



June 2016

Household Economy Analysis Drought Impact Assessment 2015

Jamshoro, Umerkot & Tharparkar Districts of Sindh Province



HEA Drought Impact Assessment 2015

SINDH Province Jamshoro, Umerkot & Tharparkar Districts

June 2016

**Food Security Cluster
Concern Worldwide**



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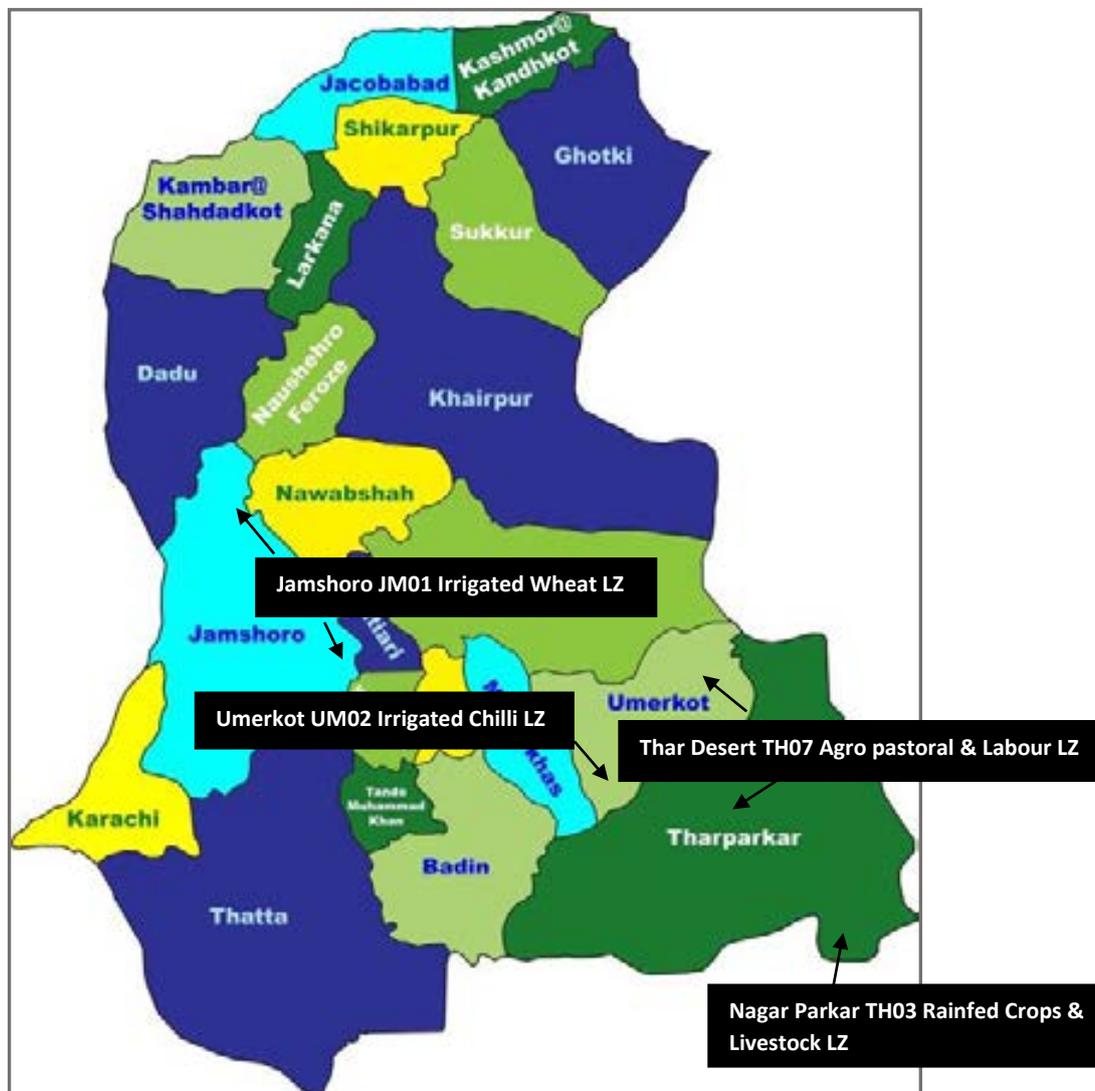
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LOCATION OF THE ASSESSMENT

The HEA Drought Assessment was implemented in three different districts of Sindh Province – Tharparkar, Umerkot and Jamshoro – covering four different livelihood zones. The location of these four zones is indicated on the map below.



EXECUTIVE SUMMARY

Sindh Province is located in south eastern Pakistan. One of the most notable features of the province is the Indus River. The Indus River is primary source of economic potential in the province yet it is also the source of the province's greatest hazard: flood. The second major hazard is drought which reflects the province's dry climate and semi-arid environment. In the past 5 years, both flood and drought have affected Sindh Province, including the study area of Jamshoro, Umerkot and Tharparkar Districts. Three consecutive years of flood emergencies (2010-2013) were then followed by a severe, two-year drought (2013-2015). Tharparkar and Umerkot Districts were particularly affected by the drought due to their desert environment.

Agriculture is a key driver of the economy of Sindh Province. Farming is based principally on irrigation along the Indus River and its tributaries. Crops, such as winter wheat, chilli, cotton, onions, millet, beans and oil seeds, are grown during two seasons (*kharif* and *rabi*). Land is owned by a few large landowners who rent out land to many sharecroppers. The sharecroppers, together with the landless agricultural labourers, make up the poorest segment of the population. In this assessment, very poor and poor households accounted for 57-63% of households in the irrigated agriculture zones, and 61-68% of households in the rainfed agriculture zones. Notably, a relatively recent report from 2011-2012 puts the rate of under-nutrition in Jamshoro and Umerkot Districts at 44-54%, and in Tharparkar District at 37.5-44%. These rates are above the provincial average and underscore the HEA finding that chronic poverty and under nutrition are widespread in these three districts.

Chronic poverty and periods of acute food shortages are certainly typical of this region of Sindh Province and against this backdrop the Food Security Cluster decided to carry out a drought assessment. The objective of the field assessment was to assess the impact of the 2013-2015 drought on local livelihoods in some of the worst drought affected districts of Sindh Province. The inquiry addressed questions such as: what was the extent of production losses? What effect did these losses have on household access to food and income, and on the things they need to support their families? How did families cope with these losses? Which households were worst affected and what was the extent of their food and income gaps? In turn, who was more resilient and why? In order for a sophisticated understanding of the effect in the 3 districts, the HEA inquiry analysed the data by livelihood zone – from irrigated agricultural zones to a rainfed agricultural zone to an agro-pastoral zone. Data collection was based on focus group interviews during which extensive data was collected from a small but representative sample of households who were divided into four wealth groups. Cross-checking was done with key informants at the village level. HEA itself is an analytical framework (not a data collection method per se) that begins with a baseline picture of food, income and expenditure then analyses how these "normal" patterns change in a bad year. This leads to an assessment of the gap in food and income that is secured in a bad year (or, alternatively, a current year). The gap is measured against basic survival and livelihood protection thresholds. HEA uses livelihood modelling in order to assess the resources available compared to the resources required. These modelling tools can be used each year for predictive needs assessments in emergency or development contexts.

The HEA assessment covered the Irrigated Wheat zone along the Indus River in Jamshoro District; the Irrigated Chilli zone in western Umerkot District; the Rainfed Crops and Livestock zone in Nagar Parkar Tehsil (Tharparkar District); and the Thar Desert Agro-pastoral and Labour zone in Tharparkar District and in eastern Umerkot District. In all of four zones, crops are the main source of food and income. In the Irrigated Wheat Livelihood Zone, wheat is the main food crop and is also an important crop for sale, together with chilli, onions and a variety of other vegetable and oil seed crops. Casual labour is mainly found on local farms and includes harvesting wheat and chilli peppers. In the Irrigated Chilli Livelihood Zone, wheat is grown as the staple food crop but the principal cash crops are chilli peppers and cotton. Casual labour is mainly found in the local agricultural sector. In the small Rainfed Crops & Livestock zone in southern Tharparkar District, as well as in the Thar Desert Agro-pastoral zone, millet and beans are the staple food crops. Cash from livestock sales and casual labour (both local and migratory) are the main income sources in the Thar Desert Agro-pastoral zone. In the Rainfed Crops & Livestock zone, sales of various types of beans as well as oil crops and vegetables provide the bulk of income for local farmers. Local agricultural labour is also an important source of income for the poor and very poor.

The differences between the zones meant that the drought had a different impact on households in each area. The economies in the irrigation zones did prove to be relatively resilient in face of drought and although there were some production and price swings in 2013, 2014 and 2015, the swings were not large enough to lead to emergency level food and income gaps. This meant that farmers were able to secure their food and income in a similar way in both the drought and non-drought years with some expenditure adjustments. Moreover, poor labourers were able to find work harvesting wheat and chilli. Access to irrigation thus clearly gives these farmers some stability during drought years (as long as water flow upstream is plentiful). However, chronic poverty is a concern. Even in an average production year, **around 57% of households in the Irrigated Wheat zone had total resources falling below US \$1 per person per day (pppd)**. Average food and cash income was US \$0.70 pppd for these poor households.

The impact of drought was much more severe in the Thar Desert Agro-pastoral and in the Nagar Parkar Rainfed Crops & Livestock Livelihood Zones. These zones are dependent on local rainfall for crop and livestock production. Lack of rainfall thus meant extremely low harvests and high livestock deaths. Households responded to the shock mainly by reducing their non-essential expenses and looking for additional casual work or seeking gifts or loans. These strategies helped reduce the initial food and income gap that they faced when their harvest failed but serious gaps remained. The result was that by May/June 2015, about 75% of the population in these two zones to differing degrees lacked the resources to cover basic survival and livelihood protection needs. In short, an estimated 1,101,623 people fell below emergency-level thresholds. To fill the gap, the total requirement was 17,792 MT (wheat flour) or PKR 667,200,000 in cash. Although some households were worse affected than others, in general terms, those who needed humanitarian assistance required PKR 4,542/household of 7-8 members (or 121 kg wheat flour/household) to ensure that their most basic needs were met.

Revised Estimate of Need in 2015 – Tharparkar + Umerkot Districts (w/ coping strategies) (MT wheat flour)

		PKR	x1000	
		TOTAL		
Sindh Province, District	Tehsil	Beneficiaries	Either	OR
			MT	Cash
Tharparkar	Nagar Parkar	46,152	1,930	72,375
Tharparkar	Chachro, Dahli	356,118	5,526	207,225
-	Mithi, Islamkot	292,104	4,317	161,888
-	Diplo	210,248	3,107	116,513
-	Nagar Parkar	84,613	1,251	46,913
Umerkot	Umerkot (Garibabad UC)	112,389	1,661	62,288
TOTALS		1,101,623	17,792	667,200

The worst affected area was the Thar Desert Agro pastoral & Labour Livelihood Zone. In the Thar Desert, the loss of livestock coupled with major harvest shortfalls and reduced local agricultural labour opportunities led to major income gaps. Even by

using coping strategies, the very poor, poor and middle households in this zone saw their total food and cash resources drop by PKR 25,047-51,300/household. This meant that their total resources (food + cash) in the second year of drought were only PKR 65,741-72,070/household. This level of resources was just 58-72% of their pre-drought year total income. Middle households saw the largest drop in income and faced the greatest gap in what they could afford and what they needed to buy to cover basic food energy and livelihood input costs. Moreover, for very poor, poor and middle households, their **total resources were around US \$0.25-0.27 per person per day (pppd), a drop from US \$0.38-0.51 in the reference year.** In both good and bad years, pppd income levels were found to be far below the estimated “extreme poverty line” of US \$1.51 pppd for Asia. It is also below the international poverty line which was recently raised by the World Bank to US \$1.90 pppd in 2015.

The Nagar Parkar Rainfed Crops & Livestock Livelihood Zone also suffered major income losses due to drought. Very poor households’ total food and cash income dropped from PKR 106,151 /household in the baseline year to PKR 59,030 in 2015. Income from additional casual work boosted their total resources to an estimated PKR 76,465 which was enough to cover the cost of their basic needs. However, they still had an income shortfall of PKR 29,686 which meant reducing clothes, transport or other expenses. Poor households faced the largest income losses. Their drought year total resources – an estimated PKR 74,500 -- were only 60% of their pre-drought year total income. Moreover, very poor, poor and middle households all had total incomes very much below the international poverty line, averaging US \$0.25, US \$0.25 and US \$0.55 pppd respectively in the 2015 drought year.

In 2016, conditions are expected to improve in these two zones due to heavy monsoon rains in July/August 2015 which will lead to better harvest outcomes. However, herd recovery will take some years, leaving the agro-pastoral economy dependent largely on rainfed crops and labour earnings.

A flood impact scenario showed that the irrigated zones are more vulnerable to flood events than to drought. The scenario investigated the potential impact of a flood that wipes out the kharif chilli and cotton crop. The Jamshoro Irrigated Wheat zone would remain above emergency level thresholds in this event as long as the Rabi winter wheat crop and the December onion crop were not greatly affected. However, there would be major income losses in the Irrigated Chilli zone. The

worst affected would be poor and middle households who would face a potential drop in income of around PKR 69,000 and PKR 100,000 respectively. In total, an estimated 78-85% of the population would be hit hard, including the better-off, with an average cash transfer of PKR 32,990 needed per household from May-October. This exercise points to the vulnerability of households in the irrigated zones to flood, especially those farmers who are more dependent on kharif season crops such as in the Umerkot Irrigated Chilli zone.

Given the chronic levels of debt in most of the zones, it is difficult to envision a rapid route to resilience. Even in an average production year, gifts and loans were an estimated 23%, 19% and 13% of the annual income of the very poor, poor and middle households respectively (except in the Jamshoro Irrigated Wheat zone). In cash terms, credit and gifts were in the range of PKR 10,000-16,000/household. This is substantial. Moreover, gifts and credit provided by money lenders in a bad year reportedly reached as high as PKR 70,000/household. As the calculated gap in resources due to the drought was in the range of PKR 25,000-50,000, this level of credit (or income support) is not off the mark. The BISP safety net programme has helped boost low incomes in Pakistan through inputs of around PKR 10,000-18,000/household/year. If doubled, safety-nets or income transfers of this sort could help reduce the need for household credit in absence of alternative higher-value income or labour opportunities.

INTRODUCTION AND BACKGROUND

Drought and Flood in Sindh Province

Sindh Province is located in south eastern Pakistan. One of the most notable features of the province is the Indus River. This 3,180 km long river empties into the Arabian Sea on Pakistan's southern coast from its origins on the Tibetan Plateau. The Indus River flows all year round with water flow peaking from July-September during the monsoon season. The surrounding environment is semi-desert but the river allows for irrigated agriculture on a scale that would not be possible using rain-fed means alone. Throughout most of the province, average rainfall is typically 200-250 mm per year. Although much of the province falls within the semi-arid Indus River Basin, there are in total 4 ecological zones: mountains, plains, coast and desert. The drought impact assessment took place in two of the four agro-ecological zones: the plains and the desert.

The river brings great potential to Sindh Province yet it is also the source of one of the province's greatest hazards: flood. The second major hazard is drought which reflects the dry climate and semi-arid environment in Sindh. In the past 5 years, both flood and drought affected Jamshoro, Umerkot and Tharparkar Districts, the three districts covered in this assessment. Firstly, there were unprecedented floods in 2010 which broke through protective embankments and caused great destruction. Subsequently, torrential monsoon rains in 2011 led to a second year of flooding. The following year (2012-2013) the riverine areas were hit again with flash floods. The southwest monsoons bring rain in July-August and the massive and destructive river floods in 2010 were associated with extremely heavy monsoon rains (reportedly the second highest recorded rainfall in the last 50 years). Such heavy rains are characteristic of an El Nina event. The three consecutive years of flood emergencies were then followed by a severe drought in 2013-14 and 2014-15. Tharparkar and Umerkot Districts were particularly affected by the drought not the least because of their desert environment. Indeed, droughts are common in this corner of Sindh, occurring approximately every three years.

Chronic Poverty in Sindh Province

Agriculture is a key driver of the economy of Sindh Province. Agriculture employs an estimated 45% of the labour force and the agricultural sector is the second largest behind manufacturing. Farming is principally based on irrigation along the Indus River and its tributaries. There is an extensive system of canals, barrages and protective bunds with three main barrages located at Kashmore (Guddu barrage), Sukkur (Lloyd barrage) and Kotri (Kotri barrage). Crops are grown during two seasons. Summer (kharif) season crops are harvested in October, post-monsoon (July-August). Kharif season crops include rice, cotton, chilli, sugar cane, sorghum (for fodder) and millet. One of the key vegetables grown in Sindh, namely onions, is harvested between kharif and Rabi seasons usually from November to February. Winter (Rabi) season crops include wheat and oil seeds, which are planted in December and harvested in March/April.

The agricultural sector is based on a system of a few large landowners who rent out land to many sharecroppers. The sharecroppers, as well as the landless agricultural labourers, come from poor and very poor households. According to data collected by the Nutrition Information System (NIS), rates of global acute malnutrition (GAM) and severe acute malnutrition (SAM) in Tharparkar and

Umerkot Districts are above the provincial average. Moreover, a relatively recent report from 2011-12 puts the rate of under-nutrition in Jamshoro and Umerkot Districts at 44-54%, and in Tharparkar District at 37.5-44%. Underweight prevalence in Pakistan as a whole was 31.5% in the same year (Zaidi, Shehla et al, 2012).¹ This points to chronic poverty as well as to chronic food insecurity, under-nutrition and disease. Another indicator of poverty is the high level of household debt. A common response to low income is to borrow money but this strategy also contributes to ongoing poverty due to frequent economic shocks and hence the difficulty in repaying loans leading to chronic indebtedness.

Objectives

- To support the Food Security Cluster, led by FAO-Pakistan, to assess the impact of the 2013-2015 drought on local livelihoods in some of the worst drought affected districts of Sindh Province
- To provide baseline data of the food, income and expenditure in selected livelihood zones of Jamshoro, Umerkot and Tharparkar Districts
- To understand how households cope with bad years and the extent of seasonal out-migration
- To recommend what resources are required to meet the needs of the affected population

The Inquiry Process – HEA Methodology

Household Economy Analysis, or HEA, is an analytical framework that takes as its starting point how households secure their food and income in an average year, and what goods and services they purchase with their income. The question then asked is when a shock occurs, what happens to food and income access, and how does this affect what households can purchase, and whether they can meet their basic survival and livelihood protection needs.

The 2015 drought assessment was undertaken in 4 different livelihood zones in 3 districts of Sindh Province. A livelihood zone is a geographical area in which the population shares more or less the same type of production system (i.e., agriculture or fishing) and has similar access to markets. HEA uses livelihood zones as the geographical unit of assessment because people living in different agro-ecological areas face different shocks. Moreover, people have different options to respond to common shocks depending on where they live. Another important factor in HEA is to collect and analyse data by wealth group. Just as it is important to understand the effect on food security of where people live, it is also important to understand the effect of what people own (including land, tools, livestock and other assets) on their food and income options.²

For the 2015 drought impact assessment, four livelihood zones were selected: (1) the Irrigated Wheat Livelihood Zone (JM01) in Jamshoro District; (2) the Irrigated Chilli Livelihood Zone (UM02) in Umerkot District; (3) the Thar Desert Agro pastoral & Labour Livelihood Zone (TH07) in Tharparkar and Umerkot Districts; and (4) Nagar Parkar Rainfed Crops & Livestock Livelihood Zone (TH03) in Nagar Parkar Taluka, Tharparkar District. (See the livelihood zone map, page 10.) The assessment took place over two rounds with Round 1 field work carried out from

¹Shehla Zaidi et al, 2012: *Sindh Provincial Report: Nutrition Political Economy, Pakistan*. Division of Women and Child Health, Aga Khan University and Institute of Development Studies.

