE? RECORD ALL ITEMS MENTIONED. (MULTIPLE OPTION) **1 = Child growth, 2 = Child health, 3 = Child food, 4 = Comfort (for not crying), 5 = Mother health, 6 = Preventing pregnancy, 7 = Other (specify)**			

3.6	After how many months of exclusive breastfeeding did you first give other liquids and/or foods to the child? **1 = 2-3 months, 2 = 4-6 months, 3 = > 6 months, 4= Others**			
3.7	IS THIS CHILD STILL BREASTFEEDING NOW? **1=YES 2=NO** (IF YES, THAN SKIP 3.8)			
3.8	IF NO, WHY DID YOU STOP BREASTFEEDING? DON'T READ CHOICES, (RECORD ALL ITEMS MENTIONED) **1=MOTHER ILL/WEAK, 2=CHILD ILL/WEAK, 3=NIPPLE/BREAST PROBLEM, 4=INSUFFICIENT MILK, 5=CHILD AWAY, 6=CHILD REFUSED, 7=MOTHER DIED, 8=CHILD GROWN UP, 9=OTHER (SPECIFY)....**			
3.9	WHAT SHOULD BE BABIE'S FIRST ADDITIONAL FOOD WITH BREAST MILK? DO NOT READ THE CHOICES, ASK: ANY THING ELSE? **(RECORD ALL ITEMS MENTIONED)** (MULTIPLE OPTION) **1=VITAMIN, MINERAL SUPPLEMENTS OR MEDICINE, 2= PLAIN WATER, 3= SWEETENED, FLAVOURED WATER OR FRUIT JUICE OR TEA OR COFFEE, 4= ORAL REHYDRATION SOLUTION (ORS), 5= INFANT FORMULA, 6= TINNED, POWDERED OR FRESH MILK, 7= COW'S / BUFFELO'S MILK, 8 = GRUEL / SOFT PORRIDGE / HALWA OF SUJI / RICE PORRIGE, 9=GOAT MILK, 10=FAMILY FOOD, 11=POTATO MASH, 12 = DON'T KNOW, 13 = OTHER (SPECIFY).....**			
3.10	WHAT IS THE MEAL FREQUENCY FOR 6 -23 MONTHS CHILDREN (HOW MANY TIMES DID YOU FEED THE CHILDREN) BETWEEN SUNRISE YESTERDAY AND SUNRISE TODAY (IN LAST 24 HOURS)? **1 = 4 - 6 TIMES, 2 = 6 - 8 TIMES, 3 = 9 - 12 TIMES, 4 = 12 TIMES +**			
3.11	CAN YOU NAME THE SIGNS THAT A CHILD WITH MALNUTRITION MAY HAVE? (DO NOT READ THE CHOICES ASK: ANY THING ELSE? (MULTIPLE OPTION) **1=Thin, 2=Short, 3=Old man face, 4=Irritable, 5=Change of hair color, 6=Sunken Eye Ball, 7= Leg Edema,** **8= Dont know, 9 = Other (specify)..**			
3.12	FROM WHERE DO YOU GET INFORMATION ABOUT NUTRITION AND HEALTH SERVICES (MULTIPLE OPTION) **1 = Doctor 2 = Nurse 3 = Nurse/Midwife 4 = Health-Ext. worker/Auxiliary midwife 5 = Other health workers in NGOs** **6 = Traditional birth attendant 7 = Relative/friend 8 = Other (specify)_____**			
3.13	**WHO USUALLY GIVE ADVICE TO THE MOTHER TO TAKE CARE OF THE CHILD?** **1=GRAND MOTHER OF CHILD 2=GRAND FATHER OF CHILD 3=ELDER PARENTS 4=FATHER OF CHILD 5=MOTHER HERSELF, 6=OTHER (SPECEFY): ----------**			

SECTION 4: IMMUNIZATION

This section is to be completed only by the mother or principle care taker for index child in the household. Use the coding as indicated for each question's correct answers. Check the vaccination card and enter the information accordingly

