Sindh

Drought Needs Assessment Report

January
2019

International Organization for Migration (IOM)
Organisation Internationale pour les migrations (OIM)
Organización Internacional para las Migraciones (OIM)

Food and Agriculture Organization of the United Nations

unicef

WFP
World Food Programme
wfp.org

World Health Organization

ACTED

HANDS

UKaid
from the British people

Sindh Drought Needs Assessment (SDNA) Report

January 2019

Contents

Acknowledgment

The Sindh Drought Needs Assessment (SDNA) was designed and implemented by the Natural Disasters Consortium (NDC) in eight drought affected districts (Tharparkar, Umerkot, Sanghar, Jamshoro, Badin, Thatta, Dadu and Kambar Shahdakot) of Sindh. The NDC is led by the International Organization for Migration (IOM), and also includes the Food and Agriculture Organization of the United Nations (FAO), United Nations Children's Fund (UNICEF), Health and Nutrition Development Society (HANDS) and the Agency for Technical Cooperation and Development (ACTED). The World Food Programme (WFP), the World Health Organization (WHO), United Nations Office for Coordination of Humanitarian Affairs (OCHA), and the United Nations Population Fund (UNFPA) also provided technical support for the assessment.

The NDC would like to acknowledge the contribution of Mr. Syed Salman Shah (Director General), Mr. Muhammad Ali Shaikh (Director Operation) and Mr. Asif Jan (Deputy Director) of the Provincial Disaster Management Authority (PDMA-Sindh) for their support, technical advice and inputs on design and execution of assessment, and completion of the assessment report.

The NDC would also like to acknowledge the financial support offered by the Department for International Development (DFID) without which it would not have been possible to conduct this assessment.

Finally, and most importantly, we would like to thank those families who spent time in answering the survey questions, without them this report would not have been possible.

For feedback, queries or comments concerning any aspect of the survey or this report, please contact:

Ajmal Jahangeer (Statistician, Information Management Unit, FAO, Raja.Jahangeer@fao.org)

Shehryar Rashid (Monitoring & Evaluation Coordinator, IOM, shrashid@iom.int)

Executive Summary

The Natural Disasters Consortium (NDC) comprised of IoM, FAO, UNICEF, ACTED and HANDS conducted Sindh Drought Needs Assessment (SDNA) in eight districts of Sindh, namely, Tharparkar, Umerkot, Sanghar, Thatta, Badin, Jamshoro, Dadu and Kambar Shahdadkot. The World Food Programme (WFP) and World Health Organization (WHO) also provided technical support for the assessment. The detailed assessment was conducted to assess the impact of the drought on agriculture (crop cultivation, production, water availability and livestock), livelihoods and food security, access to water and sanitation and hygiene practices of the households and communities and to provide recommendations to the Government of Sindh, NDC partners, and other decision/policy makers to prioritize actions (short, medium and long term) in relevant sectors and geographic areas to address immediate needs, build back better and increase future resilience to drought.

The assessment used both quantitative and qualitative data. The data was collected from 1,229 households located in 69 sampled drought notified revenue villages (Dehs) of the eight districts.

Agriculture

On average, the surveyed households in the drought areas own 3.1 acres of land whereas they cultivate on average of 2.8 acres only. Of the surveyed households, 42% own cultivable agricultural land, whereas 53% cultivate land.

Compared to 2016-17 seasons, cultivation area (measured in acres) for wheat reduced by 17% in 2017-18, rice by 70%, cotton by 16%, cluster beans by 30%, millet by 38% and pulses by 45%. Compared with the 2016-17 agricultural season, overall crop production (measured in maunds) for wheat reduced by 23%, sorghum by 33%, rice by 35%, cotton by 18%, cluster beans, millet and sesame each by 83% and pulses by 95%.

Own production of cereals for household consumption was only sufficient for about 2.8 months.
Overall, 50% of farming households reported water not being available at all compared to last year (2017) for agriculture, 30% reported less water availability, 7% reported water availability to some extent, while 13% reported less/no shortage of water. Water scarcity is more severe in desert/arid areas.

The three major problems faced by farming households as they reported are: lack of water for crop cultivation, lack of access to high yielding variety seeds and lack of access to fertilizer. The farming households indicated the need for irrigation water, quality seeds, fertilizer, new irrigation system, agricultural services and tools and credit to enhance crop production.

87% of surveyed households currently own livestock and 14% own poultry. 32% of the surveyed households currently own cattle, 12% own buffaloes, 69% own goats, 12% own sheep, 9% own camels, 21% own donkeys and 11% of surveyed households own poultry.

The current episode of drought has adversely affected the livestock population. Of the surveyed households who own livestock, 25% reported deaths of cattle during the past six months, 54% reported deaths of goats, deaths of sheep by 45%, deaths of buffaloes by 21%, deaths of camels by 20%, donkeys by 18%, whereas 57% reported deaths of poultry.

The surveyed households also reported sale of livestock/poultry to meet their food and other household needs (normal sale) and also due to occurrence/risk of disease, lack of water and fodder for livestock (distress sale). Overall, 40% of the surveyed households that keep livestock sold one or more cattle during the past six months, 31% sold one or more buffaloes, 65% sold goats, 55% sold sheep, 13% sold camels, and 7% sold donkeys and 29% sold poultry.

The main reasons for deaths of livestock reported by surveyed households are lack of fodder, livestock diseases and lack of water. The main problems reported by livestock holders are lack of fodder for animals reported by 96% of surveyed livestock holders, 89% reported lack of drinking water, 83% reported livestock diseases and 53% reported lack of shelter for animals. The top four items/supports required by livestock owners (in order of importance) are: straw/green fodder (reported by 93% livestock holders), drinking water (by 83%), vaccines/medicines (by 67%) and concentrated feed (by 35%).

Household Sources of Livelihoods/Income

The primary sources of livelihood/income of surveyed households include non-agricultural wage labor, followed by sale of agriculture produce (sale of food /cash crops/vegetables/fruits), and sale of livestock/livestock products. Agricultural wage labor as primary/secondary source of livelihood slightly increased in non-desert/arid areas whereas it reduced in desert/arid areas. Sale of agricultural produce reduced over six months preceding the survey, particularly more in desert/arid areas. Average monthly income of surveyed households from all income sources was PKR 10, 581 six months ago, whereas it was PKR 9,401 at the time of survey; hence, a reduction of 11%.

Food Consumption

The surveyed households are spending a major proportion of their income on food purchases and compromising on other basic needs (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 had either ‘poor’ or ‘borderline’ food consumption; 18% of households have ‘acceptable food consumption’, 41% have ‘poor consumption’ and another 41% have ‘borderline.

About 45% of the surveyed households travel within 10 km to buy food and non-food items from the nearest markets, 24% travel between 10 to 20 km, while 31% travel more than 20.

Food Security

Prevalence of food insecurity based on Food Insecurity Experience Scale (FIES) was quite high as 71% of the surveyed households are moderately or severely food insecure, whereas 32% are severely food insecure. Prevalence of food insecurity is higher among households in desert/arid areas and women headed households compared with households in non-desert/arid areas and men headed households.

The food security prevalence based on Consolidated Approach to Reporting Indicators of Food Security (CARI) shows that 46% of the surveyed households are moderately food insecure, whereas 36% are severely food insecure.

Migration

Overall 15% of the surveyed households reported migration of their members at some point during the last 6 months; 10% of the households performed routine seasonal migration whereas only 5% migrated due to the prevailing drought in Sindh.

Health and Nutrition

Access to healthcare is a critical issue in the surveyed districts. 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 travelling 19.8 kms to access healthcare. Morbidity among PLW and children under the age of 5 is very high in the surveyed households. A key finding was the prevalence rate for acute malnutrition among children aged 0-59 months, which was at a critical level in almost all drought affected districts except Dadu. Approximately 0.4 million children under five in eight districts are acutely malnourished and need emergency lifesaving nutrition interventions (CMAM).

Housing, Water and Sanitation

Most of the surveyed households live in “Katcha Houses” (40%), followed by “Chora” (34%), “Semi Pakka” (12%), “Pakka” (9%), and wooden houses (2%). Most of the surveyed households have one room (54%) house followed by two rooms (31%) and three rooms (10%).

Around three-fourths of the surveyed population had access to improved water sources, with 28% forced to rely on unimproved sources of drinking water. Lack of drinking water for livestock has also been reported as a critical issue. Majority of households from all districts except Badin walked over 30 minutes to access unsafe drinking water. More than four-fifths of surveyed population had no access to a household toilet and practice open defecation.

Recommendations

Agriculture (Crops Sector)

- 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.

- Introduction and up scaling of innovative and proven agricultural techniques including; bio-saline agriculture, soil management through proper fertilization, no-till, crop rotation, seed banks establishment, strip farming and mulching.
- Capacity building of farmers through Farmers Field Schools (FFS), Junior Farmer Field Schools (JFFS), Farmers Business School (FBS) and Women Open Schools (WoS).

Livestock

- 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.
- Setting up of temporary and permanent *mandies* (markets) for feed, fodder and animals considering de-stocking/relocation perspectives as well.
- Re-stocking of livestock to rebuild the livestock-based livelihood and provision of livestock shelters to the extremely vulnerable individuals once emergency is over.
- Trainings on livestock and poultry rearing, Livestock Farmer Field Schools (LFFS), LEGS training and provision.

Water Infrastructure

- Initiation of 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.
- Repair and rehabilitation of existing dug-wells, tarai, tobas. Provide alternative sources of low-salinity water; either through new wells, treatment of low-quality water or providing water from outside the drought-affected region is critical for agriculture.
- Conserve rainwater by checking surface run offs through structural mitigation measures and introduction of micro-irrigation systems.

Food Security

- Trainings on kitchen gardening, diet diversity, food processing and food safety
- Regular monitoring of food security, nutrition and livelihoods through seasonal surveys such as Livelihood and Food Security Assessment (LFSA)

Health and Nutrition

- Establishment of vaccination camps in drought affected areas
- Utilize kitchen gardening as a nutrition sensitive agriculture intervention
- More focus should be attained on community-based nutrition services as accessibility to health facility is identified as a core issue
- Coverage assessment (SQUEC/SLEAC) of existing CMAM services is recommended to understand the programmatic and geographical coverage with its effectiveness

Wash and Sanitation

- Increase access to improved sources of water for the highly vulnerable areas and priority affected districts/talukas through the repair/rehabilitation of non-functional water supply systems and water treatment plants
- Investment in the establishment of operation and maintenance systems that are community and/or local government owned as relevant and that address long-term sustainability
- Health and hygiene messages, including the importance of hand washing at critical times and the use of various household water treatment options, should form part of integrated into health and nutrition interventions in affected areas
- Sanitation, the access to household level toilets, should continue to be addressed through long-term development programs aimed at eradicating open defecation

Introduction

Pakistan is fraught with challenges of poverty, food insecurity and continuous natural and manmade disasters. As per the latest poverty estimates, 24% of Pakistan's population lives below the national poverty line; which includes 31% in rural areas and 13% in urban areas[1]. Further, nationally 38.8% of the population is poor based on multidimensional poverty index (MPI)[2]; 54.6% in rural and 9.4% in urban areas. The situation of food security also paints a bleak picture. The global report titled "Food Security and Nutrition in the World", a joint publication of FAO, IFAD, WFP, UNICEF and WHO, reports 20.5% of the total population of Pakistan was undernourished during the period 2015-2017.

Sindh province has higher incidence of multidimensional poverty. Overall, 43% of the population in Sindh is multi-dimensionally poor; rural population is 7 times poorer compared with urban population (76% in rural vs. 11% in urban areas). Based on a BISP census conducted in 2010/11, the incidence of poverty in Sindh is 44%. Further, as per draft findings of the Food Security Assessment conducted in 2015/16, prevalence of undernourishment is 22% in Sindh.

Sindh province is prone to multiple hazards: floods and drought. Although, Sindh has not experienced a major flood since 2015, but drought/drought like conditions have been prevailing since 2013 which have impacted on livelihood and food security in parts of the province. Particularly, drought has been a recurring phenomenon in the South-East and Western districts of the province.

The Sindh Drought Needs Assessment (SDNA) conducted by the Food Security Working Group (FSWG) in 2015/16 revealed that the arid zones in the West (Jamshoro and Dadu) and South-East (Tharparkar, Umerkot and Sanghar) were the most drought affected areas. These areas experienced moderate to severe drought during 2013-15 and reported livestock and crop losses.

In February 2017, a joint UN observation mission, comprising of staff members from the Provincial Disaster Management Authority (PDMA), Sindh, and UN agencies (FAO, WFP, UNICEF, IOM and OCHA), visited the desert areas of Sanghar, Umerkot and Tharparkar. The mission observed poor food security and livelihoods situation in the desert areas. Additionally, the communities reported reduced crop production, livestock losses and limited availability of water for domestic consumption and agriculture activities.

In April/May 2017, the FSWG Sindh carried out a Livelihood and Food Security Assessment (LFSA) in Tharparkar, Umerkot, Sanghar and Jamshoro Districts. The assessment findings revealed high livestock losses, inadequacy of own produced cereals, high malnutrition among children under the age of 5 and pregnant and lactating women (PLW), problems in accessing health care facilities/providers, poor housing status, poor access to improved water sources and sanitation, and very high food insecurity.

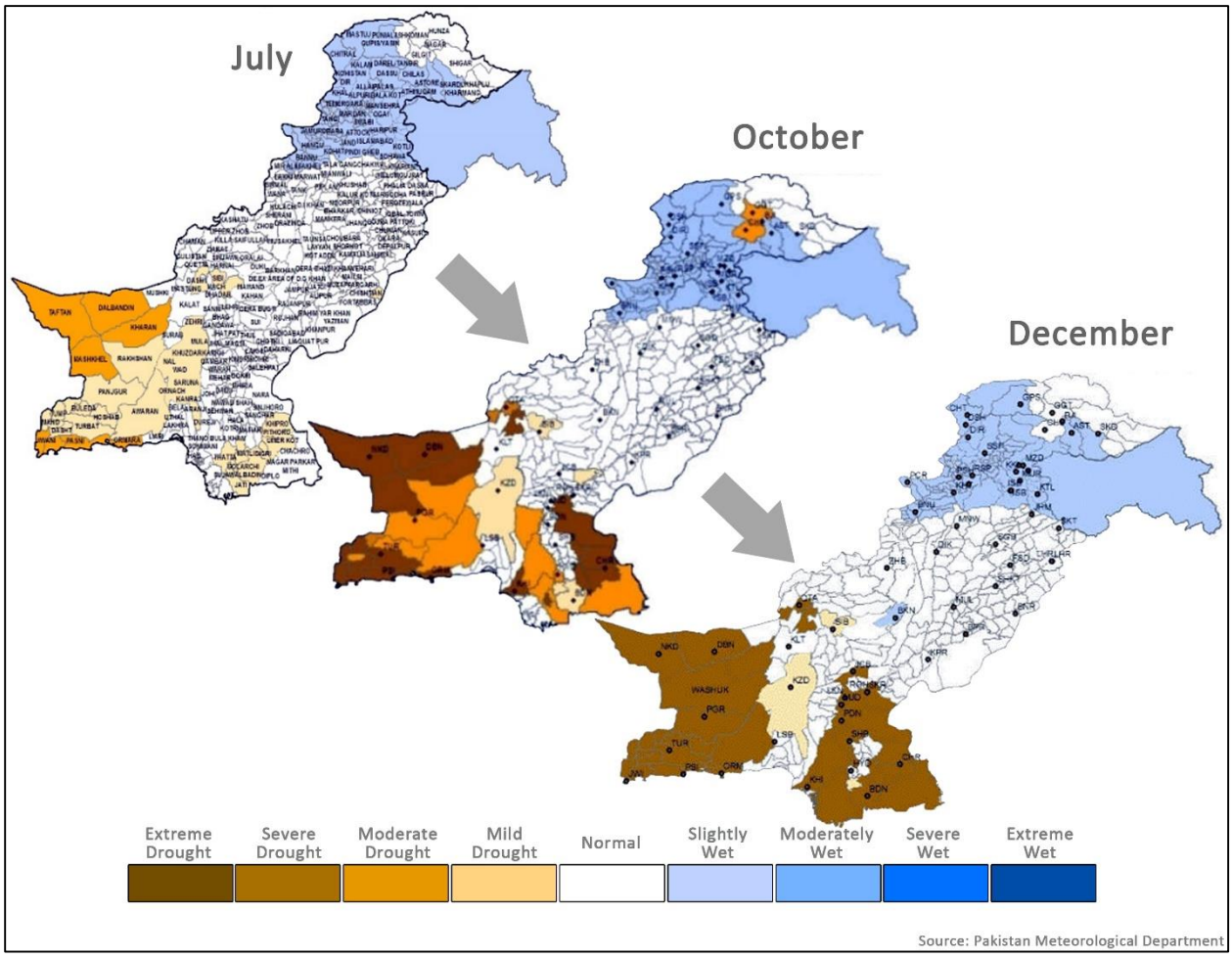
Furthermore, drought-like conditions have been prevailing recently in the south-eastern and western districts of

[1] National poverty line is based on cost of basic needs approach (CBN), which include both food and non-food items. The latest national poverty line was computed using data of Household Integrated Income and Consumption Survey (HIICS) conducted in 2015-16.

[2] MPI was calculated from 15 indicators related to education, health and standard of living. The latest MPI was based on Pakistan Social and Living Standards Measurement (PSLM) survey conducted in 2014-15.

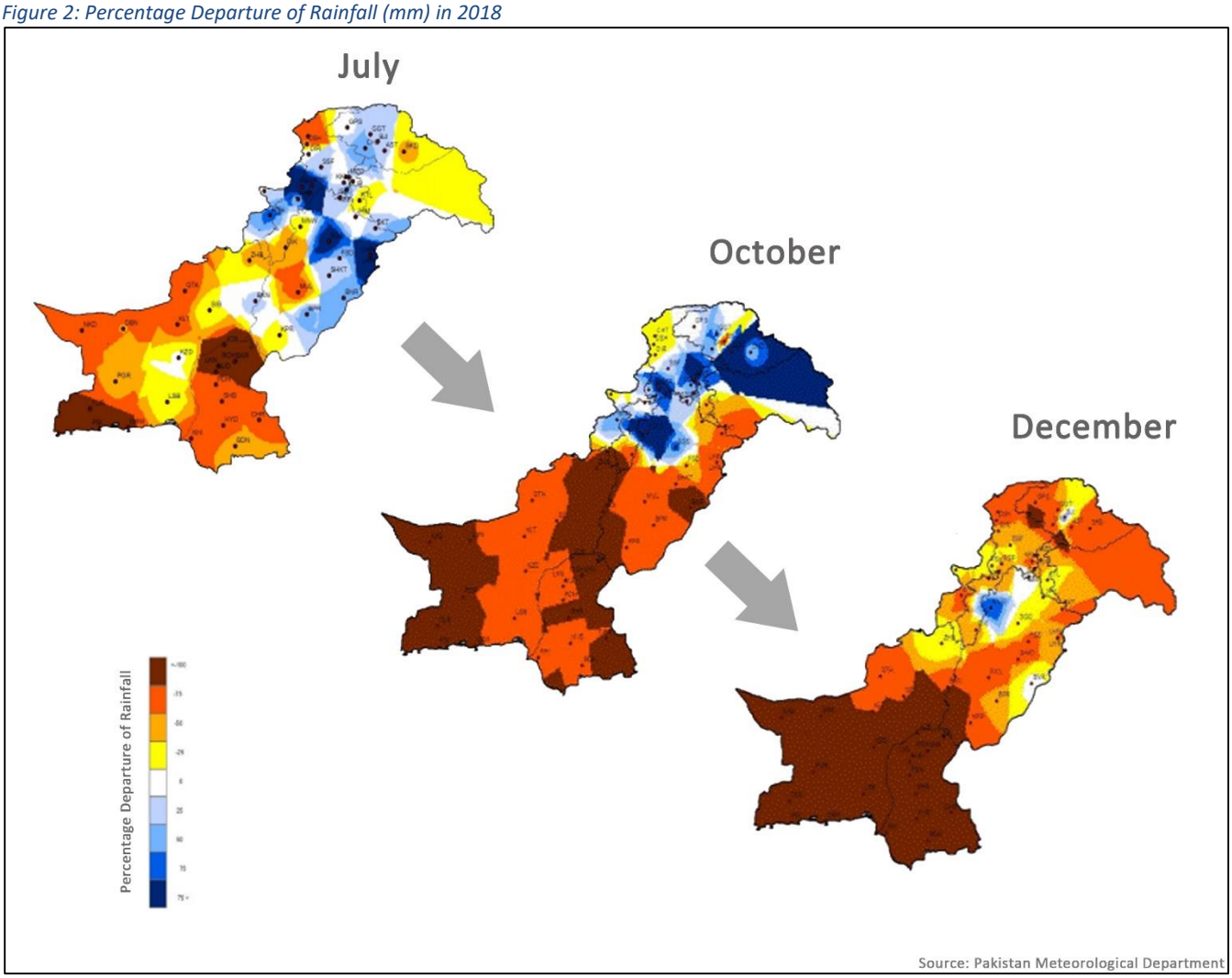
Sindh. The drought condition in Pakistan, reflected by Standardized Precipitation Index (SPI), for selected months in 2018 are shown in figure 1. Many districts in Sindh province are under 'moderate to severe' drought conditions due to no or very low precipitation and persistent dry conditions which have aggravated since July 2018. Further, departure from normal rainfall for selected months in 2018 (as shown Figure 2) is also very high in several parts of the country including Sindh and anomaly has increased in Sindh and Balochistan provinces[3].

Figure 1: Drought Condition in Pakistan in 2018



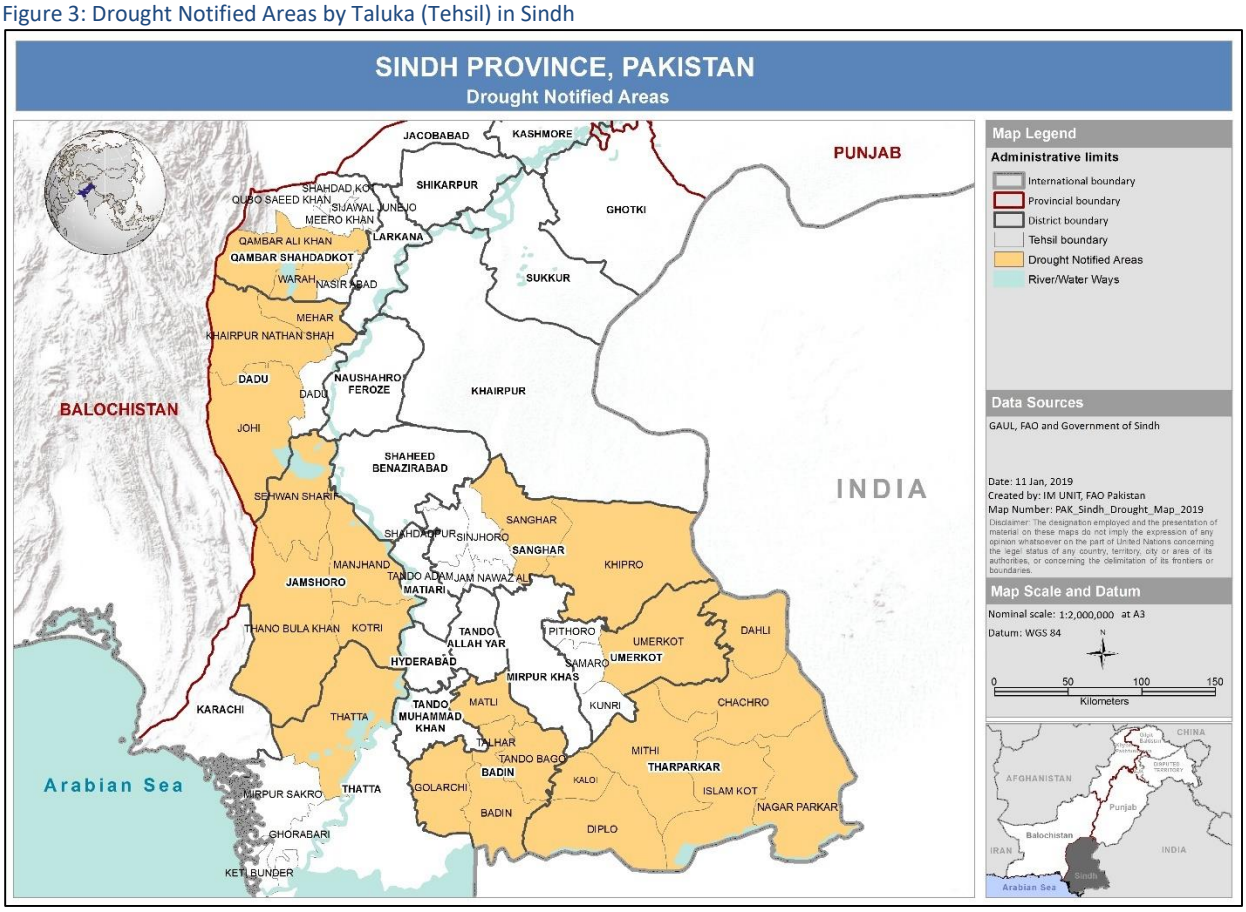
[3] The maps have been prepared by Pakistan Meteorological Department (PMD).

Figure 2: Percentage Departure of Rainfall (mm) in 2018



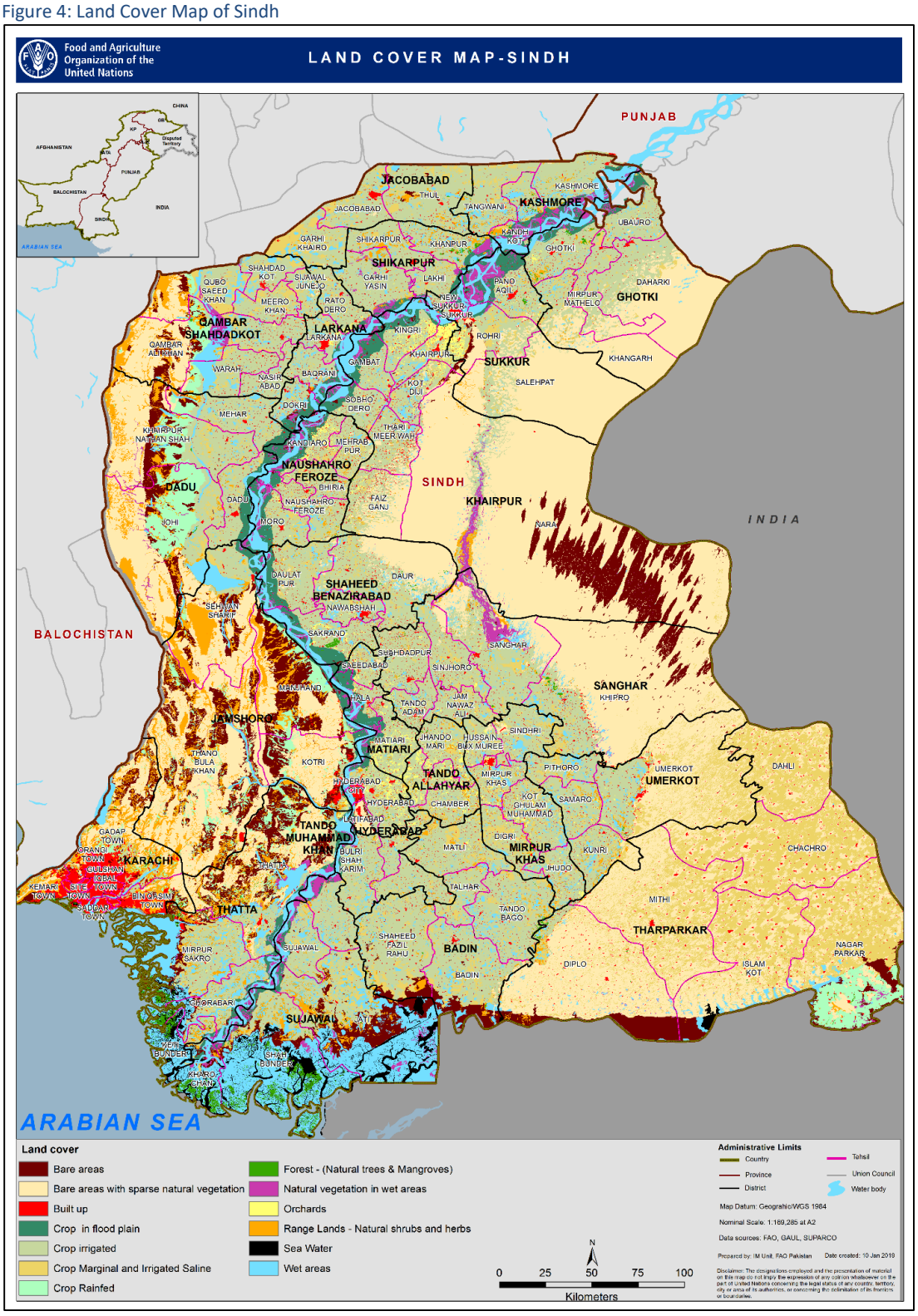
Considering lack/very limited rainfall during the last monsoon season (July-September 2018) and reports of the situation being aggravated further, the Government of Sindh in September 2018 notified 513 Revenue Villages (*Dehs*) as calamity/drought affected in 8 districts of Sindh Province, namely, Tharparkar, Umerkot, Sanghar, Thatta, Badin, Jamshoro, Dadu and Kamber Shahdadkot. The below map (in figure 3) shows the Talukas/Tehsils (sub-districts) in which these Dehs are located.

Figure 3: Drought Notified Areas by Taluka (Tehsil) in Sindh



The Land Cover Map of Sindh (Figure 4) indicates that most of the notified revenue villages (Dehs) are located in the desert/arid areas. Most of the drought affected or notified areas have no access to canal water and mainly dependent on rainfall for crop cultivation.

Figure 4: Land Cover Map of Sindh



The Natural Disasters Consortium (NDC) with the consent of Provincial Disaster Management Authority (PDMA) Sindh has conducted the rapid multi-sector drought needs assessment in the notified areas. The Natural Disaster Consortium (NDC) is comprised of the International Organization for Migration (IOM), the Food and Agriculture Organization of the United Nations (FAO), United Nations Children's Fund (UNICEF), Health and Nutrition Development Society (HANDS) and the Agency for Technical Cooperation and Development (ACTED). The World Food Programme (WFP) also worked alongside the NDC to complete the assessment and further technical advice was also provided by the World Health Organization (WHO).

Objectives of the Assessment

The assessment was conducted with the following specific objectives:

- To assess the impact of the drought on agriculture (crop cultivation, production, water availability and livestock), livelihoods and food security, access to water and sanitation and hygiene practices of the households and communities.
- To provide recommendations to the Government of Sindh, NDC partners, and other decision/policy makers to prioritize actions (short, medium and long term) in relevant sectors and geographic areas to address immediate needs, build back better and increase future resilience to drought.

Methodology of Assessment

The assessment was conducted in 69 out of 513 revenue villages (Dehs), notified as being affected by drought by the Government of Sindh in 8 districts, namely, Tharparkar, Umerkot, Sanghar, Thatta, Badin, Jamshoro, Dadu and Kambar Shahdadkot.

During this assessment, two comprehensive tools were designed and administered: a multi-sectoral questionnaire at household level, and a FGD tool at the community level. The household questionnaire was mainly based on quantitative indicators, while the FGD included both quantitative and qualitative information. The analysis presented in this report is mainly based on household questionnaire, while analysis based on FGD will be incorporated in the final draft.

Sampling Methodology

To estimate the sample size for the assessment, a mixed method of sampling was used. For areas like Tharparkar, where almost the entire district was notified as hit by the calamity, the sample size was estimated using the following standard statistical parameters/formula:

Population size (N): (No. of households)
Confidence level (z): 95%
Margin of error (e): 5%
Prevalence (p): 0.5

For districts where fewer Dehs in a district or a sub-district were affected, the sample size was estimated considering the availability of human resources (enumerators) and time constraint. Considering these and standard formula of sample size estimations, a sample size of 380 households was estimated for Tharparkar district, whereas for other districts, the sample size ranges from 72-216 corresponding to number of *Dehs* notified[4].

The sample households were drawn from the drought notified areas using a multi- stage random sampling technique as described below:

- First stage: Revenue villages (*Dehs*) were selected randomly
- Second stage: Primary Sampling Unit (PSU) (one village from each sampled *Deh*)
- Third stage: Secondary Sampling Unit (SSUs/ 18 Households from each sampled village)

Out of 18 households interviewed per village, up to 3 were women headed households to assess their situation in comparison to men headed households.

[4] Using the standard formula, sample size for other districts would have been in the range of 200-380 households, which corresponds with the varied number of notified Dehs in each district.

Orientation on Questionnaires

A three -day orientation session on assessment questionnaires and methodology was arranged in Hyderabad from October 6-8, 2018 which was jointly facilitated by staff of FAO, IOM, WFP and UNICEF. A nutrition officer from WFP facilitated an extended session on Mid Upper Arm Circumference (MUAC) measurement of children age 6-59 months, and pregnant and lactating women (PLW).

Data Collection

Data collection for this assessment began on October 9, 2018 and continued until October 18, 2018. All field staff were divided into teams which consisted of 4 team members included 1 team coordinator, 2 male enumerators, and 1 female enumerator. One field team consisting of these 4 team members was sent Sanghar, Umerkot, Thatta, Kambar Shahdadkot, Jamshoro, and Badin district to collect data. However, due to the larger sample size two field teams comprising of 8 team members were sent to Tharparkar and Dadu district to collect data. Team coordinators were responsible for coordinating with head office and local community members, supervising data collection, checking filled questionnaires, and dispatching completed questionnaires to FAO Islamabad Office for data entry. Staff of FAO, WFP, UNICEF and HANDS extensively monitored the field teams to ensure quality of data collection.[5]

Data Entry and Analysis

Filled questionnaires were entered into a database by experienced data entry operators under the supervision of FAO staff in Islamabad office. Consolidated data was analyzed by a team of data analysts from IOM, FAO, WFP, UNICEF, HANDS and ACTED. Data analysts prepared a tabulation plan and analyzed the data using Excel, SPSS and STATA software.

Limitations of the analysis

The findings of the assessment present the situation in the **drought notified areas only,** and hence should not be generalized to all households in the surveyed districts or sub-districts (Talukas/Tehsils). The findings of the assessment for drought areas in Badin and Jamshoro districts also need to be considered with caution as a smaller number of households were surveyed due to time constraint.

[5] List of sampled districts, tehsils, union councils, and revenue villages is provided in Annex A.

Regional/Household Socio-Demographic Profile

The targeted sample for this assessment was 1,242 households, however at the conclusion of data collection the field teams were able to interview 1,229 households in eight districts. These households were interviewed in 69 Dehs of 53 Union Councils, located in 24 sub-districts (Talukas/Tehsils) of the 8 districts. All households were surveyed in both desert/arid and non-desert/arid areas of the surveyed districts[6]. The distribution of surveyed households in each district is as follows:

Table 1: Distribution of Surveyed Households Across the Sub-districts/Districts

Overall Sample: 1,229 households															
Badin (N=126)		Dadu (N=217)		Jamshoro (N=117)		Kambar Shahdadkot (N=108)		Sanghar (N=93)		Tharparkar (N=371)		Thatta (N=72)		Umerkot (N=125)	
Tehsil/ Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample	Tehsil/Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample	Tehsil/ Taluka	Share in district sample
Badin	29%	Johi	83%	Manjhand	31%	Kambar Khan	33%	Khipro	42%	Chacharo	16%	Thatta	100%	Umerkot	100%
Golarchi	14%	Khairpur Nathan Shah	9%	Sehwan	39%	Warah	67%	Sanghar	58%	Dahli	11%				
Matli	14%	Mehar	8%	Thano Bula Khan	30%					Diplo	14%				
Talhar	14%									Islam Kot	15%				
Tando Bago	29%									Kaloi	15%				
										Mithi	15%				
										Nagar Parkar	14%				

[6] The list of surveyed Dehs is provided in the annex A.

Overall, an overwhelming majority (92%) of the surveyed households (100% in Dadu, Sanghar, Tharparkar and Thatta) were located in desert/arid areas, whereas 8% were located in non-desert/arid areas (29% in Badin, 26% in Jamshoro and 17% in Kambar Shahdadkot).

Table 2: Distribution of Surveyed Households by Location in Desert / Arid Status

		Overall	Badin	Dadu	Jamshoro	Kambar Shahdadkot	Sanghar	Tharparkar	Thatta	Umerkot
		1229	126	217	117	108	93	371	72	125
Desert/Arid Area	Non-desert/arid	8%	29%	0%	26%	17%	0%	0%	0%	14%
	Desert/arid	92%	71%	100%	74%	83%	100%	100%	100%	86%

Demographic and Socio-economic Profile of Surveyed Households

Overall, around two-thirds of the respondents were men headed household. Our sampling methodology required field teams to select 3 women headed households from each village throughout the assessment in order to assess the livelihood and food security situation of women headed households compared with male headed households. Overall, 12% of the surveyed households were headed by women (widows, divorced, separated, or whose husband was away from home for work). The proportion of women headed households interviewed was highest in Thatta (24%) followed by Sanghar (22%). Overall, the average age of the household head was 44 years. With the exception of Umerkot, the average age of the household head was between 40-50 for all the districts. An overwhelming majority of the household heads were married (overall 90%), however, unlike in other districts, around 20% of the household heads were widow/widowers in Jamshoro and Thatta.

Table 3: Demographic Characteristics of the Surveyed Households

		Overall	Badin	Dadu	Jamshoro	Kambar Shahdadkot	Sanghar	Tharparkar	Thatta	Umerkot
		1229	126	217	117	108	93	371	72	125
Gender of respondent	Women	33%	59%	37%	12%	22%	24%	27%	44%	43%
	Men	67%	41%	63%	88%	78%	76%	73%	56%	57%
Relationship of respondent to head of household	Self	64%	38%	60%	79%	82%	77%	67%	68%	52%
	Spouse (Wife/ Husband)	25%	53%	21%	1%	16%	18%	25%	21%	39%
	Daughter/ Son	7%	6%	12%	15%	2%	3%	4%	8%	6%
	Other members	4%	3%	7%	5%	0%	1%	5%	3%	3%
Gender of head of household	Women	12%	10%	12%	12%	8%	22%	9%	24%	9%
	Men	88%	90%	88%	88%	92%	78%	91%	76%	91%
Age of head of household	Average	44	40	44	47	42	46	45	48	36
Marital status of head of household	Unmarried	5%	5%	6%	3%	1%	8%	4%	3%	9%
	Married	86%	90%	85%	76%	93%	80%	91%	77%	87%
	Divorced/Separated	1%	0%	0%	0%	3%	0%	1%	0%	2%
	Widow/Widower	8%	6%	9%	22%	4%	12%	5%	20%	2%

Around two-thirds of surveyed households reported having a child under the age of 5 (83% in Badin), and 82% of the households reported having a child between the ages of 5 – 17 (with highest percentage - 89% - in Thatta). Around half of the surveyed households reported the presence of a PLW. Whereas 33% of the surveyed households reported presence of an elderly member (age above 60 years), in Thatta this was highest (43%) and in Umerkot it was lowest (14%).

Table 4: Demographic Characteristics Including Age Bracket

		Overall	Badin	Dadu	Jamshoro	Kambar Shahdadkot	Sanghar	Tharparkar	Thatta	Umerkot
		1229	126	217	117	108	93	371	72	125
Household has under 5 children	No	32%	17%	26%	24%	29%	31%	42%	43%	35%
	Yes	68%	83%	74%	76%	71%	69%	58%	57%	65%
Households has 5-17 years old children	No	18%	14%	13%	15%	13%	24%	25%	11%	21%
	Yes	82%	86%	87%	85%	87%	76%	75%	89%	79%
Household has PLW	No	49%	33%	44%	50%	56%	55%	53%	57%	47%
	Yes	51%	67%	56%	50%	44%	45%	47%	43%	53%
Household has elderly (age 60+)	No	67%	72%	62%	62%	83%	66%	62%	57%	86%
	Yes	33%	28%	38%	38%	17%	34%	38%	43%	14%

Education, which is often a very important factor in improving economic status of households, is very low among the surveyed households. An overwhelming majority (69%) of the heads of households have never been to school (81% in Jamshoro). Only 18% of the heads of households attained primary level of education, followed by secondary education at 5%, and middle education at 4%.

With respect to current primary sources of livelihood/income, overall 64% of surveyed households (94% in Thatta) earn their livelihood/income from non-agricultural sources[7], followed by 23% from agriculture-based activities[8] (81% in Kambar Shahdadkot), and 12% from sale of livestock/livestock products (50% in Sanghar).

Table 5: Level of Education and Primary Income Sources of the Households

		Overall	Badin	Dadu	Jamshoro	Kambar Shahdadkot	Sanghar	Tharparkar	Thatta	Umerkot
		1229	126	217	117	108	93	371	72	125
Highest education level of head of household	Never been to school	69%	57%	62%	81%	79%	76%	67%	72%	66%
	Primary (1-5)	18%	24%	27%	13%	12%	21%	15%	22%	13%
	Middle (6-8)	4%	8%	2%	0%	3%	1%	6%	3%	8%
	Secondary (9-10)	5%	5%	5%	4%	4%	2%	7%	1%	9%

[7] Non-agricultural sources include: daily wage labour, business/self-employed, government employee, NGO/private employee, professional (doctor, engineer, lawyers), petty trade, handicrafts, pension/ allowances, remittances (domestic/foreign) etc.
[8] Agriculture based activities include: sale of agriculture produce (sale of food/cash crops/vegetables/fruits), agricultural wage labour, forestry worker, sale of firewood/grass/charcoal etc.

	Higher secondary (11-12)	2%	4%	2%	0%	0%	0%	4%	1%	2%
	Graduation /Post graduation	1%	2%	1%	2%	3%	0%	1%	0%	2%
Current primary source of livelihood/income of household[9]	Agriculture (sale of food/cash/ vegetables/ fruits/agriculture wage labor/forestry/fishery workers	23%	22%	33%	20%	81%	30%	9%	4%	14%
	Non-agriculture	64%	71%	67%	70%	16%	20%	74%	94%	74%
	Sale of Livestock/Livestock Products	12%	7%	0%	10%	3%	50%	17%	1%	11%

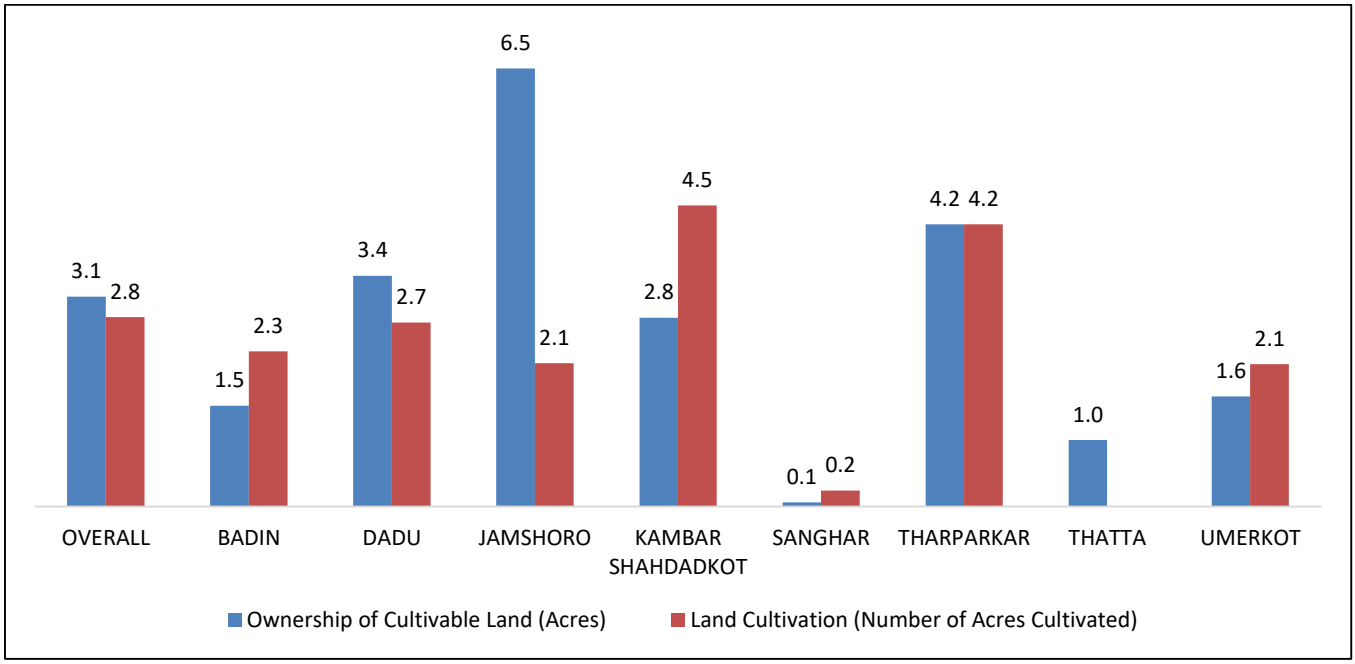
[9] Livestock though part of agriculture sector has been categorized separately to assess situation of livestock holders compared with other groups.