² For a full description of the HEA analytical framework and the HEA approach to assessment, go to FEG's website @ foodeconomy.com and click on "What is HEA?"

20-28 November 2015 and Round 2 field work conducted from 6-18 December and 23-29 December 2015.

An HEA assessment involves 4 different steps. These steps allow for cross-checking of information throughout the assessment to ensure rigor and to build confidence in the data.

Interview	Type	Information Gathered	No. of interviews per zone	Total (4 zones)
Form 1	District	Agricultural data	1 interview	4 interviews
		Livestock data	x 4 livelihood zones	
		Rainfall data		
		Population data		
		Market prices		
		Humanitarian aid		
Form 2	Markets	Market price trends	2 interviews	8 interviews
		Trade volume trends	x 4 livelihood zones	
		Trade routes (key crops)		
Form 3	Village	Wealth breakdown	8 interviews	32 interviews
		Hazard timeline	x 8 community leaders	(256 people interviewed)
		Crop + Milk yields	x 4 livelihood zones	
		Migration routes		
		Seasonal calendar		
		Local price trends		
Form 4	Household	Sources of food (12 months)	4 interviews	128 interviews
		Sources of income (12 months)	x 6 HH representatives	(768 people interviewed)
		Expenditures (12 months)	x 8 villages	
		Coping strategies	x 4 livelihood zones	

(1) Step 1 (the Form 1 interview) involves a key informant discussion at the district level. During the interview, the zone's boundaries and its basic characteristics are confirmed or updated. The district level interview also involves gathering production and price data for the last 5-10 years for major crops and livestock in the zone as well as gathering rainfall data and population data. Relevant information about health and nutrition, relief assistance and main development interventions are also recorded.

(2) Step 2 (the Form 2 interview) involves a market visit to verify local weights and measures. The market visit also involves interviewing traders of major staple food and cash crops in the zone to discuss commodity volume and price trends over the last 5 years as well as general information about commodity trade routes.

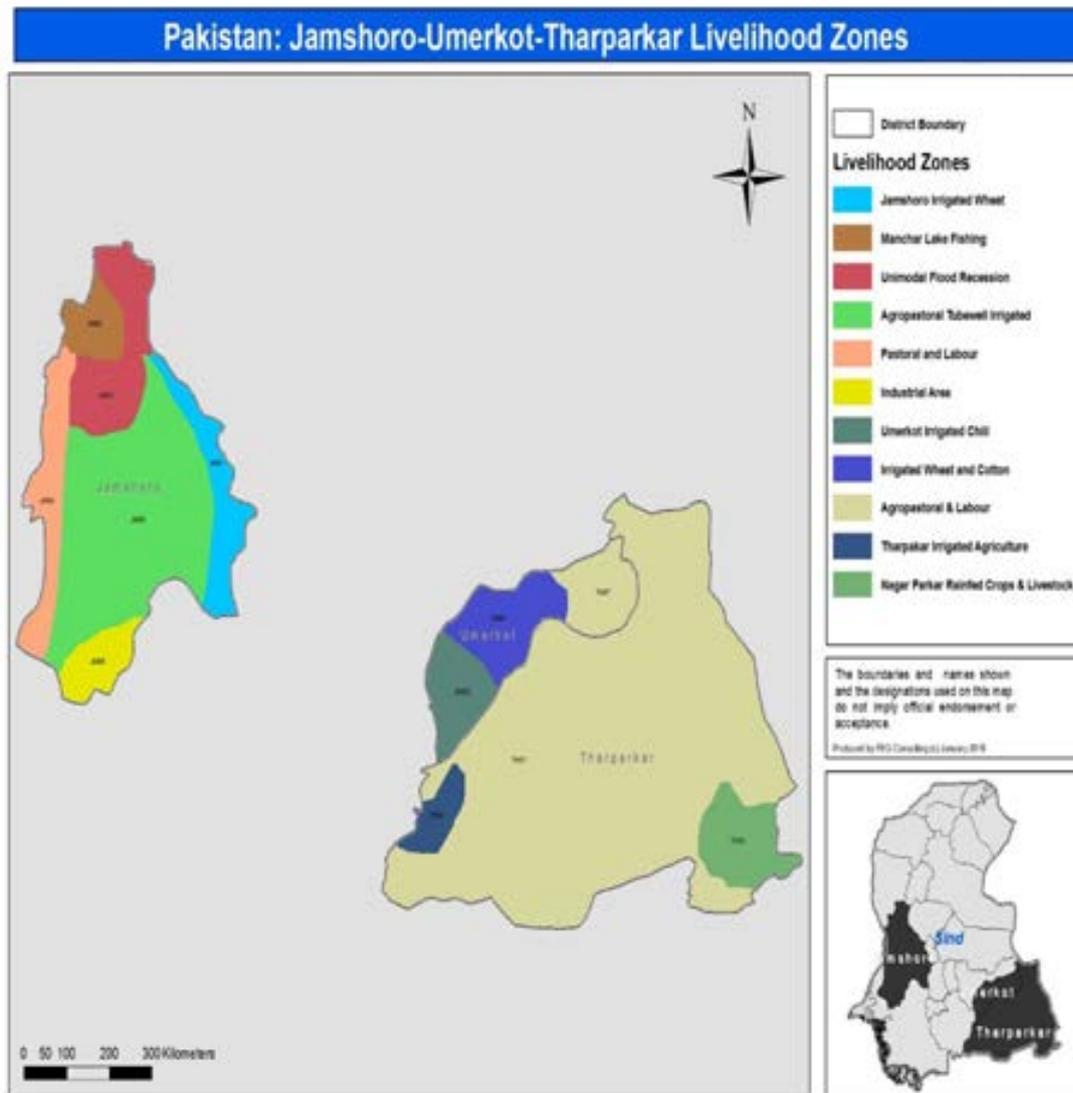
(3) Step 3 (the Form 3 interview) is a key informant interview in the 8 villages selected for the assessment. Key informants are elders in the community. They also include community leaders who are knowledgeable about the household economy of the local population. The interview involves a lengthy discussion about hazards in the last 5 years (both chronic and periodic); average production outcomes for key crops; average milk yields; a seasonal calendar, trends in local market prices for key goods; and, most importantly, a wealth breakdown and description of the assets owned by each wealth group. The wealth group breakdown becomes the starting point for selecting households from each wealth group for a follow-up focus group discussion.

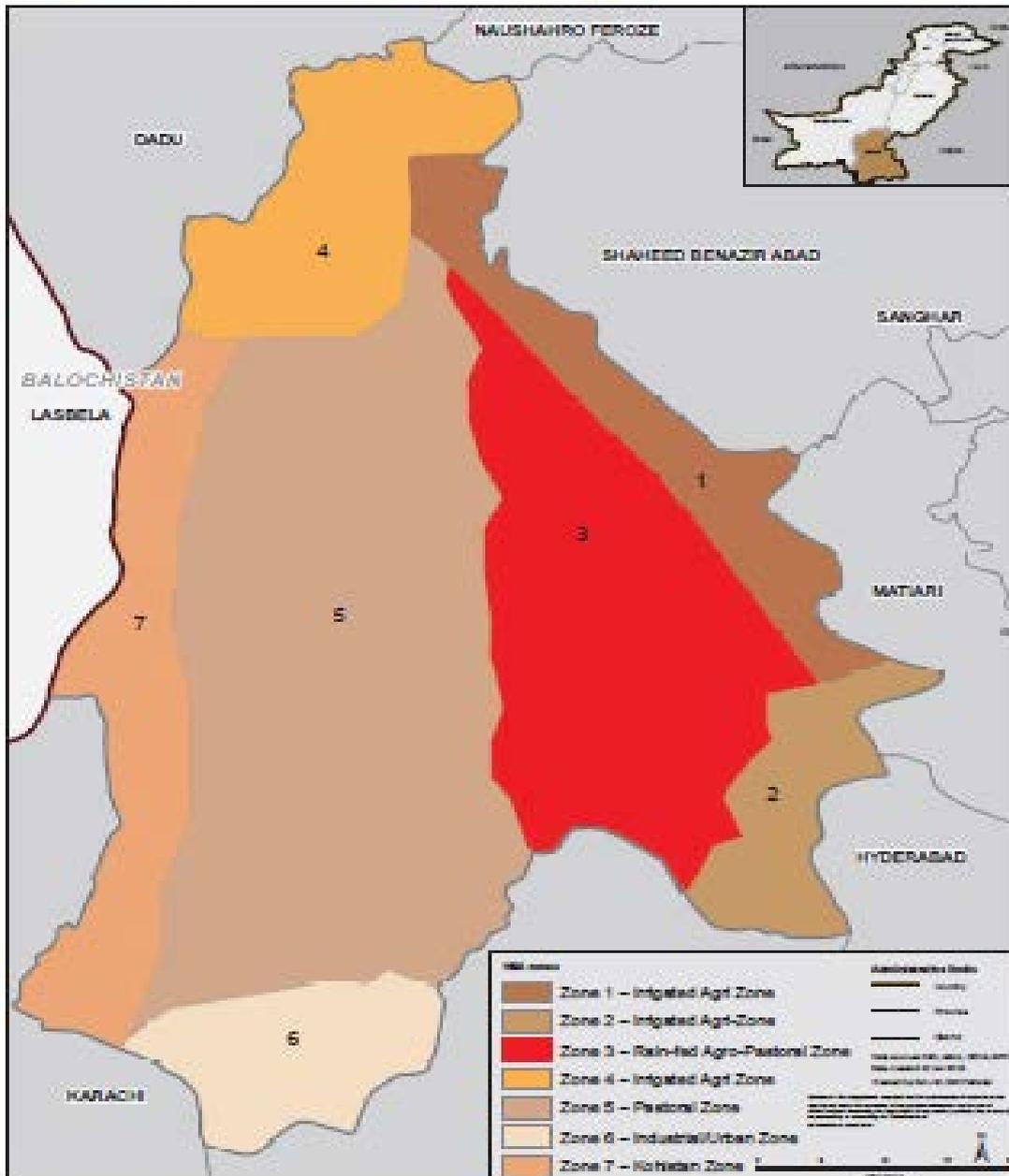
(4) Step 4 (the Form 4 interview) is a focus group discussion with a minimum of 6 household representatives per wealth group. A separate interview is conducted with each wealth group. An

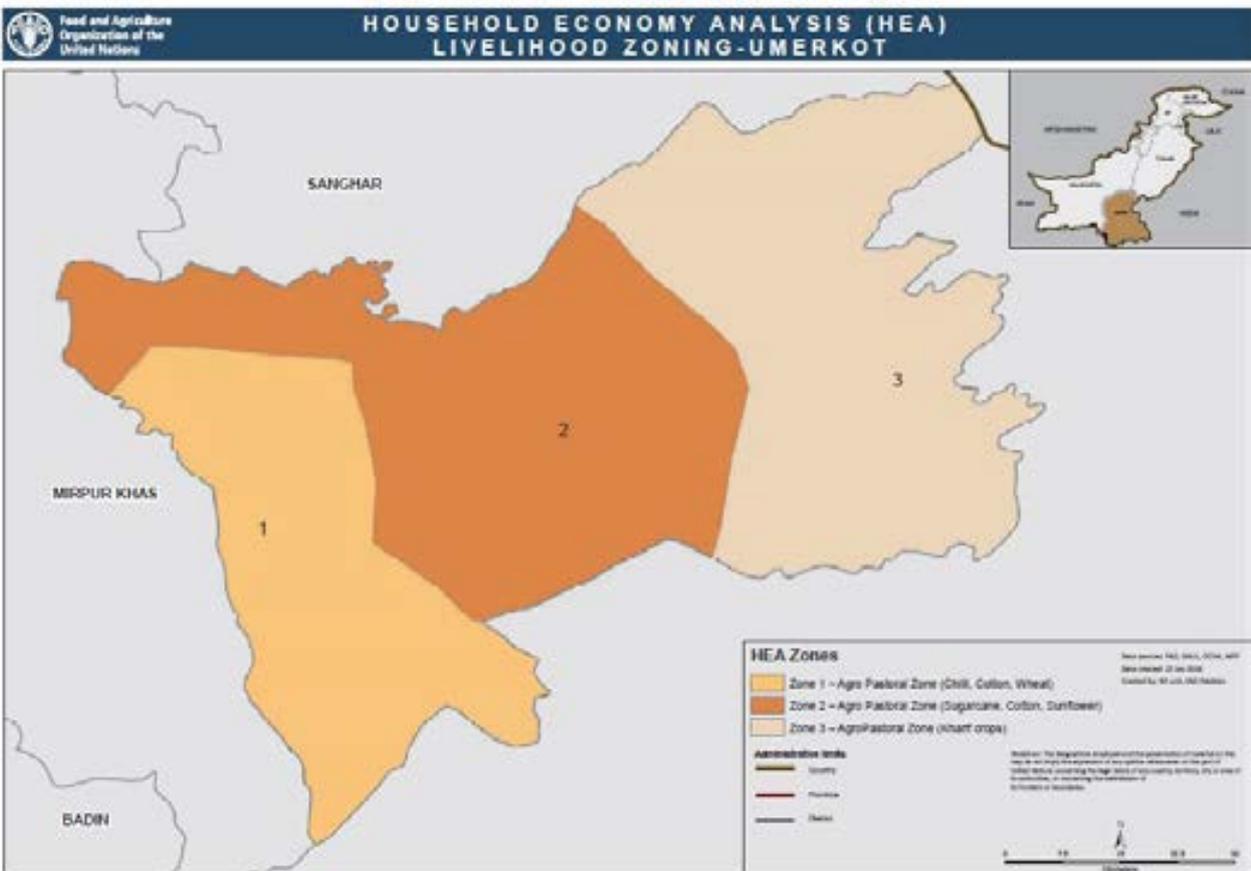
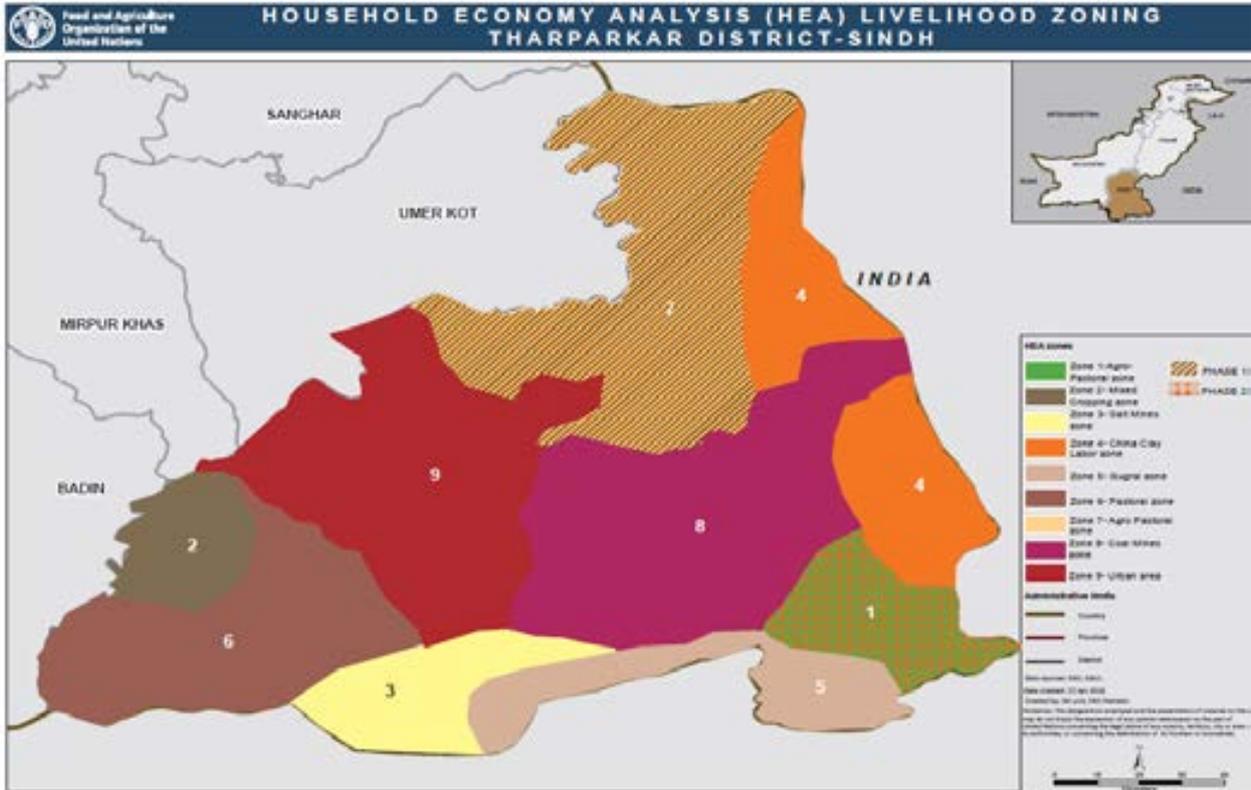
equal mix of female and male household representatives is encouraged. The Form 4 interview is a comprehensive quantification of food and income obtained from all food and income sources in a selected reference year (usually an average year), focusing on typical amounts for most households in that wealth group. Food secured in the year must amount to a survival minimum (2100 kcal/day/person calculated for a household per year). Expenditures on food and essential non-food items, as well as other goods and services are recorded, and these expenditures must balance with income earned.

Data collected from the field is entered in the HEA baseline storage spreadsheet. The baseline data is read into a separate Livelihood Impact Assessment Spreadsheet (LIAS) where baseline data is combined with current year (or bad year) monitoring data in order to assess the impact on food and income access.

LIVELIHOOD ZONE MAPS







SUMMARY OF THE ASSESSMENT AREA

Assessment Area by livelihood zone, district, tehsil, UC and population

Livelihood Zone	District	Tehsil / Taluka	UC	2002 Population	2015 Pop Estimate	
JM01 Irrigated Wheat	Jamshoro	Manjhand		69,772	91,414	
			Lakha	16,306	21,364	
			Sann	16,870	22,103	
			Amri	31,235	40,924	
			Manjhand	5,361	7,023	
			Kotri		78,512	128,760
				Allah Bahchar?		
				Kotri		
			Sehwan Sharif		48,570	79,655
				Bhan		
				Talti		
				Dal		
				Channa		

Livelihood Zone	District	Tehsil / Taluka	UC	1998 Population	2015 Pop Estimate	
UM02 Irrigated Chili	Umerkot	Kunri		130,349	204,648	
			Bastan			
			Sher Khan Chandio			
			Chajro			
			Khindi Meman			
			Kanri			
			Nabisar			
			Samaro		105,274	165,280
				Samaro		
				Samaro Road		
				Padhrio Farm		
				Sataryoon		
				Araro Bhargari		

Livelihood Zone	District	Tehsil / Taluka	UC	1998 Population	2015 Pop Estimate
TH03 Nagar Parkar Rainfed Crops & Livestock	Tharparkar	Nargar Pakar		153,106	240,376
			Phitapur		
			Virawah		
			Nagar Pagar		

Livelihood Zone	District	Tehsil / Taluka	UC	1998 Population	2015 Pop Estimate
TH07 Thar Desert Agropastoral & Labour	Umerkot	Umerkot		246,506	387,014
			Garibabad		
			Chur?		
	Tharparkar	Chachro		257,757	404,679
			Kantio		
			Wejhiar		
			Mithrio Charan		
			Hirar		
			Tar Dos		
			Fanghyar		
		Dahli			
			Tar Ahmed		
			Garu		
			Pirano Jobar		
			Parno		
		Islamkot			
			Islamkot		
			Khario Ghulam Shah		
			Sengario		
			Manjhooti		
		Mithi		211,424	331,936
			Maherano		
			Juruo		
			Chelhar		
			Mithrio Bhatti		
			Malambo Ravina		
		Diplo		152,177	238,918
			Deplo		
			Dabharo		
			Bolhari		
			Jharmario		
			Bhataro		
		Nagarparkar		153,106	240,376
			Pilu		
			Harho		

LIVELIHOOD STRATEGIES

Overview of Livelihoods in 4 Livelihood Zones (LZs)

District	Jamshoro	Umerkot	Tharparkar, Umerkot	Nagarparkar Taluka
Zone	Irrigated Wheat LZ	Irrigated Chili LZ	Agropastoral	Rainfed Crops
Livestock	buffalo, goats	buffalo, goats	camel, cattle, goats, sheep	cattle, oxen, goats
Winter <i>rabi</i> crops	irrigated wheat, mustard seed, fodder	irrigated wheat		onions, castor seed
Summer <i>kharif</i> crops	chili, onions, cotton, chickpeas, sorghum	chili, cotton	millet, cluster beans, moth beans, sesame	millet, cluster beans, moth beans, sesame
Income Sources	ag labour; construction labour; buffalo milk sales; livestock sales; wheat and cash crop sales, fodder sales	ag labour; construction labour; labour migration, buffalo milk sales; livestock sales; chili & cotton sales	ag labour; construction labour; labour migration; remittances; livestock sales; crop sales	ag labour; construction labour; livestock sales; crop sales
Other	firewood sales, handicraft sales	firewood sales, BISP, loans & food credit	loans & food credit	loans & food credit
	RY: March 14 - Feb 15	RY: Oct 13 - Sept 14	RY: Sept 12 - Aug 13	RY: Sept 12 - Aug 13

A note on HEA terminology: The Reference Year (**RY**) is the most recent “average” production year (neither really good nor really bad). The reference year provides the baseline against which the impact of a shock is measured. The reference year is a “consumption” year as it starts with the harvest of the principal crop in a particular livelihood zone. The Current Year (**CY**) starts with the current harvest and covers the upcoming consumption year, in this case 2015-2016 although for this assessment it also includes the 2015 drought year.

