FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Ethiopia Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) Project Impact Evaluation

Report of the Interim Monitoring Survey 2014-2015

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Tim Frankenberger, President
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AFDM	African Flood and Drought Monitor
BFS	Bureau for Food Security
CMAM	Community Management of Acute Malnutrition
CSI	Coping Strategies Index
DAO	District Agriculture Officers
EA	Enumeration Area
FEWSNET	Famine Early Warning System Network
FGDs	Focus Group Discussions
FTF FEEDBACK	Feed the Future FEEDBACK
GIS	Geographical Information System
HFIAS	Household Food Insecurity Access Scale
HI	High Intensity
IE	Impact Evaluation
IMS	Interim Monitoring Survey
KIIs	Key Informant Interviews
LI	Low Intensity
NDVI	Normalized Difference Vegetation Index
NGO	Non-Government Organization
NMA	National Meteorological Agency of Ethiopia
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OTP	Outpatient Therapeutic Program
PC	Pastoral Clusters
PCA	Principal Components Analysis
PPS	Probability Proportional to Size
PRIME	Pastoralist Areas Resilience Improvement and Market Expansion
PSNP	Productive Safety Nets Program
SNNP	State of Southern Nations, Nationalities and Peoples
SPI	Standardized Precipitation Index
TFP	Therapeutic Feeding Program
TOT	Terms of Trade
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme

Executive Summary

The Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) project, funded under the United States government's Feed the Future initiative, was launched in October 2012 in one of the most shock-prone areas of the world, the drylands of Ethiopia. A key objective of the project is to enhance the resilience of households to shocks. In particular, it aims to enable households to withstand and recover from the recurrent climate-related shocks—mainly drought—to which they are subjected. The analysis presented in this report is being undertaken as part of an impact evaluation (IE) whose goal is to determine whether the PRIME project has a positive impact on households' resilience to shocks and, thus, on well-being outcomes including poverty, food security, and children's nutritional status.

The PRIME IE was launched with a baseline survey undertaken in two zones of the project area, Borena and Jijiga, in November/December 2013. In addition to the baseline and endline surveys, two interim monitoring surveys (IMS) were planned in order to capture real-time household and community responses to any actual shocks that might occur during the project's five-year implementation period. This innovative feature of the IE would be launched after "trigger indicators" being monitored on the ground, for example, livestock body conditions, reached shock levels.

As it were, March 2014 marked the beginning of a protracted period of drought in the PRIME IE area, as detected by the PRIME trigger indicators. In response to these events, the first PRIME IMS was launched in October 2014. A quantitative questionnaire was administered to a representative sample of over 400 households in 17 kebeles (communities) over a period of six months, through March 2015, for a total of six rounds. It was administered to a panel of households selected from among the baseline households. Qualitative data collection, including focus group discussions and key informant interviews, also took place in each round.

The objective of this report is to present the results from the analysis of the quantitative and qualitative IMS data in order to understand how households coped with the drought, how it affected their food security, and whether those with stronger resilience capacities prior to the drought's onset were more resilient to its effects. The specific research questions explored are:

(1) What downstream impacts of the drought did households experience and how did the incidence of these impacts evolve over the IMS period?

(2) What coping strategies did households employ to deal with the drought?

(3) How did households' food security change over the drought period? Which types of households were able to maintain their food security in the face of the drought, i.e., which were resilient to its impacts?

(4) How did the severity of exposure to the drought affect households' ability to recover from it?

(5) Did households' resilience capacities before the onset of the drought help protect them from its negative impacts?

(6) Did households' resilience capacities before the onset of the drought prevent them from using negative coping strategies that undermine their future resilience to shocks?

Providing real-time data collected during an actual shock in progression, the IMS 2014-15 data present a unique opportunity to understand how, in a time of increasing climatic variability throughout East Africa, droughts affect households, their responses, and whether their resilience capacity can help them recover.

Evolution of the Drought

Chapter 3 of the report sets the context by using external data sources to map out the progression of the 2014-15 drought in the two PRIME IE areas. The data sources include FEWS NET *Food Security Outlook* publications, PRIME trigger indicator data, rainfall classifications provided by the Ethiopian government, and satellite remote sensing data from the African Flood and Drought Monitor (AFDM). In both areas, the drought unfolded in two waves roughly corresponding to March-September 2014 (between the PRIME baseline survey and IMS Round 1) and October 2014-April 2015 (between IMS Rounds 1 and 6). The regions both experienced relatively good rainfall in 2013, the year leading up to the PRIME baseline survey. However, during the initial wave of the drought, the first rains (*Ganna* in Borena, *Diraa* in Jijiga) failed in the regions, leading to abnormal precipitous drops in soil moisture and vegetation coverage. Critical water and pasture shortages ensued, followed by unusual mobility patterns among pastoralists, a deterioration of livestock body conditions, and crop failures. Cereals prices sharply increased and livestock prices fell, leading to a livestock-to-cereal terms of trade far below normal in markets, to the detriment of pastoralists. Many areas in both regions were elevated to Priority 1 Nutrition Hotspot status by the Ethiopian government as malnutrition cases increased.

The second wave of the drought evolved differently in Borena than Jijiga. In Borena, the second rains, the *Hagaya* rains, failed. Thus the region experienced successive below-average rainy seasons. The lack of water and pasture reached critical levels, desperate livestock movements both within Ethiopia and cross-border ensued, and local crop production failed, necessitating cereal imports from other areas in Ethiopia. Many households were dependent on humanitarian assistance to meet their food needs, and malnutrition continued to rise. In Jijiga the second rainy season, the *Karan* rains, followed a near-normal pattern, improving water and pasture availability. FEWS NET and the PRIME trigger indicators reported that water and pasture availability had returned to normal, there was a normal harvest, and households' access to food

was stabilizing. However, remote sensing satellite data show that these favorable conditions were only the beginning of a sharp drop-off in soil moisture and vegetable coverage below the norm over the post-*Karan* dry season. While remote sensing data confirm that, overall, Borena faced more severe drought conditions over the two drought waves, this additional climate shock put Jijiga households under further stress.

Household Drought Exposure: Evidence From the IMS Data

IMS 2014-15 survey data presented in Chapter 4 confirm that households experienced drought in the period between the PRIME baseline survey and the first round of IMS 2014-15 (October 2014). In both Borena and Jijiga household reports of drought or "too little rain" increased dramatically over the period. The data also confirm continued drought conditions between IMS Rounds 1 and 6, the second wave of the drought. Over 90 percent of households participating in the quantitative survey reported experiencing drought in both of those rounds. The qualitative data collected during focus group discussions (FGDs) and key informant interviews (KIIs) also pointed to drought as the key shock households were currently experiencing across the six months of the IMS data collection.

With respect to downstream drought impacts, the quantitative data reveal that those most commonly felt by households in Borena were livestock or crop disease, food price inflation, and increases in the prices of inputs. Those most commonly felt in Jijiga, where agro-pastoralism and non-pastoralism are more common, were livestock or crop disease, food price inflation, and "very bad harvest." The IMS data confirm that the downstream effect of the drought on prices was very strong in both areas. After food price inflation, the most common economic shocks experienced were: increases in the prices of livestock or agricultural inputs, drops in the prices of products sold, and lack of demand for products sold. There was a noticeable increase in conflict-related shocks since the baseline, including theft of crops and livestock, and in deaths of household members, the ultimate negative impact. The qualitative data provide a rich source of detailed information on how households experienced these downstream impacts as well as others, including reduced access to fodder and water, cattle raids, and illness due to exposure to polluted water.

Overall summary measures of shock exposure constructed from the IMS quantitative data allow understanding of which population groups were most exposed to the drought and how their drought exposure evolved over the IMS period (the second drought wave). Two such measures are constructed. The first is a perceptions-based index based on data on the types of shocks experienced and their perceived severity as reported by survey respondents. The second is an index based on the percent of households in each of the 17 sampled kebeles reporting a series of drought conditions, downstream drought impacts, and drought coping strategies. This measure was constructed in order to provide an "exogenous" measure of shock exposure based on indicators of area-wide drought conditions. The perceptions-based measure indicates

that drought exposure was roughly the same in Borena and Jijiga. Consistent with the AFDM remote sensing data, the kebele-based measure, by contrast, indicates that drought exposure was much greater for Borena. The different pictures given by the measures points to the fact that they are measuring different phenomena, but may also point to a limitation of the perceptions-based measure in accurately representing differences across population groups in actual drought exposure. Keeping this caveat in mind, the measure indicates that shock exposure was greatest for pastoralists, followed by agro-pastoralists and non-pastoralists.

Household Response: Coping Strategies for Dealing With the Drought

Chapter 5 of the report focusses in on the coping strategies households employed to deal with the drought. The IMS coping strategies data indicate that households were using both positive and negative responses. That reducing food consumption, a negative coping strategy, was used by almost all households is a strong indication that the drought and its downstream impacts were exacerbating food insecurity in both regions. It can explain why 50 percent of households planned to rely on some type of humanitarian assistance (food aid or cash) at some time over the IMS period. The use of other negative coping strategies that undermine future resilience to shocks, for example, taking children out of school and selling productive assets, increased in the last two rounds of the IMS when drought conditions were plummeting.

A very common positive coping strategy was to rely on assistance from friends and relatives, including receiving money for food and borrowing money. The qualitative data concur that people's reliance on social capital to get them through the drought period was critical. However it was only a reliable coping strategy in the early months of the survey, because over time social capital was eroded. As the downstream impacts of the drought began to accumulate, there was a steady erosion of social support making it harder for better off households and community leaders to support those in need.

As the food security situation deteriorated over time, more households in Borena were taking children out of school either to migrate with the animals, to work to support the family, or to live with relatives. This response can negatively affect the long term human capital of a household and degrade their opportunities to escape from poverty and food insecurity in the future. Also in Borena, the governance systems in communities were starting to be negatively affected because community leaders were migrating to distant locations in search of water and pasture, making it more difficult to hold clan meetings. It is at these meetings that support is mobilized for the poor. Other traditional ritual ceremonies where food redistribution takes place were also neglected.

In Jijiga, indications that coping abilities were becoming strained as the drought progressed were reports of quarrels between spouses over food shortages, sometimes leading to divorces, and, at the community level, the breakdown of mutual support mechanisms. Patterns of migration where males of households leave for long periods of time seeking water and pasture

for livestock can lead to stressful conditions for families. Children, women and the elderly are often more negatively affected by the drought and its downstream impacts because they are the ones who remain behind in the villages.

Household Food Security and Resilience in the Face of the Drought

Chapter 6 examines trends in household food security over the IMS rounds compared to the baseline and looks at how resilient households were to the drought. Resilience to the drought is measured using two indicators: (1) the change in food security over the drought period; and (2) an indicator of whether households were able to maintain or increase their food security over the period. The underlying measure of food security relied on is the inverse of the Household Food Insecurity Access Scale. This scale also allows classification of households into four groups: food secure, mildly food insecure, moderately food insecure, and severely food insecure.

The IMS data show that changes in food security over time differ for Borena and Jijiga. In Borena, food security was lower in all IMS rounds than it was at baseline, indicating a decline in the average households' food security over time. It showed a downward trend over the monitoring period. The percentage of food secure households fell from just over one-quarter of households at baseline to 1 percent by IMS Round 6, that is, there were practically *no* food secure households by the end of the IMS period, one year after the onset of the drought. In Jijiga, food security was higher in all IMS rounds compared to the baseline. While the percent of food secure households fell between the baseline and Round 1, the percent of severely food insecure households was significantly lower in Round 1 than the baseline, and fell from 36 percent to 28 percent over the rounds, indicating a greater resilience to both waves of the drought than in Borena.

The qualitative data from both regions on households' experiences of food and livelihood security during the second drought wave highlight common conditions of economic hardship and simply not having enough food to eat. With reductions in crop production, households were forced to buy the food they would normally produce themselves even in the face of rising food prices. Similarly, households unable to sell their livestock due to reduced demand and low prices found themselves in a situation where "we do not have enough money for food consumption." Children and women felt special burdens. Children were taken out of school due to the need to use funds to buy foods that previously were used for schooling expenses. Children, the main consumers of milk, saw a reduction or complete stoppage in their milk consumption. Women were finding it difficult to feed children and other family members and perform their domestic chores due to the disruption caused by the drought. Further, their income generating activities, such as retail sales, were disrupted, reducing their incomes and money available for food.

Overall, only about one-third of households were resilient to the first wave of the drought, 26 percent in Borena and 48 percent in Jijiga. Pastoralists were less likely to be resilient than agro-pastoralists, and agro-pastoralists less likely to be resilient than non-pastoralists.

