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Final Report

IINK
NUTRITION
CAUSAL
ANALYSIS

**District Tharparkar, Sindh
Pakistan**

link
nca
NUTRITION CAUSAL ANALYSIS

Link NCA - Analyzing local causes of under-nutrition to inform nutrition programming

IMPRINT

ACKNOWLEDGMENTS

ABBREVIATIONS

ANC	Antenatal Care
ARI	Acute Respiratory Infections
CI	Confidence Interval
CLTS	Community Led Total Sanitation
CMAM	Community Management of Acute Malnutrition
ECHO	European Civil Protection and Humanitarian Aid Operations
ENA	Emergency Nutrition Assessment
EU	European Union
FANTA	Food And Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FSL	Food Security and Livelihoods
GAM	Global Acute Malnutrition
HAZ	Height for Age Z-score
HH	Household
HDDS	Household Dietary Diversity Score
IDDS	Individual Dietary Diversity Score
IPC	Integrated Phase Classification
IYCF	Infant and Young Child Feeding
Link NCA	Link Nutrition Causal Analysis
MAHFP	Months of Adequate Household Food Provisioning
MAM	Moderate Acute Malnutrition
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organization
OTP	Outpatient Therapeutic Programme
PLW	Pregnant and Lactating Woman
PNC	Postnatal Care
PPS	Probability Proportionate to Size
RCSI	Reduced Coping Strategy Index
RFS	Risk Factor Survey
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SBCC	Social Behaviour Change Communication
SFP	Supplementary Feeding Programme
SSI	Semi-Structured Interview
SMART	Standardized Monitoring for Assessment in Relief and Transitions
UNICEF	United Nations' Children's Fund
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WHZ	Weight for Height z-score

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EXECUTIVE SUMMARY

District Tharparkar, established administratively in 1990, is a desert region located in the south eastern part of Pakistan. It has been a long history of drought – with particularly severe droughts in 1987, 2014, 2018 and many other years. Drought/drought like conditions have been prevailing since 2013 which have impacted on livelihood and food security in the whole of Tharparkar. The district is chronically food insecure and heavily reliant on Government and other assistance; Tharparkar has some of the worst developmental indicators in Pakistan, and ranks as one of the least developed districts in UNDP's Human Development Index 2017. Despite numerous governmental and non-governmental interventions in recent years, the prevalence of under nutrition (both wasting and stunting) in the area remains high – above the WHO Malnutrition threshold for an emergency i.e. >15% of acute Malnutrition.

Welthungerhilfe (WHH) commissioned an integrated SMART survey in 2017, based on a SMART survey carried out by ACF the year before; the results of the 2017 SMART survey were striking: they showed that emergency levels of malnutrition persisted in Tharparkar, despite the humanitarian and development resources invested in the district in previous years, and despite the fact that there had been no drought in 2017. This prompted WHH to want to explore further, and to build a formal causal analysis of malnutrition in Tharparkar through a Link NCA, so that scarce resources could be prioritized to address the leading causes of malnutrition. The findings of this Link NCA are proposed to be widely disseminated amongst provincial and national stakeholders – government, donors, UN agencies and NGOs – so as to be used by them (and by Welthungerhilfe) to inform and influence current and future programming in the Thar desert.

A Link Nutrition Causal Analysis (Link NCA) is a method for analyzing the multi-causality of under-nutrition, as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context. It is a structured, participatory and holistic study that builds on UNICEF's conceptual framework of malnutrition with an objective to build an evidence-based consensus on plausible causes of undernutrition in a local context.[1]

The methodology has been precisely defined and tested in the field with guidance available for every step of the method. It offers a unique opportunity for a great variety of key informants, from technical experts to community members. The Link NCA methodology relies on a triangulation of both qualitative and quantitative data along with in-depth review of all valid secondary information. The quantitative data collection is comprised of an Anthropometric data collection and a Risk Factor Survey. The study also includes series of community consultations about past and/or on-going interventions as well as a prioritisation exercise with regards to future assistance. The results were presented during the Final Technical Workshop[2], which took place on October 17th 2019 in Karachi, followed by the development of operational recommendations for interventions in the zone of study.

The calculation of statistical associations through Multivariate regression analysis between individual risk factors and wasting/stunting allowed us to differentiate between causal mechanisms of these two forms of undernutrition and to simplify rather complex pathways for operational purposes.

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1   For more information about the methodology, please refer to www.linknca.org.
2   Participants included 30 technical experts from relevant government departments, UN and NGOs covering a variety of sectors, out of which 20 also participated in the Initial Technical Workshop to ensure the continuity of discussions.

KEY FINDINGS

Undernutrition trends in Tharparkar were analyzed by comparing the current survey results with the MICS 2014, SMART 2016, SMART 2017 and Link NCA 2019 conducted in Tharparkar. The Link NCA revealed that the prevalence of malnutrition was very high as compared to the WHO emergency threshold level (GAM of 15%). The MICS Sindh Survey 2014 found high malnutrition rates across Sindh - 15.4%. In district Tharparkar GAM has been found more than 32.9% in MICS, 27.1% in Smart 2016 and 28.5% in Smart 2017.

The prevalence of malnutrition status in Tharparkar has been on high for decades. The recent Link NCA revealed weight-for-height z-scores (WHZ) where the prevalence of GAM was found to be 27.8 % and SAM was 9.0 %. The level of stunting was found to be 47.3% in this study. Both of the acute and chronic malnutrition rates are higher than the WHO emergency thresholds of 15% GAM and 40% of Stunting.

The analyses undertaken during this Link NCA study allowed us to identify 17 risk factors, believed to have an impact on the incidence of undernutrition in the zone of study. Following a triangulation of data from diverse sources, seven (7) risk factors were identified as having a **major** impact, six (6) risk factors were classified as having an **important** impact and four (4) risk factors were judged to have a **minor** impact on the incidence of undernutrition in the zone of study. These risk factors all had a proven relation as a risk factor to Malnutrition in the District some having a higher and some having a lower contribution but all have their own weightage.

Among the major risk factors, two were identified in the sector of water, sanitation and hygiene, namely **poor access to water**, and **poor hygiene and sanitation practices**, while other major risk factors found were **Poor health services**, and **poor complementary feeding practices of children aged 6–23 months,** in the sector of health and nutrition. In the sector of Food security and Livelihoods the major risk factors found were **Low production/availability of food and Poor diversity of sources of incomes for HH and poor coping strategies**.

Wasting

The different deliberations with stakeholders, primary and secondary data and the in-depth causal pathways developed with the community unveiled the following picture or pathways and interactions different risk factors. Details can be viewed in the pathways given in the relevant sections of this report. The causes of wasting are multifactorial where the major pathways are a combination of **inadequate decision making and inappropriate practices, which translate into poor maternal and child health. These facts also correlate with the anthropometric measurements where the highest GAM rates are found to be in the age group of 16–27 months.** Other pathways depict that low access to water results in lower crop and fodder production which in turn reduces the access to Food (productivity) both from agriculture and livestock. Poor access to water at the household level leads to **poor hygiene practices**, such as **inadequate food handling and open defecation,** contributing to a heightened risk of contamination and spread of illnesses especially **diarrhoea** – the recurrence of which can lead to wasting. The illnesses can also be brought about by inadequate defecation practices due to a lack of a household latrine. Animals also move freely in the compound which increases the risk of **contamination via animals or their faeces** and food is also often kept uncovered leading to diseases, including diarrhoea, and potentially to wasting.

Poor practices in Health and nutrition are also negatively impacting **maternal nutrition, breastfeeding, complementary feeding practices** and health seeking behaviour resulting in poor IYCF practices and poor utilization of health services. The restricted **decision-making** powers of women related to children's education, medical services and other household expenses also showed a statistical association with wasting.

It is also important to note that analyses demonstrate a significant link between wasting/stunting and the **sex of a child**, as boys are more likely to be wasted/stunted than girls. This may be due to diverse, gender-determined care practices after childbirth and/or other physiological factors discussed in the undernutrition section.

Stunting

A causal mechanism for stunting depicts a combination of problems faced by the community. The **contamination of food** and water by livestock and through children crawling in the dirt is evident which leads to stunting, possibly through mal-absorption and frequent waterborne diseases. Poor coping strategies especially reliance on others for food or **borrowing money/food** also led to stunting through limiting food intake at the Household level. **Maternal stress** due to the shortage of resources and poverty also showed a possible statistical relation with stunting. Poor **access to market** was also found to be a contributor through delayed or limited access to food. Increased ownership of livestock showed a protective relation against stunting while reduced **fodder availability** contributed towards stunting as livestock is a major source of livelihood.

Key Recommendations

These recommendations are based on the findings of this Link NCA study, taking into consideration the reality that causes of undernutrition are multi-sectoral and necessitate longer-term and broader coverage interventions. The current interventions by various actors prove to have significant value in the context of Tharparkar; however, there is a need and a room for improvement or reorientation of current interventions to act more effectively on community's needs and priorities. There is a gap found between the perceptions of the community and the reality of the context which mostly is due to the lack of awareness causing misperceptions.

The community is on the brink of survival and all interventions should aim to build their resilience and to prevent the adoption of negative coping actions. Key recommendations are stated below while detailed sectoral recommendations are provided in the conclusions and recommendations section below.

- Strengthen sustainable multi-sectoral interventions with maximum possible coverage to strengthen the services as well as drought mitigation measures.
- Strengthen systems in the Health, Education, Agriculture, Livestock, Communication, Infrastructure, Ecotourism, and Water sectors for the provision of efficient public and development sector services to these communities.
- Execute blanket and consistent coverage of **CMAM/IYCF and NSC** services to treat the prevailing caseload of malnourished children and Pregnant and Lactating Women along with micronutrient supplementation/fortification programs.
- Strengthen existing and develop new alternative income generation opportunities which are less affected by drought so as to ensure sustained income throughout the year.
- Explore different public-private and development-corporate partnerships projects to identify and introduce new viable livelihood opportunities which are resilient to shocks.
- Explore **corporate investments** for **social entrepreneurship** and communal small and medium enterprises. Give a source of security and insurance to poor communities and boost local capabilities (e.g. in livestock and Dairy, honey, medicinal plants, embroidery)
- **Value addition** of local products: skills development and value chain and value addition for local products such as honey, condensed milk, pickle, clusterbeans, 'peero' jam, dried vegetables, embroidery and basket weaving.
- Extending livestock related assistance (fodder/feed, medicines/vaccinations) to needy and vulnerable livestock rearers.Promote transition of the Livestock into a sustainable livelihood source is required.
- De-stocking and Re-stocking of livestock to rebuild the livestock-based livelihood.
- Promote water conservation practices through the rehabilitation of water structures for both agriculture and human consumption at feasible locations
- Execute sanitation marketing with CLTS of broader coverage to prevent open defecation and increase tendency of building latrines at home.
- An in-depth focus is required on culturally appropriate SBCC campaigns with blanket coverage and communication channels that are more acceptable to the communities.

1. INTRODUCTION

District Background

District Tharparkar was established in 1990. It is a desert region located in the southeastern part of Pakistan. Its borders are adjoining with districts Mirpurkhas and UmerKot to the north, Barmer and Jaisalmer districts of India to the east, Rann of Kutch to the south (India) and District Badin to the west.

District Tharparkar has a total area of 19,638 square kilometers. It comprises Desert area and the beauty of Tharparkar is due to its pink granite, Karronjhar hills located in Taluka Nangarparkar. The district has tropical climate, intensively hot in summer and cold in winter. The annual maximum and minimum temperature remain around 28°C and 9°C in January and above 42°C in May. Administratively it is divided into 07 Talukas namely- Mithi, Islamkot, Nangarparkar, Chachro, Diplo, Dahli and Kaloi. There are 44 union councils in the district.

The SMART Nutrition Survey in district Tharparkar was undertaken in November 2016 to determine the current nutritional situation of the district. Specifically, it provides up-to-date district-specific GAM, SAM, and MAM rates; and also provides information on other key indicators of nutrition for the district. The GAM rates were found to be 27.1% with a SAM rate of 7.8%.

District Tharparkar is one of the primary target areas for nutrition assistance. As highlighted by the Sindh Drought needs assessment (SDNA) 2019, compared to other zones, proportionally more households in the southeast zone (where Tharparkar is located) have received different types of assistance; particularly free food, nutritional support, livestock support, and drinking water. The government of Sindh's Nutrition Support Program (NSP) has been introduced in the district to cover the need for SAM treatment programs, and provide nutrition supplements to pregnant and lactating women. Outreach programs are carried out through LHWs in all union councils. Under the PC-1, a national NGO provides nutrition and health services to the drought-affected population of all 44 union councils of Tharparkar, through funding provided by the World Bank as provincial loan. However, many health facilities in the district do not have the required number of Lady Health Workers (LHWs) for providing nutrition and IYCF services to community members. In addition, several national and international organizations including UN agencies, provide nutrition support to the district by focusing on raising awareness and conducting capacity-building sessions. Despite the substantial assistance provided through these programs, the recurrent disasters negatively affects the living conditions in Tharparkar for many households.

Justification of the study

Welthungerhilfe through local partners such as Thardeep Rural Development Programme (TRDP), Research Development Foundation (RDF) and Sukaar Foundation has been implementing a 'Sustainable Food and Nutrition Security (SFNS) Programme in Thar region of Sindh province since 2015; to improve nutrition the situation in drought prone areas.[3] The programme comprises of several short- to medium- and long-term interventions, funded at different times by ECHO, the German Foreign Ministry (AA), the German Development Ministry (BMZ) and WHH own funds, in order to address causes of malnutrition in region.

The programme relies on several baseline studies and field researches to contribute to improve the quality of the intervention and to highlight the issues and underlying causes of chronic malnutrition in region. These studies and researches during the programme also aid in measuring the achievement of milestones and project indicators over time.

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3   The Thar region includes all of district Tharparkar, but also desert areas of district Umerkot.

Photo: Khalid Khan

Welthungerhilfe commissioned an integrated SMART survey in late 2017, building on a SMART survey carried out by ACF the year before; the results of the 2017 SMART survey were striking: they showed that emergency levels of malnutrition persisted in Tharparkar, despite the humanitarian and development resources invested in the district in previous years, and despite the fact that there had been no drought in 2017. This prompted WHH to want to explore further, and to build a formal causal analysis of malnutrition in Tharparkar through a Link NCA, so that scarce resources could be prioritized to address the leading causes of malnutrition. The findings of this Link NCA are proposed to be widely disseminated amongst provincial and national stakeholders – government, donors, UN agencies and NGOs – so as to be used by them (and by Welthungerhilfe) to inform and influence current and future programming in the Thar desert.

2. STUDY OBJECTIVES

The global objective of the Link NCA is to provide a greater level of understanding of plausible causes of child undernutrition in District Tharparkar Sindh.

The findings will allow us to propose more targeted nutrition sensitive interventions to prevent undernutrition. The findings from the LINK NCA will inform the design of future programming and adaptions to existing projects/programmes.

The Link NCA study will aim to answer the following study questions:

- What is the prevalence and severity of wasting and stunting in the study population?
- What is the prevalence of risk factors for undernutrition among the population and vulnerable groups?
- What are the major causal pathways of undernutrition by which children in this population have become stunted and wasted?
- How have the stunting and/or wasting in this population and its causes changed a) over time due to historical trends, b) seasonally due to cyclical trends, c) due to recent shocks?
- In case of heterogeneity among communities: What are the "vulnerable groups" for each major pathway? Are there different pathways for different communities living in the study area?
- What is the communities' perception and ownership of current humanitarian operational responses (in case of existing programming)?
- What are the communities' solutions to address the major causal pathways? How do they perceive levers and barriers likely to influence the main causal mechanisms? What are their needs and capacities to address underlying mechanisms?
- Based on the causal analysis results, what recommendations can be made for improving nutrition security programming? How can the analysis be linked to a programmatic response? How can operational actors design and/or adapt operational responses based on the overall study results?

3. METHODOLOGY

A Link Nutrition Causal Analysis (Link NCA) is a method for analyzing the multi-causality of under-nutrition, as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context. It is a structured, participatory and holistic study that builds on UNICEF's conceptual framework of malnutrition with an objective to build an evidence-based consensus on plausible causes of undernutrition in a local context.[4]

The methodology has been precisely defined and tested in the field with guidance available for every step of the method. It offers a unique opportunity for a great variety of key informants, from technical experts to community members, to express their opinions on the causes of undernutrition in the zone of study. The findings are constantly reviewed until validated by all stakeholders. The Link NCA places value on perceived causes as well as on evidence-based causes to display the complexity of perspectives. Undernutrition is examined globally, avoiding a vertical, sectoral approach, linking different verified sources of information to build consensus around the plausible causes of undernutrition in a given context.

A. KEY STAGES in this LINK NCA

Preparatory phase (February to March 2019)
The main objective of the preparatory phase was to define key parameters of the study, including its objectives, geographical coverage and feasibility. A preliminary secondary data and literature review was conducted in order to define the structure of the study. Considering new methodological advancements[5] and a lack of availability of certain key indicators for the zone of study, an option comprising all three Link NCA study components (i.e. Qualitative Inquiry, Risk Factor Survey and Anthropometric Data Collection) was selected.

This phase also included preparation and planning stages necessary for any type of study, i.e. a development of Terms of Reference, resource mobilisation as well as the recruitment of a Link NCA Analyst.

Identification of Hypothesised Risk Factors and Causal Pathways (March to April 2019)
The key responsibility of the Link NCA Analyst at this stage was to establish an overall understanding of the local context and to identify a set of risk factors and their interactions which could potentially trigger undernutrition among the target population in the zone of study. The identification of hypothesised risk factors and causal pathways was based on a systematic literature review (using the Link NCA Pathways to Undernutrition module and all grey[6] literature available locally), supported by a series of exploratory interviews with key informants, such as representatives of relevant governmental institutions, non-governmental organisations and/or academia with an in-depth knowledge or work experience in the zone of study. The identified hypothesised risk factors were presented, examined and validated for field testing during the Initial Technical Workshop[7], which took place in Karachi on 13th March 2019.

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4   For more information about the methodology, please refer to www.linknca.org.
5   E.g. Integration of statistical associations' calculations (prevalence of wasting/stunting in relation to identified risk factors) with an aim to enrich the data analysis/triangulation for a more precise definition of local causal pathways.
6   National and regional surveys, research and technical project reports, working papers, evaluations, policies, etc. produced by government agencies, non-governmental organizations, academia or private companies/consultants.
7   Participants included 25 technical experts covering a variety of sectors, such as health and nutrition, maternal health and care practices, agriculture, food security and livelihoods, water, hygiene and sanitation, and education.

Primary data collection (Mid-April to mid-July 2019)

The Link NCA methodology relies on a triangulation of both qualitative and quantitative data. The quantitative data collection, which comprised of an Anthropometric data collection and a Risk Factor Survey, took place in April and May. It consisted of anthropometric measurements and 46 indicators, covering all risk factors identified and validated in preceding stages. Hard copy questionnaires were used and the collected data on Anthropometry was entered into ENA software while the risk factors data was entered into the MS Access databases; these were then merged into Excel with a unique ID.

The Qualitative survey, conducted by the Link NCA Analyst, lasted four weeks in June and July 2019. The data was collected exclusively by the Link NCA Analyst, accompanied by a Field supervisor/translator and a community facilitator. It comprised of an in-depth inquiry on all risk factors identified and validated in the preceding stages, using semi-structured interviews and focus groups discussions as the principal data collection methods. The collected data was recorded in writing in the form of notes and later reproduced electronically. This stage also included a series of community consultations about past and/or ongoing interventions as well as a prioritisation exercise with regards to future assistance.

Synthesis of results and building a technical consensus (August to September 2019)

Upon the completion of the data collection stage, the Link NCA Analyst synthetized all collected data sets and conducted a series of analyses in order to categorise risk factors according to their relative impact on undernutrition in the zone of study and to describe dynamic relationships between various risk factors and their effects on under-nutrition. The categorisation of risk factors took into account all sources of information collected in the course of the study. The results were presented during the Final Technical Workshop[8], which took place on October 17th 2019 in Karachi, followed by the development of operational recommendations for interventions in the zone of study. A final National workshop will be conducted in February 2020 with national stakeholders including donors, the Planning Commission, Ministry of Health, relevant UN agencies, and I/NGOs.

B.   SAMPLING FOR QUANTITATIVE SURVEY

Sample size (0 to 59 months)

The sample size for the Link NCA Anthropometric data collection was calculated using ENA for SMART software (2011 version). A precision of 5%[9], a design effect of 1.5[10] and an estimated Global Acute Malnutrition (GAM) prevalence of 28.5%[11] was used giving a sample size of 409 children (including 3%[12] contingency).

Table 1: Sample size calculation for nutrition status using ENA for SMART software

District	Estimated GAM Prevalence	Desired Precision	Design effect	Sample size (Children)	U5 Population (%)	Avg. HH size (# people)	Contin-gency	Sample size (HH)	Clusters (13 HH / cluster)
Tharparkar	28.5 %	5	1.5	409	12.1	6.6	3	587	48

8   Participants included 30 technical experts covering a variety of sectors, out of which 20 also participated in the Initial Technical Workshop to ensure the continuity of discussions.
9   Based on National Nutrition Survey, 2011.
10   Based on a considered homogeneity across Tharparkar district.
11   Based on SMART Nutrition Survey conducted in Tharparkar district, Sindh Province, 2017.
12   Based on Tharparkar's current level of population mobility.

A total of 878 children aged 6-59 months were assessed for their nutritional status through anthropometric measurements. Table 1.1 illustrates the distribution of the participants by gender and age. All age groups were well represented and consistent with the normal age distribution recommended by WHO (2006). As per advice of technical advisors in Action Against Hunger Paris HQ, the methodology was modified to assess all children under 5 years present at the household level during the field work and capture maximum information regarding risk factors. There were multiple children <5 found in all HHs; hence the sample size expanded to 878 children assessed ensuring good precision and stratification of analyses.

Photo 1: Anthropometric Measurement, Quantitative survey. Photo: Shahid Fazal

Unlike in other Link NCA Risk Factor Surveys, the sample size for Tharparkar was not calculated for each indicator separately. Preference was given to a fixed sample size, allowing for a calculation of correlations between anthropometric measurements and risk factors' prevalence.

The sampled households were selected across 48 clusters. In other words, 13 households were selected in each sampled cluster while the children under 5 years found in these HHs were 878 in number.

Sampling procedure

The selection of households was carried out according to a two-stage cluster sampling methodology. In the first stage, ENA software was used to select clusters[13] using Probability Proportional to Size (PPS)[14]. In the second stage, households within clusters were randomly selected using exhaustive lists of households obtained in each village and a printed random number table.

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13   Villages or gotts.
14   A complete set of sampled clusters is available in Annex A.

C.   SAMPLING FOR QUALITATIVE SURVEY

The objective of the Link NCA's qualitative survey sampling framework was not to be statistically representative of the target population but rather to be qualitatively representative of different population segments living in the area. In order for the collected qualitative data to represent realities of a majority of households, a purposive sampling was used to select villages with heterogeneity. A particular attention was paid to the representativeness of livelihoods zones, distance to health facilities and prevalence of global acute malnutrition.

Table 2: Sampled villages for Qualitative survey

Taluka /Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
Union Council	Nangarparkar	Veerawah	Kantio	Jhirmirio
Village	Garthyari	Veeal	Mithrio Mor	Jhirmirio
Sampling	Far from district center; high GAM rates	Far from district center; high GAM rates	Close to district center	Close to district center
GAM	41.5%	37.5%	13.6%	12.5%
Distance from city center (km)	150	120	50	40
Livelihood zone	Agropastoralist[15] and Livestock	Agropastoralist and Livestock	Livestock	Irrigated zone

At the village level, the following categories of participants were selected to participate in semi-structured interviews and focus groups discussions:

- Community leaders (village leaders, religious leaders and other prominent community figures);
- Traditional healers or birth attendants;
- Health centre personnel (doctors, nurses, health extension workers);
- School directors or teachers;
- Representatives of community-based organisations;
- Mothers and fathers of children under 5 years of age;
- Grandparents of children under 5 years of age
- Key government staff and staff of consortium partners
- Haari- Agriculture or LIVESTOCK farmers
- Pregnant and Lactating women
- Mother of a current SAM-MAM Child / Mother of positive deviant child [i.e. a recovered child]

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15   As this is a desert terrain, most of the agriculture labor opportunities are available in the nearby barrage area districts where many families migrate on a seasonal basis.

D.   QUANTITATIVE DATA COLLECTION

Team composition and training

The quantitative data collection team was composed of 5 teams, each containing two female anthropometric measurers, two female enumerators and a survey leader. Each supervisor was responsible for methodology compliance and quality assurance of 2 teams of two enumerators. A guide was hired in each sampled cluster to facilitate team's work and to ensure community acceptance.

Prior to the commencement of data collection, all team members received a thorough 4-day training, which took place in Tharparkar from 10th to 13th April 2019. The training included, among others, modules on survey methodology, anthropometric measurements using the SMART methodology and an administration of household questionnaires using mobile devices. All team members participated in a standardisation test and a pilot test[16] of all data collection tools for quality assurance purposes. Quantitative data collection was conducted between the 15th and 27th of April, 2019.

Data collection tools

The quantitative data was collected via hard copy questionnaires. The questionnaire covered all areas of interest linked with validated hypothesised risk factors. It was composed of sub-sections pertaining to a head of household, a caregiver of a child under 5 years of age or the child itself. One sub-section was dedicated to observations of caregiver care practices or household hygiene and sanitation practices. It was translated into Urdu and administered in Urdu[17] or Sindhi, depending on respondents' speaking abilities.

In addition, for all children aged 6–59 months, anthropometric measurements, such as height/length, weight, mid-upper arm circumference (MUAC) and a presence of oedema, were recorded, as per the SMART methodology guidelines. The height/length was measured using standard UNICEF height boards borrowed from HANDS, a national NGO. The weight was measured by using 100gm precision UNICEF SECA Scales and recorded to the nearest 0.1kg. MUAC was measured using three-coloured standardised tapes, following the 2013 revised National CMAM Guidelines. MUAC readings were recorded to the nearest 0.1cm. Oedema was diagnosed by applying a moderate finger pressure on the top of the feet. The child was recorded as oedematous only if both feet clearly had oedema.

Main challenges

- **Accuracy in terms of child's age:** Due to a low availability of recorded birth dates in the zone of study, the data collection team had to determine an approximate age for each child using a local calendar.
- **Team competencies/supervision:** Due to a low availability of experienced enumerators, less experienced individuals were recruited to collect the survey data and a small number of enumerators were from recruited from the neighbouring district [which district?].
- **Support from Link NCA Unit:** The qualitative data collection was conducted after a short break in June-July. The gap period was due to a sick leave of the Link NCA advisor from France along with Ramadan and Eid. An extended medical break of the first Link NCA Advisor from France led to delay in progression and day-to-day coaching on the methodology and different critical steps. This might have led to inappropriate supervision of the data collection process and quality assurance, and thus certain data discrepancies. The contact with the advisor was minimal from the inception phase while the contact was totally lost after mid-April. The medical break kept on extending and despite several reminders from DWHH office no new contact could be established before July 2019.

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16   Pilot test took place on 14th April 2019.
17   Urdu is the national Language, understood and used generally by all communities, Sindhi is the regional language while a very similar local Dhadki language was also used in some pockets of the community

After a gap period of almost four months, renewed technical support was provided by a newly assigned Link NCA Advisor by the Link NCA Unit UK for this stage after a gap period of 4 months. The process could not be delayed due to several reasons including funding constraints from DWHH, dynamic movements to and from the district for labour opportunities, two Eid breaks etc.

■ **Participant bias:** Due to a long history of humanitarian assistance, participants in sampled communities might have perceived some benefit in participating in the survey and the validity of their responses could be questioned. This potential threat was mitigated through an active engagement with community leaders, local guides, and a systematic provision of detailed information about the study to all participants prior to their interview.

E.   QUALITATIVE DATA COLLECTION

Team composition and training

The qualitative data collection was led by a Link NCA Analyst with the help of a Field Supervisor/translator, a community facilitator and a community mobiliser recruited locally from Tharparkar. The main role of community mobilisers was to ensure equitable selection of participants for each focus group discussion in coordination with community leaders and to carry out any support functions, as needed.

Prior to the commencement of data collection, team members received a detailed 2-day training, which took place in Tharparkar from 26th to 27th June 2019. The training included, among others, modules on survey methodology and tools as well as a detailed explanation of ethical considerations to be respected during the study. A series of practical tests was integrated into the learning process in order to test the team's level of comprehension of key concepts and practices and to ensure that a high quality standard of data collection would be met.

Data collection tools

The qualitative survey team used semi-structured interviews and focus groups discussions as two principal data collection methods. However, in order to avoid an information bias due to a long history of humanitarian interventions in the zone and a community dependence on external assistance, the qualitative survey team used a variety of participatory tools, aiming to reveal the real determinants of undernutrition in the area. The selection of participatory tools included:

a) Historical calendar
b) Seasonal calendar
c) Ranking
d) Storytelling
e) Gender wise daily activity clock
f) Gender Boxes
g) Meal composition chart
h) Household expenses
i) Health journey / Therapeutic itinerary
j) Agree/disagree game
k) Risk game

Semi-structured interviews and focus group discussions were guided by interview notes, covering key topics related to risk factors validated during the initial technical workshop. The content of the interview guides took into account available findings for Tharparkar district and instead of repeating certain inquiries it aimed to deepen the understanding about individual risk factors and their interactions in the zone of study.

For more information about qualitative survey methods and tools, please refer to the Qualitative Survey Guide in Annex C.

Data collection

The qualitative survey took place in selected communities from 28th June to 17th July 2019. The qualitative survey was conducted between the Eid-ul-Fitr (4–6 June) and Eid-ul-Adha (12–15 August).

The qualitative survey team spent approximately 6 consecutive days in each selected community. The length of semi-structured interviews or focus group discussions was limited to 1 hour or 1 hour 15 minutes maximum. The focus group discussions took place exclusively in the mornings in order to accommodate the communities' availability and their daily routine.