Agriculture

Land Ownership and Cultivation

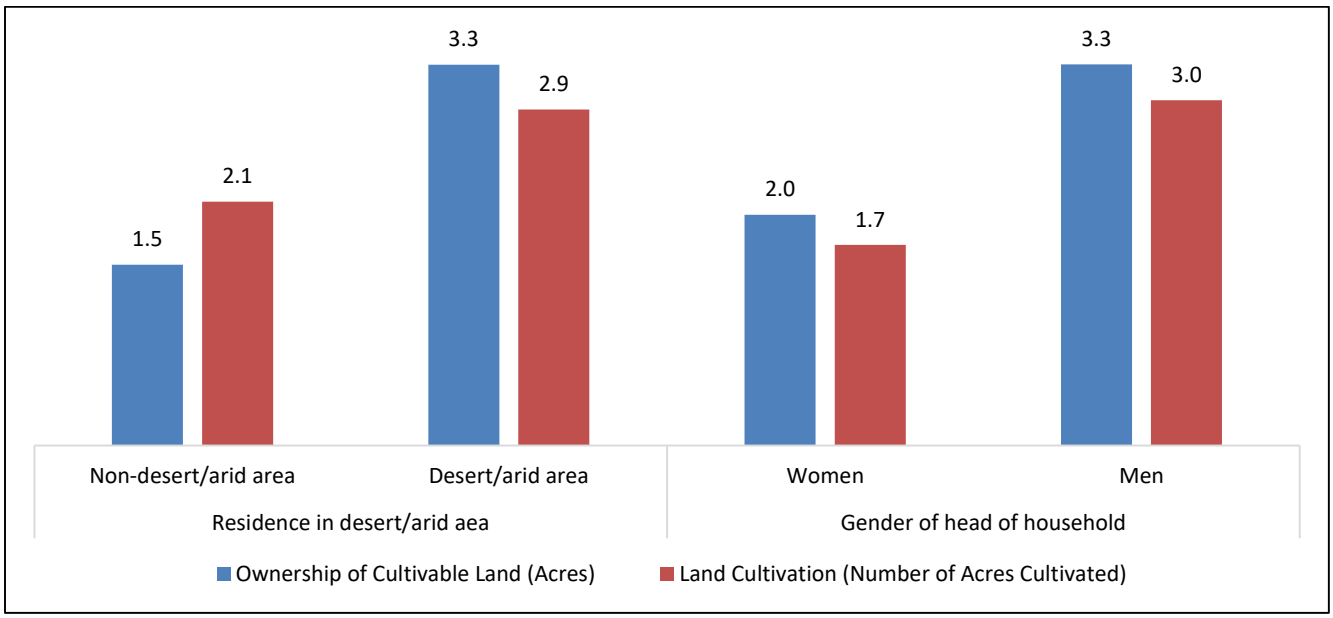
Agriculture is amongst the major livelihoods for households in the surveyed districts. The households were not only engaged in crop cultivation and agricultural labour, but also livestock rearing for subsistence and livelihoods. On average, the surveyed households in the drought areas own 3.1 acres of land (with the highest of 6.5 acres in Jamshoro), whereas they cultivate on average of 2.8 acres only (highest of 4.5 acres in Kambar Shahdadkot). Of the surveyed households, 42% own cultivable agricultural land (highest 68% in Jamshoro and lowest 3% in Sanghar), whereas 53% cultivate land (highest 88% in Kambar Shahdadkot and lowest 0% in Thatta) (Figure 5).

Figure 5: Land Ownership and Cultivation by District



The land ownership and cultivation are higher in desert/arid areas compared to non-desert/arid areas. Furthermore, women-headed households own and cultivate less land compared to male-headed households (Figure 6).

Figure 6: Land Ownership and Cultivation by Geography and Gender



In terms of distribution of agricultural land ownership overall, 58% of surveyed households do not own any land (highest 97% in Sanghar and lowest 32% in Jamshoro), whereas 16% own five and more acres of land (Figure 7). In case of land cultivation, overall, 47% of the surveyed households do not cultivate land (highest 100% in Thatta and lowest 12% in Kambar Shahdadkot), whereas 23% cultivate 2-3 acres of land (Figure 8).

Figure 7: Distribution of Land Ownership by Size of Land and District

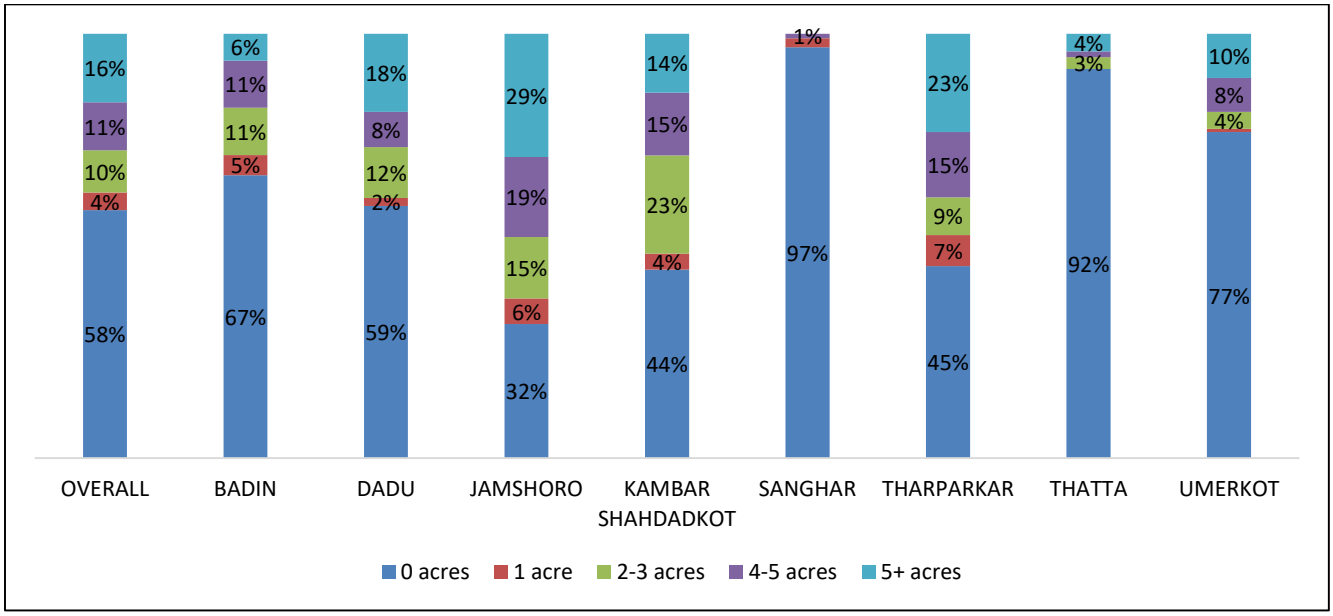
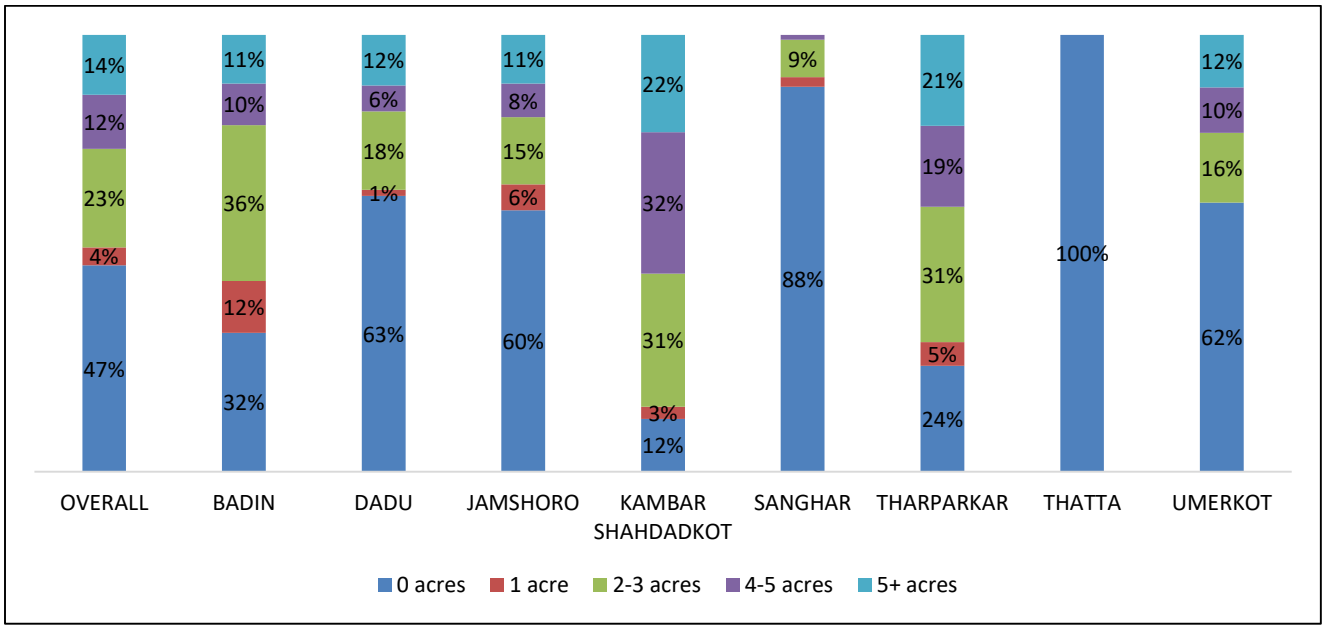
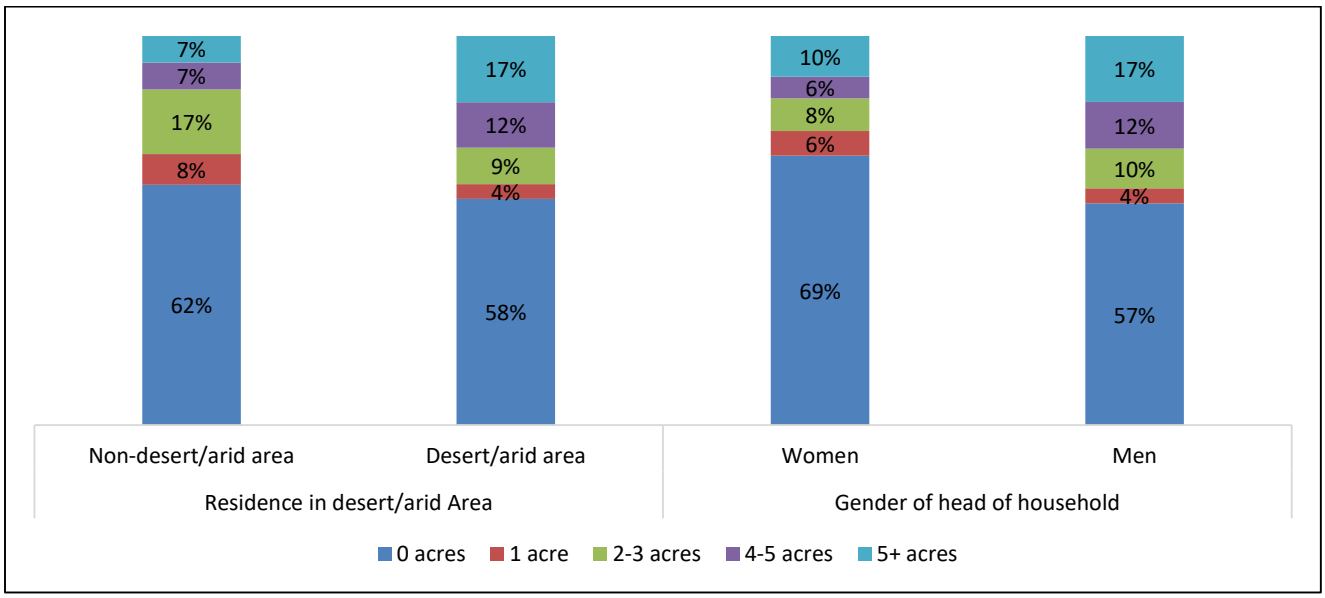


Figure 8: Distribution of Land Cultivation by Size of Land and District



A slightly higher proportion of surveyed households in non-desert/arid areas do not own a single acre of land compared with those in desert/arid areas. A significantly higher proportion of women headed households do not own land compared with male headed households (Figure 9).

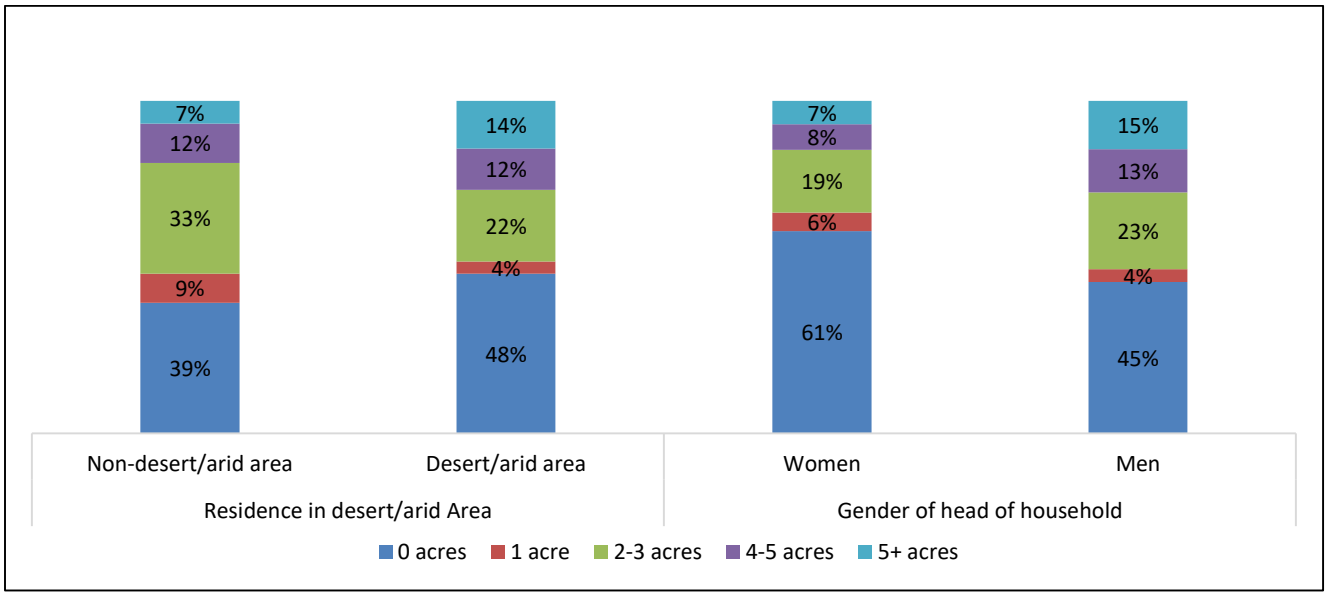
Figure 9: Distribution of Land Ownership by Size of Land, Geography and Gender



Around two-fifths of the surveyed households in non-desert/arid areas, and half in desert/arid areas do not cultivate land. In cases where households cultivate land, most of the households cultivate between 2-

3 acres of land. A significantly higher proportion of women headed households do not cultivate land compared with men headed households. Land cultivation between 2-3 acres is most common among both types of households (Figure 10).

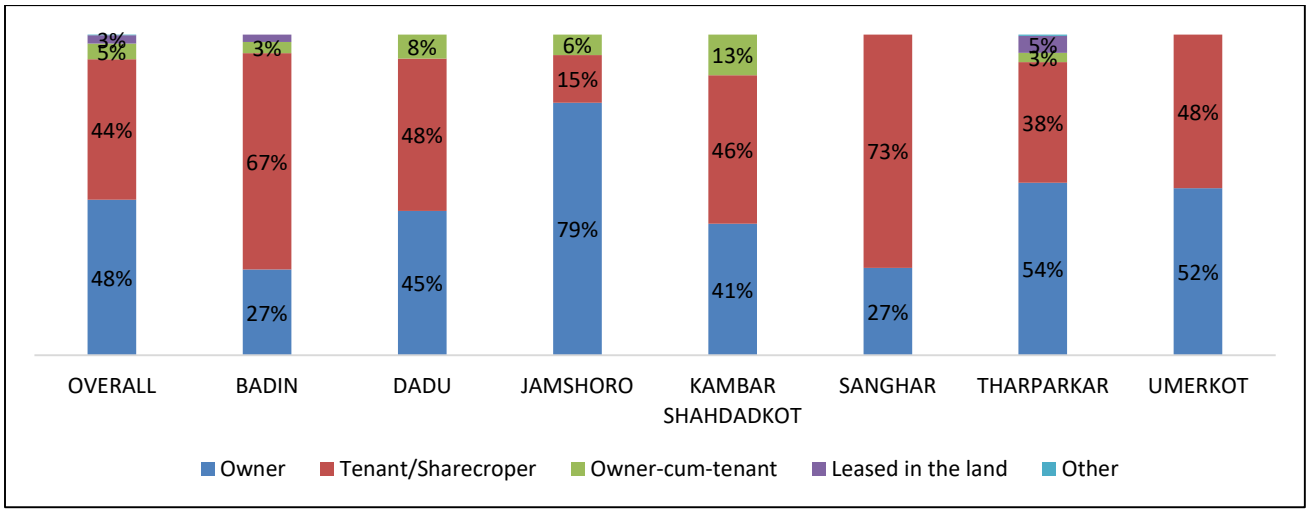
Figure 10: Distribution of Land Cultivation by Size of Land by Geography and Gender



Status of Ownership of Cultivated Land

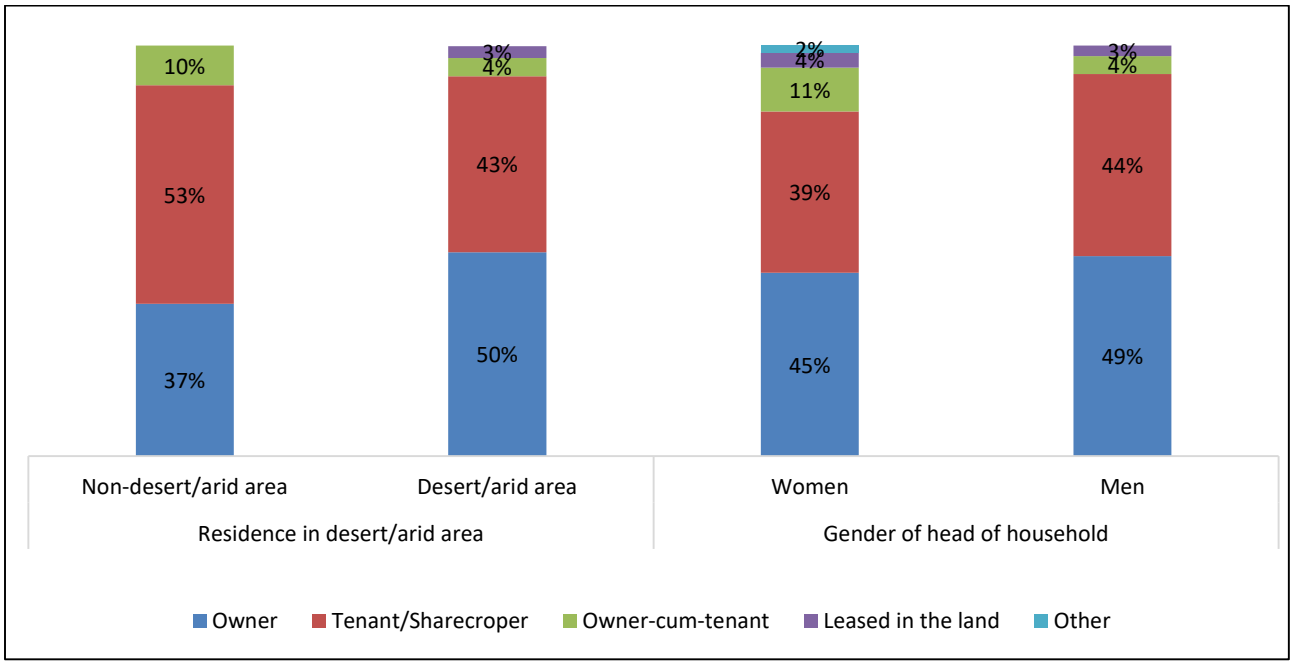
Overall, around half of the farming households (land cultivators) are owners of their own land (highest 79% in Jamshoro), 44% are tenants/share croppers (highest 73% in Sanghar) and the remaining farming households were owner-cum-tenants or received the land on lease (highest 13% in Kambar Shahdadkot). The tenants/sharecroppers often engaged in informal contracts with landlords and shared the cost of inputs (seeds, water, fertilizer, etc.) and crop production (usually 50%) (Figure 11).

Figure 11: Status of Ownership of Cultivated Land by District



Furthermore, farm households in desert/arid areas are more likely to cultivate their own land, whereas tenancy/share cropping is reported more in non-desert/arid areas. A slightly higher proportion of men headed households cultivate own land or others land as tenant/share cropper compared with women headed households (Figure 12).

Figure 12: Status of Ownership of Cultivated Land by Geography and Gender

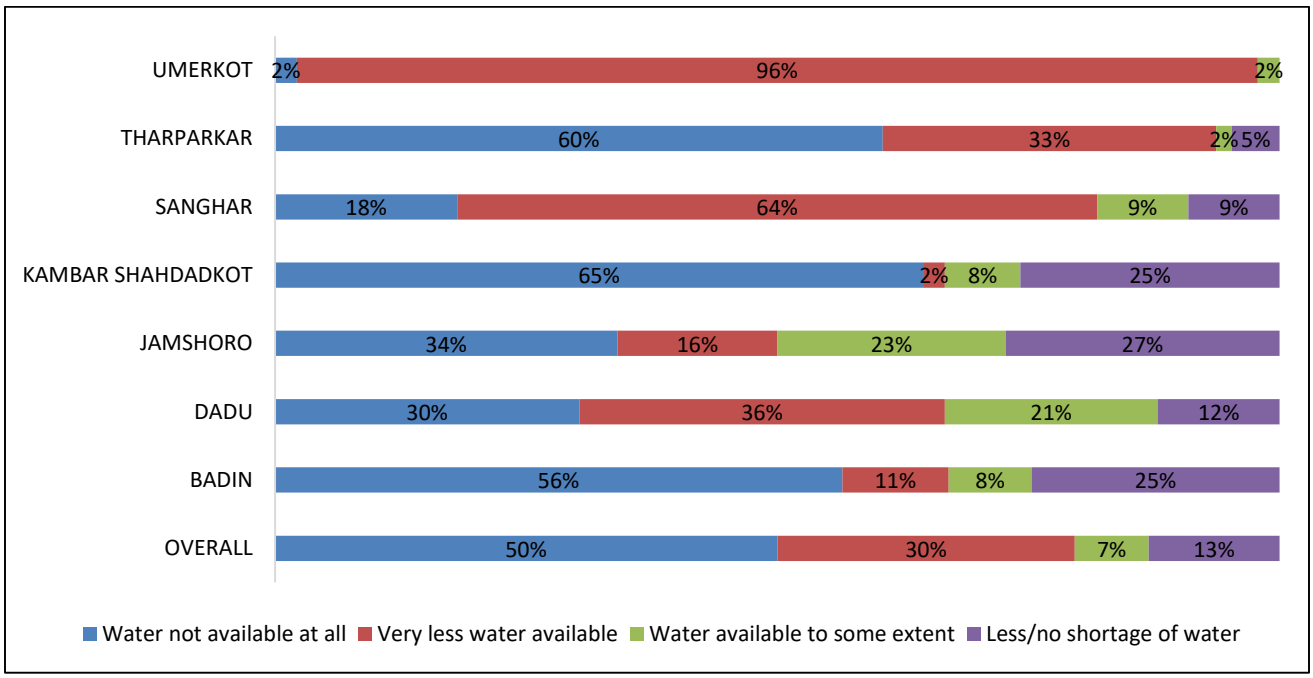


Availability of Water for Agricultural Activities

With frequent dry spells and limited recent rain fall, the farming households reported a reduction in availability of water for agricultural activities. Overall, 50% of farming households reported water not being available at all compared to last year[10], whereas 30% reported less water availability, and 7% reported water availability to some extent, while 13% reported less/no shortage of water. Almost all (98%) of the surveyed farming households in Umerkot reported water either not being available or a lot less available compared to last year, followed by 93% in Tharparkar and 82% in Sanghar (Figure 13).

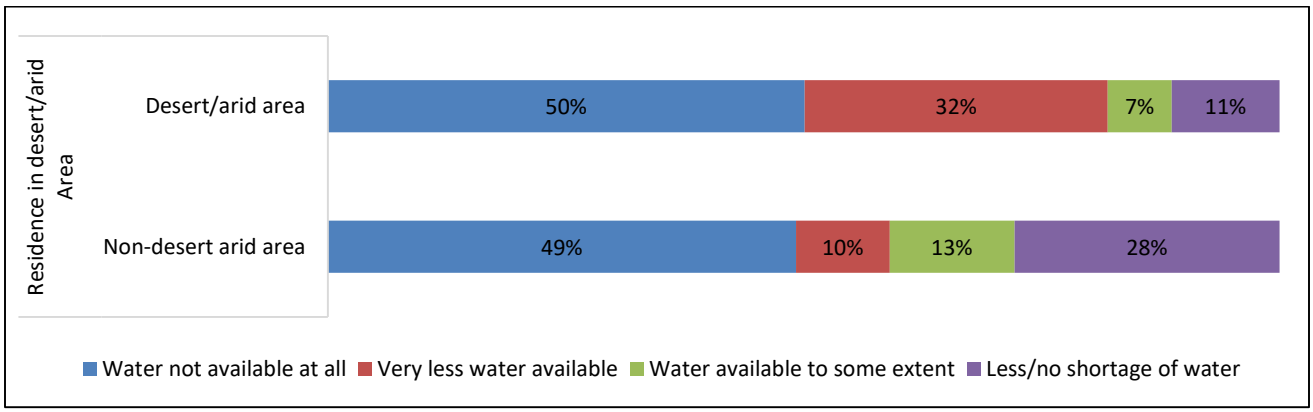
[10] Last year refers to Rabi and Kharif cropping seasons in 2017.

Figure 13: Water Availability for Agriculture Compared to Last Year (2017)



Water scarcity is more severe in desert/arid areas. In non-desert/arid areas, 59% of farming households reported severe shortages or that no water was available whereas in desert/arid areas this number jumps to 82% (Figure 14).

Figure 14: Water Availability for Agriculture Compared to Last Year (2017) by Geography



The analysis of FGDs data shows that overall 56% of the surveyed communities reported they did not receive rainfall in 2018 monsoon season, while 44% of them reported little rainfall. Of the communities which received rainfall during 2018 monsoon, overwhelming majority of the communities (83%) reported that amount of rainfall was less than the previous year monsoon followed by same as previous monsoon (11%) and more than previous monsoon (6%). In terms of change in water availability for monsoon crops, overall, 89% of the surveyed communities reported decrease in water availability, 9% reported no change whereas just 2% reported increase in water availability. Further, most of the communities (95%) reported

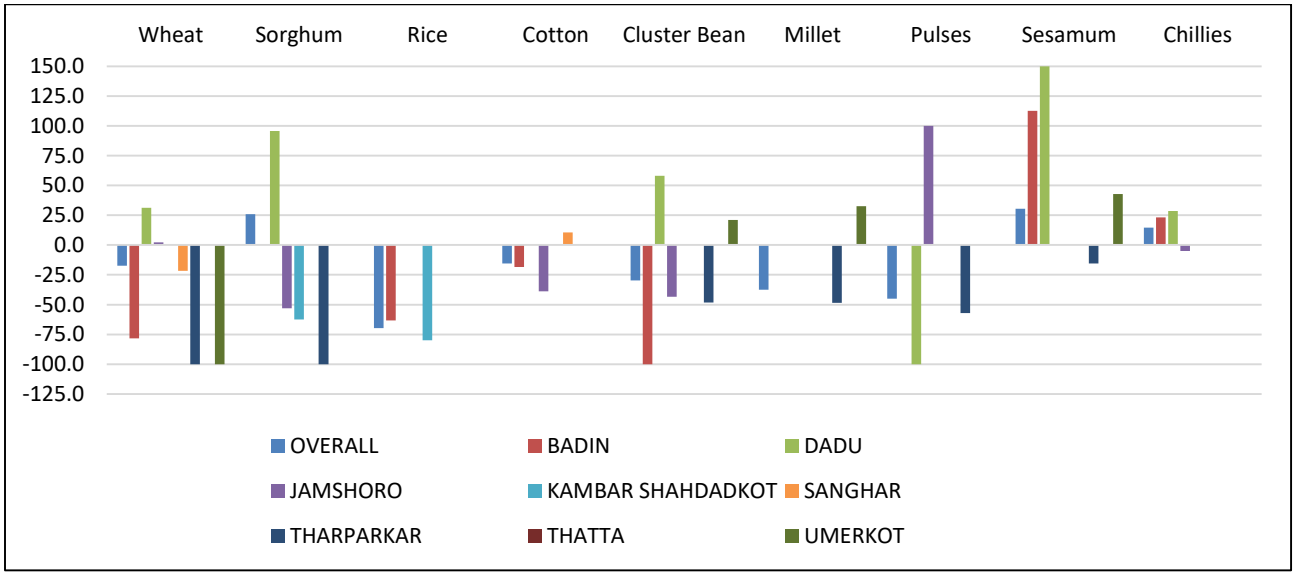
poor condition of irrigation sources. In terms of practicing any kind of improved irrigation system to save water like drip irrigation, 95% of the community reported non-practice of any such irrigation system. The communities reported underground water level on average is at 61 meters and around half of the communities reported that they are not using tube wells on solar system because underground water level is too much below, 36% are using solar system but they need more and 16% reported that most of the tube wells are on the solar system.

Crop Cultivation and Production

Change in Crop Cultivation Area Compared to 2016-17

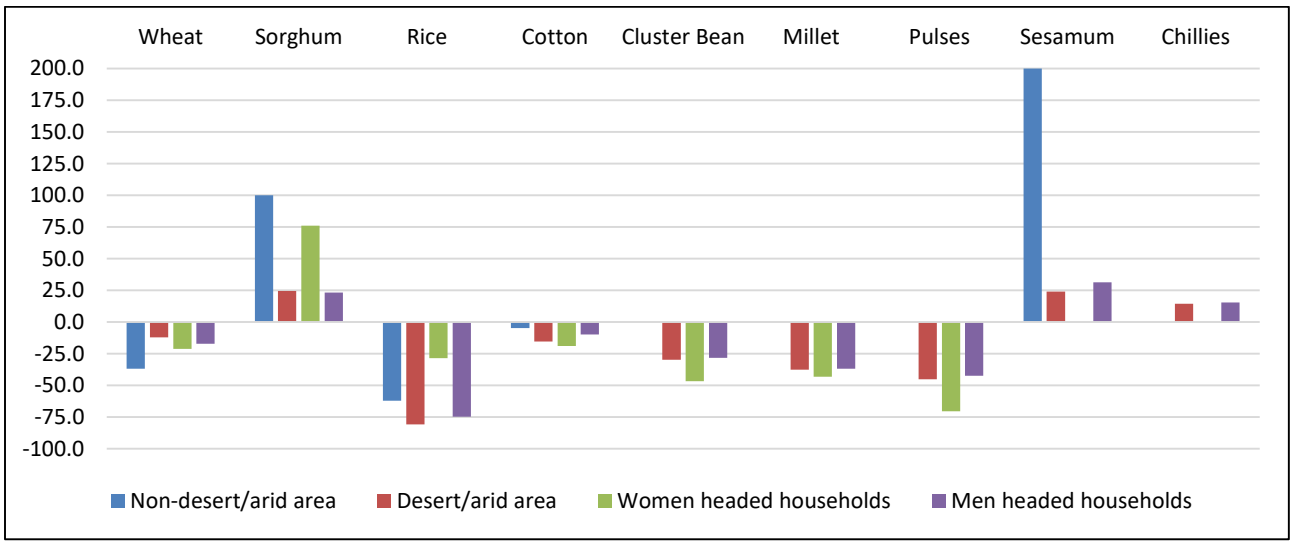
The drought in Sindh has adversely impacted area under cultivation as farmers reported a reduction in the area cultivated compared to the 2016-17 season[11]. Farming households in the surveyed areas reported cultivation of wheat, rice, cotton, millet, cluster beans, pulses/lentils, sorghum, sesame and chilies. Overall, compared to 2016-17 seasons, cultivation area (measured in acres) for wheat was reduced by 17% in 2017-18, rice by 70%, cotton by 16%, cluster beans by 30%, millet by 38% and pulses by 45%, whereas area cultivation for sorghum, sesame and chilies increased by 26%, 30% and 15% respectively. Cultivation area was reduced for wheat in Tharparkar (100%) and Umerkot (100%), for rice in Kambar Shahdadkot (80%), for cotton in Jamshoro (39%), for cluster bean in Badin (100%), for millet in Tharparkar (49%), and for pulses in Dadu (100%). On the other hand, cultivation area for sesame increased by 150% and for chilies by 28% in Dadu (Figure 15).

Figure 15: Percentage Change in Crop Cultivation Area Compared to 2016-17 by District



[11] The change in crop area cultivation is computed to compare cultivation of different crops in 2017-18 Rabi and Kharif cropping seasons compared to 2016-17 cropping seasons.

Figure 16: Percentage Change in Crop Cultivation Area Compared to 2016-17 by Geography and Gender



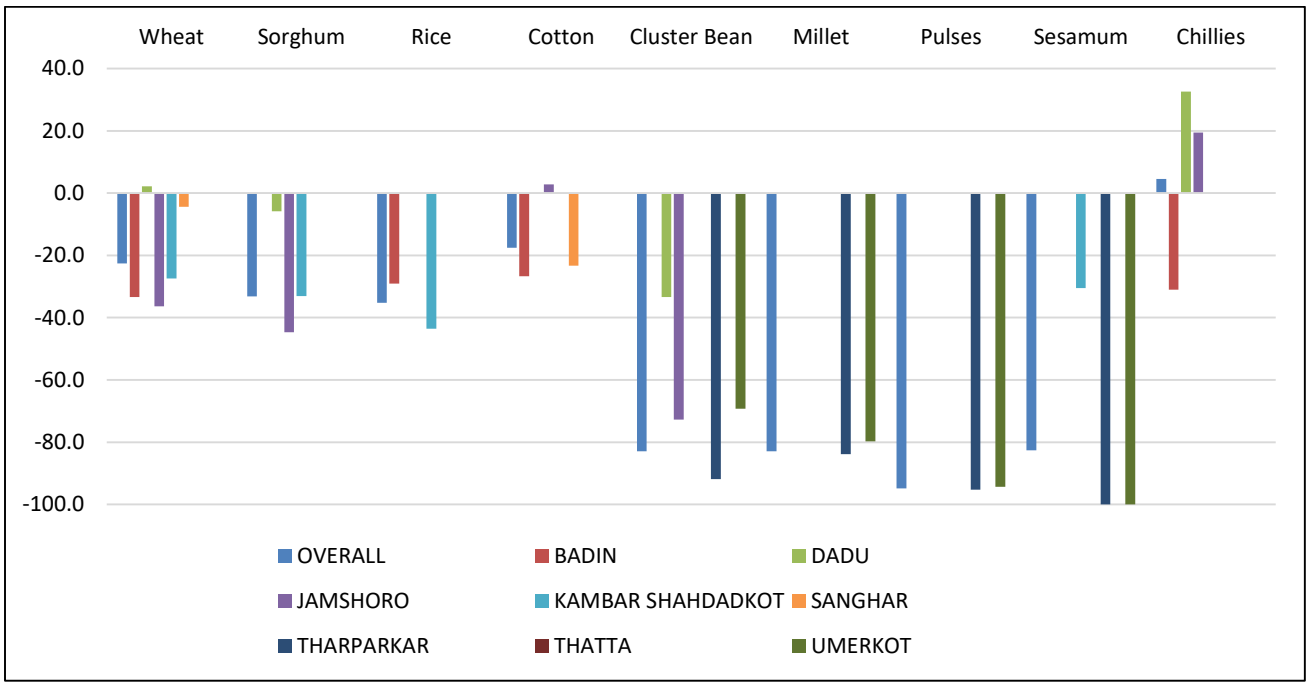
Change in Crop Production Compared to 2016-17

When compared with the 2016-17 agricultural season, overall crop production (measured in maunds) for wheat was reduced by 23%, sorghum by 33%, rice by 35%, cotton by 18%, cluster beans, millet and sesame each by 83% and pulses by 95%, whereas, production of chilies increased by 5%[12]. Compared to 2016-17, wheat production was reduced by 36% in Jamshoro, sorghum by 45% in Jamshoro, rice by 44% in Kambar Shahdadkot, cotton by 27% in Badin, cluster bean by 92% in Tharparkar, millet by 84% in Tharparkar, pulses/lentils by 95% in Tharparkar, sesame by 100% in Tharparkar and Umerkot, and chilies by 31% in Badin (Figure 17)[13].

[12] Change in crop production was computed to compare crop production in 2017-18 cropping seasons (Rabi and Kharif) with crop production in 2016-17 cropping seasons.

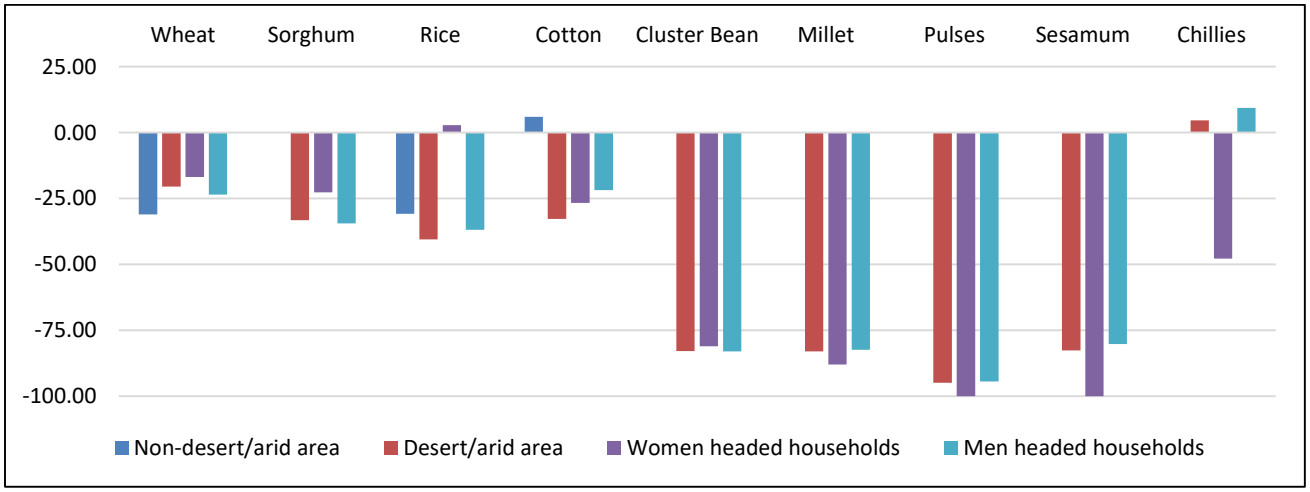
[13] As per Sindh Drought Needs Assessment conducted in 2015-16 in drought affected areas, the average change in production of wheat by district was as follows: Badin (-17%), Dadu (-25%), Jamshoro (-28%), Sanghar (-2%), Tharparkar (-81%), Thatta (-3%) and Umerkot (1%). In case of cotton, the reduction in Badin was (-32%), Jamshoro (-30%), Sanghar (1%), Thatta (-1%) and Umerkot (-6%). For Guar/cluster beans, reduction in Dadu was (-62%), Jamshoro (-31%), Sanghar (-57%), tharparkar (-27%), Thatta (-68%) and Umerkot (-50%). Similarly, the reduction for millet in Dadu was (-33%), Tharparkar (-35%), Thatta (-40%) and Umerkot (-44%).

Figure 17: Percentage Change in Crop Production Compared to 2016-17 by District



Apart from chilies, production of all crops has decreased in desert/arid areas from the 2016-17 season. Furthermore, women headed households have reported greater reduction in the production of cotton, millet, pulses, sesame and chilies when compared to the reduction reported by male headed households (Figure 18).

Figure 18: Percentage Change in Crop Cultivation Area Compared to 2016 – 17 by Geography and Gender



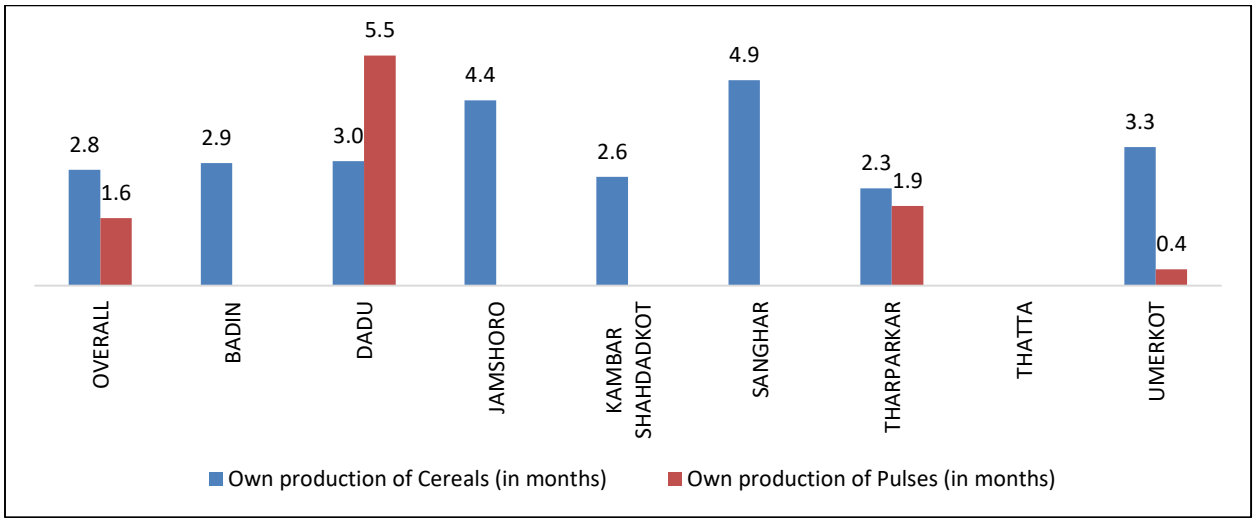
Reasons for Change in Crop Cultivation and Crop Production

The majority of farming households stated lack of rainfall as the primary reason for the change in crop cultivation and crop production. Succeeding common responses included limited availability of water for irrigation, unavailability/lack of access to seeds/other agricultural inputs, financial constraints, and loss/lack of draught animals.

Sufficiency of Cereals and Pulses Produced for Household Consumption

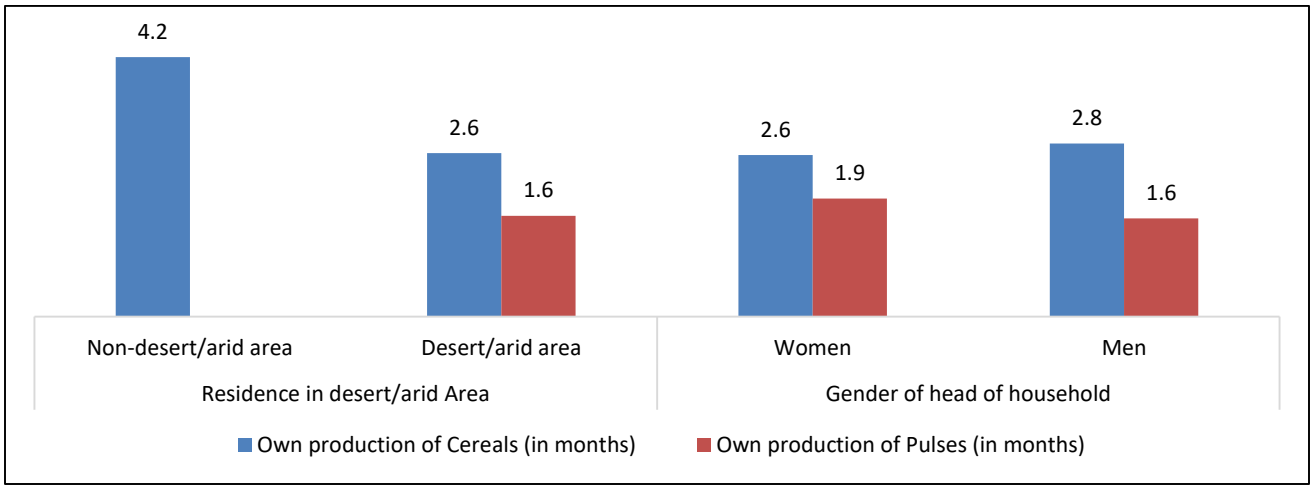
Own production of cereals for household consumption contributes to food security through the dimension of food availability. However, surveyed farming households reported limited cereal production (wheat, rice, maize, millet) in previous two seasons (Kharif 2017 and Rabi 2017-18). Overall, the cereal production was only sufficient for household consumption for about 2.8 months (highest 4.9 months in Sanghar and lowest 2.3 months in Tharparkar). The own produced pulses production was only sufficient for household consumption for 1.6 months (highest 5.5 months in Dadu and lowest 0.4 months in Umerkot) (Figure 19).