The different characteristics of each livelihood zone are important to analyse. For instance, a change in wheat production and producer wheat prices will affect livelihoods in the Irrigated Wheat and Irrigated Chilli livelihood zones but will have a more limited impact in the Thar Desert zones. By contrast, a poor millet and bean harvest will have the greatest impact in the Thar Desert Agro pastoral and Nagar Parkar Rainfed Crop zones but will have no impact in the irrigated wheat and chilli zones.

Wealth Breakdown and Assets

In HEA, three key questions are asked about the breakdown of wealth in a particular area: (1) what proportion of the population are considered poor? (2) How is poverty (and wealth) characterised in this area? (3) How resilient are the poor to economic shocks? Do they have ways to cope with shocks and protect their assets?

Wealth Breakdown - Jamshoro Irrigated Wheat LZ				
Wealth Group	Very Poor (23%)	Poor (34%)	Middle (28%)	Better Off (15%)
HH size	7	9	9	10
Land owned	0 acres	0-2 acres	2-7 acres	5-25 acres
Land cultivated	0 acres	3-7 acres	4-12 acres	5-25 acres
Livestock + Assets	0	0-4 goats 0-2 buffalo	0-4 goats 1-5 buffalo 0.5 motorcycle	0-6 goats 2-8 buffalo 1 motorcycle
Annual Cash Income (PKR)	122,375 hh/yr	196,315 hh/yr	327,725 hh/yr	621,550 hh/yr
Total Food+Cash Income pppd	US \$0.67 pppd	US \$0.73 pppd	US\$ 1.18 pppd	US \$1.71 pppd

In answer to the first question, there is a high level of poverty in the four zones. Using villagers' own judgements about wealth and poverty in their area, an estimated 26% of households were considered very poor. A higher percentage was labelled very poor in Tharparkar District (30%) whereas about 23% were considered very poor in Jamshoro and Umerkot irrigated zones. Likewise, the proportion of households who fell in the "poor" category – an estimated 36% -- was high. **In sum, the two poorer wealth groups comprised about 62% of households.** Of the remaining households, 25% were considered "middle" and only 13% were considered "better-off". Thus, the population is clearly skewed with high numbers of households living in poverty and only a few living in relative wealth.

Wealth Breakdown Umerkot Irrigated Chili LZ				
Wealth Group	Very Poor (23%)	Poor (40%)	Middle (25%)	Better Off (12%)
HH size	6	7	7	8
Land owned	0 acres	0 acres	0-10 acres	5-50 acres
Land cultivated	0 acres	2-4 acres	3-6 acres	4-45 acres
Livestock + Assets	1-2 goats	1-3 goats 0-1 buffalo	2-7 goats 1-2 buffalo 0.5 motorcycle	2-10 goats 0-4 buffalo 1 motorcycle
Annual Cash Income (PKR)	97,785 hh/yr	115,650 hh/yr	202,985 hh/yr	385,120 hh/yr
Total Food+Cash Income pppd	US \$0.53 pppd	US \$0.50 pppd	US\$ 0.86 pppd	US \$1.28 pppd

Very poor households either do not own any land or livestock at all or own very little (i.e., 1-2 goats or a few hens). In the Irrigated Wheat and Irrigated Chilli Zones, the very poor were characterised as being without land assets. They are also relatively "labour-poor". Typically there are just 2-3 adult labourers in a household of 7 people even though they rely on casual labour in order to earn a livelihood. The most

common asset owned by some of the very poor is mobile phones. An important characteristic of the very poor is that they carry chronic debt loads of Rupees 15,000-20,000 or more. This debt load means that they are not resilient to shocks as they have no savings or assets to fall back on. Their main coping strategy is labour migration.

Poor households typically own no land or very little land (approximately 1 acre). The poor are sharecroppers who cultivate the land of a landlord. This puts them in a vulnerable position of relying on the landlord for inputs. As the landlord pays up front for seasonal inputs; poor farmers receive a small portion of the harvest only. Most of the poor plant wheat for harvesting in the Rabi season and plant cash crops (millet and beans) for harvest in the kharif season. They mainly own goats. Poor households typically carry chronic debt from year to year, even as high as PKR 50,000-70,000.

Wealth Breakdown - Thar Desert Agropastoral + Labour LZ				
Wealth Group	Very Poor (30%)	Poor (38%)	Middle (20%)	Better Off (12%)
HH size	7	7	7	7
Land owned	0 acres	0 acres	2-6 acres	10-17 acres
Land cultivated	2-6 acres	4-8 acres	6-10 acres	10-17 acres
Livestock + Assets	1-5 goats 0-2 donkeys	2-5 goats 0-1 buffalo 0-2 donkeys	5-10 goats 2-10 sheep 0-2 cattle 0-2 donkeys	10-20 goats 5-15 sheep 1-4 cattle 0-2 camels 1-3 donkeys
Annual Cash Income (PKR)	82,775 hh/yr	96,065 hh/yr	114,900 hh/yr	135,300 hh/yr
Total Food+Cash Income pppd	US \$0.38 pppd	US \$0.42 pppd	US\$ 0.51 pppd	US \$0.63 pppd

Middle households are land owners (about 4-5 acres). In the Irrigated Wheat Zone they also rent-in additional land, or sharecrop additional land. Middle households typically cultivate about twice as much land as the poor. Middle households also own buffalo (1-3) or cattle as well as a few goats. In the Irrigated Chilli Zone, middle households are in chronic debt to the landlord and/or money lenders.

Better-off households own relatively large tracts of land (around 28 acres although about 15 acres in the Agro pastoral zone) some of which they rent out to poor and middle households. Typically they cultivate about 15-20 acres of land during both cropping seasons. They own 2-5 buffalo or cattle and 2-6 goats as well as a plough and a motorcycle. In the Thar Desert, they own

Nagar Parkar Rainfed Crops & Livestock				
Wealth Group	Very Poor (29%)	Poor (32%)	Middle (26%)	Better Off (13%)
HH size	8	8	8	8
Land owned	0-7 acres	2-10 acres	7-20 acres	10-35 acres
Land cultivated	0-8 acres	4-11 acres	8-22 acres	10-35 acres
Livestock + Assets	1-5 goats	2-7 goats 0-2 cattle	4-10 goats 1-5 cattle 0-2 oxen	6-18 goats 2-8 cattle 2 oxen
Annual Cash Income (PKR)	91,275 hh/yr	105,395 hh/yr	172,735 hh/yr	398,925 hh/yr
Total Food+Cash Income pppd	US \$0.38 pppd	US \$0.45 pppd	US\$ 0.71 pppd	US \$1.50 pppd

a camel or two and about 10 sheep as well. They pay for agricultural inputs, such as ploughing, fertiliser, seeds, pesticides, labour, fodder, packaging, and tools.

Households in all wealth groups were typically 6-8 people/household. In Jamshoro, household size was 7-10. Very poor households are typically the smallest and better-off

households are the largest.

Seasonal Calendar

In Sindh Province the monsoon rains fall from June/July to September. In the Thar Desert, which is entirely rain-dependent, this leads to a single harvest around September/October (the kharif harvest). However, in the other three zones where there is access to either irrigation or dam-based flood-recession cultivation, the cropping calendar is divided into two seasons: the Rabi and the kharif. Wheat is the predominant Rabi season crop. Millet, beans, cotton and chilli peppers are the kharif season crops. Onions are often harvested in-between these seasons.

The seasonal calendar has two functions. It is a descriptive tool, used to indicate when key productive activities occur during the year. It is also a planning tool, used to pinpoint when food access is lowest (i.e., the months leading up to the harvest) or when cash needs are highest (i.e.,

when disease incidence is high, or when farm inputs are needed or when debts are repaid or when festivals occur).

The seasonal calendar is also often used in conjunction with **gender calendars** in situations where men and women have distinct productive activities and responsibilities. In this region of Sindh, men and women are both actively involved on the family farm although women are considered to have a more supportive role in agricultural work. Both men and women carry out paid local agricultural labour and in situations whereby a family migrates in search of work, both men and women will take on paid farm labour. One difference is that decision-making rests with men. In sharecropping arrangements, for example, landlords only deal with the male sharecropper. Livestock production has a similar distinction. Women rear small stock; men rear large stock; but decisions about all types of livestock sales rest with men. Another difference is that only women fetch water for domestic and livestock use. Moreover, only men are involved in market-based activities, including buying supplies and selling produce at the market.

Seasonal Calendar – Food, Income and Expenditure Patterns

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Agricultural seasons	rabi		kharif					rabi					
Rainy season				[Rainy Season]									
Crops													
Wheat, winter - irrigated	harvest								planting				
Millet - rainfed													
Chili peppers													
Cotton													
Onions													
Cluster bean													
Mustard seed													
Sesame													
Livestock													
Cattle milk peak													
Buffalo milk peak													
Goats milk peak													
Livestock sales peak													
Other Income													
Agricultural labor peak													
Construction labor peak													
Labour migration peak													
Firewood sales													
Stress/High Expenditure Periods													
Livestock diseases													
High staple prices													
Human diseases													
Festivals													
Hunger season - irrigated zones													
Hunger season - rainfed zones													
Legend													

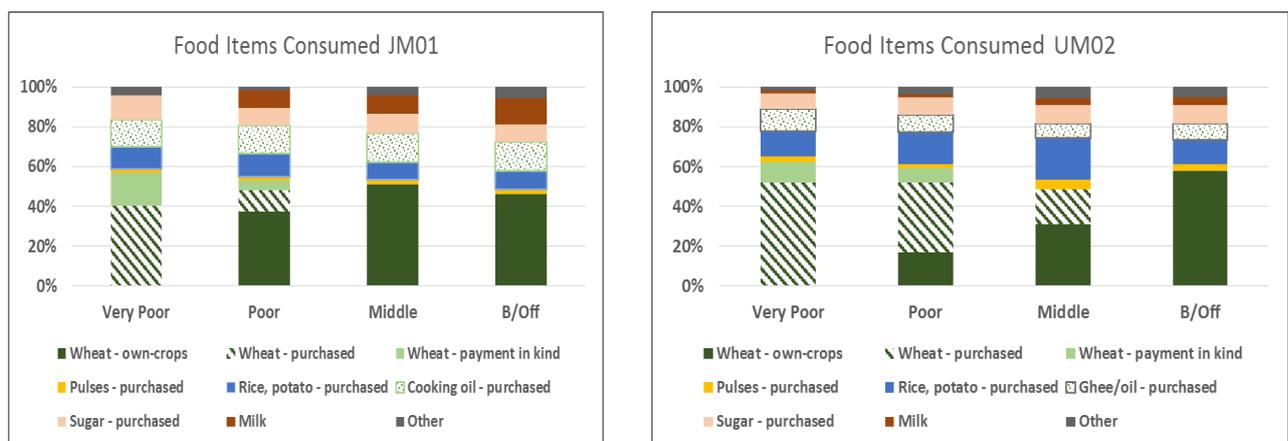
Food Sources – An Overview

During an average production year, very poor and poor households buy most of their food. Indeed, the very poor are typically labourers. Hence, they earn cash and buy food throughout the year although for some agricultural work (such as wheat harvesting) they are paid directly in wheat flour. Poor sharecroppers, by contrast, secured about 20-40% of their annual food energy from their own crops in the reference year. Aside from a little milk, the rest of their food energy was purchased. This pattern means that the very poor and poor are very vulnerable to food price increases as well as, conversely, to wage rate decreases.

Better-off households produced almost all of their food energy from their own crop and livestock production. Food from their own crops was from 60-76% in the reference year in the three cropping zones. Milk was a further 15-20%. Better-off households also purchased food during the year but they typically purchased very little staple food. Instead, they bought food such as sugar, cooking oil, rice, potatoes, beans, meat and fish for a more diversified diet. In the Thar Desert, own-crop and livestock production comprised 60% of the annual food needs of the better-off. In this zone, better-off agro pastoral households grew fewer crops and hence purchased more of their staple food, financed by selling livestock.

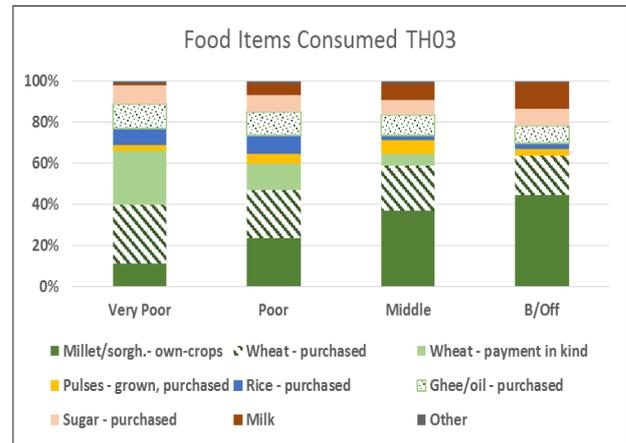
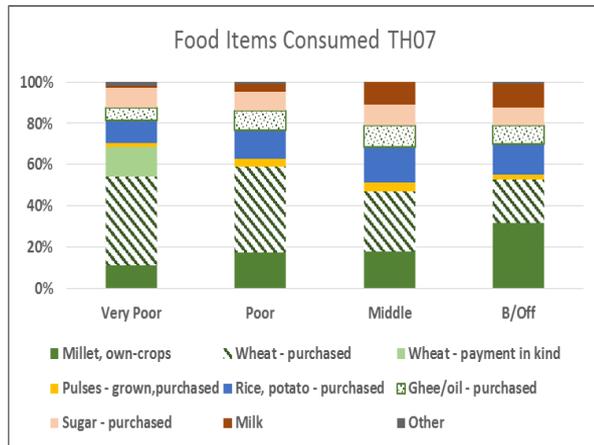
The importance of own-crop and livestock production for middle households varied across livelihood zones. In the Irrigated Wheat Livelihood Zone, own-crops contributed 60% of their annual food needs (about 7 months of food). However, own-crops only contributed 50% of annual food energy in the Rainfed Crops & Livestock Livelihood Zone, 34% in the Irrigated Chilli Livelihood Zone and just 24% in the Thar Desert Agro pastoral Livelihood Zone. Hence, middle households depend much more on the market for their food than the better-off but nonetheless produce more crops than the poor. Therefore, they are vulnerable to shocks that affect production and are also vulnerable to staple grain and other food price changes as both of these factors will significantly affect their access to food.

The composition of the diet in all four zones is heavily concentrated on carbohydrates, mainly wheat flour but also some rice and potatoes. Wheat flour alone (from own-crops, purchase and



payment-in-kind) comprised about 50-60% of the diet for most wealth groups. The difference between wealth groups was less about how much wheat flour was consumed but how they

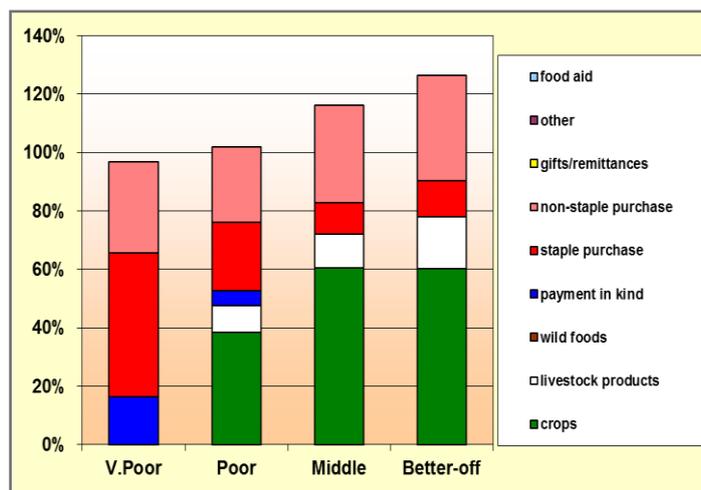
accessed it. For all wealth groups, pulses are a small supplement to the staple grains. The other main food items consumed by households in this region are sugar (about 10% of annual food energy); ghee or cooking oil (10-15%) and milk. Milk consumption was very low for the very poor and poor who own few animals. However, for middle and better-off households they secured milk from their own buffalo or cows for about 7 months of the year as well as from lactating goats for 1-2 months.



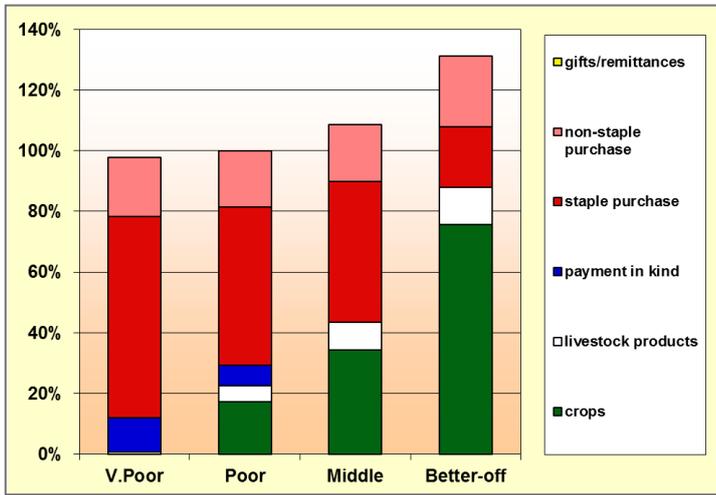
The “other” category of food includes some vegetables (either purchased or grown, including onions, leafy greens, carrots and radishes) as well as some wild foods from the Thar Desert, such as mushrooms and acacia pods. These food items are dense in nutrients. Although they are not high energy foods they are vital for a diverse diet and households from all four wealth groups ate some vegetable foods during the year. Only middle and better-off households purchased fish and meat to supplement their diet.