Table 3: Summary of community consultations during the Link NCA qualitative survey

Taluka /Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo	
Union Council	Nangarparkar	Veerawah	Kantio	Jhirmirio	
Village	Garthyari	Veeal	Mithrio Mor	Jhirmirio	Total
Semi-structured interviews (Stakeholder)	6	6	5	3	20
Semi structured interviews (mothers of SAM/MAM)[18]	2	2	3	3	10
FGDs	6	5	7	7	25
Community restitution	1	1	1	1	4
Days	6	6	5	5	22
Total Number of Male* Participants	45 (+10)	41 (+12)	51 (+7)	57 (+9)	194
Total Number of Female** participants	40 (+3)	31 (+6)	30 (+5)	43 (+8)	144

* Number of participants per community restitution.
** Due to cultural reasons separate sessions were done with females

The last day of a data collection in each sampled community was dedicated to a restitution of findings to community representatives with an objective to seek their feedback on the interpretation of collected data and, more importantly, to engage them in a design of community-based solutions to identified problems and their prioritisation.

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18   Mother of SAM/MAM Child and Mothers of Positive deviant Child

Photo 2: Female Focus group Discussions. Photo: Khalid Khan

Main challenges

- **Team composition**: Due to an unavailability of experienced research assistants within the district, 2 survey enumerators were used from the neighbouring district while the community facilitators were local. This resulted in a high workload in a desire to complete the data collection within a set timeline. However, the impact of these challenges on the quality of the collected data is deemed low.

- **Language barrier**: Due to the non-Sindhi origin of the Link NCA Analyst, his communication with community members relied heavily on translators' competencies. The competence level of the translators was not always up to the mark and it took time for the analyst to support the translators to give an appropriate response in Urdu. As there were mostly two local languages Sindhi and Dhatki, there were two translators (a male and a female) deemed suitable to fulfil the task who could understand both of the languages and translate them in to Urdu for the Link NCA Analyst. The female was helpful in some circumstances to assist the Link NCA Analyst during focus group discussions with women only, especially on sensitive or taboo subjects as it is not allowed for a male to directly talk to community females on sensitive topics such as family planning, breastfeeding etc. Despite it being a very tedious process with implications on the data quality, considering its scope its influence on the survey outputs is deemed limited.

- **Low community empowerment in terms of problem-solving**: Due to a long history of chronic drought and structural problems with grassroots extreme poverty the communities were often not able to identify the risks as problems – as to them these were norms in their communities. More often they lacked ideas how to either acknowledge food insecurity, inadequate water/sanitation or malnutrition as a problem nor could they approach an obstacle on a local level, rather than awaiting external help in the form of assistance from the government or non-governmental organisations. If they managed to propose a solution, this often turned out to be a sensitisation message that has in the meantime proved inefficient or inappropriate in their context. For that reason, the data collection team had to modify their approach and dedicate more time to problem-solving consultations in order to gather relevant feedback.

F.   DATA MANAGEMENT AND ANALYSIS

The quantitative data was collected via hard copy questionnaires and entered on a daily basis to the relevant databases developed for entry. The online data entry toolkits could not be used in the district as the authorities do not allow GPS and computer tabs to be operated due to security concerns. Before and after each entry, the data was scanned for errors of logic. After a final compilation, all the data was exported in the form of an Excel spreadsheet and analysed with Epi Info and STATA software. The anthropometric data was analysed using ENA for SMART software (2011 version).

The qualitative data was recorded manually through open-ended questionnaires in hard copy and reproduced electronically at the end of each data collection period in a sampled community. The data was grouped by themes for a more efficient analysis, making sure that the confidentiality of respondents was maintained. All views were then analysed using qualitative content analysis methods.

G.   ETHICAL CONSIDERATIONS

The following provisions were respected during the course of the Link NCA study:
a)   their agreement with the study implementation via support letters addressed and delivered to the mentioned field office;
b)   The participants were selected equitably and their informed consent was sought to ensure that they were participating in the study voluntarily;
c)   The participants of the qualitative survey were able to participate in more than one focus group discussion, if they chose to, but considering their heavy workload in the seasonal agri-labour opportunities period, community leaders were advised to spread the selection of participants across the whole village or a cluster of villages, if needed;
d)   The community leaders were informed of the selection of their community for the purpose of a qualitative study at least two days in advance. During the initial meeting they received a detailed planning of research activities in their villages in order to facilitate the participant selection process and ensure the participants' availability at stated times. The detailed planning was subject to change, if required by community members. The qualitative data collection team accommodated to each community's routine as much as possible, while balancing this against the time constraints of the study;
e)   The anonymity of participants was ensured during all stages of the study (data collection, data analysis and data storage). Their names were not collected nor shared;
f)   The qualitative data collection team organised a community wrap-up discussion during the last day of the data collection in order to allow communities to review their findings, rank identified risk factors and prioritise actions for the way forward;
g)   All children aged 6 – 59 months who were identified as suffering from severe acute malnutrition and/or other medical conditions were referred to the nearest health facility for appropriate treatment.

H.   STUDY LIMITATIONS

■ **Risk factor prevalence estimates**: Risk factor prevalence estimates featured in this report were calculated from a complete data set, where certain entries might have been doubled or tripled for caregivers and/or households with more than one child less than 5 years of age[19]. For this reason, they cannot be deemed statistically representative and should not be used as a reference in project proposals and/or any other documentation requiring a sound quantitative evidence. They were integrated into a core text of this report for purely comparative purposes, despite their approximate value. While they tend to align with the findings of previous surveys and huge deviations are not expected, their statistical value cannot be guaranteed.

■ **Correlations**: It is advised to appraise statistical associations with caution as observed links do not necessarily prove the causality, while unobserved links do not mean that the causality does not exist. Correlations thus must be considered within a larger framework, triangulated with other sources of data, and as such can be used for a prioritisation of current and future interventions.

■ **Heterogeneity**: The time designated for a qualitative data collection, although substantial, did not allow for a complex study of the dynamics and heterogeneities of the zone of study. While certain differences were observed and are rightfully highlighted in the findings, certain information might have been omitted or distorted, depending on participants' knowledge.

Photo: Shahid Fazal

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19   Data collected through a merged electronic questionnaire deployed on mobile devices.

4. FINDINGS

HYPOTHESISED RISK FACTORS

The identification of hypothesised risk factors was based on a systematic literature review (using the Link NCA Pathways to Undernutrition module and all grey literature available locally), supported by a series of exploratory interviews with key informants, such as representatives of relevant governmental institutions, non-governmental organisations and/or academia with an in-depth knowledge or work experience in the zone of study. The identified hypothesised risk factors were presented, examined and validated for field testing during the Initial Technical Workshop[20], which took place in Karachi on 13th March 2019.

Out of 46 hypothesised risk factors, 17 were retained for field-testing while 29 were merged with other factors validated for field testing. Technical Experts were afterwards invited to categorize risk factors according to their anticipated contribution to undernutrition in the zone of study on the scale from 1 (risk factor expected to contribute marginally to undernutrition) to 5 (risk factor expected to contribute substantially to undernutrition). The results of this exercise are presented in the table below[21].

Table 4: List of hypothesised risk factors validated for field-testing during Initial Technical Workshop, including Technical Experts Rating

	Risk factors	Technical Experts Rating	
		District Thar Weightage	Province-Karachi Weightage
A	Poor health services (availability, access and utilization)	4.9	4.8
B	Lack of family planning practices /services	3.3	4.8
C	Stress of care giver or HH	4.9	2.3
D	Sub optimal breastfeeding practices	2.1	4.6
E	Poor complementary feeding practices of children 6-23 months	4.3	4.4
F	Improper care practices of PLW and child	4.9	4.2
G	Lack of mother empowerment care practices and decision making	4.1	3.2
H	Low production/availability of food	5.0	
I	Low access to Food	4.8	4.6
J	Poor diversity, access and availability of sources of incomes for HH	4.8	4.2
K	Access to market	4.3	3
L	Drought affecting Livelihoods	4.8	4.8
M	Poor coping strategy	4.8	4.2
N	Low social capital of women or Household	3.3	4.4
O	Poor access to safe water for drinking	5.0	4.7
P	Poor sanitation and Hygiene practices	4.8	4.7
Q	Women/child workload	4.2	3.3
R	Early Marriages / Early Pregnancies	4.8	4.7

20 Participants included 30 technical experts covering a variety of sectors, such as health and nutrition, agriculture, food security and livelihoods, water, hygiene and sanitation, and education.
21 Cells highlighted in orange designate top most plausible risk factors, while cells highlighted in green designate the least plausible risk factors.

A.   HEALTH

A key tier of the community level primary health care is the national programme for family planning and primary health care (FP and PHC): Commonly referred to as the lady health workers (LHW) programme, it was launched in 1994 to increase access to basic preventive health care services, particularly in rural areas. Lady health workers deliver a range of services related to maternal and child health including promoting childhood immunization, growth monitoring, family planning and health promotion. They treat minor ailments and injuries and are trained to identify and refer more serious cases.

There is a shortage of Lady Health workers (LHWs) and general health staff both at community and health facility level. Inadequate Family Planning (FP) services and less institutional deliveries are resulting in multiple pregnancies, high parity, maternal anaemia, low birth weight (LBW) and premature neonates. Inadequate ANC/Natal/PNC services with lack of iron folate supplementation and early marriages increase the burden of maternal malnutrition and poor birth outcomes.

Health services in Tharparkar are provided through a three-tier health care delivery system, which relies on the following model: The Primary Health Care (PHC) Units are basically providing primary level health services and usually not having the facilities of specialist clinics, emergency dealing, hospitalization facilities, surgeries and investigation procedures. The Primary Health Care System of the government is composed of Basic Health Units (BHUs) and Rural Health Centers (RHCs). The BHU is the most basic unit serving about 1000 to 3000 patients per month and its first referral is to the Rural Health Center (RHC), which is the next step of the primary health care system22. The BHU is a Union Council (UC) level health system comprised of a primary hospital, which covers 20,000 to 30,000 people. The BHU usually has a medical doctor position but usually vacant at Tharparkar as doctors are not willing to serve in these harsh peripheries and these BHUs are either non-functional or operated by a medical technician and a nurse. Amongst a cluster of UCs one of the larger UCs will have their BHU upgraded to a Rural Health Centre (RHC) level which is a slightly bigger health facility and will have some day care procedures and one or two specialist doctors such as a paediatrician or a gynaecologist. Both the BHUs and RHCs are managed and observed by District Health Officers (DHO): this responsibility is contracted out to a semi government organization, the Pakistan Primary Health Care Initiative (PPHI). PPHI is responsible for the smooth running and performance of all BHUs and RHCs in the whole of Sindh and for addressing their day to day matters. Primary Health Care Units, whether RHC or BHU, are headed and run by qualified graduate doctors who might have a good experience in the medical field but don't have any qualifications in Human Resource management.

The secondary care hospitals are providing secondary level health care such as specialist clinics, emergency dealing, hospitalization facilities, moderate level surgeries, and a reasonable range of investigation procedures for not only the urban population but the surrounding rural population as well. Examples of these Secondary Health Care Units at government level are Taluka or Tehsil Head Quarter (THQ) hospitals and District Head Quarter (DHQ) hospitals. These DHQs should ideally be headed and run by either graduate doctors or specialists who acquire this position on seniority basis either by qualification or by length of service. But the lack of appropriate and adequate level qualified staff is an obstacle to health service delivery in the district.

According to the Sindh Drought Needs Assessment report 2019, for surveyed households the most frequented health facilities/providers were the Basic Health Unit (22%), followed by the Taluka Head Quarter (THQ) hospital (20%), the Rural Health Centre (19%), the District Head Quarter (DHQ) hospital (18%), then private doctor/clinic (12%). The remaining providers (dispensary, MCH, outreach/mobile team etc.) are visited by 9% of the surveyed households. Households in desert/arid areas and those headed by men travel significantly longer distances to access health care when compared with households in non-desert/arid areas and households headed by women.

The quantitative assessment collected information on different indicators of the health system. It was revealed that access to healthcare is a critical issue in Tharparkar. The surveyed households cited challenges such as long distances to healthcare providers, high cost of services and poor infrastructure. On average, the surveyed households reported traveling 20.8 kilometers to access healthcare. About 68% of the surveyed households reported travelling for more than 1 hour to access healthcare with an average cost of 300 PKR per single round trip to the nearest hospital. Longer distances to a health facility increase the monetary and non-monetary costs for the households and also induces residents to delay/not seek health care, which has adverse impacts on the health of the individuals. However, the calculations did not reveal a statistical association between travel time and rates of stunting and wasting (Annex B).

The reasons for the poor access to, and utilization of, health services were probed through the qualitative survey. The most common problems while accessing healthcare are the long distances to healthcare providers, the high cost of services, the non-availability of transport, and the poor road infrastructure. Other problems while accessing healthcare include: medicines not being available, lack of medical equipment, health/female health staff not available, and poor availability and utilization of immunization services.

"They do not take their children to hospital for immunization and only immunize their children if the immunization team visits their home."

(Mothers FGD)

Triangulation of the qualitative survey and the semi structured interviews with government authorities revealed that the lack of female health workers (FMO, LHW and LHV) in health and nutrition facilities prevented women from seeking health services. Similarly, due to the routine workload of the short numbers of staff, they have less priority to educate patients on health and nutrition aspects especially maternal health and IYCN. Most of the health staff is male, which made women feel uncomfortable about consulting on breastfeeding or pregnancy issues.

Figure 1: Summary of key barriers to healthcare in Tharparkar
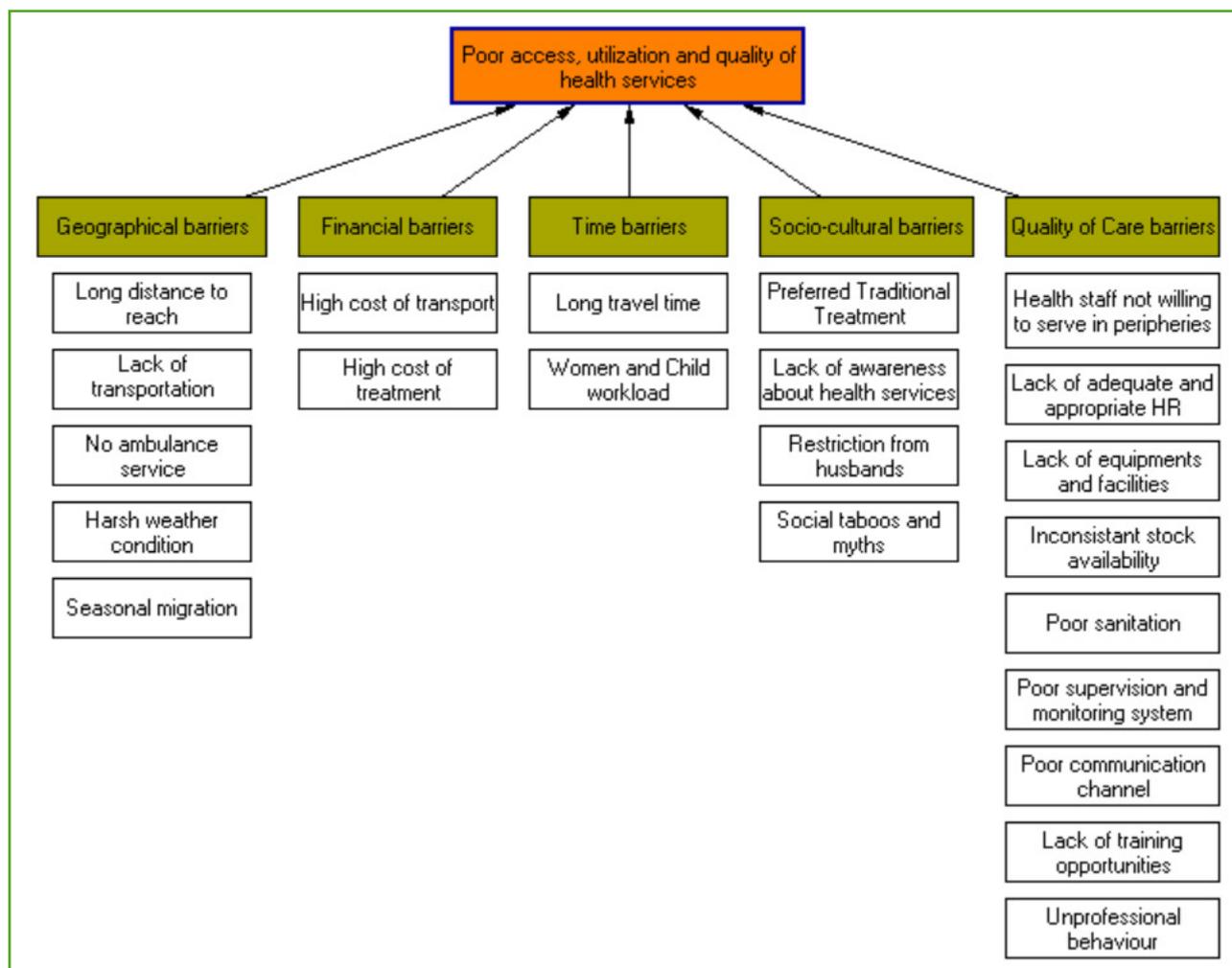
Maternal health

The quantitative inquiry shows that at least 30% of the females were married before they reached 18 years of age. The average age of marriage was found to be 19 years and the average age of a woman's first birth was reported to be 21 years. As per the survey, lack of awareness of the risks (especially amongst elders/decision makers) and poverty are the two major factors leading to early marriages. Although subsequent regression analysis carried out for the early marriages and early pregnancy did not show a significant relation with wasting or stunting.

Usage of contraception was found only in 28.65% of female responses, which is quite low. The national figures from PDHS 2013 shows that the average use of any contraceptive among currently married women has increased 34 percentage points during the past 22 years, from 21 percent in 1990-91 to 49 percent in 2006-07 and 55 percent in 2012-13. Subsequent analysis carried out for the use of contraception did not show a significant relation with wasting or stunting. A majority (80.2%) of mothers reported only one ANC visit while only 28.4% of mothers have completed 4 or more ANC visits during her pregnancy. The statistical analysis between ANC visits and anthropometry did not find a statistical correlation between the two indicators meaning that the inadequate ANC visits was not a risk factor for wasting or stunting.

The risk factor survey revealed that practices related to IYCF, WASH, and FSL are not satisfactory and the communities in the targeted district lack awareness about best practices. Maternal malnutrition was also found to be a determinant of malnutrition in the district where 14% of the mothers were acutely malnourished with a MUAC lower than 210 mm. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between **the maternal nutrition status** and acute malnutrition of the child, which means that a mother MUAC below 210mm constitutes a significant risk factor for wasting (see Appendix B).

During the qualitative inquiry about two thirds of the females responded that they visit a female doctor during pregnancy at least once but the tendency to continue ANC visits is less prevalent due to their heavy workload and a lack of permission from their husbands. The husbands' resistance stems from the reality that they are not aware of the importance of these health visits, hospitals are far, and the woman needs a male family member to accompany her, which can add to the cost and time of the visit. Almost half of the mothers (45.2%) do not go for any PNC visit. More than half of the mothers (53.8%) do deliveries at home and prefer TBAs due to the low cost and the convenience of the service being available in their neighborhood. About half (46.3%) of the children have not been checked after delivery. The statistical analysis between place of delivery and anthropometry did not find a statistical correlation between the two indicators meaning that non-institutional delivery of babies was not a risk factor for wasting or stunting.

"We prefer home delivery due to no permission from husband, low cost and hijab (purdah or covering of face and not letting to travel alone) factor"

(Mothers FGD)

Mothers said, they do deliveries at home and no ANC/PNC visits but husbands said they take females for proper ANC/PNC Visits and for deliveries to hospital, which was a false statement by the husbands as evident from the data. The husbands tend to show that they are responsible for the family matters and they do take care of the health and nutrition matters of the family but the practices were against the statements provided by the males.

(Mothers FGD)

When the reasons for not visiting a doctor regularly were probed, it was found that either the women are culturally not allowed or the husband does not allow the women to have frequent visits. When the husbands were asked separately they stated that they are fully supporting the females to have access to all health care and better food during their pregnancy; but when cross-checked with the female FGDs their response contradicted the husbands.

When the communities were asked why they visit hospitals for ANC/PNC, most responses were that it is to avoid medical risks. Poverty was another observed barrier towards completion of ANC/PNC visits, because of the cost of transportation to the health facilities. More than half of the communities still prefer home based deliveries; when probed most of their answers were around the lower cost of the home deliveries through TBAs.

"Mothers are aware that frequent births have a bad impact on mother and child health."

(Mothers FGD)

The mothers who had a priority for institutional deliveries mostly knew the importance of medical risks related to pregnancy and deliveries which they wanted to avoid. For a small number of mothers the HFs were in close proximity due to which it was convenient for them to avail the MNCH services.

Lack of female health professionals (FMO, LHW and LHV) in health and nutrition facilities prevented women from seeking health services. The work burden of existing government staff prevented them from properly focusing on IYCF practices. Mothers expressed discouragement about health centers due to unavailability of staff. In particular, most of the health staff were male, which made women feel uncomfortable about consulting on breastfeeding or pregnancy issues.

PLWs were also unable to seek care or consult relevant health care providers as they were engaged with domestic responsibilities, including fetching water for the family, taking care of family members and other domestic work.

The risk factor survey used the Roxemburg scale to assess the level of stress of the mothers/caregivers. The analysis shows that 53 % of the mothers scored 3 or above on the scale showing a significant level of stress due to poverty and drought. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between **maternal stress** and the chronic malnutrition of the child, meaning that more points on the maternal stress scale pose a potential risk factor for stunting. (see Appendix B).

Mothers expressed a general willingness to receive services at BHUs, such as delivery, post-natal care services and child immunization. However, there is a need to ensure that staff is available in the health centers, particularly female staff (so that their husbands will allow them to visit HF).

Child Health

In children under five years of age, illnesses are an immediate cause of under-nutrition. Illnesses may also negatively impact food intake among children, leading to further under-nutrition. Information on child morbidity was collected through a two-week parental or caregiver recall. The parents or caregivers were asked to recall whether the child had been sick and, if so, whether the illness was diarrhea and/or acute respiratory infection (ARI). This information was gathered for all those children whose anthropometric measurements were collected, giving a total of 878 children aged 6-59 months. Of these children, 387 children had experienced fever, diarrhea, ARI/cough or any other illness in the past two weeks. The prevalence of diarrhoea in this non-peak season was found to be 33.0%. Analyses taking into account anthropometric measurements of children in the household revealed a significant statistical association between diarrhoea and acute malnutrition, meaning that diarrhoea constitutes a significant risk factor for wasting of children in the study area (see Appendix B).

"There is no public sanitation system in this village to keep our environment clean"

(Father FGD)

Participating mothers linked diarrhoea and vomiting to under-nutrition. Although some houses had inadequate hygiene conditions, mothers also connected poor hygiene and unsafe drinking water to diarrheal diseases.

According to the IPC Acute Malnutrition analysis the Under 5 mortality rate was estimated at 2.83 Under 5 deaths/10,000 under 5 children/day and a Crude Mortality Rate of 0.89.

During the qualitative inquiry the seasonal trends related to health patterns were also recorded in consultation with the community, as shown in the table below:

Table 5: Seasonal trends of Child Morbidity/Mortality

Months	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Morbidity												
Cough/ARI/Pneumonia	orange											orange
Fever	red					red	red					red
Diarrhea	light	light	light	orange	orange	red	red	red	orange	light	light	light
Malaria						orange	orange	orange	orange			
Malnutrition	red	light	light	light	orange	red	red	red	orange	light	light	red
Children Mortality	red					orange	red	red			red	red
Climate, Weather Patterns and Hazards												
Rainfall						orange	red	red	orange			
Temperature				red	red	red	red	red	orange	light		
Season	Win.	Spr.	Spr.	Sum.	Sum.	Sum.	Sum.	Sum.	Aut.	Aut.	Win.	Win.
Drought	orange	orange	orange	orange	orange	red	red	red	red	red	orange	orange

B.   NUTRITION AND CARE PRACTICE

District Tharparkar is one of the primary target areas for nutrition assistance. The households of Tharparkar have received different types of assistance; particularly free food, nutritional support, livestock support, and drinking water. The government of Sindh's Nutrition Support Program (NSP) has been introduced in the district to cover the need for SAM treatment programs and provide nutrition supplements to pregnant and lactating women. Outreach programs are carried out through LHWs in all union councils. Under the PC-1, a national NGO provides nutrition and health services to the drought-affected population of all 44 union councils of Tharparkar, through funding provided by the World Bank as provincial loan. However, many health facilities in the district do not have the required number of LHWs for providing nutrition and IYCF services to community members. In addition, several national and international organizations, including UN agencies, provide nutrition support to the district by focusing on raising awareness and conducting capacity-building sessions. Despite the substantial assistance provided through these programs, the recurrent emergency and grassroot poverty remains an obstacle in improving the living conditions in Tharparkar.

Mothers mostly consult mother in laws and their own mothers to seek advice on children's growth. Most of the mothers are responsible for the livelihoods and all other household chores as well which poses a heavy workload on the women of Tharparkar. Husbands only go for livelihoods and contribute nothing regarding HH chores.

"Mostly mothers follow the lead of other mothers in the community in terms of IYCF and care practices".

(Marvi Workers)

Infant and Young Child Feeding Practices

Breastfeeding
The quantitative enquiry revealed that only a quarter (26.3%) of newborns received breast milk within one hour of birth. The trends of exclusive breastfeeding have changed in last few years and on the response of a child having anything else other than breast milk is declining and exclusive breastfeeding rate was found at 84.1% while among those around 78.3% were continued till 1 year and similarly around 60.4% till 2 years with complementary feeding after the first six months of age. Mothers reported breastfeeding children on average up to 20-23 months of age. Some mothers stated that they stopped breastfeeding before the child reached 24 months of age since they became pregnant again. A limited number of mothers breastfed their children up to two years of age and beyond. Among children aged 12-15 months, a total of 78.3% were continuing to be breastfed. However, only 60.4% of children aged 20-23 months were still being breastfed. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the initiation of **breastfeeding** and chronic malnutrition, which means that, the timely initiation of breastfeeding constitutes a potential positive factor for reducing the prevalence of stunting. (See Appendix B). While the analysis did not establish a statistical association between colostrum, exclusive breastfeeding, and continued breastfeeding with wasting and stunting.

When probed about their breastfeeding priorities, more than half of the FGD mothers responded that they fed the boy and girl infants in the same manner while a quarter of the mothers gave more attention to boys in terms of appropriate breastfeeding.

"Mothers prefer boys over girls in terms of breastfeeding, as boys will become bread winner later on and will continue their caste/race. On the other hand a girl will belong to another household because she will get married."

(Marvi Worker) and (KII)

Misperceptions related to IYCF persist: mothers described a "transitional" three-day period after birth, referring to this period as the phase of "bad milk" or "lack of enough milk." The mothers were not usually able to put the child to the breast within one hour related to the taboo of "the infant had to be washed first". Some mothers believed that "they did not have enough milk during the first three days after the child's birth".

A myth also exists about colostrum being harmful for newborns. Similarly, exclusive breastfeeding is not appropriately followed and complementary feeding is also not initiated in a timely manner. Survey participants showed varying levels of knowledge regarding breastfeeding, complementary feeding, dietary diversity, meal frequency, and bottle-feeding. A mother's knowledge seemed to be strongly influenced by the individuals around her, such as grandmothers, health workers, and other mothers in the community.

Cultural practices such as feeding butter to newborns, or giving sweets, honey, water and tea are common in Thar-parkar. During these initial days, they would instead give the child goat milk because it is easily accessible in the community. At this time, the mother introduced goat milk or other substances, constituting a break from exclusive breastfeeding. Other than goat milk, mothers mentioned feeding honey, extracts of "amaltas" (Cassia fistula), and kathi (extract from mixture or different local herbs) to infants. If a child was perceived to be low weight at birth, that child was fed butter since mothers believed it would provide more energy. "Ghuti", a herbal concoction, was provided by mothers to ease child stomach pain. Commercially available gripe water (commonly referred to as Nonehal) was bought from chemists' shops for easing the child's stomach pain and to promote child health. The traditional custom of giving liquids (whether green tea, gripe water, honey or "ghuti") immediately after the birth was also common in the community.

Only 26.3% of children have been timely breastfed as compared to the national prevalence[23] of 46%, 84.1% have been exclusively breastfed while the national rate is 48%. Seventy eight percent (78.3%) and 60.4% of the children have continued breastfeeding till 1 and 2 years of age respectively.

The risk factor survey depicted that among children born in the last 24 months and who were still living at the time of the survey, there were 26.3% who were put to the breast within one hour of birth, as compared to the previous Smart survey in 2017, where the figure was 19.6%. Further analyses, taking into consideration anthropometric measurements of children in the household, revealed a statistical association between the two indicators, meaning that the timely initiation of breastfeeding had a potential protective correlation with stunting (Annex B).

"The mothers start breastfeeding after 12 hours (Approx.) from the delivery. Meanwhile if the baby cries, they will feed him/her goat's milk/ghutti. If the baby doesn't cry, they will feed him/her nothing".

(Marvi Workers)

Within the community, some mothers believe that colostrum is "bad milk", and therefore colostrum should be thrown away "because it is thick and cause[s] an upset stomach." Regardless of these ill perceptions towards colostrum, respondents reported to still be receiving information sessions from health workers on the importance of colostrum and exclusive breastfeeding. Mothers reported that these sessions raised awareness in the community about how essential colostrum is to feed their babies. Nevertheless, some mothers continued to throw away colostrum since they perceived that "colostrum is thick, and the yellowish color means it is not good for child health, and that it's bad milk."

"They don't feed colostrum and consider it a bad milk. It's their custom and mother-in-laws tells them to do so."

(Mothers FGD)

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23   National Nutrition survey 2018

In addition, use of formula milk was common due to the encouragement of general practitioners. All the common myths and practices contributed towards the low prevalence of breastfeeding. Decision-making was another cause of the low prevalence of breastfeeding since the main decision makers in the family are mostly grandmothers and elders.

Based on the findings, there were numerous factors contributing to sub-optimal IYCF practices like:

Insufficient milk production: When discussing challenges in IYCF, the most commonly mentioned issue was the lack of adequate milk production or the insufficient breast milk syndrome. Moreover, conflicting IYCF messages may have caused confusion among mothers and led to the adoption of sub-optimal practices. Myths and incomplete information persisted amongst the population like colostrum is bad milk and will cause diarrhea, and a subsequent pregnancy during lactation spoils the milk and should not be fed to the infant. For instance, some mothers did not breastfeed when the child was ill. Advice for new mothers about strategies for resolving insufficient milk production were rare; therefore, women often felt that they were not producing enough milk and begin to introduce other foods. Due to weakness in IYCF counseling, some health staff advised mothers to use infant formula when they faced difficulties during breastfeeding. Medical staff was even directing them to use infant formula as early as 3 months of age. When mothers learnt that they were pregnant again, they would stop breastfeeding, even if the child was under six months of age.