Figure 19: Sufficiency of Own Produced Cereals and Pulses from Last Season (2017/18) for Household Consumption by District



Further, own cereals production is significantly more adequate in non-desert/arid areas (4.2 months) than in desert/arid areas (2.6 months). Men headed households reported slightly better adequacy of cereals production whereas women headed households reported better adequacy of pulses (Figure 20).

Figure 20: Sufficiency of Own Produced Cereals and Pulses from Last Season (2017/18) for Household Consumption *by Geography and Gender*



Agriculture Related Coping Strategies Used by Farming Households during Drought

The surveyed farming households use different coping strategies to cope with drought such as late growing (reported by 65% households), shift to another source of livelihood (by 58%) and grow drought resistant crops (by 56%). Unsurprisingly, more farming households use these coping strategies in desert/arid areas compared to non-desert/arid areas (Figure 21).

As per FGD data, drought resistant crops grown by communities include sorghum, cluster beans, millet, sesamum and moth beans.

Figure 21: Agriculture Related Coping Strategies Used by Farming Households Overall

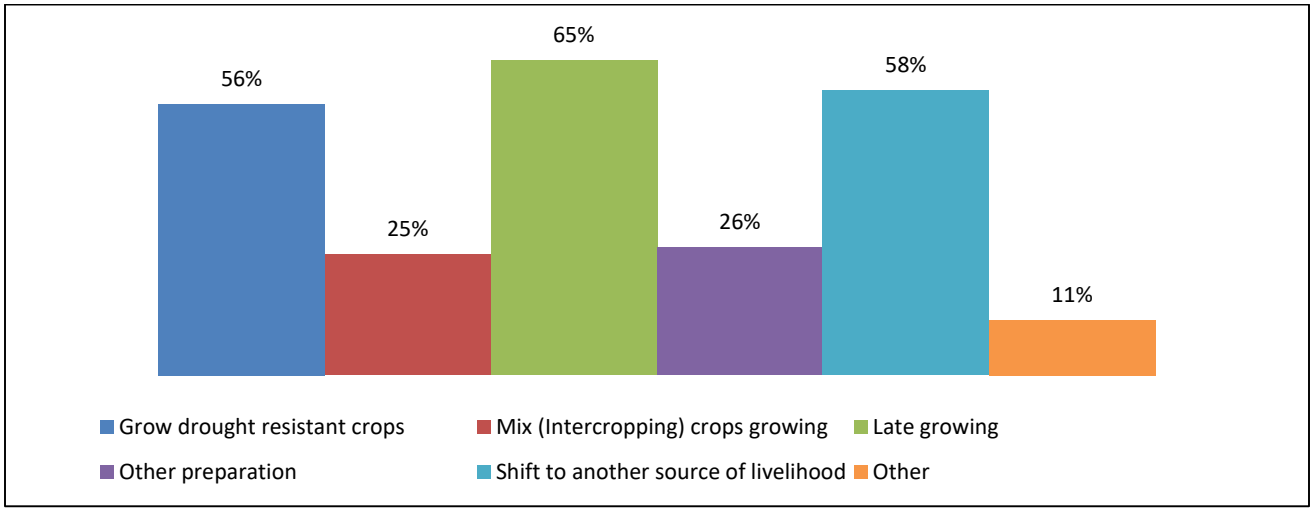
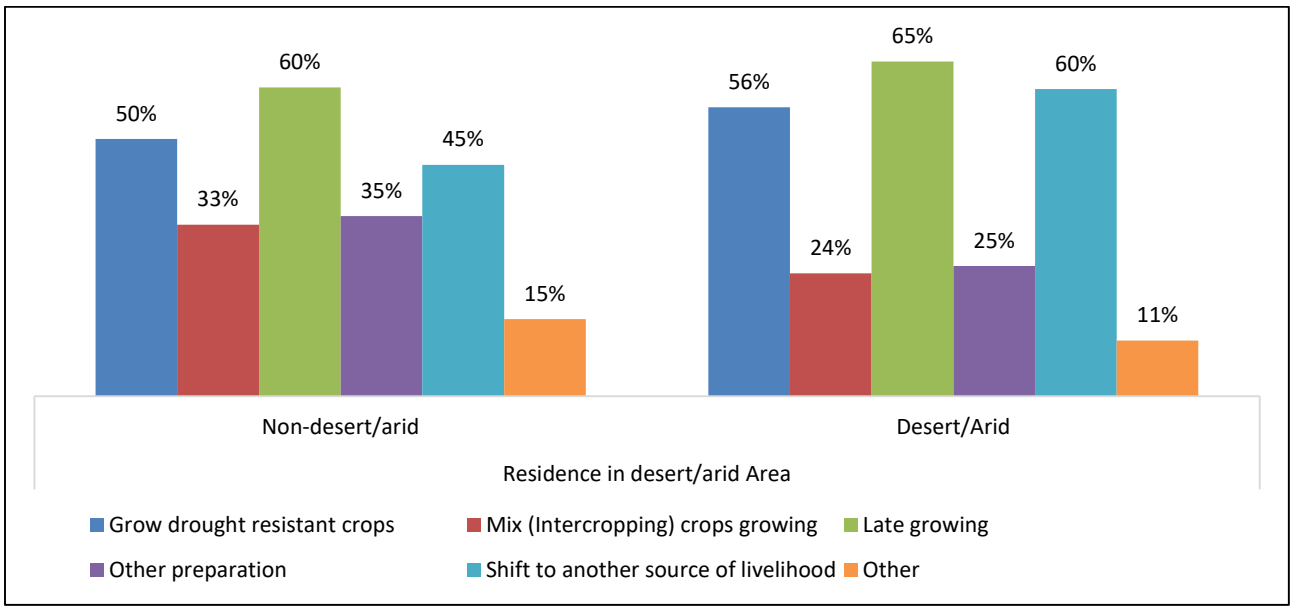


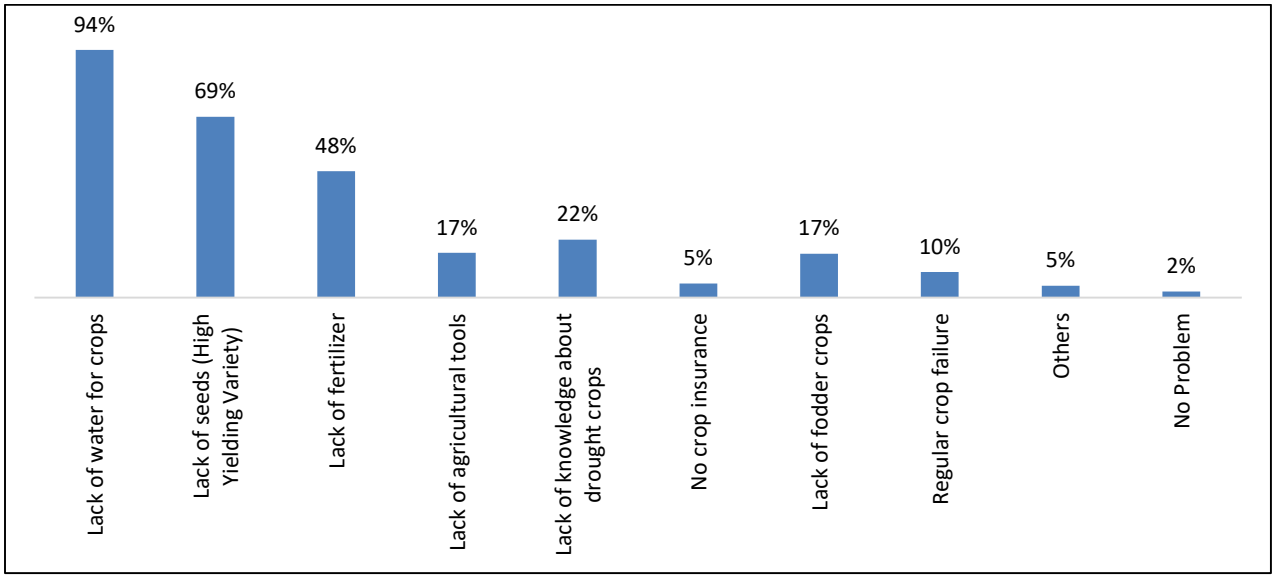
Figure 22: Agriculture Related Coping Strategies Used During Drought by Geography



Agriculture Related Problems Faced by Farming Households

The three major problems faced by farming households as they reported are: lack of water for crops, lack of access to high yielding variety seeds and lack of access to fertilizer. Although access to high yielding variety of seeds and fertilizer could be enhanced by improving physical access and financial affordability, ensuring availability of water is a major challenge which needs change in irrigation practices and investment in water retention (Figure 23).

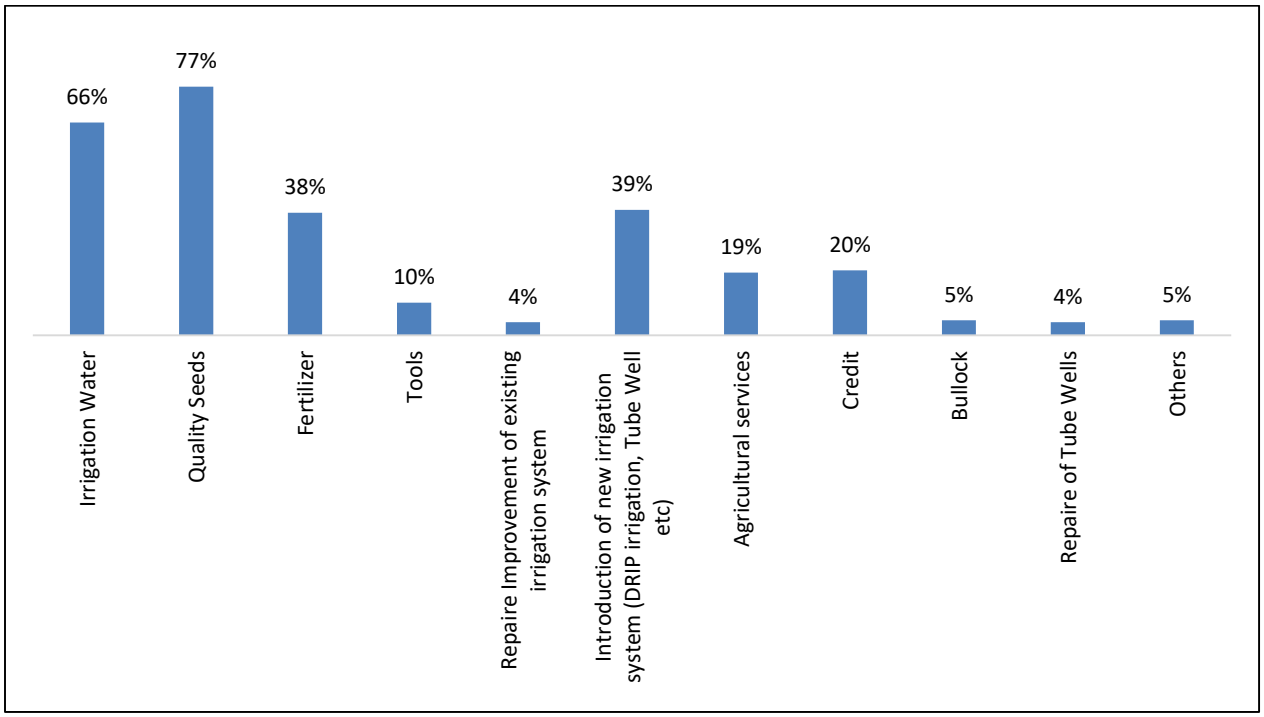
Figure 23: Agriculture Related Problems Faced by Farming Households Currently



Support Required by Farming Households to Improve Crop Production

The farming households were also inquired about any support they require (in order of importance) to improve the crop production in the next cropping season. The farming households clearly indicated the need for irrigation water, quality seeds, fertilizer, new irrigation system, agricultural services and tools and credit to enhance crop production (Figure 24).

Figure 24: Agriculture Support Required by Farming Households Overall



During the FGDs, the communities also expressed need for support to improve crop production. The required supports include irrigation water, quality seeds, fertilizers, introduction of new irrigation system, repair of tube-wells, agricultural tools & agricultural services.

Livestock

Livestock and Poultry Ownership

Livestock is an important source for sustenance and food consumption. Overall, 87% of surveyed households currently own livestock and 14% own poultry. Ownership of livestock and poultry is highest in Tharparkar (94%) and Badin (36%) respectively (Figure 25). Furthermore, 88% of the surveyed households in desert/arid areas own livestock compared with 77% in non-desert/arid areas, Poultry ownership is lower in desert/arid areas (12%) when compared with households in non-desert/arid areas (28%). Slightly more men headed households own livestock compared to women headed households (88% male vs. 83% women), while slightly more women headed households own poultry (15% women vs. 14% men) (Figure 26).

Figure 25: Ownership of Livestock / Poultry by District

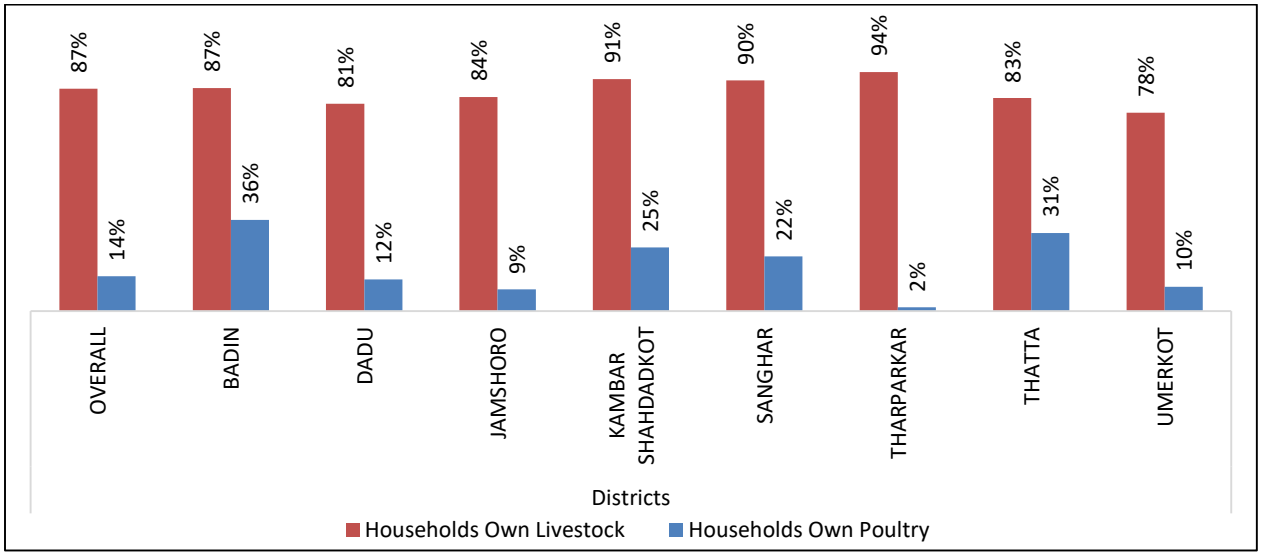
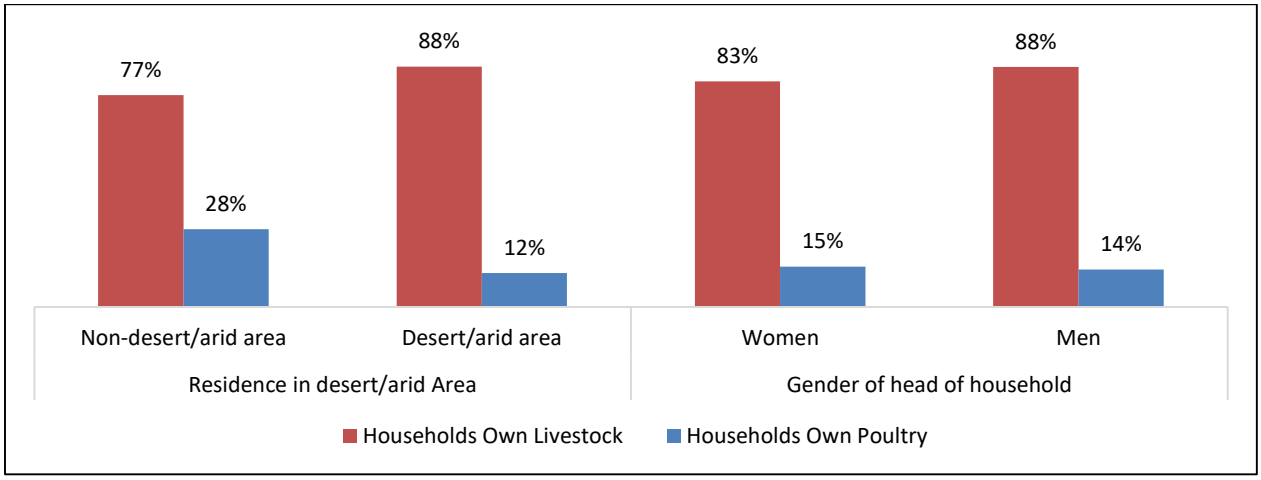
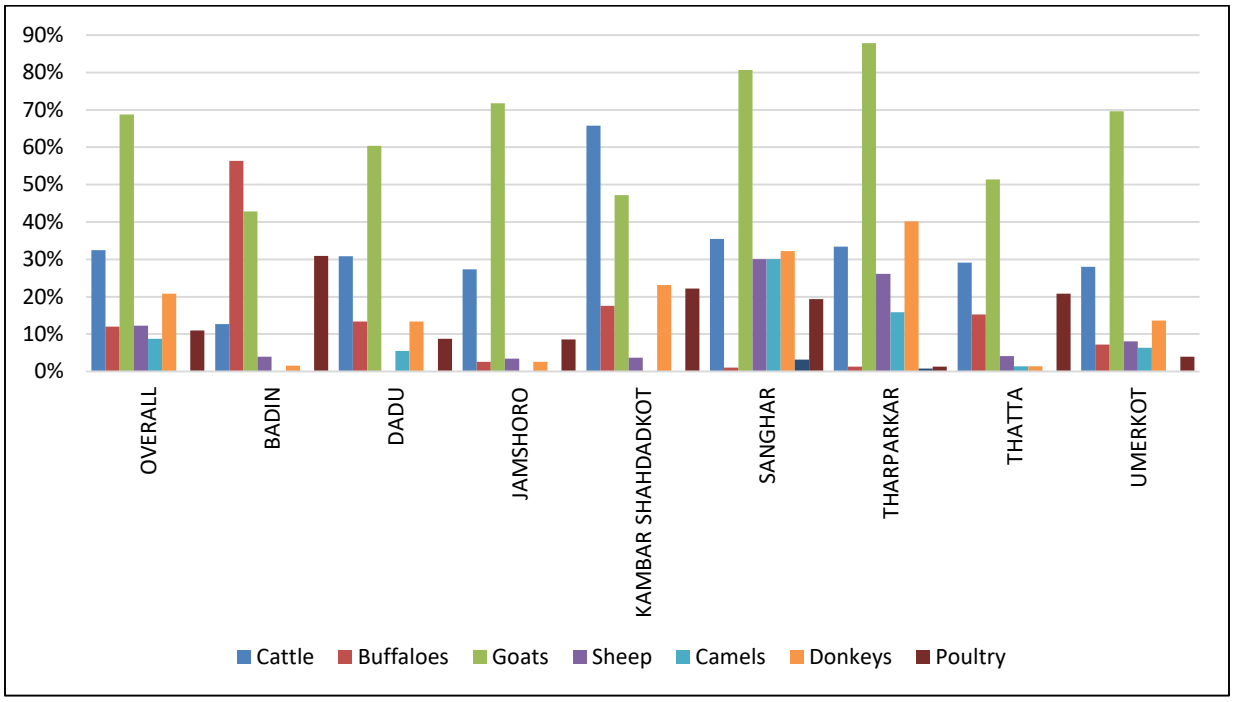


Figure 26: Ownership of Livestock / Poultry by Geography and Gender



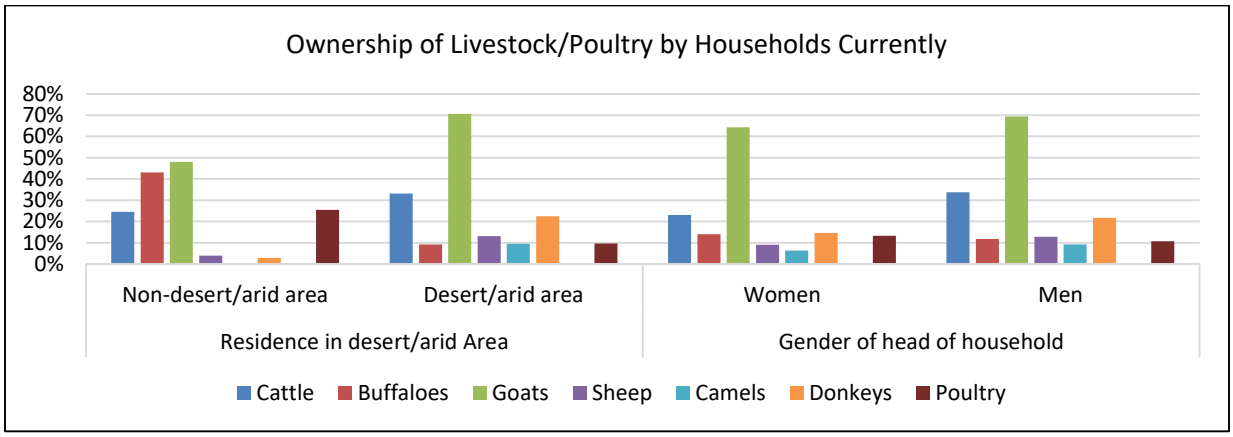
Overall, 32% of the surveyed households currently own cattle, (highest 66% in Kambar Shahdadkot), 12% currently own buffaloes (highest 66% in Badin), 69% own goats (highest 88% in Tharparkar), 12% own sheep (highest 30% in Sanghar), 9% own camels (highest 30% in Sanghar), 21% own donkeys (highest 40% in Tharparkar). On average, 11% of surveyed households own poultry (highest 31% in Badin) (Figure 27).

Figure 27: Ownership of Livestock / Poultry by District Currently



A higher proportion of surveyed households in desert/arid areas, compared with non-desert/arid area, currently own cattle, goats, sheep, camels, donkeys, whereas the reverse holds true for buffaloes and poultry. A higher proportion of men headed households compared with women headed households own all types of livestock except buffaloes and poultry (Figure 28).

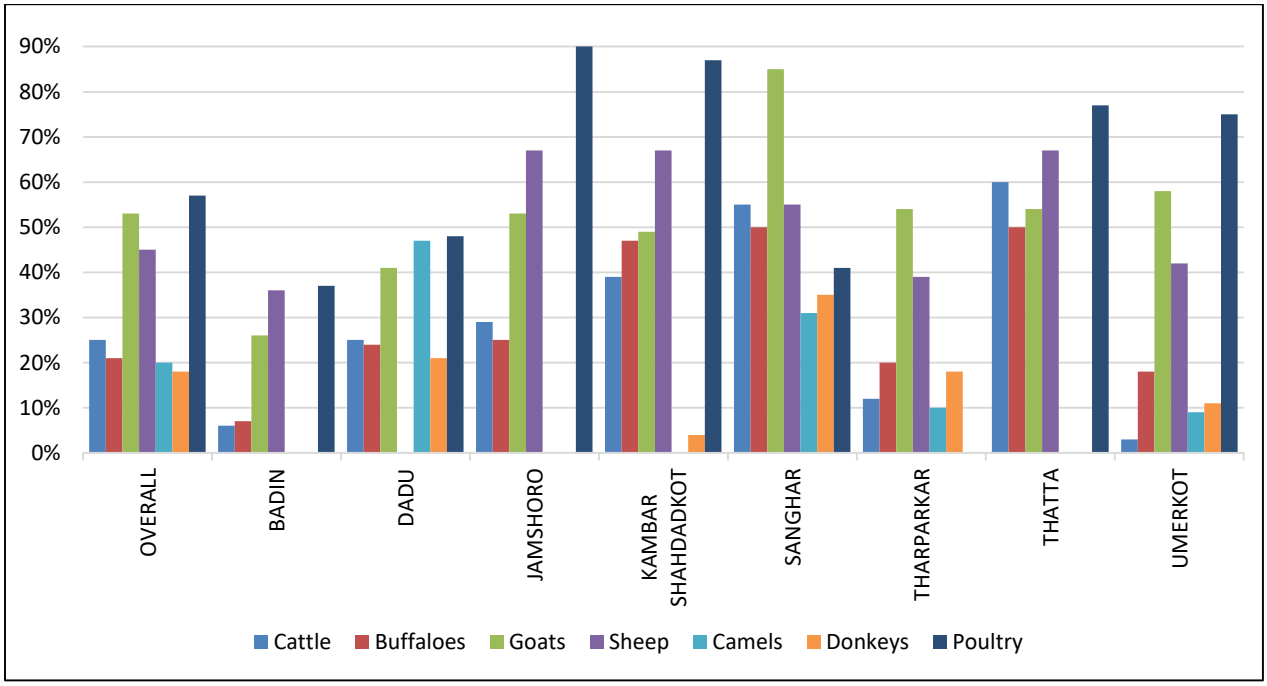
Figure 28: Ownership of Livestock / Poultry by Geography and Gender



Livestock Losses

The current episode of drought has also adversely affected the livestock population. Of the surveyed households who own livestock, 25% reported deaths of cattle (highest 60% in Thatta) during the past six months, 54% reported deaths of goats (highest 85% in Sanghar), deaths of sheep by 45% (highest 67% each in Jamshoro, Kambar Shahdadkot and Thatta), deaths of buffaloes by 21% (highest 50% each in Sanghar and Thatta), deaths of camels by 20% (highest 47% in Dadu), donkeys by 18% (highest 35% in Sanghar), whereas 57% reported deaths of poultry (highest 90% in Jamshoro) (Figure 29)[14].

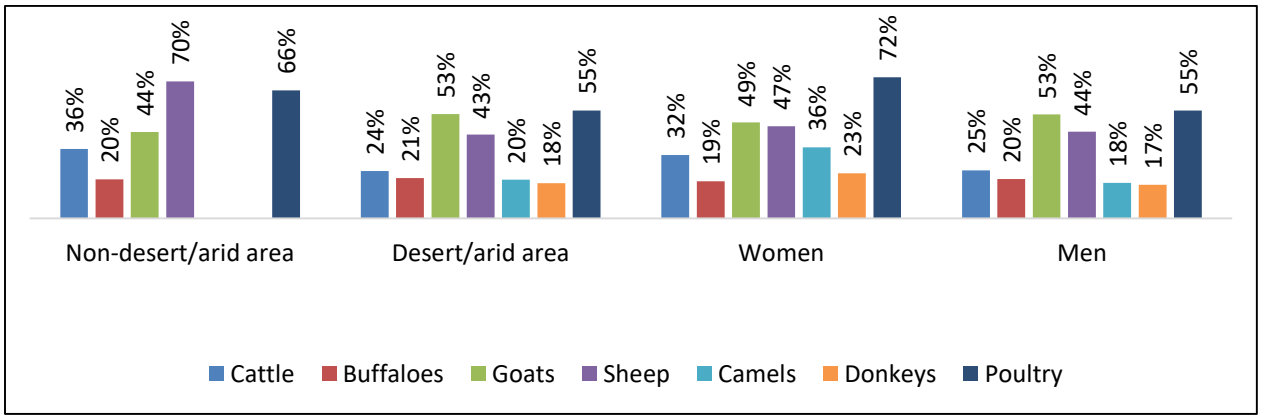
Figure 10: Percentage of Households Reported Deaths of Livestock / Poultry during Past Six Months



Proportionally more households have reported deaths of goats and sheep in desert/arid areas, whereas reverse is true for other animals and poultry. Proportionally more women headed households have reported deaths of cattle, sheep, camels, donkeys and poultry compared with men headed households (Figure 30).

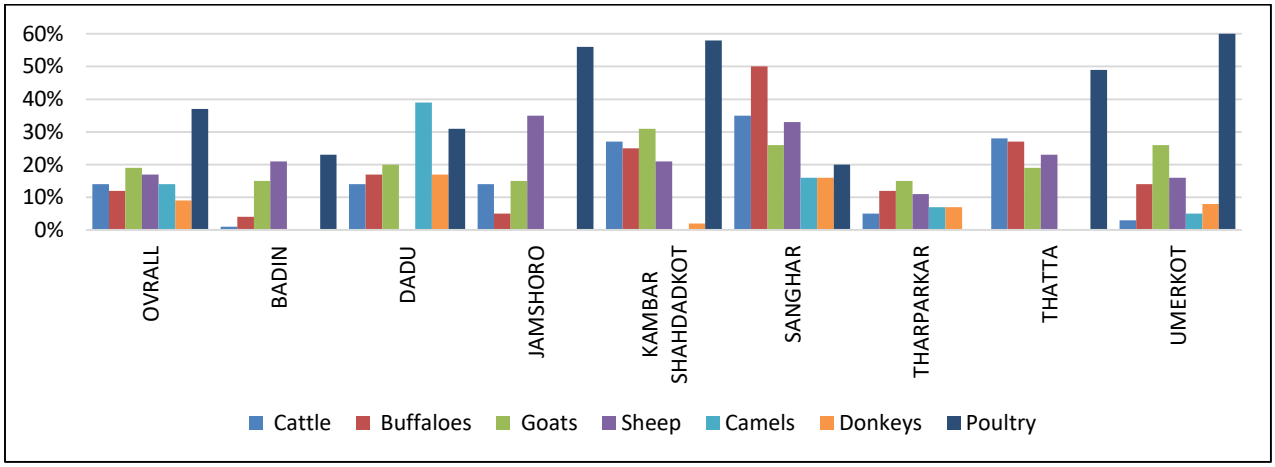
[14] These figures refer to percentage of surveyed households who reported death of one or more animal/poultry during past six months. As shown in previous figures, not all surveyed households owned all types of livestock.

Figure 30: Percentage of Households Reported Deaths of Livestock and Poultry During Past Six Months by Geography and Gender



In terms of percentage of livestock and poultry died during past six months, the surveyed households reported, overall, deaths of 14% of the cattle that they owned six months ago (highest 35% in Sanghar), 12% of buffaloes (highest 15% in Sanghar), 19% of goats (highest 31% in Kambar Shahdadkot), 17% of sheep (highest 35% in Jamshoro), 14% of camels (highest 39% in Dadu), 9% of donkeys (highest 17% in Dadu) and 37% of poultry (highest 60% in Umerkot)[15]. The deaths/losses of animals are reported for surveyed households only and these deaths/losses occurred during past six months preceding the survey. These numbers cannot be generalized to the entire district (Figure 31)[16].

Figure 31: Percentage of Livestock / Poultry Died during Past Six Months by District

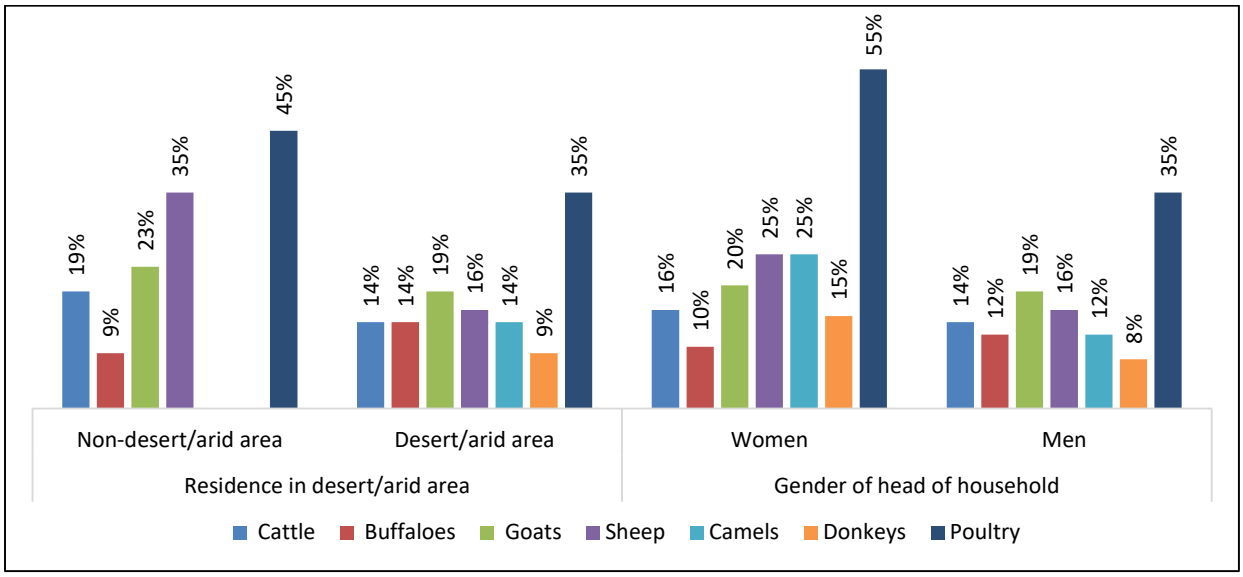


[15] The percentage of livestock/poultry died has been computed only for those surveyed households which owned any animal/poultry six months ago and reported death of one or more animal/poultry died during the past six months preceding the survey.

[16] As per the findings of Sindh Drought Needs Assessment 2015-16 conducted in drought affected areas of 9 districts, the districts experienced average change in cattle/buffaloes as follows: in Badin (-8%), Dadu (-36%), Jamshoro (-56%), Sanghar (-28%), Tharparkar (-67%), Thatta (-35%) and Umerkot (-37%). In case of goats/sheep, Badin (-14%), Dadu (-46%), Jamshoro (-50%), Sanghar (-32%), Tharparkar (-59%), Thatta (-49%) and Umerkot (-38%). Similarly, for poultry, Badin (12%), Dadu (-31%), Jamshoro (-54%), Sanghar (-52%), Tharparkar (-57%), Thatta (-14%) and Umerkot (-46%).

During past six months preceding the survey, proportionally more buffaloes, camels, and donkeys died in desert/arid areas, whereas proportionally more cattle, goats, sheep and poultry died in non-desert/arid areas. Deaths of all types of livestock and poultry except buffaloes were higher among women headed households compared with men headed households (Figure 32).

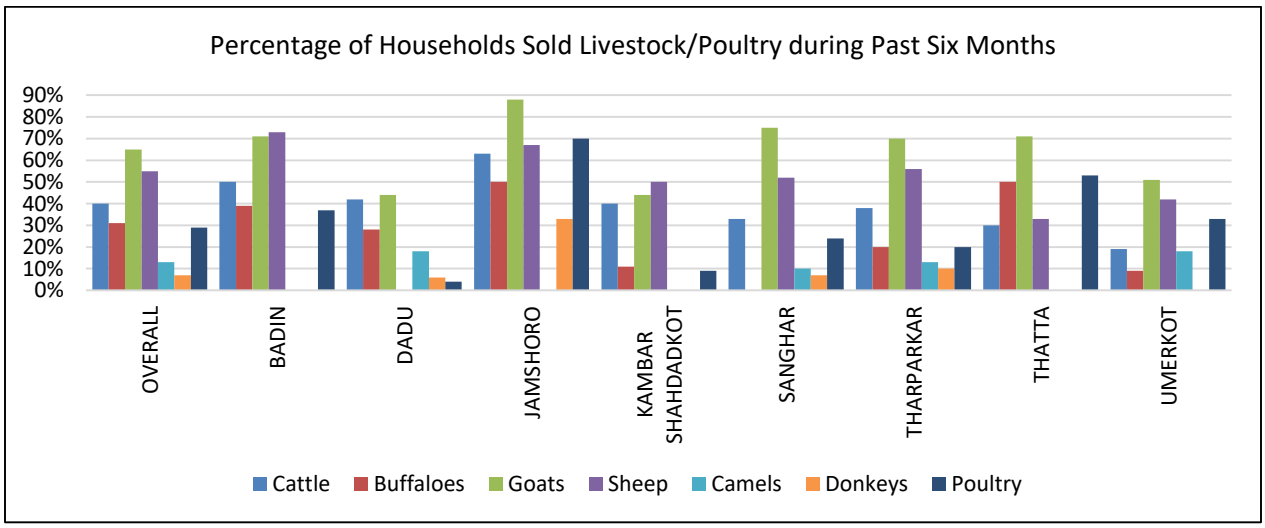
Figure 32: Percentage of Livestock / Poultry Died by Geography and Gender



Livestock Sales

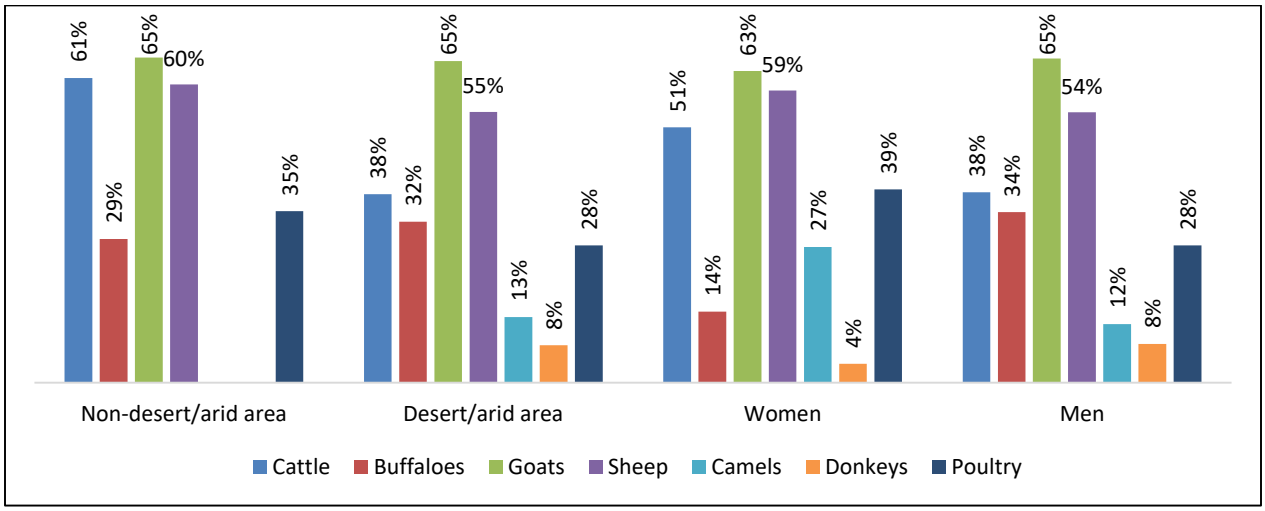
The surveyed households also reported sale of livestock/poultry to meet their food and other household needs (normal sale) and also due to occurrence/risk of disease, lack of water and fodder for livestock (distress sale). Overall, 40% of the surveyed households that keep livestock sold one or more cattle during the past six months, 31% sold one or more buffaloes, 65% sold goats, 55% sold sheep, 13% sold camels, and 7% sold donkeys and 29% sold poultry. The sale of cattle, goats, donkeys and poultry has been reported mostly by surveyed households in Jamshoro, buffaloes by households in Jamshoro and Thatta, sheep by households in Dadu and camels by households in Dadu and Umerkot (Figure 33).

Figure 11: Percentage of Households that Sold Livestock / Poultry during Past Six Months by District



The sale of buffaloes, camels and donkeys has been reported mostly by surveyed households in desert/arid areas, the sale of cattle, sheep and poultry in non-desert/arid areas, whereas similar proportion of households in both areas reported sale of goats. The analysis by gender lens indicates that more women headed households have sold cattle, sheep, camels and poultry, whereas more men-headed households have sold buffalos and donkeys (Figure 34).

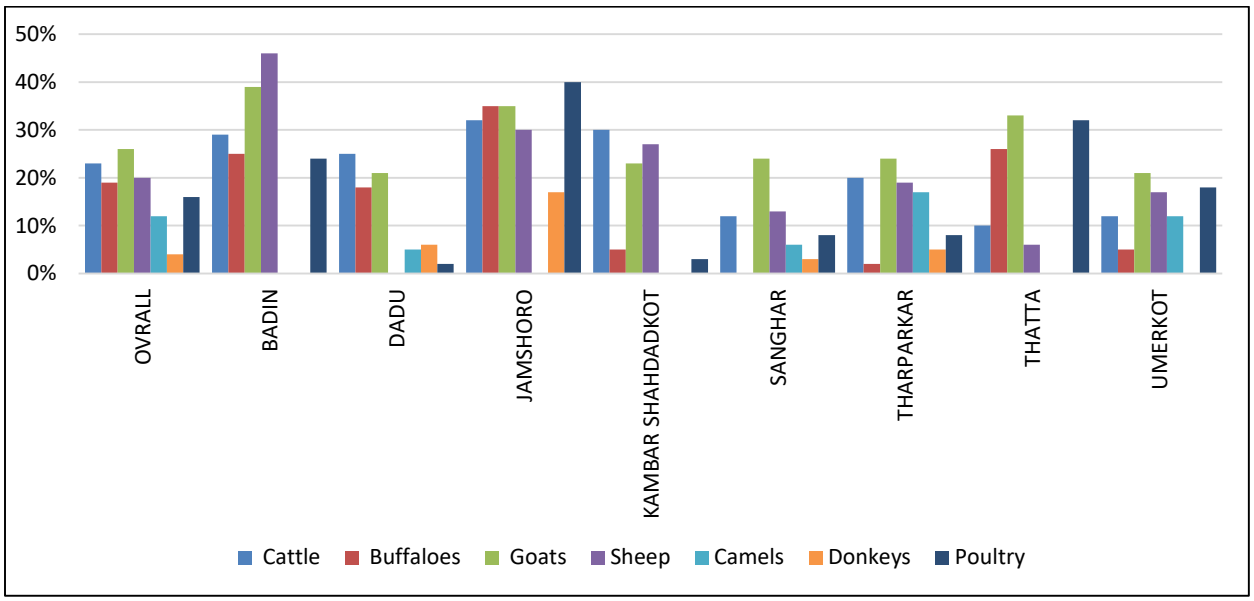
Figure 12: Percentage of Households Sold Livestock / Poultry during Past Six Months by Geography and Gender



In the past six months preceding the survey, 23% of cattle were sold, 19% of buffaloes, 26% of goats, 20% of sheep, 12% of camels, 4% of donkeys, and 16% of poultry by the survey households[17]. Across the districts, percentage of cattle, buffaloes, donkeys and poultry sold is highest in Jamshoro, goats and sheep are highest in Badin, whereas sale of camels is highest in Tharparkar (Figure 35).

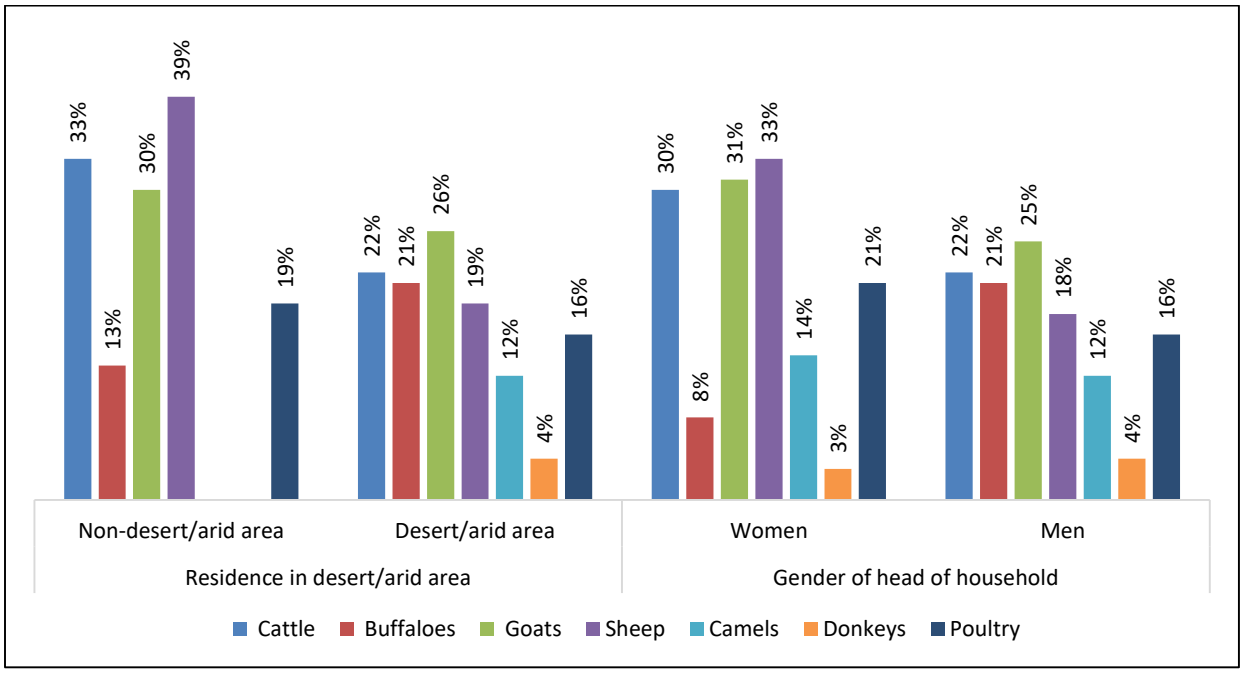
[17] This indicator is based on information on sale of one or more livestock/poultry reported by households during the past six months preceding the survey.