Food Sources by Livelihood Zone

Jamshoro Irrigated Wheat (JM01)

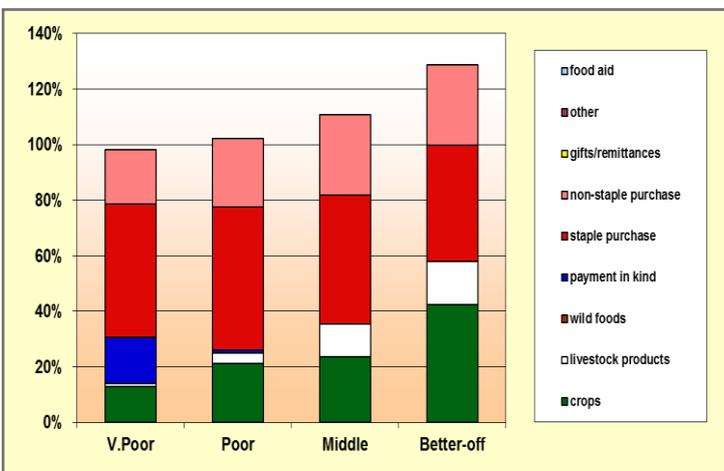


Middle and better-off households get most of their annual food energy from their own crops (60%) and from buffalo milk (12-18%). By contrast, crops and milk together comprised about 50% of the annual food energy needs of poor households. Very poor households depended fully on their labour earnings and with their cash earnings, they purchased food. They also received in-kind payment for agricultural work.



Umerkot Irrigated Chilli (UM02)

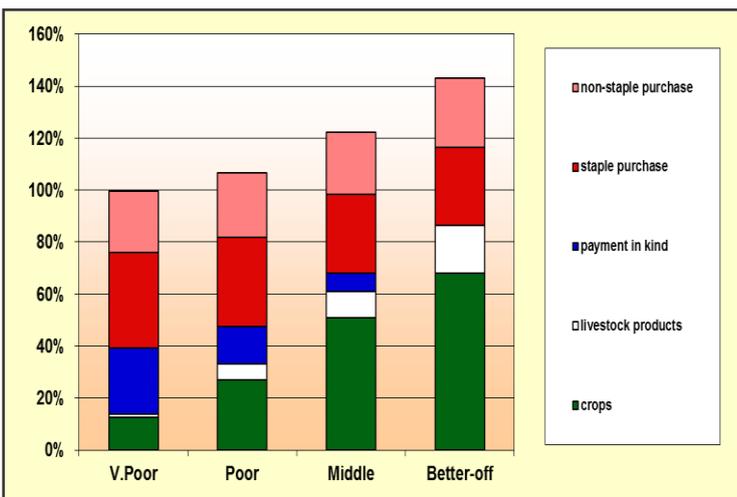
In this zone there is more priority placed on growing cash crops (chilli and cotton) and less on growing staple foods. Thus, poor and middle farmers purchase most of their food, as do the landless very poor who also secured food through in-kind payment for agricultural labour. Better-off households secured about 76% of their food energy from own-crops. Buffalo milk is a small but important food supplement.



Thar Desert Agro pastoral & Labour (TH07)

In the desert zone, a greater percentage of food is purchased than in the agricultural zones. Food purchases were 68-76% of the annual food energy for all wealth groups. Better-off and middle households bought more non-staple food; poor and very poor households bought mostly wheat flour. Own crops (millet and beans) contributed about 20-40% of annual food energy for most

wealth groups, but just 13% in the case of the very poor. Milk was extremely limited for the poor wealth groups but 12-15% of annual food energy for the middle and better-off. The very poor also secured food through payment-in-kind.



Nagar Parkar Rainfed Crops & Livestock (TH03)

In this rainfed cropping zone in Tharparkar District, own-crops are fairly marginal for the very poor (12% of annual food needs) and low for the poor (27%). However, for middle and better-off households, the contribution of own-crops is significant (50-68%), especially compared to the neighbouring desert zone. Millet and a variety of beans are the main food

crops in addition to castor seed, onions and sesame which are sold as cash crops. Milk is an important food source for middle and better-off households (10-18%) of food needs). By contrast, agricultural work paid in-kind is a critical food source for the very poor and poor.

Income Sources – An Overview

The main distinction between wealth groups is how much income comes from their own production and how much income is earned through casual labour. In the cropping zones, for middle and better-off households, almost all of their income came from their own-production in the reference year. This own-production income was a combination of income from crop sales, livestock sales and milk sales. Crop sales accounted for most of their earnings, ranging from 65-72% in the Jamshoro Irrigated Wheat Livelihood Zone to 73-90% in the Irrigated Chilli and Rainfed Crops zones. The sale of cash crops (chilli, onions and cotton in the irrigated zones; beans and onions in the rainfed crop zone) provided the most income. Staple food crops – namely wheat and millet – were sold too.

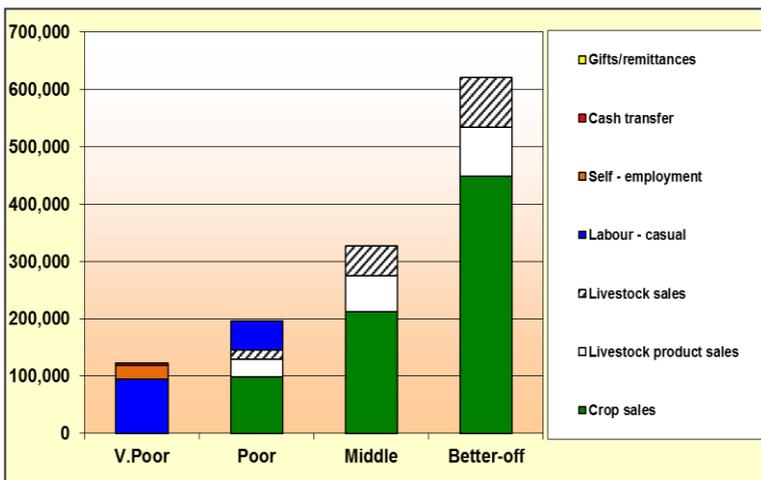
Very poor households earned almost all of their income from wages both on-farm and off-farm. As these earnings were generally insufficient to cover their cash needs, they also needed to appeal for gifts or seek out credit to cover their annual expenses.

Poor households also earned money from casual labour on-farm and off-farm. In addition, their casual labour wages were supplemented with income from crop sales, some milk sales, and the sale of a goat. Income from own crop production accounted for an estimated 50-56% of the annual cash income of poor households in the two irrigated cropping zones but only about 24% of the poor's cash income in the Rainfed Crops & Livestock Livelihood Zone.

Patterns in the Thar Desert Agro pastoral & Labour Livelihood Zone differed from the other livelihood zones. Livestock sales were relatively high for better-off households (35% of annual cash income) which reflect their livestock-based economy. During the year, better-off and middle households sold cattle, goats and sheep. However, poor and very poor households own very small herds and hence only sold a goat or two during the year. This accounted for 2-6% of their annual cash income. Conversely, 45-48 % of their cash needs were met through local labour, seasonal labour migration, and remittances from labour migrants.

One of the key findings of the baseline assessment was how the need for credit is yearly, even in an average production year, and this has led to chronic, and high, levels of debt. Gifts and loans were an estimated 21-24% of the annual income of the very poor, 17-21% of the income of the poor, and 7-19% of the income of middle households. This is substantial. The exception was in Jamshoro Irrigated Wheat Livelihood Zone where debt is seemingly more individual rather than general.

Income Sources by Livelihood Zone

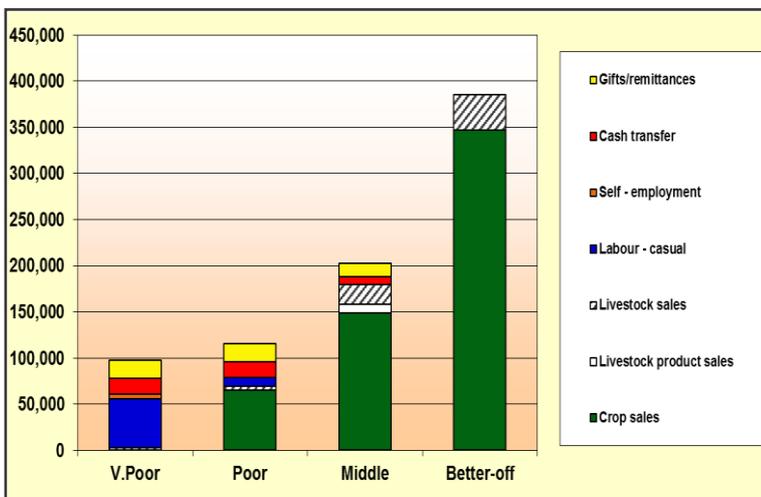


JM01 Cash Income	Very Poor	Poor	Middle	B/Off
PKR/year	122,375	196,315	327,275	621,550

Middle and better-off households earn most of their cash income from the sales of crops, principally chilli, onions and wheat but some cotton, mustard seed, chickpeas and sorghum fodder as well. The sale of buffalo milk and the sale of livestock (goats and buffalos) provide additional income. Income estimates for the reference year by wealth group are noted in the table above.

Jamsoro Irrigated Wheat

The very poor earn almost of their income from casual labour, most of it from agricultural work including spraying/watering crops, wheat harvesting, picking onions and harvesting chilli. They also sell firewood and handicrafts and carry out casual labour in the construction sector as well. The poor earn about half their income from crop sales (chilli peppers, wheat and fodder) and the other half from casual labour, livestock sales and buffalo milk sales.



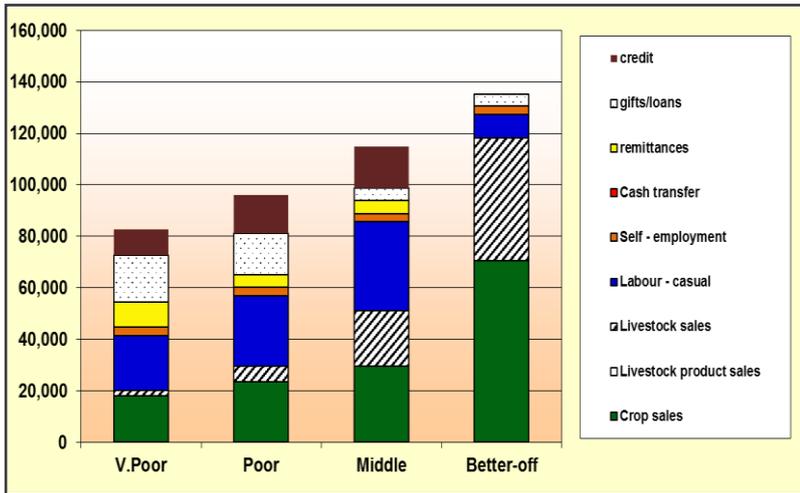
UM02 Cash Income	Very Poor	Poor	Middle	B/Off
PKR/year	97,785	115,650	202,985	385,120

reference year too. Very poor, poor and middle households received cash through the BISP, a social safety-net programme. Notwithstanding this support, all wealth groups carried debt loads of Rupees 15,000-18,000. Very poor, poor and middle households required gifts/loans during the year as well. Estimates of total cash income earned in the reference year are noted in the table above.

Umerkot Irrigated Chilli

The very poor earn most of their cash income from casual labour, principally picking cotton and chilli but also working in the construction sector. The poor, by contrast, earned just over half of their income from cotton and chilli sales. The majority of the income of middle and better-off households was also from crop sales (chilli, cotton, wheat and mustard seed). For these two wealth groups, the sale of a buffalo and a goat brought in income in the

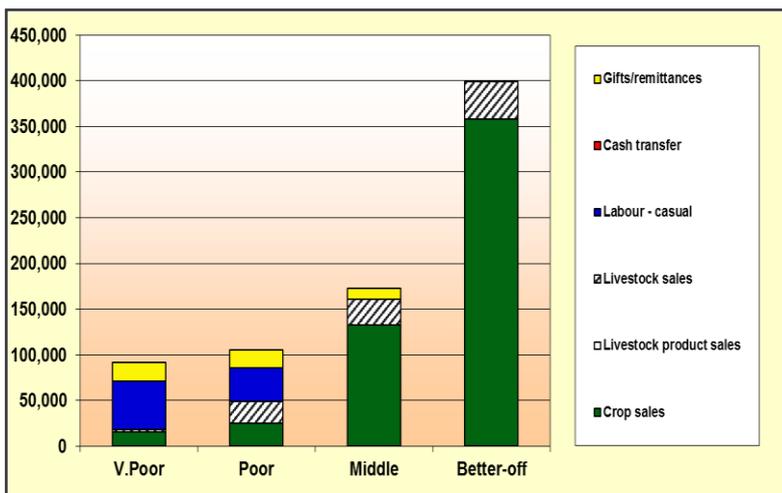
Thar Desert Agro pastoral & Labour



In general, total annual cash income was very low in this zone compared to the other zones even for the better-off. For this wealth group, livestock sales (cattle, goats and sheep) and crop sales (cluster beans, moth beans and sesame) formed the majority of their income. Very poor, poor and middle households earned their

income through a combination of casual labour, crops sales, livestock sales, remittances from labour migration and gifts/loans. Credit and gifts/loans are very important in this zone in order for households to meet their basic expenses during the year.

TH07 Cash Income	Very Poor	Poor	Middle	B/Off
PKR/year	82,775	96,065	114,900	135,300



Nagar Parkar Rainfed Crops & Livestock

Crops sales accounted for most of the income of the better-off and middle households in the reference year. Crops sold included cluster beans, moth beans and mung beans as well as onions, castor seed, chilli, sesame, millet and assorted vegetables. Cattle and goat sales contributed to their annual income.

TH03 Cash Income	Very Poor	Poor	Middle	B/Off
PKR/year	91,210	105,395	172,735	398,925

By contrast, the very poor depended mostly on labour

earnings. Income from labour was likewise important for the poor although it was combined with cash earned from livestock and crop sales. Most income from casual labour came from working in the construction sector but work was also found clearing silt from dams as well as planting and harvesting crops.

Expenditures – An Overview

The key expenditure in all 4 livelihood zones in the reference year was food. In Umerkot and Tharparkar, approximately 50% of the annual expenditures of the very poor and poor households was on food. Of this, for very poor households, 25-35% was on staple food (principally wheat flour).³ In the Jamshoro Irrigated Wheat Livelihood Zone, the very poor spent even more on food. In that zone, the very poor are labourers without land and hence had to purchase almost all of their food. In the Irrigated Wheat zone, food expenses were 75% of the annual expenditures of the very poor. Clearly, any change in the price of wheat flour will affect very poor and poor wealth groups' spending patterns enormously.

In the agro pastoral zone, food spending by even middle and better-off households was around 40-50% of annual expenditures due to more limited crop production and the greater importance of livestock in the local economy, which are sold to earn cash to buy food.

Whereas the poor wealth groups spent proportionately a great deal of their money on food, better-off households spent more of their money (about 33-40% of their annual income) on livelihood inputs. These expenditures mainly involved agricultural inputs, such as paying for the costs of ploughing, labour, fertiliser, seeds, tools, and produce packaging. Livelihood input expenses also included the costs of fodder for livestock, animal medications, and some livestock purchases. These were significant expenses for middle households too (22-30% of annual expenditures). Only in the Thar Desert Agro pastoral & Labour Livelihood Zone were livelihood input expenses relatively low for all wealth groups (5-7% of annual expenditures). In that zone, annual income was low for all wealth groups, limiting cash payments to a few essential inputs (including animal drugs, ploughing, and produce packaging).

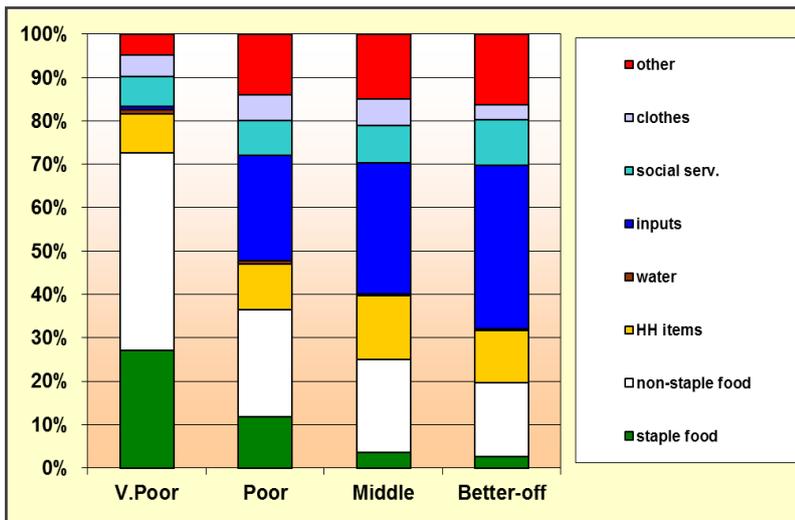
Other essential expenditures were grouped into three different categories: (1) household items (including tea, salt, soap, kerosene/batteries, grinding fees and utensils); (2) social services (education and medicine); and (3) clothes. Expenditures on each of these categories were approximately 5-10% of annual spending (it was a little higher for household items at 5-15% of annual spending).

However, the category (other than food) that involved major spending was the "other" group of items. This category of spending includes items such as mobile phone costs, transportation costs and loan repayments. It also includes less essential but "desirable" expenses such as festivals, marriages and tobacco/cigarettes. Tobacco expenses were typically in the range of around PKR 5,000/household/year for the very poor and poor and up to about PKR 10,000/household/year for middle and better-off wealth groups. Together, these "other" expenses were approximately 15-25% of the annual expenditures of the very poor, poor and middle households, and 20-40% of the annual expenditures of the better-off.

³ By contrast, only about 25-30% of middle household's annual expenditures was on food (5-15% on staple food). This dropped to 10-20% spending on food (5% on staple food) for the better-off.

Expenditures by Livelihood Zone

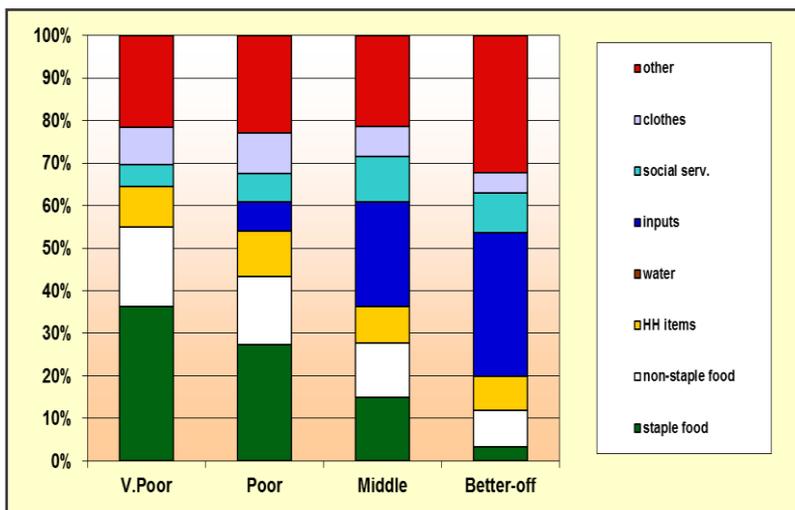
Jamshoro Irrigated Wheat



A clear pattern in the graph at left is that the very poor spent most of their income on food (food comprised almost 75% of their annual expenditures) whereas the majority (30-40%) of expenditures of middle and better-off households was on livelihood inputs. Only 20-25% of their expenditures was on food (of which 5% was on staple food). 35% of the annual expenditures of poor households was on food

compared to the 25% that was spent on livelihood inputs. Notably, in the Irrigated Wheat Livelihood Zone, poor, middle and better-off households proportionately spent relatively little on staple food as in this zone, wheat is a principal crop.