Unfavorable environment: Although perceptions about colostrum are improving, many women still discarded their colostrum as "bad milk' due to family traditions. Bottle-feeding was common, even in children under six months of age. They recognized the importance of having a clean breast before beginning breast-feeding, and of washing hands before putting the child to the breast. Despite this knowledge, if water availability was limited mothers were unable to follow these practices.
Another challenge is the lack of awareness and participation in child feeding by fathers. The primary caretaker, usually the mother, is expected to take care of child feeding alone; men rarely discuss issues about child feeding with the caretakers. Generally, children and adults eat their meals separately.

Mothers' workload: Mothers were solely responsible for childcare, as well as other household work and sometimes agricultural activities. If a mother was working away from home; she was not available for on-demand breastfeeding.

Support of grandmothers: Grandmothers were identified as authority figures on breastfeeding and child feeding, as in other aspects of childcare. The decisions made by grandmothers often determined the practices followed by mothers.

Bottle-feeding
Bottle-feeding was assessed by the percentage of children aged 0–23 months who were bottle fed during the previous day. The survey identified that 12.4% of children aged 0–23 months were bottle-fed during the previous day. Mothers viewed bottle-feeding as convenient. Mothers usually left the bottle filled with formula with infants for feeding while they were away or unavailable to breastfeed on demand. Expressing breast-milk in a cup was rarely reported. Mothers often used bottle-feeding when they needed to work away from home on farms or in fields. At night, when mothers needed to rest, bottle-feeding was used to give the infant milk or other fluids. Bottle-feeding usually began when the child was 4–6 months. Sometimes, mothers provided an empty bottle to calm the child. Bottles were identified to be in unhygienic condition.

Health care practitioners have contributed greatly to the mothers' use of infant formula. If a mother had challenges while breastfeeding, health staff advised her to use infant formula. Though this information may be directed at specific mothers with serious challenges while breastfeeding, the message has been shared widely among mothers, leading them to believe that formula milk is superior to breast milk. Mothers reported purchasing infant formula or powdered milk when they could afford it.

Complementary feeding

In recent years there is a trend observed of improved breastfeeding indicators, also evident from the previous SMART surveys done in the district. But the growth faltering starts when the complementary feeding stage starts as the community has scarce means to cover the nutrient/caloric gap of the growing infants. Thee responses related to untimely initiation of complementary feeding were mostly unawareness of the mothers as they did not neither know about the increased growth needs of this age group nor did they have the means to provide appropriate and timely complementary foods.

A common response was received during the survey that when the child reaches four months of age, most mothers are assured by the families that their child "can eat other foods that make a child strong." Some common foods and fluids given as complementary feedings include infant formulas, mashed potatoes, boiled rice, chapatti, and lassi. Mothers expressed that due to their heavy workloads, they cannot continue relying on breast milk and other liquids only; instead, they introduce solid and semi-solid foods as a way of "reducing the child's hunger, which cannot be finished by breast milk alone and which makes the child cry constantly." Another practice adopted by mothers was giving Tetrapak milk to the young child if she did not have enough money to purchase infant formula.

The risk factor survey showed that only 59.6% of the children aged 6-8 months who had been introduced to complementary feedings (solid, semi-solid, or soft foods) have started complementary food on time.

Minimum dietary diversity is very low i.e. 22.9% (4 or more food groups). The proportion of children 6–23 months of age, who received solid, semi-solid, or soft food or milk feeds the minimum number of times was 51.6% in breastfed children and 22.9% in non-breastfed children. Minimum diet diversity scores were very low for both children and women i.e. 2.3 and 2.7 respectively.

"Due to poor feeding practices and low dietary diversity mothers become weak and this impacts on child health; if the mother is weak, the child will be born Low Birth Weight and weak."

(Mother FGD, village-Mithrio Mor)

Mothers mostly relied on liquids instead of semi solids or soft foods. Average meal frequency of children aged 6-23 months was 2-3 times a day. Mothers fed their children usually only in the morning and in the evening, with a long gap during the day. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the minimum meal frequency and chronic malnutrition, which means that the appropriate meal frequency provided to breastfed infants constitutes a potential positive factor for stunting. (see Appendix B). It did not show any association for the non-breastfed infants with wasting and stunting.

"Mostly mothers start complementary feeding well before 6 months of age, due to the frequent pregnancies of the mother, as they stop breastfeeding the child as soon as they get pregnant again. Mothers said that due to early pregnancy they get weak so there is no breast milk and also due to poverty they can't afford to get extra food for the mother. They also believe that during pregnancy the breast milk becomes spoilt and injurious for the lactating child. A few mothers also responded that if they feed the infant, it will consume all of the energy and will harm the fetus. The other reason is the women's workload as mothers give child complementary food before going out to work."

(Mothers FGD) and (Marvi Workers)

Children are usually dependent on the available seasonal foods prepared for all family members. As most families are poor, the available foods are often limited. During festivals, families prepare special foods (halwa, or other foods cooked with a high proportion of oil), which add variety to the child's diet. However, these specials foods are not

suitable for young children. Due to cultural beliefs, certain foods are associated with negative health impacts and therefore not provided to children, such as yogurt during winter, spicy foods to children under eight months of age and semolina (sooji) to children under two years of age. It was assumed that semolina provided to children will cause abdominal pain.

"Children are being fed with the same food which is prepared for other household members."

(Mothers FGD)

The common complementary foods are rice/rice pudding or sooji (semolina); otherwise mostly the same food is being fed to the infants and children as to the adults. It was observed that the grandmother advises on a child's diet. The role of the LHWs and medical staff shall also be enhanced in awareness generation related to MIYCN education promotion. It was also observed that mostly there was no special food being provided to the pregnant or lactating women for their additional needs.

An in-depth analysis was conducted to assess the consumption patterns and complementary feeding practices for children aged 6–23 months born to mothers aged 15–49 years in the PDHS 2012–13. This CFPP analysis revealed some positive associations between the general wellness indicators of the children and the mother's education and awareness indicators which gives us learnings for future recommendations. Findings conclude that educated mothers were found to be better caregivers to their children as compared to uneducated mothers. Mother's involvement in the decision-making process regarding major household purchases was significantly associated with food consumption. Consumption of grain, roots and tubers, dairy products, eggs, and fruits and vegetables were found to be relatively higher among children whose parents made joint decisions and/or mothers took sole decisions regarding major house-hold purchases. Children of non-working mothers were more likely to have a better diet consisting of the seven food groups than the children of working mothers. Children of younger mothers received less food from any recommended seven food groups as compared to children of older mothers.[24]

Minimum acceptable diet and consumption of iron-rich food

Minimum acceptable diet is a composite indicator reflecting the adequacy of complementary feeding practices. It incorporates minimum dietary diversity and minimum meal frequency based on a 24-hour dietary recall. 21.6% of children aged 6–23 months received a minimum acceptable diet. Among children aged 6-23 months, there were 20.9% who had received at least one iron-rich food in last 24 hours. Though the trend of minimum acceptable diet has changed and a significant positive change is observed however, the consumption of iron rich or iron fortified foods is an essential requirement and needs special attention to overcome the critical malnutrition situation in the district.

Dietary Diversity Score (DDS)

The Minimum Dietary Diversity score (MDD) is based on the number of different food groups consumed by the child (MDD-Child) aged 6–23 months and the women (MDD-Women-mostly mother of the assessed child) in the past 24 hours. The set of 15 food groups for children and for women were included in the questionnaire. The MDDC ranges from 0 to 15, and the MDDW ranges from 0–10 with lower numbers indicating less dietary diversity. The MDDC and MDDW give an indication of food groups consumed by the child and women respectively in the last 24 hours. The following set of food groups were used to calculate the MDDC and MDDW.

The overall MDDS-W score recorded for the women was found to be very low (2.7), and it was even lower in the children (2.3), indicating that, on average, each household consumed less than 3 of the 12 food groups at household level. This indicated that households had poor access, affordability of diverse foods, coupled with poor knowledge of diverse food groups and poor food preferences. Other significant observations revealed during the survey were the low dietary diversity of food, and food provided to children aged 6-23 months was not rich in micronutrients. The statistical analysis between dietary diversity and anthropometry did not find a statistical correlation between the two indicators meaning that the minimum dietary diversity was not a risk factor for wasting or stunting.

According to the LFSA 2017 findings, surveyed households lacked in providing diversified food to reproductive age women and young children. Overall only 17% of surveyed women of reproductive age in Tharparkar were meeting the minimum dietary diversity (MDD-W) i.e. who consumed 5 or more food groups out of 10 in past 24 hours recall period. The MDD-W is considerably lower among women of rural and desert/arid areas, men headed, unsustainable, agriculture and poor households than among women of urban, non-arid areas, women headed, sustainable, non-agriculture and very rich households of the neighboring districts.

The risk factor survey shows that among children aged 6 to 23 months, 11.6% have consumed one food group and 24.0% have consumed 2 food groups. 19.9% of children have consumed 3 food groups. Only 44.3% of children have consumed the minimum required food groups which is 4 and above.

According to the LFSA 2017 findings, among children aged 6-23 months, overall 16% of children met the minimum dietary diversity (MDD) based on a 24-hour recall period. The low dietary diversity among women of reproductive age and young children could be attributed to the poor health and nutrition situation in the surveyed districts. Less than a quarter of the households had poor food consumption. The diet of the people in desert/arid areas was poorer in terms of quality and quantity with a very low dietary diversity in Tharparkar.

There is a strong association between maternal age and MDD of children. Children with mothers aged 19-34 years are 2.3 times more likely to attain MDD than children of younger mothers (15-18 years). This likelihood for children of mothers 35 years or older is also high with the odd ratios of 2.1. There was a statistically significant association between both parents being uneducated and MDD provided to children. Children whose parents had no education are less likely to receive MDD as compared to children belonging to households with a higher overall level of education (e.g. both parents educated).

The most commonly used food group is that comprising bread, porridge and cereals, which is used by 96.2% among children aged 6 to 23 months. This is followed by the food group of yogurt and milk products (51.8%) and foods made from beans and lentils (40.6%). Food groups of White potatoes, white yams and other foods made from roots are consumed by 38.7% of children of the said age group. While the milk (powdered milk/fresh animal milk) food group is consumed by 39.0% of the children. The food group of Any Dark Green Leafy Vegetables is consumed by 37.5% of the children. This is because Tharparkar is mostly livestock dependent area. The consumption of the remaining food groups (like meat, organic meat, eggs, ripe mangoes etc) among these children is around 10.0% or below, which is very low.

In terms of Mothers, 6.0% of mothers consume only 1 food group, 36.0% of mothers consume 2 food groups, 39.4% of mothers consume 3 food groups and 15.0% of mothers consume 4 food groups. For adult women, a minimum of 5 or more food groups is necessary but here only 3.4% of the mothers are fulfilling this criterion of minimum diet diversity. It is also observed that there is a low feeding priority given for mothers: both the quantity and quality of food the mother consumes is inadequate and the mother is given the last priority to eat during meals.

"Food distribution pattern is children first, males second and mothers third. No extra or special care is being given to PLWs"
(Mothers FGD)

Among women, the most commonly used food group is bread, cereals and rice, at 98.8%. This is followed by food groups of milk and dairy products (72.4%) and pulses, legumes and lentils (41.4%). Food group of Any Dark Green Leafy vegetable is 29.0%. All the remaining food groups usage is around 15% and below for each food group.

The qualitative inquiry probed into the reasons of the low dietary diversity scores which were found between low and medium from the quantitative data. It was observed that there was poor access to diverse diet due to poverty and the frequent failure of agriculture (prolonged droughts), which could deteriorate yet further because of the prevailing drought situation in the district. They were totally dependent on seasonal vegetables and fruits which had declined over the years due to lower levels of precipitation. The community did not have enough resources to purchase fresh foods to ensure dietary diversity. It is also worth noting that there was a lack of awareness as well related to the importance of dietary diversity.

The results of the quantitative survey align with the Livelihood and Food Security Assessment (LFSA) conducted by FAO in 2017 which analyzed the dietary diversity scores amongst other indicators in the drought affected districts of Sindh. A high proportion of energy derived from staple cereals is an indication of poor dietary diversity, while those with better diversity are likely to have a balanced proportion of their total energy from staple cereals as well as other nutritious foods. Generally, the diet of the people in the surveyed districts was not only inadequate in terms of quantity, but also of poor quality and was heavily cereal-based, thus poor or low dietary diversity remains a problem across the districts. Overall, Tharparkar was reported highest with a proportion of 84% of surveyed households having low dietary diversity (<4.5 food groups) while the remaining had medium dietary diversity (4.5 to 6 food groups). Among the districts, none of the districts had higher dietary diversity (>6 food groups).

Care practices

It is evident that women may have more difficulties to partake in household decision-making. The qualitative survey probed into the gender differences on how the community treats boy and girl children with regards to feeding, medical treatment and education. The responses showed a small difference between the boy and girl child for feeding and medical services as the boys get preferred for breastfeeding, complementary feeding, and are taken for medical advice. When asked about schooling a majority responded that they do not prioritize girl's education due to cultural reasons and because the access to schools is very far. They said they did not want to send their girls to far away schools where they are exposed to potential risks and violence.

"The education system is very poor. Mostly villages do not have even a primary school, particularly for girls. The majority of primary schools do not have teaching staff and in some places the teachers did not regularly visit the schools."
(Father FGD)

C.   FOOD SECURITY AND LIVELIHOODS

According to the FGDs in Tharparkar, livestock production is the primary source of income while the staple crops for selling and consumption are millet and beans which are rain dependent, hence seasonal. The majority of the communities in Tharparkar rears livestock for subsistence only and is not gaining reasonable financial benefits from this asset which usually becomes a burden on their HH economy. There is potential for these livestock to be industrialized and become a potential source of consistent income throughout the year, increasing their resilience to shocks. Another cultural practice also exists that the community do not like to sell their livestock as they feel it was an ancestral asset holding practice which they need to continue. Half of the community is Hindu so religiously they do not have the practice of selling milk or selling cattle for meat. Tharparkar depends on rainfall for crop and livestock production; the recurrent droughts have had a severe impact on livelihoods, household income and food security. Famine-like droughts have affected the district in 1987, 2000, and 2013. Provincial Disaster Management Authority (PDMA) Sindh has established the district as a drought-hit area on multiple occasions, most recently in September 2018, with an emergency status declared in talukas Mithi, Islamkot, Diplo, Chachro, Dahli, and Nangarparkar. Furthermore, in December 2014, the district was classified as "severely food insecure (emergency)" according to the FAO's Integrated Food Security Phase Classification (IPC); the IPC also designated Tharparkar's outlook as "likely to deteriorate" with regard to its food security status.

Similarly, the Sindh Drought Needs Assessment (SDNA) conducted in 2019 determines the prevalence of food insecurity based on Food Insecurity Experience Scale (FIES) which is quite high as 71% of the surveyed households are moderately or severely food insecure, of which 32% are severely food insecure.

Income generating activities

Income
According to the findings of the Risk Factor Survey conducted during this Link NCA study, the primary sources of livelihood/income of the surveyed households include agricultural wage labor (70.5%) in the neighboring districts through seasonal migration, followed by small insignificant sources like agriculture and livestock produce, while the amount of skilled opportunities were only 4.1%. Agricultural wage labor as the primary or secondary source of livelihood is prevalent in the desert/arid population but they often migrate to irrigated areas outside of their districts to avail these seasonal opportunities. Only 17% of the respondents reported that they had an alternate income generating skill which could help them cope better in times of drought. The synthesis of all sources of information shows that the livelihood sources across the district were more or less the same and the households were heavily relying on unsustainable strategies for earning income/livelihoods i.e. daily wage labor (agriculture and non-agriculture) and this source was highly exposed to the risk of drought, with diminishing opportunities over time.

According to the LFSA 2017 the primary sources of livelihood/income of surveyed households include sale of livestock/livestock products. Sale of agricultural produce reduced over the six months preceding the survey, particularly more in desert/arid areas.

The community usually seeks out alternate local casual labor or work in the agricultural sector (wheat harvesting and rice harvesting) as well as in the construction sector (building houses or cleaning local dams)[25]. There was also a tendency to take loans but this was only effective in the first year of the drought before credit became too high risk for the lenders. The FGD participants attributed food insecurity to the 3rd consecutive year of drought in the district, hence low crop production and loss of livestock.

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25   HEA 2016

"Families do migrate from this community to other districts for unskilled labor and livestock grazing/fodder. Our usual migration destinations are Thatta, Mirpurkhas, Hyderabad and Nawabshah."

(Mothers FGD and Fathers FGD)

Those earning income and dependent on agriculture (sale of food/vegetables/fruits/agriculture wage labor/forestry/fishery work) were observed to be more at risk of food insecurity as compared to those engaged in non-agriculture activities or who had an alternate source of income. At Tharparkar it was observed that women provide full support to their male members of household in earning of income. Women headed households are earning livelihood/income from agriculture wage labor and handicrafts.

The calculations revealed a statistical association between two indicators, meaning low crop production is one of the key risk factors leading to stunting (Cf. Annex B). It is an indirect link where low crop production reduces the access and availability of a diverse diet causing a caloric and nutrient deficit eventually leading to stunting.

There is a widespread lack of education, and lack of skills for any type of professional or diverse skilled jobs. This is another reason why the males are mostly not working as they prefer professional roles, entrepreneurships or skilled jobs for which they do not have the eligibility requirements of education or skills; furthermore, these opportunities are also not widely available in the district.

In the local seasonal calendar developed during the FGDs and semi structured interviews, the months of April to August were found to be the lowest for HH income, and unsurprisingly also hence having the poorest health and nutrition conditions. Most of this was related to the harsh weather and the prevailing drought conditions. In these months there were limited agriculture labor opportunities, severe shortage of water and lack of agriculture produce and fodder. The Months of Adequate Household Food Provisioning (MAHFP) indicators (Figure 2) also support the findings from the communities which show that April-August are the months where HHs have the worst access and availability of food. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the fodder stocking facility and chronic malnutrition of the child, which means that, in households where fodder stocking capacity was not present this constituted a significant risk factor for stunting (see Appendix B). This association supports the source of livelihoods amongst which livestock is a major contributor. The recent droughts have negatively affected the production of fodder which leads to stunting by reducing the survival and production of livestock.

There are negligible alternative income generation activities in the communities to support the community financially in this stress period. The communities have no other choice and adopt negative coping strategies. During this lean period the majority of the community ends up borrowing money for survival, leading to a vicious cycle of indebtedness. Some households liquidate their assets, such as livestock or crops previously set aside. This is a period of limited scope for finding seasonal labor and nowhere to migrate to for opportunities. As the monsoon arrives in July/August there are some arid zone crops which fulfill some needs of the community and also bring some agriculture labor opportunities in the neighboring districts where the families migrate to. The frequent droughts have badly affected the livelihoods and food chain of the district due to which they have no food/fodder left to be stored for lean periods and end up in extended hunger gaps.

Table 6: Seasonal calendar for economic activities and food security in District Tharparkar

Months	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Climate, Weather Patterns and Hazards												
Rainfall						O	R	R	O			
Temperature				R	R	R	R	R	O	L		
Season	Win.	Spr.	Spr.	Sum.	Sum.	Sum.	Sum.	Sum.	Aut.	Aut.	Win.	Win.
Drought	R	R	R	R	R	R	O	O	R	R	R	R
Farming and Availability of Food												
Milk Production	R	R	L	L	L		R	R	L	L	L	L
Fodder Availability	O	O	O							R	R	R
Fodder purchasing				O	O	O	O					
Income Generation												
Livestock Sales	R	R			R	R	R					R
Normal Seasonal Migration of Livestock	R	R	R							R	R	R
Migration of Livestock due to Drought	R	R	R	R	R					R	R	R
Market Prices of Livestock	R	R	L	L	L	L	R	R	R	R	R	R
On-Farm labor opportunities						L	R	R	L	L	R	
Off-Farm labor opportunities	R	R	R	L	L							R
Seasonal Migration for Agriculture Labor		R	R							L	L	
Migration for general labor	R	R	R	R	R	L						R
Socio Cultural Trends												
Workload for Men	R	R	O				R	R	R	R	R	R
Workload for Women	R	R	R	R	R	R	R	R	R	R	R	R

Figure 2: Months of Adequate Household Food Provisioning (MAHFP)

Months of Adequate Food Provisioning (MAHFP)
Months in which the Household Did Not have Enough Food

Month	Value
January	78
February	43
March	40
April	256
May	234
June	569
July	(peak)
August	530
September	259
October	74
November	40
December	49
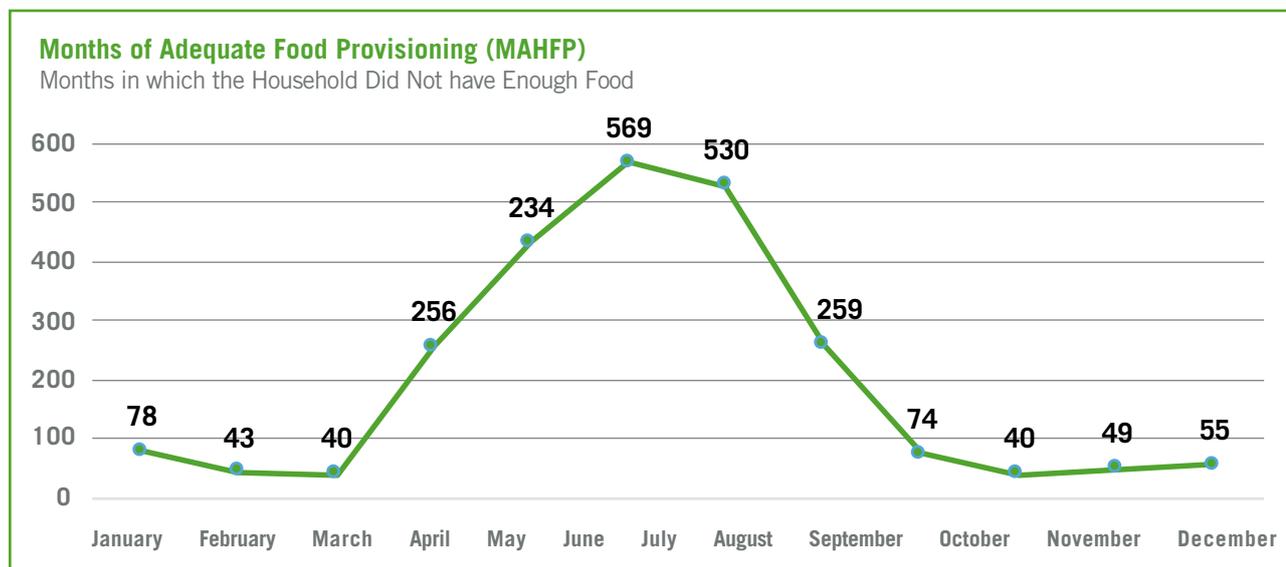
The HEA 2016 analyzed the wage rates during shocks. "In the reference year, it was typical for one family member to carry out casual work for about 8 months of the year, earning PKR 175–200/day, several days per week. During the drought year, this number increased from 1 family member to 2–4 family members who were engaged in casual work for 8 months of the year. However, during the drought years, wages typically dropped to PKR 120–150/day for local labor. Wages for migratory labor were an estimated PKR 300/day. Construction labor and agricultural labor wages also dropped in some areas from PKR 200/day to PKR 100–150/day."

According to the LFSA 2017 the average monthly income of surveyed households from all income sources at Tharparkar was PKR 10,303 six months ago, whereas it was PKR 9,672 at the time of survey; hence, a reduction of 11%. Female headed households have a lower average monthly income from all sources compared with male headed households currently (PKR 7, 547 vs 9,645) as well as six months ago (PKR 8,634 vs 10,847).

There is also an increase in labor migration (and remittances) during drought conditions. The level of migration increases both in number of months and number of people from each household which saturates the labor market. The wages drop in the market due to the supply/demand imbalance in these days and do not give a rational return to the migrated community. In the desert region the communities also used sell their livestock during drought, as a coping strategy. However, the net gain from livestock sales is usually low due to the falling prices for animals in poor condition.

Similarly, the small number of households who have any petty trade will double the number of people involved in basket weaving or embroideries etc. to be able to sell more. The limiting factor is that they have no money for the inputs of these small enterprises and the middle man in the value chain takes it as an opportunity to exploit the workers by giving either small loans or inputs on credit.

A 70-year-old female from village Mithrio Mor, UC Kantio, Taluka Chachro said: "If the government or any organization support us to open a vocational center in our community and train women on handicraft, this will give us an opportunity to support HH expenditure and save money. Savings will be used to purchase extra livestock, which gives us extra milk and business opportunities for males to sell extra livestock in the market."

Livestock

Livestock is the major source for sustenance and food consumption at Tharparkar. Overall, 80% of surveyed households currently own some livestock, and the rate of ownership of livestock is highest in Tharparkar compared to all other districts in Sindh. A majority (84%) of the HHs reported that they owned goats, 27% owned cattle, 20% sheep, followed by 16% of HHs who also owned donkeys/mules while only 3% of the households were rearing poultry during the survey period. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the **ownership of livestock** with both acute and chronic malnutrition, which means that, the more livestock are owned constitutes a potential positive factor for both wasting and stunting (see Appendix B).

Livestock including poultry is the mainstay of the affected areas of Sindh. As small and marginal farmer's livestock often is a valuable asset to help supplement incomes from their small landholdings. Livestock ownership diversifies production and resource management options, increases total farm production and income. The livestock related support to the farmers in protection and management of this invaluable asset base is time critical. In absence of such support the farmers will adopt negative copping strategies such as slaughtering and distress selling.

The Risk Factor Study respondents reported that due to the recent droughts they had lost 54% of their livestock; 43% of livestock owners reported a shortage of fodder at the time of the survey and 31% reported a shortage of water for livestock. Smaller livestock was found to be more vulnerable, as 66% of reported deaths were goats, 23% sheep and 12% Cows. The main reasons for the death of livestock reported by surveyed households are lack of fodder, livestock diseases, lack of water and lack of shelter. The top four items/supports required by livestock owners (in order of importance) are: straw/green fodder, drinking water, vaccines/medicines and concentrated feed.

"The Main reason behind livestock death is lack of fodder and drinking water."

(Fathers FGD)

The SDNA 2019 states that the practice of selling cattle, goats, sheep, and poultry is more common in non-desert/arid areas whereas more buffaloes, camels and donkeys are sold in desert/arid areas. Sales of all other livestock and poultry has been reported more by women headed households showing their vulnerability and tendency towards distress selling.

Among the main sources of feed for livestock in the villages are: green/dry fodder, either own produced or purchased from the market; followed by plants/bushes from grazing in open fields. Pastures in the area are not available as reported by 54% of the surveyed communities; little availability is reported by 37% surveyed communities; and adequate availability by 10%[26]. When taking into account that the drought increases the risk for livestock/poultry diseases, there is a consistent need for livestock/poultry vaccination.

The FGDs participants shared that there is a gradual transition of the communities towards prioritizing smaller livestock over larger cattle. The reason expressed by the community is the rearing costs and efforts required for smaller animals are much less than for cows. They require less fodder and water, are easier to manage, have a higher survival rate in drought and are easy to sell during times of distress. The sale price of goats in normal conditions ranges from 10,000 to 18,000 Rupees while during the distress selling period its price is around 4000 PKR only. Similarly, the price of sheep in normal conditions ranges from 5,000 to 15,000 rupees depending upon size and breeds while during distress selling period its price is around 4000 PKR only.

"We haven't shifted from bigger to smaller animals; instead we sold both bigger and smaller animals due to distress selling and at half of the normal price."

(Father FGD- Garhtyari)

26   SDNA 2019

In the first year of drought, before livestock sickened and died, it was possible for households to sell some of their herd to raise money. The very poor and poor households sold their goats during drought. In the reference year, for example, they typically sold 1-2 goats for an estimated PKR 3,000/goat. In the drought year, this increased to 2-4 goats sold. However, prices typically fell to PKR 1,500- 2,000/goat. Poor, middle and better-off households sold cattle as well. Middle and better-off households generally sold an additional 1-3 cattle. Poor households sold 1 cow in both good years and bad as their herds are too small to increase their sales. Prices typically fell in the bad year, dropping from an average of PKR 19,500/head to an average of PKR 5,000/head[27].

It was observed that mostly the management of livestock is the responsibility of the women household members which adds to their existing workload; the men claim that they also take care of the livestock but it was observed rarely.

The community was cognizant of the fact that the consistent availability of fodder is the key to successful survival of their livestock. They also stated that due to lack of fodder and water livestock morbidity and mortality increases.

Furthermore, there were reductions in fodder, which lead to malnutrition in livestock, reduced milk supply and livestock deaths. To overcome the reductions in fodder, most people resort to distressed sales of livestock, while others migrate in search of fodder for their livestock and employment opportunities1

"By providing fodder, the income from livestock can be enhanced."

(Fathers FGD)

Agriculture

Poor households typically own no or very little land (approximately 1 acre) and livestock2. The poor are usually sharecroppers who cultivate the land of a landlord. This puts them in a vulnerable position of relying on the landlord for contributions. Poor farmers only receive a small portion of the harvest since the landlord only pays once for the seasonal harvest contributions. Poor populations had limited access to purchase food such as milk and often relied on food through payment in-kind.

"Mostly people own agricultural land but are completely dependent on rainfall, which is normally insufficient for cultivation. Their preferred livelihood source is agriculture and it can be improved if water is provided for cultivation."

(Fathers FGD)

"Their income is not sufficient to cover all of their household needs."

(Fathers FGD and Mothers FGD)

The community is engaged in agriculture activities for about 9 months of the year either in their small lands they cultivate during the Monsoon, or working on wages in the fields of other people, or migrating to the barrage areas for seasonal agriculture labor opportunities. The community avails agriculture on-farm labor opportunities in the months of February/March and September/October in the barrage areas in other irrigated districts mostly for harvesting of Rabi and Kharif crops respectively. These opportunities can increase or decrease in time and volume, based on the climatic conditions in the prevailing years. But they are relatively less volatile as compared to the on-farm opportunities within the district as these are totally dependent on rainfall, which has been disrupted in recent years.