Figure 13: Percentage of Livestock / Poultry Sold during Past Six Months by District



Further, percentage of cattle, goats, sheep, and poultry sold is higher in non-desert/arid areas whereas more buffaloes, camels and donkeys were sold in desert/arid area. Except buffaloes and slightly for donkeys, sale of all other livestock and poultry has been reported more by women headed households (Figure 36).

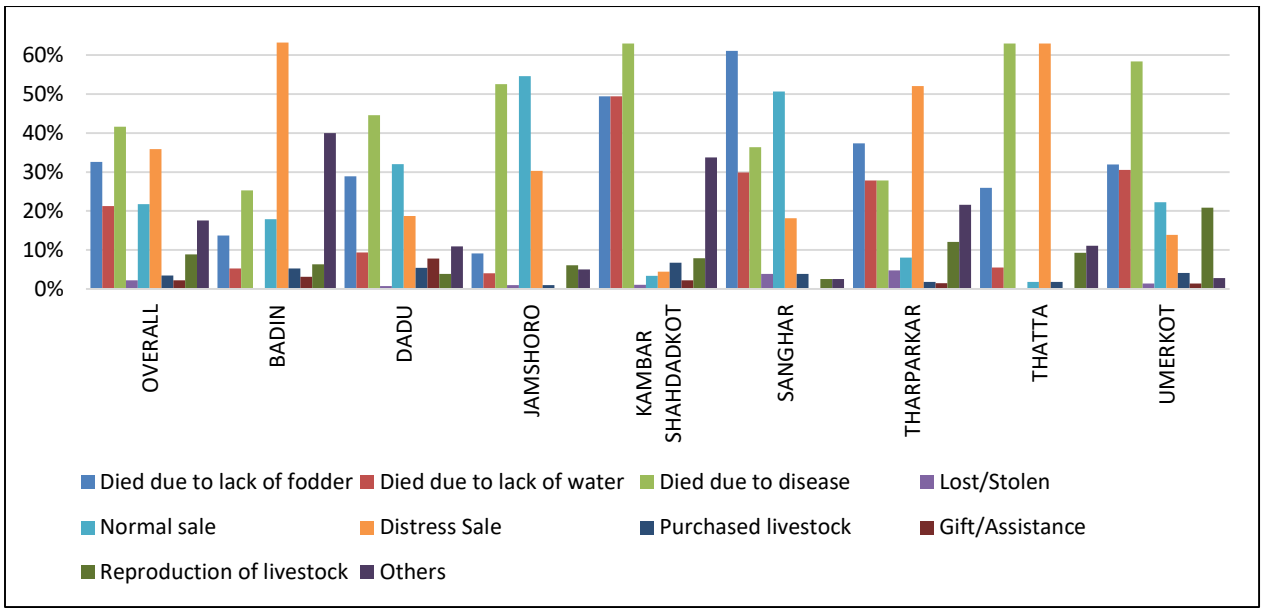
Figure 36: Percentage of Livestock / Poultry Sold by Geography and Gender



Reasons for Change in Livestock/Poultry Ownership Compared to Six Months Ago

Overall, the main reasons for deaths of livestock as reported by surveyed households are lack of fodder, livestock diseases and lack of water, particularly in Kambar Shahdadkot, Sanghar, Tharparkar and Umerkot, whereas distress sale is the main reason for decrease of livestock particularly in Badin, Tharparkar and Thatta (Figure 37).

Figure 14: Reason for Change in Livestock / Poultry Ownership Compared to Six Months Ago by District



The analysis of FGDs data shows that 54% of the surveyed communities reported decrease in sale of livestock/poultry during the dry spell, whereas 46% reported dry spell has increased the sale of livestock/poultry. The main reasons for selling live animals/poultry birds during the months of July-September 2018 were: need for money reported by most of the surveyed communities, lack of fodder/animal feed in their field/grazing land, cannot afford to buy fodder/feed, old age/sickness, ack of shelter (2%).

Overall, the average percentage of households that slaughtered their own animals in the last three months was 4% (of which 5% in Thatta and 2% in Dadu), and most of the community members (94%) who slaughtered their own animals, did it because of the drought.

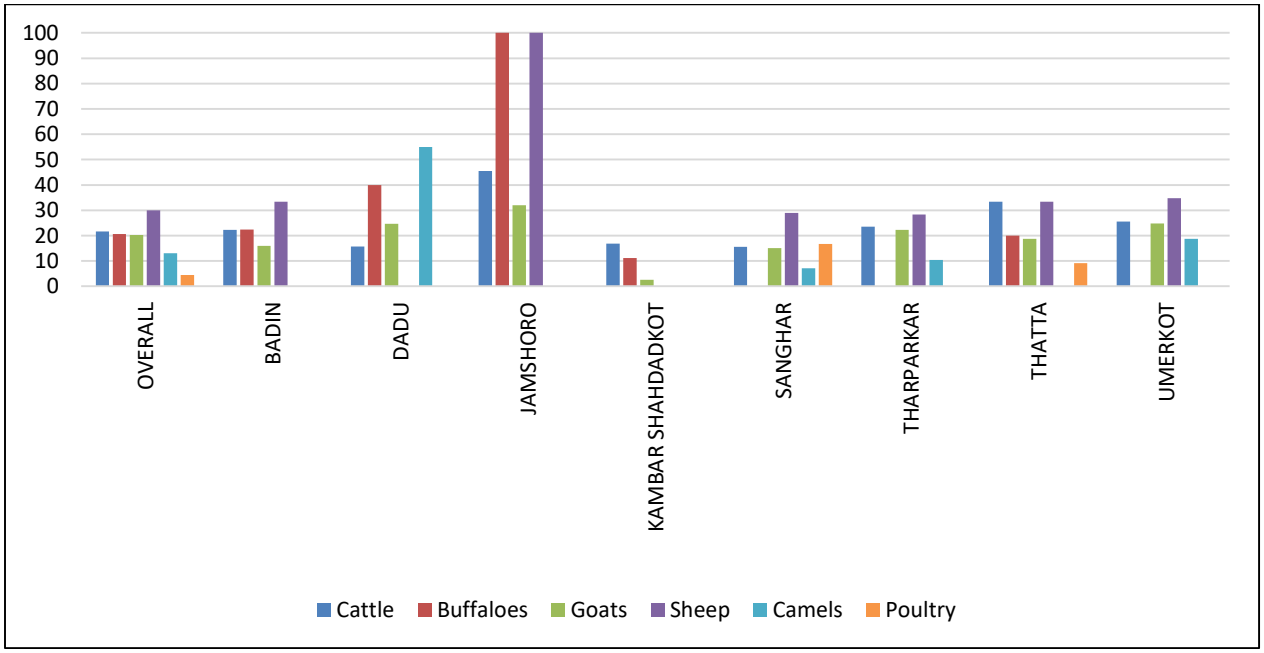
Among the main sources of feed for livestock in the community/villages are, green/dry fodder own produced/purchased from the market followed by plants/bushes (32%), grazing in open field (25%) and wheat/other grains (3%). **T**he pastures in the area are not available as reported by 54% of the surveyed communities, little availability is reported by 37% surveyed communities, and adequate availability by 10%.

The most common diseases occurred to livestock in the surveyed communities during past six months include FMD, PPR, Gomboro, CCPP, indigestion, internal/external parasite, and manges/surra. The most common diseases occurred to poultry during the last six months were infectious bronchitis in, chicken pox and new castle disease[18].

Current Status of Vaccination of Livestock/Poultry

When taking into account that the drought increased the risk for livestock/poultry diseases, there is an urgent need for livestock/poultry vaccination. Currently, overall, very low proportion of livestock/poultry is vaccinated: around 20% of cattle, buffaloes and goats, 30% of sheep, 13% of camels and only 4% of poultry birds. Across the districts, the proportion of cattle that is vaccinated is lowest in Dadu and Sanghar, of buffaloes in lowest in Sanghar, Tharparkar and Umerkot, of goats and sheep is lowest in Kambar Shahdadkot, and of camels is lowest in Thatta (Figure 38).

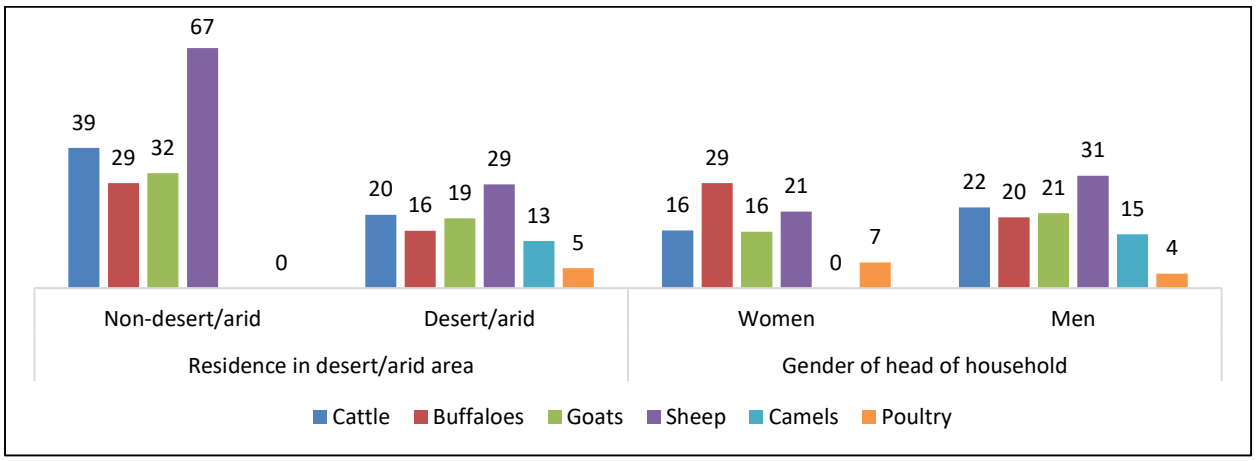
Figure 15: Percentage of Livestock / Poultry Currently Vaccinated by District



Significantly higher proportions of cattle, buffaloes, goats, sheep, camels and poultry are currently vaccinated in surveyed non-desert/arid areas than in desert/arid areas. Lower proportions of cattle, goats, sheep and camels are vaccinated in women headed households than male headed households (Figure 39).

[18] **Acronyms:** CCPP- Contagious Caprine Pleuro Pneumonia, FMD- Foot and Mouth Disease, PPR- Peste des petits ruminants

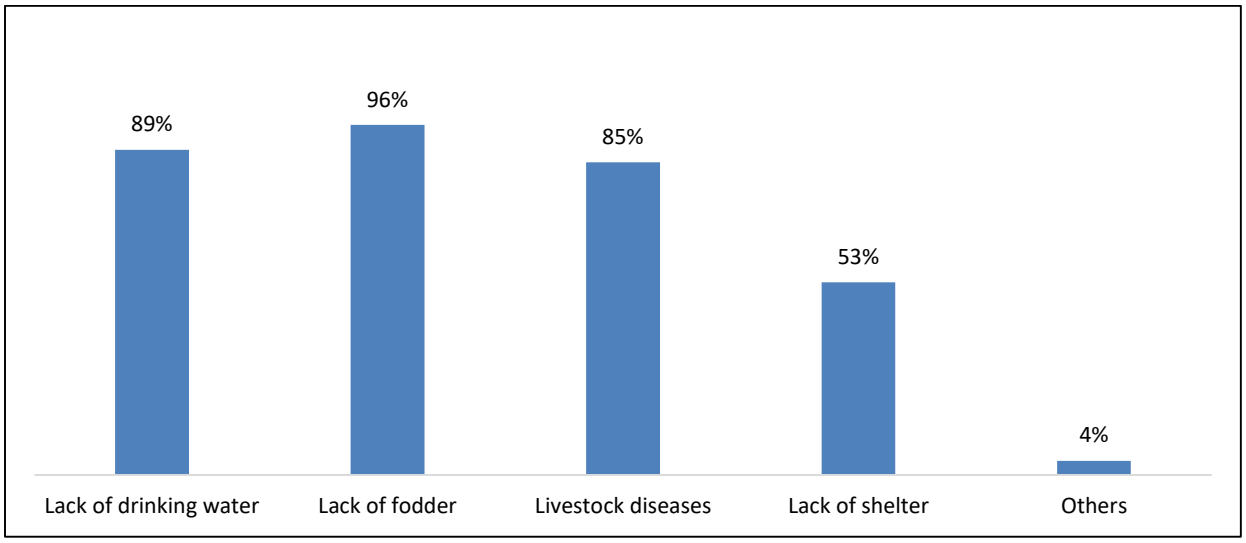
Figure 39: Percentage of Livestock / Poultry Currently Vaccinated by Geography and Gender



Problems Faced by Livestock Owners

Among livestock holders, 96% reported lack of fodder for animals, 89% reported lack of drinking water for animals, 83% reported livestock diseases and 53% reported lack of shelter for animals as significant problems (Figure 40).

Figure 40: Main Problems for Livestock

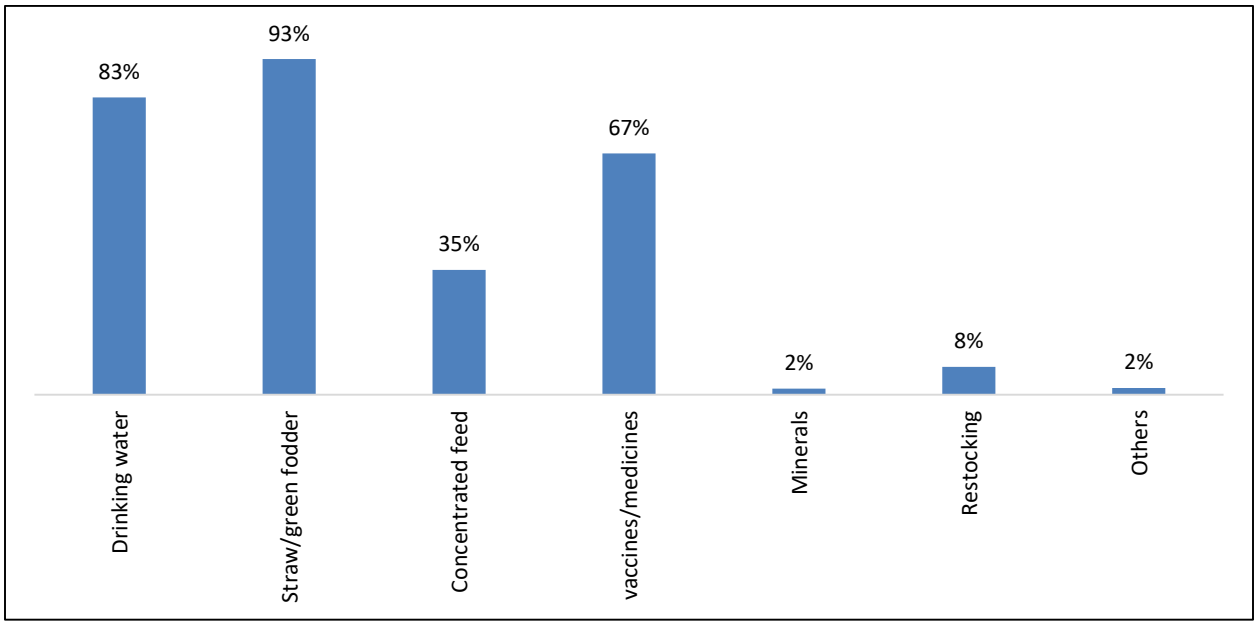


Livestock Support Needed by Livestock Owners

The top three items/supports required by livestock owners (in order of importance) are: straw/green fodder (by 93% livestock holders), drinking water (by 83%), vaccines/medicines (by 67%) and concentrated

feed (by 35%). Except vaccines/medicines, there is a slight difference in support required by livestock holders in desert/arid and non-desert/arid areas (Figure 41).

Figure 41: Overall Livestock Support Required



Household Assets Ownership, Livelihood/Income Sources and Food Expenditure

Assets Ownership

Assets owned by a household can reflect general living conditions and can help assess their coping capacity, purchasing power, allowing for comparisons in poverty levels. The aim of calculating asset ownership as part of this drought assessment was to evaluate the situation within households in drought affected districts.

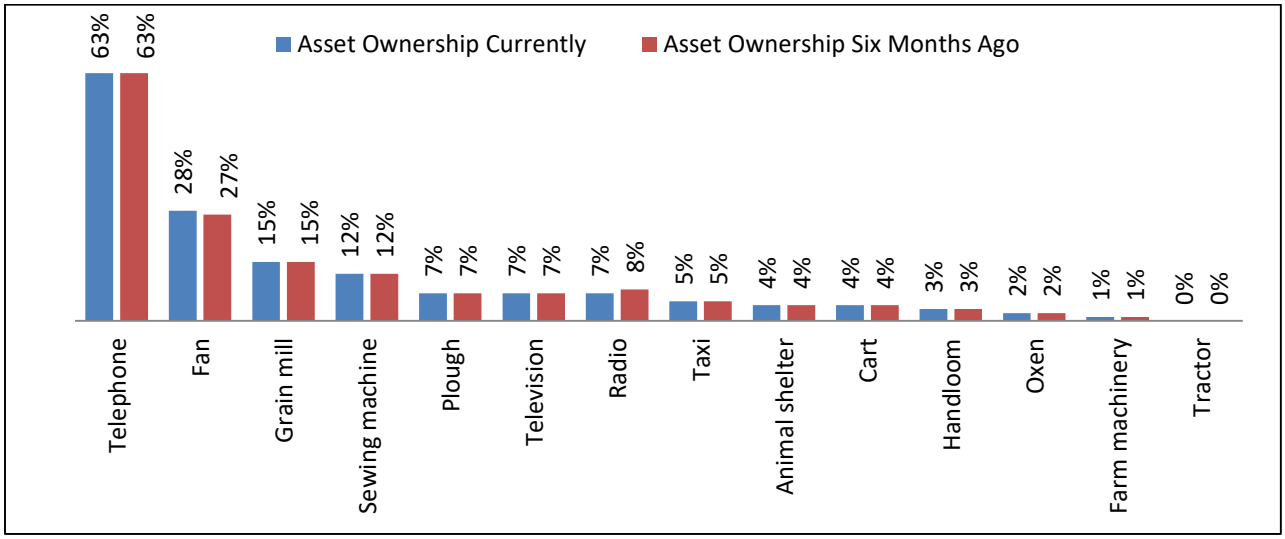
Current Asset Ownership Comparison with Past Six Months - Overall

Current asset ownership status of the surveyed households was compared with their situations 6 months ago to observe any changes in asset ownership. In particular, the data was collected to check adoption of negative coping strategies, specifically sale of household assets to meet household expenditure needs. As per data collected, the situation at the time of assessment almost remains the same as it was 6 months ago and, neither trends of asset sale to fulfil household needs nor buying new assets was observed. Only marginal (1%) changes were reported, particularly for non-productive assets including fans and radios.

The graph below represents the overall asset ownership status in the communities surveyed. While comparing the productive assets with non-productive, fewer households (maximum 7%) reported to have productive assets like plough, taxi, cart, livestock etc., while 12% reported using sewing machines, and 15% using grain mills.

While asking about the non-productive assets, maximum ownership was reported having mobile phones (63%), while 28% confirmed owning electric fans, and 8% confirmed ownership of televisions and radios in their houses. Non-ownership of fans with 72% of the households could be due to lack of electricity or non-affordability of an essential item for household comfort (Figure 42).

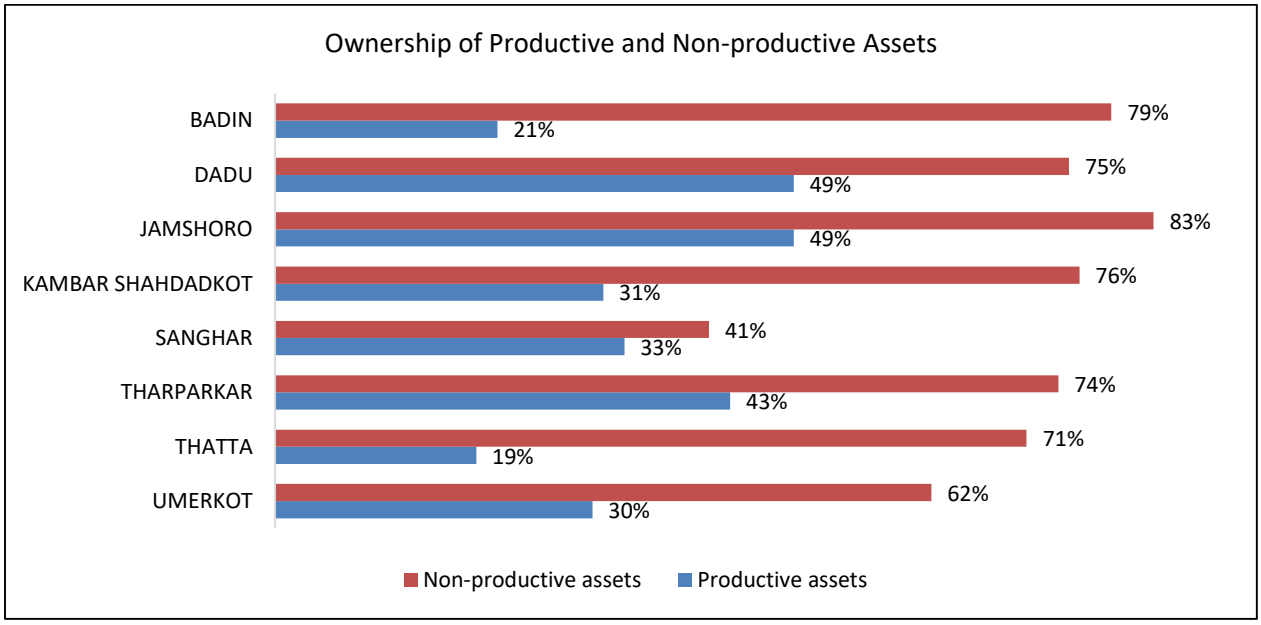
Figure 42: Asset Ownership- Current and Six Months ago by District



Current asset ownership – District wise

Asset ownership has not changed for the last six months in any of the assessed districts. The graph below shows the percentage of households that reported non-ownership of assets. While comparing productive assets versus non-productive assets, the majority of the households among all districts don't own productive assets. The graph below represents a district-wise analysis of household ownership of productive and non-productive assets (Figure 43).

Figure 43: Ownership of Productive and Non-productive Assets by District

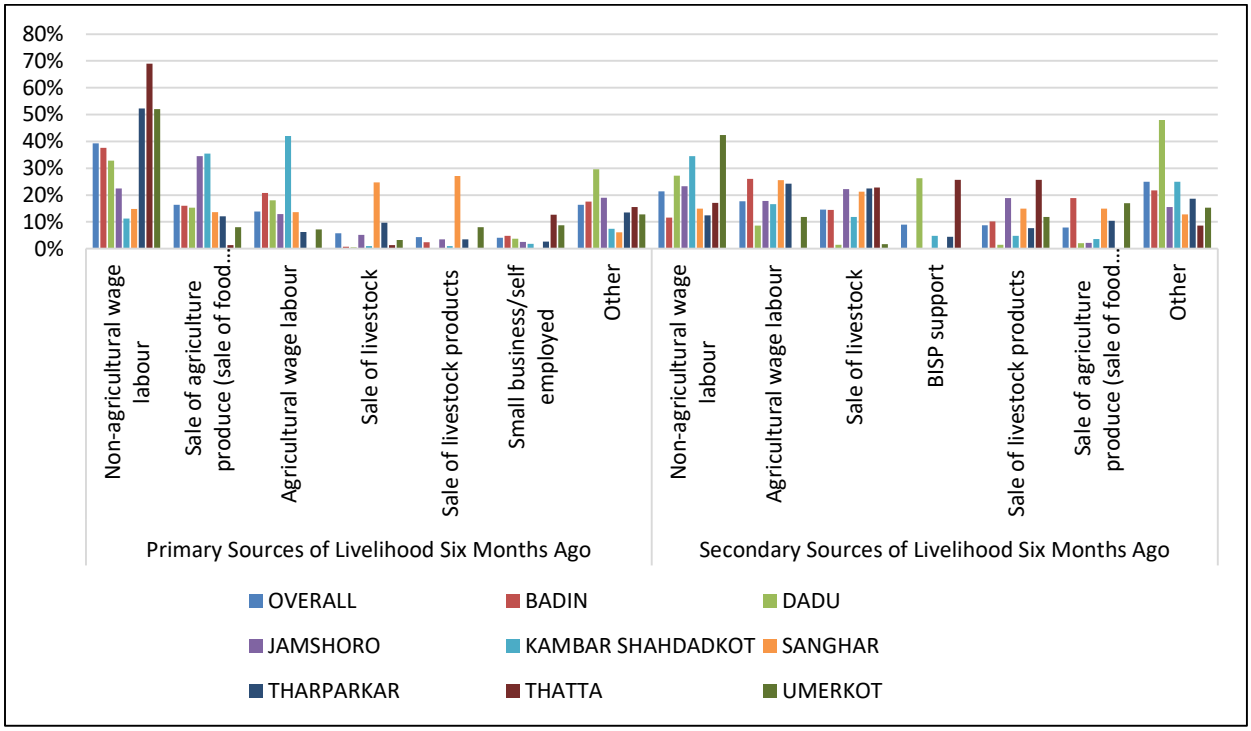


Livelihood/Income Sources

Primary and Secondary Livelihood/Income Sources

Among the main sources of income six months ago, 39% of surveyed households reported non-agricultural wage labor as primary source of livelihood/income and 21% reported it as secondary. Agricultural wage labor was the second main source of livelihood/income (for 16% households as primary and for 18% as secondary) followed by sale of agricultural produce (sale of food/cash crops, vegetables/fruits) for 16% as primary and for 8% as secondary, sale of livestock/livestock products (10% as primary and 24% as secondary) and other sources (for 16% households as primary and 25% as secondary sources) (Figure 44).

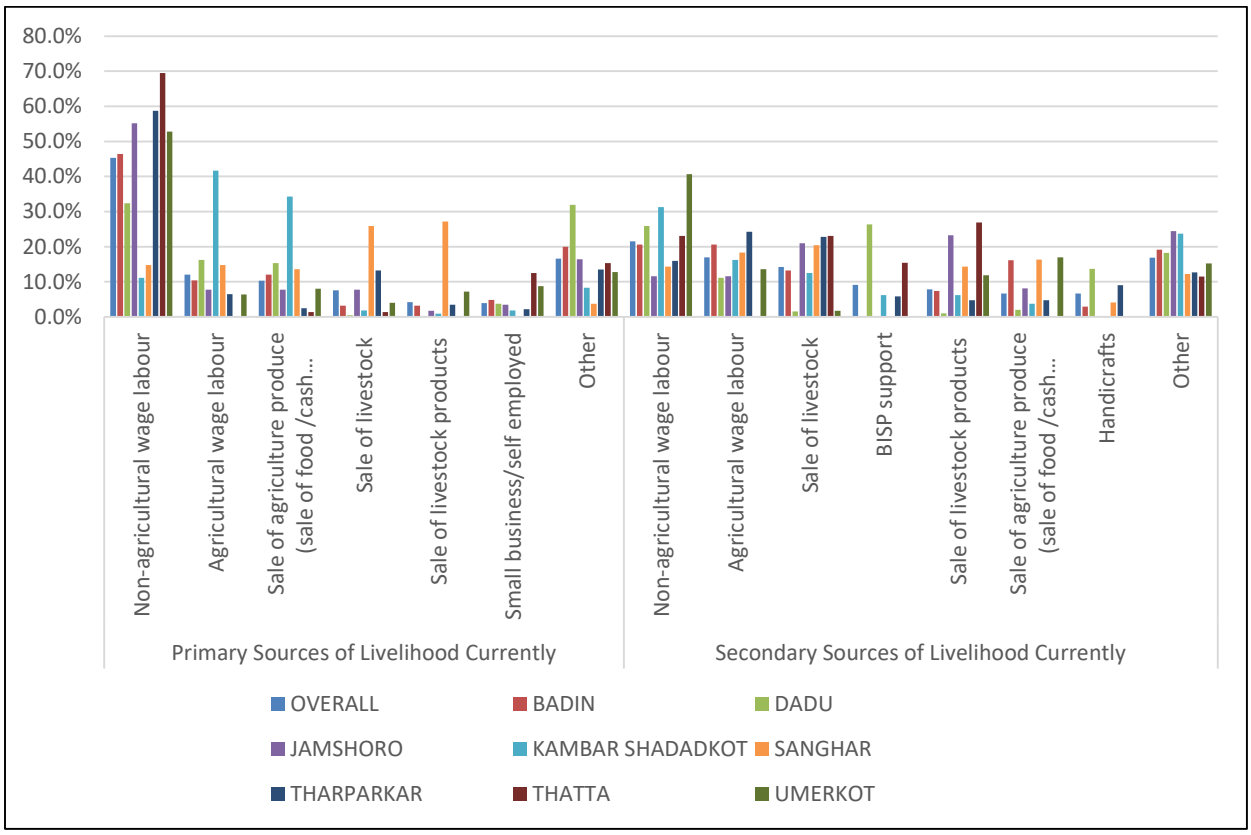
Figure 44: Household's Main Sources of Livelihood/Income Six Months Ago



The surveyed households have experienced a shift in livelihood/income sources over the past six months. Currently, among the main sources of livelihood/income, non-agricultural wage labor is still reported by most of surveyed households but slightly increased (45% as primary and 22% as secondary) followed by sale of livestock/livestock products, (12% as primary and 24% as secondary) agricultural wage labor, (12% as primary and 17% as secondary), sale of agricultural produce, (sale of food /cash crops/vegetables/fruits) and other sources (17% each as primary and secondary).

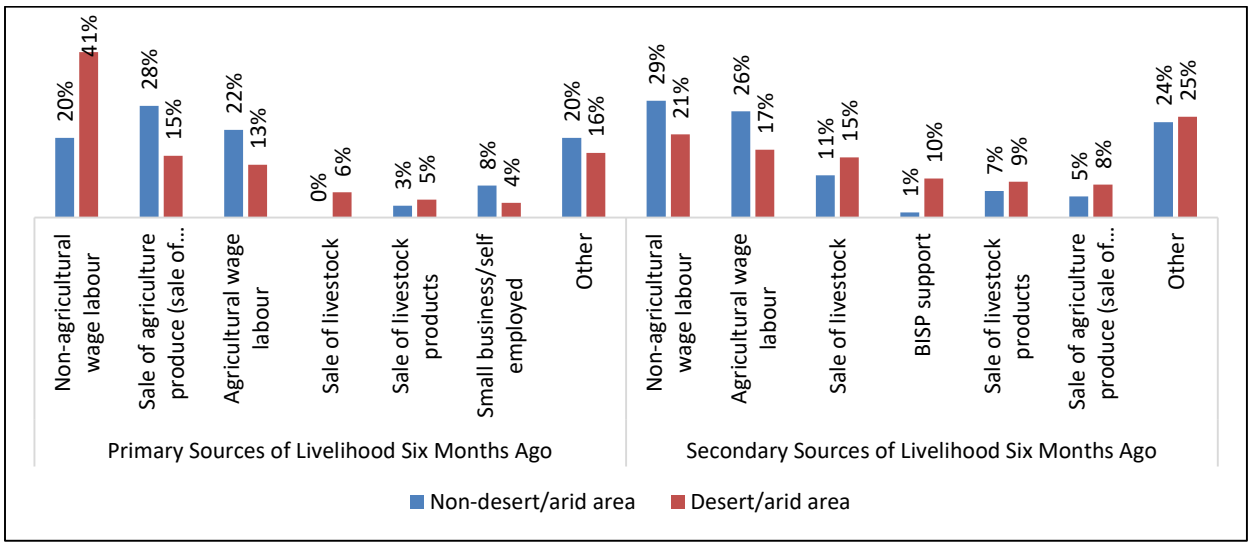
Across the districts, non-agricultural wage labor is a primary source of livelihood/income currently for most of the surveyed households in Thatta (69%) followed by Tharparkar (59%) and Jamshoro (55%). Agricultural wage labor-the second most reported source of livelihood/income is more common in Kambar Shahdadkot (42%), followed by 16% in Dadu and 15% in Sanghar. Sale of agriculture produce (sale of food/cash crops/vegetables/fruits) is now the fourth most reported primary source of livelihood/income (it was the third primary source six months ago) and reported mostly by surveyed households in Kambar Shahdadkot (34%) followed by 15% in Dadu and 14% in Sanghar (Figure 45).

Figure 45: Household's Main Sources of Livelihood/Income Currently by District



Furthermore, non-agriculture wage labor is currently main source of livelihood/income for surveyed households in desert/arid areas and men headed (46% each) compared with 35% in non-desert/arid areas and 37% women headed households (Figure 46).

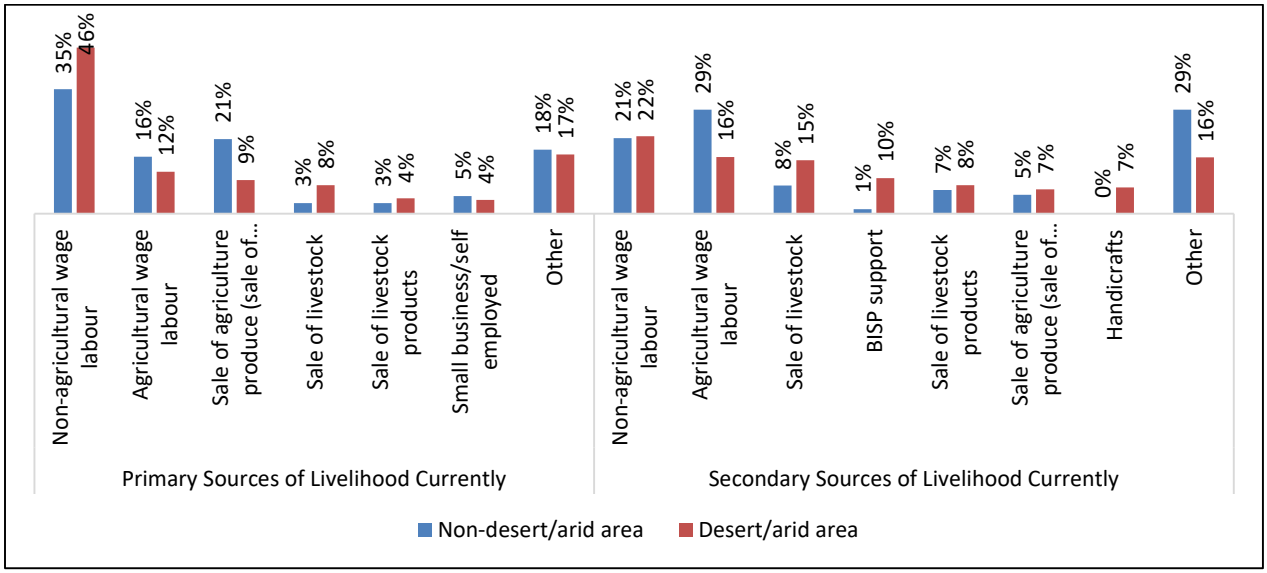
Figure 46: Household's Main Sources of Livelihood/Income Six Months Ago by Geography



Furthermore, in the last six months, non-agricultural wage labor has become the main source of livelihood/income for more households, particularly in desert/arid areas. Agricultural wage labor as primary/secondary source of livelihood/income slightly increased in non-desert/arid areas whereas it reduced in desert/arid areas. Proportion of sale of agricultural produce among main sources of livelihood/income reduced over six months, particularly more in desert/arid areas (Figure 47).

Contrary to household interviews, 91% of the surveyed in FGDs, reported that casual labor has decreased during the current dry spell (all communities in Dadu, Kambar Shahdadkot and Thatta reported so), whereas only 9% reported casual labor increased. Probably, they referred to casual labor in agriculture sector which has seen slight reduction as a source of livelihood/income as per findings of assessment.

Figure 47: Household's Main Sources of Livelihood/Income Currently by Geography



Women's Livelihood/Income Sources

In the surveyed districts, women provide full support to their male members of household in earning of income. The analysis by gender informs that compared to men headed households, proportionally less women headed households were/are earning livelihood/income from non-agricultural wage labour, sale of agricultural produce and sale of livestock/livestock products, whereas more women headed households were/are earning livelihood/income from agriculture wage labour and handicrafts. Over the last six months, non-agricultural wage labour as a source of livelihood/income has increased for both women and men headed households, sale of agricultural produce reduced, whereas agricultural wage labour for women headed households increased but reduced for men headed households (Figure 48 and 49).

Figure 48: Main Sources of Livelihood/Income Six Months Ago by Gender

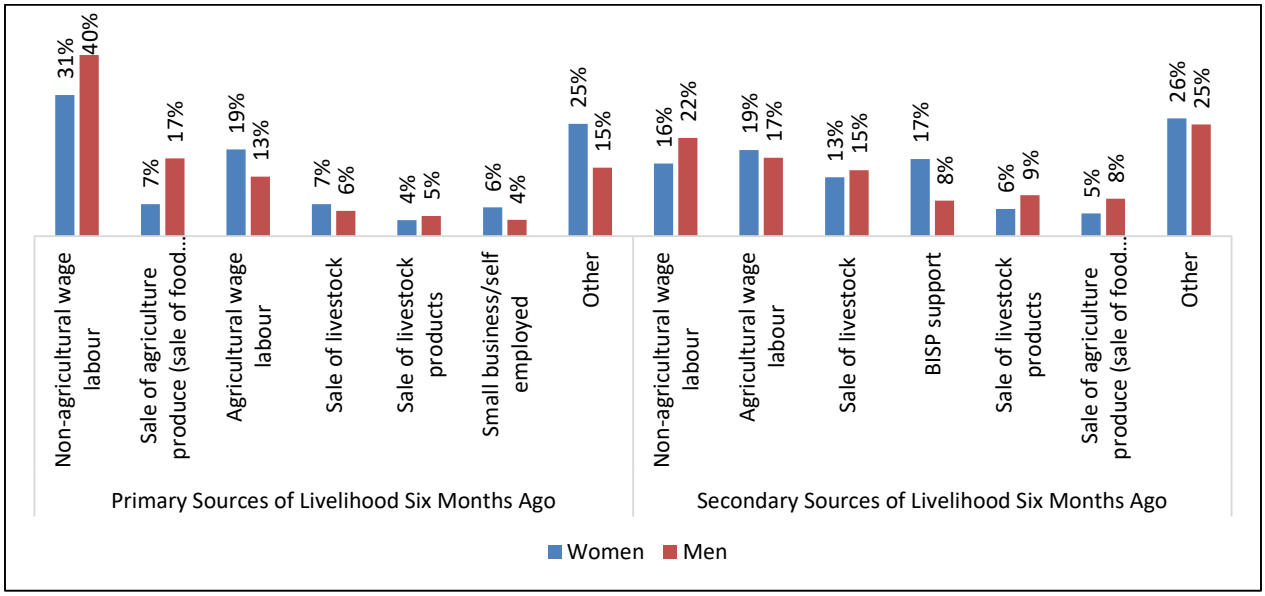
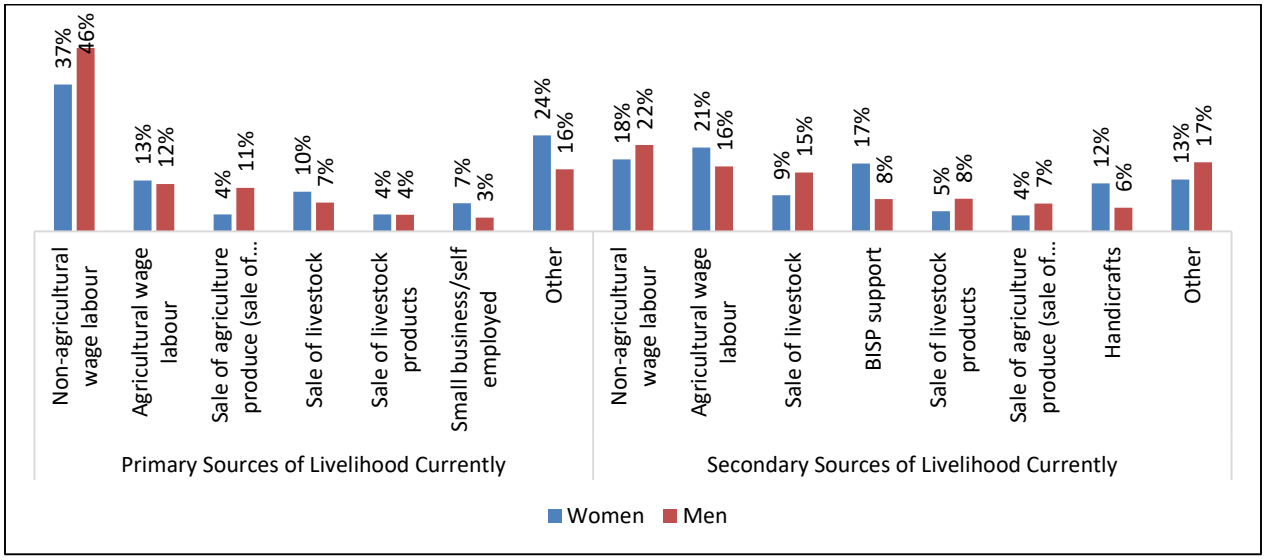


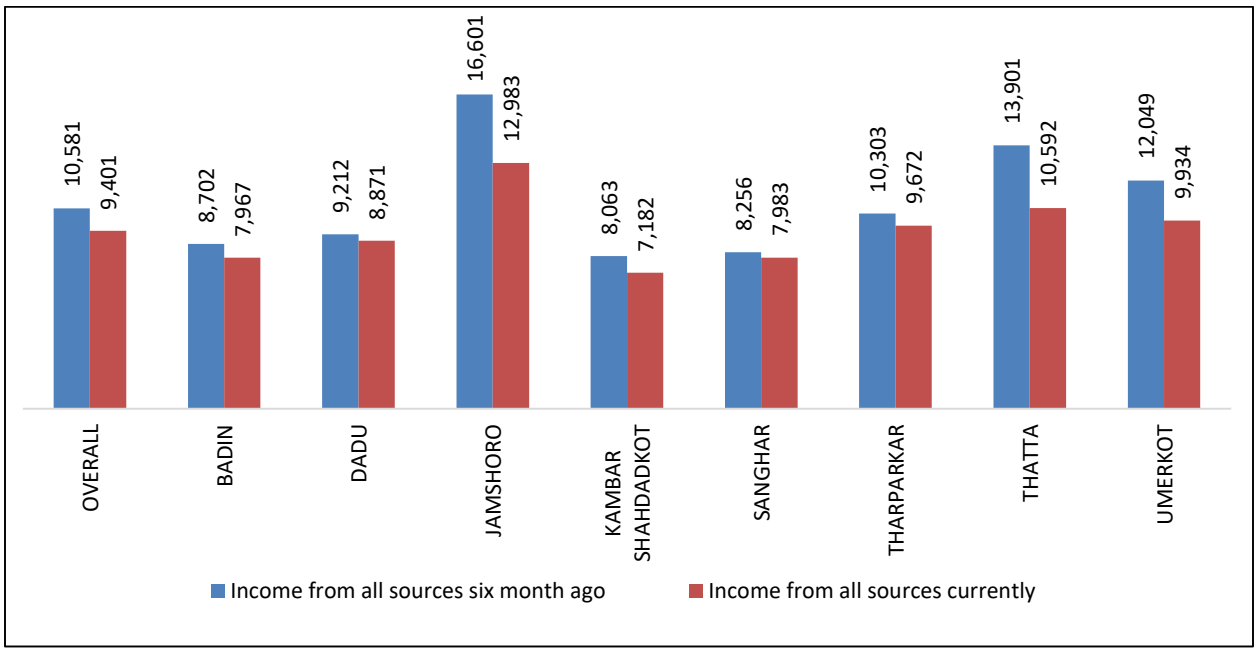
Figure 49: Main Sources of Livelihood/Income Currently by Gender



Household Monthly Income

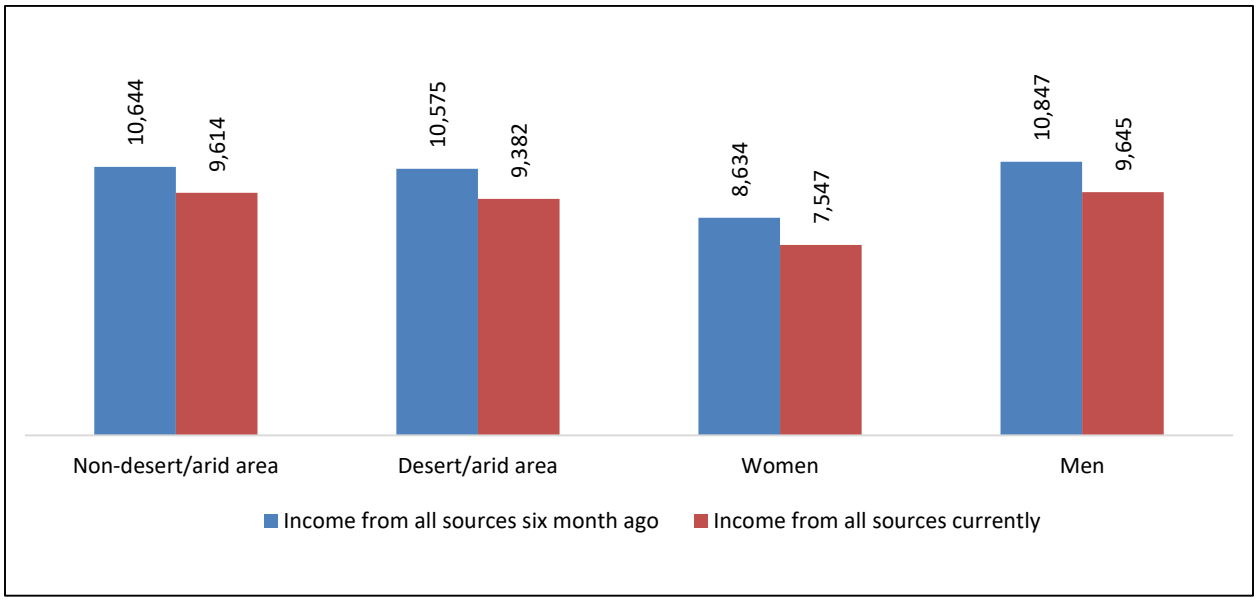
The surveyed households have experienced 11% reduction in income over the past six months. Overall, average monthly income from all income sources was PKR 10, 581 six months ago (highest PKR 16,601 in Jamshoro and lowest PKR 8,063 in Kambar Shahdadkot). Currently, average monthly income is PKR 9,401 (highest PKR 12,983 in Jamshoro and lowest PKR 7,182 in Kambar Shahdadkot) (Figure 50).