4.1	NAME OF THE INDEX CHILD				
4.2	AGE (MONTHS)				
4.3	GENDER **1= MALE 2= FEMALE**				
4.4	WHEN YOU WERE PREGNANT WITH INDEX CHILD, WERE YOU GIVEN AN TT INJECTION? (see vaccination card) **1=YES 2=NO 3=YES, BUT LOST CARD**				
	IMMUNIZATIONS THAT CHILDREN HAVE RECEIVED (IF CARD IS NOT AVAILABE THAN DO NOT RECORD)				
4.5	DO YOU HAVE VACCINATION CARD FOR THE CHILD? (IF NO CARD THAN GO TO 4.10) **1=YES, 2= NO**				
		Dose 1	**Dose 2**	**Dose 3**	**Dose 4**
4.6	BCG 1 WITH OPV **1= YES, 0= NO (If Yes verify the mark on the child arm & check Card**				
4.7	(1)DPT1, (2)DPT2, (3)DPT3 **1= YES, 0= NO (see vaccination card)**				
4.8	(1)OPV1, (2)OPV2, (3) OPV3 **1= YES, 0= NO (see vaccination card)**				
4.9	Measles **1=YES 0= NO (see vaccination card)**				
4.10	DID <NAME OF CHILD> TAKE A VITAMIN "A" DOSE LIKE THIS DURING THE LAST 6 MONTHS? Show capsule for different doses – 100,000 IU for those 6-11 months old, 200,000 IU for those 12-23 months old.) **1=YES 0= NO 2= DON'T KNOW**				
4.11	DID YOUR CHILD TAKEN DEWORMING TABLETS IN THE LAST SIX MONTHS? **1=YES 0=NO**				

Q NO 5	SECTION 5 : CHILDHOOD ILLNESS AND MANAGEMENT	RESPONSE	
5.1	HAS CHILD HAD ILLNESS IN THE LAST 2 WEEKS? **1=YES, 2= NO** IF NO, THAN SKIP 5.2, 5.3 AND 5.4		
5.2	IF YES, WHAT WAS THE TYPE OF ILLNESS? (MULTIPLE OPTION) **1=DIARRHOEA, 2=COUGH/UPPER RESPIRATORY TRACT INFECTION, 3=MALARIA, 4=INTESTINAL PARASITE, 5=FEVER, 6= SKIN DISEASE, 7 = OTHER (SPECIFY).....** **Reminder to the interviewer:** **1, Diarrhoea** = any episode of more than three loose stools per day; bloody diarrhoea: any episode of more than three stools per day in which there is presence of blood in stools; **2, Cough/URTI** = any episode associated with fever and cough and at least one of the following signs: running nose, wheezing, difficult breathing, sputum, chest pain; **3, Malaria verified by fever** = elevated body temperature (confirm if test was done), fever, chills, headache, muscular aching and vomiting		
5.3	WHEN CHILD HAD ILLNESS, DID YOU BREASTFEED HIM/HER? (IF CHILD IS BEING BREAST FEED) **1=LESS THAN USUAL, 2= ABOUT SAME AMOUNT, 3= MORE THAN USUAL, 4= NOT BREASTFED, 5= STOPPED BREAST FEED, 6= DON'T KNOW**		
5.4	WHEN CHILD HAS ILLNESS, WHETHER ILLNESS CHANGE THE INTAKE OF SOLID/LIQUID FOODS? **1=LESS THAN USUAL, 2= ABOUT THE SAME AMOUNT, 3= MORE THAN USUAL**		
5.5	IF DIARRHOEA, DID CHILD RECIEVE ORS? (Oral Rehydration Solution) **(IF NO DIARRHOEA, SKIP 5.5 AND 5.6)** **1 = YES 2 = NO** **Reminder to the interviewer:** **1, Diarrhoea** = any episode of more than three loose stools per day; bloody diarrhoea: any episode of more than three stools per day in which there is presence of blood in stools.		

5.6	FOR DIARRHOEA, IF TREATMENT WAS TAKEN THAN WHERE WAS THE TREATMENT TAKEN? **1= HOME, 2 = VILLAGE, 3 = HEALTH FACILITY**	
5.7	CAN YOU LIST THE MAJOR CAUSES OF DIARRHOEA? DO NOT READ THE CHOICES, ASK: ANY THING ELSE? (MULTIPLE OPTION) **1= Dirty/contaminated water/liquid, 2 = Spoiled, stale food, 3 = Not washing hands before taking meal, 4 = Not washing hands with soap after defecating, 5 = Not washing hands with ash/mud after defecating, 6 = Not using sanitary latrine, 7 = Not continuing breastfeeding up to 2 years, 7 = Not giving immunization properly, 8= Don't Know, 9 = Other (specify)**	
5.8	DO YOU KNOW HOW DIARRHOEA CAN BE PREVENTED? DO NOT READ THE CHOICES, ASK: ANY THING ELSE AND RECORD ALL ITEMS MENTIONED. (MULTIPLE OPTION) **1 = Use of safe foods, 2 = Use of safe fluids, 3 = Washing hands before taking foods, 4 = Washing hands with soap after defecation, 5 = Washing with ash/mud after defecation, 6 = Using sanitary latrine, 7 = Continue breastfeeding up to 2 years, 8= Proper immunization, 9 = Don't know, 10 = Other (specify)...**	