The FGDs informed the survey team regarding the agriculture patterns throughout the year. The Agriculture Annual calendar shows that the indigenous crops grown in the district are mostly Millet (Bajhra) followed by cluster bean (Guar) and patchy production of Mung bean (Green Gram), Till and Mott. Communities do not have any seed banks as they usually consume the seeds during the lean season. The cultivation of these crops is dependent on the rains hence the land preparation is done in June followed by sowing in July and August and harvesting in October and November. These months also bring on-farm labor opportunities within the district for local agricultural labor. There is a general shortage of food production at home from March to August. There is fodder availability with the monsoon rains only in the months of August and Sept while the rest of the year is marked by moderate to severe shortages of fodder. The community is compelled to buy fodder a considerable number of months throughout the year to sustain their livestock.

When the reasons for crop failure were probed the majority (71%) of the risk factor survey respondents stated that crop failure in the last year was mostly due to the lack of rainfall; 31% of the community also related the crop loss to crop diseases; while 18% had to sell agriculture produce/seeds/tools in the time of distress. The shock had also badly affected the agriculture labor opportunities where 43% responded a decline or loss in agriculture labor opportunities and 7% a loss of livestock labor opportunities.

In terms of agriculture opportunities the FGDs suggest that majority of the community is engaged in seasonal labor opportunities while most of the workload is on the women and the children. Most of the opportunities are related to agriculture wage labor in the barrage areas outside the district in the cultivation and harvesting seasons when whole families migrate for these opportunities. This migration could mean a 3 month stay outside their home towns. During the short rain spell at Thar district the community takes the opportunity to plow the lands with local seeds and fodder and grow these seasonal crops for consumption or as a source of livelihood. In these opportunities also mostly women and children are the ones responsible. The community was aware of the fact that this extensive workload is detrimental to the health of these vulnerable age groups and was contributing to malnutrition in women and children.

Table 7: Seasonal Calendar for Agriculture activities in District Tharparkar

Months	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
	Farming and Availability of Food											
Crop damages due to disease/ insect attack	■					■	■					
Millet (Bajra), Mung (Green Gram), Cluster bean (Guar), Moth Bean (Mott ki Dal)						Land Pre-paration	Sowing			Harvesting		
Chabhad (yellow melon), Watermelon (Hendana)						Land Pre-paration	Sowing		Harvesting			
Shortage of Food			■	■	■	■	■	■				

The risk factor survey shows that crop production patterns have been affected due to the recent drought and the community not having diverse sources of income hence purchasing powers of food is mostly limited. About 70% of the HH responded that they had the stock available for HH food and 40% of fodder but the amount of stock would hardly last for a week and not more (7.6 days stock of food and 8.5 days stock of Fodder). This shows the greater fragility of the communities towards shocks and how soon their own supplies will diminish. This information is critical to plan any disaster risk programmes and or drought emergency programs as the community will immediately be short of all supplies in case of shocks and will be exposed to mortality and morbidity of both humans and livestock.

A 26 year old male from Village Jhirmiryo, UC Jhirmiryo, Taluka Diplo said that: "The underground water table in this area is very high and useful for cultivation and safe for drinking. If the government or any other organization support us to install solar water pumps for land cultivation it will be a helping hand for our community to improve agriculture production and fodder for livestock. We will be able to return the loan within 2–3 years."

Expenditure

From the spending perspective, the current Risk Factor surveyed households are spending a major proportion (43%) of their income on food purchases and compromising on other basic needs (e.g. health care – only 9%, and education – only 3%) and 7% of their expenses were recorded against the purchase of cigarettes or alcohol. Talking about alcohol consumption is culturally sensitive as it is prohibited by law and by the Muslim religion; but half of the district population is non-Muslim (mostly Hindu). It has been observed through probing questions and information from authorities and market actors that the sale of alcohol in the district is prevalent which shows that the consumption is of a significant level and a good amount of money is being spent on alcohol, cigarette, paan, ghutka, and chaalia[28]. There was a tendency found of spending more money on cigarettes, alcohol etc. and social events such as weddings and not appropriately utilizing household income for the health and nutrition of the family. Thus the category (other than food) that involved major spending was the "other" group of items. This category of spending includes items such as mobile phone costs, transportation costs and loan repayments. It also includes less essential but "desirable" expenses such as festivals, marriages and tobacco/cigarettes. Tobacco expenses were typically in the range of around PKR 5,000/household/year for the very poor and poor and up to about PKR 10,000/household/year for middle and better-off wealth groups. Together, these "other" expenses constituted approximately 15–25% of the annual expenditures of the very poor, poor and middle households, and 20–40% of the annual expenditures of the better-off.[29]

In the Tharparkar Desert Agro pastoral and Labor/Livelihood Zone the livelihood input expenses were relatively low for all wealth groups (5–7%[30] of annual expenditures). In that zone, annual income was low for all wealth groups, limiting cash payments to a few essential inputs (including animal drugs, ploughing, and produce packaging). Other essential expenditures were grouped into three different categories: (1) household items (including tea, salt, soap, kerosene/batteries, grinding fees and utensils); (2) social services (education and medicine); and (3) clothes. Expenditures on each of these categories were approximately 5–10% of annual spending (it was a little higher for household items at 5–15% of annual spending).[31]

28   The prior three are forms of chewing tobacco
29   HEA 2017
30   LFSA 2017
31   HEA 2016

The LFSA surveyed households[32] are spending a major proportion of their income on food purchases and compromising on other basic needs (such as health care, education, others). Overall, 36% of the surveyed households spend a very high share (more than 75% of the total household expenditure) on acquiring food, while 31% spend a high share (65–75% of the total expenditure) on food. The majority of the surveyed households have either 'poor' or 'borderline' food consumption; 18% of households have 'acceptable food consumption', 41% have 'poor consumption' and another 41% have 'borderline.'

"The major part of spending is decided and used by males on unnecessary expenses like alcohol, cigarettes, paan/supari/ghutka etc."

Female FGD- Village Ghartyari

There was an example of one of the female FGD participants where she stated that "the husband works on a 250 PKR wage where he contributes 50 PKR to HH expenses and the remaining all amount is spent on his alcohol."

Female FGD- Village Ghartyari

The above is an extreme example where a huge amount by the male was spent on alcohol which is not that common but the FGD participants (males) were hesitant to talk about alcohol due to which further questions could not be asked. In this case the female was earning through agriculture labor and the burden on earning income for the home was on the wife.

One contributing factor to alcohol consumption is that a local alcohol known as Tharo is produced in bulk quantities and easily available in the neighborhoods from informal shops and houses that produce alcohol. Tharo is a popular form of liquor in interior Sindh as it is very cheap and is easy to prepare. Predominantly made by women, tharo is usually prepared at home. A typical bottle of tharo would include gur (jaggery), bark of a kikar/babul tree (Acacia nilotica), dried orange peels, fertilizers, tranquilizing pills and some other herbs. They are then cooked together in a clay pot over low heat. The mixture is then allowed to ferment for about seven to 10 days.[33] The end product is referred to as tharo in the local lingo. A plastic bag containing 200ml of tharo is sold at a measly price of Rs150.

Another reason is that the males are usually unemployed and they have a routine of gathering and having this alcohol, maybe as a means of reducing stress. This tharo is also being provided in weddings as a drink for the men.

Market access

Markets are functioning well and reasonably connected to the bigger markets at Hyderabad and Mirpurkhas districts but there are almost no markets at the UC level in the desert/arid belt of Tharparkar for the local community.[34]

The risk factor survey reported that long distances to the markets from communities/cost of transportation and unavailability of transport were the two main reported problems in accessing the markets. Even though food is generally available in the markets, the household's ability to afford food remains a challenge. Most of the households were dependent on markets for acquisition of food on cash and credit basis except milk and dairy products which mostly were available either at home with self-owned livestock or purchased from others in the neighborhood. More than half (54%) of surveyed households reported having no resources to buy food from the local markets. On average, the surveyed households reported traveling 24 kilometers (KMs) to access the nearest markets. About 55% of the surveyed households reported travelling for more than 1 hour to access markets and an average of 460 PKR cost per single round trip to the nearest market. Due to the dispersed terrain there might be some communities who have to travel even as much as 100 Kms to reach the market. Longer distances to market increase the monetary and

32   LFSA 2017
33   https://www.dawn.com/news/1144192
34   LFSA 2017

non-monetary costs for the households. Subsequent analyses taking into account anthropometric measurements of children in the household revealed a significant statistical association between the **distance to market** and chronic malnutrition, which means that the farther distance from the markets constitutes a significant risk factor for stunting of children in the study area (see Appendix B).

Table 8: Seasonal calendar for Market Activities at District Tharparkar

Months	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Farming and Availability of Food												
Fodder Availability	■	■	■							■	■	■
Fodder purchasing				■	■	■	■					
Income Generation												
Livestock Sales	■	■			■	■	■					■
Market Trends												
Market Prices of Staple/ Fresh food	■	■	■	■	■	■	■	■	■	■	■	■
Market Prices of Live-stock	■	■	■	■	■	■	■	■	■	■	■	■

There was an example of affordability from the mother FGDs who said that **"The nearest market is around 5 KMs away and food is easily available there but we can't afford to buy it."**

Household Coping Strategies

There are slight differences between the coping strategies in the rainfed areas and the agro pastoral desert area. During shocks the rain fed area community usually sells their indigenous crops (such as vegetables including onions, brinjal and radishes) and eats less of these high value crops. They consume all of the harvested millet rather than selling as the crop is a relatively low value crop. They also reduce avoidable expenditures including sugar, salt, tea, soap, meat, clothing, toiletries and festivals. The community usually shifts to "consumption switching" where the households eat fewer food items that are relatively costly in favor of food items that are relatively cheap. In this zone, this meant that households sold all their high value cash crops or at least whatever little they harvested and purchased the staple grain, wheat, edible oil, sugar and other pricier items.

The Reduced Coping Strategy Index (RCSI) was developed to compare food security across different contexts. It is a sub-set of the context-specific CSI, but is calculated using a specific set of behaviors with a universal set of severity weightings for each behavior. Thus, the reduced CSI uses a standard set of five individual coping behaviors that can be employed by any household, anywhere. Furthermore, the study reveals that communities do follow poor coping strategies. Finding are annexed in Annex D.

The findings of the Risk Factor Survey, conducted during the course of this Link NCA study, revealed that 55% of households admitted to adopting coping strategies relying on less preferred and less expensive food, 60% borrow food from friends/relatives, 35% limit portion size at meal times, 26% restrict consumption by adults in order for small children to eat and 23% reduce the number of meals eaten in a day. Considering that the Risk Factor Survey was conducted in a post-harvest period, it is safe to assume that this percentage could be considerably higher during a lean season. Almost a half of these households, i.e. 18% of all respondents, admitted to adopting all coping strategies, while 76-80% of these households, i.e. approximately 26% of all respondents, admitted to adopting the most severe strategies, i.e. relying on less expensive foods or borrowing food from family or neighbors, respectively.

When probed about the indigenous coping strategies aftershocks, 43% of the community responded that they adopt distress selling of their livestock and other productive assets, 15% adopt late cropping and 13% are forced towards bonded labor with no wages in order to repay their debts. Only 7% of the respondents said that they were able to shift to another source of livelihood.

"We take on debt from sugar cane owners to marry our children or repair or construct our houses and then we work hard (the whole family) with very low daily wages to repay the loan."

(FGD Harri village, UC Jhirmiryo).

These results were further analyzed taking into consideration the anthropometric measurements of children in the household. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the **reduced coping strategy** and chronic malnutrition of the child, which means that borrowing food as a coping strategy constitutes a significant risk factor for stunting. (see Appendix B).

Due to the prolonged drought and increasingly erratic monsoons, agricultural activities have dwindled in these study areas. Pressure on the agricultural sector has pushed people into other less stable jobs including daily wage labor or woodcutting. Many villagers borrow money on unfavorable terms and become trapped in a cycle of debt, which they are unable to pay off due to the failure of consecutive harvests[3]. Poor households typically carry chronic debt from year to year, as high as PKR 50,000-70,000[4]. The very poor households were found to be fully dependent on their labor earnings and their cash earnings.

Photo: Shahid Fazal

Only a small number of the FGD participants responded that they receive support from the government in terms of safety nets (e.g. The Benazir Income Support Programme (BISP)) and general wheat distribution while the majority of the community was on their own for their food access. This means that there was only a small number of community members who were supported through safety nets especially in the lean period and a majority of the community were directly affected by the food shortage, eventually resulting in peaks in malnutrition.

D.   WASH

According to the risk factor survey, two major risk factors have been identified in WASH sector i.e. (i) poor access to water, and (ii) poor hygiene and sanitation practices. .The water source used by households in Tharparkar varied from area to area; however, most families (54.8%) fetched water from open wells. Other sources of water included private and public boreholes (19%) and government water supply schemes (16%), while a negligible number utilized safe water from reverse osmosis (RO) water filtration plants (4.9%).

Survey has revealed the following water usage information;

S.No	Source	% served	Quality	Access
01	Open Wells	55 %	unimproved or unsafe	Farfetched
02	Private/Public boreholes	19 %	unimproved or unsafe	
03	Govt. Water Supply Scheme	16 %	unimproved or unsafe	(more than one hour consumed daily)
04	R.O Plant	05 %	Safe	

- **Lack of ownership from the community in Government WASH schemes persists due to which the community does not maintain the public water schemes.**

(Observation)

- **The Public Health Engineering Department (PHED[35]) will take responsibility for chlorination and disinfection of Canal water supply.**

(Observation)

The communities reported that the underground water level on average used to be about 100 meters but due to the deep excavation of the Thar Coal Project the ground water of the surrounding areas has dropped to a depth of 300 meters

Based on the findings, open wells and surface water are considered "unimproved or unsafe" sources of water due to outside contamination; whereas the community terms any sweet water source as "safe" water. Other sources of water were not confirmed safe for drinking because of the high salinity in groundwater. Groundwater in Tharparkar is largely brackish and unfit for human consumption. However, in the absence of drinking water, the people of Tharparkar had to consume groundwater and the practice of treating/purification is not prevalent. Water sources were mostly uncovered in the community, and animals were used for pulling water from the wells. In some areas, Reverse Osmosis (RO)[36] plants were established but due to the heavy load[37], these plants were found badly damaged and unable to meet the community water needs. Although they have limited water sources still purification methods were lacking due to limited knowledge and available resources.

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35   It is the local government department who deals with public water and sanitation systems
36   Installed for water filtration and provision of safe drinking water
37   Is it due to the heavy load, or to a lack of understanding about maintenance?

Apart from the quality of water, distance to the main water source is another issue in the surveyed districts where mostly children and women have to walk a long way to fetch water. Time spent on collection of drinking water reduces the time available for children's education, and time available to women to care for their young children. The use of women's time on fetching water from far distances is also likely to have adverse impact on breastfeeding during the approximately 180 days when the child needs to be exclusively breastfeed. The scarce availability of drinking water means that fetching water becomes one of the main chores for HHs, especially for women and girls. More than half of the risk factor survey respondents reported taking more than 1 hour to fetch water daily. Fetching water is primarily the responsibility of adult women (76.0% of households), followed by adult men (12.7%). Fetching water from long distances takes up a big part of the day, which could be used for other productive purposes; like spending time with family, preparing more nutritious food, taking care of young children, getting ample rest, socializing, etc.

The majority of the community has observed a reduction in the water table in recent years due to severe water shortages. Rain water harvesting was termed as a good mitigation measure by the communities but requires resources for the initial investment in the catchment areas and the water tanks.

■ **Poor drainage systems and high levels of open defecation lead to environmental contamination in rural areas of Tharparkar.**

(Observation)

Water storage facility and water treatment

Since the majority used open wells, there is a high likelihood of physical contamination and a possibility of biological and chemical contamination. Nevertheless, 95.2% of participants felt that their water storage facility was safe. The most common water treatment method used was straining the water through a cloth. Although, filtrating by cloth and waiting for particles to settle at the bottom is not considered as a water treatment procedure by scientists, the population still used these means to remove the physical contaminants from water. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between **drinking water storage facility** availability and acute malnutrition of the child, which means that where households do not have adequate water storage capacity this constitutes a potential risk factor for wasting (see Appendix B).

"More than half of the communities still need safe drinking water in rural areas of district Tharparkar".

(Father FGD)

"The main sources of drinking water are open wells, which are mostly not protected and safe. The same water from open wells is used for cooking as well. Water is not easily available and is not clean. The water table has also decreased in recent years. People can't afford to buy water tankers.

(Mothers FGD)

Inadequate hygiene and sanitation

In poor communities, sanitation is a challenge and awareness is low about hygiene. Due to a lack of awareness on hygiene or unavailability of water, mothers may not be able to maintain appropriate cleanliness during food preparation or feeding children.

The livestock mostly move freely in the houses and the streets with a great potential of environmental contamination and possible zoonotic diseases. This is because of the livestock contaminating the utensils and water sources and the oral-fecal contamination due to livestock feces being spread at all places in the home premises.

"Livestock freely move around in houses, which is causing zoonotic diseases".

(Observation)

Children crawling and playing on dirty floors also proved to be one of the key risk factors leading to stunting. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between **environmental sanitation** and chronic malnutrition of the child, indicating in households where water storage and/or cooking areas were within 10 metres of latrines or defecation areas this constituted a significant risk factor for stunting (see Appendix B).

Unavailability of 'toilets/latrines' was more common in rural, desert/arid areas, households with unsustainable and agriculture-based livelihood sources, and very poor households. Low access to improved sanitation facilities might be linked to low availability of water in the area; as with limited water availability for drinking and cooking, households would be less concerned about the absence of improved sanitation facilities at home.[38]

As discussed in the child health section the prevalence of diarrhea amongst children was found to be high and the statistical analysis also showed a significant association with wasting.

Protected latrine use

An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. Improved sanitation facilities for excreta disposal include flush or pour flush toilets to a piped sewer system, septic tank, or pit latrine; ventilated improved pit latrine, pit latrine with slab, and use of a composting toilet.

Poor sanitation practices like open defecation are very common in Tharparkar and hand washing awareness was almost absent in half of the community, which may contribute to the increase in malnutrition and disease prevalence. Open defecation is prevalent mostly due to a lack of knowledge about the importance of latrines and its health benefits coupled with a lack of affordability to build latrines in every household. There is also a false belief prevalent that in the desert feces quickly dries up and vanish and that this is not a health hazard.

Availability of a protected latrine impacts domestic and personal hygiene and plays a role in the prevention of diarrhea. Survey findings indicated that very few HHs were using protected latrines (27.4%). Additionally, 71.1% practiced open defecation which increases the risk of environmental contamination, disease and eventually may lead to undernutrition. According to community members, poverty and lack of water for toilet use were the main challenges; they could not afford these expenses; and therefore practiced open defecation. Some communities did not have proper house structures and believed that making a toilet in their homes was useless.

"Open defecation is more prevalent due to scarcity of water and culture. We can't afford to make latrines."

(Mothers FGD and Fathers FGD

38 LFSA 2017

Disposal of child stools and solid wastes

Most participants do not do anything to dispose the child's stools and leave it in the open which is a leading cause of environmental contamination. The most common practice for disposing of household solid wastes was to throw it nearby, or in a common landfill located far from houses and majority of the population does nothing for waste disposal.

"Garbage is dumped near house and left open untreated which smells bad and is full of flies".

(Father FGD)

"The Marvi workers that that some mothers told them that, "in our (mother) absence/while being busy in HH chores, or working in fields, our child eats soil and sometimes even human/animal feces, as they are left in open".

(Marvi workers FGD)

Hand washing

Hand washing with water and soap is the most cost effective health intervention to reduce major water related diseases in children under five, especially diarrhea. It is most effective when done using water and soap after visiting a toilet or cleaning a child, before eating or handling food, and before feeding a child. Monitoring correct hand washing behavior at these critical times is challenging. A reliable alternative to observations or self-reported behaviors is observing if a household has a specific place where people most often wash their hands and observing if water and soap (or other local cleansing materials) are present at a specific place for hand washing.

Survey results revealed that 51% of households use only water for hand washing, which depicts the gravity of the situation. About 39% of respondents reported washing their hands with water and soap and 8.3% with water and ash. Water scarcity is also a major contributing factor to poor hand washing practices.

"They barely wash their hands as they don't have sufficient water even for drinking purposes. For hand washing purposes they use soil or ash mostly."

(Fathers FGD)

Photo: Azam Afridi

E.   GENDER and Decision powers

The risk factor survey indicated that at least 30% of the females were married under the age of 18 years. The average age of marriage was found to be 19 years and the average age of a woman's first birth was reported to be 21 years. The survey indicated that lack of education (especially amongst elders/decision makers), honor and poverty are the main factors leading to early marriages.

"We get our girls married early as soon as we get some money in hand to use it for their marriage – as we are not certain whether we will have this amount for the next year or not."

(Father FGD)

"A girl may run away with someone at any moment and cause disgrace to her family, so it's better to get her married as soon as possible."
(Mothers FGD)

"Girls mostly get married between the age of 15 to 20 and boys between the age of 20 to 25."

(Father FGD)

Photo 3: In-depth interview about gender roles. Photo: Khalid Khan

The findings indicate that a male head of household may tend to restrict the decision-making powers of his spouse, particularly with regards to the use of her own income, food purchases and consumption of the household's own production. This not only limits woman's capacities to prepare adequate meals for the household, both in terms of quality and quantity, but it may also provoke negative coping strategies within the household, which a woman is not able to control. The risk increases proportionately to a growing household size. As a result, children might not have access to adequate food intake and their growth may be delayed.

The findings of the Risk Factor Survey revealed that predominantly it is the male who makes decisions at the household level; although the women may sometimes participate in decision-making with the male, there were almost no incidences found where the women was empowered to make decisions alone. The survey found that 50% of the decisions regarding the family's healthcare, children's education and how the other household expenses will be managed are made by the husband. The remaining decisions might be made by the husband and wife together but none of the decisions were made by the women alone. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between the **decision making of mothers** and acute malnutrition of the child, which means that the mother not having the power to decide on education and medical services constitutes a potential risk factor for wasting (see Appendix B).

"Mothers don't have the power to decide which food to buy from the market; that is the father's domain."

(Father FGD)

Figure 3: Decision making dynamics at household level
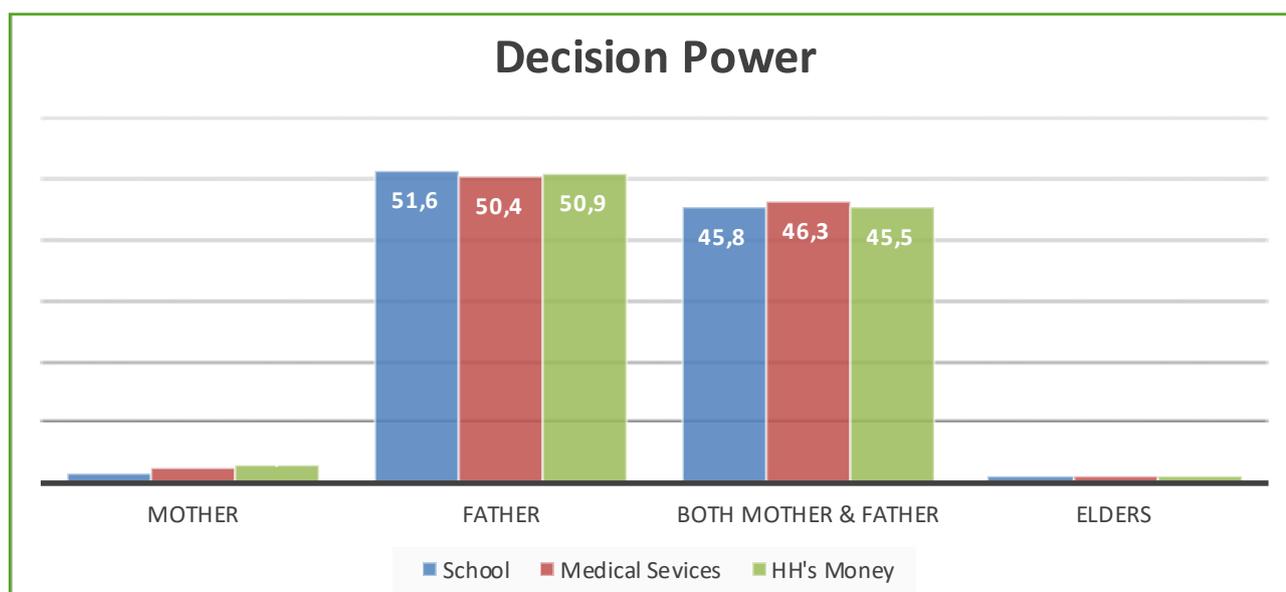
If the household decision maker was solely the husband, children were least likely to receive Minimum Dietary Diversity (MDD) as compared to children living in households where decisions were made jointly. The highest likelihood of receiving MDD was among children living in households where women are the sole decision makers as compared to children from households where the decisions are made by someone else. Therefore, it is concluded that female participation in decision makers has a positive effect on the level of MDD being received by children. A positive impact on MDD was observed in households where decisions were taken jointly; households where decisions are made jointly have the highest likelihood of children receiving MDD.[39]

F.   UNDERNUTRITION

ANTHROPOMETRIC DATA COLLECTION RESULTS

The prevalence of malnutrition status in Tharparkar has been on high for decades. The recent quantitative survey revealed weight-for-height z-scores (WHZ) where the prevalence of GAM was found to be 27.8 % (within a 95% Confidence Interval (C.I.) of 25.2 - 30.6%) and the prevalence of SAM was 9.0 % (7.3 - 11.0 range with 95% C.I.). Over a period of two years, the prevalence of stunting in the district has slightly increased to 47.3% as compared to 46.1% in late 2017 (SMART survey 2017). Patchy coverage with short span programs in nutrition resulted in non-sustainable treatment and prevention programs. The limited number of CMAM treatment sites is hardly accessible to the community and there is further disruption due to an irregular supply chain of essential nutrition supplies.

Figure 4: Malnutrition prevalence trends over time (2014-2019) in Tharparkar
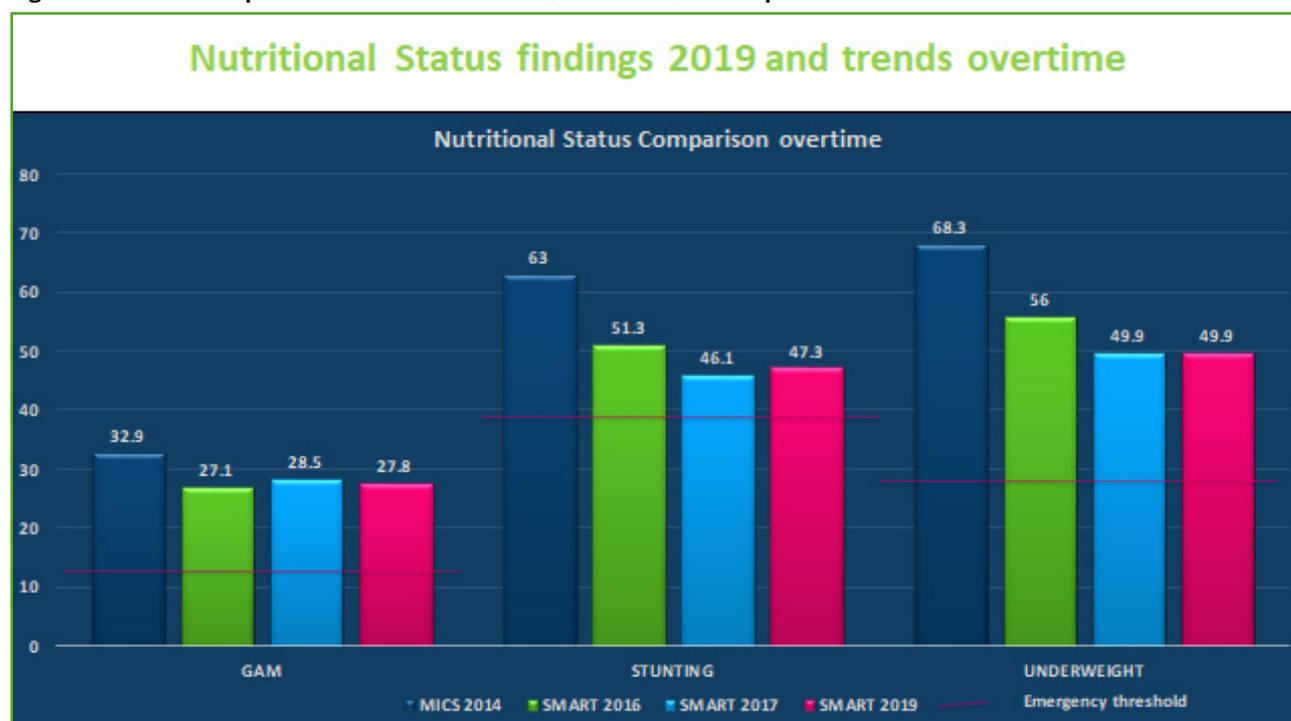
Nutrition status trends over time – District Tharparkar

Undernutrition trends in Tharparkar were analyzed by comparing the current survey results with the MICS 2014, SMART 2016 and SMART 2017 conducted in Tharparkar. The comparison identified that global acute malnutrition (GAM) has slightly decreased in 2019 (27.8%) when compared with the rate of malnutrition (28.5%) reported for Tharparkar district in the last SMART survey (2017).

The SMART survey revealed that the prevalence of malnutrition was very high as compared to the WHO emergency threshold level (GAM of 15%). Children aged 6-59 months suffered from diarrhea, fever and Cough/ARI and pneumonia in the two-weeks preceding the survey.

The MICS Sindh Survey 2014 found high malnutrition rates across Sindh - 15.4%. In district Tharparkar malnutrition prevalence is very high and above WHO emergency thresholds. The WHO emergency threshold is 15% of GAM, however in Tharparkar GAM has been found more than 20% in MICS, and previously conducted SMART surveys.

"Due to poverty we usually migrate to other parts of Sindh. We have shortages of food and work in open fields with high temperatures. With hot weather and poor hygiene conditions children usually suffer from diarrhea and other diseases, which results in malnutrition "

(FGD Grandmothers, Jhirmiryo village

Many factors including food insecurity, poor infant young child feeding practices and the poor hygiene situation are directly affecting the nutritional status of children under two years of age and, ultimately, impact child survival.