Figure 50: Average Monthly Income of Households by District



The analysis by desert/arid status and gender lens show that average monthly income from all sources of surveyed households is lower in desert/arid areas than in non-desert/arid areas, currently (PKR 9,382 vs PKR 9,614) as well as six months ago (PKR 10,575 vs 10,644). Women headed households have lower average monthly income from all sources compared with men headed households currently (PKR 7, 547 vs 9,645) as well as six months ago (PKR 8,634 vs 10,847) (Figure 51).

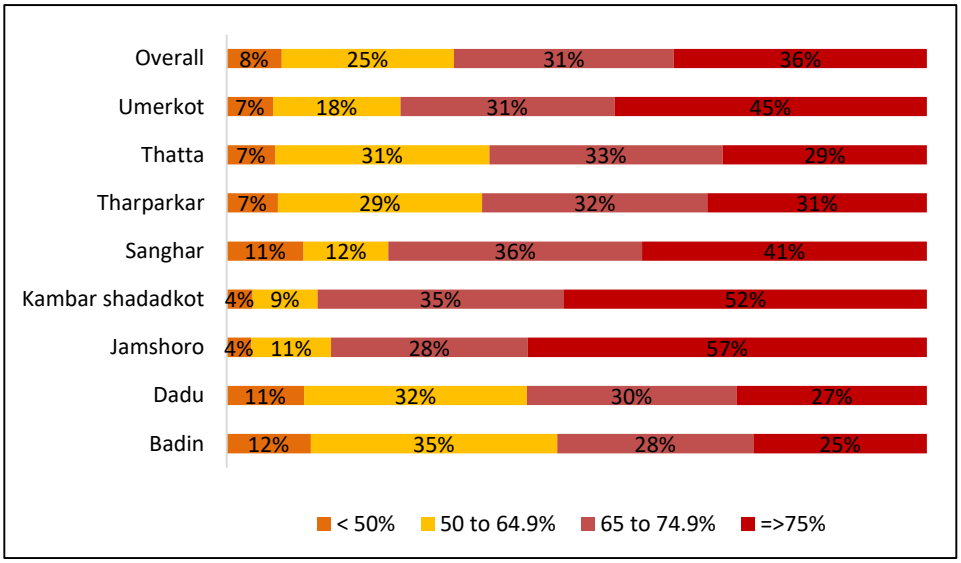
Figure 51: Average Monthly Income of Households by Geography and Gender



As per analysis of FGDs data, most of the communities (97%) reported that household's income has decreased and only 2% of them reported no impact on household's income, whereas 1% reported income has increased. The analysis also indicates that the dry spell also impacted on women's income as 92% communities reported women's income decreased.

Household Expenditure

Figure 52: Food Expenditure Share by District



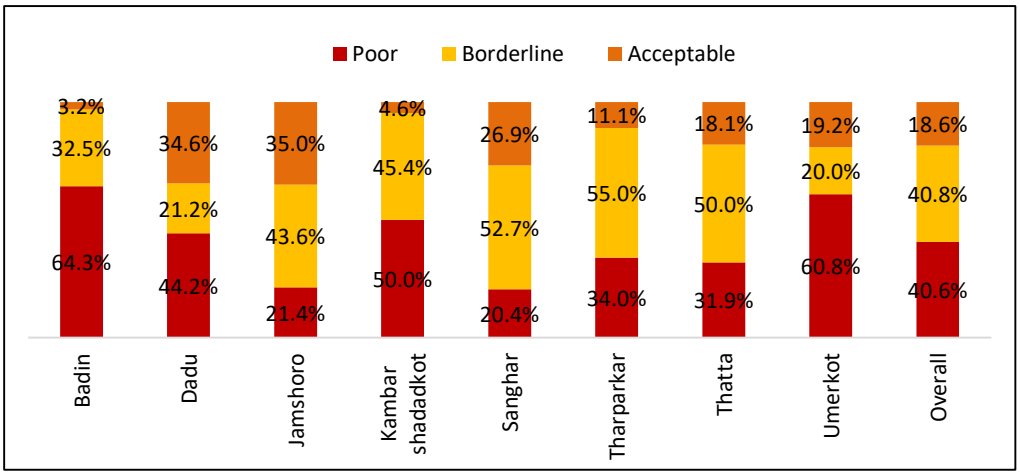
The high share of expenditure spent on food out of the total expenditure is a proxy indicator of household vulnerability and food insecurity. The higher the share of food expenditure, the greater the likelihood that a household has poor food access and higher economic vulnerability. The households were asked about their food and non-food expenditures in the last month prior to the survey. As per the findings of the survey, the households are spending a major proportion of their income on food purchases and compromising on other basic needs (health care, education, others). Overall, 36% of the households spend a very high share (more than 75% of the total household expenditure) on acquiring food. While 31% of the households spend a high share (65-75% of the total expenditure) on food (Figure 52).

Food Security

Food Consumption

The Food Consumption Score (FCS[19]) a proxy indicator of food security is a composite score based on dietary frequency, food frequency and relative nutrition importance of different food groups consumed at the household level.

Figure 53: Food Consumption Groups



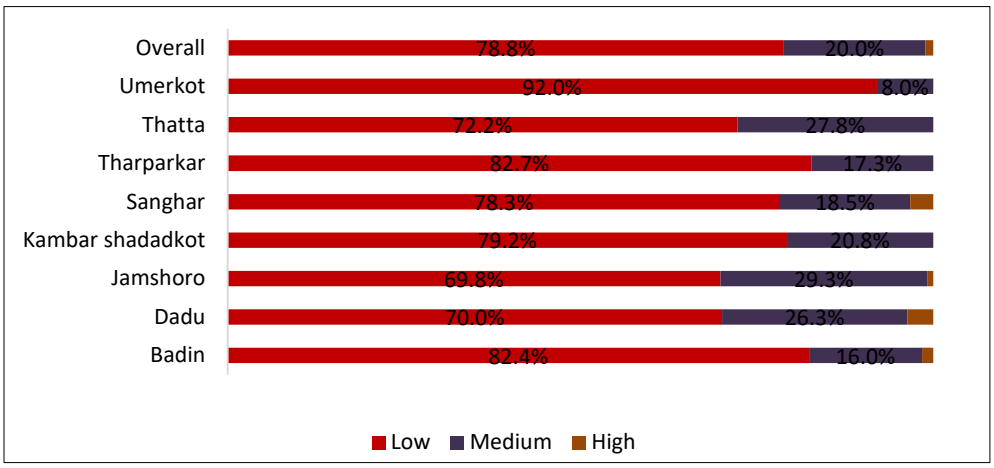
The assessment revealed that overall, around 18% of households have '*acceptable food consumption'*, 41% have '*poor consumption*' and another 41% have '*borderline consumption'* (Figure 53). Majority of the surveyed households have either '*poor*' or '*borderline*' food consumption. The highest percentage of households with 'poor' food consumption is in Badin (64%) followed by Umerkot (61%) and Kambar Shahdadkot (50%). The percentage of households with 'borderline' food consumption is highest in Tharparkar (55%), followed by Sanghar (53%) and Thatta (50%). The percentage of households with 'acceptable' food consumption is highest in Jamshoro and Dadu (35% each) followed by Sanghar (27%) and Umerkot (19%)[20].

[19] FCS Consumption Score (FCS) is an acceptable proxy indicator giving an indication of food security status of the household if combined with other household access indicators. Based on a seven-day recall of the food groups consumed within a household, the FCS measures food diversity (types of foods consumed), food frequency (the number of days each food group is consumed), and the relative nutritional importance of different food groups. The score for each food group is calculated by multiplying the number of days the commodity was consumed and its relative weight. The FCS is a weighted sum of food groups. Based on FCS standard thresholds, households are categorized into three groups: "poor" food consumption (FCS=1-28),"borderline "food consumption (FCS = 28.1-42), and "acceptable "food consumption (FCS>42).

20 As per the findings of Sindh Drought Needs Assessment conducted in 2015-16, the surveyed households had 'Poor' and 'Borderline' food consumption groups in each district as follows: Badin (17% and 70%), Dadu (4% and 82%), Jamshoro (18% and 60%), Sanghar (26% and 64%), Tharparkar (21% and 66%), Thatta (4% and 78%) and Umerkot (29% and 55%).

Household Dietary Diversity [21](based on 7 food groups consumed by the household during past 7 days recall period

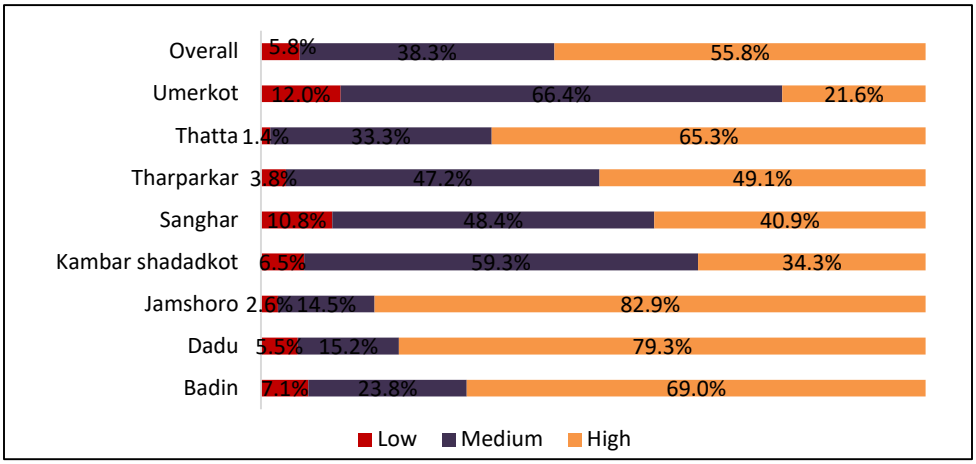
Figure 54: Household Dietary Diversity (HDDS)



The share of different food items for an individual's energy intake has important implications for overall health and wellbeing. A high proportion of energy derived from staple cereals is an indication of poor dietary diversity, while those with better dietary diversity are likely have a lower proportion of their total energy from staple cereals and consume more nutritious foods. The Households Dietary Diversity Score (HDDS) has been computed using two different methodologies. Figure 54 is showing the Diet Diversity Score (DDS) of the households based on 7 food groups (i.e., excluding sugar/sweet from 8 groups used in FCS module) consumed at the household level during the past 7 days recall period. This DDS is not an average for one day (24 hours) and dietary diversity is ranked in 3 groups: Low (<4.5 food groups eaten), Medium (4.5 to 6 good groups eaten), and High (above 6 food groups eaten). Acceding to this method the diet of the surveyed households is not only quantitatively inadequate, but also qualitatively poor and heavily cereal-based. Overall, the proportion of all surveyed households with low dietary diversity was 79%, while that of medium diet diversity was 20%. Among districts, 92% households in Umerkot, 83% in Tharparkar, 82% in Badin, 79% in Kambar Shahdadkot and 78% households in Sanghar district have 'low dietary diversity'.

21 The Diet Diversity Score(DDS) measures how many food groups out of 7 groups (i.e., excluding sugar/sweet from 8 groups used in FCS module) are consumed on average over a 7-dayperiod. DDS is not an average for one day. The indicator results in the sum of the number of consumed food groups (from O to 7). Based on DDS, dietary diversity is ranked in 3 groups: Low diet diversity (DDS is less than 4.5), Medium (DDS= 4.5 - 6), and High (DDS is above 6).

Figure 55: Household Dietary Diversity (based on 12 food groups consumed by the household during past 24 hours recall period)



Households Dietary Diversity Score (HDDS) based on one-day (24 hours) recall and 12 food groups is presented in figure 55. The thresholds used are Low (0-2 food groups eaten), Medium (3-4 food groups eaten) and High (>=5 food groups) (Figure 53). According to HDDS, about 56% of the surveyed households have High, 38% households have Medium whereas only 6% households have Low Dietary Diversity Score. District wise analysis shows that Umerkot Tharparkar, Sanghar districts have almost half, and Kambar Shahdadkot district has more than half of the surveyed households in the Medium (consuming 3-4 food groups) dietary diversity score.

Prevalence of Moderate and Severe Food Insecurity

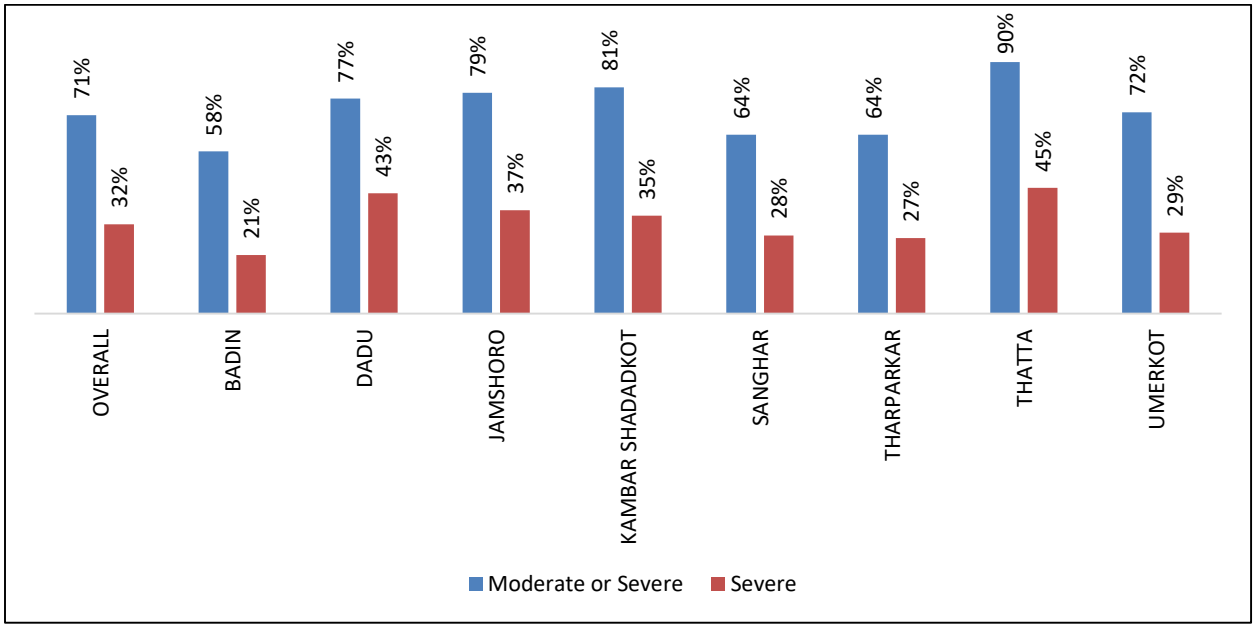
The Food Insecurity Experience Scale (FIES) [22] is a food security measurement scale composed of eight questions to evaluate the level of which households experience food insecurity. The questions ask to report on the occurrence of experiences and conditions that are typically associated with food insecurity. Respondents are asked to report if each of the conditions has been experienced, over the past 12 months, because of a lack of money or other resources to obtain food.

The analysis[23] shows that overall 71% of the surveyed households are moderately or severely food insecure, whereas 32% are severely food insecure (Figure 56). The analysis by districts shows that surveyed households in Thatta has highest (90%) prevalence of moderate or severe food insecurity followed by 81% in Kambar Shahdadkot and 79% in Jamshoro, whereas, prevalence of severe food insecurity is also highest in Thatta (45%) followed by Dadu (43%) and Jamshoro (37%). On the other hand, prevalence of both moderate or severe and severe food insecurity are lowest in Badin (58% and 21% respectively).

Figure 56: Prevalence of Moderate and Severe Food Insecurity based on FIES by District

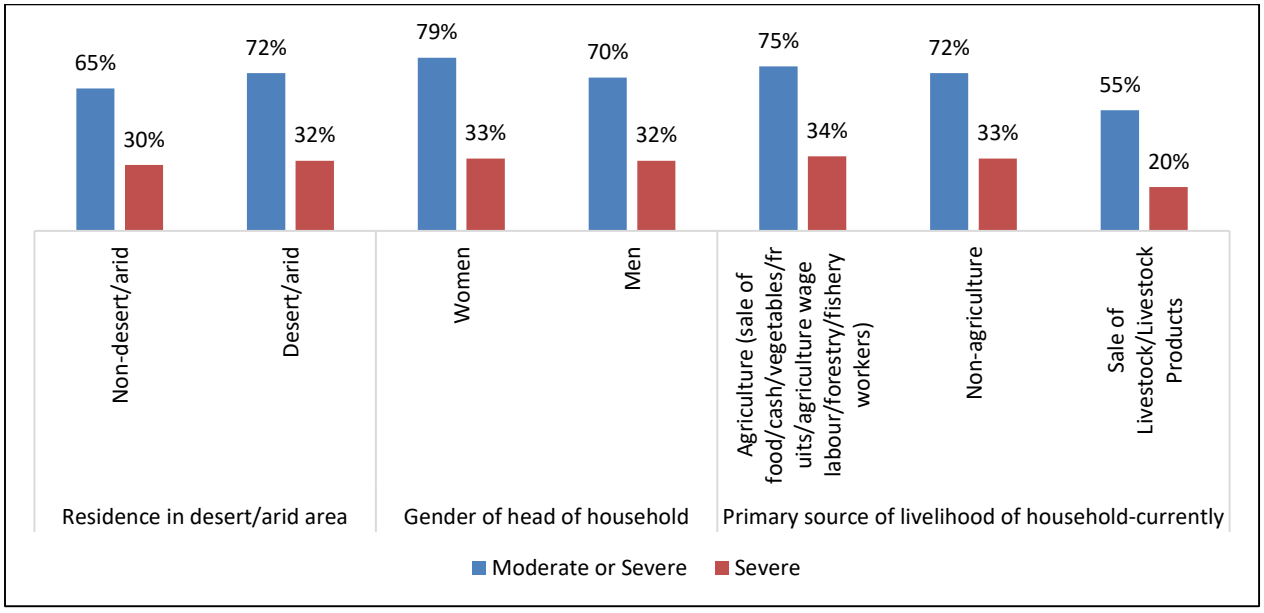
[22] The Food Insecurity Experience Scale (FIES) developed by FAO is used to compute Sustainable Development Goal (SDG) indicator 2.1.2: the prevalence of moderate or severe food insecurity in the population.

[23] The analysis presented in this section qualifies the statistical tests performed before estimating the prevalence of moderate and severe food insecurity.



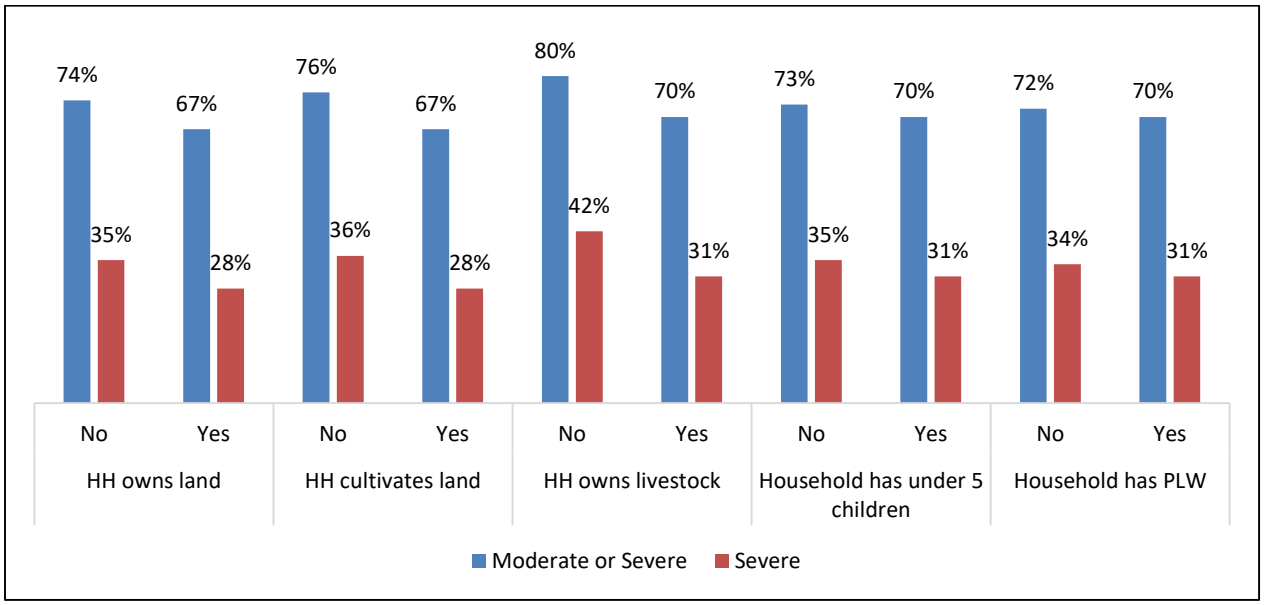
Analysis by other dimensions indicates that prevalence of both moderate or severe and severe food insecurity are higher among households in desert/arid areas and women headed households compared with households in non-desert/arid areas and men headed households. Further, surveyed households earning income from agriculture (sale of food/cash/vegetables/fruits/agriculture wage labor/forestry/fishery work) have highest prevalence of food insecurity followed by those engaged in non-agriculture activities, whereas it is lowest among households that sell livestock/livestock products (Figure 57).

Figure 57: Prevalence of Moderate and Severe Food Insecurity based on FIES by Geography, Gender, and Primary Source of Income



The prevalence of food insecurity (both moderate or severe and severe) is also higher among surveyed households that do not own cultivable agricultural land, not engage in land cultivation or do not own livestock compared with households that own cultivable agricultural land, engage in land cultivation and own livestock (Figure 58).

Figure 16: Prevalence of Moderate and Severe Food Insecurity based on FIES



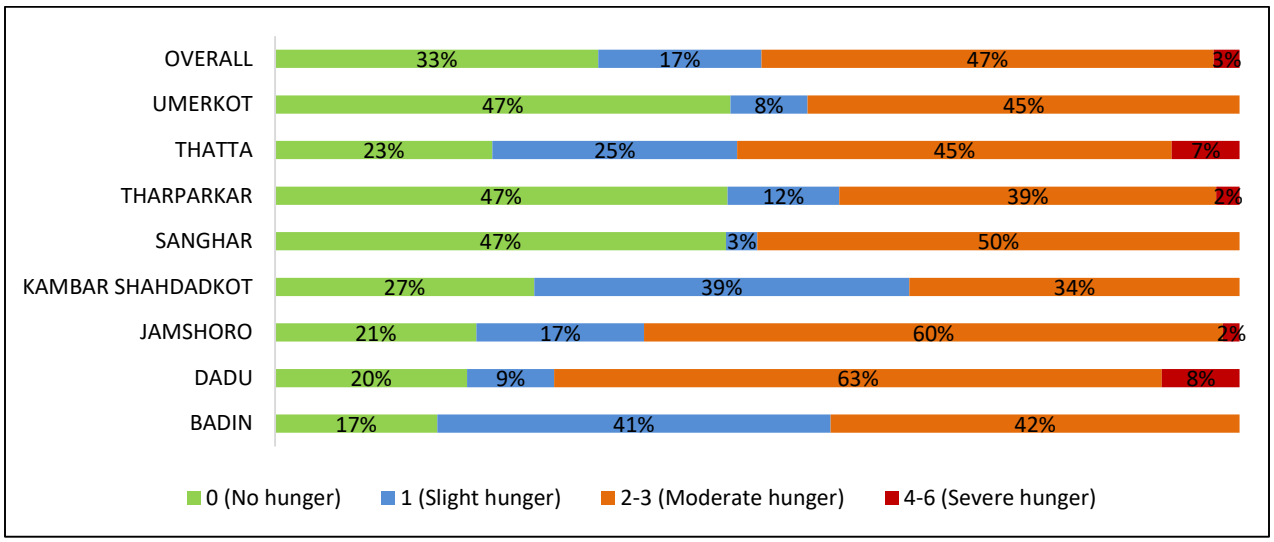
Household Hunger Scale

Household Hunger Scale (HHS) is a method developed by Food and Nutrition Technical Assistance (FANTA) based on perceptions of food insecurity at household levels[24]. It assesses whether households have experienced problems in food access during the preceding 30 days based on three questions and measures the severity of food insecurity in the past 30 days, as reported by the households.

Based on the HHS, around half (48%) of surveyed households do not experience hunger (highest 47% in Umerkot, Sanghar and Tharparkar), 23% experience slight hunger (highest 41% in Badin), 47% experience moderate hunger (highest 60% in Jamshoro), whereas only 3% experience severe hunger (highest 8% in Dadu) (Figure 59).

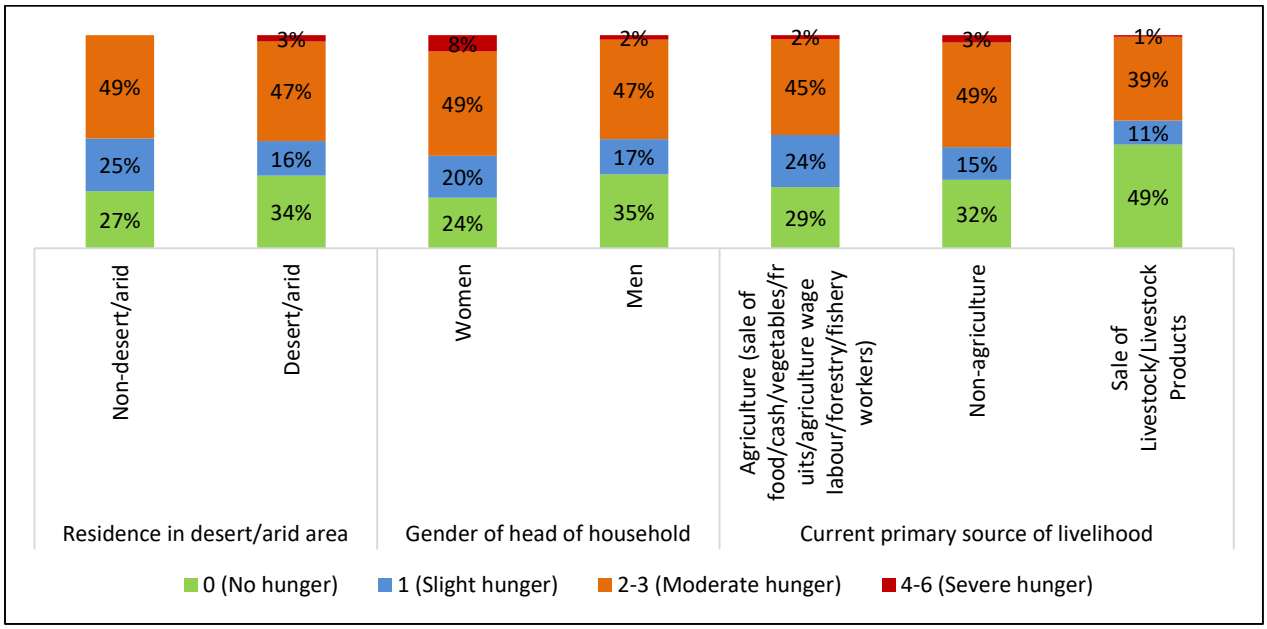
[24] As per methodology of HHS, four categories are commuted: no hunger (HHS=0), slight hunger (HHS=1-2), moderate hunger (HHS=2-3) and severe hunger (HHS= 4-6).

Figure 59: Households Experiencing Hunger Measured by Household Hunger Scale



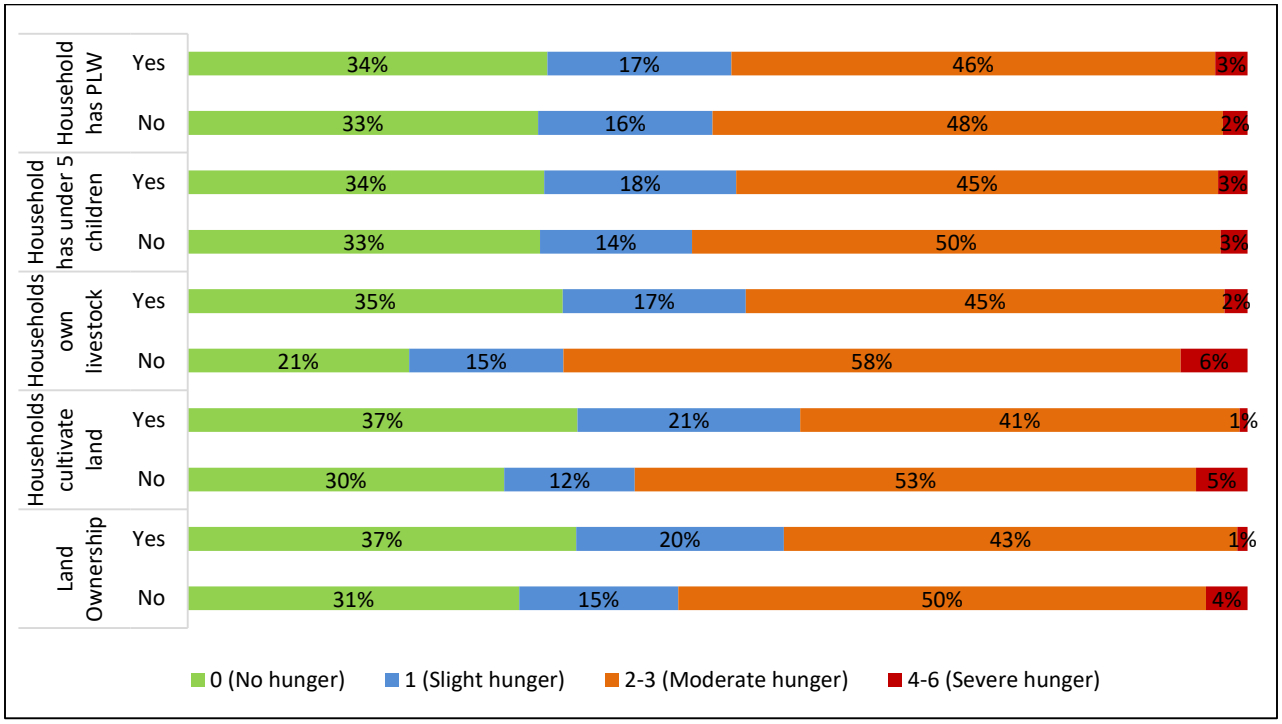
Around half of the surveyed households are facing moderate/severe hunger in both desert/arid and non-desert/arid areas, whereas no hunger and slight hunger are reported more in desert/arid and non-desert/arid areas respectively. Prevalence of moderate/severe hunger is slightly higher (57%) among women headed households than among men headed households (49%). The analysis by households' primary income source indicates that households earning income from non-agricultural sources have highest (53%) prevalence of moderate/severe hunger, followed by those that sell food/cash/vegetables/fruits/agriculture wage labor/forestry/fishery work (47%) and sell livestock/livestock products (40%) (Figure 60).

Figure 60: Household Hunger Score by Geography, Gender, and Primary Source of Income



Further, the prevalence of moderate/severe hunger is higher among surveyed households that do not own cultivable agricultural land (54%), do not engage in land cultivation (58%) or do not own livestock (65%) compared with households that own cultivable agricultural land (44%), engage in land cultivation (42%) and own livestock (47%). There is no significant difference in prevalence of moderate/severe hunger between households that have children under 5 years age / PLW and those households that do not have (Figure 61).

Figure 61: Household Hunger Score by Various Characteristics



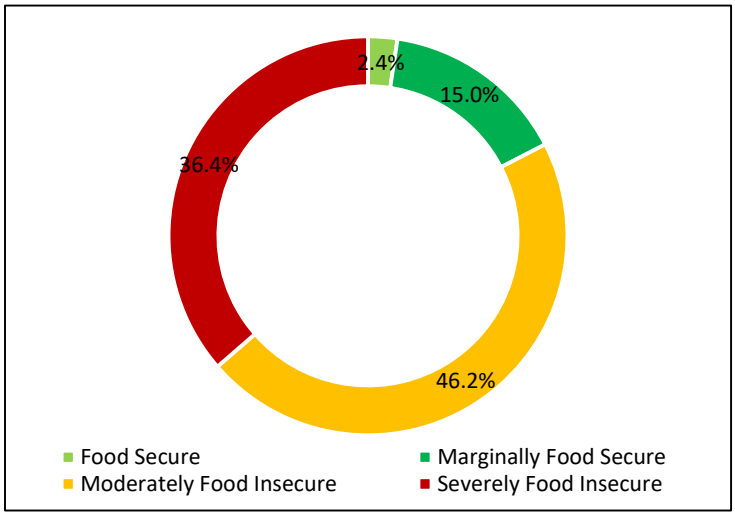
Consolidated Approach to Reporting Indicators of Food Security (CARI)

The food security prevalence rate is also analyzed by applying the Consolidated Approach to Reporting Indicators of Food Security (CARI)[25], which composites two important dimensions of household food security, namely food consumption and coping capacity. The former is an indicator of current food security, and the latter is a combined result of the food expenditure share (an indicator of economic vulnerability) and livelihood coping.

According to the findings of the survey based on CARI, overall 36% of the households are found to be 'severely food insecure, whereas 46% are moderately food insecure (Figure 62).

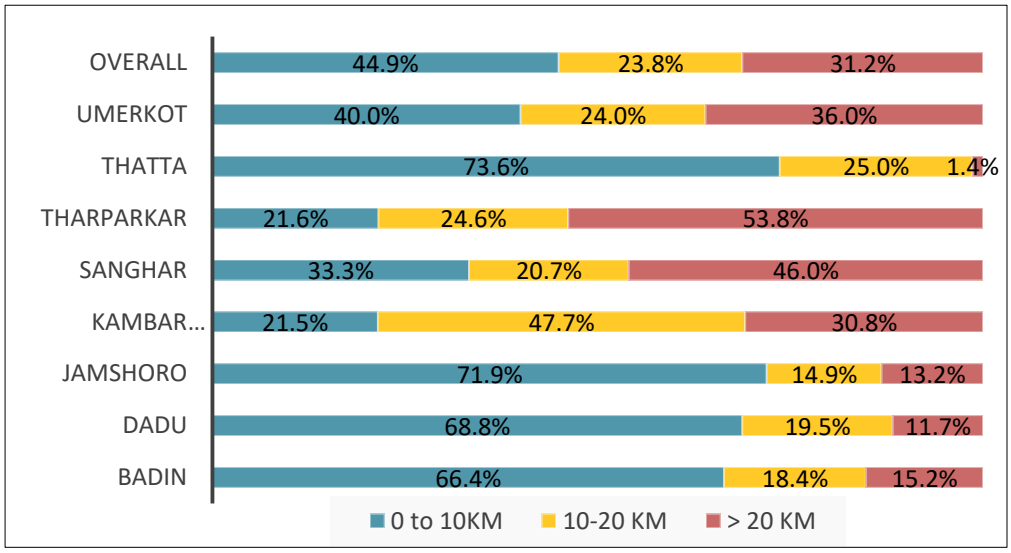
[25] The CARI culminates in a food security console which supports the reporting and combining of food security indicators in a systematic and transparent way. The food security console is the final output of the CARI. It combines a suite of food security indicators into a summary indicator –called the Food Security Index (FSI) - which represents the population's overall food security status. Central to the approach is an explicit classification of households into four descriptive groups based on the composite Food Security Index: food secure, marginally food secure, moderately food insecure, and severely food insecure.

Figure 62: Overall Food Security Rate based on CARI



Access to Markets

Figure 63: Distance to Markets



Markets play an important role in households' food security, given their high dependence on markets for selling and/or sourcing food, agro-livestock commodities and related inputs, labor alongside other essential non-food items. Overall, about 45% of the surveyed households have to travel within 10 km to buy food and non-food items from the nearest markets , whereas 24% have to travel between 10 to 20 km to the nearest markets, while 31% travel more than 20 km to reach to the nereast markets, (Figure 63).

Among the districts , the households who travel greater than 20 km to reach the nearest market include Tharparkar (54 percent), Sanghar (46 percent), Umerkot (36 percent), and Kambar Shahdatkot (31 percent).

Shocks and Coping Strategies

Exposure to Shocks

Shocks are "external short-term deviations from long term trends that have substantial negative effects on people's current state of well-being, level of assets, livelihoods, safety or their ability to withstand future shocks". Shocks can be slow-onset like drought, or relatively rapid onset like flooding, disease outbreak, or market fluctuations.

Table 6: Shocks Experienced by Households during Past 6 Months by District

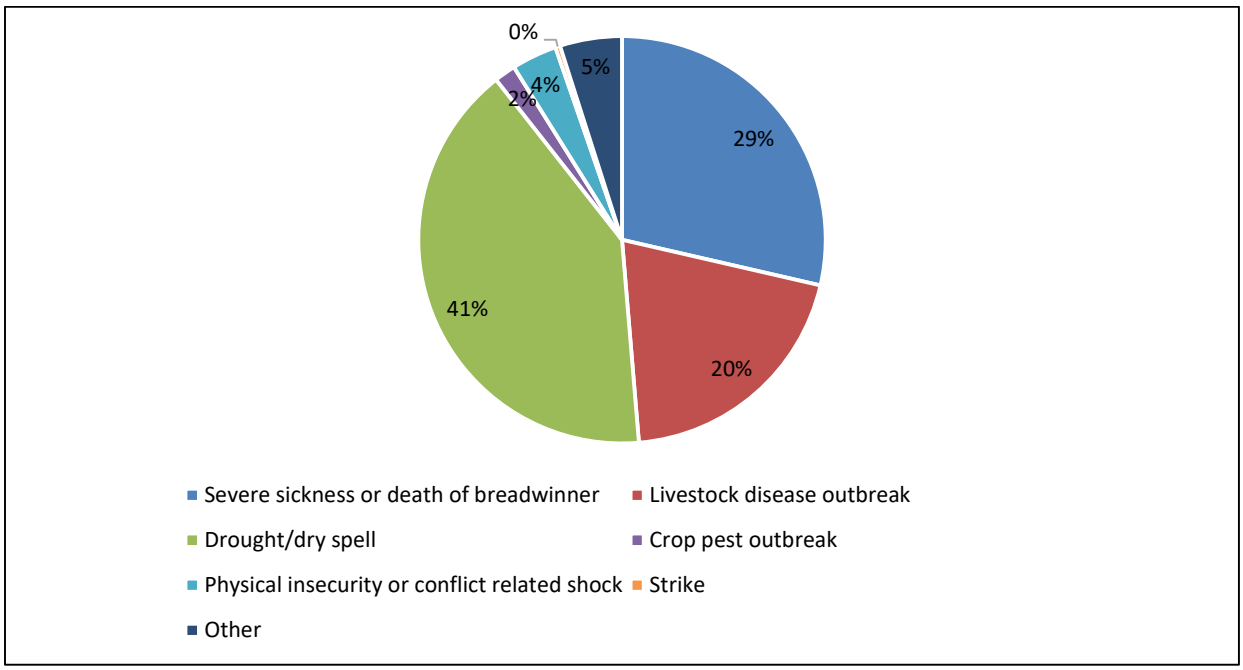
Districts	Yes	No
Badin	49%	51%
Dadu	55%	45%
Jamshoro	64%	36%
Kambar S.Kot	47%	53%
Sanghar	48%	52%
Tharparkar	39%	61%
Thatta	50%	50%
Umerkot	58%	42%
Overall	**48%**	**52%**

The recent episode of drought has adversely impacted households in these areas. Overall, 48% of the households did experience a shock whereas 52% did not experience any shock during this period.

The analysis shows that the highest percentage of households which experienced any shock was in Jamshoro (64%), followed by Umerkot (58%), while the lowest percentage was in Tharparkar district (39%).

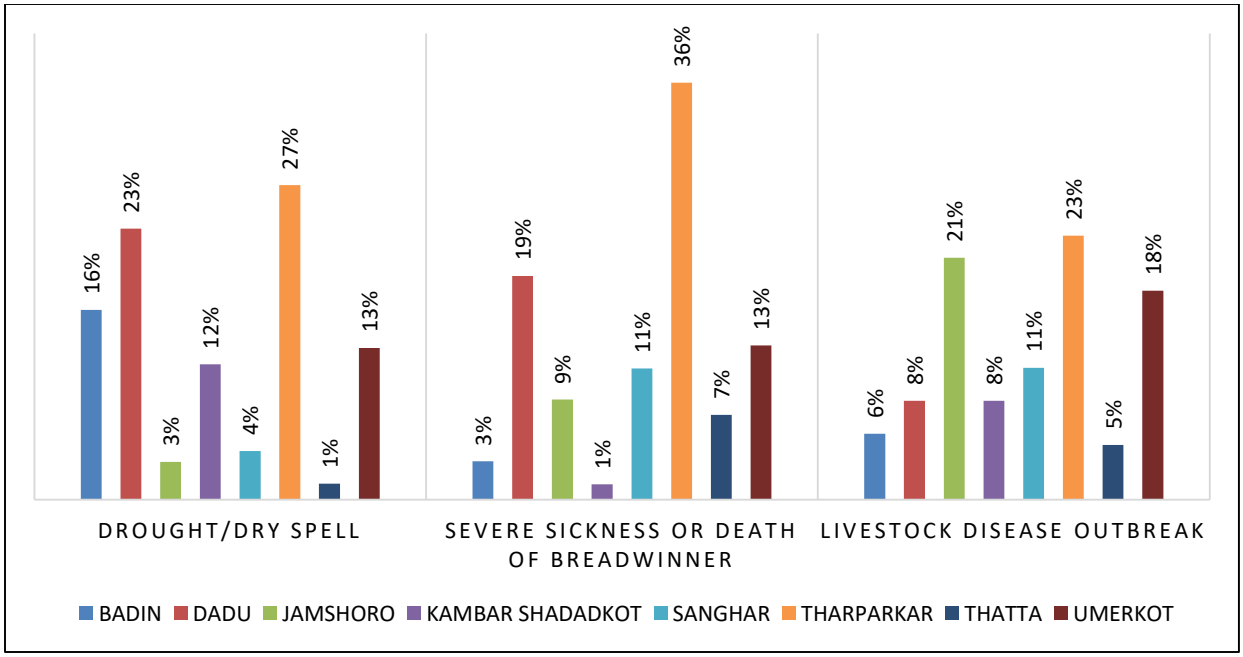
Households that did experience a shock were asked three main shocks they experienced during past six months. Analysis indicates that drought/dry spell was the biggest shock experienced by 41% of the households, followed by severe sickness/death of breadwinner experienced by 28% of households, and livestock disease outbreak which was experienced by 20% of the households. Percentage of other minor shocks remained low at 11% collectively (Figure 64).

Figure 64: Major Shocks Experienced by Households during Past Six Months



The distribution of shocks experienced at district level is depicted in the figure below. Households in Tharparkar mostly experienced drought/dry spell shock (58%), shock related to severe sickness or death of breadwinner (54%) and a shock related to livestock disease or outbreak (24%) (Figure 65).