The Relationship Between Household Resilience, Drought Exposure, and Pre-Drought Resilience Capacity

Chapter 7 of the report explores the relationships between household resilience to the drought, the degree of their exposure to the drought, and their pre-drought resilience capacity using regression analysis. The analysis focuses on the first wave of the drought spanning the time between the baseline (December 2013) and the first round of the IMS data collection (October 2014). Resilience capacity is measured using indicators of its three dimensions—absorptive capacity, adaptive capacity, and transformative capacity.

The regression analysis confirms that the more severely a household was exposed to the drought, the less likely it was to recover from it, that is, the less resilient it was. The analysis suggests that households' absorptive capacity had a positive impact on their resilience to the drought In Borena. This result is strongly robust to the measure of shock exposure employed, whether that is based on agro-climatic conditions or households' own perceptions of their exposure to the drought. It found no impact of absorptive capacity on resilience to the drought in Jijiga, perhaps due to the combination of lower drought exposure and low pre-drought absorptive capacity in the region. While the evidence is not as strong for adaptive capacity and transformative capacity, the analysis is suggestive that they do play a role in supporting households' resilience to shocks as well.

Does Resilience Capacity Help Prevent the Use of Negative Coping Strategies?

Chapter 8 of the report explores whether households' pre-drought resilience capacities helped prevent them from employing negative coping strategies in response to the drought and thus compromise their ability to recover from future shocks and stressors. Four types of coping strategies are explored: reducing food consumption, selling or consuming productive assets, employing negative financial strategies (taking out a loan from a money lender or purchasing food on credit) and employing negative strategies related to the care of children (taking children out of school and/or sending them to work for money).

When looking at use of the coping strategies immediately following the drought (in IMS Round 1), the results differ for Borena and Jijiga. For Borena, the regression analysis gives evidence that all three dimensions of resilience capacities helped to prevent households from reducing their food consumption as a response to the drought. Additionally, adaptive and transformative capacity helped to prevent them from depleting their productive assets. And transformative capacity helped prevent them from undermining the human capital of their

children by taking them out of school or sending them to work for money. However, there is some evidence that households with greater absorptive capacity were more likely to use these strategies involving children.

The analysis suggests that resilience capacity had less of a preventative effect in Jijiga than Borena at the time of IMS Round 1, again perhaps because all three dimensions of resilience capacity were much lower in that region at the onset of the drought. While absorptive capacity was found to reduce asset depletion in the region, both adaptive and transformative capacity were found to increase it. This result may be due to the fact that households with greater adaptive and transformative capacity start out with greater asset bases.

When looking at the use of coping strategies over the entire six-month IMS period (a period in which the second drought wave was in full progress), we find strong evidence that both adaptive and transformative capacity helped to prevent households from either taking their children out of school and/or sending them to work for money in both regions. Absorptive capacity helped to prevent households from employing negative financial strategies in Borena, and adaptive capacity helped to prevent them from reducing their food consumption in Jijiga.

Conclusions

The majority of households in the PRIME IE area were not able to maintain their food security in the face of the drought, that is, they were not resilient in the face of the drought. Their absorptive, adaptive and transformative capacities did buffer them from the shock. But for most households, they were not enough to maintain their food security and prevent them from employing negative coping strategies that undermine their ability to manage future shocks and stressors. Any future interventions should be focused on both strengthening resilience capacities to manage shocks and timely social protection interventions that are carried out over a long enough period and appropriately targeted to protect households from the most severe drought impacts—such as food insecurity, conflict, and death—and enable them to maintain their asset and human capital bases.

1. Introduction

The Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) project, funded under the United States Government's Feed the Future initiative,[1] was launched in October 2012 in one of the most shock-prone areas of the world, the drylands of Ethiopia. A key objective of the project is to enhance the resilience of households to shocks. In particular, it aims to enable households to withstand and recover from the recurrent climate-related shocks—mainly drought—to which they are subjected.

The analysis presented in this report is being undertaken as part of an impact evaluation (IE) of the project implemented by the Feed the Future FEEDBACK (FTF FEEDBACK) activity, which is contracted by the United States Agency for International Development (USAID) to provide monitoring and evaluation support to Feed the Future. The overall objective of the IE is to determine the impact of the project's interventions on pastoralist, agro-pastoralist, and non-pastoralist households' resilience to shocks and, thus, on well-being outcomes including poverty, food security, and children's nutritional status.

1.1 The PRIME Project

The PRIME project has three interrelated objectives: increasing household incomes, enhancing resilience, and bolstering adaptive capacity[2] to climate change among pastoral people in Ethiopia. To achieve these objectives, the project takes a multi-faceted approach through:

- Fostering the growth and competitiveness of livestock value chains;
- Addressing the needs of the very poor and chronically food insecure households through value chain interventions;
- Improving the policy environment through a continuous and collaborative evaluation and learning process; and
- Improving delivery of human health services and behavior changes.[3]

The project seeks to assist not only pastoralists, but also non-pastoralists and those transitioning between these extremes. It is being implemented in 23 woredas within three pastoral clusters (PC) in Ethiopia, the Southern PC, the Somali PC, and the Afar PC (see

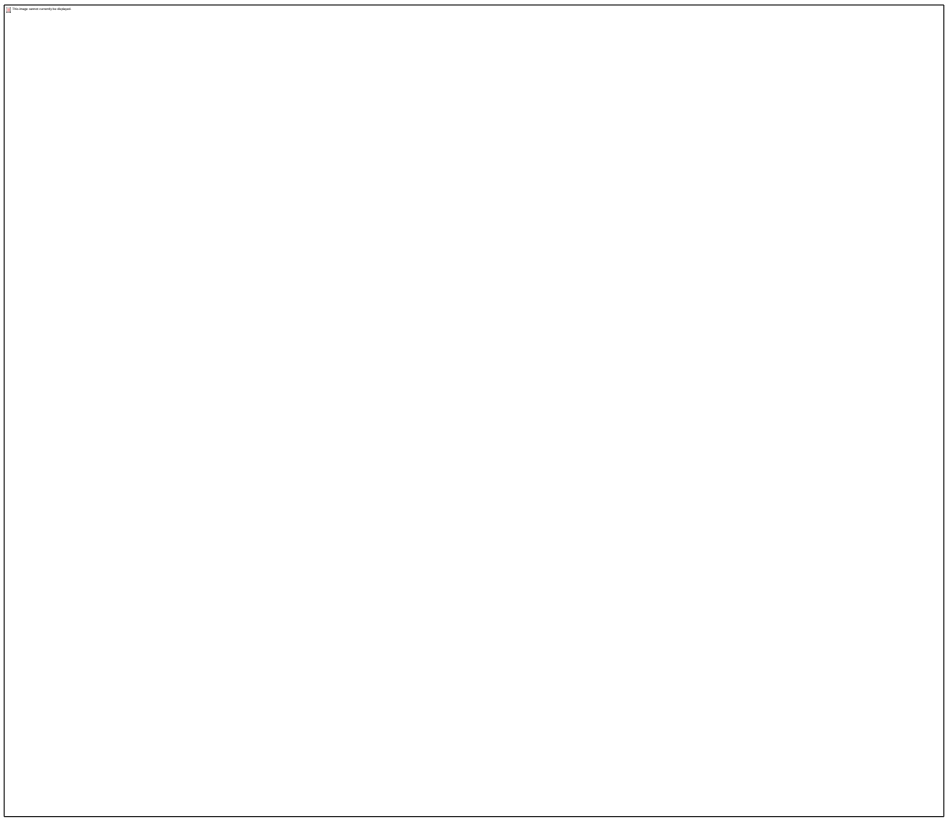
[1] The Feed the Future initiative seeks to address global food insecurity in 19 focus countries by accelerating growth of the agricultural sector, addressing the root causes of undernutrition, and reducing gender inequality. USAID is responsible for leading the government-wide effort to implement the Feed the Future initiative, whose high-level target is: "to reduce by 20 percent the prevalence of poverty and the prevalence of stunted children under 5 years of age in the areas where we work." (USAID. 2013).

[2] Adaptive capacity is the ability to make proactive and informed choices about alternative livelihood strategies based on changing conditions.

[3] See baseline report (Smith et al. 2015) for more detailed information on project activities.

Figure 1.1). The Southern PC includes the Borena/Guji zones of Oromia Region and the Liban Zone of Somali Region. The Somali PC includes the Jijiga and Shinile zones of the Somali Region, and the Afar PC is comprised of Zone 3 of the Afar Region. The project is being implemented by Mercy Corps in partnership with CARE International, Kimetrica, Haramaya University, Pastoralist Concern, Aged and Children Pastoralists Association, and SOS Sahel Ethiopia. It is a five-year project and expects to benefit 250,000 individuals.

Figure 1.1. PRIME project intervention areas



1.2 Background on Interim Monitoring Survey 2014-15

The PRIME IE was launched with a baseline survey undertaken in two zones of the project area, Borena and Jijiga, in November/December 2013. An endline survey will be conducted near the end of the project, and the baseline and endline data will be employed to evaluate the impact of the project on households' resilience in the face of shocks, household incomes and food security, and children's nutritional status.

In addition to the baseline and endline surveys, two interim monitoring surveys (IMSs) were planned in order to capture real-time household and community responses to any actual shocks that might occur during the implementation of the PRIME project. This innovative feature of the IE would be launched after "trigger indicators" being monitored on the ground reached shock levels. Examples of these indicators are rainfall, pasture conditions, water availability, livestock

body conditions, and food price levels. When the trigger indicators reached shock levels, a series of monthly surveys would be administered to a subsample of the 3,142 baseline households to record their shock exposure, shock coping strategies, and food security as the shock progressed.

As it were, March 2014 marked the beginning of a protracted period of drought in the PRIME IE area. The trigger indicators soon reached shock levels as it became apparent that the March-May rains failed in both Borena and Jijiga. Borena's second rainy season (September-October/November) failed as well, leaving households in a crisis situation. While Jijiga's second rainy season (July-September) started three weeks late, and rainfall was near-normal in amount and time-distribution across the season in most areas, it experienced an abnormally arid dry season, putting further climate-related stress on households.

In response to these events, the first PRIME IE IMS was launched in October 2014. A quantitative questionnaire was administered to a sample of over 400 households in 17 kebeles (communities) once a month over a period of six months, through March 2015, for a total of six rounds. Qualitative data collection, including focus group discussions and key informant interviews, also took place in each round.

1.3 Objective of this Report and Research Questions

The objective of this report is to present the results of the analysis of the quantitative and qualitative IMS data in order to understand how households coped with the drought, how it affected their food security, and whether those with stronger resilience capacities prior to the drought's onset were more resilient to its effects. The specific research questions explored are:

(1) What downstream impacts of the drought (e.g., food price increases and conflict) did households experience and how did the incidence of these impacts evolve over the IMS period?

(2) What coping strategies did households employ to deal with the drought?

(3) How did households' food security change over the drought period? Which types of households were able to maintain their food security in the face of the drought, i.e., which were resilient to its impacts?

(4) How did the severity of exposure to the drought affect households' ability to recover from it?

(5) Did households' resilience capacities before the onset of the drought help protect them from its negative impacts?

(6) Did households' resilience capacities before the onset of the drought prevent them from using negative coping strategies that undermine their future resilience to shocks?

The IMS 2014-15 data provide a unique opportunity to understand how, in a time of increasing climatic variability, droughts affect households, their responses, and whether their resilience capacity can help them recover using real-time data collected during an actual shock in progress.

1.4 Resilience and Resilience Capacity

As resilience and resilience capacity are both key concepts on which the analysis of this report is based, it is important to understand what each is and the distinction between them.

The PRIME IE conceptualizes resilience according to the USAID definition, which states that resilience is "the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth."[4] This report focuses on resilience at the *household* level. From a practical measurement standpoint, it defines resilience as the ability of a household to manage or recover from shocks and stresses and takes into account whether that recovery took place with the use of negative coping strategies that undermine the ability to recover from future shocks and stresses.

While resilience itself is an ability to manage or recover, resilience capacities are a set of conditions that are thought to enable households to achieve resilience in the face of shocks. Resilience capacities can be classified into three categories:

- A*bsorptive capacity* is the ability to minimize exposure to shocks and stresses (*ex ante*) where possible and to recover quickly when exposed (*ex post*).[5]
- *Adaptive capacity* involves making proactive and informed choices about alternative livelihood strategies based on changing conditions.
- *Transformative capacity* relates to governance mechanisms, policies/regulations, infrastructure, community networks, and formal safety nets that are part of the wider system in which households and communities are embedded. Transformative capacity refers to system-level changes that enable more lasting resilience.