Wasting

Wasting refers to low weight-for-height and indicates acute undernutrition. Using the WHO 2006 reference standards for weight-for-height z-scores (WHZ), the prevalence of GAM was 27.8% (25.2 - 30.6% with a 95% C.I.) and the prevalence of SAM was 9.0% (7.3 - 11.0% with a 95% C.I.). There was a huge difference recorded between the findings of the WHZ and the MUAC where MUAC seems to have identified a smaller number of malnourished children. The MUAC identified 21.0% (17.4 - 25.0% with a 95% C.I.) of children as the GAM rate while through the WHZ criteria there were 27.8 % (25.2 - 30.6% with a 95% C.I.) children with GAM.

Table 9: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 859	Boys n = 431	Girls n = 428
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(239) 27.8 % (25.2 - 30.6% with a 95% C.I.)	(138) 32.0 % (27.8 - 36.5% with a 95% C.I.)	(101) 23.6 % (20.3 - 27.2% with a 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(162) 18.9 % (16.5 - 21.5% with a 95% C.I.)	(95) 22.0 % (18.2 - 26.5% with a 95% C.I.)	(67) 15.7 % (13.0 - 18.8% with a 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(77) 9.0 % (7.3 - 11.0% with a 95% C.I.)	(43) 10.0 % (7.5 - 13.1% with a 95% C.I.)	(34) 7.9 % (5.5 - 11.4% with a 95% C.I.)

The prevalence of oedema is 0.5 %

Table 10: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 878	Boys n = 442	Girls n = 436
Prevalence of global malnutrition (< 125 mm and/or oedema)	(184) 21.0 % (17.4 - 25.0% with a 95% C.I.)	(82) 18.6 % (14.1 - 24.0% with a 95% C.I.)	(102) 23.4 % (19.0 - 28.5% with a 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(135) 15.4 % (12.4 - 18.9% with a 95% C.I.)	(59) 13.3 % (10.1 - 17.4% with a 95% C.I.)	(76) 17.4 % (13.2 - 22.7% with a 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(49) 5.6 % (3.8 - 8.0% with a 95% C.I.)	(23) 5.2 % (3.2 - 8.3% with a 95% C.I.)	(26) 6.0 % (3.8 - 9.2% with a 95% C.I.)

In terms of age group, children aged 6-17 months and 18-29 months were more acutely malnourished than children in other age groups. The prevalence of GAM was highest in the younger children (below 30 months of age) where 31.4% of children aged 6-17 months and 36.6% of children aged 18-29 months were found to be wasted. The MUAC findings again were different in this age group where 39.8% of children aged 6-17 months and 28% of children aged 18-29 months were found to be wasted. This shows that the MUAC criteria was more effective for children between 6 months to 1.5 years of age, as it identified more malnourished cases as compared to the WHZ criteria; however, after children reached 18 months of age and there were more linear growth spurts the WHZ was capable to identify more cases as compared to the MUAC.

The anthropometric data indicates a higher prevalence of acute malnutrition in boys as compared to girls in Table 9. The date shows that the GAM (WHZ) is higher in boys (32.0%) as compared to girls (23.6%) and the trend is similar in both MAM and SAM for boys. However, the MUAC findings show the opposite, as they indicate that 18.6% of the boys and 23.4% of the girls met the GAM criteria. This again raises urgent questions about the admission criteria into CMAM programming in Pakistan, which is using MUAC only. If we look into the WHZ; the boys are much more malnourished; but when these boys are received at the CMAM centers they will be misinterpreted as normal children based on MUAC which is a missed opportunity and results in many malnourished children not receiving treatment, especially boys. Subsequent analyses taking into account anthropometric measurements of children in the household revealed a significant statistical association between **gender** and chronic malnutrition, which means that the male children were significantly more at risk of both wasting and stunting in the study area (see Appendix B).

It is not yet known but there can be an association of the body type/shape of the boys at Tharparkar due to its desert terrain; maybe the anthropometric cut-offs should be used differently in this region for boys and girls. What has been seen in Tharparkar and generally in the rest of Sindh indicates that boys are more at risk as compared to girls, yet this is surprising given that culturally it is observed that boys receive more attention, and therefore one would expect girls to be more malnourished.

Further research is required on this aspect to unveil the gender differences in terms of malnutrition, determine the most appropriate anthropometric measurement/cut-offs and compare the boys and girls of Thar/Sindh with children from a very different geographical terrain such as the higher altitudes of the north of the country.

The Marvi workers gave a possible hypothesis to explain this phenomenon: they stated that feeding practices are usually on demand and pre-lacteals are fed when they cry after delivery, which can start the contamination from the very first day. The marvi workers stated that boys have generally higher needs so they would have a tendency to be hungrier. This may explain why boys are more malnourished because they are more exposed to secondary food sources.

The dynamics of why boys are more affected are still unclear as in some instances it was seen that the boys were prioritized for attention for food, medical treatment and education. In one of the FGDs the mothers expressed that:

"Male children get preference over female children. As boys will later on become bread winners and will lead their caste/ blood line. On the other hand girls will belong to other families in future when they get married."

(Mother FGD)

It is also important to note that analyses demonstrate a significant link between wasting and the sex of a child, namely that boys are more likely to be wasted than girls. This may be due to diverse, gender-determined care practices after childbirth and/or differences in body shape that still need to be researched.

"Those children whose mothers get pregnant again within 6 months of giving birth become malnourished. Small children and PLWs are the vulnerable groups for malnutrition."

(Mothers FGD, Village Jhirmirio).

Stunting

Stunting, or low height for age, is an indicator of chronic malnutrition arising from deprivation related to long-term food insecurity, micronutrient deficiencies, recurrent illnesses, and/or other factors that interrupt normal growth. Unlike wasting, it is not affected by seasonality but rather related to the long-term effects of socio-economic development and a long-standing situation of food insecurity, droughts, etc. Stunting has long-term impacts for physical and cognitive development. Over a period of two years, the prevalence of stunting in the district has slightly increased to 47.3% as compared to 46.1% in 2017 (SMART 2017, Tharparkar). There are similar findings of gender in stunting as well where both moderate (27.8% "B" and 25.7% "G") and severe (22.2% "B" and 18.9% "G") stunting was found to be higher in boys as compared to girls. The table below illustrates the prevailing chronic situation in district Tharparkar, where the prevalence of stunting, at 47.3%, is higher than the WHO emergency threshold of 40%.

Table 11: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 841	Boys n = 424	Girls n = 417
Prevalence of stunting (<-2 z-score)	(398) 47.3 % (42.8 - 51.9% with a 95% C.I.)	(212) 50.0 % (43.5 - 56.5% with a 95% C.I.)	(186) 44.6 % (39.5 - 49.8% with a 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(225) 26.8 % (23.0 - 30.8% with a 95% C.I.)	(118) 27.8 % (23.0 - 33.2% with a 95% C.I.)	(107) 25.7 % (21.6 - 30.2% with a 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(173) 20.6 % (18.2 - 23.2% with a 95% C.I.)	(94) 22.2 % (18.4 - 26.5% with a 95% C.I.)	(79) 18.9 % (15.8 - 22.6% with a 95% C.I.)

G.   COMMUNITY PERCEPTIONS OF UNDERNUTRITION AND THERAPEUTIC ITINERARIES

In the qualitative survey the perceptions of malnutrition amongst the local community members were probed through the Focus Group Discussions (FGDs). When the picture of a malnourished child was displayed during the FGDs most of the community responded that they see similar conditions prevailing in their surroundings. When asked about the possible reasons, the first response was that due to multiple/frequent pregnancies and an already weak mother, these type of children are born. Eventually both mother and child have a poor nutritional status. The community members were easily able to link the malnourished child with weakness and the local names of Sukkul/Sukhra/Kamzor.

Most participants to FGDs thought that malnutrition is a non-contagious disease. They clarified that it happens mostly in summer because of the lean period and the lack of labour opportunities. Some respondents related malnutrition to common childhood illnesses and some respondents described it as a common form of weakness only, not having much relation with diseases. Some people who did not consider malnutrition as a disease believed it was rather connected to the 'evil eye' or as an act of fate due to poverty.

The majority of the qualitative responses termed malnutrition as a noncontagious element and related it to the prevailing form of hunger and weakness. The community identification method or how they label a child as being 'sukkul' (malnourished) was visible symptoms of weakness and visible ribs. A small number of responses also related a large head size to a malnourished child.

When asked about the seasonality of malnutrition affecting children about half of the responses answered that mostly in summers it affects children while the other half stated their children are at risk throughout the year and they can find malnutrition in the community at all times of the year. Those community members who considered malnutrition to be seasonal believed that there are seasonal peaks of diseases but they were not able to relate malnutrition to grassroots poverty, food insecurity, improper IYCF practices or women workload etc.

When the community was asked about ways to prevent malnourishment, half of the responses were related to the provision of healthy diet to both mother and child followed by a very few responses related to healthcare, hygiene and family planning.

Photo: Azam Afridi

Table 12: List of expressions in the local language of Tharparkar (Datki) used to describe malnutrition and/or other childhood diseases

Marasmus*	
Beemar	Sick/ failure to gain weight
Dast	Diarrhea
Thakal	Weakness due to Diarrhea and Fever (Dehydration)
Sanhon	getting thin
Kangi	getting extremely thin, emaciated
Jasmani Kamzori	weight loss, disease of inadequate diet
Sukkul	Skinny
Sukhra**	very skinny, bony
Dubro	extremely thin, « close to death »
Abhro	extremely thin
Apahaj	Disabled/Handicap
Paiteer***	« big belly »
Doghar, Nazar (Nazar Bad)	« evil eye », « devil », « affected by Black Magic » and have lost their weight or got severely ill.
Lukhasno, Bukhayal	affected by a lack of food

*The general terms commonly used for a malnourished/weak child are Kangi, Sukkul, Sukhra

** the same term is used for bony animals affected by drought.

*** this term is commonly used to describe worm infested children with a swollen belly

Members of visited communities were aware about the recognition of undernutrition through presented photos or drawings. Some participants observed a child getting thin (**"sanhon"**) but considered it an everyday occurrence in their circumstances due to the very high prevalence of malnutrition, as evident from the anthropometric survey (28% GAM).[40] The community did not relate stunting (**'bona'**) with malnutrition as they said it is genetic and comes from parents. They also were not aware of the consequences of malnutrition (especially stunting) and rather perceived that it is a very usual condition. The view of a "big belly" was also not usually related to wasting but was rather classified as a child with intestinal worms related to the common habits of ingesting dirt particles in the play areas and not washing hands before meals. Most commonly used expressions to describe malnourished children were **"sukkul"** or **"sukhra"**, which describe an extreme thinness or emaciation. The communities also used a general Sindhi term, **"Kangi"**, for malnourished to explain it to people out of the district as the previous two names were mostly used in Thar. The difference between the two is the severity of thinness, **"Sukhra"** being more serious than **"Sukkul"**. The term **"Sukhra"** was also used for bony animals affected by drought. When asked what causes that illness, some did not know while others attributed it to an "evil eye" (**"Doghar"**), disease or inadequate food intake. The females FGDs were also able to relate the weakness of infants to malnourished mothers whereas the males were not able to make this link.

40 A child showing ribs.

Certain community members used a term **"Dubro"**, meaning extremely thin, even close to death, in addition to **"Sukhra"**. Some respondents used two synonymous terms **"Lukhsano/Bukhayal"** for the people affected by a shortage of food but some other communities related these terms to a condition where the intake is appropriate but the child does not gain weight. If we triangulate with the poor sanitation conditions the big belly *("Paiteer")* condition was prevalent while they had a good explanation for its being due to worms. Research shows that Environmental Enteropathy (EE) and intestinal worms prevent nutrients from being absorbed, eventually causing weight loss even when the nutritional intake is appropriate. This means that the definition of *"Lukhsano"* has a story to tell about the nexus of sanitation-intake-malnutrition.

The community perceives thinness as the common/natural body shape for Tharparkar as it is a desert and has been dry for decades and the overall community looks alike in body shape, as all age groups are usually thin in appearance. **Sukkul** and **sukhra** are very common forms present in the community and would not trigger a visit to a health centre unless additional medical complications were seen. By contrast, the communities feel that conditions such as diarrhoea *("Dast")* and acute respiratory infections do need to be treated at a health facility. Community members clarified that they would seek a health centre treatment only in the case of acute diseases, while chronic diseases are treated in a traditional way. According to them, **Sukkul** is not usually considered for treatment, but those families who give importance to it will treat it through religious leaders or other **"holy"** methods.

In some of the communities the participants referred to malnourished children as **"bukhayal"**, meaning affected by a lack of food. The causes of malnutrition were largely unknown but thought to be linked to poor maternal nutrition, lack of food due to poverty and poor birth-spacing. But again, since the sight of such malnourished children was common, the communities would normally only seek medical support when a disease (such as diarrhoea or a fever) was coupled with this condition.

The community also stated that "poverty and stress are interrelated where poverty, causing food shortages, and stress, aggravating the health problems, eventually lead towards malnutrition".

(Mother FGD Jhirmirio)

Therapeutic itineraries of undernutrition

The level of understanding of malnutrition is especially worrying in the case of parents of malnourished children in the nutrition programmes, be it OTP or SFP. Mothers recognised malnutrition as a disease, not as a deficiency of food and micronutrients. However, during the discussion with ex-employees of a local NGO managing CMAM programming, they expressed that community mobilization activities, follow up visits, tracing of beneficiaries and community sensitisation messages were not properly spread due to a lack of human and financial resources for the project. Also, the frequent disruption of supplies of "PlumpyNut®", allied to the long distances to, and lack of human resources in, OTP centres increased the number of defaulter and non-responding children which made the situation protracted.

As a natural consequence, the lack of understanding of malnutrition often leads to a false understanding of its treatment, where the therapeutic supplements provided are usually considered as a food, rather than a medicine. This automatically leads to its being shared within the household. The exchanges with certain key informants confirmed that the concerned staff in hospitals consistently spread messages about not sharing the PlumpyNut in the households. Despite this, mothers described the PlumpyNut as a chocolate which is beneficial for malnourished and normal children. While parents did not admit eating it themselves, they admitted that sometimes they would share it with other children in the household if a sick child refused to eat it. Only a few participants contested this, saying that sharing PlumpyNut delays the recovery of a sick child.

However, during exchanges it became apparent that many community members do not notice the difference in severity of the illness and its associated treatment. Judging from their responses, an early screening could address their concerns and treat the child before (s)he gets severely malnourished. Thus the in-patient treatment finds itself on the other side of the scale as the least favourite treatment - primarily due to a prolonged stay at a health facility, which distances them from their other children. The functionality of the in-patient settings is also found to be inconsistent. UN-WHO supporting the DoH had established three stabilization centres in different THQ hospitals but currently only that at the DHQ was found to be functional. The long distances that must be travelled to access primary health care make it extremely difficult even for community members to reach their nearest BHU/RHCs. While travelling to the DHQ to be admitted in an in-patient setting is close to impossible for the majority of the communities as some community members might need to travel 2 hours one way to the DHQ, which involves high transport costs that cannot be supported by these poor communities. Secondly the mother is usually working for which reason it is not possible for her either to be admitted herself or to stay for hours to accompany her 'SAM with complications' child at the NSC.

According to key informants, most children who are vulnerable to malnutrition are those from larger families, especially those with younger siblings as the care and attention of parents is often engaged by the youngest ones. In practice, this includes children in 12-36 months of age span, depending on the birth-spacing of children in respective households. In addition, children who were born prematurely, had a low birth weight or a late initiation to complementary feeding often seem to have a higher prevalence of malnutrition at 9-12 months of age.

Photo: Azam Afridi

H.   COMMUNITY PERCEPTIONS OF CAUSAL MECHANISMS OF UNDERNUTRITION

The qualitative inquiry of this Link NCA study included almost 50 independent exchanges with over 300 participants. Their detailed and complementary evidences helped to define two key causal pathways of undernutrition in Tharparkar. While the first one is primarily set in the sector of food security and livelihoods – with important links with health, nutrition and care practices, the second one pertains mainly to the water, hygiene and sanitation sector. Both have links with the heavy workload of women and household size.

Household food security and nutrition causal pathway

The key trigger of the first causal mechanism is poor agricultural production, which is fuelled by multiple contributing factors, such as lack of rainfall and drought conditions in the past couple of years, insufficient seeds, cultivating tools or low land ownership and above all the desert soil which is not cultivable with this negligible level of precipitation. Considering that agricultural labour is the main source of income and food for a majority of households in Tharparkar, low in-district harvests have serious consequences on low household income as well as on each household's capacity to sustain itself until the next farming season. As a result, families are forced to migrate to the barrage areas in other districts for labour opportunities at lower wages. Other income-generating opportunities being limited, household's resilience capacities are substantially reduced and cannot be easily deployed at a time of shock. As a consequence, the household plunges into the liquidation of its assets, for example through distress selling of their livestock. Another factor revealed was that in spite of being a livestock rich demography; the community is not taking the benefit of this resource as a source of income; rather, the management cost of maintaining their animals usually becomes a burden. The usual shortage of income and food leads to changes in the communities' eating habits as they limit the quality and the quantity of their consumed foods. The resulting inadequate food intake particularly affects pregnant and lactating women as well as young children, especially in large households. The eating habits in Thar families also contribute to the limited food intake of females in the house. Females eat last due to cultural habits and family dynamics which leads to a reduction of women's energy and nutrient sources, which then translates into their low nutritional status. As a result, women experience problems with breast milk production, and thus are often unable to meet the nutritional demands of the infants that they are breastfeeding, leading to infant undernutrition.

Early marriages and early pregnancies make the situation worse. As shown in the qualitative part only 26% of mothers practice early initiation of breast feeding and only 60% initiate complementary feeding on time (i.e. between 6 and 8 months after birth). The exclusive breastfeeding rates is relatively better (84%) but the malnutrition in these infants indicates that exclusive breastfeeding is not followed appropriately with the frequency and quantity of feeds. Poor household nutrition also reflects negatively on young children's complementary feeding practices. Due to the scarcity of income and lack of awareness, women do not initiate complementary feeding properly (either too early at four months or too late at nine months) and nor do they offer their infants age-appropriate meals. A child thus does not have access to a balanced diet, which would support his/her healthy growth and development. Due to the low literacy rate and low LHW coverage mothers are unable to recognise malnutrition signs earlier in children. Difficult access to health facilities and poor quality of health services makes the situation overwhelming.

Photo 4: Community Risk Factor rating exercise and causal pathways. Photo: Khalid Khan

Photo: Khalid Khan

Figure 5: Causal pathway illustrating interconnections between household food security risk factors and nutritional status of women and infants in Tharparkar District[41]
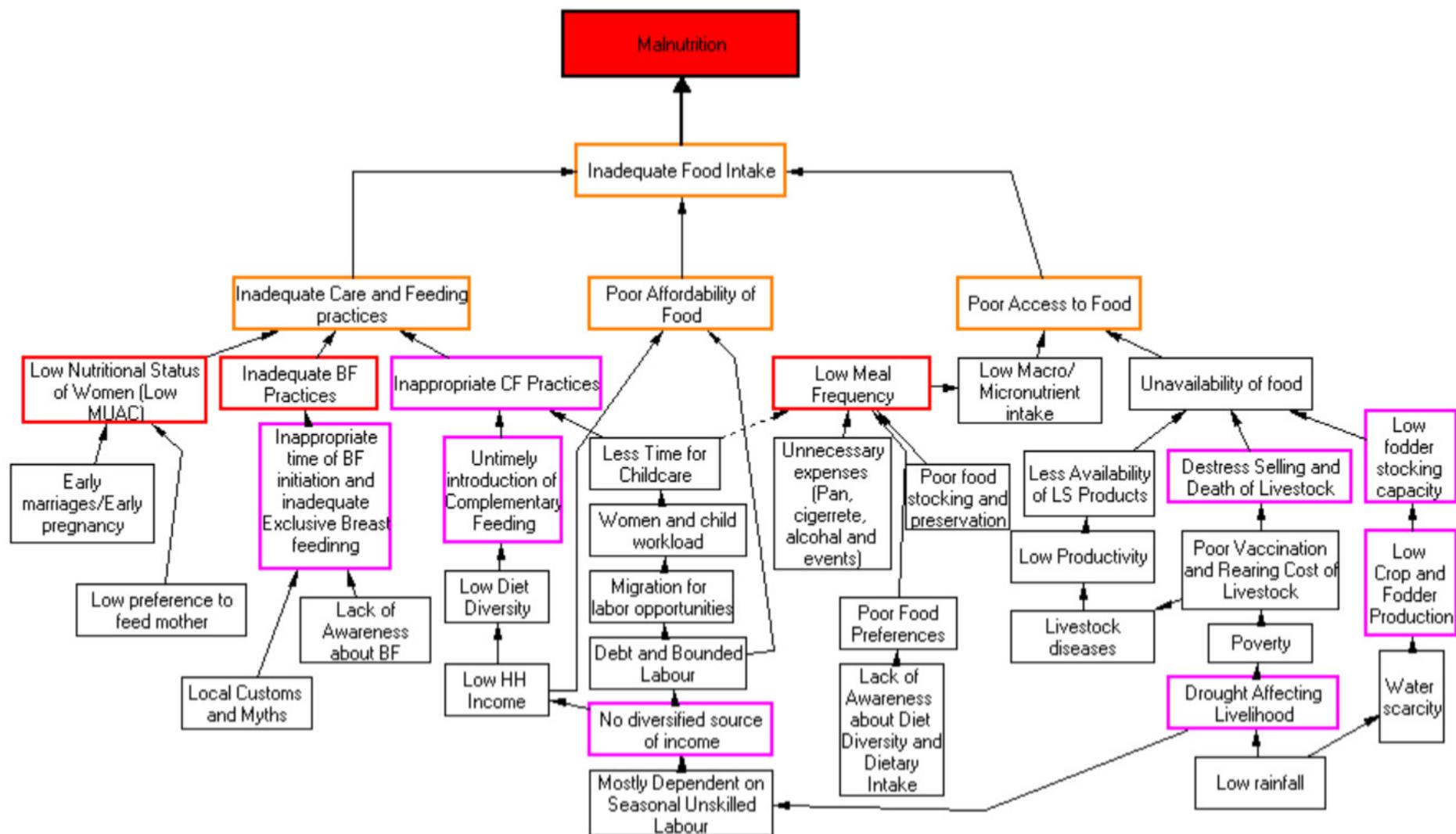
41   Cells highlighted in dark red colour signify risk factors with a significant link to wasting while cells highlighted in pink colour signify risk factors with a significant link to stunting, as per calculations of their p-value (Annex B).

Figure 6: Causal pathway illustrating interconnections between water, hygiene and sanitation risk factors and nutritional status of infants and young children in Tharparkar [42]
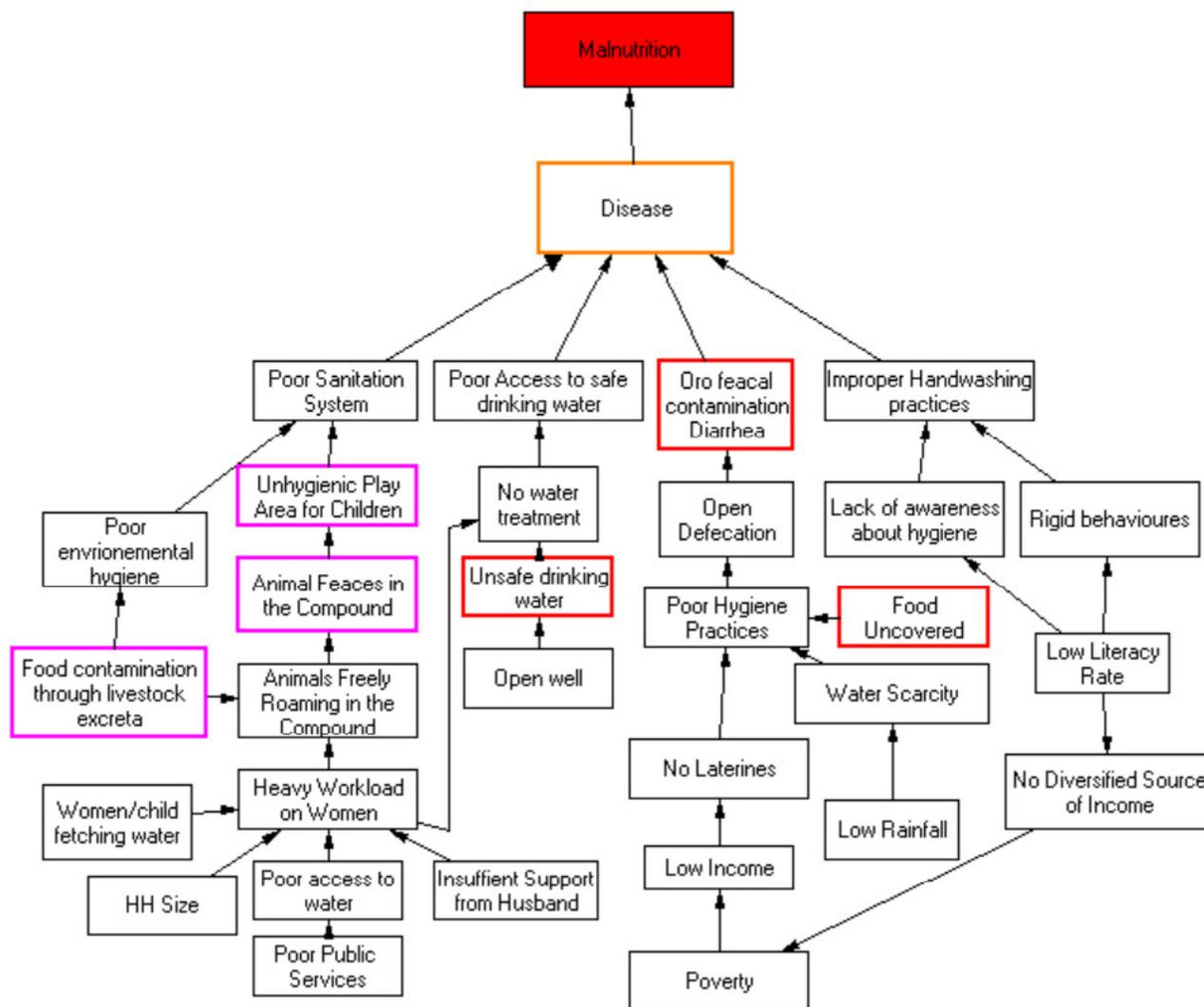
42 Cells highlighted in dark red colour signify risk factors with a significant link to wasting while cells highlighted in pink colour signify risk factors with a significant link to stunting, as per calculations of their p-value (Annex B).

Water, hygiene and sanitation causal pathway

The key trigger of the second causal mechanism is poor access to water in general, and especially access to safe drinking water. Given that most households fetch water from open wells or ponds which are subject to seasonal variations and inconsistent rainfall, as a result, water is fetched in limited quantities, translating into low household consumption. Fetching water is a time consuming activity in Tharparkar: the majority of community members take more than half an hour one way to reach the nearest water point. Unavailability of water in the household leads to poor hygiene practices, such as infrequent bathing, washing of clothes, inadequate hand washing practices and open defecation contributing to a heightened risk of contamination and spread of illnesses – the recurrences of which can lead to under nutrition. Disease can also be triggered by the poor quality of fetched water which, disregarding the nature of the source, is not treated at the household level. While reasons for not practicing water treatment are numerous, key factors include poor awareness of water quality, belief in water purity and the underestimated link between water and diarrhoea. A connecting risk factor at the heart of the poor water, hygiene and sanitation causal pathway is the heavy workload of women (and on some occasions the workload of children as well), which is fuelled by their numerous household duties and which eventually impacts negatively on their capacity to practice adequate hygiene practices in line with sensitisation messages on the subject as well as on the time available to them for proper breast feeding practices.

Photo: Khalid Khan

I. MAPPING OF OPERATIONAL ACTORS AND PERCEPTIONS OF INTERVENTIONS

This section is based on feedback from operational partners, who are implementing a multitude of projects in Tharparkar, complemented by feedback from respective communities. A detailed mapping of interventions, as reported by key government and non-governmental organisations active in the zone of study, is available in Annex E.

The consultations about past or ongoing interventions in the zone revolved around themes such as the evolution of programming, financial volume, geographical coverage, length, timing, beneficiary targeting and cultural appropriation of these interventions.

Tharparkar is a desert zone with a scattered population of approximately 1,600,000 people. Administratively, it is very difficult to manage and provide basic needs to them. Many actors in the area are implementing emergency-based projects focusing on a nutrition sensitive approach (WASH and Livelihood projects). Nutrition specific projects are very limited and were focusing mainly on the SFP component financed by WFP. The OTP component was being run by PPHI, but due to frequent supply breakages more beneficiaries become non-responded or defaulter.

Evolution of programming from an operational actors' perspective

A few operational partners in the zone have changed their approaches recently, including a shift from emergency to development programming (Concern Worldwide, WHH and FAO). That reflects positively on the duration and scope of their activities, which were relatively short-term and sector-oriented in the past. The interventions at Chachro tehsil are longer and transition into multi-sectoral interventions, which are deemed to have a longer-lasting impact on targeted communities. The organisations reported working through local partners, while also shifting from distributions, where local communities are more beneficiaries of aid, to partnerships, where community members become partners with rights as well as responsibilities during the implementation of activities. In addition, organisations were observed to have moved towards a more evidence-based approach, building their programming on plausible studies, rather than random community wishes. That is not to say that organisations do not take the community feedback into consideration; they do so, however, by more systematic means.

All of these changes were motivated by growing, unaddressed needs, the importance of engaging with communities in all stages of the project cycle and a change in organisational ideology and principles, putting more focus on resource optimisation. This has led to more methodical work processes, improving the general quality of interventions and meeting desired objectives. In addition, new interventions are believed to strengthen community capacities, enabling them to respond better to potential future shocks.

Nevertheless, the volume and geographical coverage of interventions is not considered sufficient due to the vastness of the zone of study and the immense needs of the affected populations. When it comes to the length of interventions and geographical coverage, organizations noted that the duration of activities depends heavily on guidance from the government based on hot spot reports compiled at the national level on a quarterly basis and the availability of donor funds. These tend to prioritize urgent humanitarian needs, addressing immediate needs rather than their root causes. For that reason, most interventions are limited to 6-12 months. While tangible proof of these interventions, such as hand-dug wells, may last, behaviour change interventions do not bear fruit due to the limited project implementation time, and hence this can be judged to be an inadequate long-term strategy.