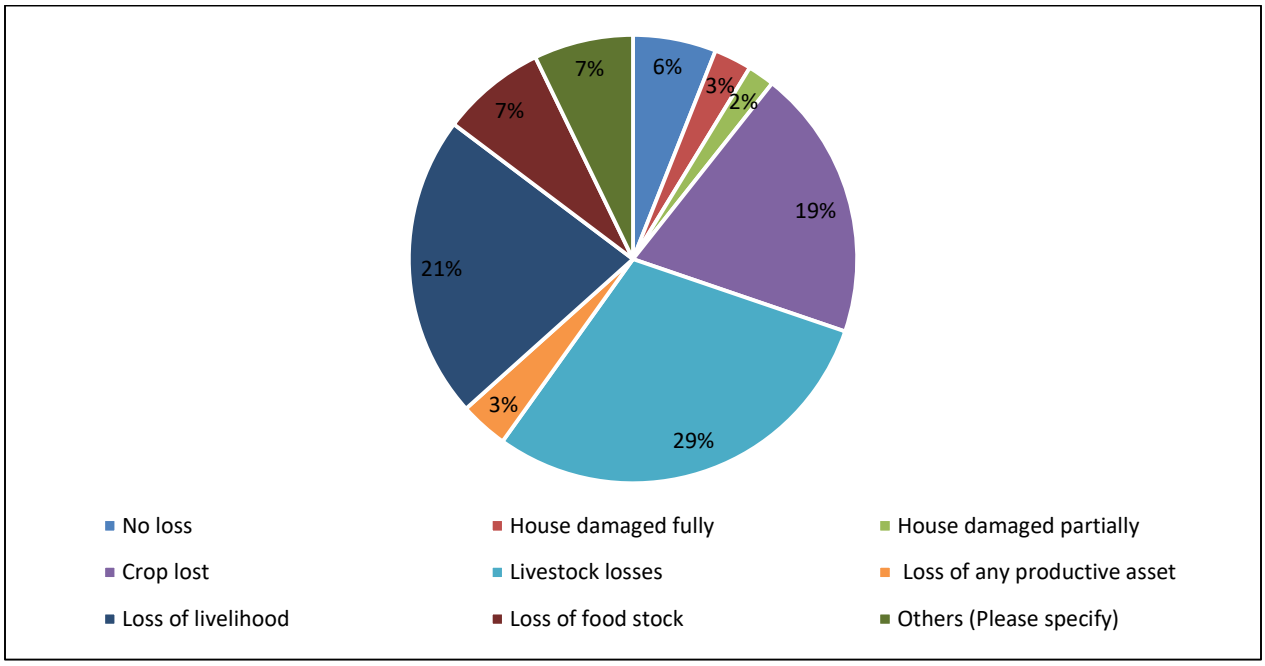
Figure 65: Distribution of Major Shocks Experienced by Households by District



Household Losses

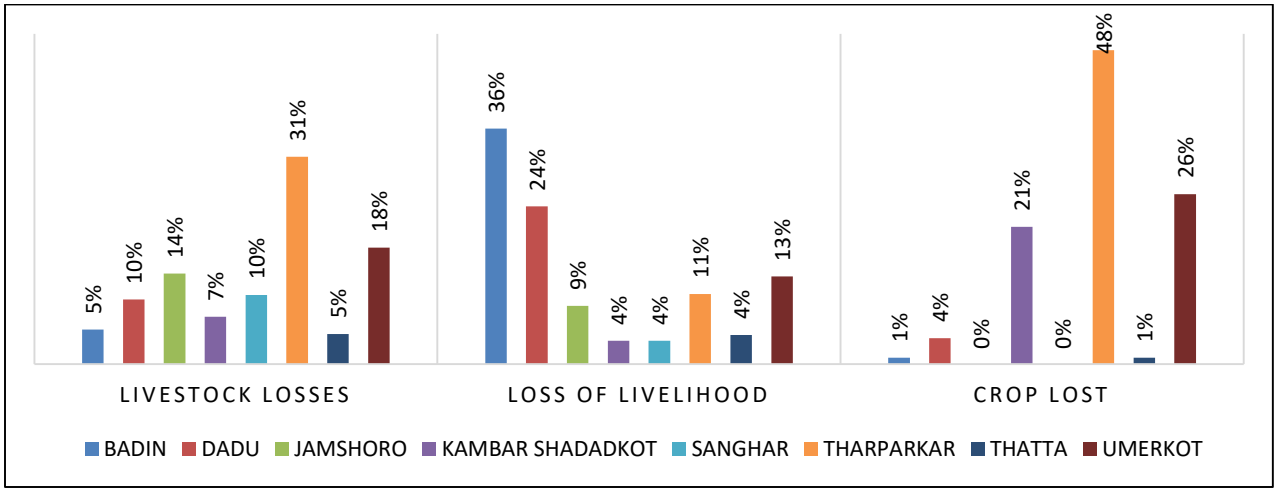
Shocks lead to losses, and drought affected communities experienced a diverse range of losses. The district level analysis reveals that the biggest type of loss faced by the households was loss of livestock which was reported by 29% of the households, followed by loss of livelihood (21%), crop losses (19%), and loss of food stock (7%) (Figure 66).

Figure 66: Losses Experienced by Households during Past Six Months



At the district level, households in Tharparkar were most likely to experience losses related to livestock (48%) and crops (48%). Whereas, households in Badin were most likely to experience losses related to loss of livelihood (36%) (Figure 67).

Figure 67: Type of Losses Experienced by Households by Districts

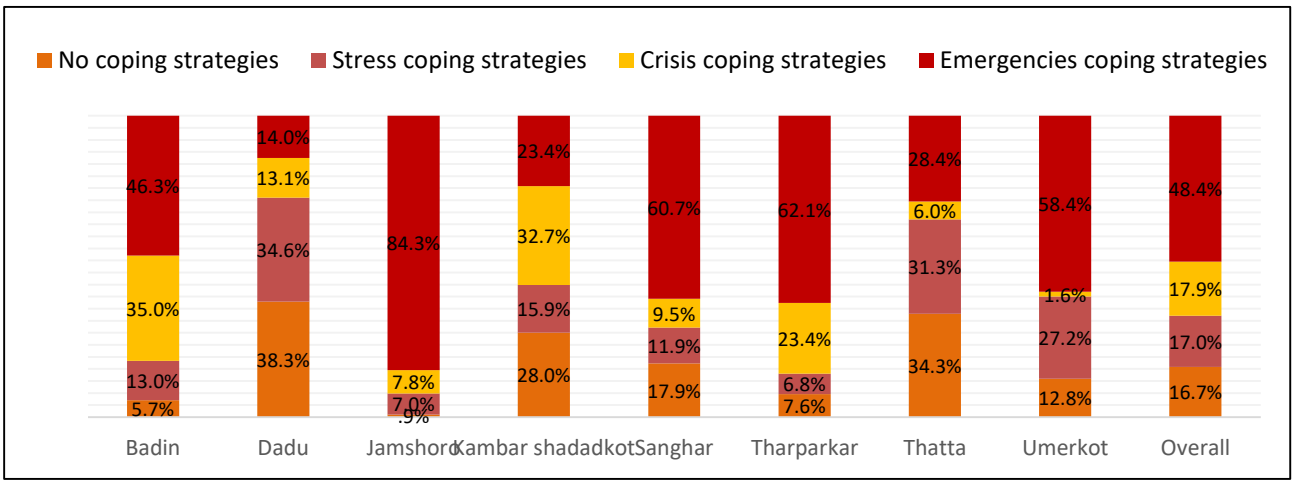


Livelihood Coping Strategies

Households use a variety of coping strategies when they have problems meeting their food needs. There may be coping strategies which could affect the livelihood of the households in the medium to long term. These include selling household goods or assets to buy food, selling productive assets or means of transport (such as a sewing machine or tractor), or consuming seed stock held for the next planting season. The livelihood-based strategies are analyzed based on their occurrence in the past 30 days prior to the survey.

The livelihood-related coping strategies are analyzed into three sub-categories, i.e. *stress strategies* (such as borrowing money, purchase food on credit, spent savings), *crisis strategies* (selling household or productive assets, or withdrawing children from school), and *emergency strategies* (such as consuming seed stock held for the next season, selling house or land or last female animal, or begging). Overall, 83% of the households reportedly used at least one livelihood-based coping strategy to meet their food needs. The proportion of households adopting "stress", "crisis" and "emergency" coping strategies are 17%, 18% and almost 50%, respectively. District wise findings show that In Jamshoro 84%, in Tharparkar 62%, in **Sanghar 61%**, and in **Umerkot 58%** are resorting on "emergency" coping strategies (Figure 68).

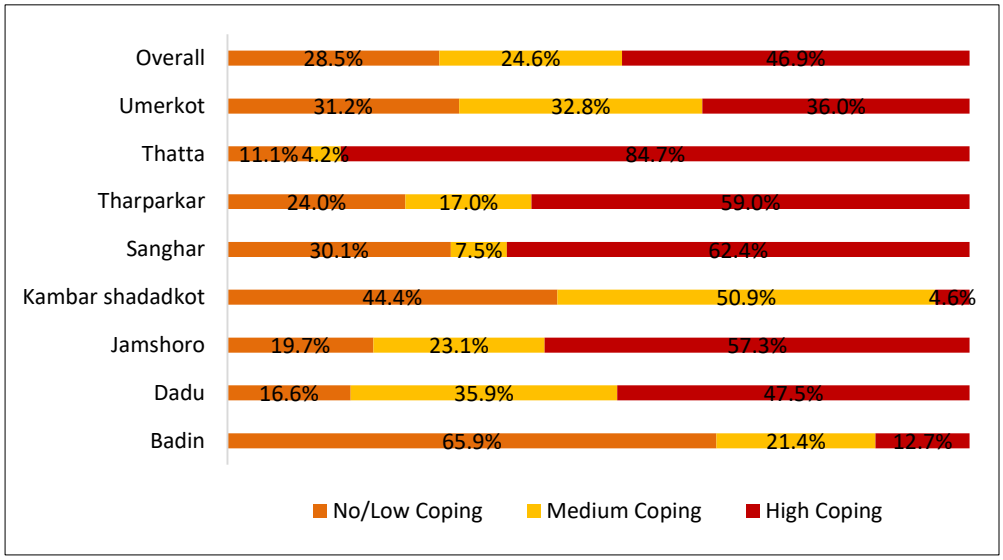
Figure 68: Livelihood Based Coping Strategies by District



The food-based coping strategy measured by the reduced coping strategy index (rCSI) is also a proxy indicator of food security. Change in food consumption of the household such as eating less preferred or less expensive food, borrowing food from others, reducing the number of meals or portions, adults eating less to provide sufficient food for the children are considered as food-based coping strategies.

Overall, it was found that 47% of the surveyed households adopted "high" level food based coping strategies, another 25% adopted "medium" level coping strategies, while 28% adopted "No/low" level coping strategies (Figure 69).

Figure 69: Food Based Coping Strategies



Among districts, the households adopting "high" food-based coping strategies are in Thatta (85%), Sanghar (62%), Tharparkar (59%), Jamshoro (57%), Dadu (48%), and Umerkot (36%). While households in Badin (13%) and Kambar Shahdadkot (5%) are less likely to use "high" food-based coping strategies.

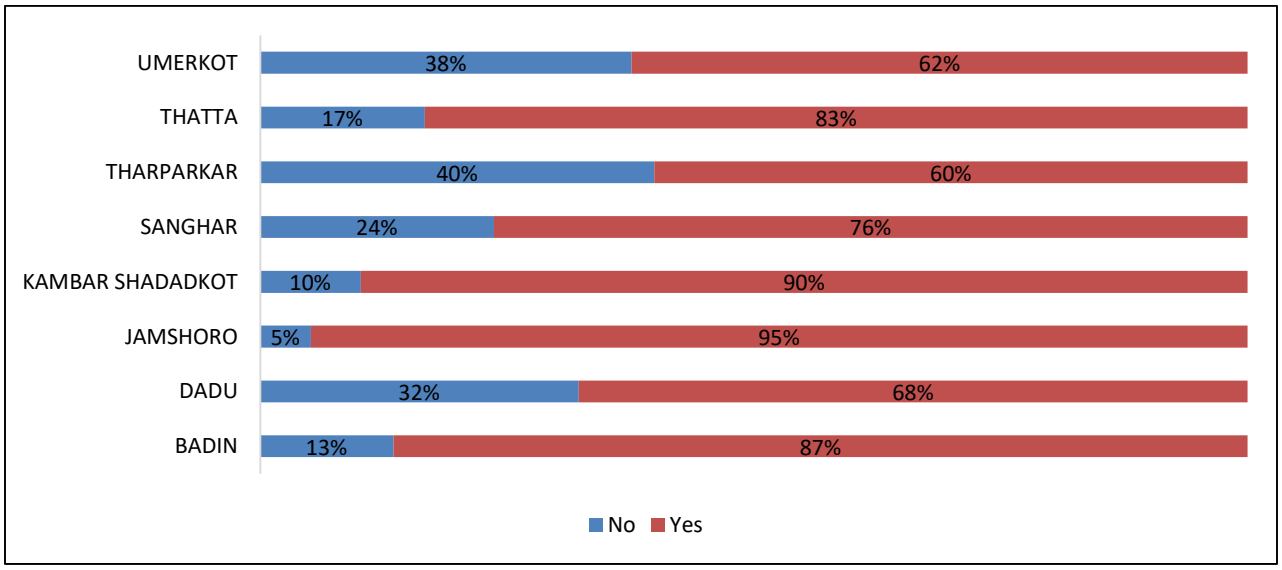
The higher coping strategy index indicates a more serious food insecurity situation. It suggests that food gaps are existing in the area and vulnerable households are adopting these short-term coping strategies to meet their food needs.

Household Indebtedness

Household Indebtedness

The households were asked if they contracted new debt during the last six months and 73% of the households confirmed contracting new debt. District wise analysis shows that minimum percentage of households contracting new debt was in Umerkot (62%) and maximum in Jamshoro (95%) (Figure 70).

Figure 70: Percentage of Households Contracted Debt during Past Six Months by District



Reasons for Contracting Debt

When probing the respondents about the reasons for contracting debt during the last six months, the three main reasons reported include the need to meet food needs (70%), health needs (54%) and to repay earlier debt (13%) (Figure 71).

District wise analysis of reasons for contracting debt shows that percentage of households contracted debt to meet food needs was highest (86%) in Kambar Shahdadkot followed by 85% in Badin and 82% in Thatta. 70% of the households in Badin reported contracting debt to meet health needs, followed by 66% in Jamshoro and 60% in Sanghar. 44% households in Kambar Shahdadkot reported contracting new debts to repay the previous ones (Figure 72).

Figure 71: Reasons for Contracting Debt during Past Six Months-Overall

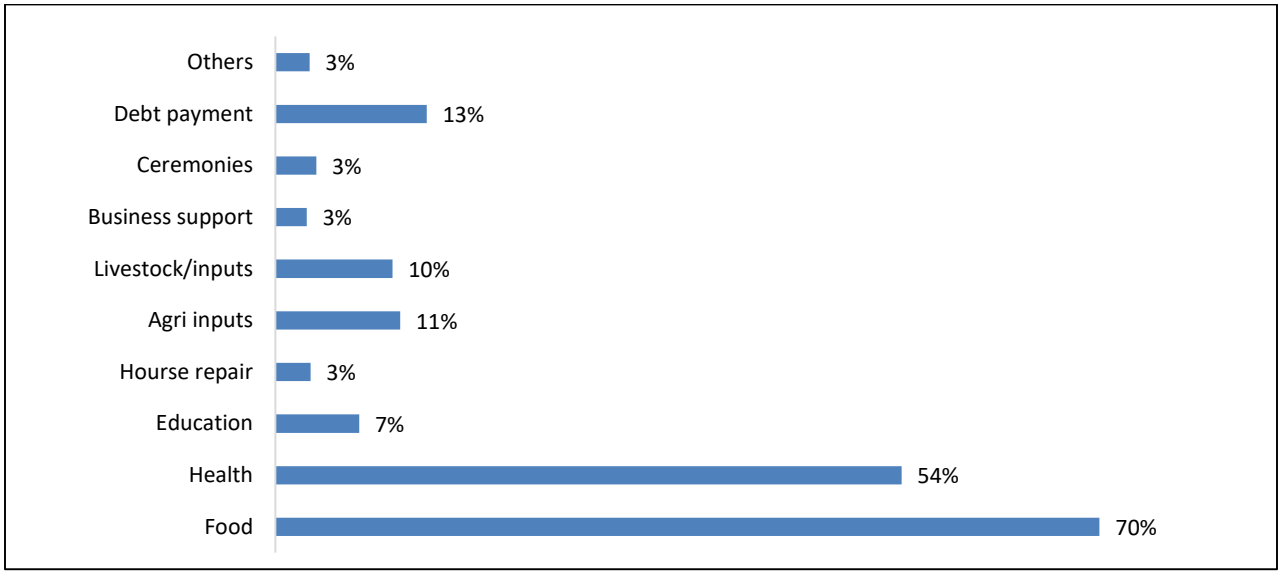
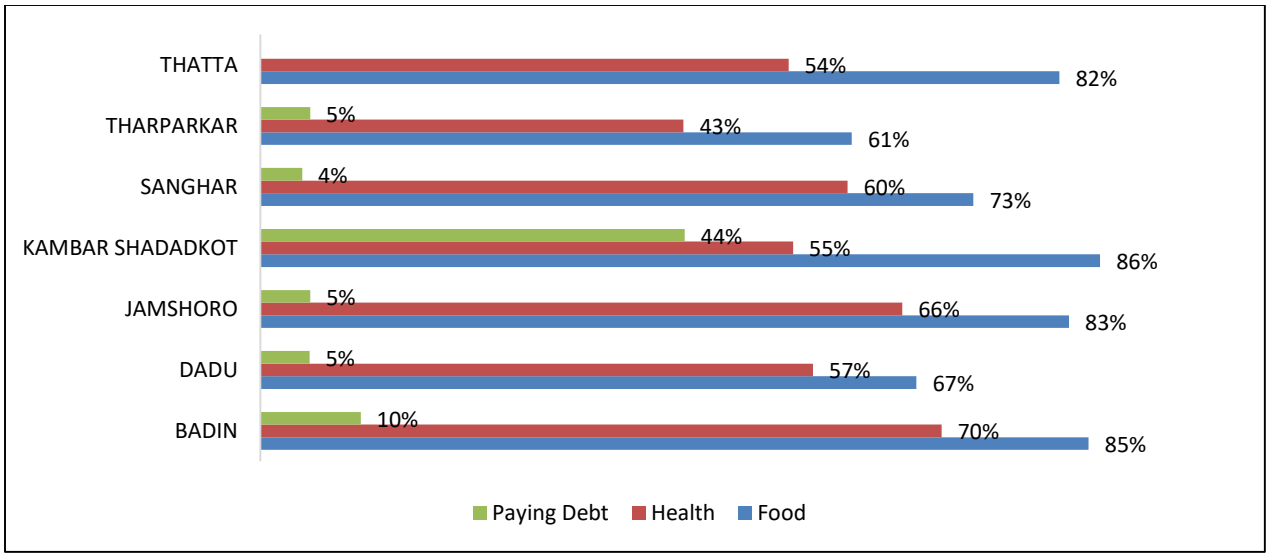


Figure 72: Reasons for Contracting Debt during Past Six Months by District



Outstanding Debt

Overall, on average PKR. 35, 386 is the outstanding debt per household. Maximum average outstanding debt per household is recorded in Thatta (PKR. 52, 632) and minimum PKR. 33, 495 is recorded in Badin.

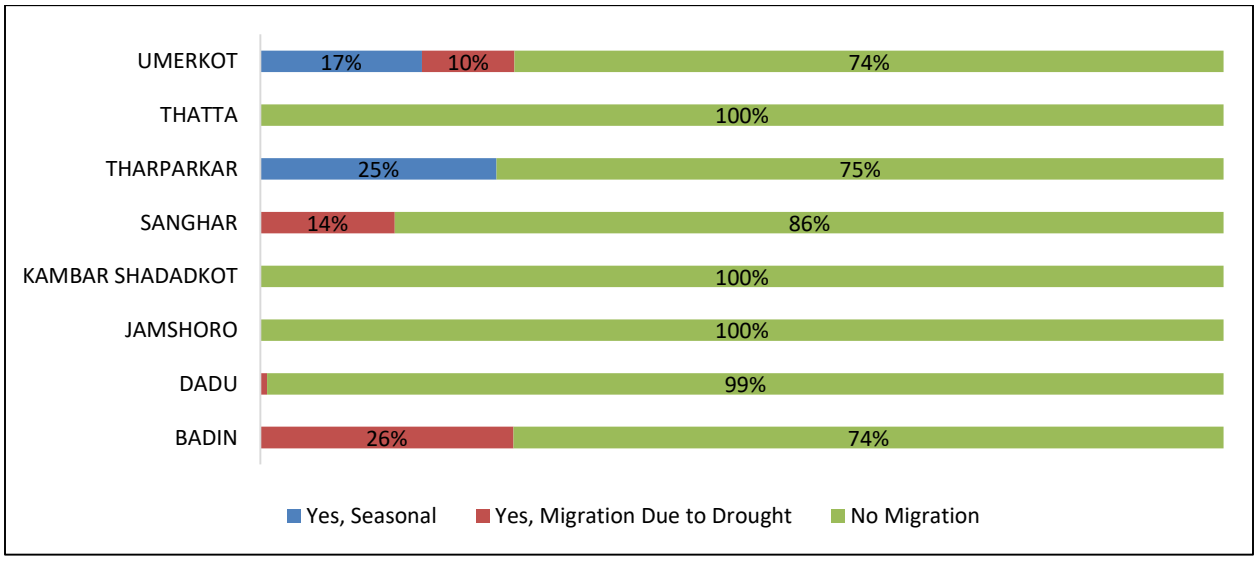
Table 7: Outstanding Debt

District	Average Household Outstanding Debt (PKR)
Badin	33,495
Dadu	26,891
Jamshoro	40,532
Kambar Shadadkot	38,312
Sanghar	49,466
Tharparkar	33,665
Thatta	52,632
Umerkot	27,423
Overall	**35,836**

Migration

Overall 15% of the surveyed households reported migration of their members at some point during the last 6 months (Figure 73). However, disaggregating the data by reason for migration shows that 10% of the households performed routine seasonal migration whereas only 5% migrated due to the prevailing drought in Sindh. This suggests that while the drought in Sindh is affecting the surveyed households, it is not yet causing a mass migration / movement of individuals from the region. Reviewing the analysis by district suggests that households from Badin, Sanghar, and Umerkot were more likely to migrate because of the drought in Sindh.

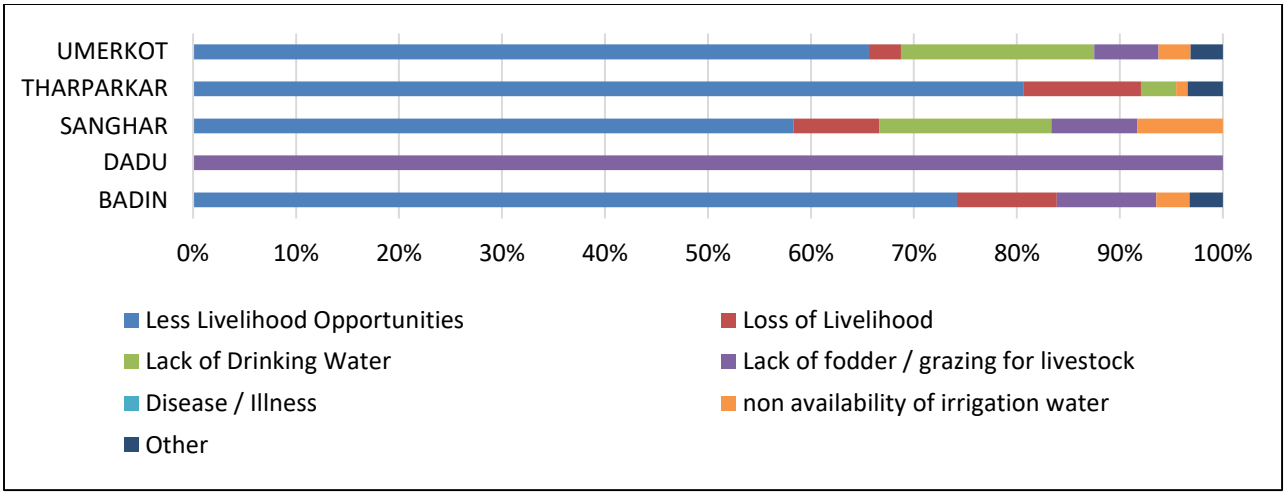
Figure 73: Migration by Household Members during Past Six Months



Out of the households that did migrate, majority (74%) revealed that the primary reason for migration was due to less livelihood opportunities in their previous location (Figure 74). In fact, only 7% of the households revealed that the primary reason for migration was due to a lack of drinking water. These

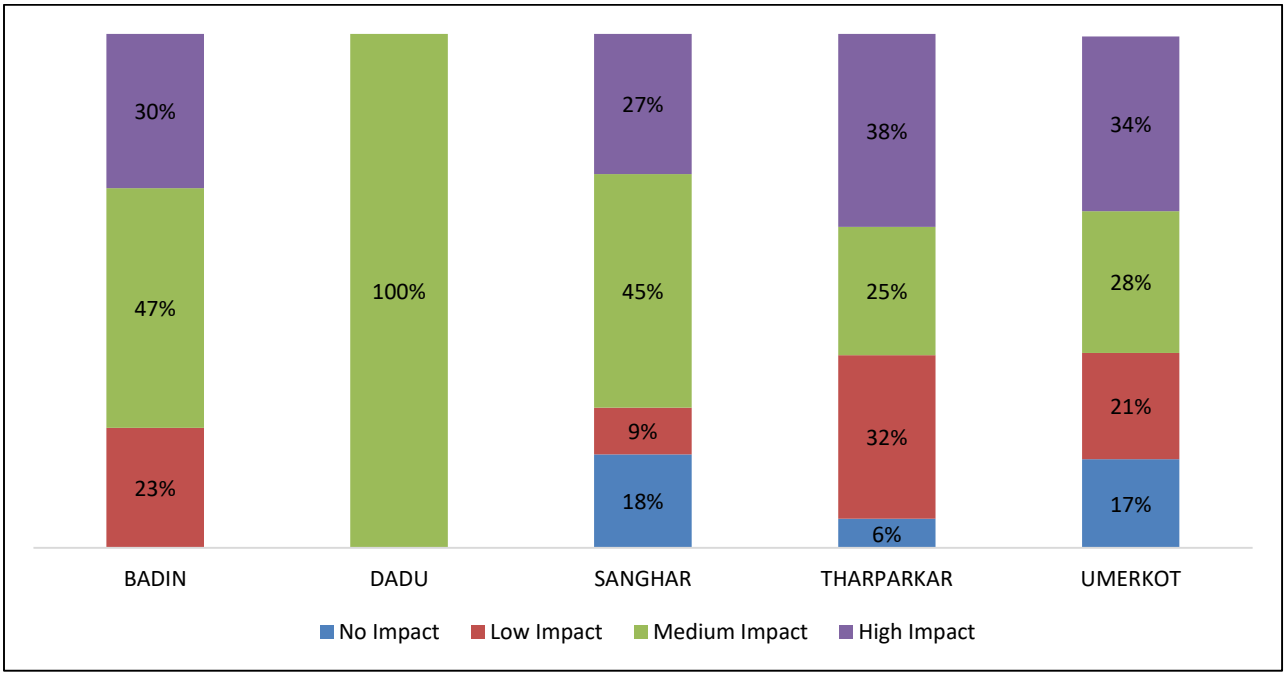
findings support the earlier results which suggest that household are more likely to perform seasonal migration for livelihood reasons rather than migrate specifically due to the drought in Sindh.

Figure 74: Main Reasons for Migration of Family Members



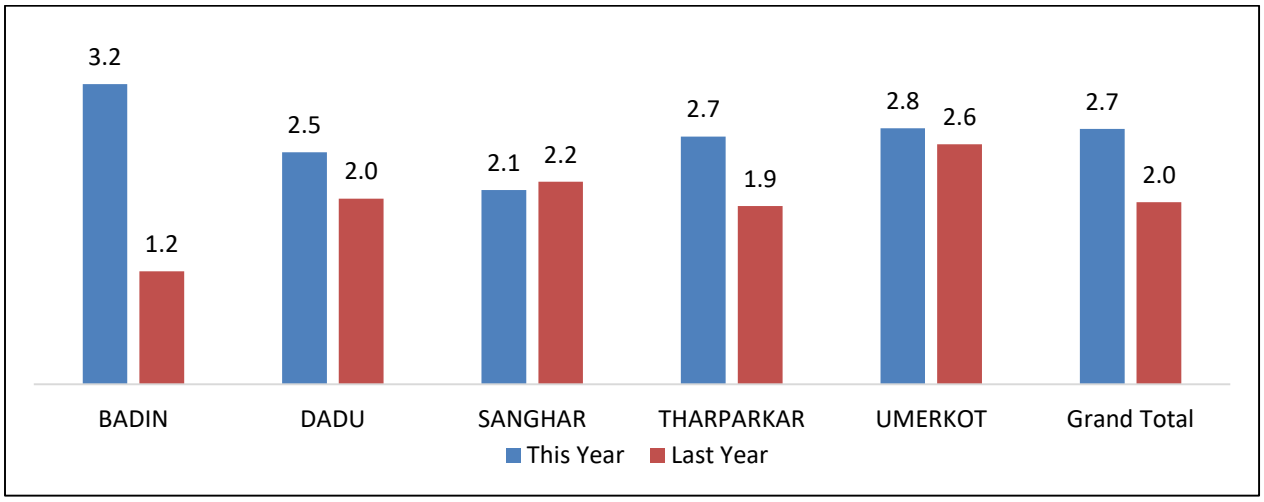
Households that did migrate were more likely to report that the migration had a high to medium impact on household income. For example, 38% of the migrated households from Tharparkar, 34% of the migrated households from Umerkot, and 30% of the migrated households from Badin reported that the movement had a high impact on household income (Figure 75).

Figure 17: Impact of Migration on Household Income



Out of the households that did migrate, on average 2.7 households members migrated this year overall compared to 2.0 household members last year (Figure 76). This is consistent across most of the districts where migration occurred with the results showing that more people were likely to migrate this year compared to last year.

Figure 76: Average Number of Household Members that Migrated

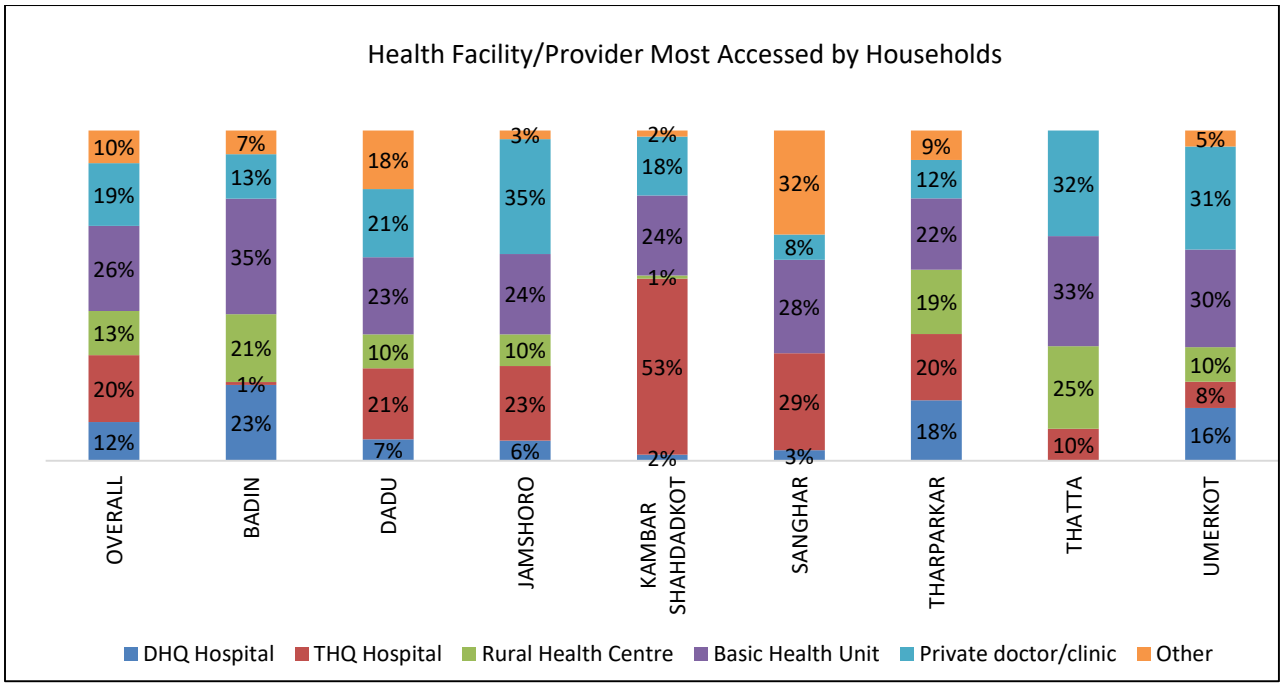


Health and Nutrition

Access to Healthcare

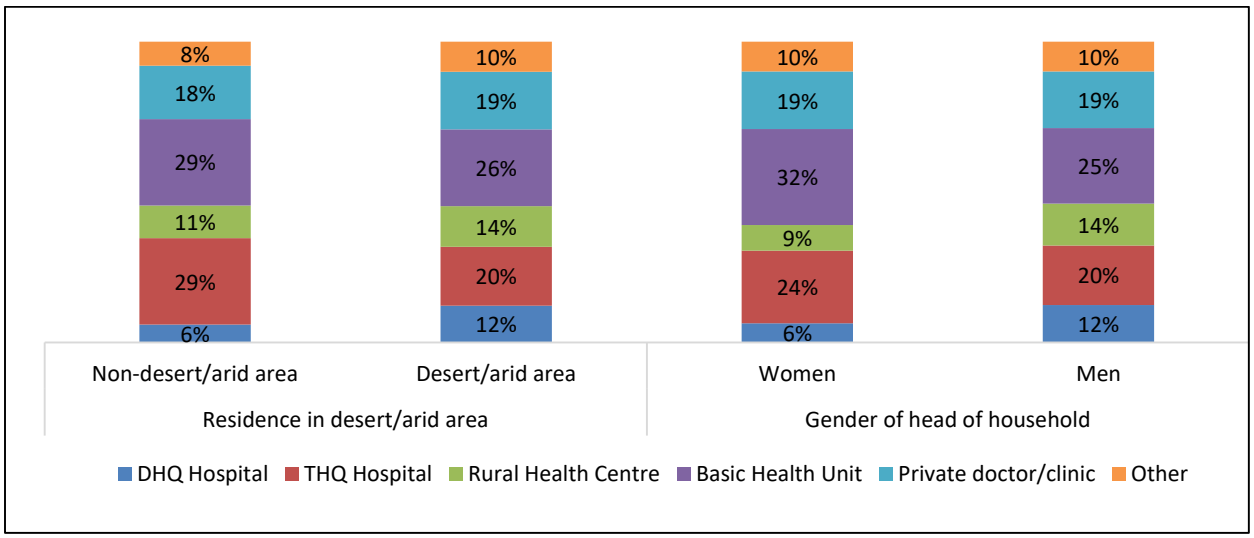
Access to healthcare is a critical issue in the surveyed districts. For surveyed households, the most frequented health facilities/providers were the Basic Health Unit (26%), followed by the Taluka Head Quarter (THQ) hospital (20%), private doctor/clinic (19%), the Rural Health Centre (13%), and the Districts Head Quarter (DHQ) hospital (12%). The remaining providers (dispensary, MCH, outreach/mobile team etc.) are visited by 10% of the surveyed households. Analysis by districts shows that the DHQ and THQ hospitals are mostly visited by households in Kambar Shahdadkot, the RHC hospital is mostly visited by households in Thatta, and the BHU is mostly visited by households in Badin. Private doctors/clinics are visited mostly by households in Jamshoro, and other forms of healthcare (dispensary, MCH, outreach/mobile team etc.) are mostly used in Sanghar (Figure 77).

Figure 77: Health Facility Provider Accessed the Most by Households by Districts



The analysis by areas shows that households in desert/arid areas prefer visiting the BHU over THQ hospital and private doctor/clinic. Households in non-desert/arid areas are equally likely to visit the BHU and THQ hospital (29% each) and less likely to visit a private doctor/clinic and RHC. Slightly higher proportions of women headed households than men headed households visit BHU and THQ hospital (Figure 78).

Figure 78: Health Facility Provider by Geography and Gender



On average, the surveyed households reported traveling 19.8 kilometres (KMs) (highest in Kambar Shahdadkot and lowest in Thatta) to access healthcare. 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. Longer distance to a health facility increases 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 (Figures 79 and 80).

Figure 79: Average Distance to Health Facility Accessed the Most by Households

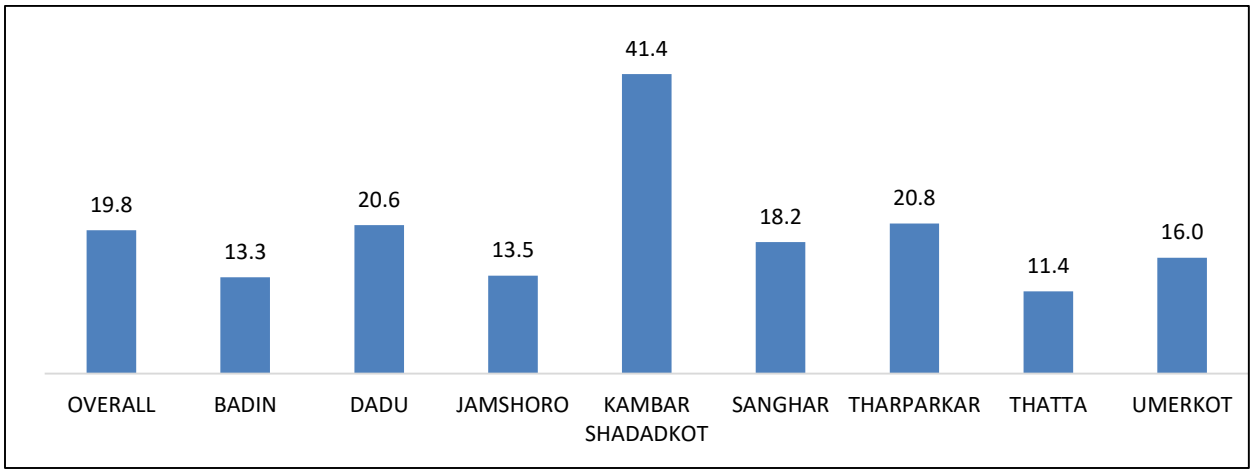
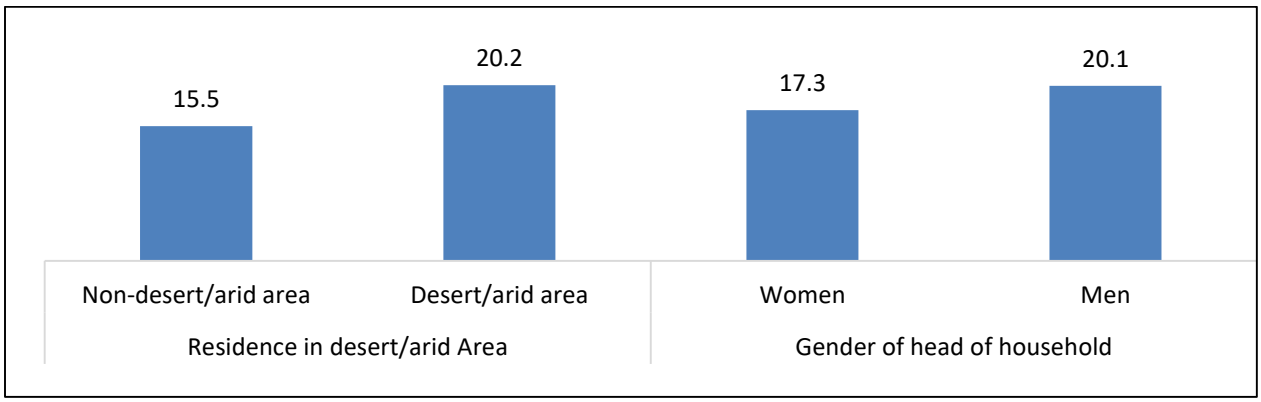


Figure 80: Average Distance to Health Facility Accessed the Most by Geography and Gender



The most common problems while accessing healthcare are the long distances to healthcare providers, the high cost of services, the lack/unavailability of transport, and the poor road infrastructure. Other problems while accessing healthcare include: medicines not available, medical equipment not available, and health/female health staff not available). Surprisingly, more households in non-desert/arid areas than households in desert/arid areas reported long distances to healthcare providers, the unavailability of transport and the high cost of services as problems they faced (Figures 81 and 82).