Given their complexity, measuring the resilience capacities requires combining a variety of indicators of the underlying concepts relevant in a particular setting into one overall indicator. The measurement of absorptive, adaptive and transformative capacity for the PRIME IE will be described in the next chapter.

[4] USAID. 2012.

[5] The descriptions in the paragraph of absorptive, adaptive, and transformative capacity are from Frankenberger et al. (2012b).

1.5 Organization of the Report

Chapter 2 of this report presents the IMS data collection and analysis methodologies. Chapter 3 provides an overview of the evolution of the 2014-15 drought in Borena and Jijiga using data from external sources. Chapter 4 then presents the IMS data on household exposure to the drought and its downstream impacts as well as the coping strategies employed by households to deal with them. Chapter 5 examines how household food security changed over the IMS period and the extent to which households were resilient to the drought. It also examines how the degree of shock exposure influenced households' ability to recover from the drought. Chapter 6 investigates how households' initial (baseline) resilience capacities affected their ability to manage or recover from the drought and Chapter 7 whether it helped prevent the use of negative coping strategies. Chapter 8 provides conclusions.

2. Methodology

This section outlines the methodology used for collecting the PRIME IE IMS 2014-15 data. It then describes the methods for analyzing both the quantitative and qualitative data collected.

2.1 Data Collection: Quantitative Survey

The IMS data were collected for a panel of households selected from among the 3,142 baseline households so that baseline (pre-drought) information on resilience capacities and household characteristics would be available for analysis. The data were collected in six rounds, one month apart, between October 2014 and April 2015. The beginning of the data collection marks seven months after the onset of the drought, and the end marks 13 months after its onset. The dates of data collection for each round are given in Table 2.1.

Table 2.1. IMS rounds: Dates of data collection

Survey round	Start date	End date
Round 1	October 22, 2014	November 1, 2014
Round 2	November 24, 2014	December 3, 2014
Round 3	December 25, 2015	January 2, 2014
Round 4	January 25, 2015	February 3, 2015
Round 5	February 24, 2015	March 6, 2015
Round 6	March 28, 2015	April 5, 2015

The data were collected by Green Professional Services, the same organization that collected the baseline data. Enumerator training took place from October 21-24 and included a review of the quantitative questionnaire, use of the Nexus 7 tablets with which the data were collected, human subjects research training, data checking for quality control, creating backup copies of data, and data archiving and transfer. Trainers included staff members from Green Professional Services, TANGO International, and Ethiopia-based staff of Westat, the company leading the FTF FEEDBACK activity.

Sampling Design

In order to facilitate the actual impact evaluation of the PRIME project, the baseline sampling design was planned with the need to collect data for two PRIME project intervention groups—high intensity and low intensity[6]—within each of the two PRIME IE areas. The sample was thus drawn from four strata:

- Borena high intensity (Borena HI);
- Borena low intensity (Borena LI);

[6] Each of the 112 kebeles in the IE area were assigned to a "high intensity" or "low intensity" group. See the baseline report (Smith et al. 2015) for details of this assignment process.

- Jijiga high intensity (Jijiga HI); and
- Jijiga low intensity (Jijiga LI).

To ensure a representative sample, sample selection was based on a two-stage, stratified random sampling design for the baseline data collection. In stage one of sample selection, sample enumeration areas (EAs),[7] were selected within each stratum using probability proportional to size (PPS) sampling. In the second stage, households within each EA were selected randomly from household listings. Sample size was chosen in order to be able to detect a 20 percent reduction—a change from 50 to 40 percent—in a key outcome variable of interest, the prevalence of poverty, between the baseline and endline surveys. After baseline data collection, the number of sample households in Borena available for sampling for the IMS was 1,744 and the number in Jijiga was 1,398 located in a total of 139 enumeration areas. These households made up the sampling frame for the IMS.

The goal of the IMS sample selection was to ensure a representative sample of at least 400 households from among the baseline sample throughout the monitoring period. Sample selection was based on a stratified random design, with the strata being the two project areas and EAs randomly selected within them. All baseline households residing in each EA were then included in the sample. In order to ensure the minimum 400 household sample size, and using a 10 percent mark-up for nonresponse and 5 percent mark-up for sample attrition, five EAs were chosen in each stratum using PPS sampling.

Working with local informants, IMS enumerators were able to locate 93 percent of the baseline households, collecting data from 453 households. After data cleaning, the final number of households included in each round of the IMS sample is 414; 215 in Borena and 199 in Jijiga (see Table 2.2). Note that the distribution of households across woredas was highly unequal, and in Jijiga the sample was concentrated in only two of the woredas, Gursum and Kebrebeyah.

Table 2.2. The PRIME IMS 2014-15 sample

Project area	Woreda	Number of kebeles	Number of households
Borena	Yabello	5	127
	Teltele	1	20
	Dugdadawa	1	22
	Miyo	1	46
Jijiga	Gursum	2	45
	Jijiga	0	0
	Kebrebeyah	7	154
Total		17	414

[7] Enumeration areas are the smallest geographical unit for which population data were collected in the 2007 census, which provided the sample frame for the baseline. There may be several enumeration areas in each kebele.

Figure 2.1 shows the location of Borena within the broader region of Oromiya (see the pink area in the south) as well as the woredas in the area. Figure 2.2 shows the same for Jijiga within Somali (see the dark pink area in the north).

Sampling weights, the inverse of the selection probability of each household, used in the calculation of all descriptive statistics, were calculated round-by-round to ensure that the resulting statistics are representative of the population in each round. In cases where a statistic is calculated summarizing information across all of the rounds, the mean of the round sample weights was employed.

Quantitative Survey Questionnaire

The IMS questionnaire contains six modules:

Module 1: Household identification cover sheet

Module 2: Shocks and shock coping strategies

Module 3: Fodder and water availability

Module 4: Food insecurity coping strategies

Module 5: Household dietary diversity

Module 6: Household hunger

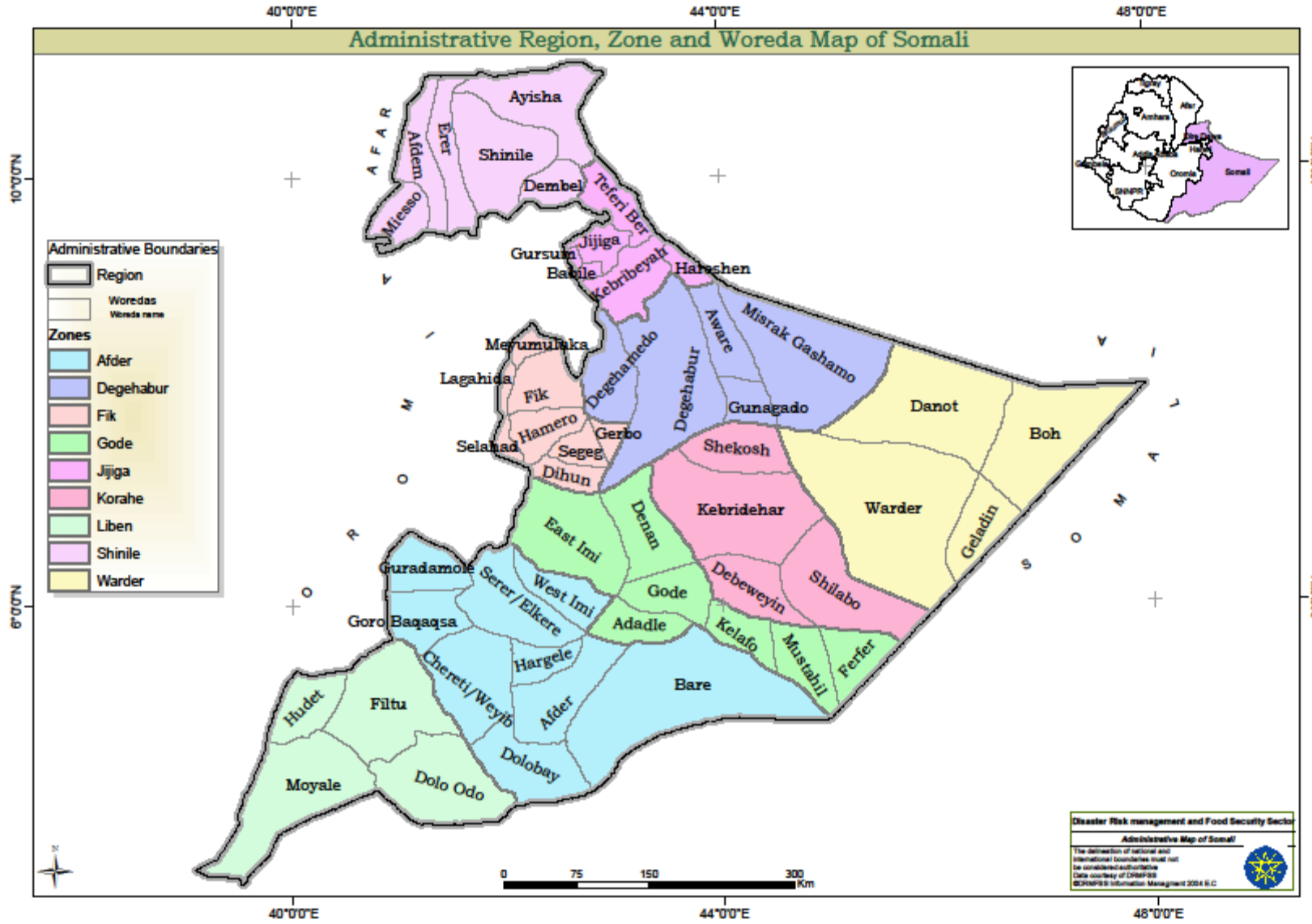
In each IMS round, data were collected on the shocks households experienced, the strategies they used to deal with the shocks, and indicators of household food security.

2.2 Data Collection: Qualitative Survey

Qualitative information is essential for understanding situational awareness of the drivers of resilience and providing a deeper understanding of the processes and interrelationships relevant to household and community resilience. It is used in this report to contextualize indicators employed in the study, provide an understanding of local concepts and definitions of resilience, and enable a better understanding of the significance of changes that are measured quantitatively as perceived by households.

Figure 2.1. Location of Borena within Oromiya region

Figure 2.2. Location of Jijiga within Somali region



Qualitative data was collected in kebeles to determine how communities were coping with the shocks, how social capital functioned in the face of shocks, and how community structures held up under shocks. Interviews also explored the relationships between community responses and household responses. Another objective of the qualitative interviews was to determine gender-differentiated impacts of shocks. The fact that the interviews were conducted over time provided a picture of the worsening conditions that communities faced through time and how they tried to cope with them.

Qualitative interviewers traveled with quantitative teams and conducted focus group discussions (FGDs) or key informant interviews (KIIs) in many of the kebeles. Each team had a female and a male interviewer (usually the supervisor). Separate FGDs were held for men and women, and attendance ranged from five to eight people. In Round 1, eight female and eight male FGDs were held in eight kebeles in both Borena and Jijiga. During Rounds 2, 3, and 5, the number of female and male focus groups interviewed ranged from four to five persons and were carried out in five to six kebeles. Due to respondent fatigue it was not possible to conduct FGDs in Rounds 4 and 6. In these rounds KIIs were carried out. In total, 41 female FGDs and 43 male FGDs were conducted across all rounds.

The KII sessions were conducted with one or two individuals, usually a kebele leader or official and a local elder. In total 15 KIIs were carried out in Borena in four to five kebeles, and 22 KIIs in Jijiga in five kebeles. In Borena, interviews were conducted with five community elders and 10 kebele officials. In Jijiga, interviews were carried out with nine community elders and 13 kebele officials.

2.3 Analysis of the Quantitative Data

The quantitative data analysis was conducted in STATA using both descriptive and multivariate techniques.

Descriptive Analysis

The baseline and IMS household survey data are used to conduct descriptive analysis of indicators describing households' shock exposure (Chapter 4), food security (Chapter 5), and resilience to the drought (also in Chapter 5). Indicator values are reported as percentages and means. Indicators are reported by two key population subgroups:

- PRIME IE region: Borena or Jijiga; and
- Pastoralist status: Pastoralist, agro-pastoralist or non-pastoralist.

Tests for statistically significant differences in the indicators across the groups are undertaken, with differences considered significant if they are statistically significant at the 0.05 level.