According to respondents (livestock and nutrition focal persons), organizations plan activities well, taking into consideration seasonal variations and changing community needs/availabilities at those times. However, it would be good if they would share proposals with respective district focal persons for review and feedback before submission to the donor.

Past and present interventions are reported to respect the cultural and religious identity of targeted communities. A failure to so would prompt an unfavourable feedback from both the government and the community and would not be tolerated. None of the organizations reported having faced this issue nor observed any negative impact of their interventions on targeted communities.

The selection of beneficiaries is regulated by the type of intervention and respective criteria are defined in line with project objectives. A proposed set of targeting criteria is finalised after consultation with local authorities and concerned communities and is, therefore, considered to be just and transparent. Most recurrent targeting criteria include a prevalence of malnutrition combined with the presence of vulnerable groups in the household, such as children and pregnant and lactating women, orphans, women headed households and disabled persons.

Photo 5: Community action plan development. Photo: Azam Afridi

Evolution of programming from the beneficiaries' perspective

Gathering community feedback on past or present interventions proved to be a real challenge during the qualitative data collection for two principal reasons: a) community members demonstrated a very short-term memory of interventions and/or were not concerned by them, and b) they were linking information with future assistance which might have caused perception bias (even though communities were briefed in advance). The communities generally fear that if they express themselves as being in any way prosperous then this might have a negative impact on future programmes and they wanted to show themselves as being deprived and not self-sufficient or resilient.

Focus group participants highlighted a general lack of community engagement in past or ongoing interventions. They stated that they are not systematically informed about projects' modalities and they do not know whom they could request the respective information from. In this way the organizations can also not be asked about the interventions and the community do not have the means or education to hold them accountable for their rights or the interventions.

As a result, communities feel deprived in both the identification of their problems and giving solutions to them. The community is an isolated population and is usually cut off from the culture and markets of the rest of the province; they are uneducated and in a destitute condition to know what is good or bad for their health and lives. Whatever is happening in the malnutrition dynamics in their district, they feel it is God's will and nothing can done about it.

Due to the frequent migrations to find agricultural labour they resemble the nomads and do not have a sustainable way of living. For these and many other reasons they are not aware of the interventions nor are they able to form sustainable community based organizations who can coordinate with government and NGOs and attract context specific programmes for them.

Feedback on Safety Net Programme

A very small number of community members are enrolled in the Benazir Income Support Programme (BISP) and the needs are far beyond the scope of the safety net programme. The amount is also very small to sustain a food basket for a family. Findings from the SDNA indicates that other than payments from the BISP and unconditional food assistance, the households did not receive much assistance from any other source. While the qualitative inquiry suggests that the actual number of beneficiaries of BISP may be much less than the 33% targeted by BISP.

The Government of Pakistan was responsible for giving BISP payments and was relatively more likely to provide food assistance to communities. However, the United Nations and NGOs were more likely to provide nutrition support for mothers and children. The findings suggest there is scope for improvement in providing humanitarian assistance to households in drought notified areas in Sindh. There were mixed responses from the community regarding households receiving support from BISP followed by nutritional support, food assistance, cash/food for work/training and agriculture/livestock support from multiple sources (Government, UN, I/L NGOs, relatives/friends/community members). But the needs of the community were much higher than the interventions provided. Another problem identified was that most of the interventions are simply being linked with the BISP database assuming that it is the prime source of poverty information while the reality might be different. The BISP census was done a decade ago and conditions have changed with the passage of time. It is anticipated that a number of beneficiaries might have further deteriorated and some might have improved in financial conditions. The recent droughts and other events have also resulted in emerging new cases of poverty which are not catered in these assistance models by government and development partners.

J.   SUMMARY OF FINDINGS AND CATEGORISATION OF RISK FACTORS

In order to understand how participating communities perceive the severity of risk factors for undernutrition, a prioritization exercise was conducted in each of the four localities at the end of the qualitative data collection period. All risk factors identified by community members over the course of this study were presented back to them with the use of flashcards, portraying each discussed risk factor. After a recapitulation of survey findings by the qualitative data collection team, participants were invited to validate the interpretation of results and suggest modifications, if necessary. Subsequently, they were requested to divide risk factors into three categories (major, important, minor), depending on their impact on child undernutrition. The results of this exercise are presented in the table below. Risk factors perceived as having a major impact on undernutrition are highlighted in red, important factors are marked in orange while risk factors with minor impact are colored green. White cells marked "N/A" signify that a respective community did not identify that risk factor as a cause of undernutrition in their milieu.

Table 13: Summary of results of a community rating exercise

	Risk factors*	Garth-yari	Veeal	Mithrio Mor	Jhirmirio	Overall
A	Poor health services	+++	+++	+	+	++
B	Lack of family planning practices /services	+++	+++	+	++	++
C	Stress of care giver or HH	+++	+++	+	++	++
D	Sub optimal breastfeeding practices	+++	+++	-	++	++
E	Poor Complementary feeding practices of children 6-23 months	+++	++	++	+++	+++
F	Improper care practices of PLW and child	+++	++	+	++	++
G	Lack of mother empowerment for care practices and decision making	+++	+++	++	+++	+++
H	Low production/availability of food	+++	+++	++	+	++
I	Low access to Food	+++	+++	+	++	++
J	Poor diversity of sources of incomes for HH	+++	+++	++	+++	+++
K	Access to market	++	+++	N/A	++	++
L	Poor coping strategy	+++	+++	+	+++	+++
M	Low social capital of women or household	+++	++	++	++	++
N	Poor access to water	+++	+++	++	N/A	+++
O	Poor sanitation and hygiene practices	+++	+++	+++	+++	+++
P	Women/child workload	+++	++	+	+++	++
Q	Early Marriages / Early Pregnancies	++	++	++	+++	++

* A summary description of the various risk factors found in these villages is given in Annex D

After the completion of both quantitative and qualitative data collection, the Link NCA Analyst triangulated all available data sets, compared correlations for each risk factor and determined the strength of its association with undernutrition. The impact of each factor was determined in line with the rating grid presented below.

Table 14: Rating grid for the categorisation of risk factors

Category	Criteria
Major risk factor	No contradictory information AND Strength of association from literature review is classified as [++] or [+++] AND Majority of [++] or [+++] for all other sources of information
Important risk factor	A minor amount of contradictory information exists AND Strength of association from literature review is classified as [++] or [+++] AND Majority of [++] or [+++] for all other sources of information
Minor risk factor	A moderate level of contradictory information is permitted AND Strength of association from literature review is classified as [+] or [++] AND Majority of [+] for all other sources of information
Rejected risk factor	No contradictory information AND Majority of [-] or [+] for all sources of information

The ratings for each hypothesized risk factor are summarized in the table below.

Table 15: Summary of categorisation of risk factors

	Risk factors	Prevalence from secondary data /literature review	Correlations from quantitative survey	Strength of association with under-nutrition from literature review	Seasonal and historical associations with under-nutrition	Findings from the qualitative survey	Community rating exercise	Interpretation/ Impact of risk factor
A	Poor health services	++	+++	++	-	+++	+++	MAJOR
B	Lack of family planning practices /services	++	+	++	+	++	++	IMPORTANT
C	Stress of care giver or HH	-	++	++	+	++	++	IMPORTANT
D	Sub optimal breastfeeding practices	++	++	+++	+	+++	++	IMPORTANT
E	Poor complementary feeding practices of children aged 6-23 months	+++	+++	+++	+	+++	+++	MAJOR
F	Improper care practices of PLW and child	+	-	+	+	++	++	MINOR
G	Lack of mother empowerment regarding care practices and decision making	+	+	+	-	++	+++	MINOR
H	Low production/availability of food	+++	+++	++	++	+++	++	MAJOR
I	Low access to food	+++	++	++	++	+++	++	IMPORTANT
J	Poor diversity of sources of incomes for HH	++	+++	++	++	+++	+++	MAJOR
K	Access to market	+++	+++	+	++	++	++	IMPORTANT
L	Poor coping strategies	++	+++	+++	++	++	+++	MAJOR
M	Low social capital of women or household	-	-	+	+	++	++	MINOR
N	Poor access to water	+++	+++	+++	+++	+++	+++	MAJOR
O	Poor sanitation and hygiene practices	++	+++	++	+	+++	+++	MAJOR
P	Women/child workload	+	+	++	++	+++	++	IMPORTANT
Q	Early marriages / Early pregnancies	+	-	++	+	++	++	MINOR

At the same time, the Link NCA Analyst revisited sectoral causal pathways of undernutrition, as developed with communities during the qualitative inquiry, and developed two simplified outlines, likely to explain most cases of wasting and stunting in Tharparkar district. Most importantly, this exercise allowed differentiation between diverse causal mechanisms for wasting and stunting, highlighting the relevance of adapting response strategies to respective types of undernutrition.

Figure 7: Causal pathway likely to explain most cases of wasting in Tharparkar[43]
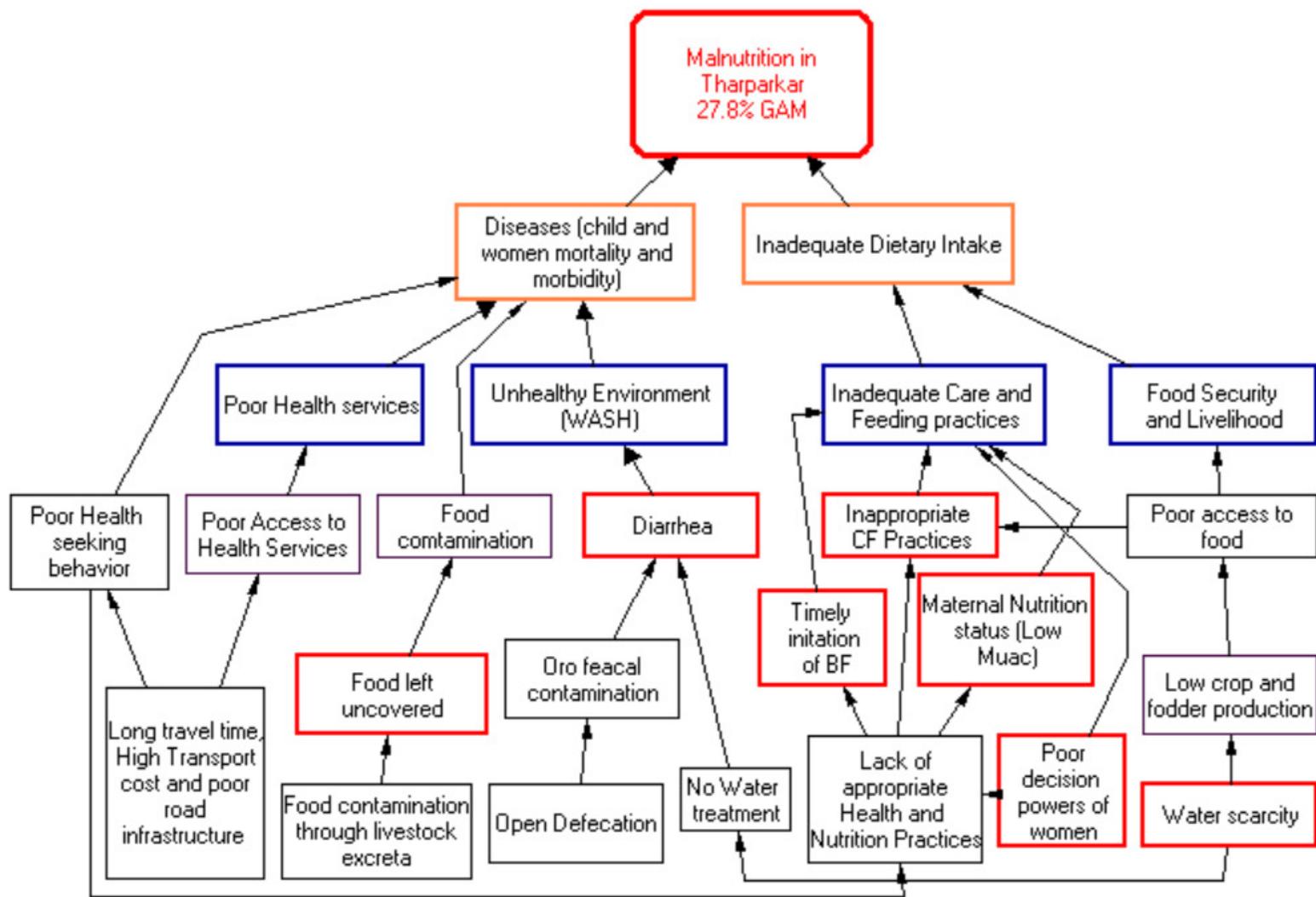
43   Cells highlighted in dark red colour signify risk factors with a significant link to wasting while cells highlighted in pink colour signify risk factors with a significant link to stunting, as per calculations of their p-value (Annex B).

As shown in the diagram the causes of wasting are multifactorial: the major pathways are a combination of low decision making and inappropriate practices, which translate into poor maternal and child health. These facts also correlate with the anthropometric measurements where the highest GAM rates are found to be in the age group of 16–27 months. Other pathways show that water scarcity results in lower crop and fodder production which reduces access to food (productivity) both from agriculture and livestock. Poor access to water at the household level leads to **poor hygiene practices**, such as **inadequate food handling**, contributing to a heightened risk of contamination and spread of illnesses especially **diarrhoea** – the recurrences of which can lead to wasting. The illnesses can also be brought about by inadequate defecation practices such as **open defecation** due to the lack of a household latrine. Animals also move freely in the compound which increases the risk of **contamination via animals** or **their faeces** and food is often kept uncovered leading to diseases, including diarrhoea, and potentially to wasting. Analyses taking into account anthropometric measurements of children in the household revealed a statistical association between **food being left uncovered** and acute malnutrition of the child, meaning that in those households who leave food uncovered this constitutes a significant risk factor for wasting (see Appendix B).

The findings indicate that a male head of household may tend to **restrict the decision-making powers** of his spouse, particularly with regards to the use of her own income, food purchases, decisions about **children's education** and **medical services**. This not only limits woman's capacities to prepare adequate meals for the household, both in terms of quality and quantity, but it may also provoke negative coping strategies within the household, which a woman is not able to control.

The level of good health and nutrition practices is considerable but the indulgence in these appropriate practices is a problem mostly due to cultural taboos and a lack of means to adopt good practices. Poor practices in health and nutrition negatively impact **maternal nutrition, breastfeeding, and complementary feeding practices** and health seeking behaviour resulting in poor IYCF practices and poor utilization of health services.

It is also important to note that analyses demonstrate a significant link between wasting/stunting and **sex of a child**, meaning that boys are more likely to be wasted and stunted than girls. This may be due to diverse, gender-determined care practices after childbirth and other physiological factors discussed in the undernutrition section of this report (Section F).

A causal mechanism for stunting depicts a combination of problems faced by the community. The **contamination of food and water** by livestock and through children crawling in the dirt is evident, which leads to stunting possibly through malabsorption and frequent waterborne diseases. Poor coping strategies especially reliability on others for food or **borrowing money/food** also led to stunting by limiting food intake at the household level. **Maternal stress** due to shortage of resources and poverty also showed a possible statistical relation with stunting. **Poor access to markets** was also found to be a contributor by delaying or resulting in poor access to food. Since livestock is a major source of livelihood for the districts, this was reflected both positively – as increased ownership of livestock showed a protective relation against stunting – but also negatively, as reduced **fodder availability** contributed towards stunting.

Figure 8: Causal pathway likely to explain most cases of stunting in Tharparkar[44]
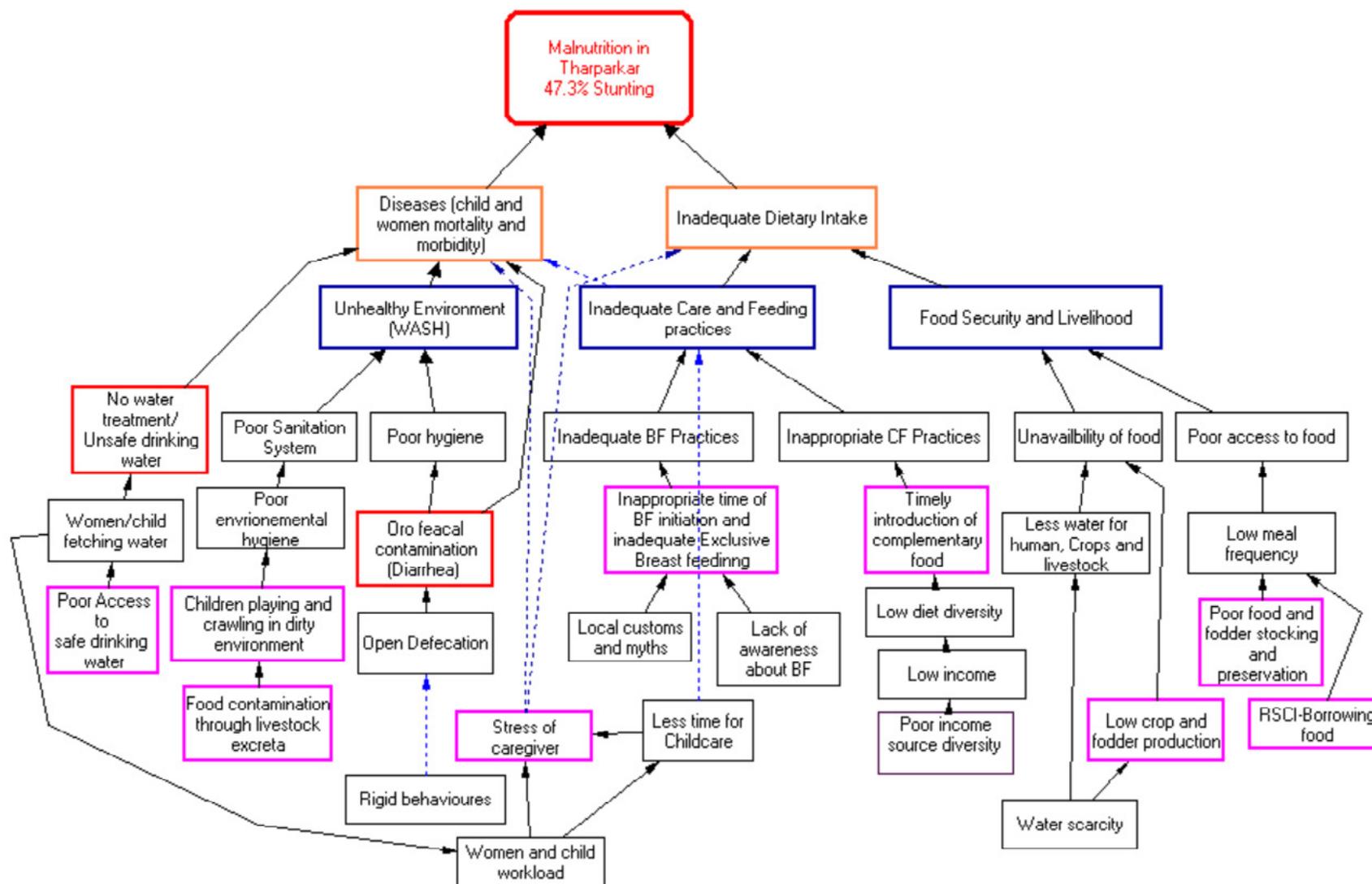
44   Cells highlighted in dark red colour signify risk factors with a significant link to wasting while cells highlighted in pink colour signify risk factors with a significant link to stunting, as per calculations of their p-value (Annex B).

K.   CONCLUSIONS AND RECOMMENDATIONS

Tharparkar district located in Southern East part of country has a tropical desert climate. It has the lowest Human Development Index of all the districts in Sindh. Thar has a fertile desert and the livelihood of Thari people depends mostly on rainfall agriculture but frequent disasters have badly affected their sources of livelihoods which are mostly agricultural labor and livestock.

Drought, malnutrition, infant and child mortality and locust attacks are very common in Tharparkar. Among these, drought has been officially declared at least 17 times up to 2018. Drought is directly and indirectly impacting the health and nutrition status of the community. In addition to frequent droughts and severe water shortages, public services related to health, WASH, electricity, education, agriculture and livestock etc are also not adequately and consistently available to the community.

Amongst the social aspects, rigid behaviors and a knowledge gap were found to be a limiting factor in attaining a better health and nutrition status. There is a significant gap between the perceptions of the community and the reality of the context which is mostly due to a lack of awareness and realization of the scale of the malnutrition problem.

The analyses undertaken during this Link NCA study allowed us to identify 17 risk factors, believed to have an impact on the incidence of under nutrition in the zone of study. Following a triangulation of data from diverse sources, Seven (7) risk factors were identified as having a major impact, six (6) risk factors were classified as having an important impact and four (4) risk factors were judged to have a minor impact on the incidence of under nutrition in the zone of study.

Among the seven major risk factors, two were identified in the sector of water, sanitation and hygiene, namely **poor access to water** and **poor hygiene and sanitation practices.** Two major risk factors were identified in the sector of health and nutrition: **poor health services** and **poor complementary feeding practices of children aged 6-23 months.** In the sector of food security and livelihood the three major risk factors found were **low production/availability of food; poor diversity of sources of incomes for households** and **poor coping strategies.**

The calculation of statistical associations between individual risk factors and wasting/stunting allows us to differentiate between causal mechanisms of these two forms of undernutrition and to simplify rather complex pathways for operational purposes.

Recommendations:
The recommendations are in line with the causal factors identified in this study and will contribute in reducing/ addressing the risk factors in the district. The recommendations and responses for Tharparkar will learn from and contribute to the sustainable development goals at large.   The following will have a direct scope for the addressing Malnutrition at Tharparkar ; 1)- ending Poverty 2)- Zero Hunger, 3)- Good Health and Wellbeing, 5)- gender Equality, 6)- Clean water and sanitation, 8)- Decent work and economic Growth. While the following will have a role in addressing the basic causes of Malnutrition in Tharparkar. 4)- Quality Education, 10)- Reduced inequalities, 13)- climate action, 15)- Life on land and 17)- partnerships for the goals.

Recommendations for Health and Nutrition

1. Increase the placement of **staff especially female** professionals in health facilities.

2. Functionalize and sustain the **Health services** at all levels at all times (higher geographical coverage of functional health services)

3. Strengthen all **pillars of the health** systems to ensure timely accessibility to appropriate health services.

4. Execute blanket and consistent coverage of **CMAM/IYCF and NSC** services to treat the prevailing caseload of malnutrition, MM supplementation.

5. Execute blanket distribution of **LNS** to PLW and children <2 to prevent the current decline of nutritional status due to the drought.

Recommendations for Food Security and Livelihoods

1. Strengthen **rain water harvesting** with larger storage available for kitchen gardening and livestock.

2. Increase coverage of safety nets and use nutrition sensitive beneficiary selection criteria

3. Strengthen skill development for uneducated youth, provide **alternative income generation** opportunities and reduce the community dependence on livestock and agriculture, which are no longer consistently dependable due to the drought. Plan activities that are less affected by drought, and involve more males in income generation activities.

4. Develop **linkages** between community organizations, authorities and **markets** for income generation activities and selling of products; reduce community exploitation by middle men, give community organizations/unions direct access to markets and provide a fair price for their products.

5. Explore different **public private** or development sector and corporate partnerships for social entrepreneurship to develop new income generation areas and expand the existing ones (e.g. livestock).

6. Explore **corporate investments** for **social entrepreneurship** and communal small and medium enterprises. Give a source of security and insurance to poor communities and boost local capabilities (e.g. in livestock and Dairy, honey, medicinal plants, embroidery).

7. **Develop value chains of** male cows marketed on a fair market share for beef throughout the year and during Eid ul Azha (prevent middle man exploiting local livestock owners).

8. Extending livestock related assistance (fodder/feed, medicines/vaccinations) to needy and vulnerable livestock rearers. Livestock Protection and Management interventions including; supply of fodder, feed, fodder seed, water and animal health camps by engaging the services of all technical agencies and the concerned line department.

9. Setting up of temporary and permanent mandies (markets) for feed, fodder and animals considering de-stocking/relocation perspectives as well.

10. De-stocking / relocation of livestock in case of market disruption and animal mortality due to prolonged emergency

11. Re-stocking of livestock to rebuild the livestock-based livelihood and provision of livestock shelters to the extremely vulnerable individuals once emergency is over.

12. Provide immediate assistance to livestock owning population by providing necessary assistance for fodder, feed, water livestock health services is immediately required for protection of livestock. This would discourage distress selling of livestock and help farmers to maintain a very important part of their asset base.

13. Establish consistent supply of fodder through getting fodder from barrage areas/ districts. Provision of fodder seed suitable for the areas. Establish fodder banks for the lean season.

14. Set up fodder/feed mandies (markets) at fixed prices and allow farmers to buy. In areas where the livestock is concentration high; camps needs to be set up for easy provision of services. For medium to long term livestock breed improvement, pasture management through controlled grazing.

15. Livestock insurance and enterprise development are crucial elements to enable the pastoralists to prepare and respond to the future shocks.

16. **Develop and strengthen value chain enterprises:** Fodder is the key to the success of the livestock based economy of Thar. Local investors (e.g. via a revolving fund) or corporate investors should form medium enterprises of communal dairy farms where they take responsibility for livestock rearing and the dairy business and the animals are taken from HHs on a monthly lease. This will ensure a regular supply chain of fodder, water, controlled environment, vaccines and other essential livestock medicines. The investor provides care, fodder, health services and sells the dairy product. "Thar Dairy" – a concept of organic Thar cow breeds tetra pack milk and other products. A side benefit of Thar dairy would be that **women's workloads** would be reduced and this could promote women and child health through better care practices, as there would be significant time savings for women (due to the reduction in time needed for collecting water and fodder for livestock, and taking care of livestock).

17. Solar energy livestock farming can be an option to save further resources with solar run ice line refrigerators and chillers.

18. Register these enterprises with the livestock departments and dairy development organizations for any insurance opportunities and availability of relevant services.

19. Ensuring sustainability of nutritional ecology by improving education/awareness on conserving biodiversity.

20. Support farmers by providing drought resistant agricultural inputs and promotion of climate smart agriculture. Specifically, provide drought resistant seed (cereals, pulses, legumes, vegetables and fodder), fruit plants and shrubs suitable to Tharparakar.

21. Improve provision of **drought resistant seed varieties** for kitchen gardening. Promoting bio-saline agriculture/halophytes and salt tolerant crops.

22. **Value addition** of local products: skills development and value chain and value addition for local products such as honey, condensed milk, pickle, clusterbeans, 'peero' jam, dried vegetables, embroidery and basket weaving.

23. **Demote microfinance** and loan repayment a this is a big burden: instead, sensitize communities to sell male cows and invest in IGAs, small enterprises.

24. Explore the role of **the Scaling Up Nutrition (SUN) business network** to capitalize on corporate social responsibilities for Thar e.g. Soft drinks availability and coverage in rural areas.

Recommendations for WASH

1. Promote water conservation practices through the rehabilitation of water structures for both agriculture and human consumption at feasible locations in order be ready before the next Monsoon season i.e. July-August, to capture maximum run-off water.

2. Establish new and rehabilitate and existing water supply (including wells and tarais) and sewerage system infrastructure.

3. In addition to rain water harvesting, indigenous Solar Distillation techniques may also be promoted for brackish water treatment.

4. Provide water tanks for rain water storage with increased storage capacities along with education on maintaining the hygienic conditions of these tanks and best utilization of the stored water.

5. **Improve education/awareness** on water collection, storage/preservation, water treatment, use and importance of latrines to prevent open defecation.

6. Educate communities to **separate livestock** from food preparation, storage, dish washing and dining areas to prevent contamination from livestock excreta and the spread of zoonotic diseases.

7. **Execute sanitation marketing** with CLTS of broader coverage to prevent open defecation and increase tendency of building latrines at home.

8. Explore feasibility of clean water provision by the government through water trucking during times of severe shortage. And provision of water at subsidized rates during lean period.

9. Improve utilization of household level toilets, through long-term development and government initiatives aimed at eradicating open defecation

Recommendations for Gender

1. Improve HH water access to reduce **the burden on women of fetching water**.

2. Improved diet of Child bearing age women in general pregnant and Lactating women specifically also attention on good nutrition of Adolescent girls.

3. **Improve basic education** for the new generation of boys and girls so they have more chances of prospective professional careers and entrepreneurships.

4. **Men should be sensitized to realize** that women's work has an economic importance which they are not paid for.

5. Awareness raising on early marriages impact on girl health and regarding law of child marriages.

Cross-cutting recommendations

1. Strengthen SBCC on **MIYCN** through suitable delivery channels[45] such as community promoter sessions, street theatres, health and nutrition fairs (melas) etc.

2. Strengthen **SBCC** on water collection, storage/preservation, water treatment, and use and importance of latrines to prevent open defecation.

3. Strengthen SBCC and strict regulation of spending on **tobacco and alcohol** to save money for food.

4. **Regulate and increase daily wage** rates and include food provision at work sites for labourers

5. Provide free **education** with stationary and text books, fill in the vacant government teacher positions and ensure staff retention and adequate service provision. Third party monitoring of education department is required to ensure adequate education services in all areas (the migration of families is an obstacle in child retention at school). Migration days in the seasonal calendar can be utilized as annual vacations.

6. If a canal could be built into the district, it could help increase the availability of water throughout the district. The canal banks could be a site for mass plantations especially of indigenous fodder. Small arteries of these canals could feed into **tarais** which would increase the storage of water both for human and animal consumption.

7. Drought: **Mass Afforestation** is required with local drought resistant trees, bushes, grasses and shrubs (preferably those which can be used as fodder and bear some fruit or vegetables). This will have an impact on the availability of shelter, fodder and food and a long-term impact on temperature reduction and precipitation.

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45 These channels were found to be effective in Tharparkar as there are no consistent electricity, cellular, TV or radio channels available.