Figure 81: Problems Faced by Households in Accessing Health Care

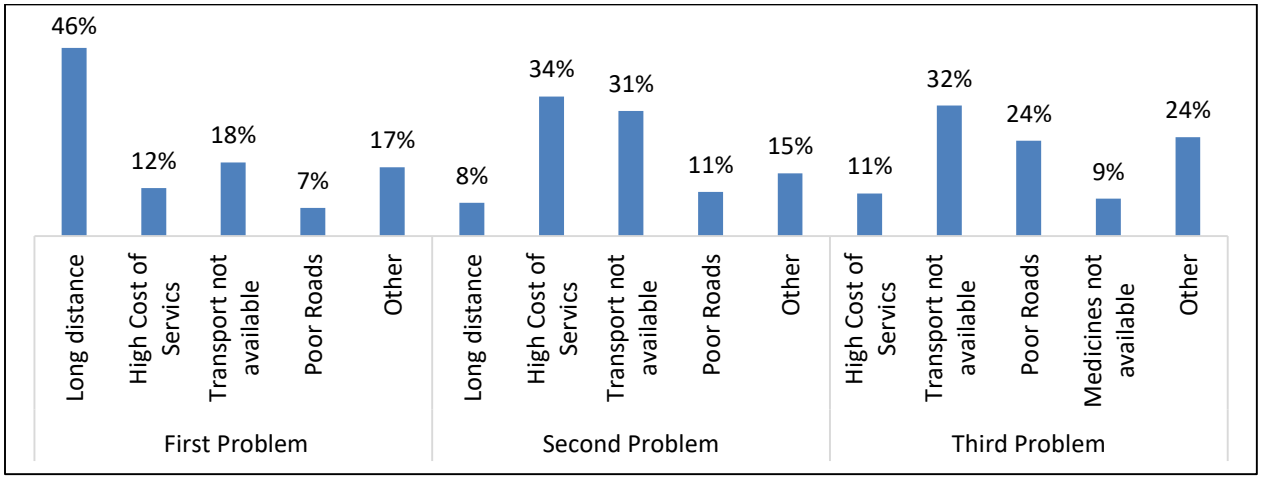
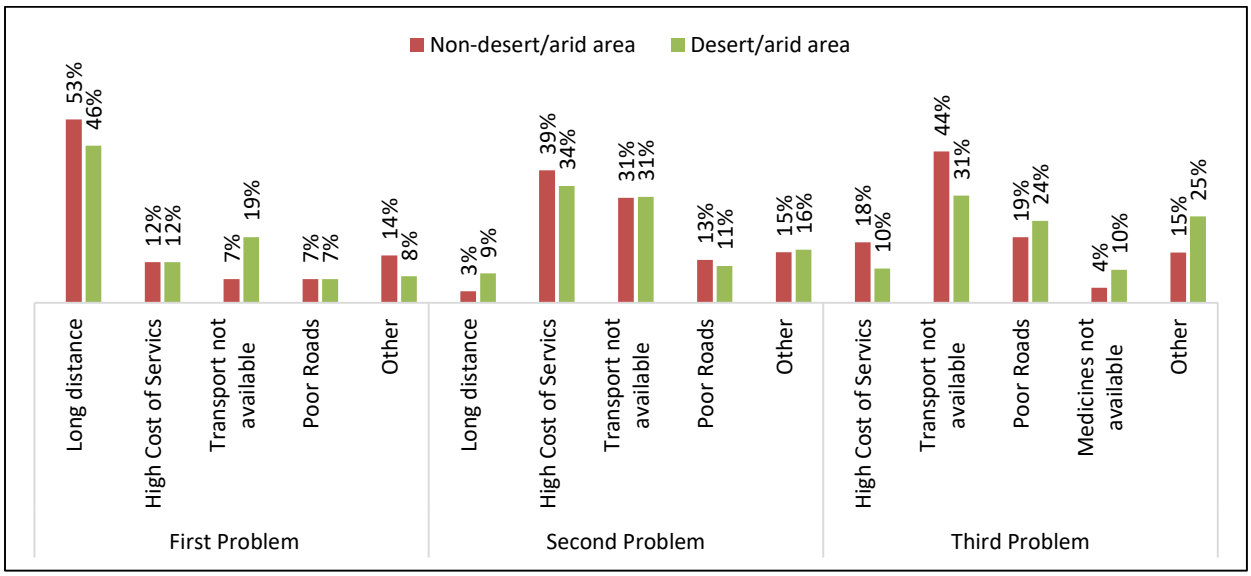


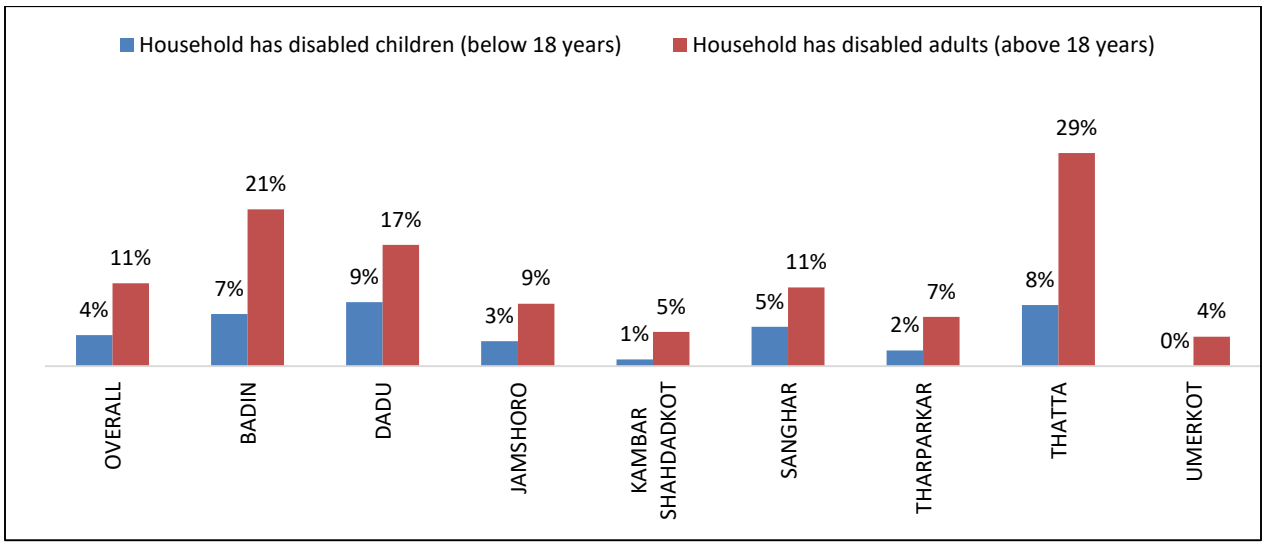
Figure 82: Problems Faced by Households in Accessing Health Care by Geography



Disability

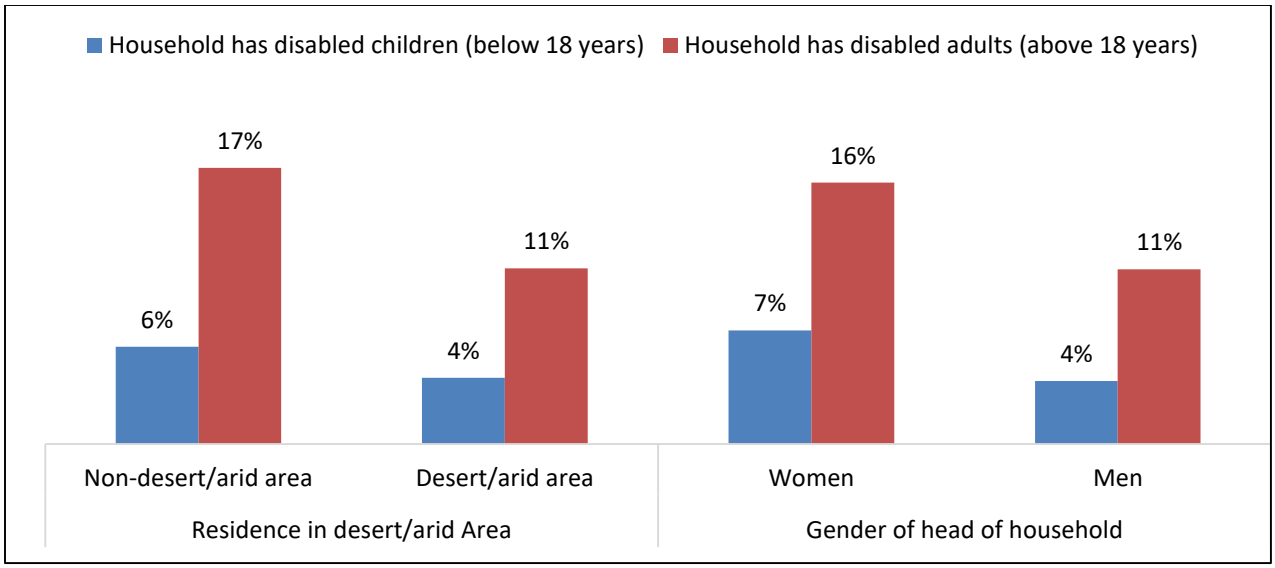
Disability limits the capacity to access education and earn livelihood and subsequently impacts food security. Overall, 4% of the surveyed households reported having at least one child with a disability and 11% reported at least one adult with a disability. Across the surveyed districts, the percentage of households with children with disabilities was highest in Dadu (9%) and the percentage of households with adults with disabilities was highest in Thatta (29%) (Figure 83).

Figure 83: Percentage of Households with Household Members who has a Disability



Disabilities among children and adults were higher in non-desert/arid areas when compared with desert/arid areas, and disabilities were more prevalent in women headed households than in men headed (Figure 84).

Figure 84: Percentage of Households with Households Member who has a Disability by Geography



Health Status (PLW and Child Morbidity and Child Mortality)

Morbidity among PLW and children under the age of 5 has been found very high in the surveyed households. Overall, almost all PLWs, 82% of boys and 85% of girls under the age of 5 fell ill during past thirty days preceding the survey. Morbidity among boys and girls under the age of 5 was higher in desert/arid areas and women headed households when compared to non-desert/arid areas and men headed households respectively.

The most common reported illnesses among PLWs are cough/fever (46%), diarrhea (21%), skin infections (7%), malaria (3%) and others (23%). In the case of boys under the age of 5, 48% of surveyed households reported illnesses in the form of cough/fever, 29% reported diarrhea, 7% malaria, 4% skin infections whereas 13% reported other illnesses. In the case of girls under the age of 5, 43% of surveyed households reported illnesses in the form of cough/fever, 31% reported diarrhea, 7% skin infections, 3% each reported malaria and pneumonia, whereas 13% reported other illnesses.

It is encouraging to find that healthcare was provided to an overwhelming majority of ill PLWs (89%), boys under the age of 5 (81%), and girls under the age of 5 (91%). Unlike PLWs and boys under the age of 5, a smaller proportion of girls under the age of 5 received health care in desert/arid areas than in non-desert/arid areas.

A significantly higher proportion of ill PLWs living in women headed households received health care when compared to PLWs living in men headed households. On the other hand, a significantly smaller proportion

of ill girls under the age of 5 received healthcare in women headed households than in male headed households.

Table 8: Percentage of PLWs, under 5 Boys and Girls Ill in the Past One Month and Received Health Care

		Morbidity (PLWs)	Healthcare received (PLWs)	Morbidity (Under 5 Boys)	Healthcare received (Under 5 Boys)	Morbidity (Under 5 Girls)	Healthcare received (Under 5 Girls)
Districts	Overall	99	89	82	81	85	91
	Badin	100	85	77	89	89	87
	Dadu	95	94	67	74	85	78
	Jamshoro	100	82	88	100	82	94
	Kambar Shahdadkot	93	83	88	60	78	94
	Sanghar	100	80	100	100	75	100
	Tharparkar	100	90	91	83	93	100
	Thatta	100	100	85	85	81	88
	Umerkot	100	90	83	80	86	95
Residence in desert/arid area	Non-Desert/Arid area	100	89	69	82	76	100
	Desert/Arid area	98	89	83	81	86	90
Gender of head of household	Women	95	100	83	82	94	78
	Men	99	87	81	81	84	92

Nutritional Status of Children Under 5 Years Age

Note: The following section does not use data from the Sindh Drought Assessment of 2018, and instead utilizes data from the recent completed National Nutrition Survey (NNS) of 2018. The reason for this is that while the assessment was able to collect multi-sector data, the methodology and timing constraints were not sufficient for nutrition data. Therefore, UNICEF and WFP have received approval from the Government to utilize preliminary results from the recent NNS 2018 to provide a picture of the nutrition status of the drought affected districts.

Consecutive issues with dietary intake, lack of affordability for nutritious diet, food security, livelihoods, and social protection, coupled with natural calamities i.e. flood and drought have led to high number of children being wasted across Pakistan (15.1%; NNS 2011). Which is further aggravated by limited treatment and prevention options specifically in the disaster-prone areas.

All the underlying causes of malnutrition, food security, hygiene, health access and sanitation are pointing toward a poor nutrition situation in all 8 districts. This is also corroborated by the very preliminary data of the National Nutrition Survey (NNS 2018).

Findings of NNS 2018 (Preliminary/Un- Published Data):
UNICEF and WFP jointly recommended to use NNS 2018 preliminary data (unpublished data) for GAM calculation, as a way forward:

UNICEF coordinated with Agha Khan University to share raw/preliminary data on GAM for 8 drought notified districts. Later, UNICEF did obtain concurrence from Ministry of National Health, Services, Regulation and Coordination (MoNHSR&C) to use preliminary/unpublished findings in the drought assessment report due to the challenges faced in drawing conclusion on drought rapid assessment data.

Methodology:
The weight and height of children under 59 months are used as proxy measures for the general health/nutrition of the entire population. Weight-for-height (wasting) provides the clearest picture of acute malnutrition in a population at a specific point in time.

Moderate Acute Malnutrition (MAM) is identified by moderate wasting;
WFH < -2 z-score and > -3 z-score for children 0-59 months (or for children 6-59 months, MUAC <125 mm and > 115 mm).

Severe Acute Malnutrition (SAM) is identified by severe wasting;
WFH < -3 z-score for children 0-59 months (or for children 6-59 months, MUAC <115 mm) or the presence of bilateral pitting edema.

Global Acute Malnutrition (GAM) is the presence of both MAM and SAM in a population.
A GAM value of more than 10 percent indicates an emergency. High prevalence rates outside of the *seasonal* norm is cause for concern.
Commonly used thresholds for GAM are:
Prevalence of wasting Severity of malnutrition[26]
<5% acceptable (Low)
5% to 9.9% poor (medium)
10% to 14.9% serious
>15% critical

Prevalence %	High		Medium	Low
GAM	≥15% Critical	10-14% Serious	5-9%	<5%

Sample Size:
Total 2,447 children 0 to 59 months in 8 drought notified districts were assessed through WFH anthropometric measurement instrument during NNS 2018 data collection process.

Analysis of NNS 2018 Preliminary Findings on Acute Malnutrition.
NNS 2018 preliminary database on WFH for children 0 to 59 months, significantly identifying the prevalence rata at **critical level (according to WHO standards)** for acute malnutrition in almost all drought affected districts except Dadu where GAM is near to critical level.

[26] Source: WHO. 2000. *The Management of Nutrition in Major Emergencies*

Malnutrition rate among children was highest in district Umerkot (29.1%) followed by Badin (26.6%), Tharparkar (22.7%) and Kambar Shahdadkot (22.8%), while lowest malnutrition rate was observed in district Dadu (14.3%) (Figure 85 and 86).

Figure 85: NNS 2018 – Preliminary Findings (Raw / Un-Published Data) on GAM Rates

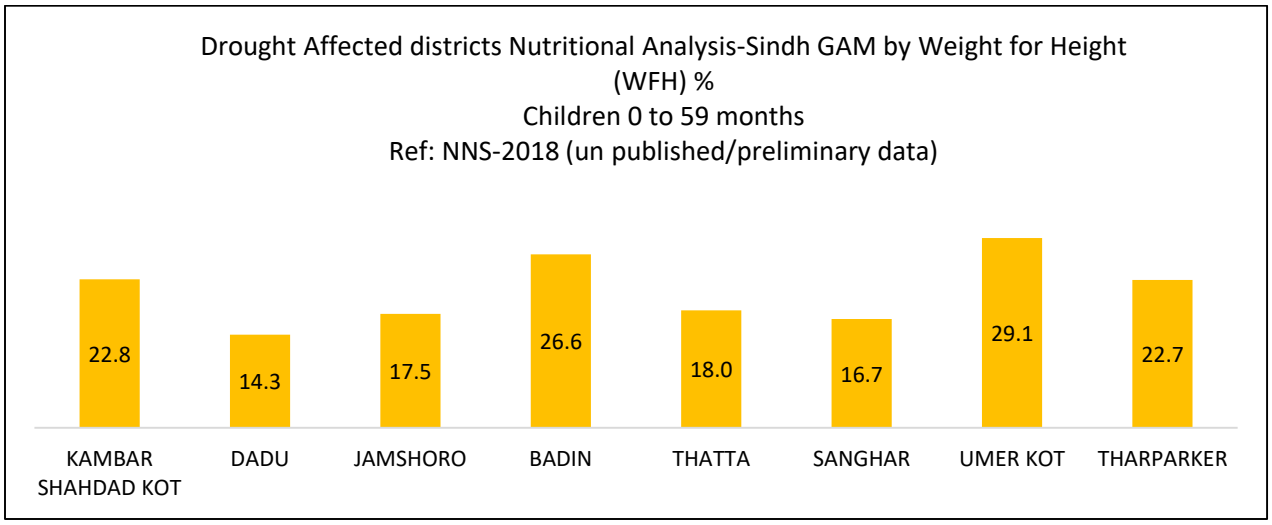
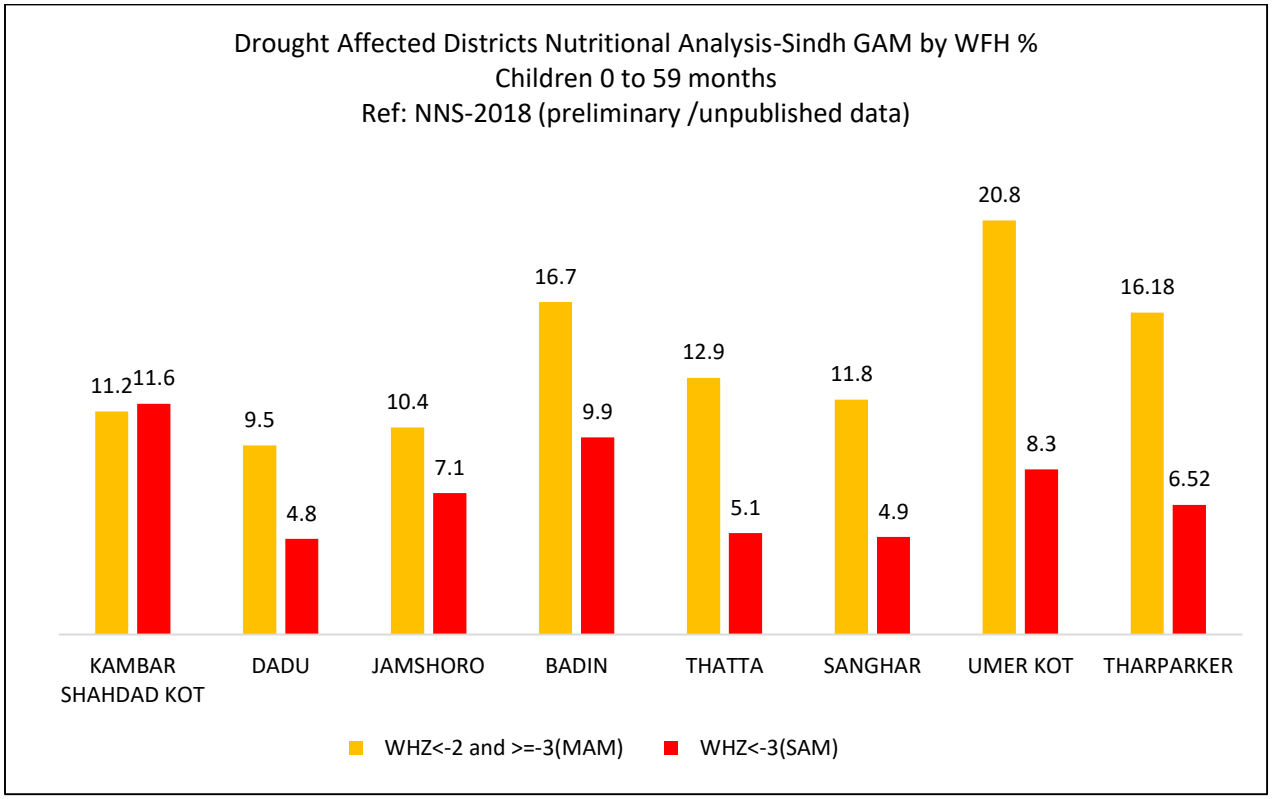


Figure 86: Drought Affected Districts Nutritional Analysis – Sindh GAM by WFH



Caseload as per NNS 2018 – preliminary findings.

The NNS 2018 preliminary findings clearly identified high caseload of acute malnutrition in drought affected districts. Around 0.4 million children under five in 8 districts are acutely malnourished and need emergency lifesaving nutrition interventions (CMAM).

Table 9: Caseload of GAM, MAM and SAM Children by District based on Preliminary Findings of NNS 2018

Province	Sr.#	Districts	*GAM Caseload/District*	*MAM Caseload/District*	*SAM Caseload /District*
Sindh	1	Tharpakar	74,146	52,849	21,296
	2	Umerkot	61,832	44,196	17,636
	3	Sanghar	68,019	48,061	19,958
	4	Badin	95,040	59,668	35,372
	5	Jamshoro	34,412	20,451	13,962
	6	Thatta	34,921	25,027	9,894
	7	Dadu	43,894	29,160	14,734
	8	Kambar Shahdadkot	60,540	29,739	30,801
		Total	**472,804**	**309,152**	**163,653**

These finding on the high acute malnutrition rates are very much linked to the drought assessment' findings on food security indicators, like the food consumption of the households among the districts has significantly been affected as majority of the surveyed households have either '*poor*' or '*borderline*' food consumption. Furthermore, among districts, 92% households in Umerkot, 83% in Tharparkar, 79% in Kambar Shahdadkot have 'low dietary diversity' at household level.

Drought assessment report identified that access to healthcare is a critical issue in the surveyed districts due to the long distance, high cost of services, lack/unavailability of transport, poor road infrastructure, this has a strong link to the access to the nutrition services established in the health facilities (where applicable), hence reducing the effectiveness of treatment of malnutrition.

It is important to note that currently 6 out of 8 districts (Tharparkar, Umerkot, Sanghar, Kambar Shadadkot, Thatta and Badin) are covered by nutrition intervention under the PC1 by Nutrition Support Program (NSP) with variant ratio of nutrition services. However it should be worth noting that the nutrition services provided through PC1 is only taking care of severely acute malnourished (SAM) children, neglecting moderately acute malnourished (MAM) children, which is double in numbers as compared to SAM. MAM are highly vulnerable to further deterioration with increase chances of mortality and morbidity if left untreated in addition malnourished PLW are extremely vulnerable to poor birth outcome and morbidities if not treated through MAM services(TSFP services)

It is significant to mention that these preliminary findings are extracted based on selected sample (under five children) and the final NNS 2018 published results may vary after assigning weights. Additionally, sampling for the NNS 2018 was done at the district level whereas amount of area notified as drought affected varies by district.

Housing, Water and Sanitation

Housing

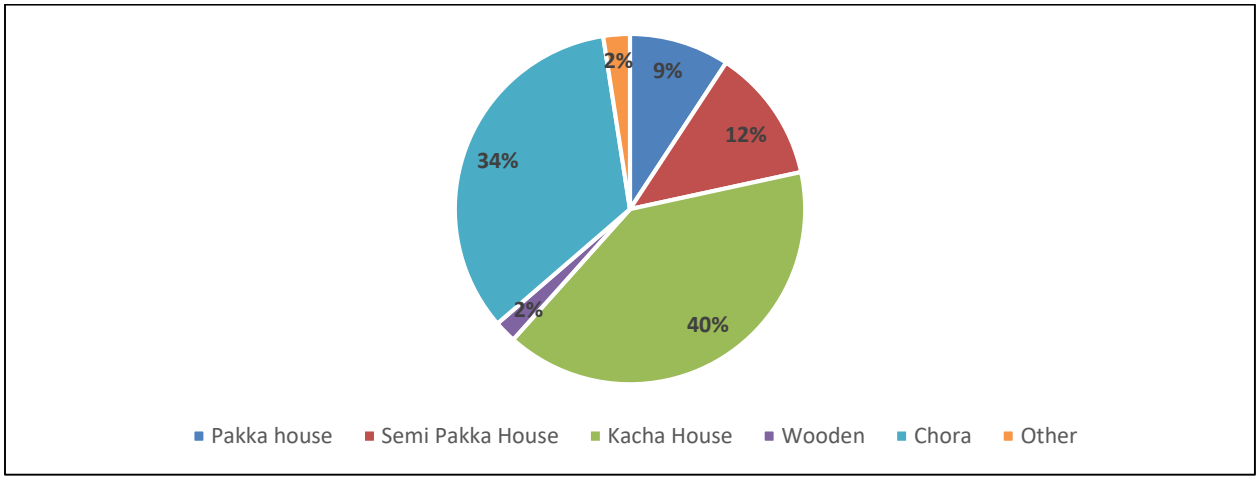
Drought can affect our community and our environment in many different ways. We often talk about drought's impacts as either “direct” or “indirect”. Decent, affordable housing is important to families because it fulfills a basic human need for shelter, but it also contributes to the wellbeing of both parents and children. This in turn leads to improvement in both physical and mental health. This assessment reveals that almost 91% of surveyed households live in their own houses; 5% live in houses owned by a landlord, and 4% in other houses whose ownership was not specified.

Table 10: Ownership Status of Respondents Residence

District	Own house	Landlord’s place	Rented	Other
Badin	78%	9%	0%	13%
Dadu	96%	2%	0%	2%
Jamshoro	91%	2%	0%	7%
Kambar Shadadkot	97%	1%	2%	0%
Sanghar	66%	33%	1%	0%
Tharparkar	99%	1%	0%	0%
Thatta	86%	10%	3%	1%
Umerkot	90%	8%	0%	2%
Overall	91%	5%	0%	4%

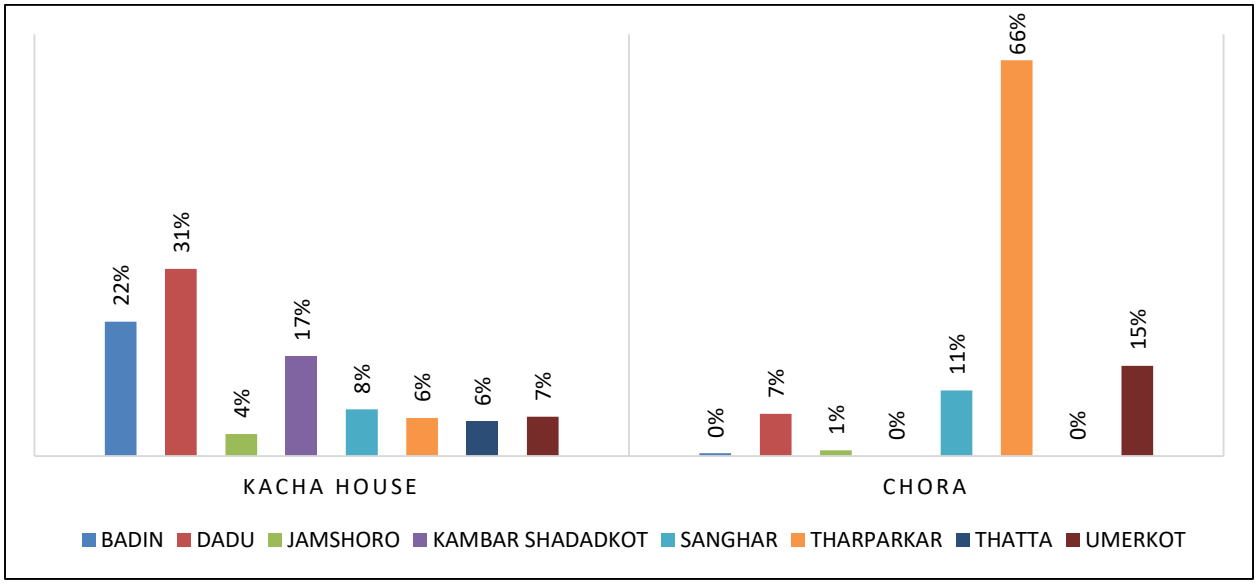
The figure below describes the type of house / structure the households are living in. Most of the households live in “Katcha Houses” (40%), followed by “Chora” (34%), “Semi Pakka” (12%), “Pakka” (9%), and wooden houses (2%) (Figure 87).

Figure 87: Type of House Households Live In



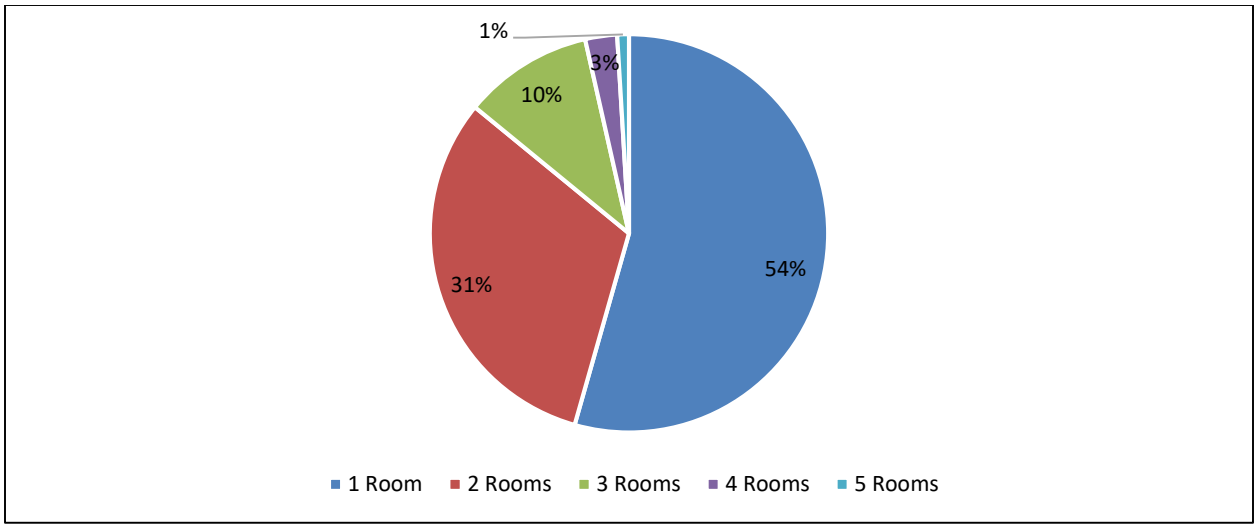
The district level analysis reveals that there are a large number of households in Tharparkar which live in "Chora" structures. Furthermore, a large number of households in Badin and Dadu live in "Katcha" houses (Figure 88).

Figure 88: Distribution of Houses by Structure



Most of the households in surveyed areas live in one room (54%) houses followed by two rooms (31%) and three rooms (10%). No house in the surveyed area has more than 5 rooms (Figure 89).

Figure 89: Distribution of Houses by Structure

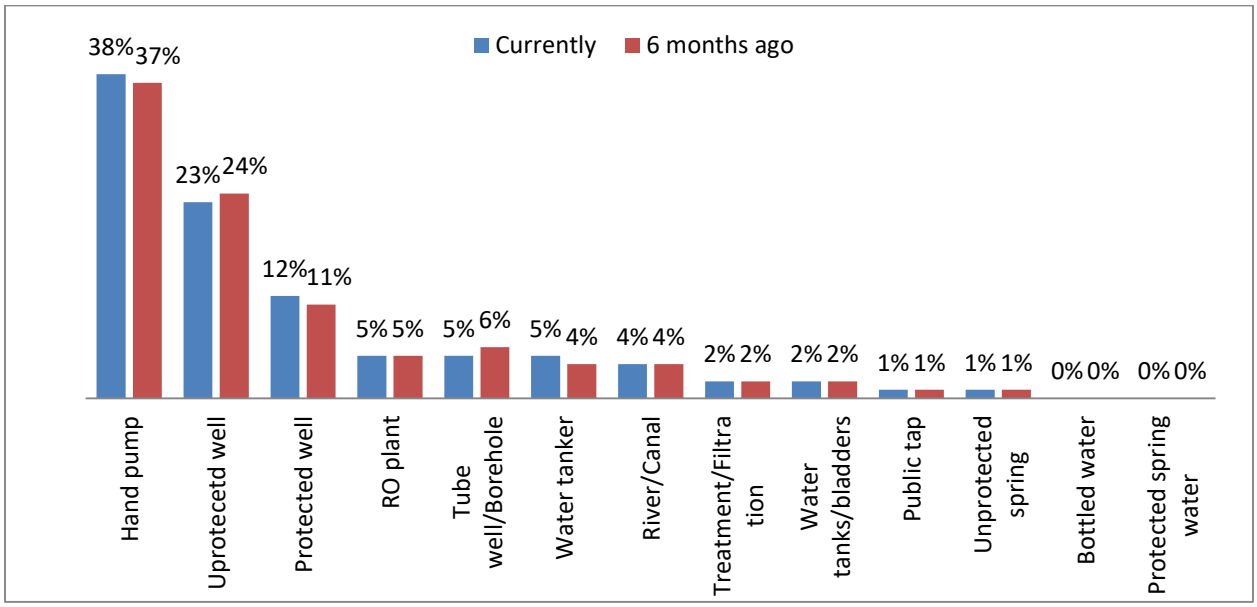


Most of the households in the sample do not have access to electricity (62%), some receive electricity from WAPDA (30%), whereas a small percentage of households receive electricity from solar/generator/other sources (7%).

Access to Drinking Water

Overall 72% of the surveyed population currently have access to improved[27] water sources, with 28% forced to rely on unimproved sources of drinking water (Figure 90). While access to an improved water source is not a measure of water safety, improved sources are more protected, offering an increased likelihood that water is safe for consumption.

Figure 90: Access to Water, Types of Water Systems Accessed by Survey Respondents

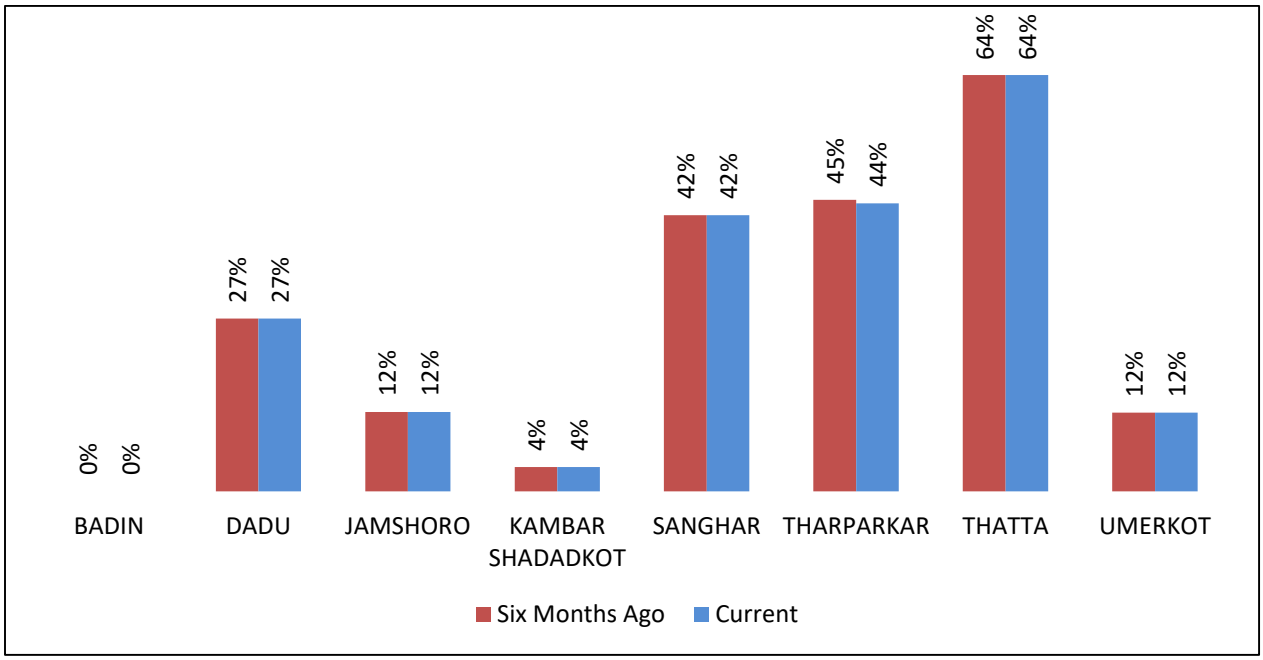


However, access to improved sources varies significantly by district, as shown in the figure 91 below, where 64% of those surveyed in Thatta, 44% in Tharparkar and 42% in Sanghar relying on unimproved sources of water. However, households reported no change in access to water over the last six months[28].

[27] Improved water sources include: piped water, public tap, tube well or borehole, treatment plant, protected well, protected spring, hand pump, bottled water, water tanks or bladders. Unimproved sources include: unprotected well, river/canal, unprotected spring, rainwater.

28 According to Sindh Drought Needs Assessment conducted in 2015-16, overall 70% of surveyed households had access to potentially safe drinking water and rest 30% had access to potentially unsafe drinking water. By district, the households' access to 'Potentially safe' and 'Potentially unsafe' drinking water sources was as follows: Badin (87% and 13%), Dadu (92% and 8%), Jamshoro (63% and 37%), Sanghar (84% and 16%), Tharparkar (32% and 68%), Thatta (56% and 44%) and Umerkot (72% and 28%).

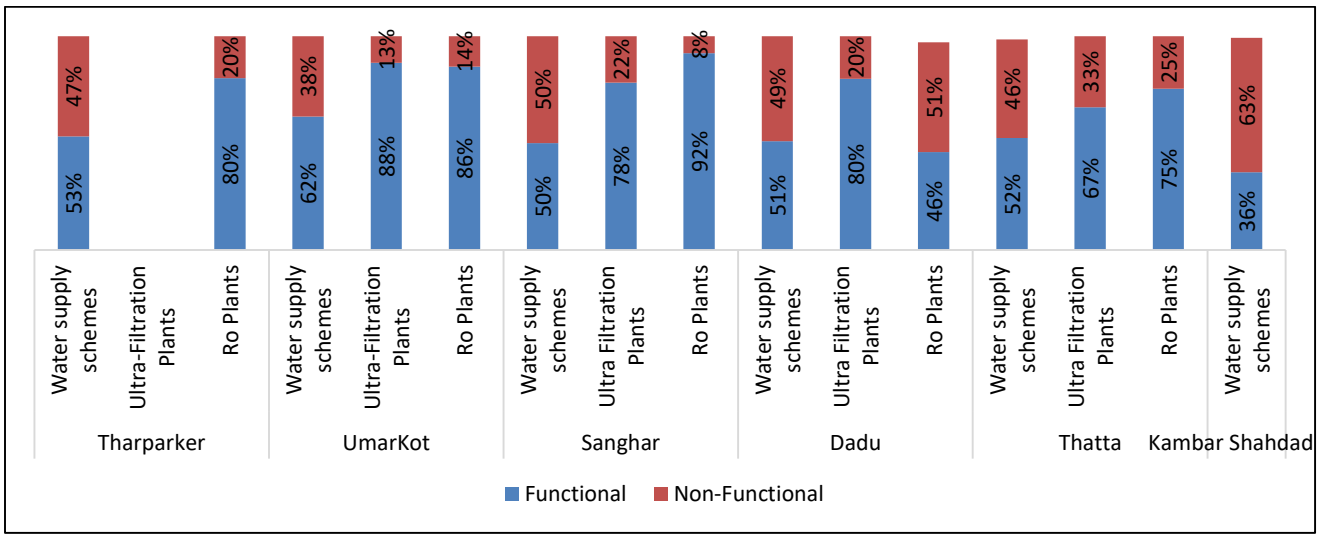
Figure 91: District Wise Percentage of Respondents Relying on Unprotected / Unsafe Sources of Drinking Water Currently and Six Months Ago



A comparison of access to unimproved drinking water sources indicated that 29% of women-headed households compared with 28% of men-headed households rely on unimproved sources for drinking, indicating no major discrepancy based on gender. However, 35% of respondents who indicated their source of livelihood was non-agriculture and 35% who indicated their source of livelihood as livestock relied upon unimproved sources of water, whereas only 16% of respondents with agriculture-based livelihoods relied on unimproved water sources.

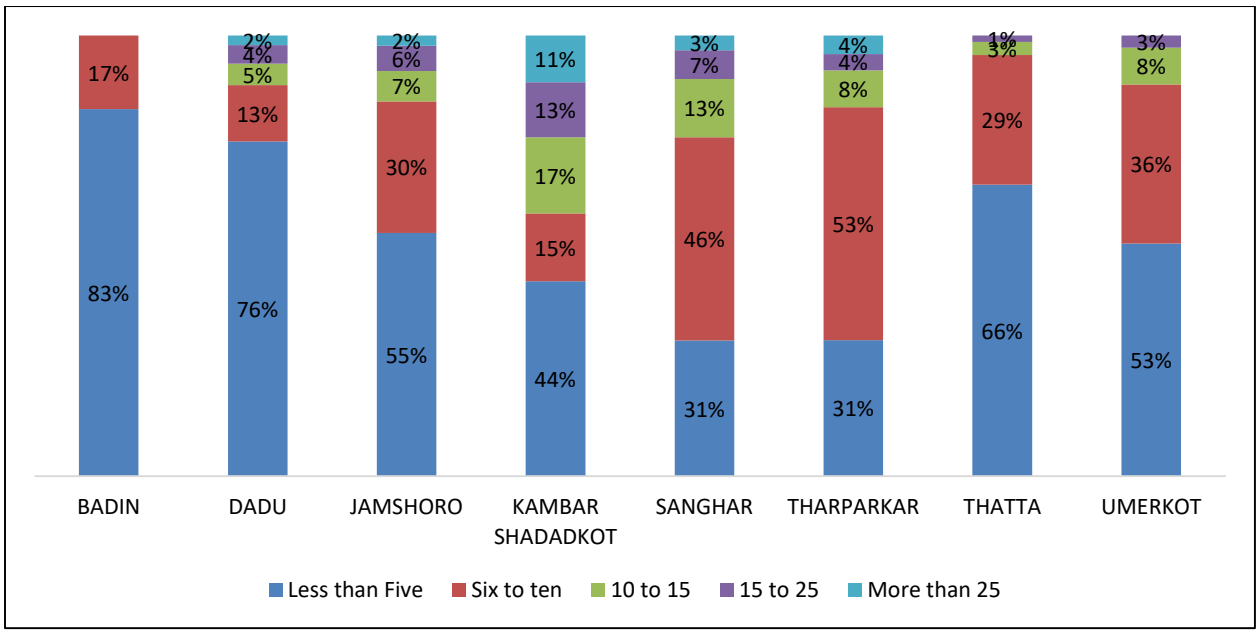
Secondary data, collected from Sindh WASH Sector Information Management System, hosted by the Sindh Public Health Engineering Department (PHED), provides some insight into the status of water supply schemes and water treatment plants across six of the affected districts (Figure 92). Though further analysis is required to localize this data against other vulnerabilities, this data is given below.

Figure 92: Functionality of Water Supply Schemes in Six Districts (Source: PHED WASH Sector MIS)



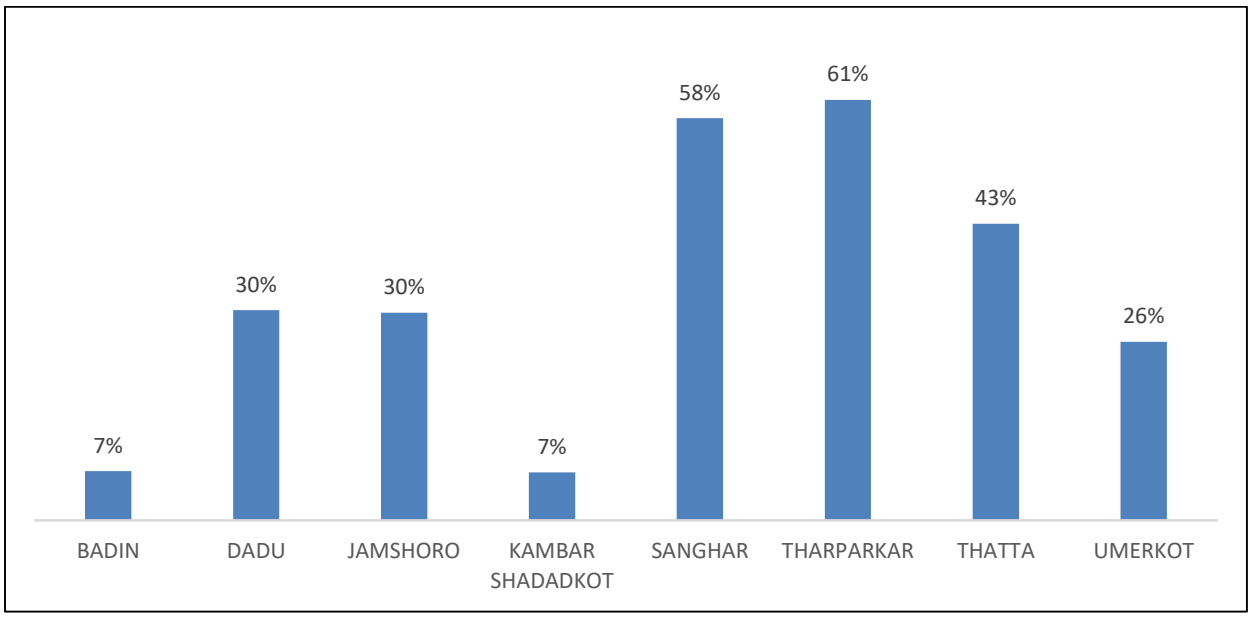
Further to the sources of water available to the population, the amount of water available, the distance travelled to collect this water and whether the households feel this water is sufficient to meet their needs is important to understanding their level of access. The figure below illustrates the liters of drinking water available per person per day, regardless of whether that water is considered safe or unsafe for drinking purposes. A majority of households across all districts use 10 liters or less per person per day (Figure 93).

Figure 93: District Wise Litres of Water Available Per Person Per Day



Overall 38 % of households indicated that the feel that the drinking water available is insufficient for their household, with 61%, 58% and 43% of households from Tharparkar, Sanghar and Thatta respectively reporting as such (Figure 94).

Figure 94: Percentage of Households Indicating Drinking Water is Insufficient for their Daily Needs



No major difference was reported by women or men headed households in this regard, though those reported livelihoods based on livestock (49%) or non-agriculture (41%) were twice as likely to report insufficiency of drinking water as compared to agriculturalists. Lack of drinking water for livestock has also been reported as a critical issue (Table 11).

Table 11: Cross Sectional Analysis on Perceptions of Sufficiency of Water for Drinking

Gender of Head of Household	Women	38%
	Men	39%
Primary Source of livelihood	Agriculture (sale of food/cash/vegetables/fruits/agriculture wage labor/forestry/fishery workers)	22%
	Non-agriculture	41%
	Sale of livestock/livestock products	49%
Residence in desert/arid area	Desert/Arid	40%
	Non-Desert/Arid	13%

The distance travelled to collect drinking water is another important measure of access. The figure 95 highlights the amount of time respondents reported that they walk, one-way, to collect drinking water, with figure 96 further breaking this down for those respondents who rely on unimproved sources of water. Alarmingly, of those with access to unimproved sources, for all districts except Badin, between 65 and 100 % of households reported that they walk ten minutes or more, with a majority walking over 30 minutes to access what is unsafe drinking water. However as indicated earlier, there was no significant change in access reported over the last six months, indicating longer term development issue related to drinking water access for these populations.