Q. N O:6	SECTION: 6 HEALTH FACILTY	RESPONSE
6.1	WHERE DO YOU VISIT FOR HEALTH SERVICES / FACILETIES? 1= B.H.U, 2=R.H.C, 3=PRIVATE CLINIC, 4= TRADITIONAL HEALER, 5 = OTHER (SPECIFY)……	
6.2	WHAT IS THE MODE OF VISIT TO HEALTH SREVICES / FACILITIES? **1=ON FOOT, 2=BY PUBLIC BUS, 3=OTHER (SPECIFY)……**	
6.3	WHAT IS THE DISTANCE OF NEAREST HEALTH FACILITY FROM YOUR HOUSE? **1 = WITH IN 1 KM, 2 = 1 - 4 KM, 3 = 4 - 8 KM, 4 = 8 KM+**	
6.4	ARE YOU SATISFIED WITH HEALTH SERVICES / FACILITIES? **1 = YES 2 = NO** (IF YES, THAN SKIP 6.5)	
6.5	IF NO, WHAT ARE THE REASONS? (MULTIPLE OPTION) **1=LACK OF PROPER MEDICINES, 2=LACK OF DOCTR /STAFF, 3=POOR DEALING, 4=LIMITED OPENING TIME, 5=OTHER(SPECIFY)……**	

Q. NO 7	SECTION 7: FOOD SECURITY AND LIVELIHOOD	RESPONSE	
7.1	OCCUPANCY CATEGORY OF THE LAND FOR YOUR HOMESTEAD? **1**= OWN, **2**= SOMEONE ELSE'S LAND, **3**= GOVERNMENT LAND		
7.2	WHAT TYPE OF HOUSING ARE THEY LIVING IN? **1=MUD/MUD BRICK, 2=STONE/CONCRETE/BREK, 3=THATCH, 4=PLASTIC SHELTER, 5=OTHER (SPECIFY)**		
7.3	DO FAMILY HAVE OWN LAND? **1 = YES** **2 = NO** (IF NO, THAN SKIP 7.4)		
7.4	IF YES, HOW MUCH OF LAND YOU HAVE? **1 = 1 - 5 ACRE, 2 = 6 - 10 ACRE, 3 = 11 - 15 ACRE, 4 = 16 ACRE +**		
7.5	WHAT IS THE DISTANCE OF MARKET WHERE YOU GO TO MOST OFTEN TO PURCHASE FOOD? **1 = WITH IN 1 KM, 2 = 1 - 4 KM, 3 = 4 - 8 KM, 4 = 8 KM+**		
7.6	WHAT IS THE MAIN FOOD SOURCE FOR THE HOUSEHOLD? (MULTIPLE OPTION) **1=Own production, 2=Purchase, 3=Food aid/donation, 4=Shared production, 5=Borrow, 6=Other (specify)**		
7.7	DURING KHARIF HARVEST SEASON (OCT to DEC), WHAT IS THE MAIN STAPLE FOOD OF YOUR HOUSEHOLD? **(MAKE PRIORITIES)** **1=Wheat, 2=Rice, 3=Potato, 4=Fish, 5=Other (specify)_____**	**Pr. 1** **Pr. 2** **Pr. 3**	
7.8	DURING THE LEAN SEASON WHAT IS THE MAIN STAPLE FOOD OF YOUR HOUSEHOLD? (When there is no food available at home and no employment)? **(MAKE PRIORITIES)** **1=Wheat, 2=Rice, 3=Potato, 4=Fish, 5=Other (specify)_____**	**Pr. 1** **Pr. 2** **Pr. 3**	
7.9	WHAT IS THE PROPORTION OF THE HARVEST YOU KEEP YOURSELF? **(Answer in percentage: 100% if the respondent keep all the harvest)**		

7.10	IF YOU PURCHASE THE MAIN STAPLE FOOD, THAN WHAT IS THE SOURCE OF INCOMES? **RANK ANSWERS IN ORDER OF IMPORTANCE)** **1=UNSKILLED WAGE LABOUR, 2=SKILLED WAGE LABOUR, 3=SHOPKEEPER/TRADER INCOME, 4=SALE OF LIVESTOCK, 5=REMITTANCE, 6=SALE OF AGRICULTURAL PRODUCTS, 7=RENTING LAND, 8=SALE OF FISHING PRODUCTS, 9=INCOME SUPPORT (ZAKAT/AID), 10= SELLING OF HANDICRAFTS, 11= SELLING OF MILK AND DAIRY PRODUCTS, 12= SALE OF FISH, 13= OTHER (Specify)**	Source 1	
		Source 2	
		Source 3	