Baseline data on self-reports of the main sources of households' food and income in the last year, along with rankings of these sources in terms of the proportion of food/income they provide, are used to classify households into the pastoralist status groups. The groups are defined as follows:

Pastoralist. Livestock production and sales is the primary livelihood activity;

Agro-pastoralist. Crop production and sales is the primary livelihood activity. Livestock production and sales is also a livelihood activity; and

Non-pastoralist. Livestock production and sales is not a source of food or income. Also included in this category are households for which livestock production and sales is declared as a livelihood activity, but the primary source of food and income is wage labor, self-employment unrelated to crop or livestock production, remittances, gifts or inheritances, or assistance from friends, neighbors or relatives or from an outside organization.[8]

As noted above, representativeness of the PRIME IE area is maintained by weighting any statistics that apply to the survey population as a whole by the survey sampling weights.

Some important variables of interest (e.g., resilience capacities and one of the measures of drought exposure) are composite measures based on multiple indicators. In many of these cases, Principal Components Analysis (PCA) or polychoric factor analysis are used to construct an index. These techniques reduce a set of "input" variables that are hypothesized to be related to one another to a single variable by detecting structure in the relationships among the input variables from their correlation matrix. PCA is appropriate to use when all of the input variables are continuous. Polychoric factor analysis[9] is the PCA analog that is appropriate to use when some variables are binary or ordinal. For both, the variables are combined using weights that represent their correlations with the single variable produced. Indexes are constructed using this technique only if the signs of the weights for the input variables are as expected (positive or negative) given our conceptual understanding of the relationships between the input variables and the indicator being measured.

Multivariate Regression Analysis

In Chapters 7 and 8 of this report, multivariate regression analysis is used to investigate Research Questions (4), (5), and (6), restated here:

(4) How did the degree of exposure to the drought affect households' ability to recover from it, that is, their resilience?;

[8] For the small number of sample households (n=63) for which livelihood activity rankings are not available, supplementary information on the primary occupation of household members over 10 years of age and the reported number of livestock owned were used for classification.

[9] Kolenikov and Angeles. 2004.

(5) Did households' resilience capacities before the onset of the drought help protect them from its negative impacts?; and

(6) Did households' resilience capacities before the onset of the drought prevent them from using negative coping strategies (e.g., selling productive assets) that undermine their future resilience to shocks?

As will be seen in the next chapter, the 2014-15 drought under investigation in the report took place in two waves:

First drought wave: From the baseline to IMS Phase 1 (December 2013-October 2015), associated with the failure of the *Ganna*/*Diraa* rains; [10]

Second drought wave: From IMS Round 1 to Round 6 (October 2014-April 2015), associated with the failure of the *Hagaya* rains in Borena and abnormally arid dry season in Jijiga following the *Karan* rains.

The regression analysis will focus on the 10-month period of the first drought wave, from which there was a brief period of climatic recovery, allowing observation of households' ability to recover after a completed drought cycle.[11] It takes into account household coping strategies to deal with the first wave of the drought that were exhibited during the second wave (when the IMS data were collected).

Households' ability to manage or recover from the drought, or "resilience" (denoted R) is measured using changes in food security (Y) over time. A household is defined to be resilient if it was able to maintain or increase its food security over the drought wave.

Analysis for Research Question (4)

To address Research Question (4), the association between drought exposure and household's resilience to the drought, a standard empirical growth model allowing for transitional dynamics is first employed (see Dercon et al. 2012). This model allows investigation of what factors affected the *change* in food security from before the drought wave until after, including the

[10] The actual date on onset of the first wave of the drought was March 2014. However, the data on shock exposure presented in the next section indicates that households' shock exposure situations changed little in the short period between the baseline (November/December 2013) and March 2014. Thus baseline measures of important variables for this analysis, such as food security (which are only available at baseline), are considered to be valid measures of households' situations at drought onset.

[11] Climatic recovery from the second drought wave had not taken place by the end of the IMS data collection. Preliminary analysis showed little to be learned using the data over the short period as households' food security was still exhibiting a delayed pattern of response to the first drought wave over most of it (see Chapter 6).

change in drought exposure over the period. The change in food security for household i (Y_i, i=1,..,n) over the first wave of the drought ($Y_{i,R1} - Y_{i,BL}$) is hypothesized to be influenced by:

- The change in shock exposure over the period ($SE_{i,R1} - SE_{i,BL}$);
- Initial food security ($Y_{i,BL}$), which is expected to be negatively associated with the change in food security; and
- Household and community characteristics, as measured prior to the drought period ($X_{i,BL}$).

The empirical specification is:

$$Y_{i,R1} - Y_{i,BL} = \alpha + \beta_1(SE_{i,R1} - SE_{i,BL}) + \beta_2 Y_{i,BL} + \beta_3 X_{i,BL} + \varepsilon_i, \quad (1)$$

where α and the βs are coefficients to be estimated, and β_1 is the estimate of the association between the changes in drought exposure and changes in food security.

The household characteristics, X_i, that will be included as independent variables are:

- Number of household adult equivalents;
- The percent of households in six age-sex groups (female 0-16, female 16-30, female 30+, male 0-16, male 16-30 and male 30+);
- Education of adult household members, measured as dummy variables for no education, achievement of a primary education by at least one member, and achievement of a secondary education by at least one member;
- Whether the household is a female-adult-only household, that is, there are no adult male household members;
- Pastoralist status (dummy variables for pastoralist, agro-pastoralist and non-pastoralist); and
- An asset index based on ownership of three categories of assets: consumer durables, agricultural productive assets, and livestock.[12]

Shock exposure is measured using kebele-level indicators of rainfall deviations from the norm and soil moisture deficits over the drought wave (see Chapter 3).

[12] Consumer durables ownership is measured as the number of consumption assets owned out of a total of 11. Ownership of agricultural productive assets is measured as the number of productive implements owned out of 22. Animal ownership is measured in Tropical Livestock Units. An overall asset index is constructed using a PCA based on the above three measures and placed on a zero-100 scale (see Smith et al. 2015).

Next, a standard growth model (e.g., Yamano et al. 20015; Hoddinott and Kinsey 2001) is implemented using stock (rather than flow) measures of shock exposure that represent cumulative, additive exposure over the drought wave. The specification is:

$$Y_{i,R1} - Y_{i,BL} = \alpha + \beta_1 SE_{i,BL_{R1}} + \beta_2 Y_{i,BL} + \beta_3 X_{i,BL} + \varepsilon_i. \quad (2)$$

Here again the stock measures are based on kebele-level rainfall deviations from the norm and soil moisture deficits, but also include a household-level shock exposure measure. This is an experiential measure of the perceived exposure of households to the downstream impacts of the drought that they were facing at the end of the drought period, in IMS Round 1 (see Chapter 4). Use of a household-level measure allows us to control for unobserved, kebele-level characteristics, such as altitude and cultural norms, influencing the changes in food security that took place over the drought period. The kebele fixed-effects model is:

$$Y_{i,R1} - Y_{i,BL} = \alpha + \beta_1 SE_{i,BL_{R1}} + \beta_2 Y_{i,BL} + \beta_3 X_{i,BL} + \mu_k + \varepsilon_i, \quad (3)$$

where μ_k are kebele-level dummy variables, one for each of the 17 sample kebeles.

To examine drought exposure effects on resilience directly, a probit model of the determinants of resilience is estimated, with resilience measured using a dummy variable for whether or not each household either maintained or increased its food security between the baseline and IMS Round 1. The estimating equation is:

$$R_{i,BL\_R1} = \alpha + \beta_1 SE_{i,BL\_R1} + \beta_2 X_{i,BL} + \varepsilon_i, \quad (4)$$

where R is resilience, and the SE and X_i variables are as defined above. This equation can also be modified to include kebele-level fixed effects when shock exposure is measured at the household level, as in equation (3).

Analysis for Research Question (5)

To investigate Research Question (5), which asks whether households' resilience capacities at baseline helped protect them from its negative impacts, the same empirical techniques are employed. For evidence as to whether resilience capacity indeed has an effect on resilience, equation (1) is first modified as:

$$Y_{i,R1} - Y_{i,BL} = \alpha + \beta_1 \left(SE_{i,R1} - SE_{i,BL}\right) + \beta_2 RC_{i,BL} + \beta_3 Y_{i,BL} + \beta_4 X_{i,BL} + \varepsilon_i, \quad (5)$$

where RC is resilience capacity.

Then an equation including an interaction term between the change in shock exposure and resilience capacity is estimated:

$$Y_{i,R1} - Y_{i,BL} = \alpha + \beta_1 \left(SE_{i,R1} - SE_{i,BL}\right) + \beta_2 RC_{i,BL} + \beta_3 \left(SE_{i,R1} - SE_{i,BL}\right) * RC_{i,BL} + \beta_4 Y_{i,BL} + \beta_5 X_{i,BL} + \varepsilon_i. \quad (6)$$

A coefficient on the interaction term between the change in shock exposure and baseline resilience capacity (β_3) that is positive and statistically significant is evidence in support of the protective effect of resilience capacity. Equations (5) and (6) are also run using the stock measures of shock exposure.

Equation (4), with dependent variable resilience, is similarly modified to include resilience capacity as follows:

$$R_{i,BL\_R1} = \alpha + \beta_1 SE_{i,Bl\_R1} + \beta_2 RC_{i,BL} + \beta_3 SE_{i,Bl\_R1} * RC_{i,BL} + \beta_4 X_{i,BL} + \varepsilon_i. \quad (7)$$

In addition to an overall index of resilience capacity, equations (5) through (7) will be estimated using indexes of absorptive, adaptive and transformative capacity (see Chapter 6).

Analysis for Research Question (6)

Finally, to investigate Research Question (6) regarding whether resilience capacity helped prevent the use of negative coping strategies in the face of the drought,[13] the following probit model is employed:

$$CS_{i,R1} = \alpha + \beta_1 SE_{i,Bl\_R1} + \beta_2 RC_{i,BL} + \beta_3 X_{i,BL} + \varepsilon_i, \quad (8)$$

where CS is a dummy variable indicating the use of a coping strategy.

Here the sign and statistical significance of β_2 indicates whether households' baseline resilience capacity helped to prevent the use of negative coping strategies. When the household-level drought exposure measure is employed, the kebele fixed-effects version of equation (8) will be used. Both the Round 1 data on coping strategies and a measure combining the coping strategies data over all six rounds will be used to measure the dependent variable. For the coping strategies analysis a dummy variable indicating whether or not a household expected to receive humanitarian assistance at any time over the IMS period is included as an independent variable in the estimating equations. Receipts of humanitarian assistance are important to take into account as a "crisis modifier" was released by the PRIME project over the period, which may have altered the trajectory of food security for households (see Chapter 3).

2.4 Analysis of the Qualitative Data

The qualitative information from the FGDs and KIIs were transferred into topically-structured matrices. The information was then analyzed to identify patterns in responses and contextual information to help explain the quantitative findings. Responses from participants were triangulated across the data sources to cross-check the reliability of information and to identify differences in perceptions between groups based on gender, social or economic status, and ethnic group.

[13] Negative coping strategies are identified in Chapter 4.

Specific research questions guiding the qualitative analysis included:

1. What kind of shocks and stresses is the community experiencing now?
2. In what ways is the shock affecting the entire community?
3. What are the gender-differentiated impacts of shocks?
4. What actions are members of the community taking to support each other to respond to the shock?
5. How is the shock affecting relationships within the community?
6. How is the shock affecting relationships with other communities?
7. Are community leaders effective at organizing support for all members of the community? Why or why not?
8. What collection action is the community taking to protect or maintain resources important to the whole community? Which resources and why?

The qualitative findings will be integrated with the presentation of the quantitative findings in Chapters 4, 6 and 6 of the report.

3. Evolution of the Drought

After providing a description of the two IE areas, Borena and Jijiga, this section describes how the drought evolved in them between the time of the PRIME IE baseline survey and the end of the IMS data collection (November/December 2013-March 2015). In both IE areas the drought took place in two waves, roughly corresponding to March-September 2014 and October 2014-April 2015, which will be described in turn in each region. The chapter relies on secondary sources of information on rainfall, soil moisture and vegetation patterns, as well as the downstream effects of the drought on crop production and livestock body conditions, food prices, migration patterns and, finally, the state of malnutrition.