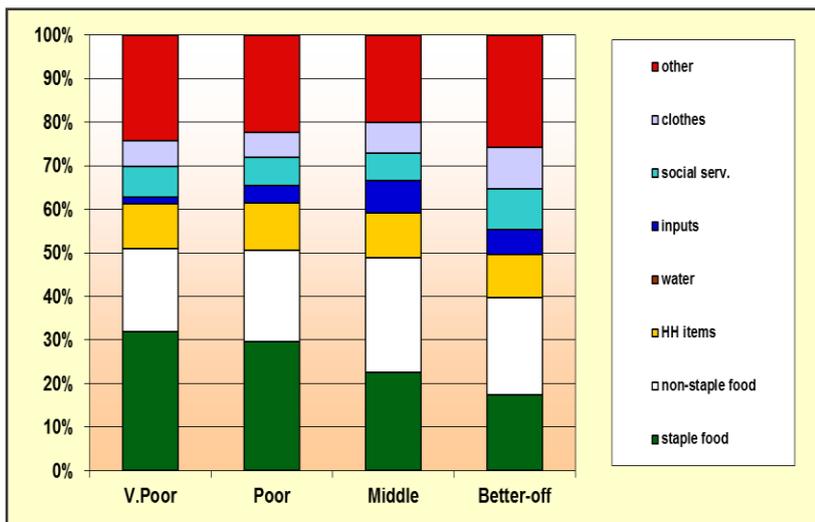
Umerkot Irrigated Chilli



In this zone food spending was 45-55% of the annual expenditures of the very poor and very poor. Very little cash was spent on livelihood inputs by these households. By contrast, 25-35% of the annual expenditures of middle and better-off households was on livelihood inputs. Food spending was relatively low (11-28% of annual expenditures). A major category of spending by all wealth groups was on "other" which includes

transportation costs, phone credit, festivals, tobacco and cigarettes, amongst other things. These items accounted for 22-35% of spending by all wealth groups.

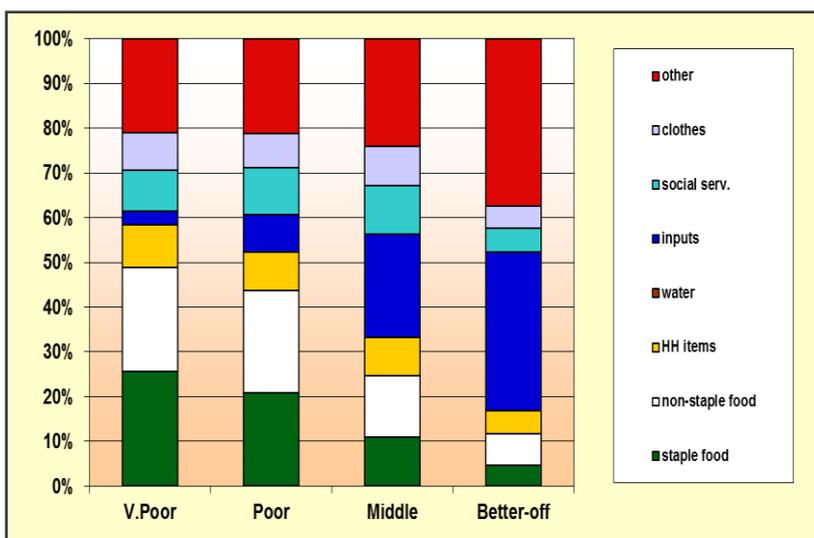
Thar Desert Agro pastoral & Labour



Staple food items comprised 40-50% of annual expenditures of all wealth groups. Middle and better-off households spent about as much on food as the poor because in this agro pastoral economy, households grow less food and purchase more either through livestock and milk sales or through casual labour. However, middle and better-off households spent less on staple food than the poor and very poor.

The other major expense was on “other” items (20-25% of spending) which comprised transport costs, phone credit, social support, festivals and tobacco. Spending on livelihood inputs was low in this zone and mostly comprised ploughing, animal drugs, fodder and tools.

Nagarparkar Rainfed Crops & Livestock



For poor and very poor households, their highest proportion of spending (45-50%) was on food (about equal parts spending on staple food as on non-staple food). Poor households spent more than the very poor on livelihood inputs (fodder, animal drugs, tools, seeds and ploughing expenses). Better-off and middle households spent much more on livelihood inputs which comprised 23-36% of

annual expenditures, including spending on fodder, animal drugs, ploughing, seeds, fertiliser, pesticides, tools, water pump maintenance and labour). As in the other zones, spending on transportation, phone credit, festivals/marriages, cigarettes and tobacco was relatively high comprising 20-25% of annual expenditures of the very poor, poor and middle households, and almost 40% of annual spending by the better-off.

Total Resources, Poverty Lines and Thresholds

In addition to analysing how households secure their food and income and how they spend their cash earnings in a reference year, it is also useful to calculate households' total resources and compare this to poverty lines. In HEA, the total value of household resources is a combination of food produced and income earned. To do this calculation first the value of food secured through own-production must be converted into a cash equivalent. The cash value of food produced is then added to the cash income earned from labour and/or from the sale of farm products and other goods. In an HEA assessment, these total household resources are called "Total Income" or "Total Food+Cash Income".

The total income calculation is useful in two ways. First, it is used as a benchmark for emergency planning. HEA has two emergency level thresholds – the survival threshold which measures food insecurity, and the livelihood protection threshold which measures livelihood insecurity. When household total income dips below these thresholds, the gap indicates the amount of resources required to save lives and livelihoods. Conversely, households remaining above emergency thresholds during a crisis provide us with a picture of what resources are required for resilience in that region. Second, the total income calculation is useful because when converted into **per person per day** (pppd) income, it can be compared with poverty lines. In general, most households produce enough and earn enough in an average year to prevent starvation and to cover the expenses associated with their current livelihood status. Nonetheless, for many households, these total resources are at a level that fall well below what is considered necessary for resilience, asset creation and long-term livelihood security.

The Survival Threshold as a Poverty Indicator: The survival threshold and the livelihood protection threshold are principally used in emergency planning as triggers for humanitarian aid. However, the calculation of the survival basket, and the proportion of its cost compared to household total income, can also be used as an indicator of poverty. Clearly, if a high proportion of total household resources are dedicated to meeting basic survival needs, this indicates poverty. Conversely, if a significant proportion of household resources are dedicated to livelihood inputs then such households are investing in productive activities that build and strengthen their household economy.

The figures in the table below underscore the fact that poor and very poor households – whom together comprised an estimated 62% of households across the four zones – spend an awful lot of their resources just meeting their survival needs. The survival basket of goods consists of the staple food required to meet survival food energy at the rate of 2100 kcal pppd as well as some basic non-food survival items such as soap, salt, and fuel and water for cooking. These survival costs come to roughly 50% of the total resources of poor and very poor households in the four zones. By comparison, the cost of the survival basket of goods came to around 32% of the total resources of middle households, and to an estimated 20% of the total income of the better-off. The high proportion of the resources of the poor and very poor that goes toward basic survival needs is one indicator of poverty in the region.

Cost of a Survival Food and Non-Food Basket Relative to Total Income (PKR/hh/yr)

JM01 Jamshoro Irrigated Wheat	Very Poor	Poor	Middle	B/Off
Survival Costs	89966	89623	89623	89503
Total Income PKR/hh/yr	170214	238144	384424	621147
Survival Costs as % of Total Income	53%	38%	23%	14%
UM02 Umerkot Irrigated Chili	Very Poor	Poor	Middle	B/Off
Survival Costs	89966	89623	89623	89503
Total Income PKR/hh/yr	170214	238144	384424	621147
Survival Costs as % of Total Income	55%	50%	29%	17%
TH07 Thar Desert Agropastoral	Very Poor	Poor	Middle	B/Off
Survival Costs	58373	58373	58373	58373
Total Income PKR/hh/yr	99259	110132	134042	166560
Survival Costs as % of Total Income	59%	53%	44%	35%
TH03 Rainfed Crops & Livestock	Very Poor	Poor	Middle	B/Off
Survival Costs	65062	65062	65062	65062
Total Income PKR/hh/yr	115326	134630	214749	452200
Survival Costs as % of Total Income	56%	48%	30%	14%

The survival food basket includes the cost of sufficient staple food to meet survival food energy needs for the year, as well as survival non-food goods including soap, fuel for cooking food, water expenses, and salt.

Just as a high proportion of resources dedicated to survival needs indicate poverty, the opposite is also true that a high proportion of resources dedicated to productive inputs (as well as to non-essential goods) indicate relative wealth. As stated above, the survival and livelihood protection thresholds are more typically used for emergency planning, to judge food and livelihood insecurity and the extent of food and income gaps. However, it is also instructive to note that for the very poor and poor the cost of their livelihood inputs was roughly 20% of total resources whereas the situation was reversed for the better-off. In their case, the cost of the livelihood protection basket was on average 56% of total resources of which 20% were survival costs and 36% were livelihood input costs. In the Irrigated agriculture zones, the cost of the livelihood input basket was even higher -- an estimated 42-48% of total resources. This value reflects higher farming expenses but also the pay-off in terms of higher income.

Total Income per person per day as a poverty indicator: Total household income secured by households can also be compared to national and international poverty lines. This was done by converting annual household total income into **per person per day** (pppd) income.

As the figures in the table below indicate, even in the reference year – which was selected as an average production year in each livelihood zone – the total resources secured by households in each of the four livelihood zones were mostly below international poverty lines. This poverty line has been re-set several times since 1990. Initially, in 1990, the international poverty line was set at US \$1 pppd. In 2005, it was re-set to US \$1.25 by the World Bank to reflect higher costs of living, and then re-set again to US \$1.90 in 2015. The Asian Development Bank uses the figure US \$1.51 pppd as the poverty threshold in Pakistan, and calculated that 27% of the population in 2014 (or 31 million out of a rural population of 114 million) were poor. The HEA results using total

income show that only the better-off households in the Jamshoro Irrigated Wheat zone (15% of households in that zone) were above this US \$1.51 pppd threshold although better-off households in the Irrigated Chilli zone and the Nagar Parkar Rainfed Crops zone come reasonably close to this threshold. All other wealth groups– or an estimated 87% of households in 3 zones and 100% of households in the Thar Desert Agro pastoral Zone -- fell below the threshold.

Total (Food+Cash) Income Per Person Per Day by Wealth Group – Average Year

RY Total Resources US\$ pppd	Very Poor	Poor	Middle	Better Off
JM01 Jamshoro Irrigated Wheat	\$0.67	\$0.73	\$1.18	\$1.71
UM02 Umerkot Irrigated Chilli	\$0.53	\$0.50	\$0.86	\$1.28
TH07 Thar Desert Agropastoral & Labour	\$0.38	\$0.42	\$0.51	\$0.63
TH03 Rainfed Crops & Livestock	\$0.38	\$0.45	\$0.71	\$1.50

This finding may indicate that the poverty line has perhaps been set too high for rural Sindh given what it actually means to be poor or better-off in the province. The poverty line itself is a bit

of a moving target, open to re-interpretation depending on the analysts. For instance, according to World Bank staff calculations, headcount rural poverty fell nationally from 40% in 2002 to 16% in 2011. However, a working paper published by WIDE showed high and increasing poverty between 2001-02 and 2010-11.⁴

Other sources also indicate a high degree of persistent poverty in Sindh Province. For instance, the Sustainable Development Policy Institute reported that 33% of households lived below the poverty line in Sindh Province and that in 18 of the 27 districts in the province the population in general faced severe poverty conditions.⁵ Moreover, Tharparkar District had the highest incidence of poverty with 47% of households living below the poverty line. In Jamshoro District, the incidence was 39%. Their calculations were based on a “clustered deprivation” approach to defining poverty which is based on five dimensions (household assets, health, education, water & sanitation and food consumption income). These findings align closer to the HEA results where 62% of households were considered by their communities to be poor and very poor. Note, in HEA, wealth group classifications are defined locally. Interestingly, in the Thar Desert Agro pastoral zone, the total income for better-off households was lower than the total income of poor households in the Jamshoro Irrigated Wheat zone. This reflects that in irrigated zones, even poor households need to generate a level of income that supports higher farm input expenses. It also indicates that in the Agro pastoral zone expenses are generally low which is both a cause and effect of lower income overall.

Trying to determine the breadth and depth of poverty is an important endeavour. However, in a drought assessment the more pertinent question is which households are unable to meet their basic needs when drought hits? How many households fall below the threshold of resources required to save lives and livelihoods? What is the extent of their gap in resources? The next section tackles these questions.

⁴ Moreover, when the analysis was modified to allow the poverty line to vary by time and space, the incidence in Sindh Province varied from 14.9% to 55.3%. N. Nazli, E. Whitney and K. Mahut. 2015: *Poverty Trends in Pakistan*. UN University, WIDE (World Institute for Development Economics Research) Report 136, 2015.

⁵ AidData.org. 2015: *Poverty in Pakistan: Numerous Efforts. Many Numbers. Not enough Results*.

2015 DROUGHT IMPACT ASSESSMENT

Current Year (CY) Hazards – Drought and Flood

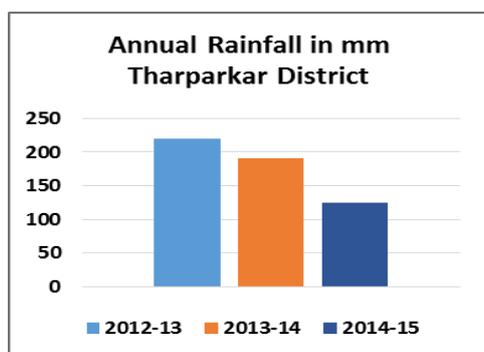
Both drought and flood are major hazards in Sindh Province. The effects of drought are more pronounced in the Thar Desert resulting in production losses in both the rainfed cropping and livestock sectors. Floods – including flash floods from localised heavy rainfall as well as river flooding from upstream storms – are the main hazard in the two irrigated cropping zones. 2010 and 2011 were two recent years of extensive flooding that brought widespread destruction to villages and farmlands along the Indus River and its tributaries in Sindh Province. Floods occurred again in Sindh Province in August 2015. Other than floods and drought, the other main hazards in all four livelihood zones are crop pests and disease.

The current year (CY) is defined as the current “consumption” year in each of the livelihood zones. In the Irrigated Wheat zone, the consumption year starts with the wheat harvest in March/April (the Rabi season). Wheat is the dominant crop in this zone both for household consumption and for sale. In the Irrigated Chilli zone, the Rainfed Crops & Livestock zone and the Thar Desert Agropastoral & Labour Livelihood zone, the consumption year starts with the kharif season harvest. In those three zones, the dominant crops (chilli, cotton, millet and beans) are harvested in September/October.

	JM01 Irrig. Wheat	UM03 Irrig. Chili	TH07 Agropastoral	TH03 Rainfed Crops
Hazard	Flooding in Aug (kharif season)	Flooding in August (kharif season)	Drought	Drought
	Good wheat harvest in Apr 15. Floods in Aug 15. Bumper wheat crop expected in Apr 2016	Average production year from Oct 14- Sept 15	2013-14 drought 2014-15 drought	2013-14 drought 2014-15 drought
Current Year	Mar 15 - Feb 16	Oct 14 - Sept 15	Sept 14 - Aug 15	Sept 14 - Aug 15

The current year, thus, differs by livelihood zone. In the Irrigated Wheat Livelihood Zone, the current year covers the period March 2015-February 2016 although the available data only covers the period March-December 2015. This period covers the recent flood event in 2015. The CY analysis uses the Jamshoro District data for kharif crop production (which did not show a major flood impacts). In the next section, a potential flood scenario addresses possible flood effects in affected tehsils, such as Manjh Ttehsil, that fall in the Irrigated Wheat Livelihood Zone.

In the other livelihood zones, in order to measure drought impacts, the assessment year covers the period September/October 2014 – August/September 2015 and hence uses production data for the 2014 kharif harvest and the 2015 Rabi harvest. In the Thar Desert, drought was the major event of the last two years. The drought was very severe with production shortfalls of 43-50% of the reference year. The drought was finally broken by the arrival of monsoon rains in July-August 2015. However the analysis assesses the impact of the 2013-2015 drought on food and income access up to September 2015.



**CY Production and Price Monitoring
Major Key Parameters by Zone**

JM01 Irrigated Wheat	UM02 Irrigated Chili	TH07 Agropastoral TH03 Rainfed Crops, L/stock
Winter wheat	Winter wheat	Millet
Chili	Chili	Beans
Onion	Cotton	Onion
Livestock prices	Livestock prices	Livestock prices
Ag labour rates	Ag labour rates	Migrant labour rates
Construction labour rates	Construction labour rates	Construction labour rates
Wheat flour (consumer price)	Wheat flour (consumer price)	Wheat flour (consumer price)

To assess the impact of current year production and prices on local livelihoods, certain key parameters are monitored in each livelihood zone. Key parameters are those elements of people’s livelihoods which provide significant food or income, and which an increase or decrease in either the quantity or price would likely have a significant impact on household food and income access. The major key parameters for each livelihood zone are listed in the table above.

The Drought Year Problem Specification

JM01 Irrigated Wheat LZ		
Current Year Scenario is Mar15 - Feb16	CY Outcome Production	CY Outcome Price
Winter wheat	104%	104%
Chili	108%	113%
Onion	133%	115%
Goat sales		113%
Ag labour		100%
Construction labour		133%
Wheat flour (consumer price)		113%
CY values are expressed as a % of the RY value (2014-2015) Price and production data is from the district		

The current year in the Jamshoro Irrigated Wheat zone covers the 2015 Rabi harvest (winter wheat, mustard seed and onions) as well as the 2015 kharif harvest (chilli and cotton). District level data pointed to 4-8% increase in production for wheat and chilli and 33% increase in onions although flooding may have reduced the kharif season chilli harvest in flood affected areas (see the flood scenario section). Producer prices for these key crops also increased (they were 4-15% higher) to the benefit of farmers. In the case of very poor labourers, agricultural wage rates were stable but construction wage rates were higher (33% increase) thus keeping pace with the higher cost of wheat flour, the staple food purchased by households in this zone.

UM02 Irrigated Chili LZ		
Current Year Scenario is Oct14 - Sept15	CY Outcome Production	CY Outcome Price
Winter wheat	98%	104%
Chili	115%	107%
Cotton	100%	114%
Goat sales		125%
Ag labour		100%
Construction labour		125%
Wheat flour (consumer price)		97%
CY values are expressed as a % of the RY value (2013-2014) Price and production data is from the district		

The Irrigated Chilli Livelihood Zone covers two tehsils in Umerkot District: Kunri and Samaro. There was some flooding in this zone in August and this would have affected this year’s kharif season crops (namely chilli and cotton). However, district level data for last year’s kharif season showed that overall the season was slightly better than the October 2013 – September 2014 reference year.

In addition, farm labour rates were stable and construction labour rates were 25% higher than the previous year. Moreover, staple food prices (notably wheat flour) were 3% lower than during the reference year.

TH03 Nagar Parkar Rainfed Crops & Livestock		
Current Year Scenario is Sept14 - Oct15	CY Outcome Production/Quantity	CY Outcome Price
Millet	57%	120%
Cluster bean	56%	112%
Onions	80%	200%
Goat sales		69%
Ag labour	50%	100%
Construction labour	50%	125%
Wheat flour (consumer price)		91%
CY values are expressed as a % of the RY value (2012-2013) Price and production data is from the district		

The Nagar Parkar Rainfed Crops & Livestock Livelihood Zone covers 3 of 5 Union Councils (UCs) in Nagar Parkar Tehsil, Tharparkar District. This area was hit hard by a two year drought that affected crops and livestock production as well as casual labour opportunities. Millet and bean production fell to 56-57% of the baseline. With supply low, producer prices rose. However, the consumer price of wheat flour dropped by 9% reflecting good supply in the main wheat-growing areas.