7.11	IN THE PAST 7 DAYS, IF THERE HAVE BEEN TIMES WHEN YOU DID NOT HAVE ENOUGH FOOD OR MONEY TO BUY FOOD, HOW OFTEN HAS YOUR HH HAD TO:	**Frequency score: Number of days out of past 7 days (0 - 7)**
7.11.1	RELY ON **LESS PREFERRED** AND LESS EXPENSIVE FOODS?	
7.11.2	BORROW FOOD, OR RELY ON HELP FROM A FRIEND OR RELATIVE?	
7.11.3	LIMIT PORTION SIZE AT MEALTIMES?	
7.11.4	RESTRICT CONSUMPTION BY ADULTS IN ORDER FOR SMALL CHILDREN TO EAT?	
7.11.5	REDUCE NUMBER OF MEALS EATEN IN A DAY?	
7.12	DO YOU HAVE ANY LIVESTOCK? **1=YES 2=NO** (IF No, THAN SKIP 7.12 & 7.13)	

7.13	HOW MANY ANIMALS DO YOUR FAMILY HAVE OWN BEFORE AND AFTER THE HEAVY RAIN FALL OF 2011?	**COW/BUFFALO/CAMEL**		**SHEEP/GOATS**		**POULTRY**	
		BEFORE	AFTER	BEFORE	AFTER	**BEFORE**	**AFTER**

7.14	WHERE DO YOU KEEP DOMESTIC ANIMALS (IF THEY HAVE A LIVESTOCK)? **1=IN SIDE THE HOUSE, 2=OUT SIDE THE HOUSE IN SEPARATE SHED, 3=OUT THE HOUSE IN OPEN SPACE, 4=OTHER (SPECIFY).....**				
7.15	WHERE DO YOU STORE YOUR HARVEST? **1= OWN STORAGE AT THE HOUSE 2= COMMUNAL STORAGE 3= DO NOT STORAGE HARVEST 4=OTHER (SPECIFY)**				
7.16	HOW MANY MONTHS WAS THE STORAGED HARVEST AVAILABLE FOR THE HOUSEHOLD DURING THE LAST YEAR? (Respond in number of months)				
7.17	DID ANY FAMILY MEMBERS IN YOUR FAMILY ATE ANY OF THE FOLLOWING TYPES OF FOODS (**INCLUDING SNACKS AND ANYTHING IRRESPECTIVE OF QUANTITY**) IN THE LAST 24 HOURS (FROM THIS TIME YESTERDAY TO NOW) (**ASK TO THE PERSON WHO PREPARED FOOD**).				
	Instructions: Ask the respondent what meals they had along the day during the last day. Start asking what meal they had during the last day and then ask what they had in each of each meal. **Do not read the list of food to them. Complete the table yourself taking into consideration the answers of the respondent.**	7.14 (A) Family member ? 1=Yes 0=No	7.14 (B) Index child? 1=Yes 0=No	7.14 (C) What is the main source of the dominant food item consumed? **(MULTIPLE OPTIONS)** 1= Own production, 2= Purchases 3= Gifts from friends/families 4=Food aid, 5= traded or Bartered 6=Borrowed, 7= Gathering/wild 8=Others, specify...	
7.17.1	**CEREALS:** BREAD, RICE NOODLES, BISCUITS, OR ANY OTHER FOODS MADE FROM RICE, WHEAT AND MAIZE				
7.17.2	**WHITE ROOTS & TUBERS:** WHITE POTATOES, WHITE YAM, OR OTHER FOODS FROM ROOT				
7.17.3	**VITAMIN A RICH VEGETABLES:** PUMPKIN, CARROT, SWEAT POTATO.				
7.17.4	**DARK GREEN LEAFY VEGETABLES .**				
7.17.5	**OTHER VEGETABLES:** TOMATO, ONION, EGG PLANT, LADY				