3.1 Description of the IE Areas

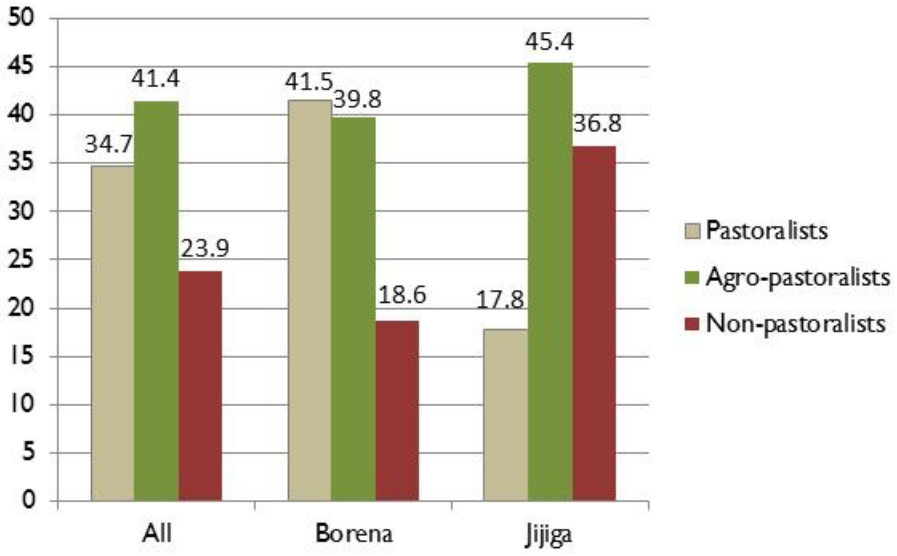
Borena is located in the southern lowlands of Ethiopia, bordering on Northern Kenya. It is one of 17 zones within the region of Oromiya. Jijiga (also known as Fafan) borders Somalia and is located in the northern part of the Somali region. Both areas have arid and semi-arid climates and are situated in the drylands of Ethiopia, where pastoralism has traditionally prevailed. They are characterized by erratic and unpredictable rainfall and patchy vegetation.[14] The scope for sedentary arable farming is limited in many parts of these zones. Nomadic and semi-nomadic pastoralists have traditionally made efficient use of scarce natural resources to access food and earn income through the sale and consumption of livestock and livestock products, that is, meat, milk and hides.

A sustainable balance of human populations, livestock populations, water, and rangeland resources are required for pastoralism to thrive over the long term. However, in Borena and Jijiga, as in pastoral areas across Ethiopia, pastoral systems are under increasing pressures due to natural and man-made shocks that are leading to imbalances between these populations and the resources they depend on to sustain themselves. Ongoing climate change is expected to increase the unpredictability of rainfall, leading to more frequent droughts and floods. A diminishing natural resource base due to overgrazing, increased sedentarization, and the increased presence of agriculture[15] has reduced pastoralists' mobility, a key foundation of traditional risk management strategies, and made them increasingly vulnerable to shocks. An additional challenge is that increased competition for pasture and water has led to conflict in a number of locations, including locations within the PRIME project's operational area. These pressures have spurred many pastoralists to transition out of pastoralism and seek alternative livelihoods.

[14] This overview of the PRIME project area is summarized from Mercy Corps (No date).
[15] The increased presence of agriculture manifests itself in increased numbers of commercial farms and in private enclosure.

Figure 3.1, from the baseline data, shows the percent of households that are pastoralist, agro-pastoralist and non-pastoralist in Borena and Jijiga. As can be seen, the transition out of pastoralism is well under way in both areas, being furthest along in Jijiga. Pastoralism is far more prevalent in Borena than Jijiga, and non-pastoralism far more prevalent in Jijiga than Borena. Accordingly, the baseline data show that crop production is far more likely to be households' main source of income and food in Jijiga. Note that the PRIME IE baseline data indicate that neither region is poorer or more food insecure than the other when multiple indicators of both poverty and food insecurity are examined (Smith et al. 2015).[16]

Figure 3.1. Percent of pastoralists, agro-pastoralists, and non-pastoralists, by project area



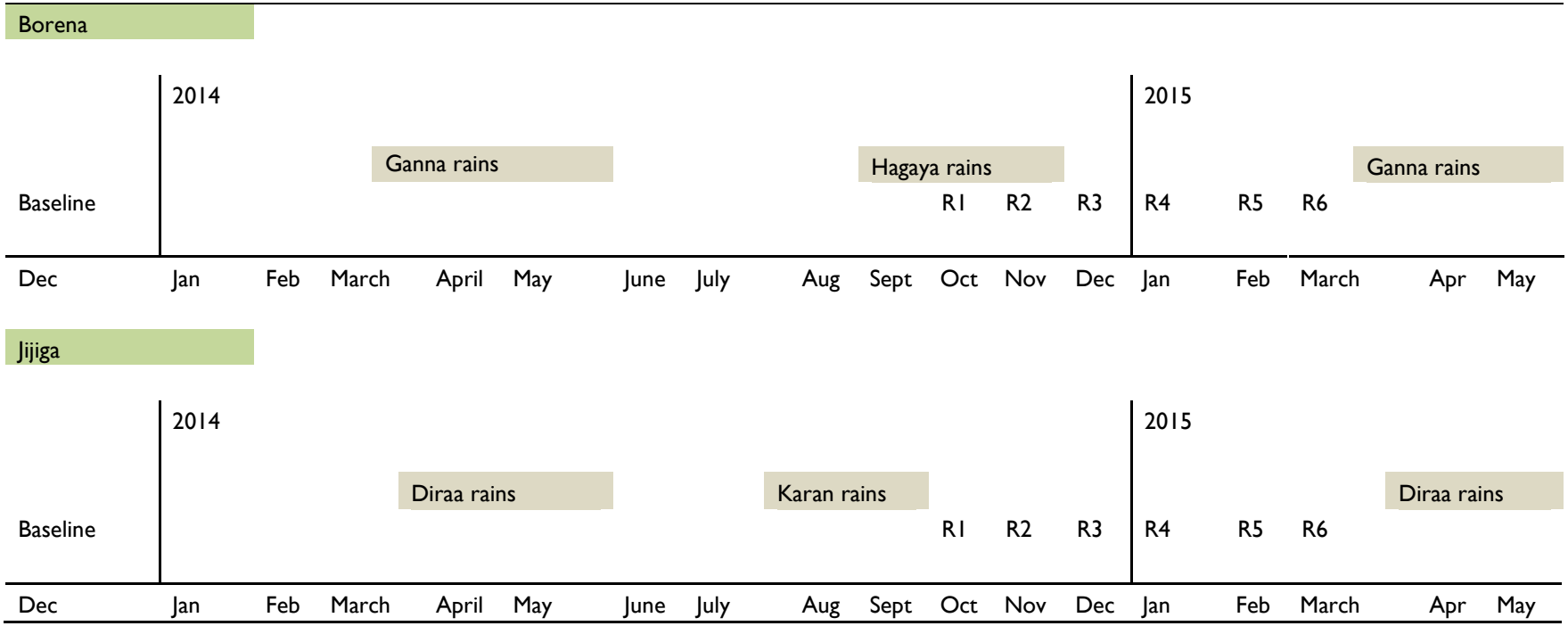
Source: Smith et al. (2015).

3.2 Normal Rainfall Calendar

Both IE areas have a bi-modal rainfall patterns. The rainfall calendar in Figure 3.2 shows that Borena's first rainy season, the *Ganna* rains, normally begins in mid-March and ends in May. Its second rainy season, the *Hagaya* rains, normally runs from September through November. Jijiga's rainy seasons are the *Diraa*, running from late March through May, and the *Karan*, from late July through September. The calendar also shows how the normal rainy seasons overlap with the baseline and six rounds of the IMS data collection.

[16] When consumption expenditures are used to measure poverty, Borena appeared to be poorer. However, a measure of poverty based on asset ownership indicates that Jijiga was poorer. With respect to food security, although calorie consumption was lower in Borena, dietary diversity is higher. Experiential measures of food security point to Jijiga as having had somewhat poorer food security than Borena.

Figure 3.2. Rainy seasons in Borena and Jijiga in relation to the baseline and IMS 2014-15 data collection



Sources: SCI, FAO, UNICEF, FAO and WFP. 2012; FEW SNET Food security outlook. April-September 2.

3.3 Sources of Drought Exposure Information Employed

Unless otherwise noted, the drought evolution information in this chapter is taken from four sources. The first is FEWS NET *Food Security Outlook* and *Food Security Outlook Updates* published from October 2013 through May 2015. The information in these publications is from local observers, market reports, and remote sensing data on evolving drought conditions.

The second source of information is PRIME trigger indicators data collected from July 2014 through June 2015 in the PRIME project operational area are employed. These data allow understanding of conditions specifically in the PRIME IE woredas for which data were collected in IMS 2014-15 (see Table 2.2).

The third, and possibly most objective, source of information is African Flood and Drought Monitor (AFDM) data retrieved through satellite remote sensing. The AFDM is a real-time drought monitoring and seasonal forecast system for sub-Saharan Africa developed through a collaboration of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Hydrological Programme. Current conditions are compared to an historical, multi-decadal reconstruction of the terrestrial water cycle using data from 1950-2008. For this report, data on measures of rainfall, soil moisture and vegetation comparing the current situation with the historical record are employed. These are the (1) Standardized Precipitation Index (SPI); (2) Soil moisture index (percent of norm); and (3) Normalized Difference Vegetation Index (NDVI) percentile. The AFDM is an internet interface based on Google Maps that allows Geographical Information System (GIS) coordinates to be employed to access data for localized geographical areas with 0.25° spatial resolution (Sheffield et. al. 2014). For this analysis, month-by-month AFDM data are downloaded using baseline GIS coordinates collected for households in each of the 17 sample kebeles.

The final source of information is National Meteorological Agency of Ethiopia (NMA) Seasonal Agrometeorological Bulletins from February 2014 through February 2015. The NMA provides classifications of rainfall conditions by season in terms of the percent of rainfall compared to normal, as follows:

Much below normal:	<50% of normal
Below normal:	50-75% of normal
Normal:	75-125% of normal
Above normal:	>125% of normal

3.4 Evolution of the Drought in Borena

December 2013, when the PRIME IE baseline survey was administered, marked the end of an unusually good rainfall year for Borena. The March-May *Ganna* rains were classified as "above normal" by the NMA, temperatures in the June-September dry season were normal, and the *Hageya* rains were "normal to above-normal." While herd sizes and milk production were much lower than 5-10 years earlier due to recurrent drought in previous years, most water points were replenished. Livestock body conditions and production were stable, and staple food prices showed a normal pattern.

First Wave of the Drought: March-September 2014

However the 2014 *Ganna* rains were well below average in many areas of Borena. Specifically within the PRIME project area, parts of the Tetele, Yabello and Dugdadawa IMS woredas experienced "below normal" rainfall and some "much below normal" by NMA classifications. All of Miyo woreda experienced "much below normal" rainfall.

By July 2014, the PRIME trigger indicators were reporting that all PRIME IE woredas were experiencing deterioration in pasture conditions and critical water shortages. The pasture and water availability situation was deteriorating most seriously in Miyo, where an increase in malnutrition cases was reported. Unusual migration began to take place, with pastoral households from Miyo migrating with their cattle to Kenya, and those from Yabello and Teltele moving to areas in the neighboring State of Southern Nations, Nationalities and Peoples (SNNP) region. Reports came in that those migrating to Kenya were expected to return back due to heightened tension with communities there in the face of scarce resources. As early as June 2014 some areas in Borena began to receive humanitarian assistance.

Also in July, downstream economic shocks began to be registered by the trigger indicators system. Households began to reduce milk sales, preferring to reserve the smaller amounts available from their cattle for children, and the price of milk showed a sharp increase. Below-average crop production in agro-pastoral areas triggered a sharp decrease in the supply of grain to the market, leading to increased staple food prices. Meanwhile, livestock prices were falling because pastoralists were selling more animals in fear of imminent drought. With falling livestock prices due to distress sales and rising staple food prices, the terms of trade (TOT) was turning against pastoralist households, forcing some to sell even more livestock in order to meet food needs.

By August/September 2014, near the end of the dry season, the water shortage became so serious that the government began responding by trucking in water, and the Oromia Pastoral Development Commission began to distribute straw and hay. The PRIME trigger indicators reached crisis levels and triggered the use of the project's emergency crisis modifier in six woredas of Borena, including Miyo, Yabello, and Teltele. Funds were made available for a feed-and-fodder voucher intervention through which communities could access feeds and breeding

stock. The aim of the intervention was to prevent further livestock deaths while preserving key productive assets of pastoral households as well as milk supply in households with pregnant and lactating mothers and/or children under 5.[17]

Between July and August, Therapeutic Feeding Program (TFP) admissions increased by 25 percent in Oromia as a whole, and within Oromia being most pronounced in Borena. There were reports of increases in Outpatient Therapeutic Program (OTP) cases and stabilization center admissions in Miyo and Yabello woredas. UNICEF reported increasing admissions of children with severe acute malnutrition to Community Management of Acute Malnutrition (CMAM) programs in Miyo and Teltele.[18] All of the PRIME IE woredas except Yabello were declared Priority 1 national "nutrition hotspots" by the Ethiopian government's Disaster Risk Management and Food Security Sector.