5. ANNEXES

a) DETAILED SAMPLING FOR ANTHROPOMETRIC DATA COLLECTION and RISK FACTOR SURVEY

S#	Name of U/C	Population	Number of Villages	Livelihood Zone
1	Chelhar	20,206	38	Agro pastoral + Labor
2	Kantio	23,187	41	Agro pastoral + Labor
3	Vejhiar	9,408	57	Agro pastoral + Labor
4	Chachro	14,000	30	Agro pastoral + Labor
5	Rajoro	15,890	42	Agro pastoral + Labor
6	Hirar	10,351	50	Agro pastoral + Labor
7	Saringhiar	13,695	42	Agro pastoral + Labor
8	Tardos	12,363	19	Agro pastoral + Labor
9	Mithrio Charan	19,983	28	Agro pastoral + Labor
10	Kheensar	15,223	28	Agro pastoral + Labor
11	Tar Ahmed	12,694	46	Agro pastoral + Labor
12	Parno	17,178	39	Agro pastoral + Labor
13	Pirani Jo Par	19,598	25	Agro pastoral + Labor
14	Nangarparkar	17,101	60	Rainfed and Livestock Zone
15	Pithapur	10,292	60	Rainfed and Livestock Zone
16	Harho	11,817	79	Agro pastoral + Labor
17	Virawah	15,198	77	Rainfed and Livestock Zone
18	Satidera	16,053	36	Agro pastoral + Labor
19	Tigusar	12,319	32	Agro pastoral + Labor
20	Pillu	9,402	50	Agro pastoral + Labor
21	Sobhiyar	10,563	62	Agro pastoral + Labor
22	Khetlari	16,327	100	Agro pastoral + Labor
23	Bhitaro	9,260	167	Barrage irrigated zone + livestock
24	Bolhari	8,510	111	Agro pastoral + Labor
25	Dabhro	9,208	90	Agro pastoral + Labor
26	Kaloi	13,754	114	Barrage irrigated zone + livestock
27	Mithi	19,697	35	Agro pastoral + Labor
28	Mohrano	8,541	121	Barrage irrigated zone + livestock
29	Joruo	12,274	59	Agro pastoral + Labor
30	Malanhore Veena	12,996	55	Agro pastoral + Labor
31	Bhakuo	10,482	51	Agro pastoral + Labor
32	Manjthi	11,294	74	Agro pastoral + Labor
33	Islamkot	25,577	27	Agro pastoral + Labor
34	Sonal Beh	10,324	20	Agro pastoral + Labor
35	Kehri	8,535	65	Agro pastoral + Labor
36	Seengaro	12,848	39	Agro pastoral + Labor
37	K.G. Shah	13,750	25	Agro pastoral + Labor

b) CALCULATIONS OF STATISTICAL[46] ASSOCIATIONS BETWEEN HYPOTHESISED RISK FACTORS AND ANTHROPOMETRIC MEASUREMENTS OF CHILDREN IN RESPECTIVE HOUSEHOLDS

					Outcome Variable								
Risk Factor					**Wasting (WHZ)**			**Stunting (HAZ)**			**Underweight (WAZ)**		
Logistic Regression													
Indicator	N	n	Prevalence 95% [CI]	Design Effect	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI
Male Children	878	442	50.3% (46.9 – 53.6)	1.126	0.003	1.56	1.16 2.10	0.082	1.27	.97 1.65	0.053	1.30	.99 1.69
Access to HF (30 Mins and More)	613	545	88.9% (86.2 – 91.2)	4.017	0.793	0.94	0.59 1.48	0.380	0.83	0.55 1.26	0.317	0.81	0.53 1.23
Access to Market (30 Mins and More)	613	558	91.0% (88.5 – 93.0)	7.723	0.227	0.72	0.43 1.22	0.046	1.58	1.01 2.48	0.016	1.76	1.11 2.79
Diarrhea	878	184	20.9% (18.4 – 23.8)	1.489	0.044	1.36	1.01 1.83	0.881	1.02	0.78 1.34	0.050	1.32	1.00 1.73
Cough and Fever	878	308	35.0% (31.0 – 38.3)	1.703	0.234	1.20	0.89 1.62	0.904	0.98	0.75 1.29	0.098	1.26	0.96 1.64
Timely initiation of breastfeeding	403	106	26.3% (22.3 – 30.8)	6.111	0.794	1.08	0.61 1.92	0.051	0.57	0.33 1.00	0.487	1.22	0.69 2.14
Colostrum Feeding	403	378	93.7% (91.0 – 95.8)	1.352	0.817	0.88	0.29 2.69	0.867	0.91	0.31 2.71	0.513	0.70	0.23 2.07
Exclusive breast-feeding (0 to 6 months)	107	90	84.1% (76.0 – 89.8)	1.127	0.200	0.55	0.22 1.37	0.479	0.74	0.32 1.70	0.573	0.791	0.35 1.79
Continued breast-feeding at 1 year	74	58	78.3% (67.7 – 86.2)	0.7423	0.964	0.97	0.27 3.45	0.911	0.93	0.26 3.30	0.774	1.19	0.36 3.94

46 The two shades of green shows protective factors (dark green for a significant association and a light green for a potential association) and the two shades of orange shows the risk factors (significant and potential association).

				Outcome Variable								
Risk Factor				**Wasting (WHZ)**			**Stunting (HAZ)**			**Underweight (WAZ)**		
Logistic Regression												
Indicator	**N**	**n**	**Prevalence 95% [CI]**	**Design Effect**	**P-value**	**Odds Ratio**	**95% CI**	**P-value**	**Odds Ratio**	**95% CI**	**P-value**	**Odds Ratio**	**95% CI**
Minimum meal frequency-Breast fed Children (6-8 months)	62	31	50.0% (37.9 – 62.1)	1.012	0.940	1.06	0.26 4.27	0.680	1.30	0.38 4.43	0.680	1.29	0.39 4.24
Minimum meal frequency-Breast fed Children (9-23 months)	234	129	55.1% (48.7 – 61.4)	1.285	0.344	1.43	0.68 3.01	0.109	0.54	0.26 1.15	0.654	1.18	0.57 2.45
Minimum meal frequency- Non-Breastfed Children (6-23 months)	69	16	22.9% (18.6 – 28.1)	1.364	0.370	0.53	0.14 2.11	1.000	1.00	0.26 3.86	0.671	1.37	0.32 5.92
Minimum Dietary Diversity-Child (fewer than 4 Food Groups)	296	178	60.1% (54.5 – 65.5)	2.057	0.395	0.78	0.44 1.38	0.218	1.44	0.81 2.56	0.327	1.33	0.75 2.34
Minimum acceptable diet achieved (Minimum meal and Min diet diversity)	296	61	21.6% (17.3 – 26.7)	1.817	0.634	0.88	0.53 1.48	0.833	1.06	0.64 1.75	0.099	1.53	0.92 2.54
Bottle fed	403	50	12.4% (9.5 – 15.9)	1.494	0.767	0.90	0.45 1.80	0.852	1.07	0.55 2.09	0.980	0.99	0.51 1.94
Consumption of iron-rich or iron-fortified foods (Minimum 1 rich iron food)	296	62	20.9% (16.7 – 25.9)	2.279	0.994	1.00	0.46 2.16	0.243	0.64	0.29 1.36	0.429	0.74	0.34 1.57
Mother MUAC (below 210mm)	613	88	14.3% (11.8 – 17.4)	1.746	0.012	1.66	1.12 2.47	0.234	1.26	0.86 1.84	0.012	1.65	1.12 2.42

					Outcome Variable								
Risk Factor					Wasting (WHZ)			Stunting (HAZ)			Underweight (WAZ)		
Logistic Regression													
Indicator	N	n	Prevalence 95% [CI]	Design Effect	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI
Improper Hand washing practices	613	373	60.8% (56.9 – 64.6)	2.725	0.298	1.18	0.87 1.59	0.577	0.93	0.70 1.22	0.489	1.10	0.84 1.45
Reduced Coping Strategy (Rely on less preferred and less expensive food)	613	339	55.3% (51.4 – 59.2)	5.567	0.941	1.01	0.75 1.36	0.396	0.89	0.68 1.16	0.281	0.86	0.66 1.13
Reduced Coping Strategy (Borrow food/ rely on help from friends or relatives)	613	366	59.7% (55.8 – 63.5)	4.688	0.778	1.02	0.90 1.16	0.002	1.21	1.07 1.37	0.138	1.09	0.97 1.23
Reduced Coping Strategy (Limit portion size at meal time)	613	212	34.5% (30.9 – 38.4)	5.083	0.198	1.22	0.89 1.67	0.930	1.01	0.76 1.34	0.413	1.13	0.85 1.49
Reduced Coping Strategy (Restrict con-sumptions by adults in order for small children to eat)	613	162	26.4% (23.1 – 30.1)	5.965	0.559	1.10	0.79 1.54	0.606	1.08	0.80 1.47	0.454	1.12	0.83 1.52
Reduced Coping Strategy (Reduce number of meals eaten in a day)	613	142	23.1% (20.0 – 26.7)	4.109	0.218	1.24	0.88 1.74	0.211	1.22	0.89 1.68	0.056	1.36	0.99 1.87
rCSI (HHs adopting any rCSI strategy)	613	462	75.3% (71.8 – 78.6)	6.468	0.676	0.93	0.66 1.31	0.770	0.95	0.69 1.31	0.759	0.95	0.69 1.30
Mother Education (Below secondary education)	613	583	95.1% (93.1 – 96.6)	1.781	0.921	0.97	0.49 1.88	0.225	0.68	0.37 1.26	0.563	0.83	0.45 1.54

Risk Factor					Outcome Variable								
					Wasting (WHZ)			Stunting (HAZ)			Underweight (WAZ)		
Logistic Regression													
Indicator	N	n	Prevalence 95% [CI]	Design Effect	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI
Drinking Water Storage (Facility not available)	613	150	24.5% (21.2 – 28.0)	5.388	0.095	1.33	0.95 1.86	0.181	1.24	0.91 1.69	0.238	1.218	0.88 1.65
Close proximity (<10 meters) of household water storage/cooking area to latrine/area for defecation	613	357	58.2% (54.3 – 62.1)	4.642	0.534	1.10	0.81 1.49	0.043	1.33	1.01 1.75	0.144	1.23	0.93 1.62
Cooking utensils left on the ground	613	286	46.7% (42.7 – 50.6)	4.88	0.636	1.07	0.80 1.44	0.858	0.98	0.75 1.27	0.141	1.22	0.94 1.59
Food Left Uncovered	613	176	28.7% (25.3 – 32.4)	5.488	0.038	1.39	1.02 1.90	0.618	0.93	0.69 1.24	0.357	1.15	0.86 1.53
Free range animals can enter the house and/or kitchen	613	203	33.1% (29.5 – 36.9)	6.223	0.887	1.02	0.75 1.39	0.255	0.85	0.64 1.12	0.131	1.24	0.94 1.64
Early Marriage – Less than 18 Years	613	187	30.5% (26.9 – 34.3)	1.638	0.322	1.17	0.86 1.60	0.590	0.92	0.69 1.23	0.491	1.11	0.83 1.47
Early Pregnancy – Less than 19 Years	613	114	18.5% (15.7 – 21.9)	1.929	0.635	1.08	0.79 1.49	0.161	0.81	0.61 1.09	0.970	1.01	0.75 1.34
Contraceptive Usage (Not using any FP method)	613	437	71.2% (67.6 – 74.7)	2.253	0.252	1.21	0.87 1.69	0.568	0.92	0.68 1.23	0.570	0.92	0.68 1.23
ANC Visits (Less than 4 visits)	613	472	80.2% (76.9 – 83.2)	2.146	0.270	1.22	0.85 1.75	0.114	1.29	0.94 1.78	0.088	1.32	0.96 1.81

					Outcome Variable								
Risk Factor					Wasting (WHZ)			Stunting (HAZ)			Underweight (WAZ)		
Logistic Regression													
Indicator	N	n	Prevalence 95% [CI]	Design Effect	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI
Fodder Stocking Facility (Not Available)	613	358	58.4% (54.5 – 62.2)	4.539	0.288	1.18	0.87 1.58	0.004	1.49	1.14 1.95	0.054	1.30	1.00 1.71
Main Source of Income (Unskilled/Agri. Labour)	613	432	70.5% (66.7 – 73.9)	4.143	0.810	1.04	0.74 1.47	0.489	1.11	0.82 1.52	0.681	1.07	0.78 1.45
Expense on Un-necessary Items (20% and above of the total HH expense)	613	312	50.8% (46.9 – 54.8)	3.143	0.168	1.23	0.92 1.65	0.664	1.06	0.81 1.38	0.326	0.88	0.67 1.14
Land Ownership (Don't own Agri-cultural land)	613	340	55.5% (51.5 – 59.4)	4.447	0.975	0.99	0.72 1.38	0.686	1.06	0.79 1.43	0.239	1.20	0.89 1.61
Women Workload	613	466	76.0% (72.5 – 79.2)	4.299	0.294	1.25	0.83 1.89	0.775	1.05	0.73 1.52	0.839	0.96	0.67 1.38

Indicator	Risk Factor / Mean	WHZ			HAZ			WAZ		
		P-Value	Coeff.	SE	P-Value	Coeff.	SE	P-Value	Coeff.	SE
	Linear Regression									
Cost of transportation to Health Facility (Rs)	431 (318.4 - 544.4)	0.370	-0.00	0.00	0.137	0.00	0.00	0.620	0.00	0.00
Inadequate dietary diversity among woman (MDD – W)	2.7 (2.6 - 2.8)	0.144	-0.02	0.01	0.611	0.00	0.01	0.956	-0.00	0.01
Livestock Ownership	6.7 (5.1 - 8.3)	0.082	0.00	0.00	0.059	0.00	0.00	0.834	-0.00	0.00
Number of Children	3.5 (3.3 - 3.7)	0.148	0.01	0.00	0.271	-0.01	0.00	0.561	0.00	0.00
Months of Adequate Food Provisioning (MAHFP) (1-12)	3.9 (3.6 - 4.2)	0.199	0.01	0.01	0.528	0.00	0.01	0.637	0.00	0.01
Mental Stress of mothers (on a scale of 1-8 responses)	3.1 (2.7 - 3.4)	0.672	0.00	0.00	0.039	0.01	0.00	0.043	0.01	0.00

c) QUALITATIVE SURVEY GUIDE

Information note[47]

Nutrition causal analysis Link NCA in Tharparkar district of **Sindh Province, Pakistan** is being conducted as part of **DWHH** Food and Nutrition security Programming in Sindh.

Name of principal researcher: Shahid Fazal

INVITATION: We would like you to participate in a study conducted by DWHH, a non-governmental organization, which fights against the causes and effects of hunger in almost 37 countries around the world, including Pakistan. The organisation has expertise in the domain of Food and nutrition, including Agriculture, livestock, water, sanitation and hygiene, as well as disaster risk reduction.

STUDY OBJECTIVES: The objective of this study is to improve our understanding of causes of child undernutrition in **Tharparkar** district of **Sindh Province.** We are hoping that this study will help us to identify risk factors triggering the undernutrition in your community so that together and with the involvement of local authorities and other partners we can reduce the malnutrition in the future. The study will take place from 28th June to 17th July 2019across four communities of Tharparkar.

PROCEDURE: In your community we would like to spend 6 consecutive days, starting today. We will share a detailed planning of our activities in order to facilitate the selection and mobilisation of participants for interviews and focus group discussions. The study will concern mainly parents of children under 5 years of age but other key informants may be solicited to contribute. Any person desiring to share his opinion outside of scheduled interviews and focus group discussions can approach the study team to do so. The study team would also like to conduct a number of observations and household visits in your community, if possible, in order for us to better understand your daily challenges. Focus groups discussions will be organised around themes, such as health, nutrition, care practices, water, hygiene and sanitation, food security and livelihoods, as well as gender. Each focus group discussion should be attended by 8–12 people, as outlined in the shared detailed planning. It should be noted that we will not be able to accommodate more people at the time. Participants are asked to come on time in order not to delay following focus group discussions. Do you agree to let us conduct this study in your community? Do you have any questions? If so, we will need you to appoint a community mobiliser. It needs to be someone that is known and respected by all members of your community. The role of this person will be to mobilise participants for semi-structured interviews and focus group discussions, as outlined in our detailed planning. Preferably, the selection of participants will be coordinated with you. Please note that it is preferable if selected participants attend only one focus group discussion. If they wish to contribute more than once, this is permitted only if it concerns different topics. However, we are interested in talking to as many community members possible and for this reason it would be better if more people in the village/ cluster of villages were mobilised to participate. Please note that the participation of a community mobiliser will not be remunerated and needs to be fully voluntary.

Please note that there is no good or bad response to our questions, no good or bad opinion, and no good or bad way of doing things. We are sincerely interested in immersing into your daily lives and learning about your beliefs and practices. If you agree to participate, we will ask for about one hour of your time.

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47   Used as an opening of each exchange with key informants, be it a semi-structure interview or a focus group discussion. Sentences in grey are relative only for an initial meeting with community leaders.

CONFIDENTIALITY: We will not ask for your name and will not share the content of our discussion with other people in your community. Your name will not appear in our study and no one will be able to identify what you shared with us.

RISKS: Unfortunately, apart from our sincere appreciation, we cannot promise you anything in exchange for your participation in this study. The participation in this study does not guarantee your selection in future DWHH activities nor should it have a negative effect on your involvement in ongoing activities. However, during focus group discussions we will share some water and snacks with you, which you may choose to take home with you, if you wish.

INFORMED CONSENT: The participation in this study is your choice. You are free to stop the interview or leave the focus group discussion at any time. Your participation is fully voluntary. If you do not wish to answer a question, you may decline to do so and we will move onto a next question. If you have any questions about us or the work we do, you can ask us any time.

Seasonal Calendar [48]

A seasonal calendar is a diagram of changes over the seasons – usually over the period of 12 to months. Seasonal calendars are useful to identify seasonal patterns of change – for example, changing availability of resources, such as food or income, work and migration patterns; to explore relationships between different patterns of change – for example, the relationship between income levels and movements of key populations for work; to identify when people may be particularly vulnerable; to explore seasonal patterns of well-being and hardship and how different people are affected; or to identify when people are particularly vulnerable to infection.

During the qualitative survey, the study team will explore seasonal variations for each risk factor while the topic will be discussed. Respective risk factors will be listed on a printed template of a seasonal calendar, depicting twelve months of a universal year, aligned with 4 seasons of an Ethiopian year. During focus groups discussions, participants will be asked to define in what month each risk factor is most important and precise causes of these changes.

HISTORICAL CALENDAR

A historical calendar is a diagram that shows change over a certain period of time. For the purposes of this study, a period of 10-15 years will be considered. However, if participants mention key events dating prior the 15-year period, these will equally be noted. A historical calendar is useful for exploring change over time in a particular situation, and the reasons for change. This may include changes in behavior, knowledge and attitudes in a community. It is also useful when exploring the consequences of a particular event or assessing the effectiveness (impact) of a project or a community initiative.

During the qualitative survey, the study team will explore historical variations for each risk factor while the topic will be discussed. Respective risk factors will be listed on a hand-drawn template of a historical calendar (A2 format), depicting 15 universal years. During focus groups discussions, participants will be asked to define in what year each risk factor was most important and precise causes of these changes. All important events that marked the life in a community in a positive or negative way, be it political, socio-economic, environmental or other, will be noted as potential triggers. The aim will be to draw trends based on the community knowledge and potentially identify correlations between various risk factors.

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48   Participatory Learning and Action (PLA) tool no. 19 & 20 (https://www.aidsalliance.org/).

STORYTELLING[49]

Storytelling involves participants discussing 'typical' stories from their community. This approach helps to open discussions on sensitive subjects in a non-threatening way and to identify the real-life situations and issues that affect people in their community. It helps to explore how people feel about those situations and what action they would like to take.

ODuring the qualitative survey, the study team will introduce pre-prepared real-life stories during focus group discussions to test participants' standpoint on subjects, which may be particularly sensitive, and/or test their responses given in a classic question-answer exchanges. The aim of this method will be to shift the attention from them (which may make them feel uncomfortable) and rather involve as observers and counselors to other people in situations, which reflect their daily reality.

DAILY ACTIVITIES CHART

Daily activity charts show how people spend their time over the course of a day. They are useful to explore how men and women spend their day; to evaluate their workload and to discuss their different roles and responsibilities or to explore the factors that influence these differences.

During the qualitative survey, the study team will introduce printed images of daily activities in a given community and will asks participants of focus group discussions to place them on a timeline starting with the usual time when they get up and ending with the usual time when they go to bed. This will be done for men and women separately. Any other groups, such as children or elderly, or groups with different economic functions (farmers, herders or market sellers) may be introduced, if deemed relevant.

MEAL COMPOSITION CHART

Meal composition charts show what people usually eat over the course of a day. They are useful to explore community's perception of good nutrition and how that reflects on their eating habits now and in situations when money would not be a barrier to a procurement of desired foods. For the purpose of this study three scenarios will be considered: typical food intake during a fasting period, typical food intake during a non-fasting period and a typical food intake when money would not be a barrier.

During the qualitative survey, the study team will introduce a hand-drawn chart (A2 format), divided into three columns, representing each scenario. The participants of a focus group discussion will be asked to state how many meals a day they eat during each scenario and what actual meals they eat at those times of a day.

HOUSEHOLD EXPENSES

Household expenses are a participatory exercise, the main objective of which is to show how household income is distributed to cover its expenses. It may reveal household's priorities in terms of spending; identify harmful behaviour or decision-making mechanisms within the household.

During the qualitative survey, the study team will introduce a printed set of images representing different types of regular expenses incurred by a household in a given community. These images will be placed in front of participants. The participants will also receive a set of pebbles representing money, which a household has available to cover these expenses. The role of participants will be to distribute the income among various expense group, just as they would in a real life.

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49   Participatory Learning and Action (PLA) tool no. 58 (https://www.aidsalliance.org/).

HEALTH JOURNEY / THERAPEUTIC ITINERARY[50]

This tool involves drawing the story of a person's health-seeking journey over a period of time. It involves tracing the development of person's health since falling ill, marking all different treatment options, which were explored in order to cure. The therapeutic itinerary is an engaging participatory exercise, which allows to open a discussion about traditional and non-traditional treatments in a non-threatening way. It also permits to explore people's understanding of current illnesses, which eventually trigger their choices. In addition, the tool allows to explore barriers of access to a biochemical treatment available in state-supported health facilities.

During the qualitative survey, the study team will introduce a blank sheet of paper (A2 format) and ask the participants to explain their typical health journey in case of current illnesses, which will be traced on a blank sheet of paper. The aim is to identify whether their knowledge of these illnesses triggers the same reaction and/or certain differences exist. A particular attention will be paid to an understanding and treatment of child undernutrition.

GENDER BOXES[51]

This tool involves participants placing 'typical' women and men in 'gender boxes' and identifying the roles, qualities and behaviours expected of them. It involves exploring what happens if a woman or man breaks out of their box and does not do what is expected of them. The aim of this exercise is to explore, in a non-threatening way, where those roles, qualities and behaviours come from and the pressures that they bring. It also allows to identify what roles, qualities and behaviours need to be changed and how that can be done. Gender boxes are particularly useful for exploring issues related to gender vulnerability, power and cultural traditions.

During the qualitative survey, the study team will introduce a blank sheet of paper (A2 format) and ask the participants to trace two same-size boxes next to each other. One will represent a woman and one will represent a man. The participants will then be asked to place all qualities, roles or behaviours expected of them inside the box. Any qualities, roles or behaviours not aligned with societal expectations will need to be drawn outside of the box. Once completed, the participants will be requested to compare and discuss what gender boxes show.

AGREE/DISAGREE GAME[52]

This tool involves participants to express their agreement or disagreement with different statements relating to studied risk factors in their community. Agree/disagree game is highly interactive and engaging. It can serve as an energiser and an opener of more structured exchanges, which will follow. It helps to provide a lively and non-threatening way for people to explore their attitudes about key issues in their community. The agree/disagree game is particularly useful for exploring attitudes about gender, cultural traditions and stigma. It can also provide an additional layer of understanding to a researcher in a community, which is reliant on humanitarian assistance and whose answers to different questions may be biased by expectations of a follow-up aid.

During the qualitative survey, the study team will place three printed signs with emoticons in front of focus group participants. Each sign will represent 'I agree' ☺, 'I disagree' ☹ or 'I am not sure'. The study team will then read out pre-prepared statements relating to a discussed topic and ask the participants to stand next to a sign, which represents their opinion on the matter. The participants will be encouraged to explain why they are standing by different signs. They will also be encouraged to try to persuade each other and change their minds if they wish to. Once all statements will be used, participants will be encouraged to discuss what the game has shown.

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50   Participatory Learning and Action (PLA) tool no. 17 (https://www.aidsalliance.org/).
51   Participatory Learning and Action (PLA) tool no. 25 (https://www.aidsalliance.org/).
52   Participatory Learning and Action (PLA) tool no. 36 (https://www.aidsalliance.org/).

COURAGE TO CHANGE[53]

This tool involves participants standing at different points along a line to show how easy or hard it is to adopt certain behaviours or make changes relating to challenges experienced in their communities. Using courage to change helps to create a non-threatening environment, in which participants can express freely how they feel about certain sensitisation messages deemed to improve their quality of life. The exercise allows participants to identify barriers, which they face in relation to suggested behaviours, which will eventually lead to a deeper understanding of a gap between knowledge and practice. This may be particularly helpful to organisations implementing projects focusing on behaviour change.

During the qualitative survey, the study team will draw a line on the ground. One end will represent "easy" while the other end will mean "difficult". The study team will then introduce pre-prepared behaviours, which are expected to be adopted by the community. The participants will be asked to position themselves at that end of the line that represents their attitude towards the stated behavior, i.e. whether it is easy or difficult to adopt. Participants will be encouraged to explain why they feel that way about those behaviours and what makes it easy/difficult to adopt.

RISK GAME[54]

This tool involves participants identifying a perceived risk relating to certain behaviours along a line showing a low to high risk. Using the risk game helps to explore people's knowledge and attitudes about levels of risk related to their current behavior and/or suggested behavior through sensitization activities. In this respect, the tool may help to identify areas of risky behavior that might need to be prioritized for future action. A risk game is particularly useful for raising awareness about illness prevention among the general community, including breastfeeding, care and hygiene practices.

During the qualitative survey, the study team will draw a line on the ground. One end will represent "low risk" while the other end will mean "high risk". The study team will then introduce pre-prepared behaviors, which are current in the community or expected to be adopted by the community. The participants will be asked to position a flashcard depicting the concerned behavior at that point of the line that represents their perception of risk related to the stated behavior, i.e. whether it is safe or dangerous practicing/not practicing certain behavior. Participants will be encouraged to explain why they feel that way about those behaviors.

53   Participatory Learning and Action (PLA) tool no. 39 (https://www.aidsalliance.org/).
54   Participatory Learning and Action (PLA) tool no. 55 (https://www.aidsalliance.org/).

Interview questions/guide

Health and Nutrition		
HandN Q-1	What diseases are common in your Community?	
HandN Q-2	Do the mothers utilize ANC/PNC services appropriately?	(4 ANC. Institutional delivery + 2-3 PNC)
HandN Q-2.1	If yes why_____	
HandN Q-2.2	If no Why_____	
HandN Q-3	Do you prefer an institutional delivery or home based delivery?	
HandN Q-3.1	If home based why?	
HandN Q-3.2	If institutional based why?	
HandN Q-4	What are the reasons of home based deliveries in your community?	
HandN Q-5	Whom do you usually consult for deliveries?	TBA, Dai or mother in laws or health staff
HandN Q-6	Do you consult doctors during pregnancy?	Heath care accessibility/affordability issues and all
HandN Q-6.1	If yes, how often?	
HandN Q-6.2	If no, why not?	
HandN Q-7	Do pregnant women visit health facilities regularly for routine check-up?	ANC/PNC visits
HandN Q-7.1	If yes, how often?	
HandN Q-7.2	If No, why?	
HandN Q-8	How much time after delivery does the mothers return to work again?	
HandN Q-9	Is immunization done at HF level?	
HandN Q-10	Are your children immunized?	
HandN Q-10.1	Are children dewormed in your community?	
HandN Q-11	What is your opinion about frequent pregnancy and birth on mother and child health?	
HandN Q-12	Have you seen children like this in your community?	Show picture of malnourished child
HandN Q-12.1	If yes, how often?	
HandN Q-13	According to you, what has happened to this child? If local name is covered by this question – Skip Question 3	To know the local terminology of disease
HandN Q-14	What is local name for this condition?	Record all of them
HandN Q-15	Is this a disease?	To know the perception of community
HandN Q-15.1	If yes, how do you know this is a disease?	
HandN Q-15.2	Is this contagious?	
HandN Q-15.3	If no, then what is it?	
HandN Q-16	Do you remember when you first saw undernourished children?	To know if it is well known in community or not
HandN Q-17	How you identify undernutrition in child?	Use local name now onwards
HandN Q-18	-Which children usually suffer from undernutrition in your community?	To know about the specific practices of households, having undernourished children
HandN Q-19	Is there a category or special condition?	
HandN Q-19.1	If yes, why only these children suffer from undernutrition?	

HandN Q-20	Is there a specific time/period (seasonal trend) or event when there are more undernourished children in the community....	
HandN Q-20.1	Why_____?	
HandN Q-21	What do you think of a household, which has undernourished children?	Local behaviour, perception
HandN Q-22	What is the first thing you do when you come to know about this condition?	Local remedies, solutions, care seeking behavior
HandN Q-23	What are the causes of undernutrition?	Practices, behaviours, root causes, scarcity of resources
HandN Q-24	Can only children be affected from undernutrition?	To assess the knowledge – if they mention other members like mothers, women headed HHs, adolescents, elderly, then further investigate on age, practices, knowledge, behaviours
HandN Q-24.1	Or other community members too?	
HandN Q-25	Does growth of the children you know is similar?	Probe if they can compare or identify a malnourished child amongst the children they know.
HandN Q-26	All of them are growing same in terms of height, weight?	
HandN Q-26.1	If no, what do you think, why they are not growing same?	
HandN Q-27	What should we do to avoid being undernourished?	Probe and take suggestions
HandN Q-28	According to you, what are the best practices to remain healthy?	
HandN Q-29	What is the relation of Malnutrition, Poverty and stress in your community (probe) ?	
HandN Q-29.1	And what are the consequences.	
BREASTFEEDING and COMPLEMENTARY FEEDING		
BFCF Q-1	What do you think about breastfeeding?	
BFCF Q-1.1	What is the general perception for breastfeeding in your community?	
BFCF Q-2	Why early initiation is not being done timely in community?	
BFCF Q-3	What are the reasons of not giving colostrum or first milk to newborn babies in your community?	
BFCF Q-4	Do mothers breastfeed children appropriately?	
BFCF Q-4.1	If No, why?	
BFCF Q-5	What are the reasons of delayed (after moth 8) or early initiation (before 6 months age) of complementary feeding to children in your community?	
BFCF Q-6	Is there preference being given for adequate breast feeding amongst the boy and girl children?	
BFCF Q-7	What else a child eats/drinks during breastfeeding years?	
BFCF Q-8	Does anyone gives advice on child's diet?	
BFCF Q-8.1	If yes, Who?	
BFCF Q-8.2	And who decides what to give to children?	
BFCF Q-9	Are children being given the same food which is prepared for whole family?	
BFCF Q-9.1	Why or why not?	
BFCF Q-10	Are there anything special foods given to PLWs to eat at home?	