TH07 Thar Desert Agropastoral & Labour		
Current Year Scenario is Sept14 - Oct15	CY Outcome Production/Quantity	CY Outcome Price
Millet	57%	120%
Cluster bean	50%	112%
Cattle sales	50%	69%
Goat sales	50%	86%
Migrant labour	65%	125%
Construction labour	50%	125%
Wheat flour (consumer price)		91%
CY values are expressed as a % of the RY value (2012-2013) Price and production data is from the district		

The Thar Desert Agro pastoral zone was also affected by the two-year drought. Harvests were 50-57% of the baseline, and livestock mortalities were high thus sales dropped by 50%. Livestock prices were 14-31% lower, reflecting the animals' poor condition. Labour wage rates rose by 25% of the 2012-2013 rates but the availability of work dropped due to the surge in workers looking for casual work. Wheat flour was 9% less than in the baseline year due to good supplies on the market.

2015 Drought Year Outcomes

Jamshoro Irrigated Wheat Livelihood Zone

No emergency level deficits were calculated for the current year. This outcome was due to four critical factors: (1) Slightly higher harvest outcomes for the key crops, wheat, chilli and onions; (2) Slightly higher producer prices for those crops sold by farmers; (3) Steady agricultural wages and slightly higher manual construction wages; and (4) a relatively small increase in the consumer price of wheat flour that can be absorbed due to factors 1, 2 and 3.

Umerkot Irrigated Chilli Livelihood Zone

No emergency level deficits were calculated for the current year. This outcome is due to an increase in the chilli harvest and a slight increase in the producer price for chilli producers. Wages for casual labourers also remained steady or rose and the price of staple grain declined slightly.

Thar Desert Agro pastoral & Labour Livelihood Zone

Current Year (CY) (that is, 2015 drought year) deficits were calculated for very poor, poor and middle households as shown in the table below. These deficits are the estimate of food and income shortfalls compared to emergency level thresholds due to the effects of drought on crop and livestock production, and on labour opportunities. The initial results are an estimate of direct drought impacts before accounting for how households coped with the shock by using their own means.

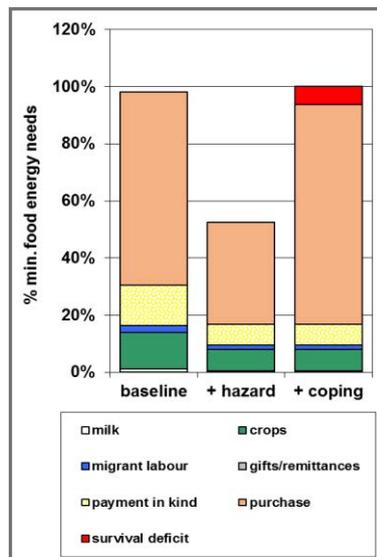
Initial Results w/out Coping				
TH07 Thar Desert Agropastoral	Very Poor	Poor	Middle	Better Off
Survival Deficit	6%	0	0	0
Livelihood Protection Deficit	19%	17%	18%	0

Deficits are measured against two different emergency-level thresholds. A survival threshold is the food energy needed for survival. Resources below the threshold indicate that a household will not have the food energy required for survival. A livelihood protection threshold measures the resources needed to meet survival food energy needs plus basic livelihood expenditure needs. If resources fall below this threshold, it indicates that household resources are too low to cover the costs of a household's minimum livelihood protection needs. Thus a 6% survival deficit means a household cannot meet 6% of their annual food needs based on 2100 kcal/person/day (see chart below at left). A livelihood protection deficit of 19% means that a household cannot meet 19% of key reference year livelihood expenditures (see graphs below).

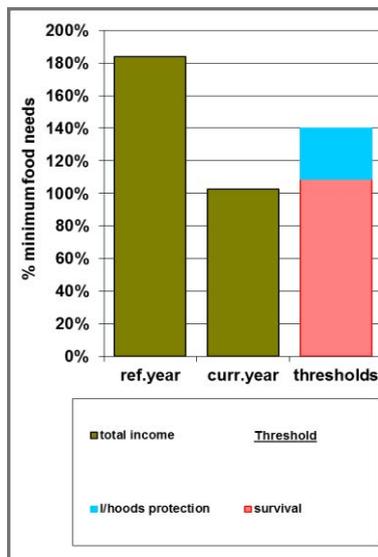
The total income bar graphs show total household resources (food and income) for the reference year and the drought year. Cash income is converted into food equivalents using the staple grain price as the unit of conversion. The total household income that is available in the drought year is compared to how much food and income is needed to meet a basic household survival threshold and a household livelihood protection threshold. These thresholds represent the minimum resources needed to save lives and livelihoods.

Very Poor Households

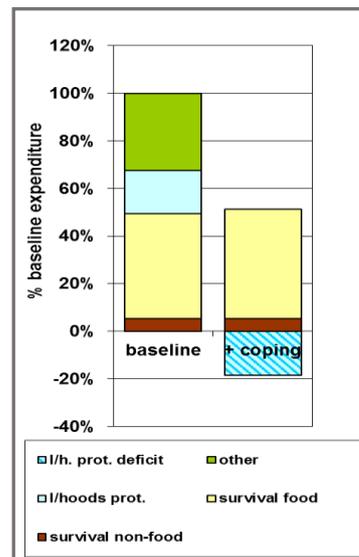
Food Sources / Survival Deficit



Total Food+Income / Thresholds



Expenditures / LP Deficit



In practical terms, this meant that the very poor faced a survival food gap of 22 days of food. It also meant that the very poor faced an expenditure gap of 49%. The key is that they lacked the cash to pay for livelihood maintenance costs (which came to 19% of their baseline spending). In cash, this 19% gap amounts to PKR 15,327. Poor households were short PKR 16,326 (17% of PKR 96,034) and middle households faced an expenditure gap of PKR 20,671 (18% of baseline expenditures of PKR 114,840).

Another example of the impact of drought on households in the affected area was a loss of livestock. In the reference year, cattle ownership was 1.5 and 3 cows for middle and better-off households respectively. However, it was estimated that by the end of 2015, this number had dropped to 0.5 cows for middle households and 1 cow owned by the better-off. Similarly, sheep and goat herds declined. Only middle and better-off households owned sheep but all wealth groups owned some goats. In the reference year, the numbers owned were 2, 4, 7 and 12 goats by very poor, poor, middle and better-off households. By late 2015, it was estimated that these numbers dropped to 0, 1, 2, and 3.5 goats for very poor, poor, middle and better-off households respectively. Sheep numbers also dropped from 5 to 1.5 for middle households, and from 10 to 3.5 for the better-off. This is a major loss of assets.

Nagar Parkar Rainfed Crops & Livestock Livelihood Zone

Survival and livelihood protection deficits were calculated for the current year as outlined in the table below. These deficits represent the initial calculation before addressing to what extent households coped with the economic shock. The deficits were the result of substantial harvest shortfalls from drought, as well as livestock mortalities and low sale prices for goats and cattle. The price of wheat flour, the staple grain, decreased slightly which helped very poor and poor families in particular.

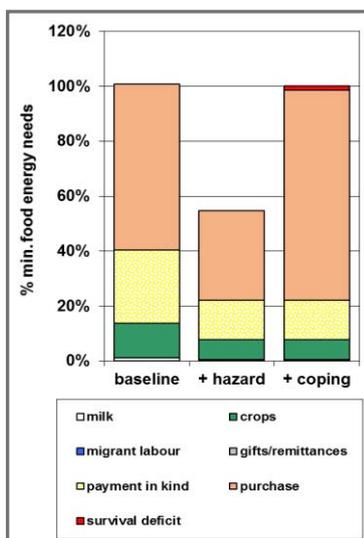
Initial Results w/out Coping				
TH03 Rainfed Crops & Livestock	Very Poor	Poor	Middle	Better Off
Survival Deficit	1%	0	0	0
Livelihood Protection Deficit	18%	21%	0%	0

There were several assumptions made in calculating the current year outcome. First, it was assumed that there were more people looking for work compared to the reference year and thus increased labour competition would mean less work available per worker. Second, the current year calculation assumed that the availability of gifts and loans would be substantially reduced after two years of drought, due to general hardship affecting all households as well as due to non-payment of previous years' debts. It is also assumed in the analysis that taking on more debt is not a desirable thing.

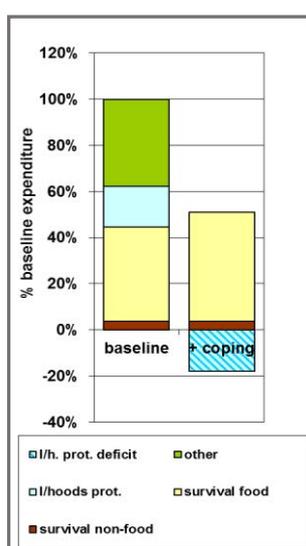
It was calculated that the very poor had a survival deficit of 1% of their annual food energy needs. Very poor and poor households were calculated to have had initial livelihood protection deficits of 18-21% of their reference year expenditures. These deficits are illustrated in the graphs below.

Very Poor Households

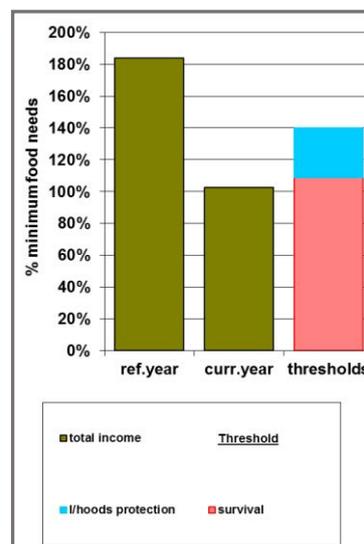
Food Sources / Survival Deficit



Expenditures / LP Deficit



Total Food+Income / Thresholds



What these findings meant in practice was that the very poor faced a food gap of 4 days. They also faced an income gap of PKR 17,242 which was the cost of covering this food gap as well as the shortfall in cash required to meet all of their livelihood expenses. Poor households were also unable to meet their basic livelihood expenses and were short PKR 22,171. Some of the income losses were due to the poor harvest. For instance, for poor households, crop consumption and sales came to PKR 38,396 in the reference year but dropped to PKR 27,573 in the drought year – a loss of PKR 10,823.

The survival and livelihood protection deficits that were calculated for the Agro pastoral & Labour and the Rainfed Crops & Livestock Livelihood Zones can be translated into numbers of people affected and how much food and/or cash aid was needed to fill these gaps. The summary of these results is shown below, for both livelihood zones. The population numbers are based on a projection of the 2008 census results. These results reflect the initial deficit, before coping strategies are taken into account.

Estimate of the Initial Deficit (before Coping) and Numbers of People Affected

		PKR	x1000	
		TOTAL		
Sindh Province, District	Tehsil	Beneficiaries	Either	OR
			MT	Cash
Tharparkar	Nagar Parkar	87,978	6,812	255,450
Tharparkar	Chachro, Dahli	356,118	28,617	998,138
-	Mithi, Islamkot	292,104	23,345	875,438
-	Diplo	210,248	16,803	630,113
-	Nagar Parkar	84,613	6,762	253,575
Umerkot	Umerkot (Garibabad UC)	112,389	8,982	336,825
TOTALS		1,143,449	91,321	3,424,538

The table shows the aggregate result for very poor, poor and middle house-holds. Each beneficiary required 80 kg/person or 600 kg/household. In cash, the need in 2015 was PKR 2,995/person (or PKR 22,462/hh).

Coping Strategies

One of the steps in a full HEA analysis is accounting for how households cope with a shock. In general terms, households usually cope with an economic shock in three main ways: (1) reduce expenditures on non-essential items; (2) switch spending from more expensive items to cheaper ones (i.e., buy more wheat flour rather than rice or sugar); and (3) expand income sources.

The more specific ways that households respond to food and income shortfalls caused by drought and/or flood impacts are listed in the table below. The listed strategies reflect how households in Jamshoro, Umerkot and Tharparkar Districts have actually coped with crises. The list is divided by wealth group because different options are available to different wealth groups based on their available resources and assets.

Typical Coping Strategies by Wealth Group				
	Very Poor	Poor	Middle	Better-Off
Reduce Expenditures				
by 25%	washing powder, firewood, ag inputs		tools	
by 50%	tea, soap, water, mobile, utensils, clothing, cigarettes, school (pocket money)		salt, soap, firewood, utensils, clothing, mobile, livestock drugs, school (pocket money), medicine	
by 100%	festivals		transport, festivals, livestock purchase	
Expand Income				
Livestock	Sell 1-2 more goats		Increase livestock sales by 150% for buffalo and by 200% for goats	
Labour	Increase casual labour for 3-8 months		Look for casual labour for 3-8 months	
Labour migration	Thar desert: Labour migration increased 150-200% (RY 4 months, BY 8 months)			
Loans	Seek loans (10-60 K)		Seek loans (up to Rs 100,000)	
HH migration	Household migrates			

Households affected by a drought or flood do not just wait for assistance to arrive. Instead, the affected population look for ways to fill food and income gaps caused by harvest shortfalls or dying livestock by actively managing their remaining resources and trying to earn additional cash. HEA analysis allows the option of incorporating people's active response to a crisis by showing how their actions reduce the deficit. Any remaining deficit requires external assistance.

The following analysis shows what deficits remain when coping strategies are taken in to account. In this particular analysis of coping strategies, the following were included for each livelihood zone.

Nagar Parkar Rainfed Crops & Livestock LZ

- Sell more cash crops (such as vegetables including onions, brinjal and radishes) and eat less of these “high value” crops
- Eat all harvested millet rather than sell some of the crop
- Reduce expenditures including sugar, salt, tea, soap, meat, clothing, toiletries and festivals

One common coping strategy is called “consumption switching”. This means that households eat fewer food items that are relatively costly in favour of food items that are relatively cheap. In this zone, this meant that households sold all their high value cash crops – or at least whatever little they harvested – and purchased the staple grain, wheat, forgoing oil, sugar and other pricier items. They also ate millet rather than sold the crop as it is a relatively low value crop.

- **Sell an additional goat and cow**

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

- **Seek out additional local casual labour or additional work in the agricultural sector (wheat harvesting and rice harvesting) as well as in the construction sector (building houses or cleaning local dams).**

In the reference year, it was typical for one family member to carry out casual work for about 8 months of the year, earning PKR 175-200/day, several days per week. During the drought year, this number increased from 1 family member to 2-4 family members who were engaged in casual work for 8 months of the year. However, during the drought years, wages typically dropped to PKR 120-150/day for local labour. Wages for migratory labour were an estimated PKR 300/day. Construction labour and agricultural labour wages also dropped in some areas from PKR 200/day to PKR 100-150/day.

- **Seek out loans**

This strategy was only effective in the first year of the drought before credit became too high risk for the lenders. For the poor, the size of their loans increased from PKR 10,000 in the reference year to PKR 15,000-20,000 in the drought year. Better-off households reported receiving loans of PKR 100,000 to help cover their expenses.

Thar Desert Agro pastoral & Labour

- **Eat all of the millet harvest and sell none. Reduce non-essential expenditures.**

Some examples of non-essential expenditures that households reportedly reduced were cigarettes (reduced by 50%), zakat (reduced to 0% if no harvest), and livestock drugs (reduced by 25%). Festival expenses and marriages were also reduced to 0% in the drought years.

- **Increase goat, sheep and cattle sales.**

This strategy was mainly used by middle and better-off households in the first year of the drought. Even in the first year, the net gain of livestock sales was low due to falling prices for animals in poor condition. For instance, middle households reported that a goat sold for PRK 3,000 in the reference year sold for PRK 2,000-1,500/animal during the drought and thus even doubling their sales (from 2-4 goats) led to few income gains. Better-off households reported doubling their sales of sheep and goats from 5 to 10 animals or more. They also reported receiving low prices with a drop from PKR 3,250/goat to PKR 2,000-3,000/goat. By the second year, most households, including the very poor and poor households, said that as there were no new births and hence they did not have additional sheep and goats to sell.

- **Increase casual labour (i.e., harvesting work or casual jobs in the construction sector)**

The strategy for poor families in a bad year is to try to increase their earnings from casual labour. For instance, a family member who found work for 15 days/month over 7-8 months in the reference year increased their labour activities to 10-12 months in the drought year. However, total earnings did not always increase because wages in many cases fell due to a high supply of labourers. For example, it was reported that local wages for some work fell from PKR 300/day to PKR 70/day. Elsewhere, wages stayed level at PKR 250/day but the number of work days decreased in the bad year by 5 days a month (from 25 days/month for 8 months to 20 days/month for 8 months).

- **Increase labour migration (and remittances).**

Very poor, poor and middle households all used this strategy during the drought. It was common for twice as many household members to leave the village in search of seasonal work elsewhere. These workers also stayed away for twice as many months. For instance, in the reference, 1-2 people working away for 4 months away was increased to 2-4 people who left for 8 months in search of work. In villages where workers were already doing migratory work for about 8 months of the year, they increased this to 10 months or sent 2 family members rather than 1. On the whole, wages dropped due to so many people looking for work. For instance, wages dropped from PKR 180-200/day to PKR 150/day.

- **Increase sales of embroidery handicrafts and petty trade.**

As with other forms of labour or self-employment, involvement in petty trade and handicraft sales doubles in a bad year. Typically, this meant that more family members undertook this work in a bad year in an attempt to generate more income.

- **Loans, Gifts, Relief**

In a single year drought, seeking out loans and gifts of PKR 10,000-15,000 is very common. However, in a two year drought, this strategy is not effective as too much debt has accumulated. In the current drought year, some relief food was reportedly received (i.e., around 150-350 kg/household /year in monthly distributions of 50 kg/household).

Revised Results

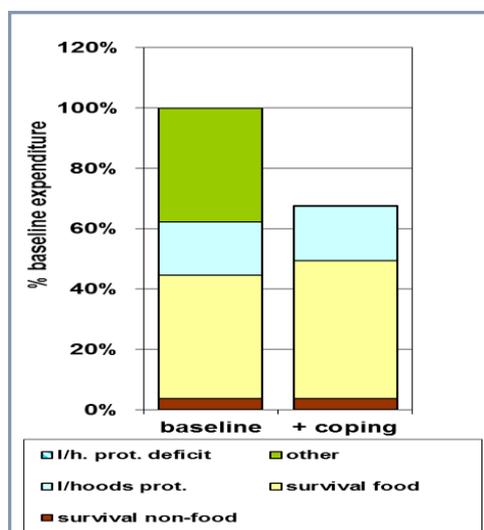
The result of taking coping strategies into account is shown in the results table below.

Nagar Parkar Rainfed Crops & Livestock

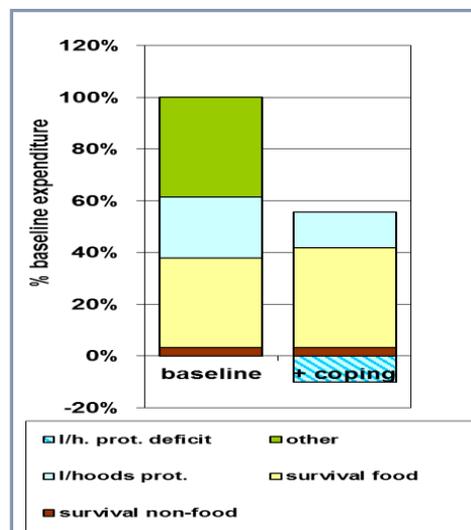
Results with Coping Strategies				
TH03 Rainfed Crops & Livestock	Very Poor	Poor	Middle	Better Off
Survival Deficit	0%	0	0	0
Livelihood Protection Deficit	0%	10%	0%	0

For the very poor, the combination of their various strategies allows them to eliminate their gaps. However, poor households still have a livelihood protection deficit amounting to 10% of their normal year expenditures. This is due to the fact that in the baseline year, they earned a higher income which in part was spent on more livelihood inputs, such as animal drugs, fodder, ploughing, seeds and tools, and these expenses led to a higher livelihood protection threshold than that of the very poor.