The June-September dry season was marked by higher than usual temperatures, which put further pressure on water and pasture availability. By September, livestock body conditions and production had deteriorated further, and livestock were concentrated in the small areas of more favorable pasture and water conditions. Cereals prices reached record levels, leading to a further deterioration in the TOT for pastoralists.

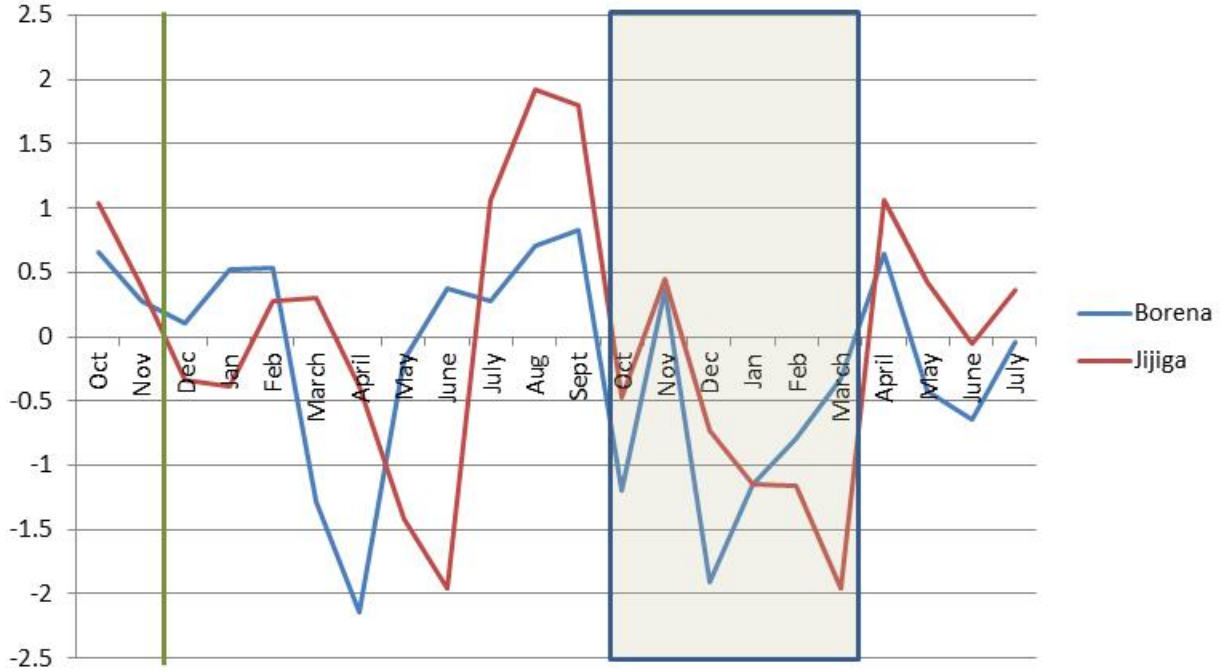
AFDM satellite remote sensing drought monitoring data for the first wave of the drought can be seen in Figures 3.3 through 3.5. Rainfall deviation showed a marked drop below zero (the norm) during the rainy season and then recovered during the dry season. Consistent with FEWS NET, NMA, and PRIME trigger indicator information, soil moisture and vegetation—on which both pastoral and farming livelihoods are highly dependent—declined precipitously over the first wave of the drought, from March 2014 through August/September, both reaching below 20 percent of normal. Note that soil moisture and vegetation were below the 1950-2008 norm over the entire period, perhaps reflecting a "new normal' that has come with climate change.

Second Wave of the Drought: October 2014-April 2015

Conditions worsened as the 2014 *Hagaya* rains started one to two weeks late, extending the dry season, and ended early. The entire *Hagaya* rainy season was marked by low and erratic rainfall. Again, Miyo was hit the hardest. With surface water unavailable, some households began using water from hand-dug wells. Livestock body conditions deteriorated further, and livestock prices continued to decline. By December 2014, one year after the PRIME baseline survey was administered, it was reported that successive below-average *Ganna* and *Hagaya*

[17] Yussuf, Mohamed Muhumed. 2015. Emergency Market Mapping and Analysis (EMMA) report: Post emergency (2014) livestock and fodder/feed market systems in pastoral and agro-pastoral areas of Ethiopia. February 2015. USAID and MercyCorps.
[18] UNICEF. 2014. Ethiopia Humanitarian Situation Report, September and October 2014. October 20, 2014.

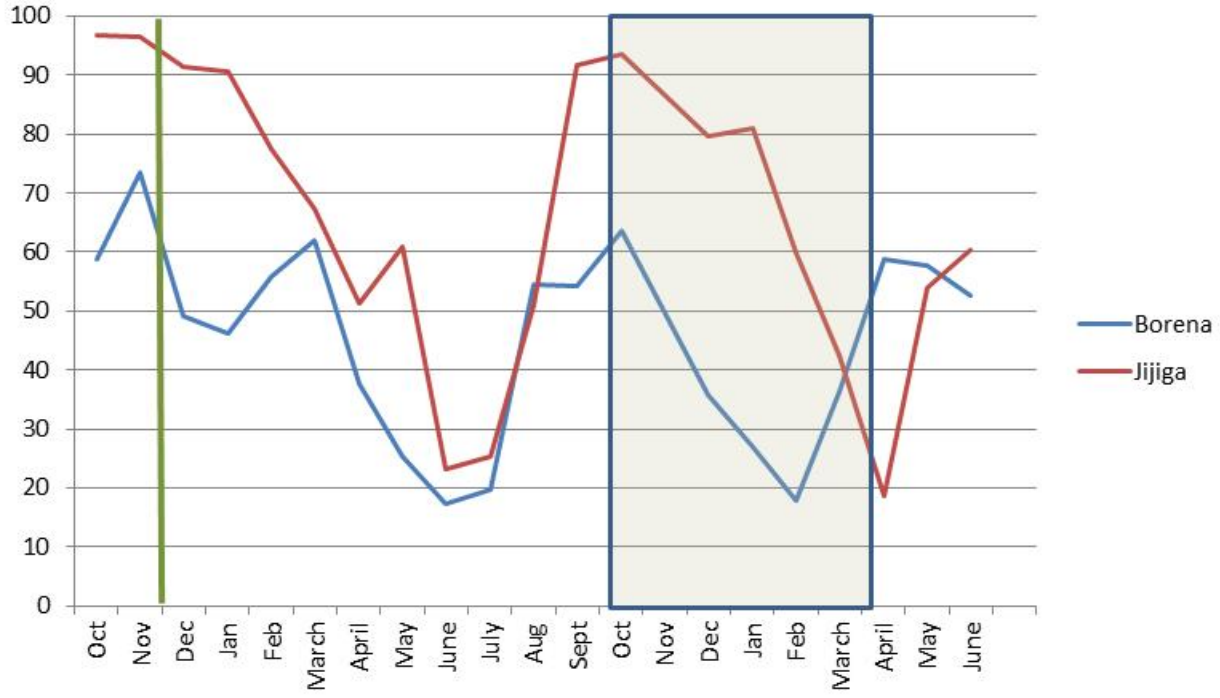
Figure 3.3. Rainfall deviation from norm in Borena and Jijiga, October 2013-July 2015[1]



[1] The green vertical line represents the timing of baseline data collection. The shaded box represents the timing for the IMS.

Source: African Flood and Drought Monitor, 2015.

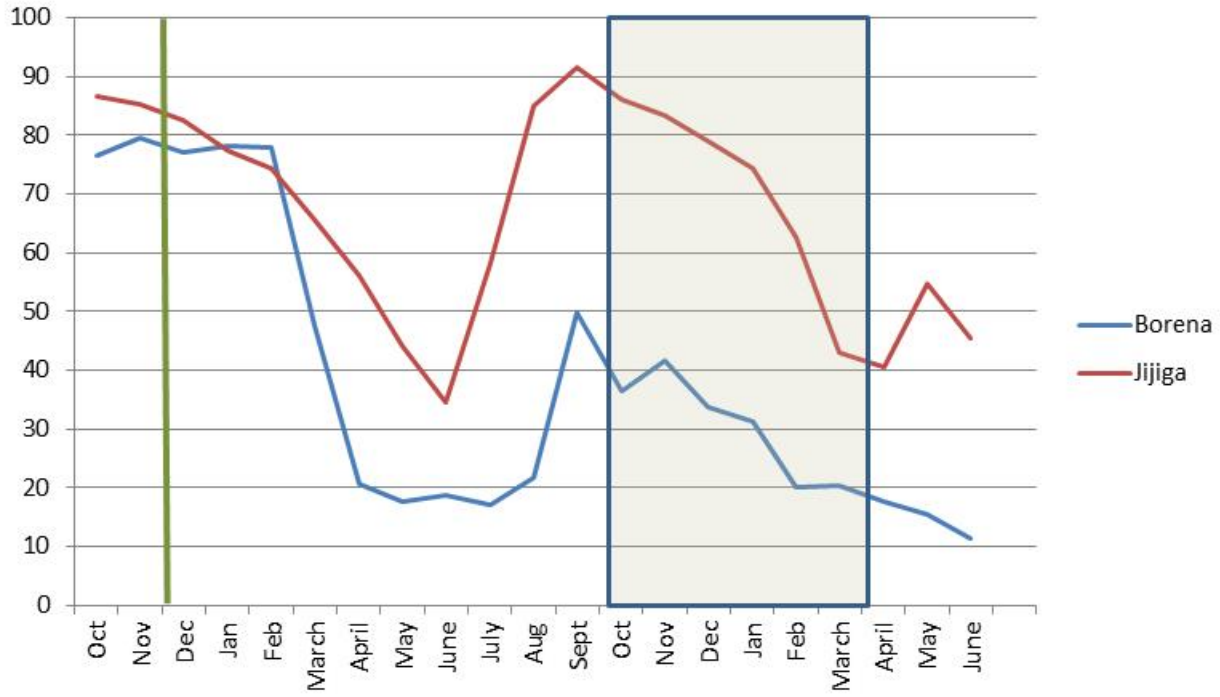
Figure 3.4. Soil moisture percentage of norm in Borena and Jijiga, October 2013-July 2015[1]



[1] The green vertical line represents the timing of baseline data collection. The shaded box represents the timing for the IMS.

Source: African Flood and Drought Monitor, 2015.

Figure 3.5. Normalized difference vegetation index percentile in Borena and Jijiga, October 2013-July 2015



[1] The green vertical line represents the timing of baseline data collection. The shaded box represents the timing for the IMS.

Source: African Flood and Drought Monitor, 2015.

rainfall had resulted in a high rate of livestock off-take from sales and excess deaths, a low number of conceptions and births, which meant low milk production of lactating female livestock and below-normal milk production.

In February 2015 the PRIME trigger indicators indicated that pasture conditions were "depleting alarmingly," a crisis state had been reached, and that lack of water and pasture had reached critical levels. Unusual mobility of pastoralists in search of pasture and water continued. Most of the water points in Borena had dried up. In all woredas in Borena the land was reported to be bare, overgrazed and degraded, and deteriorating livestock body conditions were triggering desperate livestock movement to places with better pasture, internally, externally (to other regions within Ethiopia), and cross-border. There was growing fear that the abnormal mobility pattern may cause resource-based conflict with neighboring communities. Due to the failure of local crop production, grain was being supplied from outside of the Borena zone. With the price of livestock constantly declining and price of grain escalating, the TOT were further deteriorating for pastoralists.

Field data show that households in Dugdadawa, Teltele and Yabello woredas had begun to adopt negative coping strategies, including the sale of productive and household assets. The food security situation continued to deteriorate in Teltele and Yabello, being the worst in Miyo and Dugdadawa woredas.

The March 2015 FEWS NET food security outlook headlined: "Much of Borena Zone increasingly food insecure". Due to successive below-average rainy seasons, pasture and water had been depleted or exhausted in most parts of Borena. Livestock, especially lactating cows and their calves, were emaciated. Milk, butter and other livestock products were no longer available, and livestock prices continued to decline. Additional water trucks were requested by the Oromia Water Bureau for Miyo, Teltele and Yabello woredas. Livestock deaths due to pasture shortage were reported in Miyo, and there was growing fear of massive livestock deaths. The NGO CONCERN Ethiopia sought to strengthen its emergency nutrition response in hotspot woredas of Borena.