	FINGER, BITTER GUARD, BOTTLE GUARD, ETC.				
7.17.6	**VITAMIN 'A' RICH FRUIT:** MANGO, APRICOT, RIPE PAPAYA AND FRUIT.				
7.17.7	**OTHER FRUITS:** INCLUDING WILD FRUITS AND FRUITS JUICES MADE FROM THESE FRUITS.				
7.17.8	**ORGAN OF MEAT:** LIVER, KIDNEY, HEART.				
7.17.9	**FLESH MEATS:** BEEF, LAMB, GOAT, CHICKEN, DUCK, OR ANY OTHER MEATS.				
7.17.10	**EGGS.**				
7.17.11	**FISH AND SEA FOOD.**				
7.17.12	**LEGUMES, NUTS AND SEEDS:** BEANS, PEAS, LENTILS, OR NUTS AND FOOD PREPARE FROM THESE ITEMS.				
7.17.13	**MILK & MILK PRODUCTS:** CHEESE, YOGURT, MILK OR OTHER MILK PRODUCTS.				
7.17.14	**OILS & FATS:** OIL, FAT, OR BUTTER ADDED IN FOOD OR USED FOR COOKING.				
7.17.15	**SWEETS**: SUGAR, HONEY OR CAKE, SWEETED JUICES, JAGGERY FOODS.				
7.17.16	**SPICES, CONDIMENTS & BEVERAGE:** CONDIMENTS, COFFEE, TEA.				
7.17.17	**INFANT FORMULA:** MILK OTHER THAN BREAST MILK AND MILK AND MILK PRODUCTS				

SECTION 8: WATER, SANITATION AND HYGIENE			
Put able One of the Enough or Not			
8.1	WHAT IS THE MAIN SOURCE OF DRINKING WATER OF YOUR FAMILY DURING THE **RAINY SEASON**? **(Make Priorities)** **1= HAND PUMP, 2= TAP STAND, 3= PROTECTED WELL, 4= UNPROTECTED WELL, 5= RIVER, 6= SPRING, 7= VENDOR/BUY WATER, 8= TANKER/TRUCK, 9= POOLED FLOOD WATER, 10= OTHER (SPECIFY)**	**Pr. 1**	
		Pr. 2	
		Pr. 3	

8.2	**WHAT IS THE MAIN SOURCE OF DRINKING WATER OF YOUR FAMILY DURING THE DRY SEASON? (Make Priorities)** **1= HAND PUMP, 2= TAP STAND, 3= PROTECTED WELL, 4= UNPROTECTED WELL, 5= RIVER, 6= SPRING, 7= VENDOR/BUY WATER, 8= TANKER/TRUCK, 9= POOLED FLOOD WATER, 10= OTHER (SPECIFY)**	**Pr. 1** **Pr. 2** **Pr. 3**	
8.3	HOW MUCH TIME IT TAKES TO FETCH WATER? **1= WITHIN ½ Hr, 2=1/2 TO 1 Hr, 3=1hr TO 1½ HR, 4=1½ to 2 Hrs.**		
8.4	FOR DRINKING PURPOSE, HOW MANY LITERS OF WATER YOU COLLECT PER DAY? **1= UP TO 20 LTR, 2= 20 TO 40 LTR, 3= 40 TO 60 LTR, 4= 60 TO 80 LTR 5= OTHER (specify).....**		
8.5	DO YOU TREAT YOUR WATER IN ANY WAY TO MAKE IT SAFER TO DRINK? **1=Yes, always, 2= Sometimes, 3=No** (IF NO or DK THAN SKIP 8.5)		
8.6	IF YES WHAT DO YOU USUALLY DO TO THE WATER TO MAKE IT SAFER TO DRINK? **(Make Priorities)** **1=Boil, 2=Add bleach/chlorine/ water agar, 3=Strain through a cloth, 4=Use water filter (ceramic, sand, composite, etc.), 5=Let it stand and settle, 6=Water purifying product, 7=Other (specify_)_____**	**Pr. 1** **Pr. 2** **Pr. 3**	
8.7	HAVE YOU EVER HEARD ABOUT WATER BORNE DISEASES? **1=YES, 2=NO, 3=DON'T KNOW** (IF NO, THAN SKIP 8.7)		
8.8	IF YES, WHAT ARE WATER BORNE DISEASES? **(Make Priorities)** **1= DIARRHOEA, 2= FEVER, 3= COUGH, 4= VOMITING, 5= SKIN DISEASES, 6= OTHER (SPECIFY).....**	**Pr. 1** **Pr. 2** **Pr. 3**	
8.9	WHEN DO YOU WASH YOUR HANDS? (MULTIPLE CHOICE) **1= BEFORE EATING, 2= BEFORE PREPARING FOOD, 3= AFTER DEFECATION, 4= BEFORE FEEDING CHILDREN, 5= AFTER DISPOSING OF CHILDREN FAECES, 6= OTHER (SPECEFY).....**		
8.10	DO YOU USE SOAP/ASHES WHILE WASHING YOUR HANDS? **1= YES ALWAYS, 2= YES SOMETIMES, 3= NO**		
8.11	WHAT KIND OF TOILET FACILITY YOU HAVE FOR YOUR FAMILY? **(Make Priorities)**	**Pr. 1**	