Very Poor HH – Expenditures



Poor HH – Expenditures / LP Deficit



The very poor arguably had sufficient resources to meet their very basic needs. However, the very poor nonetheless faced income gaps and could only afford about 65% of their reference year expenditures. This meant that after buying priority staple food, basic non-food “survival” items, and key livelihood items, they would not have had money left over to pay for a range of other normal year expenses, including transport, phone credit, clothing, utensils & cooking pots, tobacco, and festivals. Poor households faced an even greater expenditure gap. As well as being short on cash income to pay for “other” expenses, they would not have earned enough to pay for

all their livelihood input needs as well. This left them with a livelihood protection deficit of 10% of the normal year expenses.

Nagar Parkar Rainfed Crops & Livestock (TH03)			
Income Loss (PKR)/household	Very Poor	Poor	Middle
Crop sales	-3,176	-4,455	10,605
Milk consumption	-400	-2,046	-3,383
Livestock sales	-1,670	-14,744	-17,249
Loans/Gifts/Remittances	-18,293	-18,293	-10,976
Labour	-13,713	-10,000	
Payment-in-kind	-7,193	-4,008	-2,003
other	-2,676	-6,794	-11,711
Total income Loss			
before coping	-47,121	-60,260	-34,717
Additional Coping Income			
Labour	14,576	10,156	1,369
Payment-in-kind	2,313	1,203	186
Other	546	103	418
Total Income Loss			
after Coping	-29,686	-48,798	-32,744
Total Income			
after Coping	76,500	74,500	163,700
USD per person per day	\$ 0.25 pppd	\$ 0.25 pppd	\$ 0.55 pppd

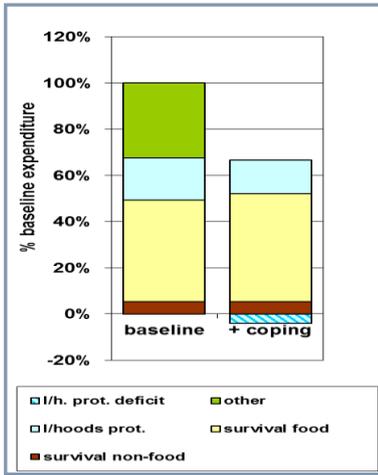
The income losses faced by households due to drought impacts are illustrated in the table at left. Middle households faced the smallest income loss. Nonetheless, even after coping with their losses, they still faced a shortfall of PKR 32,744/household compared to their reference year income mainly due to losses in livestock sales, milk production and loans/gifts. Poor households faced the greatest income loss, seeing declines (after coping) of PKR 48,798/household of their reference year income mainly due to losses of income from livestock sales, loans/gifts, and labour. These losses in 2015 meant that their total food +

cash income was similar to the level of resources secured by the very poor – which is to say, very low. **When total income is calculated on per person per day (pppd), the very poor and poor earned only US \$0.25 from all food and income sources. This level is far below the international poverty line of US \$1.25 pppd.** Middle households were also below this level at US \$0.55 pppd.

Thar Desert Agropastoral & Labour

Results with Coping Strategies				
TH07 Thar Desert Agropastoral	Very Poor	Poor	Middle	Better Off
Survival Deficit	0%	0	0	0
Livelihood Protection Deficit	4%	1%	7%	0

After taking coping strategies into account, no survival (i.e., food) deficits were estimated for any wealth group. Moreover, livelihood protection (i.e., expenditure) deficits were greatly reduced. Middle households were expected to have the highest deficit compared to the baseline due to their higher expenses in the reference year. In addition, in this particular drought year, middle households were hit particularly hard with crop and livestock losses as well as reduced labour opportunities due to higher numbers of people looking for casual work. In this analysis, it was also assumed that loans and gifts would not be available although perhaps in reality, middle households (who are more credit worthy in good years) may have taken additional loans to fill critical income gaps.



Very Poor HH – Expenditure Gaps

The graph at left illustrates that in the Thar Desert Agropastoral & Labour zone, the 2013-2015 drought caused large income losses. In 2015, very poor households’ expenditures dropped to 67% of their baseline levels. The large expenditure gap affected both essential goods and services as well as “non-essential” goods and services (such as tea, tobacco, phone credit, transport, and so on). These non-essential goods are represented by the “other” category in the expenditure graph. Thus, the expenditure deficit amounted to 4% of their essential expenses for livelihood maintenance and the other 29% is the gap in income to pay for “other” expenses.

Thar Desert Agropastoral & Labour (TH07)			
Income Loss (PKR)/household	Very Poor	Poor	Middle
Crop sales	-6,000	-7,632	-9,622
Milk consumption	-343	-1,028	-4,880
Livestock sales	-1,113	-3,341	-12,890
Gifts/Remittances	-11,597	-6,713	-5,219
Loans/credit	-9,150	-13,700	-14,900
Labour	-5,430	-6,516	-12,055
Payment-in-kind	-3,506		
other	-2,953	-4,770	-4379
Total income Loss			
before coping	-40,092	-43,700	-63,945
Additional Coping Income			
Labour	5,819	6,996	7,688
Migration/Remittances	7,098	6,167	1,872
Other	2,128	1,875	3,085
Total Income Loss			
after Coping	-25,047	-28,662	-51,300
Total Income			
after Coping	65,741	72,070	71,300
USD (per person per day)	\$ 0.25 pppd	\$ 0.27 pppd	\$ 0.27 pppd

The overall loss of income due to the drought is shown in the table at left for very poor, poor and middle households. Middle households faced significant income gaps in crop sales and livestock sales as well as labour and loans. Very poor and poor households saw large income losses in crop sales, remittances/gifts, loans and labour. Compared to the reference year, income fell by an estimated PKR 40,100-64,000 in the drought year. Sending more family members out for local and migratory labour helped bring in some additional income. However, even by maximising these strategies, the total resources

secured by very poor, poor and middle households in 2015 represented a drop in resources of PKR 25,047-51,300. For these three wealth groups, their annual income in the drought year was an estimated PKR 65,741-72,070. **This level of income is extremely low and amounts to around US \$0.25-0.27 per person per day (pppd), a level which is far below the international poverty line.**

Revised Estimate of Need based on Current Year Outcome with Coping

		PKR	x1000	
		TOTAL		
Sindh Province,	Tehsil	Beneficiaries	Either	OR
			MT	Cash
Tharparkar	Nagar Parkar	46,152	1,930	72,375
Tharparkar	Chachro, Dahli	356,118	5,526	207,225
-	Mithi, Islamkot	292,104	4,317	161,888
-	Diplo	210,248	3,107	116,513
-	Nagar Parkar	84,613	1,251	46,913
Umerkot	Umerkot (Garibabad UC)	112,389	1,661	62,288
TOTALS		1,101,623	17,792	667,200

The final estimate of humanitarian aid that was required in the 2015 drought year is shown in the table at left. This estimate of need works out to 16 kg wheat flour per person or about 121 kg/household of 7-8 people, covering 75% of the

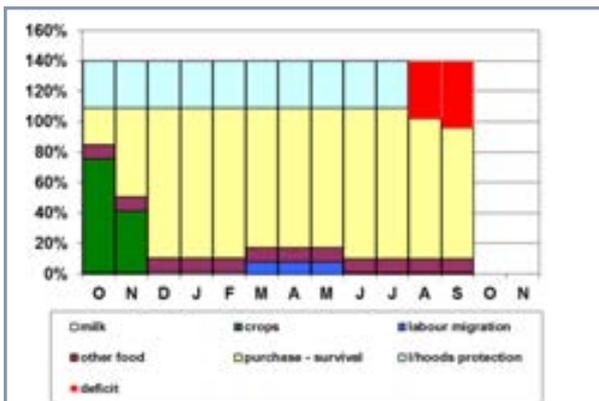
population. In terms of cash, it represents PKR 606/person or PKR 4,542/household. This amount would have covered the basic costs required for livelihood protection and survival after household coping mechanisms (such as labour migration, local labour, increased sale of handicrafts and livestock sales) were stretched to their maximum. Households themselves reported receiving 150-350 kg/household from the relief effort. This was certainly in the range of resources required to fill emergency needs.

Seasonality

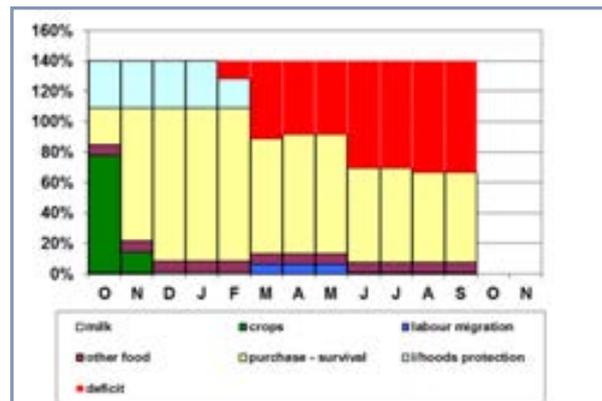
When there are calculated deficits, it is important to address what season the deficits will occur in order to ensure the right timing of assistance. The seasonal analysis is illustrated by the graphs below where the red bars show what months the deficits occurred and the extent of the food and income gap.

Thar Desert Agropastoral & Labour - Very Poor Households – Seasonal Deficit

Deficit after Coping



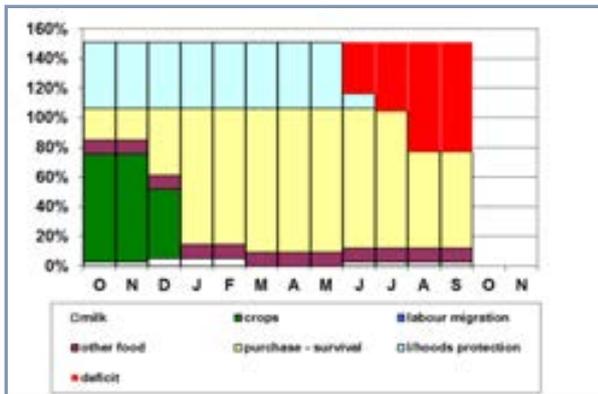
Deficit before Coping



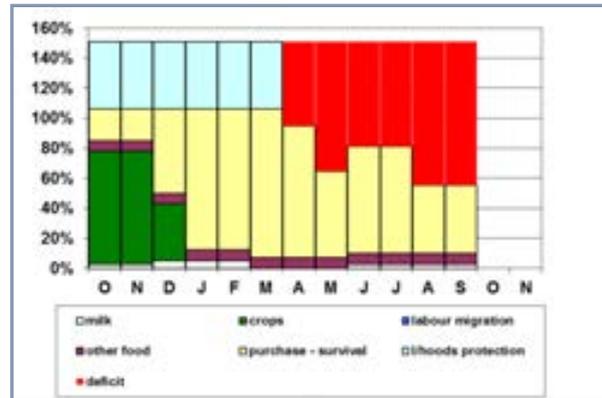
If households' capacity to cope is not taken into account, very poor households clearly faced an income (or expenditure) gap beginning in February. The deficits intensified and were worse from June-September just before the kharif harvest in October. When households' coping strategies are taken into account, food and income gaps were not evident until August-September.

Nagar Parkar Rainfed Crops & Livestock – Poor Households – Seasonal Deficit

Deficit after Coping



Deficit before Coping



The situation for poor households in Nagar Parkar shows that before coping strategies are taken into account, food and income gaps were felt from April-September. By contrast, accounting for households' own response to emerging gaps, the most severe deficits were felt from June-September.

2016 FLOOD IMPACT

Flood Scenario

HEA Outcome Analysis allows planners to make predictions about the coming year by drawing up scenarios of possible production and price trends. These scenarios can be purely speculative prior to a hazard occurring (i.e., if a major flood occurs then what might be the impact) or they can be carried out mid-season just before the first season harvest but include a prediction about the outcome of the second season.

In this case, based on reports about flooding during the 2015 monsoon season in July/August, a scenario was drawn up that investigates the impact on food and income **when flooding is severe**.

Flooding along the Indus River is a common occurrence. Some years, floods are more extensive and cause massive destruction across a widespread area. 2010 and 2011 were examples of widespread destruction due to severe flooding. In July-August 2015, there was flooding in Jamshoro and Umerkot Districts. These floods affected households in both the JM01 Irrigated Wheat Livelihood Zone and in the UM02 Irrigated Chilli Livelihood Zone. According to government records, 24,770 people in Jamshoro District were evacuated due to the flood event. This represents 3.7% of the population of the district. However, the people who were affected were concentrated in the riverine areas and this is the area of the Irrigated Wheat Livelihood Zone. For this reason, a flood scenario was created in order to look at the potential flood effect on food and income sources in the two zones affected by the 2015 floods.

JM01 Irrigated Wheat LZ UM02 Irrigated Chilli LZ		
Current Year Scenario is Oct15 - Sept16	CY Outcome Production/Quantity	CY Outcome Price
Winter wheat	100-105%	104%
Chilli	0%	150%
Cotton	0%	150%
Onion	50%	125%
Goat sales		125%
Ag labour	50-75%	100%
Construction labour	100%	125%
Wheat flour (consumer price)		98-113%
CY values are expressed as a % of the RY value Price and production data is from the district		

According to district-level crop production and price data from Jamshoro and Umerkot Districts, there was not a noticeable failure of the kharif harvest in October. This effects chilli and cotton in particular. Moreover, the wheat harvest in March 2016 is expected to be good, possibly even a bumper crop. Nonetheless, by drawing up the scenario, we are investigating **the likely effects of the flood event if it led to the widespread failure of the chilli and cotton crop** (which is typically harvested in September/October). In the 2016 flood scenario, it is also assumed

that some of the onion crop (typically harvested in November) would also be affected.

Households whose land was flooded in August, would need to wait for the floods to recede and then clear their land of debris before planting so this could cause some delays in planting onions or could possibly mean that only part of the land is planted. Another assumption in running this scenario is that there would be less work available per worker although wage rates would remain steady. This assumption is based on the fact that there would be more labourers looking for work due to the loss of income from chilli and cotton. In particular, people from poor and middle households would be trying to pick up additional casual work and this could mean less work in general per worker, taking into account also that there would be less work in particular during the

chilli and cotton harvest in affected areas. The problem specifications for the flood scenario for the two livelihood zones are outlined in the table above.

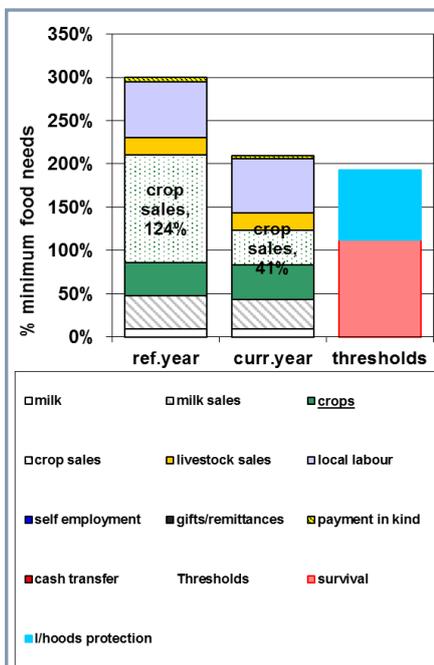
Results

Jamshoro Irrigated Wheat Livelihood Zone

The results of the 2016 flood scenario in the Irrigated Wheat Livelihood Zone show that no emergency level deficits are predicted to occur. Income from crop sales is expected to drop to 38-63% of reference year crop sale income based on the problem specification. However, as long as there is construction sector work available, as well as casual labour opportunities during the period of the wheat harvest, the very poor and poor households are expected to cope with income shortfalls without falling below emergency levels.

Poor Households

Total Food+Cash Income / Thresholds



The graph at left shows that poor households will face significant income shortfalls during 2016 in face of a failed kharif harvest of chilli and cotton. They are not predicted to fall below the emergency level thresholds. However, they are predicted to be at the brink of these thresholds. This means that food and income will be just enough to cover their most basic needs. However, there will still be a need to cut back on many reference year expenses as their total value of their food and income dropped from PKR 267,918 in the reference year, to PKR 200,242 in the reference year. The value of their total food + cash income, converted into US dollars, is US \$0.61 pppd. Middle and better-off households will also take a big cut in income in this flood scenario. In 2016, given a failed kharif harvest, middle households would see a drop in their total food + cash resources from PKR 432,484 to PKR 328,295 (a difference of PKR 104,189). Better-off households would see

losses of PKR 215,357. In the final analysis, the value of the total food + cash income resources of middle households is an estimated US \$1 pppd and for better-off households the estimate is US \$1.55 pppd. The very poor's resources amount to US \$0.48 pppd. Only the better-off will be above the international poverty threshold.

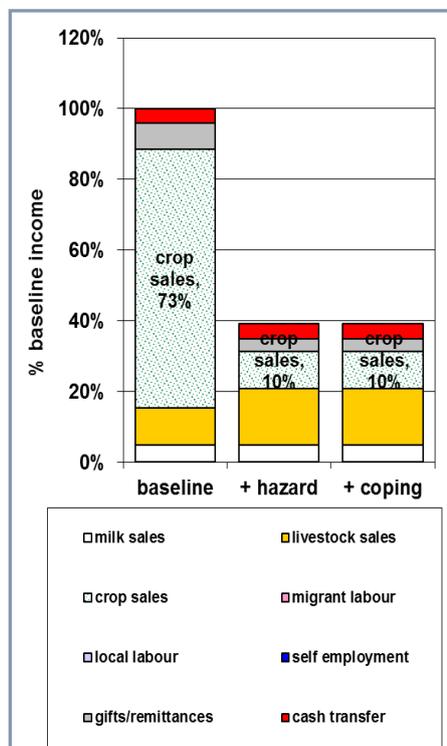
Umerkot Irrigated Chilli Livelihood Zone

Initial Results w/out Coping				
UM02 Irrigated Chilli	Very Poor	Poor	Middle	Better Off
Survival Deficit	0%	19%	0	0
Livelihood Protection Deficit	0%	25%	23%	21%

The 2016 flood scenario shows that the outcome will be severe in the Irrigated Chilli Livelihood Zone. In this livelihood zone, farmers earn much of their annual income from the sale of kharif season chilli and cotton. When these two crops fail, there will be major income losses. The scenario is based on total crop failure in the event of a flood wiping out the whole crop. This would clearly affect farming households the most. As the very poor are principally labourers, a

failed crop will not affect their food and income access – except to the extent that better-off farmers may not hire labourers for chilli or cotton harvesting in a year of failed harvest. The effect of lost harvest work and reduced gifts means a predicted cash income that is 75% of the reference year income, and thus an income drop from PKR 97,785 in the reference year to PKR 73,339 in the flood scenario. The poor may face higher gaps because they grow chilli and cotton for income as well as work as labourers during the harvest season.

Middle HH – Income Sources



The results show that both middle and better-off households are predicted to have significant income and expenditure deficits in face of a failed chilli and cotton harvest. The graph at left shows that in the reference year, 73% of the annual cash income of middle households came from crop sales (wheat, sorghum, chilli, cotton and mustard seed). In the 2016 flood scenario, income from crop sales is predicted to drop substantially. The result is that they would likely earn just 10% of their reference year cash income from crop sales. Moreover, their total cash income in 2016 will likely be just 40% of their annual total cash income of the reference year. This means a drop down to PKR 81,194 from an annual total of PKR 202,985. For better-off households, a failed chilli and cotton harvest would mean that their cash income in 2016 would drop by 70% which means a decline to PKR 115,536 from a total in the reference year of PKR 385,120. This would leave a serious gap in what they could afford to buy.

Results with Coping Strategies

In the irrigated agricultural zones, households have five main ways of coping with food and income gaps. These coping strategies include: (1) reduce and switch expenditures; (2) sell livestock; (3) seek additional casual work or migrate away for work; (4) sell more firewood; (5) appeal for gifts or loans. Of these strategies, selling firewood and appealing for loans are considered negative strategies. All of the strategies are elaborated below but negative strategies were not used in the analysis.