Figure 95: One Way Time Taken to Travel to Main Water Source by District

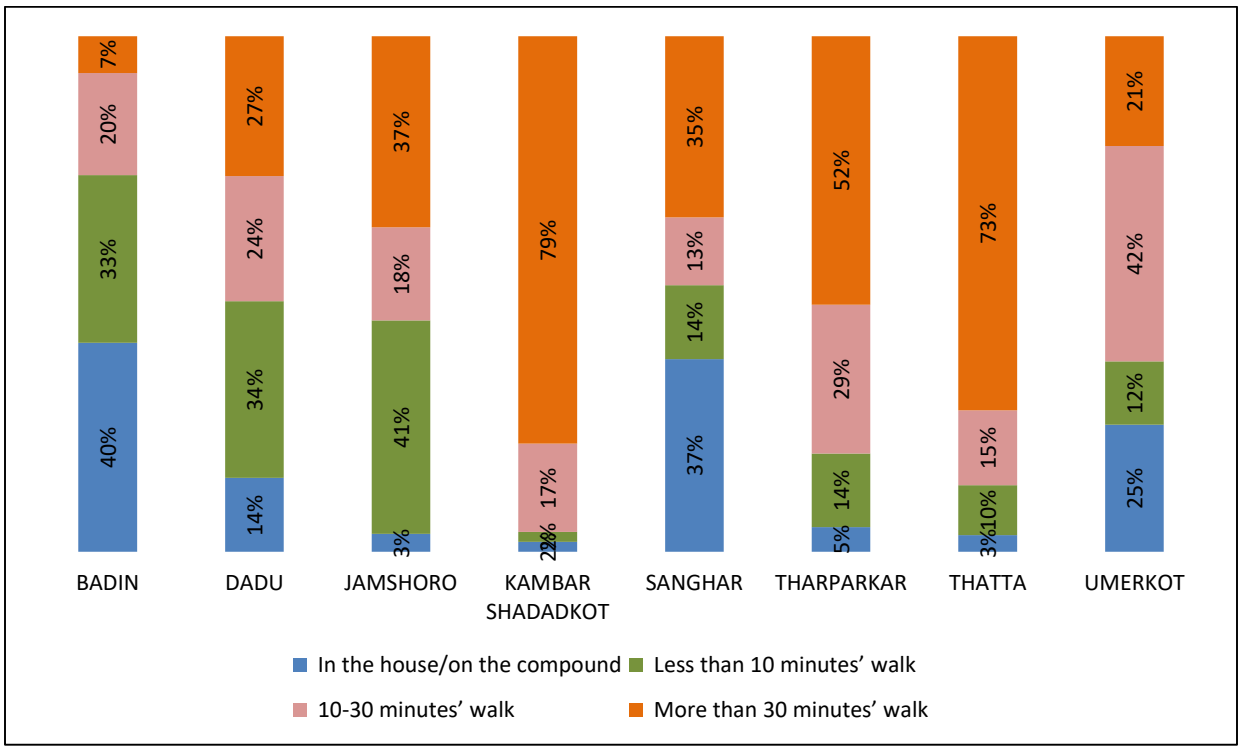
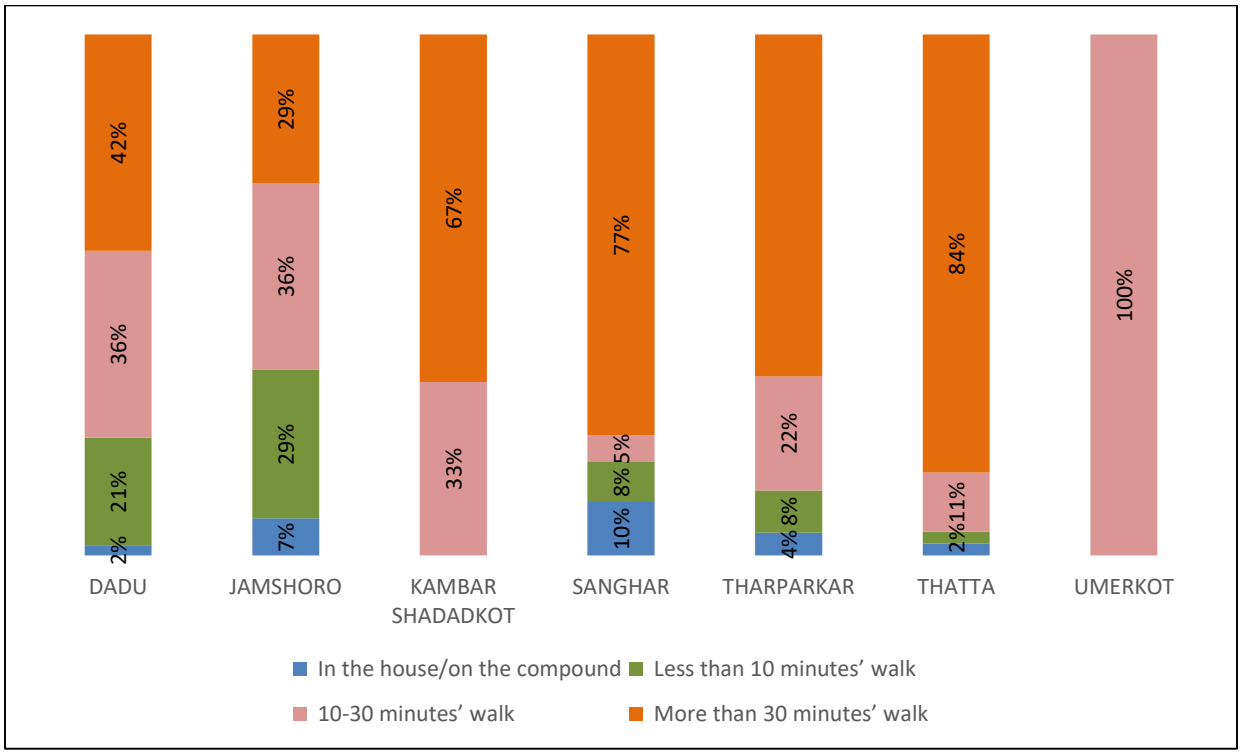
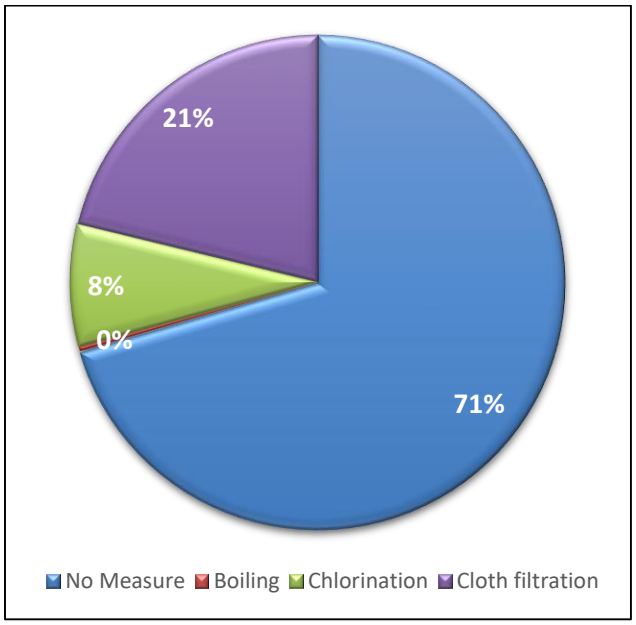


Figure 96: One Way Time Travelled to Water Source by Households Relying on Unprotected Drinking Water Sources by District



As expected, women carry the largest share of the burden of collecting water, with the exception of Jamshoro, where 46% of men are reported to fetch water versus 44% of women and Kambar Shahdadkot, where 72% of men are reported to collect water versus 18% of women. Additionally, a majority of households (71%) reported no household water treatment prior to drinking, with the exception of Jamshoro, where 77% of households reported using cloth filtration (Figure 97).

Figure 97: Households Reporting Water Treatment at the Household Level



Sanitation

The surveyed population overwhelmingly has no access to a household toilet and therefore practice open defecation (82%). Figure 98 details the type of latrine in use by survey households. A comparison of the results of this survey with PSLM data for Sindh for 2015, shows much higher open defecation practice among the surveyed population than district averages from 2015 (Figure 99). This could be due to a number of reasons, including the small sample size of the survey, the focus of the survey on areas already considered affected by drought and thereby vulnerable populations. There is no data thus far to indicate that open defecation has increased due to drought.

Figure 98: District Wise Access to Type of Toilet

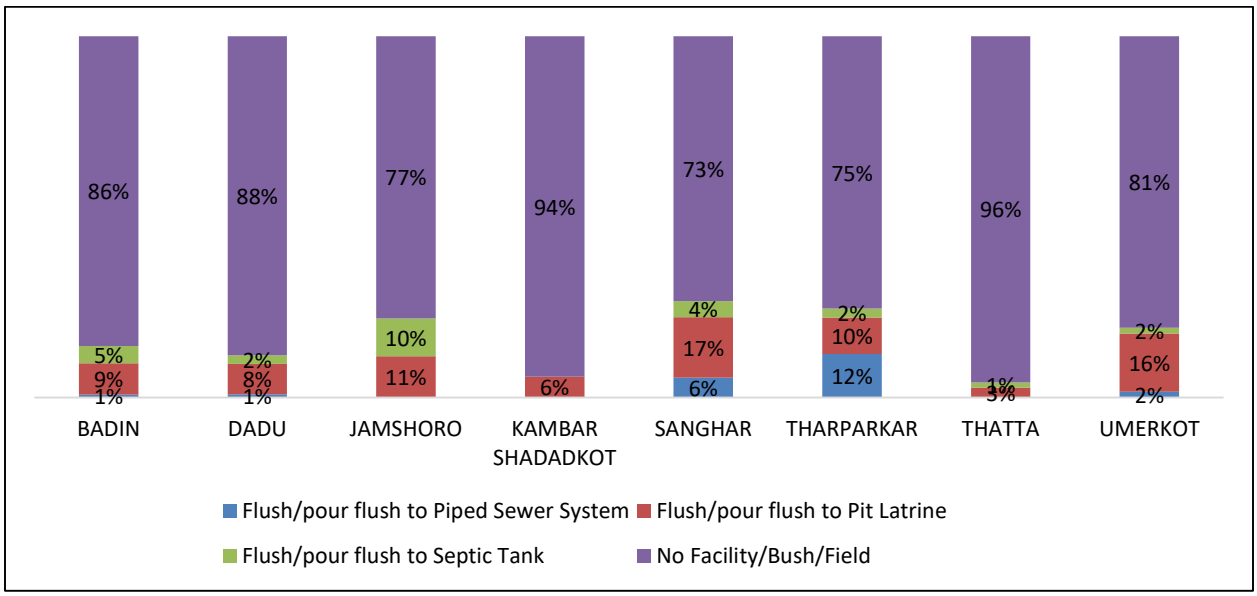
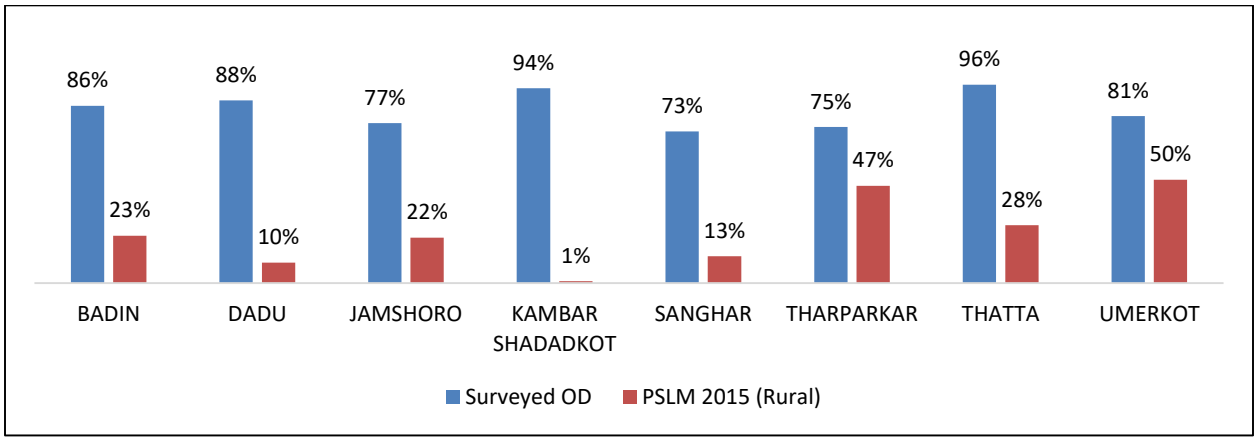


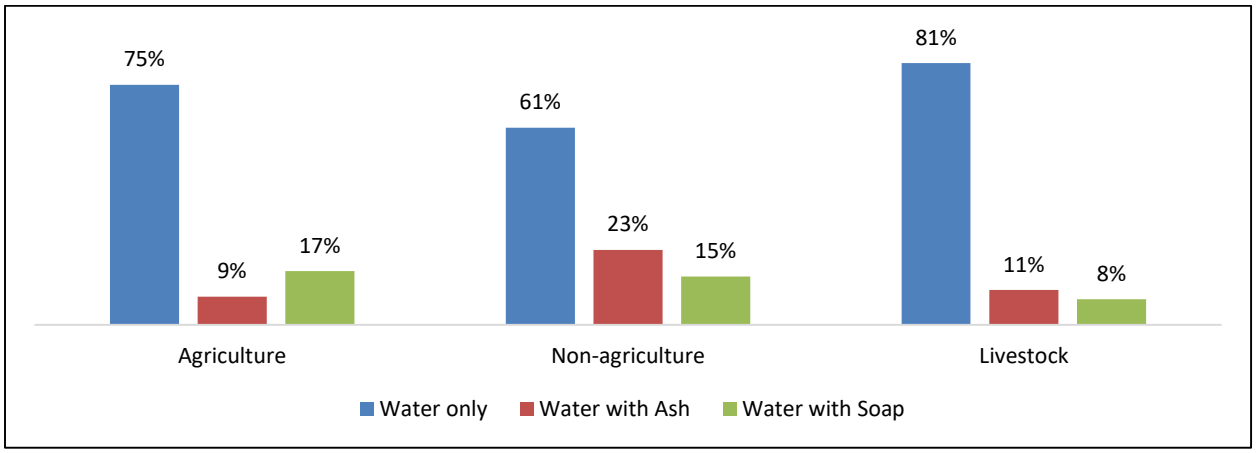
Figure 99: Open Defecation Practices: Surveyed Population as Compared to PSLM 2015 Hygiene



A majority of households indicated that they wash their hands at critical times, including after defecation (85%), before prepared food (74%) and before eating (71%). However, a majority of households, regardless of their source of livelihood/income, wash their hands with water only (Figure 100)[29].

[29] As per Sindh Drought Needs Assessment conducted in 2015-16, overall 61% of surveyed households used water only for hand washing, water and soap (30%), and water and ash/other (9%).

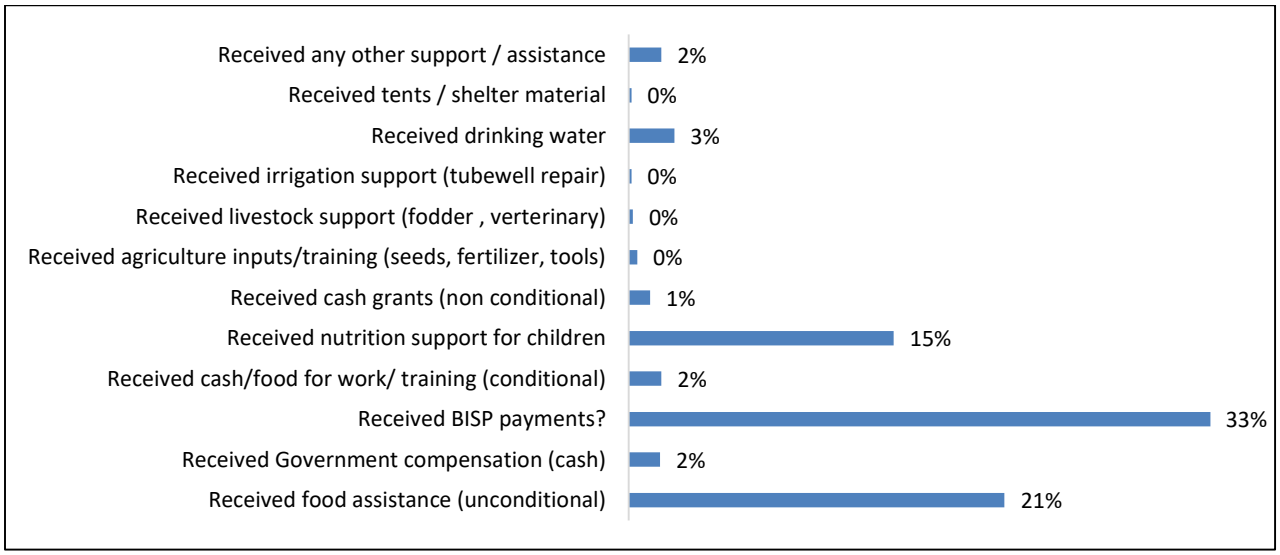
Figure 100: Hand Washing Practices by Source of Livelihood/Income



Receipt of Assistance

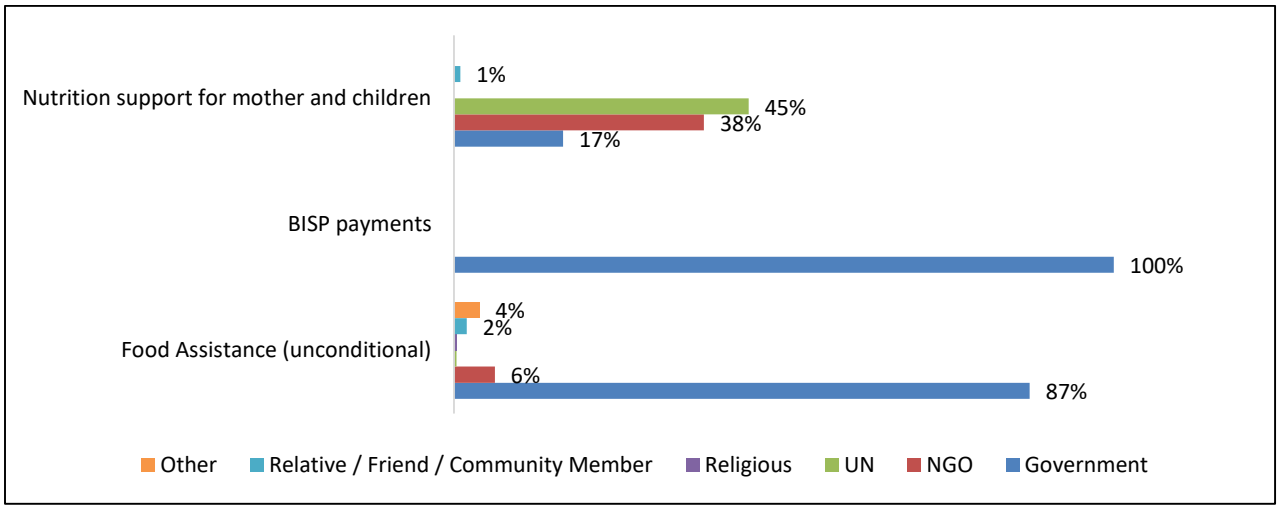
Data on assistance received by the households surveyed suggests that other than payments from the Benazir Income Support Program (BISP) and unconditional food assistance, the households did not receive much assistance from any source during past six months preceding the survey. Overall, 33% of the surveyed households received payments from BISP, 21% received some form of unconditional food assistance, where as 15% received nutrition support for mothers and children (Figure 101).

Figure 101: Assistance Received by Households During Past Six Months by Districts



The Government of Pakistan was responsible for giving BISP payments and was more likely to provide food assistance. However, the United Nations and NGOs were more likely to provide nutrition support for mothers and children (Figure 102). The findings suggest there is scope for improvement in providing humanitarian assistance to households in drought notified areas in Sindh.

Figure 102: Source of Assistance



Conclusion and Recommendations

Overall, the main findings of this drought assessment report show that food insecurity is a major challenge in drought affected districts of Sindh. The food adequacy/sufficiency of own produced cereals from previous seasons was only sufficient for 2.8 months. The own produced pulses production was only sufficient for household consumption for 1.6 months.

Our analysis confirms that overall, 71% of the surveyed households are moderately or severely food insecure, whereas 32% are severely food insecure. This is measured using the Food Insecurity Experience Scale (FIES) developed by FAO, which is used to compute Sustainable Development Goal (SDG) indicator 2.1.2: the prevalence of moderate or severe food insecurity in the population.

Overall, it was found that 47 percent of the surveyed households adopted “high” level food-based coping strategies and 25 percent households adopted “medium” level coping strategies, while 28 percent adopted “No/low” level coping strategies. The higher-level coping strategy index indicates a more serious food security situation. It suggests that a food gap exists in the area and vulnerable households are adopting short-term coping strategies.

Overall, 83% of the surveyed households were using at least one livelihood-based coping strategy to meet their food needs. Mainly, 17% of the households were adopting ‘stress strategies’ 18% were adopting ‘crisis strategies’ and another 50% adopted ‘emergency’ irreversible strategies. These irreversible coping strategies negatively impact food security and livelihood in the future.

In terms of health indicators, on average household members travel around 20 kilometers to the health facility they use the most. Overall, 11% of the households have an adult household member (above 18 years age) who is disabled and 4% have a child (below 18 years age) who is disabled. The rate of morbidity among PLW and under 5 children is very high in the surveyed households. Overall, almost all PLWs fell ill during the past one month preceding the survey and the same was reported for 82% of the boys under age 5 and 85% of the girls under age 5.

Based on preliminary results from NNS 2018, the GAM rate (by weight for height) is highest in Umerkot district at 29%, followed by Badin at 27%, Kambar Shahdadkot and Tharparkar at 23%, Thatta and Jamshoro at 18%, Sanghar at 17%, and Dadu and 14%. These findings suggest the malnutrition state can be classified as critical in all of the drought affected districts except Dadu where the situation can be classified as serious.

Analysis indicted that the surveyed households reported an 11 percent reduction in family income compared to six months ago i.e. PKR 10,581 to PKR 9,401. Household expenditure trends indicated that overall, 36 percent of the households spent a very high share (more than 75% of the total household expenditure) on acquiring food; while 31% households spent a high share (65-75% of the total expenditure) on food. High share of expenditure on food is a proxy indicator of household food insecurity.

According to the analysis, 73% of respondents confirmed contracting new debt during last six months; major portion of it was to cover food needs (70%) and health needs (54%) followed by general household

expenses and to repay earlier debt payments (13%). Overall, on average, PKR 35,386 is the outstanding debt against each household.

Overall 15% of the households in the sample migrated at some point during the last 6 months. However, disaggregating the data by reason for migration shows that 10% of the households performed routine seasonal migration whereas only 5% migrated due to the prevailing drought in Sindh.

As reflected in the report the drought has adversely impacted Agriculture sector (in terms of area under cultivation, production of crops and livestock). The surveyed farming households reported reduction in cultivation area of several crops. Overall, compared to 2016-17 seasons, cultivation area (measured in acres) for wheat was reduced by 17% (100% reduction in Tharparkar and Umerkot) in 2017-18, rice by 70% (80% in Kambar Shahdakot), cotton by 16% (39% in Jamshoro), cluster beans by 30% (100% in Badin), millet by 38% (49% in Tharparkar) and pulses by 45% (100% in Dadu). The crop production (measured in maunds) compared to 2016-17 seasons also reduced: production of wheat reduced by 23%, sorghum by 33%, rice by 35%, cotton by 18%, cluster beans, millet and sesame each by 83% and pulses by 95%.

The reduction in crop cultivation area and production led to limited cereal production (wheat, rice, maize, millet). Overall, the cereal production was only sufficient for household consumption for about 2.8 months (lowest 2.3 months in Tharparkar). The own produced pulses production was only sufficient for household consumption for 1.6 months (highest 5.5 months in Dadu and lowest 0.4 months in Umerkot).

The farming households reported a reduction in availability of water for agricultural activities. Overall, 50% of farming households reported water not being available at all compared to last year, 30% reported less water availability, 7% reported water availability to some extent, while 13% reported less/no shortage of water. Almost all (98%) of the surveyed farming households in Umerkot reported water either not available or a lot less available compared to last year followed by 93% in Tharparkar and 82% in Sanghar. The reduction in crop cultivation and crop production is attributed to less water availability particularly in Tharparakr and Umerkot districts. The less availability of water reported by farming households is attributed to no or very less precipitation and persistent dry conditions which has been prevailing in drought affected areas in 2018.

The surveyed farming households reported less rainfall, limited availability of water for irrigation, unavailability of seeds/other agricultural inputs, financial constraints and loss/lack of draught animals as major reasons for change in crop cultivation and crop production.

Drought has also adversely affected the livestock. Overall, of the surveyed households that keep livestock, 25% reported deaths of cattle during past six months, 21% reported deaths of buffaloes, deaths of goats by 53%, deaths of sheep by 45%, deaths of camels by 20%, donkeys by 18%, whereas deaths of poultry by 57% households (highest 90% in Jamshoro). The surveyed households reported, overall, deaths of 14% of the cattle that they owned six months ago, 12% of buffaloes, 19% of goats, 17% of sheep, 14% of camels, 9% of donkeys and 37% of poultry. The deaths/losses of animals are reported for surveyed households only and these deaths/losses occurred during past six months preceding the survey. These numbers cannot be generalized to entire district.

Based on the analysis and results from this multi-sector drought assessment, the following key recommendations are made to PDMA Sindh on how to alleviate the suffering of the households and individuals due to the drought in parts of Sindh. The following recommendations are to be taken as a strategy for the way forward and have been divided based on thematic response type / area:

Based on the analysis and results from this multi-sector drought assessment, the following key recommendations are made to PDMA Sindh on how to alleviate the suffering of the households and individuals due to the drought in parts of Sindh. The following recommendations are to be taken as a strategy for the way forward and have been divided based on thematic response type / area:

1) **Extension of Government Humanitarian Response**: Rather than creating an alternate or substitute system, all humanitarian stakeholders including UN organizations, NGOs / INGOs, donors, and other charitable organizations / individuals should utilize the Government of Pakistan and Government of Sindh's existing structure and systems to implement a rapid and comprehensive response.
    a. Integration

        - Humanitarian Response (4-6 months): Overall, based on Food Insecurity Experience Scale (FIES), 71% of the surveyed households are moderately or severely food insecure, whereas 32% are severely food insecure. Therefore, there is a high need for the government to continue and expand scope of its relief food distribution to all drought impacted districts. This assistance should continue at least during the lean period of Rabi crop.

    b. Needs and Gap Analysis
        - It is also important to undertake a detailed analysis of the ongoing humanitarian support in each affected district to identify any gaps, which can be filled by the humanitarian partners through food or cash-based interventions to address the urgent needs by complementing the government-led response.
        - To complement the government's efforts, immediate recovery plan needs to be devised for an integrated response to have maximum impact on the livelihoods of the people worst affected by the slow on-set of the disaster. The plan should include on-farm and off-farm recovery interventions with major focus on the severely food insecure households in the arid zones of Tharparker, Umerkot, Sanghar and Dadu districts. Possible interventions include:
        - Activities to support extremely vulnerable women by engaging them in various skill enhancement trainings/program for income generation.

2) **Improve Capacity of Households and Coping Strategies**: As demonstrated in the analysis above, the households are already adopting coping strategies including extreme irreversible strategies meant only for emergencies. Therefore, there is a need to improve upon the strategies used by the households as well as their knowledge base.

    To ensure food and nutrition security of the affected population in affected districts of Sindh, this is imperative to provide drought resistant seed of cereals, fodder, pulses, legumes and vegetables.

Owing to the salinity issues in the areas, bio-saline agriculture , soil management through proper fertilization No-till/reduced tillage systems, crop rotation/cropping systems, seeding rate/density, mulching/adapted soil preparation and strip farming are required to cope with the drought situation. To couple with challenge of malnutrition in drought hit areas of Sindh, an appropriately planned nutrition sensitive agriculture interventions (kitchen gardening) would play a significant role and should be adopted for all phases. Monitoring of drought risks, setting up early warning system, establishment of community seed banks and climate smart agriculture would be appropriate medium and long-term interventions to enable the farming communities to better prepare for the adverse effects of drought.

Type of support to be provided includes:

a. Agriculture
    - Support farmers by providing drought resistant crops, inputs, and promotion of climate smart agriculture. Specifically, provide drought resistant seed of cereals, fodder, pulses, legumes and vegetables.
    - Introduction and up scaling of bio-saline agriculture
    - Capacity building of farmers through Farmers Field Schools (FFS), Junior Farmer Field Schools (JFFS), Farmers Business School (FBS) and Women Open Schools (WoS)
    - Introduction of drought tolerant fruit, fodder and shrubs plantations
    - Soil management through proper fertilization
    - No-till/reduced tillage systems
    - Usage of crop rotation/cropping systems
    - Seeding rate/density
    - Mulching/adapted soil preparation
    - Strip farming as required
    - Establishment of community seed banks
    - Climate smart agriculture
    - Introduction of Agro-forestry for saline, conventionally uncultivable land to bring about resilience among poverty ridden land holders. Assessment of land for suitable trees also recommended.
    - Involve factories of engineered wood or chipboard, hardboard and Medium Density Fiberboard for making purchase agreements with locals.
    - This intervention may be useful in district Badin, Thatta, Tharparkar, Umerkot and other districts where vast portions of land is barren due to salinity and water logging.
    - The Forest Department, Revenue Department, Small & Medium Enterprises (SME) and NGOs may be involved for implementing this intervention.
    - Introduction of Silvi culture and quality timber plantation involving indigenous tree species, which are highly accepted in Agro-Forestry. Rohida (which is called desert teak) plantation can be encouraged in association with other useful trees for fodder and other purposes in Tharparkar, Umerkot, Kohistan and Kaachho areas of Dadu.
    - Commercial importance of this timber may be highlighted comparing it with Burma teak, and plan may be proposed on lines of a plantation company relationally involving local population, investors and purchasers.
    - Nurseries of forestry plants is also recommended to be established at feasible places so communities can get plants.

b. Water infrastructure

The underground water is deep and brackish. It is not fit for cultivation. Providing alternative sources of low-salinity water; either through new wells, treatment of low quality water or providing water from outside the drought-affected region is critical for agriculture. There is need to improve local rainwater collection and capacities are required to develop in efficient and effective use of water. Providing access to low-quality water and create opportunities to add value to its use would be essential. In the medium term there is need to establish water accounting systems in order to closely monitor water levels and respond promptly to dry spells and droughts. Conservation of rain water by checking surface run offs through structural mitigation measures is highly recommended.

- Initiation of water conservation practices through the rehabilitation of water structures both for 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. This should also include repair and rehabilitation of existing dug-wells in the area which are the main source of ground water. Due to water scarcity, people are heavily resorting to adopting negative coping strategies, which includes disposing off productive livelihood assets including cattle-heads. Water structures rehabilitation needs good coordination among various stakeholders (technical line departments and agencies with technical feasibility experts or skilled man power).
- Provide alternative sources of low-salinity water; either through new wells, treatment of low quality water or providing water from outside the drought-affected region is critical for agriculture.
- There is need to improve local rainwater collection
- Conserve rain water by checking surface run offs through structural mitigation measures
- Construction /rehabilitation of water infrastructure (Tarai /tobas), water conservation and introduction of micro-irrigation system

c. Livestock

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 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. The situation demands immediate measure particularly supply of fodder increased through getting fodder from barrage areas/ districts. Provision of fodder seed suitable for the areas. Setting up of fodder/feed *mandies* (markets) at fixed prices and allow farmers to buy. In areas where the livestock 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,

livestock insurance and enterprise development are crucial elements to enable the pastoralists to prepare and respond to the future shocks. Specific livestock recommendations are summarized below;

- Livestock Protection and Management interventions by engaging the services of all technical agencies and the concerned line department.
- providing necessary assistance for and supply of fodder, feed, water and cattle health
- getting fodder from barrage areas/ districts
- Provision of fodder seed suitable for the areas
- Setting up of fodder/feed *mandies* (markets) at fixed prices and allow farmers to buy
- Arrange temporary mandis (markets) so that livestock herders can get the best price of the livestock
- In areas where the livestock concentration is high camps needs to be set up for easy provision of services.
- pasture management through controlled grazing
- livestock insurance and enterprise development
- De-stocking / relocation of livestock in case of market disruption and animal mortality due to prolonged emergency
- Re-stocking of livestock to rebuild the livestock-based livelihood once emergency is over
- Trainings on livestock and poultry rearing, Livestock Farmer Field Schools (LFFS), LEGS training
- Establishment of livestock / fodder markets accessible to communities in the desert / arid areas
- Shelters to needy and vulnerable livestock/poultry handlers

d. Cash

- Cash is proposed as the assistance modality for immediate livelihood recovery support to the targeted households carrying multiple benefits. Cash injection would improve the supply and demand situation of food and non-food items in the local market which would help improve food availability, access and consumption by the targeted HHs.
- Cash based interventions should be implemented for provision of fodder during the drought period. For example, cash plus interventions particularly focusing on women and other vulnerable households in collaboration with BISP. Or additionally, conditional cash-based interventions focusing on food security nutrition and livelihood.

e. Food Security

- Trainings on kitchen gardening, diet diversity, food processing and food safety
- Regular monitoring of food security, nutrition and livelihoods through seasonal surveys such as Livelihood and Food Security Assessment (LFSA)

f. WASH

- Increase access to improved sources of water for the highly vulnerable areas and priority affected districts/talukas through the repair/rehabilitation of non-functional water supply systems and water treatment plants,

- Investment in the establishment of operation and maintenance systems that are community and/or local government owned as relevant and that address long-term sustainability.
- Health and hygiene messages, including the importance of hand washing at critical times and the use of various household water treatment options, should form part of integrated into health and nutrition interventions in affected areas.
- Sanitation, the access to household level toilets, should continue to be addressed through long-term development programs aimed at eradicating open defecation.

g. Increase in / Extension of Basic Services: Where possible, basic facilities and services should be enhanced and utilized to target the affected populations to provide relief. Examples of extension in support include:

- Health and nutrition
  - Irrespective of rapid assessment data' significance and representativeness, it is a well known and established fact that GAM rates are very high across the districts of Sindh (NNS 2011 and MICS 2014 etc.) which is further endorsed through NNS 2018 (preliminary data), therefore it is recommended to continue and scale up the provision of life saving nutrition services to mother and children, such as screening and treatment of acute malnourished children 6 to 59 months (severe and moderate usually double then SAM caseload), treatment of malnourished PLW ensuring complete package of CMAM(OTP+TSFP) services in all the affected districts with maximum scale in parallel with PC1 and AAP nutrition interventions to reduce the high burden of malnutrition and provision of IFA/multi-micronutrients to pregnant and lactating women, strengthen and enhance communication around infant and young child feeding good practices and capacity development of key implementers /partners in order to timely save many precious lives of infant and young children so that they can thrive well.
  - Considering the multifactorial causes of malnutrition there is a high need to plan/develop multisectoral programs in these affected areas, which can simultaneously address immediate, underlying and basic causes of malnutrition.
  - An integrated programmatic approach (Nutrition, WASH, Health and Food Security) for child survival and thrive, is highly recommended to address the grave malnutrition issue in the subjected districts.
  - More focus should be attained on community based nutrition services as accessibility to health facility is identified as a core issue.
  - Coverage assessment (SQUEC/SLEAC) of existing CMAM services is recommended to understand the programmatic and geographical coverage with its effectiveness
  - Malnutrition and associated silent hunger among pregnant and lactating women predispose mothers to maternal complications and even mortality. In circumstances like drought with high malnutrition rates among pregnant and lactating mothers, 4 in 10 pregnant women becomes anemic[1]. Iron deficiency anemia in mothers is an important risk factor for hemorrhages, a leading cause of maternal mortality. Calcium deficiency in pregnancy causes pre-eclampsia, another cause of mortality. Globally, maternal infections before and during child

birth are associated with around 10% of maternal mortality each year and malnutrition is one of the main factors.

- Women, who will be presenting with complications of pregnancy needs necessary care, for instance, timely Ante-natal checkups, management/referral of complications.
- It is an established fact that 4% of the total population will be pregnant at a given time, of whom 15% women expected to have life threatening complications, with 5% requiring C-Sections. Therefore, availability of emergency reproductive health services or minimum in initial service package (MISP) is mandatory.
- In a stressful situation as this, sexual and gender-based violence cases increase, and therefore, it is important to develop an appropriate response to sexual and gender-based violence.
- Establishment of vaccination camps in drought affected areas
- Utilize kitchen gardening as a nutrition sensitive agriculture intervention

- Alternatives

  - Look to promote alternative livelihood opportunities (skill trainings, enterprise development and value chain development).

h. Coordination, Partnership, and Opportunities: The Government of Pakistan, Government of Sindh, and all humanitarian stakeholders should look towards establishment and / or strengthening of institutional partnerships to provide a comprehensive response to the drought in an efficient and coordinated manner. In particular localized solutions should be identified and utilized for effective outreach. For example:

- Partnership with the BISP
  - The BISP provides support to 33% of the households in the sample, meaning the program already has a substantial amount of coverage in the drought notified areas. The beneficiaries can be assisted further by establishing linkages with respective service delivery departments and safety-net mechanisms of the government. The assistance period under this phase is proposed for four to six months. Strong monitoring, focused approach, and areas with high % of affected geographical areas/population will be targeted for immediate response.
- Localized solutions
  - Drought risks should be monitored on an ongoing basis by the Government.
  - Need to set up early warning systems
- Coordination
  - A Food Security and Livelihood Working Group needs to be established under the leadership of PDMA to coordinate the overall response, avoid duplication, develop partnerships and build synergies among partners.
- Long Term Development Response
  - For continued and sustained improvement in the situation, there is a need to address the root causes responsible for recurring drought, food insecurity and malnutrition. There is also a need to invest in resilience building and climate change adaptation through medium to long-term interventions in collaboration with the provincial government. Concerted efforts are required to improve the outreach, coverage and service delivery of the concerned line departments

particularly focusing on social sector development, early warning systems and the introduction of productive safety net initiatives through BISP and other available instruments.

i. Prioritization of Response

- Analysis and response from main indicators such as adequacy of own production of cereals, percentage reduction in crop area, percentage reduction in crop production, percentage of households reporting death of livestock, proportion of livestock deaths to total ownership, prevalence of moderate or severe food insecurity, Household Hunger Scale, CARI, food consumption score, and consumption based coping strategies have allowed us to calculate prioritization of response to the drought by district.
- Based on the analysis, Tharparkar district has the highest priority of response because the results are consistently poor for most of the indicators. Second highest priority of response is for Umerkot and Sanghar districts. Third highest priority of response is with Jamshoro, Thatta, and Dadu districts. Whereas the fourth priority of response is with Kambar Shahdadkot and Badin districts.

District Prioritization/Ranking for Response	
1	Tharparkar
2	Umerkot and Sanghar
3	Jamshoro, Thatta and Dadu
4	Kambar Shahdadkot and Badin

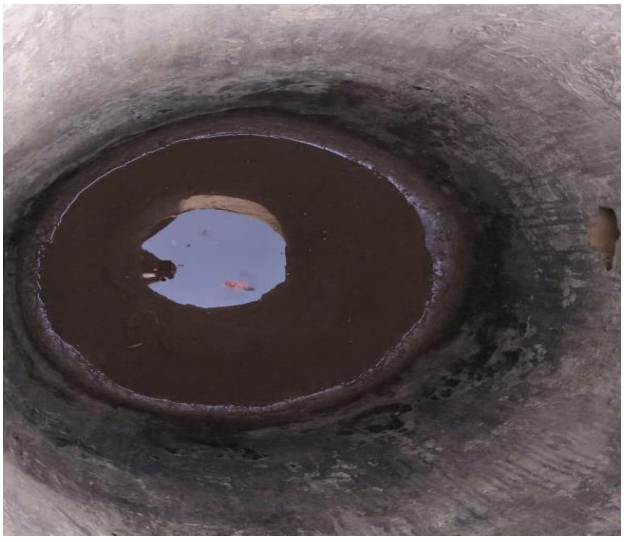
Annexure

Annex A: List of Surveyed Revenue Villages (Dehs)

S.N	District_Name	Tehsil/Taluka Name	Union Council	Revenue Village
1	Badin	Badin	Chakar Panhwar	Dasti
2	Badin	Badin	Mitho Khan	Walhari
3	Badin	Golarchi	Ahmed Rajo	Ahmed Rajo V
4	Badin	Matli	Budho Qambrani	Khori
5	Badin	Talhar	Mir Ahsan Ali Talpur	Bohro Iv
6	Badin	Tando Bago	Pir Bodlo	Katadho
7	Badin	Tando Bago	Pir Bodlo	Khahi Bero
8	Dadu	Johi	Drigh Bala	Naushehro
9	Dadu	Johi	Pat Gul Mohd	Bair Bughyo
10	Dadu	Johi	Pat Gul Mohd	Hero Khan
11	Dadu	Johi	Pat Gul Mohd	Kathiya Barani
12	Dadu	Johi	Sawro	Pat Suleman
13	Dadu	Johi	Sawro	Sawro
14	Dadu	Johi	Torr	Deen Panah
15	Dadu	Johi	Torr	Malko Jagir
16	Dadu	Johi	Torr	Nai Kate
17	Dadu	Johi	Torr	Pai
18	Dadu	Khairpur Nathan Shah	Burira	Salari
19	Dadu	Mehar	Charo	Mojhar Barai
20	Jamshoro	Manjhand	Khanoth	Sharki
21	Jamshoro	Manjhand	Shalmani	Dabri
22	Jamshoro	Sehwan	Bajara	Dalh
23	Jamshoro	Sehwan	Bubak	Yaqoobani
24	Jamshoro	Sehwan	Jaffarabad	Jaffarabad
25	Jamshoro	Thano Bula Khan	Ahmed Khan	Loyach Malik Sardar Khan
26	Jamshoro	Thano Bula Khan	Mondar	Kalo Khunher
27	Kambar Shadadkot	Kambar Khan	Gaibi Dero	Jagir 1
28	Kambar Shadadkot	Kambar Khan	Gaibi Dero	Jagir 6
29	Kambar Shadadkot	Warah	Khando	Patho
30	Kambar Shadadkot	Warah	Mirpur	Chak Fareedabaad
31	Kambar Shadadkot	Warah	Mirpur	Chandi Jagir
32	Kambar Shadadkot	Warah	Mirpur	Hamal
33	Sanghar	Khipro	Kamil Hingoro	Ranhao
34	Sanghar	Khipro	Ranak Dahar	Ranak Dahar
35	Sanghar	Sanghar	Chotyaarion	Chotyaarion
36	Sanghar	Sanghar	Chotyaarion	Rar
37	Sanghar	Sanghar	Kalar	Sareji Thar
38	Tharparkar	Chacharo	Heerar	Heerar

S.N	District_Name	Tehsil/Taluka Name	Union Council	Revenue Village
39	Tharparkar	Chacharo	Kantio	Kantio
40	Tharparkar	Chacharo	Sanghiyar	Charnor
41	Tharparkar	Dahli	Kheensar	Kheensar
42	Tharparkar	Dahli	Laplo	Laplo
43	Tharparkar	Dahli	Peerane Jo Par	Peerane Jo Par
44	Tharparkar	Diplo	Bolhari	Dohar
45	Tharparkar	Diplo	Jhirmirio	Paneli
46	Tharparkar	Diplo	Sobhiar	Malenhar
47	Tharparkar	Islam Kot	Kehri	Kehri
48	Tharparkar	Islam Kot	Khario Ghulam Shah	Khario Ghulam Shah
49	Tharparkar	Islam Kot	Sonal Bah	Sonal Bah
50	Tharparkar	Kaloi	Khetlari	Khetlari
51	Tharparkar	Kaloi	Khetlari	Nabi Sar
52	Tharparkar	Kaloi	Sarhod	Tando Niyazi
53	Tharparkar	Mithi	Chelhar	Janjhiar
54	Tharparkar	Mithi	Godhiyar	Godhiyar
55	Tharparkar	Mithi	Mithrio Bhati	Mithrio Bhati
56	Tharparkar	Nagar Parkar	Harho	Harho
57	Tharparkar	Nagar Parkar	Nagarparkar	Adigham
58	Tharparkar	Nagar Parkar	Tugusar	Tugusar
59	Thatta	Thatta	Jung Shahi	Jung Shahi
60	Thatta	Thatta	Kohistan 2	Kohistan 2
61	Thatta	Thatta	Kohistan 4	Kohistan 4
62	Thatta	Thatta	Thariri	Thariri
63	Umerkot	Umerkot	Faqeer Abdullah	Janhero Thar
64	Umerkot	Umerkot	Faqeer Abdullah	Nabi Sar Thar
65	Umerkot	Umerkot	Faqeer Abdullah	Sabhri Thar
66	Umerkot	Umerkot	Gharibabad	Baharai Thar
67	Umerkot	Umerkot	Gharibabad	Vehro Thar
68	Umerkot	Umerkot	Khaplore	Mokhal Bah
69	Umerkot	Umerkot	Khaplore	Sonheri

Annex C: Picture Gallery



The Natural Disasters Consortium (NDC) comprised of IOM, FAO, UNICEF, HANDS and ACTED conducted the Sindh Drought Needs Assessment (SDNA) in drought affected areas of 8 districts in Sindh in coordination with the Provincial Disaster Management Authority (PDMA-Sindh). WFP, WHO, OCHA, and UNFPA also provided technical support to complete this assessment. Financial support for this assessment was provided by the Department for International Development (DFID).

The assessment used both household and FGD tools. Data was collected from 1,229 households located in 69 Revenue Villages (Dehs) of 53 Union Councils, 24 sub-districts (Talukas/Tehsils) of 8 drought affected districts in Sindh (Tharparkar, Umerkot, Sanghar, Badin, Thatta, Jamshoro, Dadu and Kambar Shahdadkot).

The assessment provides detailed analysis of the current situation in the agriculture sector (crops and livestock production and losses), local livelihoods, food security status, health and nutrition status, access to water and sanitation, and migration patterns in the drought affected districts.

The findings of the SDNA will allow stakeholders including the Government of Pakistan, the Government of Sindh, NDC partners, other national and international humanitarian and development actors, to make informed decisions in relation to short, medium, and long-term interventions/programs to address immediate needs and increase future resilience to drought in Sindh.

Food and Agriculture Organization of the United Nations unicef World Food Programme World Health Organization ACTED HANDS UKaid