	1= Pour Flush Toilet, 2= Pit Latrine, 3= Open Field, 4= Other (Specify):	**Pr. 2**	
		Pr. 3	
8.12	WHERE DO YOU THROW CHILD FAECES? **1= Pour Flush Toilet, 2= Pit Latrine, 3=. Open Field, 4= Other (Specify): .....**		
8.13	DO YOU WASH YOUR HANDS AFTER CLEANING CHILDS BOTTOM? **1= YES, 2=NO, 3=DON'T KNOW**		
8.14	WHAT DO FAMILIES DO WITH GARBAGE? **1= SET ON FIRE, 2=Throw Out Side.**		

THANK YOU FOR SPENDING YOUR VALUABLE TIME WITH US

To fill at the end of the interview: Time spent:_____ Interview with HH.: **1**=Complete, **2**= Partially complete, **3**=Refused, **4**= Not Available, **5**= Other (specify)_____		Participation of interviewee: 1=Very active, 2= Ok, 3= Not very Participative
Who answered the questions: **1**= Mother, **2**= Caregiver, **3**= Father		Anthropometric measurement: **1**=Very easy, **2**= Normal, **3**=Difficult
Quality of information: **1**= Very good, **2**= Ok, **3**= Suspicious		
Interviewer/team leaders note: Use this space to record notes about the interview with this household, such as call-back times, incomplete indiv interview, number of attempts to re/visit, etc._____		

Annex 4: Focus Groups Discussions Guidelines

NCA
ACF Pakistan Mission
FGDs guidelines

Introduction

ACF is implementing a NCA in identified areas with high prevalence of malnutrition in Sindh Province, south Pakistan. The activities leading to the analysis of the causes of malnutrition include a household survey, focus group discussions and interviews to key informants.

ACF has engaged a field team consisting of two teams in Thatta and four teams in Dadu, composed by a team leader and six enumerators (three males and three females). Each team will conducted households interviews in each sampled village, following and established field plan. At the end of the households interviews in the villages belonging to a UC, the team discuss on the vulnerability patterns of the villages selected in the UC, and identifies one of the villages where FGDs will be implemented. This village is selected taking into consideration the vulnerability level of the population, as well as the access, being the distance of the villages and the accessibility one of the main challenges faced during the implementation of the field activities of the NCA.

In each selected village, ACF field team will conduct five FGDs: the first one will be conducted with members of the local BFUs, the second with male members representatives of the whole population of the area, the third one with females representatives of the whole population of the area who are mother of under five children, the fourth one with males representatives of the vulnerable groups and the last one with female representatives of the vulnerable groups, also mothers of under five children. The participants of the FGDs are selected with the support of the village leaders.

Implementation of the FGDs

Preparation for the FGDs

All the FGDs are to be facilitated by team leaders. Surveyors support the team leader in organizing activities, observing closely the reactions of the participants and taking detailed notes on discussions, agreements and disagreements, level and quality of participation and conclusions for each question demanded or activity conducted. Taking notes about the details of the FGDs is a fundamental task and the notes must be as detailed as possible.

Before the starting of the FGDs, the team leader will organize the team and assign specific tasks for the support, observation and notes. Each member of the team will receive a blank copy of the FGDs guiding questions so that they can take the proper notes.

It is suggested that before initiating the FGDs the team leader go through the guiding questions and activities to be performed as well as the task of each member of the team.

Implementation of the FGDs

- Introduce the focus group team and the process that will follow, emphasize that participants' experiences, opinions, and perspectives are sought to understand the current situation.
- Set ground rules for the focus group (e.g., each person's opinion is valid and that there may be agreement and disagreement among the group – an open exchange of ideas is being sought).
- Be appreciative of participation yet clear that participating in the focus group does not translate into receiving assistance.
- Sometimes it is good to have each participant make an individual, uninterrupted statement of introduction in the beginning to help less talkative participants bring his or her voice into the group and have more talkative participants spend time listening.
- Enhance the active participation of all persons in the FGD.
- Introduce the first topic with an open-ended question, followed by unstructured discussion
- Introduce additional topics based mainly on points made during the focus group discussion
- End the focus group discussion with a general summary of what was discussed and by asking if there is anything else participants would like to add
- Thank participants for being part of the focus group

After the focus group discussion:

- Right after having finalized the FGD, the team will meet to discuss main points in each subject treated:
    - Discussions, agreements and disagreements;
    - Difficulties in understanding and/or answering certain questions;
    - Main conclusion in each of the topics treated;
    - Level of participation of the people: who participated, who dominated the conversation, who participated less than the others.
- Write a report summarizing results based on the observations of the whole team, being sure to highlight any unexpected information or gaps that need to be filled.