As the *Ganna* rains commenced late in April 2015, marking the end of the IMS data collection, the situation in the Borena zone was one of poor livestock body conditions, with livestock being emaciated and weak, and increased livestock death rates. Almost all surface-water sources of water were dried up, traditional wells had low amounts of remaining water, and livestock migration was intensifying. Many households were dependent on humanitarian assistance, and increased TFP admissions indicated rising malnutrition.

The deteriorating conditions are confirmed by the AFDM data, which show two spikes of below-average rainfall and progressively deteriorating soil moisture and vegetation coverage (Figures 3.3-3.5).

3.5 Evolution of the Drought in Jijiga

Like Borena, Jijiga had a relatively good rainfall year in 2013, the year leading up to the PRIME baseline survey. According to FEWS NET, rainfall from the March-May *Diraa* rains was higher than in recent years, allowing good production of the main staple crops, maize and sorghum. The 2013 *Karan* rain was "near average" in the zone, restoring pasture, browse and water availability, allowing normal livestock body conditions, and a normal maize, wheat and barley harvest.

First Wave of the Drought: March-September 2014

However, the start of the 2014 March-May *Diraa* rains was late by two to three weeks, extending the dry and hot "*Jilaal*" dry season. Although FEWS NET reported that cumulative rainfall was near normal in most areas of Northern Somali, the PRIME trigger indicators reported that in PRIME woredas it was "much below normal". Both sources agree that temporal distribution was very erratic, leaving long dry spells. The AFDM satellite remote sensing drought monitoring data in Figures 3.3-3.5 confirms that rainfall was much below normal for the *Diraa* rains, leading to an abnormal precipitous drop in soil moisture and vegetation.

Critical water and pasture shortages ensued, leading to crop failure and a deterioration of livestock body conditions. Increased distances between water points and grazing sites

weakened livestock body conditions further. According to FEWS NET, water shortages in Jijiga were most severe in three woredas, including Gursum and Kebribeyah, where the IMS data collection took place.

Household milk production declined, leading to reduced supply on the market and inflation in the price of milk. Meanwhile, due to reduced crop production and increased demand for grains from the pastoral community (because of shortages of milk), grain prices sharply increased; poor livestock body conditions and increased distress sales of livestock meant a declining price of livestock. As in Borena, the livestock-to-cereal TOT fell much below normal in all markets, to the detriment of pastoralists. The situation was exacerbated by a government crackdown on cross-border livestock trade through informal channels, reducing the volume of livestock exports.

Another downstream impact of the drought in Jijiga is that agro-pastoralists who normally hire people for labor intensive farm activities stopped recruiting, because in most areas crops that had already been planted wilted and failed. Meanwhile, poorer households were migrating to urban and peri-urban areas looking for unskilled labor and creating a labor surplus there. Thus the wage rate declined, further stressing these households.

The PRIME trigger indicators reported that in the aftermath of the poor *Diraa* rains "malnutrition cases are widely observed among children under 5."[19] Another indication that the drought negatively affected children's nutritional status is that as early as February 2014, perhaps in anticipation of the poor rains, Gursum was elevated from a Priority 3 nutrition hotspot woreda to a Priority 1 woreda and remained in this position through August.[20]

Unlike the situation in Borena, the second rainy season of 2014—the July-September *Karan* rains—followed a near-normal pattern. While the rains started late, they extended longer than usual, and cumulative rainfall was near-average in amount and normally distributed geographically in most areas, as confirmed by the AFDM data (see Figure 3.3). In September 2014, the PRIME trigger indicators nevertheless indicated that poor households in PRIME woredas of Northern Somali were relying on humanitarian assistance as a key source of food and that cereal prices continued to rise. In one of the major markets in the region, the Jijiga market, maize prices were 40 percent higher than in the previous year.

Second Wave of the Drought: October 2014-April 2015

By October, when the IMS data collection began, water and pasture availability had improved in Northern Somali as a whole, which can be seen from the AFDM soil moisture and vegetation data in Figures 3.4 and 3.5.[21] Due to the delayed start of the *Karan* rains, long-cycle crops did not perform well. However, the rains were adequate for normal development of short-cycle

[19] PRIME trigger indicators report, July 16, 2014.
[20] Kebribeyah stayed at Priority 2 status from April 2013 through February 2015.
[21] The September 29, 2014 PRIME trigger indicators reported, however, that due to very dry conditions through July, vegetation had not yet fully recovered, so forage availability was still "much lower" than usual.

crops like wheat. Thus agro-pastoralists primarily planted short-cycle wheat. FEWS NET reports that there was a normal harvest in November and December. The PRIME trigger indicators nevertheless reported in February that the lingering effects of the dry spell meant continually declining livestock prices and thus a continually declining TOT to the detriment of pastoral households. Note also that both the quantitative and qualitative IMS data collected directly in PRIME IE kebeles indicates that crop production failure was a major downstream impact of the drought in Jijiga over the IMS period.

In December the PRIME trigger indicators reported that due to better water and forage availability from the rainy season, pastoral households had stable access to food and income from livestock, including milk for children. Additionally, with the extension of the rains into October, crops were developing normally in most areas of Jijiga. By January, FEWS NET confirmed that water and pasture availability had returned to normal. The number of cattle and camels that had calved during the *Karan* rains was sufficient to increase milk production and availability. Herd sizes remained stable. According to FEWS NET, households were consuming food from ongoing humanitarian assistance but in agro-pastoral and agricultural areas they would soon be able to rely on food from the harvest. By February 2014 Gursum's prior level one nutrition hotspot status was reduced to level two.

The AFDM data reveal, however, that these favorable conditions were only the beginning of a sharp drop off in soil moisture and vegetable coverage below the norm (see Figures 3.4 and 3.5) as the post-*Karan* October through March long dry season progressed. It is not clear what is underlying this trend after the after received a normal 2nd rainy season, but perhaps it was a secondary effect of the failed first rains or to abnormally high temperatures.[22]

As the IMS data collection ended in March/April, it was clear that Jijiga was entering into another drought period. The 2015 *Diraa* rains started late, extending the long dry season. In April, the PRIME trigger indicators reported that livestock body conditions were again poorer than normal for this time of year, and milk availability below average. Livestock prices declined from April to May due to poor livestock body conditions, low demand, and high supply, causing further declines in the livestock-to-cereal TOT. By June 2015, both of the Jijiga IMS woredas had been elevated to the Priority 1 national nutrition hotspot classification.

3.6 Satellite Perspective: Comparing Drought Conditions in Borena and Jijiga

The AFDM data show that a similar pattern of two large drops far below normal in soil moisture and vegetation occurred in both Borena and Jijiga over the study period, November/December 2013 to April 2015. It is important to keep in mind, however, that at almost all times over the period the dip below normal was larger for Borena than Jijiga, indicating that households in Borena faced more severe drought exposure than those in Jijiga.

[22] Data from the AFDM on temperature anomalies are only available starting in May 2015.

The quantitative and qualitative IMS data presented in the next three chapters will give further insight into how drought conditions, as well as the trajectory of food security, differed across the project areas.

3.7 Humanitarian Response to the Drought

From the above descriptions of the evolution of the drought in the PRIME IE areas, many households clearly received some humanitarian assistance. In fact a number of (NGOs) and the United Nations provided humanitarian assistance over the drought period, including the World Food Programme (WFP), CARE, World Vision, and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

WFP, CARE and World Vision provided three rounds of humanitarian relief food assistance over the IMS period of October 2014-April 2015. Each round consisted of a monthly ration of 15 kgs. of cereals, 1.5 kgs. of pulses and 0.5 kgs. of vegetable oil.

In 2014, CARE and World Vision provided two rounds of relief food to 39,620 beneficiaries in Borena (15,810 in Miyo, 8,810 in Yabello, 9,000 in Teltele and 6,000 in Dugna Dawa) while WFP provided relief food to 18,500 in Jijiga (13,000 in Gursum and 5,500 in Kebrebeyah). In 2015, the humanitarian food allocation was modified to 38,049 in Borena (19,726 in Miyo, 6,024 in Yabello, 5,448 in Teltele and 6,851 in Duga Dawa) and 13,789 in Jijiga (6,909 in Gursum and 6,880 in Kebrebeyah). Additionally, from January-April 2015, the Ethiopian government's Productive Safety Nets Program (PSNP) distributed three to four rounds of food to 6,700 beneficiaries in Gursum and 30,000 beneficiaries in Kebrebeyah. In addition, the OCHA-managed Humanitarian Response Fund supported two humanitarian projects in Borena through GOAL and CARE, supporting water, sanitation, and hygiene (WASH) (in Miyo) and nutrition (Dugda Dawa and Yabello). PRIME project humanitarian assistance was administered through CARE.

3.8 Summary

Borena and Jijiga have a bi-model rainfall pattern, with two rainy seasons interspersed by dry seasons. In both, the drought unfolded in two waves roughly corresponding to March-September 2014 (between the PRIME baseline survey and IMS Round 1) and October 2014-April 2015 (between IMS Rounds 1 and 6). Four external sources of information are used to understand how the drought evolved in the regions: FEWS NET *Food Security Outlook* publications, PRIME trigger indicators data collected in the PRIME project operational area, remote sensing data from the AFDM, and NMA classifications of rainfall conditions.

Both Borena and Jijiga experienced relatively good rainfall in 2013, the year leading up to the PRIME baseline survey. However, during the initial wave of the drought, the first rains (*Ganna* in Borena, *Diraa* in Jijiga) failed in the regions, leading to abnormal precipitous drops in soil moisture and vegetation coverage. Critical water and pasture shortages ensued, followed by

unusual mobility patterns among pastoralists, crop failure, and a deterioration of livestock body conditions. Cereal prices sharply increased and livestock prices fell, leading to a livestock-to-cereal TOT far below normal in markets, to the detriment of pastoralists. Many woredas in both regions, including four of the six included in this IMS analysis, were elevated to Priority 1 nutrition hotspot status by the Ethiopian government as malnutrition cases increased.

The second wave of the drought evolved differently in Borena than Jijiga. In Borena, the second rains, the *Hagaya* rains, failed. Thus the region experienced successive below-average rainy seasons. The lack of water and pasture reached critical levels, desperate livestock movements both within Ethiopia and cross-border ensued, and local crop production failed, necessitating cereal imports from other areas in Ethiopia. Many households were dependent on humanitarian assistance to meet their food needs, and malnutrition continued to rise. In Jijiga the second rainy season, the *Karan* rains, followed a near-normal pattern, improving water and pasture availability. FEWS NET and the PRIME trigger indicators reported that water and pasture availability had returned to normal, there was a normal harvest, and households' access to food was stabilizing. However, remote sensing satellite data show that these favorable conditions were only the beginning of a sharp drop-off in soil moisture and vegetable coverage below the norm over the post-*Karan* dry season. Remote sensing data confirm that while Borena faced more severe drought conditions over the two drought waves, this additional climate shock put Jijiga households under additional stress that is documented by the IMS data in the next two chapters.

4. Household Drought Exposure: Evidence From the IMS Data

Based on the IMS survey data, this chapter documents the severity of exposure of households to the drought over the IMS period: October 2014-March 2015. As seen in the last chapter, most of this period corresponds to the dry spell between the PRIME IE area's two rainy seasons. Based on household responses to the IMS questionnaire shock module, this chapter first explores households' direct exposure to the drought, that is, whether they actually experienced lack of rain or other direct, climate-induced drought impacts such as poor vegetation coverage. Then this chapter explores households' experiences of the downstream impacts of the drought, including livestock and crop disease, poor crop harvests, price and demand effects, and conflict and death.

4.1 Direct Exposure to the Drought

Evidence From the Quantitative Data

Table 4.1 reports on the percent of households in Borena and Jijiga experiencing various drought-related shocks at baseline and for the six IMS 2014-15 rounds. It is important to keep in mind that the baseline results represent shocks experienced in the *entire previous year*, whereas each set of IMS round results represent shocks experienced in the previous month.

In both regions the percent of households experiencing drought or "too little rain" increased dramatically from the baseline to the first IMS round, despite the longer recall period in the baseline.

In Borena, 40 percent of households reported experiencing drought at some point in 2013, the year preceding the baseline. By contrast, almost all households reported experiencing drought in October 2014 (IMS Round 1), a *Hagaya* rainy season month. The percent fell to near zero in November (Round 2), which corresponds to an unusual spike in rainfall in that month (see Figure 3.3). The percent of households reporting drought progressively increased over the last four IMS rounds, rising back into the 90's by the end of the survey period.