Reduce expenditures

The principal way that households in all wealth groups coped in the past with a bad year was to reduce expenditures. Some items simply were not bought in a bad year as the expense could not be afforded or they were bought at a reduced level. The items that were typically reduced 50% or even 100% of the baseline amount included utensils, clothing, washing powder, grinding fees, school (pocket money), fodder, livestock purchase, medicine, animal drugs, seeds, agricultural inputs (including irrigation water tax), transport, phone credit, cigarettes and festivals. The items typically reduced by 25% were salt, soap, matches, and tea. By reducing or eliminating non-food expenditures, households prioritised more of their (reduced) income on food.

Sell livestock (goats or buffalo)

Households from all wealth groups sold livestock in a bad year. Very poor households sold only goats and usually only 1 (due to very small herds). Poor households sold 1-2 additional goats for around PKR 4,000-6,000 as well as, in some cases, a small buffalo (@ PKR 10,000). In the case of middle households, goat sales were common too (usually an additional 1-2 goats) as well as the sale of a mid-sized buffalo (@ PKR 20,000-50,000). Better-off households tended to sell a mid-to-large buffalo (PKR 40,000-100,000) as well as an additional 2-3 small goats.

Seek out additional casual work locally or migrate to cities in search of casual work

Very poor, poor and middle households all reportedly increased casual labour activities in a bad year often by migrating to Karachi or to another urban area where wages are generally higher than local pay (i.e., PKR 300 compared to PKR 150-200) and where work is more plentiful. For instance, those who worked for 2 months in an average year increased their casual work to 5-6 months. Another example are those who worked for 3 weeks for a month or two in an average year, worked for 4 weeks over several months in the bad year. Some families shifted most of their energy into casual labour, sending one family member out to work for 12 months of the year (earning an estimated PKR 6,000/month), In general, wages stayed steady during the last bad year.

Appeal for gifts, loans or aid

In the Jamshoro Irrigated Wheat zone, it was more common for better-off households than the poor to take out loans during a bad year. Loans for the better-off were as high as PKR 200,000 which was double what better-off households took during an average production year. In the Umerkot Irrigated Chilli zone, loans of PKR 3,000-60,000 were common for poor households. It was less common for middle and better-off households to seek loans but those who did were lent as much as PKR 100,000. During the drought/flood, some very poor and poor households received relief aid. Some received food (i.e., for 1-3 months of food relief); some received cash (PKR 2000/household); some received a Watan card (i.e., for PKR 10,000) and some received BISP support (@ PKR 16,800/household/year).

Firewood sales

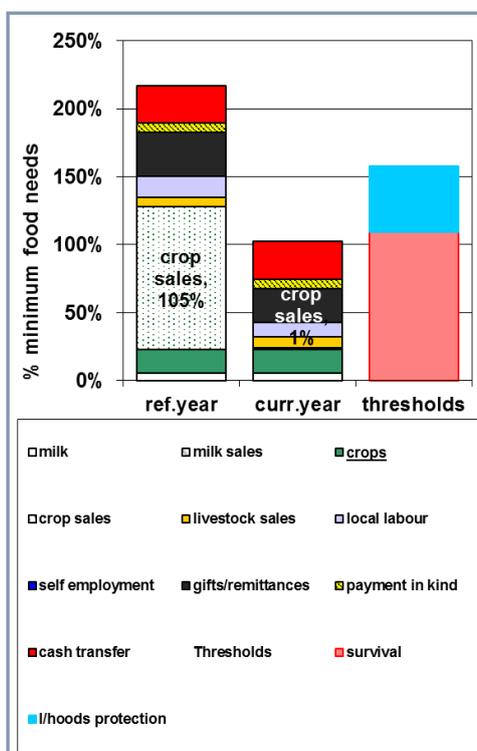
Very poor and poor households sold firewood in good years and bad. However, in a drought year, it was typical for the poor to double their sales of firewood (i.e., from 1 cart/day for 6 months to 2 carts/day for 6 months). In a flood year, firewood sales dropped by half (i.e., 10 maunds sold over 1 month in the bad year compared to 30 maunds sold per month for two months). The cost of firewood per maund shifted a bit in good years and bad. Although firewood sales are an actual way that households cope with production losses, this coping strategy is not included in the estimate of need as it is viewed as a “negative” strategy due to potential negative environmental effects.

Results with Coping Strategies				
UM02 Irrigated Chili	Very Poor	Poor	Middle	Better Off
Survival Deficit	0%	7%	0	0
Livelihood Protection Deficit	0%	25%	14%	12%

These strategies go some way in reducing food and income gaps. Nonetheless, poor, middle and better-off households will have income and expenditure deficits below the emergency threshold, and poor households will also have a food gap of 7% of their annual food needs. This equals roughly 26 days of food – or nearly a one month gap in food that they cannot meet.

Poor Households

Total Food+Cash Income / Thresholds



The graph at left shows the effect of total chilli and cotton failure on poor households in the Irrigated Chilli Livelihood Zone once coping strategies are considered. For example, in the reference year, crop sales provided 50% of the poor’s annual cash income. When valued in terms of how much staple food that income would buy, the income from crop sales provided 105% of annual food needs (total food and cash resources were valued at 217% of annual food needs).

The analysis shows that a total failure of the chilli and cotton harvest would result in crop sale income potentially dropping to 1% of annual income. It would be very difficult to make up this deficit and the coping strategies available – such as selling a goat or appealing for gifts or loans, or searching for additional casual work-- would only partially make up the deficit. The whole household could migrate away, or households could take on a very high debt but these are considered undesirable coping strategies and are not included in the analysis.

Once coping strategies are taken into account, the number of people affected in the flood scenario, and the resources required filling the survival and livelihood protection gaps, are shown in the table below.

Results (with Coping): 2016 Flood Scenario, Irrigated Chilli Livelihood Zone

		PKR		
		x1,000		
		TOTAL		
Sindh Provin	Tehsil	Benefic- iaries	Either MT	OR Cash
Jamshoro	Manjhand	-	-	-
-	Kotri	-	-	-
-	Sehwan Sharif	-	-	-
Umerkot	Kunri	163,659	19,879	771,301
-	Samaro	132,176	16,055	622,927
-	-	-	-	-
TOTALS		295,835	35,934	1,394,228

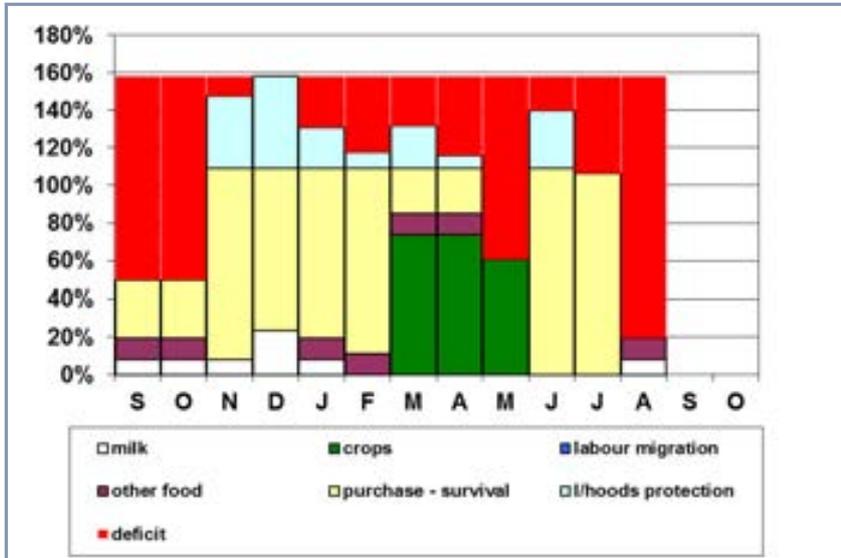
These results translate into 121.5 kg/person of wheat flour for the year or 850 kg/ household. In terms of the cash value of assistance, the amount required in face of a failed kharif harvest is PKR 4,713/person/year or PKR 32,990 for a household of 7 people. The number of beneficiaries reflects a high proportion of the total population (78-85%).

These deficits will have a seasonal pattern with major food and income gaps faced in September/October immediately after the failed kharif harvest. Onion sales ease the situation from November-February at which time wheat is harvested. However, major gaps will emerge again in July-August 2016 just before the 2016 kharif harvest in September. The graph below vividly shows the months when the deficits will be highest with the bar coloured red indicating the

deficit months. In the months of acute shortages – August, September, and October – which are the months when kharif crops are usually harvested, households would be able to meet only 20-50% of their food needs. August would be particularly dire.

Umerkot Irrigated Chilli – Poor Households – Seasonal Deficit

Deficit after Coping



CONCLUSION & RECOMMENDATIONS

Conclusion

After a severe drought of two years, it was important to investigate the effect of the drought on the local economy. What was the extent of production losses and what effect did this have on household's access to food and income, and on the things they needed to support their families? How did families cope when the harvest failed and livestock died due to drought? Which households were worst affected and what was the extent of their food and income gaps? What proportion of households faced these gaps? In turn, who was more resilient and why? The HEA field work addressed these questions by comparing not only different wealth groups but also different types of local economies – from irrigated agricultural zones to a rainfed agricultural zone to an agro pastoral zone.

Drought Resilience in the Irrigated Wheat and Irrigated Chilli Zones

The findings showed that the irrigated zones managed to maintain their production levels during the drought with some slight swings up and down. For instance, in 2014, chilli production increased to 115% of the 2013 kharif season, and then dropped to 85% of the 2013 level in 2015. Winter wheat production remained fairly stable, dropping slightly to 98% of the reference year level in the Umerkot Irrigated Chilli zone but increasing slightly to 104% in the Jamshoro Irrigated Wheat zone. Local wage rates remained fairly steady as did the price of wheat flour (the staple grain). The outcome in the irrigated agricultural zones was that farmers were able to absorb these production and price shifts without suffering any major income or food shortfalls. Nonetheless, major flood events are clearly a significant hazard in the irrigated zones and a total failure of the kharif harvest would, in the case of the Umerkot Irrigated Chilli Zone, lead to acute gaps in from May to October affecting 78% of the population in that zone and requiring PKR 32,990/household in aid. In these zones, especially in the Umerkot Irrigated Chilli Zone, chronic poverty and recurring debt is also a significant issue that will not be easily resolved.

Drought Effects in the Thar Desert

Production Shortfalls - Food and Income Gaps: The drought led to major harvest shortfalls in the worst drought affected areas of the Thar Desert, including both the Agro-pastoral & Labour and the Rainfed Crops & Livestock Livelihood Zones. Based on available production data, it was estimated that crop and livestock production fell to 50-60% of reference year levels. This also affected job availability for local on-farm work as well as migratory work. As a result, in the two Thar Desert zones, households saw major losses of household resources. Taking into consideration coping strategies, income shortfalls in 2015 were estimated to be about PKR 25,000-30,000/household for the very poor, PKR 29,000-49,000/household for the poor and PKR 33,000-51,000/household for middle households. Thus, the total food and income secured by households in the worst affected regions was extremely low by the second year of drought, amounting to PKR 70,000 for the very poor; PKR 73,250 for the poor; and PKR 117,500 for middle households (average income for the two zones).

It is useful to calculate total income in US dollars (USD) in order to compare the result to the international poverty line. Total food and income resources in 2015 translate into US \$0.25pppd for the very poor and poor, and US \$0.27-0.55pppd for middle households. This level

of income is well below the international poverty line set by the World Bank at US \$1.90 pppd in 2015.

Assessment of Need: The income losses in the worst affected areas of Tharparkar and Umerkot Districts were calculated as an estimate of need (i.e., level of humanitarian aid required to reduce emergency-level gaps). The initial estimate of need showed that 1,143,449 beneficiaries in Tharparkar and Umerkot Districts required 91,321 MT wheat flour or PKR 3,424,537,500 in cash. However, by intensifying casual labour, households reduced much of the income gap.⁶The final estimate of need shows that 1,101,623 beneficiaries needed 17,792 MT wheat flour in 2015 or PKR 667,200,000 in cash. In terms of per person or per household need, the cash required was PKR 606/person for the year to cover emergency-level gaps or PKR 4,542/household of 7-8 members. The estimate of need when coping options are not included was PKR 2,995 per person or PKR 22,462/household of 7-8 people. Those who had emergency-level deficits were the very poor, poor and middle households and these wealth groups accounted for 75% of the population (88% of households). Emergency gaps were felt most from June-September 2015 so when aid was needed most was during the 3-5 month period prior to the new harvest.

Elements of Resilience

The 2013-2015 drought had the greatest effect in the Agro-pastoral and Rainfed Crops zones in Tharparkar and Umerkot Districts. Moreover, the flood scenario affecting kharif season crops had the greatest effect in the Umerkot Irrigated Chilli zone. In both the drought and flood analyses, the Jamshoro Irrigated Wheat Livelihood Zone suffered the lowest income losses. This is perhaps instructive when looking at what makes up a fairly resilient economy although clearly a major flood that destroys homes, crops, livestock and other property along the Indus River will cause very immediate and massive losses for all households in the area.

The elements that comprise the Jamshoro Irrigated Wheat economy that seem to provide some resilience to local hazards are the combination of kharif season crops (chilli, cotton and fodder) with a relatively high proportion of irrigated rabi season crops (wheat and onions) augmented by buffalo milk sales and livestock sales as well as relatively good on- and off-farm labour opportunities which are relatively local. This zone also had the highest proportion of better-off households (17% compared to 12-14% in the other zones), and the lowest proportion of very poor (19% compared to 30% in the Thar Desert Agro pastoral and Rainfed Crop zones). Together, this mix of food and income sources as well as the spread of wealth seemingly provides the most resilience to local flood and drought hazards.

However, households in the Jamshoro Irrigated Wheat Livelihood Zone are not exactly well-off. Poor households' total food and cash income, for example, amounted to US \$0.73 pppd in the reference year. This dropped to a projected US \$0.61 pppd in the 2016 flood scenario – a level of earnings that clearly falls below international poverty lines whether pegged at US \$1.25 or US \$1.51 or US \$1.90pppd.

⁶ Negative coping strategies such as selling firewood, seeking loans and household migration were not included in the calculation of need (with coping).

Chronic Debt and Poverty

The high levels of chronic debt point to entrenched poverty. In the reference year, which was an average production year, loans (or gifts) of PKR 15,000 (around USD 150) were taken by poor and very poor households to cope with their annual expenses. As they cannot repay the entire loan during the same year, chronic debt builds. In the Umerkot Irrigated Chilli Livelihood Zone, chronic debt of PKR 50,000-70,000/household was reported. These debt levels mean that even in an average year, many households, including those from very poor, poor and many middle households do not earn enough to pay for all of their expenses. This underscores the finding that in all four zones, income was below the international poverty line for the very poor, poor and middle households (or about 85% of households).

Recommendations

Cash-for-Work or a Cash Transfer Drought Response

If wheat production is not disrupted in the irrigated zones and hence if wheat flour is available on local markets, cash-for-work or cash transfers would be an effective mechanism for income support for those affected by the drought. The main drought-affected zones were those areas where rainfed agriculture is practised. An important household response to the drought was to look for additional work. The increase in labourers and the increased competition for jobs led to either lower wage rates or fewer days of work each week per labourer. Cash-for-work would relieve some of the competition for local jobs. Given the estimate of cash needed to fill emergency level gaps (after-coping), which came to PKR 4,452/household, this would amount to 22-23 days of work per year per beneficiary household (@ PKR 200/day). The timing of the deficit was concentrated in the May-September period and a cash-for-work intervention would need to coincide with the period of need.

Asset Recovery Post-drought

One of the major assets lost during the drought was livestock. Livestock ownership is not very high in any of the four zones. However, in the worst drought affected zones, livestock assets dropped substantially. In the Thar Desert Agro-pastoral & Labour Livelihood Zone, middle households lost an estimated 3-4 sheep, 5 goats and 1 cow due to drought. Better-off households lost an estimated 6-7 sheep, 8-9 goats and 2 cows. It is likely that post-drought even the better-off own no more than 5 goats or 5 sheep or 1-2 cows. The current asset level is not sufficient to support a pastoral or an agro-pastoral economy. Restocking to reference year levels--whether natural restocking or through external support -- will help families have a source of income that was around PKR 20,000-36,000 in the reference year.

Replenishing seed stocks post-drought or post-flood is another important measure to assist in recovery. Seeds are often consumed by households in dire emergencies when faced with critical food shortages. Moreover, households reported that they lacked the income to buy seeds due to the effect of droughts and floods. Seed provision ensures that households are able to plant in time for the next cropping season without taking on more debt.

Managing the debt crisis

Chronic debt in this region has gone hand in hand with chronic poverty. Poverty is such that even with some BISP assistance of around PKR 10,000-18,000/household, many households still sought loans or gifts of PKR 10,000-15,000. This means that to support incomes to the level of actual need, BISP support would need to double the level of assistance. A medium-sized cow would also fetch around PKR 15,000 when sold, as would 3 medium-sized goats but livestock also have costs for maintenance. The sale of cluster beans by very poor and poor households amounted to PKR 10,000-18,000 in the reference year but increased sales would also require more land which may not be feasible to access. Labour is the other option and to earn an additional PKR 18,000, households would have to double their efforts finding work in the local construction sector (i.e., either one person working for 10 months not 5 or 2 people finding work not 1). Such work may not be available.

Promoting Resilience

The one livelihood zone where households remained above emergency threshold levels in both the drought and flood scenarios was the Jamshoro Irrigated Wheat Livelihood Zone. The components of their economy include: reasonable proximity to Indus River irrigation; bimodal crop cultivation with a mix of both staple and cash crops; crops augmented by buffalo milk sales and livestock sales; and casual labour opportunities. This combination provided an income that for the very poor was 125-150% higher than in the other zones and for the poor was 170-204% higher. Thus, resilience will require an income source that will effectively boost current income earning capacity by 150-200% in the other zones.

Seasonal Assessments

A predictive seasonal assessment is recommended for each livelihood zone on an annual basis in order to plan for the upcoming year. Predictive assessments use pre-harvest or immediately post-harvest production and price estimates to predict food and income access for the upcoming consumption year.

To run seasonal HEA assessments, it is recommended that planners undertake the following:

- a) Time seasonal assessment to coincide with annual crop and food needs assessments.
- b) Monitor the key parameters – tailored for each livelihood zone – for each cropping season.
- c) For seasonal monitoring, use production data by tehsil/taluka and price data by principal market if available. Otherwise, use production and price data from the district level. It is preferable to use data showing the total MT produced per crop during the harvest rather than yield rates (i.e., maunds/acre).

The Pakistan Food Security Cluster (FAO & WFP) in collaboration with Concern Worldwide Pakistan and Food Economy Group (FEG) with financial support from ECHO conducted the Household Economy Analysis (HEA) pilot study in three districts of Sindh (Jamshoro, Tharparker and Umerkot). The HEA collected information from these districts and analyzed it to provide a comprehensive picture of how households secure their food and income in a reference year, and what food or income gaps emerge if there are production shortfalls or price changes thorough provision of the Livelihood Impact Analysis Spreadsheet (LIAS).

In HEA all the data was analyzed both by wealth group as well as by “livelihood zone” and surfaced the dynamics of local livelihood systems and provided invaluable information to the humanitarian actors including Government of Pakistan and, national and international community for improved decision making which translates in improved and evidence based programming.

The results of the HEA will assist planners because the baseline data is more than just lists of what people do and what assets they have. Instead, the HEA baseline is a dynamic picture of local livelihood systems. It quantifies the proportional importance of different food and income sources and this is compared to annual needs as well as to a food security and livelihood security threshold. By having a quantified and dynamic picture of livelihoods, planners can judge how much food or income is required to build resilience in a particular place and thus target and measure development programming accordingly.

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