FGD with BHU staff – MCH, Nutrition and health situation

1. What are the main causes of malnutrition in the area? Are there any seasonal variations? Why?

2. Is there a specific profile of families with children suffering from malnutrition?

3. What are the main diseases of the area? (Priority wise)

4. How is Maternal and child health (MCH) care?

5. Your views, on quality of services, main constraints BHU/you face?

6. What are the reasons for poor health and hygiene situations? How is health awareness situation?

7. What are the constraints for management of :
    a. Open defecation:
    b. Personal hygiene:
    c. Food hygiene:

8. Are there any community groups/self help groups/ CBOs, etc. in this community? If yes, what they are doing?

Observations and comments

FGD with community male groups

1. Which is the land system prevalent in the area? How the land is distributed and what kind of access to land do farmers have? (3 minutes)

2. What are the crops, fruits and vegetables which can be grown in area? What are the crops, fruits and vegetables actually grown? (3 minutes)

3. How are crops, vegetables and fruits grown in village? What are the tools that are used? (ask about the seeds that they use, where do they get them, what are the technologies and the access to water for irrigation) (5 minutes)

4. What are the problems that farmers face in production? (5 minutes)

5. What are the main livestock grown in the area? (3 minutes)

6. What are the main problems and challenges that people in the village face in rising livestock? (Fodder, access to water, veterinary services, vaccination, illness, etc.) (5 minutes)

7. What are main sources of food (**Proportional piling (PP) in %)** (5 minutes)

Source of food	**(PP score)**
Own production	
Bought in market outside the village	
Bought in market inside the village	
Gifts from neighbors, family or landowner	
Food Aid	
Other (Specify)	

8. What are the main resources of income of the community (**Proportional piling in %)** (5 minutes)

Source of income	**(PP score)**
Agricultural work in own land	
Share-cropping	
Animal chart	
Fishing	

Salaried wage	
Daily wage laborer	
Maid	
Commerce	
Services (teachers, drivers, carpenters, etc)	
Gift, donations	
Other (Specify)	
Other (Specify)	

9. Of total HH expenditure, what was the share (%) of each item in the last month (December) and earlier reference month (before six month - July) (record score below) **(Use Proportional Piling)** (10 minutes)

Items	July 2011	December 2011
Food		
Education		
Health		
Shelter		
Other (Specify)		
Other (Specify)		
Other (Specify)		

10. Who decides how money is spent in the household? (3 minutes)

11. How is the situation of credit and loan in community? (sources, uses, seasonality and tendency) (10 minutes)

12. Wealth groups (15 minutes)

Wealth ranking of the community	Very poor	Poor	Middle	Better off
% of the population				

Caste/ ethnicity/ other social marker				
No. Adults contributing to HH income				
No total members per HH				
No children under five per HH				
Sources of income (production, casual labor, petty trade, handicraft, gifts)				
Sources of food (purchase, own harvest, food received as payment, gifts)				
Access to land (ownership, tenancy, sharecropping)				
No. Acres of land cultivated/owned				
No and type of livestock				
Other assets owned				
Income range (in PKR)				

13. Seasonal Calendar (20 minutes)

Activities	Months (January to December)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain pattern												
Main crops												
Livestock activities												
Employment												
Migration												
Collection and consumption of wild food												
Princes trend (high and low)												
Hunger season												
Main HH expenses (school, celebrations)												

Instructions (Information to be collected in the calendar)			
Rainfall **Crops** * Main crops grown for consuption * Main crops grown for sale * Livestock * Migration * Milk production * Livestock sales * Heat and births	**Employment** * Local labor (eg. On farms) * Off-farm employment (e.g brick making) * Labor migrantion (where to?) **Wild food/Game** * Collection and consuption by type	**Food purchases** * Timing of purchases and prices (highest/lowest) **Annual hunger season** Timing **Mining** * Peak periods	**For crops indicate the timing of the following:** LP (Land preparation) P (Planting) CG (Consuption green) H (Harvesting) **Indicate variations in access with arrows:** ↑ to indicate peak access ↓ to indicate minimal access

14. What is existing sources of potable water (safe, distance, enough, treatment practices, etc) in the rainy and dry seasons? (3 minutes)