BFCF Q-10.1	Why or why not?	
BFCF Q-11	Who usually guides mothers in your community about the IYCF and care practices?	

CARE SEEKING BEHAVIOUR AND WORKLOAD		
CBandW Q-1	Whom do mothers consult for advice on children's growth?	
CBandW Q-2	Do fathers take care of the child?	
CBandW Q-2.1	Do they take interest in their growth?	
CBandW Q-3	Do mothers go to work for livelihood?	
CBandW Q-3.1	Does children go to work for livelihood?	
CBandW Q-3.2	What are the consequences of livelihood workload on the health of the mother and child,	
CBandW Q-3.3	What type of livelihood work does mother do _____	
CBandW Q-.3.1	Child do_____	
CBandW Q3.3.2	Head of HH (male) do _____	
CBandW Q-4	Do they work at home after coming from workplace?	
CBandW Q-5	If mother is at work, who takes care of the younger children at home?	
CBandW Q-6	If child is sick, what you do or family does normally?	
CBandW Q-7	What a family does, if sick child is not getting better for a long time?	

FOOD SECURITY AND LIVELIHOOD		
FSL Q-1	Who is responsible for livelihood (earning HH) ?	Quant Father, mother, child
FSL Q-2	What are the reasons that community members mainly depend upon unskilled labor?	Quant
FSL Q-3	Do you have any other livelihood source as well?	Quant
FSL Q-4	What are the other possible income generation source that can be promoted in your community/Thar?	Probe
FSL Q-5	Who decides the expenditure pattern of income at HH level?	Quant
FSL Q-6	How much money do you usually spend on drugs, alcohol, social events and telecom?	Quant
FSL Q-7	What are the reasons that community members spend lot of money on unnecessary needs?	Probe
FSL Q-8	Why disruption of food and livelihood sources are common in April to August?	-Quant MAHFP -Please develop a seasonal calendar in first FGD
FSL Q-9	What is your strategy to cope with this situation?	Quant
FSL Q-10	What are the reason of decreased crop production from the past year?	
FSL Q-11	Do you have livestock?	
FSL Q-11.1	Which one?	
FSL Q-11.2	Why have you preferred to keep this livestock?	
FSL Q-12	What do you do with your livestock?	
FSL Q-13	What are reasons of shifting from bigger to smaller livestock?	Also probe if agriculture is the reason where no pastoral land, uprooting of shrubs with tractors, costs,
FSL Q-14	What is the rearing cost of livestock?	

FSL Q-15	Who mainly takes care of it and how much time needed to care off?	
FSL Q-15.1	If female, prob. Why?	
FSL Q-16	Total investment on per livestock?	
FSL Q-16.1	And total income/profit earned?	
FSL Q-16.2	(Input and output total cost analysis)	
FSL Q-17	Output: amount of milk production and amount of fuel produced?	
FSL Q-18	How can milk production be increased and used for earning	
FSL Q-19	Reason and trend of selling livestock?	
FSL Q-19.1	Sale price and its usage breakup?	
FSL Q-20	Why you are not being able to store food for a longer period?	
FSL Q-21	Why you are not being able to store fodder for a longer period?	
FSL Q-22	Zoonotic disease, does livestock at home contaminate human food/water and cause diseases??	Probe how livestock is handled at home and community
FSL Q-23	What do you recommend to improve livestock survival, (promote Livestock as the main livelihood source)	For response plan
FSL Q-23.1	What do you recommend to improve financial output from Livestock (milk, processed milk or bi-products, meat and hides)	
FSL Q-24	What are the reasons of deaths or loss of productivity in live-stocks?	Water, temp, disease, fodder, shift from livestock to agriculture..
FSL Q-23	Are vaccines available for (Zoonotic communicable diseases?	
FSL Q-24	Are veterinarian doctors available in the area?	
FSL Q-25	Water consumption per livestock and its source of water?	
FSL Q-26	What is the average worth in PKR of cow_____ sheep_____, camel_____	
FSL Q-26.1	During distress selling What is the average worth in PKR of cow_____ sheep_____, camel_____	
FSL Q-27	Labor on daily wages and medical absence from work may cost earning problem and cost of medicines at hospital?	
FSL Q-27.1	Is it so? Probe.	

Agriculture:		
Agr. Q-1	How much cultivable land do you own?	Quant
Agr. Q-1.1	Average How much land (non-ownership) do you cultivate on share-cropping basis?	
Agr. Q-1.2	Mono cropping?	
Agr. Q-1.3	Which crops do you cultivate usually? Probe	
Agr. Q-2	Do you have seed bank available?	
Agr. Q-2.1	Do you consume these seeds in any situation?	
Agr. Q-2.2	Why or why not?	
Agr. Q-3	Do you get enough water for cultivation?	
Agr. Q-4	How does water scarcity in your community impact Crop production	Crop failure which leads to lack of food availability and lack of agriculture labor opportunities?
Agr. Q-5	What is the preferred Livelihood source that has to be improved at large in the future and why?	Compare between agriculture, livestock, skill development
Agr. Q-5.1	How can the suggested improve the life ?	
Agr. Q-6	Do you think depanding on 1 livelihood source is enough in such a disaster prone area.	IGA, Skills , formal an vocational eduction, embriodary etc…..
Agr. Q-6.1	Probe what alternate Livelihood source they recommend and how can that be capitalized	
Agr. Q-7	Have you received any advanced agricultural equipment's/ training/vehicles, which can enhance your crop production?	
Agr. Q-7.1	If yes what is?	
Agr. Q-7.2	Who gave it to you? Probe details.	
Agr. Q-8	Do families have enough food to eat throughout the year?	Quant
Agr. Q-9	What type of food you usually eat at home?	Quant
Agr. Q-10	What is main source of food supplies?	Quant
Agr. Q-11	From where you get the food?	Market, Agriculture, trade
Agr. Q-12	Is that income sufficient for all your expenses?	
Agr. Q-13	Does government provide assistance to cover your expenses?	
Agr. Q-13.1	If yes, what type?	
Agr. Q-14	Is there a market nearby?	
Agr. Q-14.1	How far?	
Agr. Q-15	Is food easily available in market?	
Agr. Q-16	Can you easily afford to buy food from market?	
Agr. Q-17	Does the mother know about balanced diet and dietary diversity	
Agr. Q-18	Does the mother have power of deciding which type of food is to be purchased ?	
Agr. Q-18.1	If no who decides?	
Agr. Q-19	Who buy food from market for cooking purpose?	
Agr. Q-20	Do women go to market?	
Agr. Q-20.1	If yes, for what purposes?	
Agr. Q-20.2	And how often?	

Agr. Q-21	Is there a shop in village?	
Agr. Q-21.1	What does it sell?	
Agr. Q-22	Do families migrate from this village?	
Agr. Q-22.1	If yes, when and why? If no, skip next two questions	
Agr. Q-23	If yes, where do they go usually?	
Agr. Q-23.1	And what they do?	
Agr. Q-24	When they come back?	
Wash		
WASH Q-1	What is your main source of drinking water?	
WASH Q-1.1	Is it safe for drinking? (Quant)	
WASH Q-1.2	How to you define safe water___ protected water___	
WASH Q-1.3	Observation: Observe water storage is safe or not? How long does it take to fetch water? Who is responsible for fetching water? From where does the water come for cooking?	
WASH Q-2	Is water easily available in your community?	
WASH Q-2.1	If yes, how?	
WASH Q-2.2	And if no, why?	
WASH Q-3	What are the main problems regarding water in your village?	
WASH Q-4	Observation: Observe the distance between drinking water/cooking place with the laterine/human defecation place/livestock etc?	
WASH Q-5	Have you felt the change in climate in recent years?	
WASH Q-5.1	Any change in rainfall?	
WASH Q-6	Have you noticed any decrease in water table during the past few years?	
WASH Q-6.1	If yes, what is the reason?	
WASH Q-6.2	What do think about population density?	
WASH Q-7	Impact of Investment in rain water harvesting and tankers?	
WASH Q-7.1	Was it worthwhile or not?	
WASH Q-8	Compare the communal water schemes and HH water schemes?	
WASH Q-9	Where does all the village garbage go?	
WASH Q-10	Do you have sanitation system in village?	
WASHQ-10.1	If no, is there a need?	
WASHQ-10.2	Why and why not?	
WASH Q-11	In which situations do you usually wash your hands and why?	
WASH Q-12	During emergencies like flood and drought, how you cope with the situation?	
WASH Q-13	Why is open defecation prevalant?	
WASHQ-13.1	And why not in protected latrines?	

Gender		
GD Q-1	What is the pattern or order of distribution of food in HH?	Inequality leads to poor woman feeding (eat at the end), no extra food for PLW and no priority for PLW health care. Probe.
GD Q-1.1	Why?	
GD Q-2	Is there being extra care given to women when they are pregnant/Lactating/ ill?	
GD Q-2.1	Why or why not?	
GD Q-3	Are the girl and boy child treated differently in your society?	
GD Q-3.1	If yes why	
GD Q-4	Are girls and boys treated differently for feeding?	
GD Q-5	Are girls and boys treated differently for health care?	
GD Q-6	Are girls and boys treated differently for education?	
GD Q-7	Are boys and girls eating same food throughout the year?	
GD Q-8	At what age normally girls get married?	Poverty leads to early marriages, viscous cycle of malnutrition and infant feeding problems. Probe.
GD Q-8.1	Probe: Why? If early marriage.	
Resilience		
R Q-1	How did the recent shocks impact your life	(Livelihood, Human and financial capital)

d) SUMMARY OF FINDINGS, CATEGORISATION OF RISK FACTORS and FINAL RECOMMENDATIONS

The purpose of this exercise is to involve community members in the categorisation of risk factors with regards to their impact on the occurrence of malnutrition in their community. In other words, community members will be encouraged to rank identified risk factors from most problematic to less problematic in relation to their link with malnutrition. In addition, they will be encouraged to identify risk factors, which they believe are likely to change first, if properly addressed/supported.

Before the actual ranking exercise will be conducted, the study team will summarise their findings, which they collected during the first 5 days in the community with the use of pre-prepared flashcards. After the presentation of all identified risk factors, community members will be asked to validate the findings and the team's interpretation of community's main challenges in relation to malnutrition. If certain elements are deemed not representative of the community, the study team will modify the interpretation, as necessary.

Afterwards, the participants will be invited to rank identified risk factors from most problematic to least problematic in relation to their link with undernutrition. With the help of pebbles, they will be asked to give three pebbles to factors, which have a major impact on child undernutrition, two pebbles to factors, which have an important impact on child undernutrition and one pebble to factors, which have a minor impact on child undernutrition in their community. They will be visually aided by photos of undernourished children, which were previously used during focus group discussions, in order to keep the focus on this health issue rather than other main challenges that they face in their community.

All exchanges among participants with relation to this rating exercise and/or their justification of their rating will be duly noted. All participants will be encouraged to contribute and any disagreements will be rightfully addressed. The aim of this exercise will be to categorise risk factors into three groups, which all participants will agree with.

Once this stage is completed, the participants will be asked to pick few risk factors, which they think explain most cases of undernutrition in their community, and create a main pathway.

Alternatively, if a consensus on three categories of risks proves difficult, the study team will give three pebbles to each participant and will ask them to assign a pebble to each risk, which they consider the most important in relation to undernutrition in their community. Once all pebbles are counted, risk factors will be divided into three categories. The study team will ask participants to validate them and reach a consensus on 4-5 factors, which have a major impact on undernutrition in their community.

After the categorisation of risk factors, they study team will present solutions, which the community identified during focus group discussions to address these challenges. A validation, followed by a prioritisation of activities, will be sought.

e) MAPPING OF INTERVENTIONS

S.no	Name Of Organization	Donor	Current Projects In Tharparkar
1	AAP Health	PandDD	Early learning and stimulation for children, 0-3 years of age. CMAM/nutrition specific activities to reduce stunting.
2	AAP Agriculture	GoS	- five color vegetable, fruit trees, goat distribution, poultry distribution, livestock services
4	FAO	CERF DFID USAID	CERF: Taluka Mithi (UC-Jouro, Vijuto, Posarko) Fooder distribution
			DFID: Taluka Diplo UC-Sobihar, Chachro UC-Kantio, Matrio Charan, Mithi UC-Ko-sarko, Diplo UC-Golhari: Kitchen gardening, Seeds distribution, Water reservoir construction
			USAID: Taluka Chachro (UC-Rajuro, Vijuto): fodder distribution,
			FAO: Taluka Nangarparkar (UC-Missri Shah, Tagusar, Satidera) FAO provide technical support in agriculture and livestock establishing LOS (Livestock open school) and WOS (Women open school)
5	Concern	DFID	DFID BDRP (Concern WV): Taluka Chachro (UC-Rajoro, Jhanji, Hirar, Tar Ahmed)-Buidling disaster Risk preparedeness and resilience Wash DRR, WASH facilities, CLTS and SLTS
6	SIF	SIF	WASH In Taluka Diplo (UC Jhirmirio and Talo Jaam) Community fisical infrastructure, awareness session, school sanitation facilities
7	Shifa foundation	WHO	Establishment of the Nutrition stabilization centers
8	Nutrition International	NI	Universal Salt Iodization programme
9	WFP	USAID	To start TSFP in all Tharparkar
10	HANDS	NSP	CMAM programme
		WFP UKAid	WFP: Nutrition and WASH Project In Taluka Dahili (Community mobilization, IYCF session, provision of MAM supplements),
			UKAID: Behavior change communication sessions on ODF and tree plantation Taluka Islamkot BCC, CLTS Tree Plantation
11	TRDP	PPAF	Tahafuz Education (Enhancement of literacy) and Local support organization Projects in different tehsil of tharparkar
		GoS and UNDP	- SLMP: Kitchen Gardening, Farmers Training, Solar water pumps for irrigation, sprinkler irrigation, SLM Fund, finsh pond, backyard poultry,
12	SAGPL	World Bank-GoS	-Livestock Services (vaccination, de-worming, treatment), promotion of dairy through chiller installation, awareness sessions on livestock management, market linkages (in Islamkot, Mithi, Kaloi and Islamkot Taluka)
13	Sami Foundation	Govt.	Rapid Fund Project, FSL in Umerkot and Election commission government project (registration of Non CNIC holder) in Tharparkar

S.no	Name Of Organization	Donor	Current Projects In Tharparkar
14	RDF	BDRP	Wash and FSL integrated Project in UC Rajoro,Janjhi,Hirar,Tar Ahmed Tehsil Dahili and Chachro, UC Satidera, Misri Shah, Tigusar Tehsil Nangar Parkar District Tharparkar Climate smart agriculture, CLEWs, drought resilient demonstration plots SLTS, CLTS
15	FRDP	Concern Rapid fund	Livestock fooder and cash assisstance, Taluka Dahli UC-Dadro, Soler water powered pumps, Hygiene Sessions (Community and School), Sanitation facilities at community level,
16	AWARE	UNOCHA	WASH and FSL integrated Project in UC Hirar, Charnore, Janjhi and Tar Dos of Tehsil Chachro Emergency Intervention Sanitation facilities, water sources, hygiene sessions, Water reservoirs, Dug wells
17	Sukkar Foundation	Concern Rapid fund/ USAID	Sindh Drough Resilience Project (SDRP) in 20 UCs of Tharprkar District. Actiities: Climate Smart Agriulture, Demonstration Plot, Kitchen Gardening, CLEW Training, Skills Enhancement, Fruit trees Fodder distribution, Malnohrveena, WASH, Livelihood, Nutrition Sanitation facilities at community level, Water sources
		Naya Jeewan	Livestock Insurance, LMT session, Vaccination of livestock
18	BISP	WFP	Social safety net: top up in the BISP amount.

f) Future programmatic recommendations

The findings of the Link NCA were shared with the Technical experts at the final provincial workshop on the 17th of October at Karachi. The sectoral experts were given the opportunity to:

1. To **review on-going interventions** in the domain of nutritional security in Tharparkar in relation to Link NCA's findings; and

2. To **identify gaps and/or room for improvement** of current programming in Tharparkar in order to improve its relevance and effectiveness.

The participants reviewed the current interventions and developed recommendations for current and/or future programming in Tharparkar **in light of the Link NCA study findings**. The participants provided the following sectoral inputs for context specific programming in order to improve nutrition security programming at Tharparkar.

During the study the community gave some suggestions and recommendations based on the causal pathways that were developed with them. When the community was asked to brainstorm on the future income generating opportunities they agreed on various options. They wanted to reduce their dependency on seasonal Agriculture/LS labor opportunities while shifting towards skill development centers where they can learn more about innovative IG domains and link them with potential markets. The community also expressed more need towards improving the education systems for the future generations.

The community expressed their preference to uplift the agriculture sector at the district through promotion of agriculture activities, improved technologies and irrigation water. If triangulated with the drought conditions this is not recommended as there are less chances of agriculture survival in the future. Rather there needs to be a focus on diversity of the income generating activities and reduce their dependence on agriculture which is diminishing due to the drought conditions.

Cash based interventions should be implemented for provision of fodder during the drought period. For example, cash plus interventions particularly focus on women and other vulnerable households in collaboration with BISP or additionally, conditional cash-based interventions focusing on food security nutrition and livelihood. Cash plus interventions particularly focusing on women headed and other vulnerable households in collaboration with BISP are also viable options.

Table 16: Recommendations for future programming at Tharparkar

Causal factors	Possible interventions	Remarks	Responsibility
Health and Nutrition			
Poor health services	Increase number of heath staff	■ Need to hire and train more LHWs/CHWs and other medical professionals as per geographical distribution with good coverage in all peripheries. ■ Increase number of Community Based Midwives (CMWs). Provide fast track education and capacity of local women	Department of Health and development partners (Where applicable)
	Continuous capacity building of existing and prospective Health staff	good capacities of health professionals for health and nutrition service provision	Department of Health and development partners (Where applicable)
	Provision of transportation services to improve access to health services	Transportation of patients to and from services; likewise, transportation of outreach workers to villages.	Department of Health and development partners (Where applicable)
	Blanket CMAM/IYCF and NSC services	Continue with stable funding/resources at all UCs	Department of Health and development partners (Where applicable)
	Distribution of LNS to PLWs/U2s	For stunting prevention, supporting 1000 day window	Department of Health and development partners (Where applicable)
Lack of Family planning services	Family Planning services to be integrated into the health system	both at facility and outreach service, provision of good ANC/PNC and FP services	Department of Health and development partners (Where applicable)
Causal factors	Possible interventions	Remarks	Responsibility
Food security and Livelihoods			
Drought affecting Livelihoods	Customizing the planning tools of agriculture/livestock with climate change (i.e. climate smart seasonal calendars)	Training of all the line department staff on climate smart agriculture and revision of district level planning tools	Department of Agriculture and Livestock with support from Development partners
	introduce drought resilient livestock breed		Department of Livestock
	Carpet Uniform and broader coverage livestock insurance of the district	family having 40 small and large animals	Department of Livestock with support from Donors
	Appropriate vaccination and deworming of livestock	with improved coverage	Department of Livestock
	Range land management	Focus on promoting: citrus orchards, jujube, moringa, Dates.	Department of Agriculture

Causal factors	Possible interventions	Remarks	Responsibility
Food security and Livelihoods			
Poor diversity of sources of incomes for HH	Promoting backyard poultry farming	The families, who already are rearing some poultry, shall be prioritized.	Department of Livestock
	Camel milk enterprise development	Formation of Camel farmers common interest groups	Department of Livestock with support from Donors/Development partners
	Promoting fodder enterprises/small business in rural areas	One shop at least in each village	Department of Agriculture/Livestock with support from Donors/Development partners
	Wool refining and business enhancement	Wool business/actors first shall be identified	Department of Livestock with support from Donors/Development partners
	Promoting bee keeping in the feasible areas	Supporting rural families to establish bee keeping centers in villages.	Department of Agriculture with support from Donors/Development partners
	Promoting sea specie fish farming in the feasible areas of the district	The areas where underground water is brackish, shall be prioritized	Department of Livestock with support from Donors/Development partners
Poor coping strategy	Cash transfers during emergency period	Cash transfers can be conditional to attend any health/nutrition/education related intervention.	BISP , Donors and Development partners
Wash			
Poor access to water	Provision of safe drinking water	Solar water extraction provision of safe drinking water Promotion of water purifying techniques	Public health engineering department with support from development partners and donors
Poor sanitation and Hygiene practices	Hygiene promotion, CLTS, SLTS, MHM and BCC	Sanitation marketing Open defection free initiatives promotion of safe drinking water methods Promotion of appropriate hand washing	Public health engineering department Development partners with support from donors
	Improvised waste Management systems	Waste management and WASH in health facilities, Waste management treatment plants, Water policy and waste management policy implementation in Rules of businesses of Health and PHED	Public health engineering department + Department of health. Development partners with support from donors
	Wash In Nutrition strategies	Wash programs to be integrated in existing and future Nutrition programs	Wash and Health/Nutrition development partners

Table 17: Qualitative findings summary of the villages

Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
UC	Nangarparkar	Veerawah	Kantio	Jhirmirio
Village	Ghartiari	Veeal	Mitrio mor	Jhirmirio
GAM	41.5%	37.5%	13.6%	12.5%
Distance from Mithi City	150	120	50	40
Livelihood Zone	Agro-pastoral and live-stock (Rain-fed)	Agro-pastoral and Live-stock (Rain-fed)	livestock (Rain-fed)	Irrigated zone
Ethnicity	Hindu	Mix of Muslim and Hindu	Muslim	Hindu
Health and Nutrition	■ Access to health facilities is difficult ■ Lack of staff and medicines at HF (Particularly Female staff) ■ Lack of FP services ■ Males are the usual decision makers and Husbands do not usually allow women to visit HFs ■ Families prefer Home based deliveries through TBAs ■ No Regularity of ANC/PNC visits ■ Early marriages / Pregnancies, ■ High morbidity rate ■ Mothers take advices from Mothers/Grand mothers and mostly follow old customs and Taboos ■ Lack of knowledge and awareness, particularly regarding dietary Diversity	■ Same as Ghartiari	■ Physical access to Health facility is not in issue, but still mostly pregnant women perform home based deliveries due to local customs and lack of awareness. But there are recent positive changes in terms of institutional deliveries. ■ Irregular ANC/PNC 2-3 visits mostly due to lack of female specialized HR and medicines ■ No FP practices and high fertility rates due to lack of FP medicines and HR at hospitals. ■ Early marriages and early pregnancy increase the risk of LBW and premature babies. ■ Lack of knowledge about danger signs in pregnancy, delivery and PNC. ■ Children are immunized on the door step, but the community does not complete the required schedule. ■ Low LHW coverage and CMAM program in the area.	■ Physical access to Health facility is an issue (far away), but still mostly pregnant women perform one or two visit to DHQ for routine checkup and ultra sound analysis. ■ Others are same as Mithriomor
Mental Health	■ Mothers are mostly stressed, Physical violence on wives by husbands ■ high work burden during migration season	■ Mothers are mostly stressed due to less amount of food available ■ high work burden during migration season	■ Mothers are mostly stressed due to less amount of food available ■ high work burden during migration season	■ Mothers are mostly stressed due to less amount of food available

Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
UC	Nangarparkar	Veerawah	Kantio	Jhirmirio
Village	Ghartiari	Veeal	Mitrio mor	Jhirmirio
Care Practices	■ Improper IYCF practices ■ Mother can't take care of child due to high workload (livelihood, HH chores, water fetching, livestock care etc), ■ No special care and food for children and PLWs ■ Lack of care from husbands for children and mothers ■ Prefer traditional healing practices	■ Same as Ghartiari	■ Early Initiation of BF and exclusive BF is a problem due to local taboos and customs. ■ Complementary feeding started earlier (4 months) or too late at (8–9 months), but still mothers Breast Feed their children up to two years of age. ■ Lack of knowledge about diet diversity and balance diet. ■ Due to more adherence Muslim teachings in this village there was Low work burden on women in this village as compared to other parts of the district, mothers have enough time to care of their children. Fathers took responsibility to take care of their sick children and PLWs. ■ Prefer traditional healing or self-medication, if situation not improve then immediately seek care of specialized doctor at DHQ.	■ Early Initiation of BF and exclusive BF is a problem due to local taboos and customs ■ Complementary feeding started on time, but not appropriately. Lack of knowledge about diet diversity and balance diet. ■ Lack of knowledge about IYCF practices and mother seeks advice of grandmothers and TBAs. ■ Due to high work burden on women, mother did not properly take care of children. Elder children or grandmothers mostly look after the younger children. Somehow male care for sick children and PLWs. ■ Prefer traditional healing or self-medication, if situation not improve then immediately seek care of specialized doctor at DHQ.

Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
UC	Nangarparkar	Veerawah	Kantio	Jhirmirio
Village	Ghartiari	Veeal	Mitrio mor	Jhirmirio
Food Security and Livelihood	■ Mostly mothers supports in livelihood earning, Men utilizes major part of their income on unnecessary expenses (Drugs, Alcohol, Cigarettes, Ghutka, Supari etc) ■ Less fodder, Improper storage facilities for food and fodder, Poverty, Unjust wages for labor, Lack of diversified sources of income (Unskilled labor), Water scarcity ■ Completely rain dependent area and rainfall has decreased causing Decreased crop production, Migration to other districts for livelihood and pastoral land/ fodder, ■ Environmental contamination is high due to livestock freely roaming in the house	■ Same as Ghartiari	■ In this Muslim community mostly fathers are responsible for livelihood earning and mothers have enough time to care for children. ■ Some community member have Govt. jobs or own business, which give them opportunity for better survival in drought situation ■ Mostly people have adopted smaller livestock as they are easy to feed, sell and protect from high losses. ■ Lack of vaccination increase the risk of livestock diseases, deaths and community adopt negative copping strategy distress selling of livestock.	■ Lack of diversified sources of income (Unskilled labor), Lack of fodder for livestock mostly Hindu communities migrate to neighbor districts ■ Mothers mostly support in livelihood earning, Male Hindu community majority utilize their income on unnecessary expenses. ■ Under ground water table is high in Tehsil Diplo compare to Tehsil Chachro. Some community members with support of NGOs installed solar water pump to irrigate and cultivate their land and grow local crops. But some community still depends on rainfall. ■ Decreased crop production and fodder for livestock and lack of storage capacity worsen the situation. ■ Lack of vaccination increase the risk of livestock diseases, deaths and community adopt negative copping strategy distress selling of livestock.
WASH	■ Unprotected water sources (Open wells), Unsafe drinking water and no water treatment, Recent decrease in water table ■ Garbage is dumped near house, No sanitation system, Open defecation is prevalant, ■ Community can barely wash hands due to scarcity of water (Use soil/ash for hand washing), Non availability of latrines	■ Same as Ghartiari	■ This Village had a good access to both protected water Pipe lines and protected well water. ■ Some community members used pit latrines due to Islamic teachings and washing hands with soap. But still environmental hygiene, open defecation and sanitation are problem in the area.	■ This Village has a high water table and approximately all community members have access to safe drinking water, every 4-5 houses have protected hand pumps installed by INGO/NGOs and private donations. ■ Environmental hygiene, open defecation and poor sanitation prevail. ■ Hand washing practices and personal hygiene is also a common problem due to the lack of awareness.

Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
UC	**Nangarparkar**	**Veerawah**	**Kantio**	**Jhirmirio**
Village	**Ghartiari**	**Veeal**	**Mitrio mor**	**Jhirmirio**
Gender	■ Boys are preferred over girls for feeding, ■ Mothers eats in the last (If food is left),	■ Same as Ghartiari	■ Less gender differences due to the Muslim teachings. ■ Women do not usually work, if they do they only do in-house embroideries	■ No preference been given to boys over girls in food, education or health problems. ■ But due to unavailability of girl's school in the area, girls are not allowed to go far away for education.
Resilience and Risk management	■ Low resilience to drought, Less rainfall, Lack of diversified sources of income	■ Low resilience to drought, Less rainfall, Lack of diversified sources of income		
Education	■ Very low literacy rate which is contributing towards poor IYCF and care practices, lack of knowledge about health and balanced diet	■ Very low literacy rate which is contributing towards poor IYCF and care practices, lack of knowledge about health and balanced diet	■ Very low literacy rate among female which contribute towards poor IYCF and care practices, lack of knowledge about health and balanced diet	■ Very low literacy rate among female which contribute towards poor IYCF and care practices, lack of knowledge about health and balanced diet
Governance	■ Basic health, education and road facilities available nearby but they can't afford to avail them and some people avoid using them due to their customs of females not travelling alone.	■ Basic health, education and road facilities are available nearby but they can't afford to avail them	■ Lack of specialized HR at hospitals and schools (female doctor, LHV), low LHWs coverage, lack of equipment and supplies at HF,	■ Poor infrastructure of the local Health and education facilities. The families who can afford avail services at the Mithi city. ■ Lack of HR in BHU, CDs, Low LHWs coverage, lack of equipment and supplies in HF, poor infrastructures

Tehsil	Nangarparkar	Nangarparkar	Chachro	Diplo
UC	Nangarparkar	Veerawah	Kantio	Jhirmirio
Village	Ghartiari	Veeal	Mitrio mor	Jhirmirio
General Remarks	■ They have an issue of rigid behavior, they mostly follow old customs instead of switching there practices to the appropriate practices. ■ Poverty (Lack of diversified livelihood opportunities) which makes them more resilient to shocks. ■ As husbands are the sole decision makers so they don't follow family planning practices, ■ They also don't allow their females to go to the HF, ■ uses most of their income on unnecessary items, ■ Overload their females with on workload which affects both mothers and child health.	■ Same as Ghartiari	■ Rigid behavior following local customs and taboos. ■ Did not practice innovative solution and ideas for agriculture. ■ Male dominant community, female does not have right for decision making.	■ Rigid behavior following local customs and taboos. ■ Poor community, have no access to Govt. loan to install solar water pumps to irrigate and cultivate lands. ■ Open to accept new ideas for agriculture and livestock improvements. ■ Will welcome female education and ready to provide land for HF and female high schools.

Photo: Azam Afridi

Endnoten

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