15. What is the access to the education in the village? Where are the schools located? Causes of abandonment (3 minutes)

16. How is the access to health services in the area? What can of health infrastructures can be found? What are the conditions? Are they accessible for everybody? (5 minutes)

17. What are the types of malnutrition that you know? Who are affected groups in the village by malnutrition? How you recognize them? What are the main causes? (5 minutes)

18. What are the main shocks that hit the community in the last three years? What were the effects on the community? (3 minutes)

19. What are major coping strategies of community? (**Proportional piling - %)** (5 minutes)

Coping strategy	**(PP score)**
Total	100

Observations and comments

FGD with mothers groups

Child feeding

1. When the baby is breastfeeds, can mother give every time when child needs? If not what are the problems?

2. Who (girl or boy) got the priority for child feeding?

3. What types of semi/solid foods are being provided to following age groups children (list all types of food under each age group):
    a. Under 11 months:
    b. 12 – 23 months:
    c. 24 – 59 months:

4. Do we know importance of diversified food for child feeding?

5. What is mean by nutritive foods? And cheaper food will be nutritive or not?

6. Situation of food taboos/belief/myth in community

Restricted food	To whom	Causes/reason

Psychosocial support and stimulation of children and pregnant and lactating mother

7. Who is taking care of the infants and young children? Do you feel that you have enough time to take care of children?

8. Do men and other family members give support to the women during pregnancy? And after delivery? If so, how?

Child malnutrition

9. How malnutrition is perceived by us? And what type of problem it is?

10. How malnutrition can be overcome?

11. Are we aware about intergenerational vicious cycle of malnutrition?

12. Have we observed that one group is more at nutrition risk or it can occur in each group? Why?

13. How is diarrhea epidemic in village?

14. What are the reasons for frequent child illness?

15. What is existing sources of potable water (safe, distance, enough, treatment practices, etc) in the rainy and dry seasons?

16. What is the access to the education in the village? Where are the schools located? Causes of abandonment

17. How is the access to health services in the area? What can of health infrastructures can be found? What are the conditions? Are they accessible for everybody?

18. What type of food PLW needs?

19. What is the knowledge, beliefs and taboos about food for PLW?

Observations and comments

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USAL ANALYSIS

ACTION AGAINST HUNGER

The Link NCA methodology was developed by Action Against Hunger – France with technical support from our scientific committee including multi-sectorial experts and eminent scientists from Tufts University | Friedman School of Nutrition Science and Policy, the French Institute for Development Research (IRD), and World Food Program (WFP).

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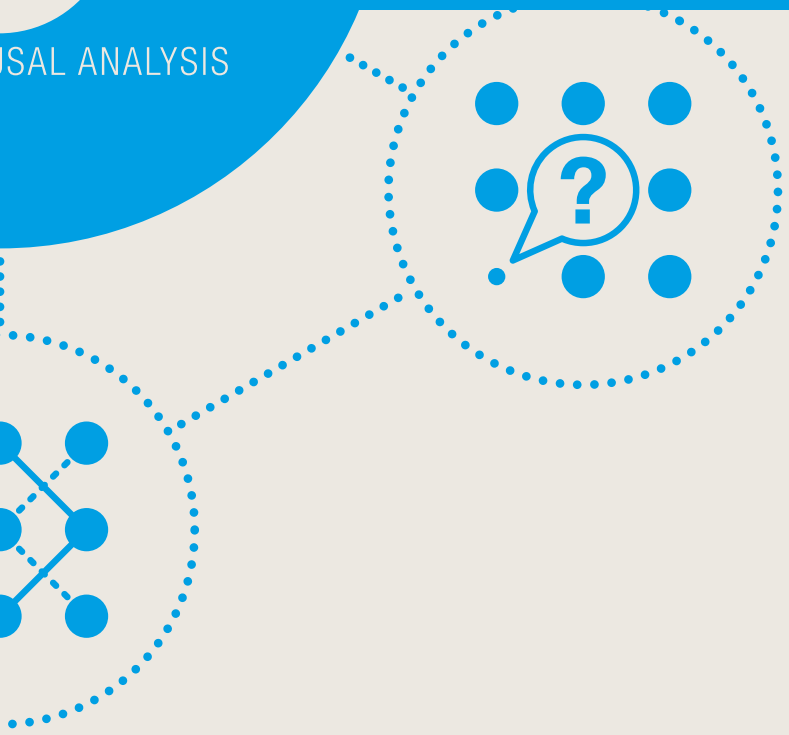

More information on **www.linknca.org**

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NUTRITION CAUSAL ANALYSIS

Pour plus d'informations concernant la
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