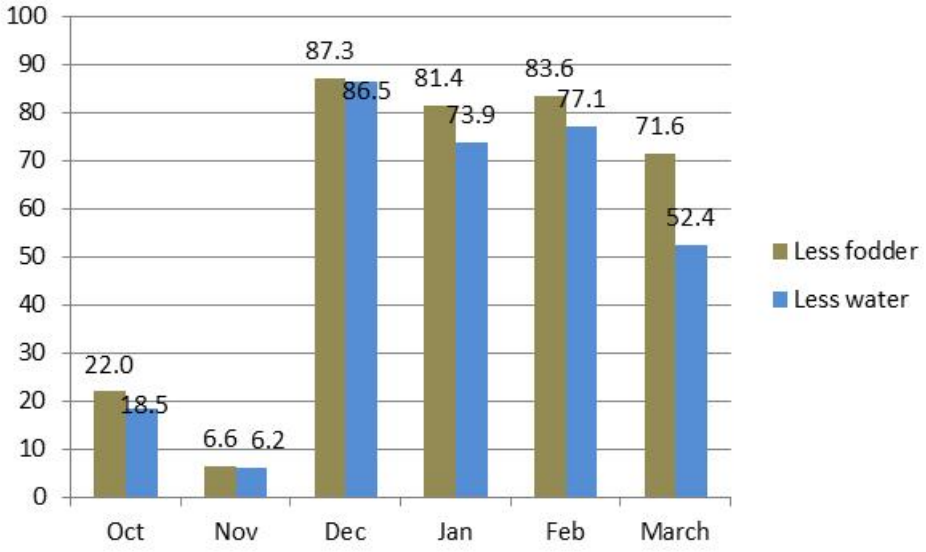
In addition to whether or not they experienced drought, in each IMS round survey respondents were asked whether water and fodder availability in their area was less, the same, or better compared to the same time last year. The percent of households reporting less availability in Borena is given in Figure 4.1a. In October and November, very few households reported less availability of water and fodder than October and November 2013. These months fall directly at the end of the *Hageya* rains, which apparently temporarily replenished water sources. However, in December over 85 percent of households reported less availability than in 2013, and this

Table 4.1. Percent of households experiencing drought-related shocks over monitoring survey period compared to the baseline, by project area

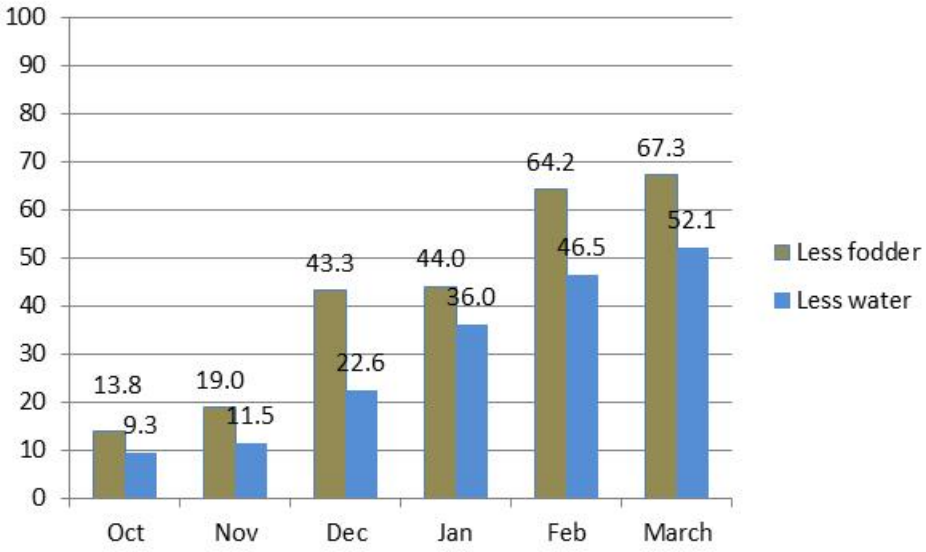
	Baseline (Last year recall)	IMS rounds (Last month recall)					
		Oct	Nov	Dec	Jan	Feb	March
Borena							
Drought (too little rain)	39.2	99.3	2.9	76.0	89.9	94.9	91.5
Livestock or crop disease	46.9	87.1	68.3	80.5	64.6	58.5	70.6
Very bad harvest	39.8	93.5	9.0	21.6	25.1	35.9	12.8
Price and demand effects							
Food price inflation	65.4	96.3	84.1	77.2	63.8	66.0	91.5
No demand for ag/livestock products	10.5	59.8	45.0	39.3	14.1	40.9	22.2
Drop in price of ag/livestock products	20.0	85.7	47.5	39.6	16.5	29.3	10.1
Rise in price of ag/livestock inputs	33.9	91.3	71.0	62.4	60.3	63.2	71.7
Conflict and death							
Theft of livestock or crops	4.8	14.5	2.5	2.4	6.2	7.7	9.1
Other conflict-related shocks	4.6	9.4	1.2	5.3	9.1	3.8	5.7
Death of household member	2.6	3.8	1.0	0.7	1.9	1.9	1.7
Jijiga							
Drought (too little rain)	53.8	96.3	95.2	92.6	99.4	97.2	98.9
Livestock or crop disease	46.5	74.5	66.7	54.3	55.1	49.8	79.8
Very bad harvest	40.7	77.0	75.4	71.9	80.3	84.0	81.0
Price and demand effects							
Food price inflation	54.7	89.5	93.6	92.1	93.8	89.4	96.5
No demand for ag/livestock products	30.1	28.0	46.5	34.2	37.1	49.6	41.1
Drop in price of ag/livestock products	29.4	20.8	36.2	38.1	30.3	40.2	51.0
Rise in price of ag/livestock inputs	40.3	47.3	52.8	37.6	51.1	57.1	56.6
Conflict and death							
Theft of livestock or crops	2.6	5.6	5.3	1.7	2.8	2.8	0.6
Other conflict-related shocks	3.6	8.8	2.6	2.8	2.8	5.1	1.1
Death of household member	7.9	6.1	5.9	3.9	1.7	1.1	0.5

Figure 4.1. Percent of households reporting less fodder and water availability compared to same month in previous year, by project area

a. Borena



b. Jijiga



percent remained above 70 in January and February. In March, some woredas began to receive 2015 *Ganna* rains, and the percent reporting less availability of water fell to near 50.[23]

In Jijiga, 54 percent of households reported experiencing drought at some time in 2013. That number rose to 96 percent in October 2014, following the end of the *Karan* rains, and remained in the 90's throughout the monitoring period.[24] As for Borena, in IMS Round 1 and Round 2, the large majority of households in Jijiga reported that there was not less water and fodder availability in the first two months following the *Karan* rains (Figure 4.1b). However, as the dry season progressed, more and more households began to do so, consistent with the sharp drop off in soil moisture and vegetation coverage exhibited by the AFDM data (Figures 3.4 and 3.5). By March, 52 percent of households were reporting that less water was available than in March 2013; 67 percent reported less fodder availability.

Even though fewer households reported experiencing drought in Borena than Jijiga in almost all of the IMS survey rounds, comparison of the water and fodder availability data in Figures 4.1a and 4.1b indicates that drought exposure was more severe in Borena, as also reflected in the AFDM data.

Evidence From the Qualitative Data

As part of the qualitative data collection, FGD and KII respondents were asked to tell enumerators what types of shocks their households and communities had faced in the past month.

Borena. Almost every FGD highlighted drought as the key shock households were currently experiencing, sometimes expressed as recurrent and prolonged severe drought, or "*oola*". *Oola* is described as entailing a shortage of potable water for people and of fodder and water for livestock. Over the six-month IMS period, respondents did mention that rains had come in November (Yabello and Dugdadawa woredas), and in several kebeles in March. Respondents at times mentioned their fear that the drought would deepen, and undoubtedly this constant concern is a source of much stress.

Jijiga. The most consistent and commonly-cited shock across the six month data collection period in all Kebeles in Jijiga was drought, along with the poor crop production and livestock diseases that resulted from it. A male focus group in one kebele in Kebrebeyah stated that rainfall has been bad for the last five years. The drought also created a shortage of fodder and water (for both animals and humans) leading to a number of downstream effects such as conflict over grazing land and water (see below).

[23] More specifically , the large majority of households in Teltele and Miyo did not report less water availability than in March 2013, signally that these areas had begun to receive *Ganna* rains at the time of IMS round 6.

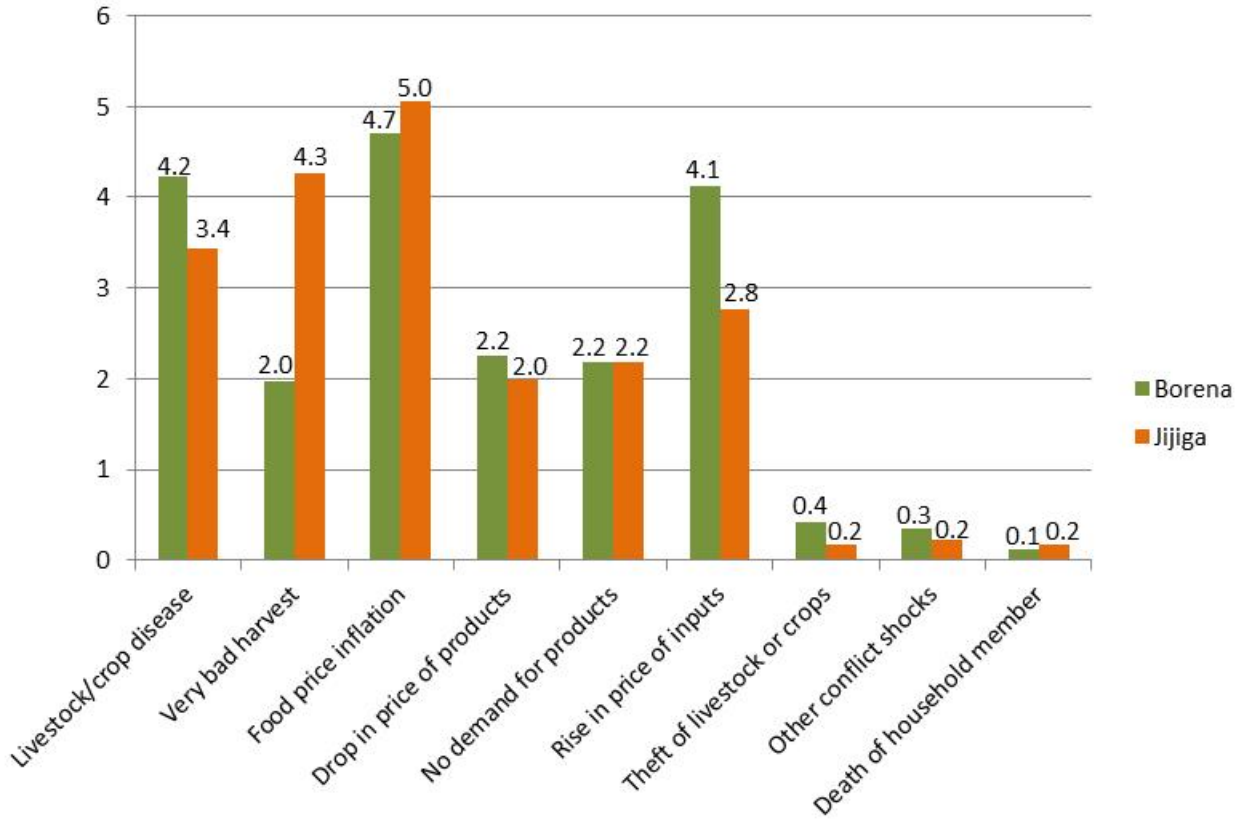
[24] Note that the Jijiga area experienced the same spike in rainfall near the time of Round 2 (see Figure 3.3), yet unlike in Borena, the large majority of households nevertheless reported experiencing drought in that round. This suggests that in Jijiga respondents had a broader view of drought than "too little rain", perhaps also including lack of vegetation and other direct impacts in their perception of the concept "drought".

4.2 Downstream Drought Impacts

Evidence From the Quantitative Data

Table 4.1 also contains month-by-month information on the percent of households reporting that they experienced downstream impacts of the drought. A summary measure comparing downstream shock exposure across the project areas, the average number of rounds in which households in each area experienced different types of shocks, is given in Figure 4.2.

Figure 4.2. Number of IMS rounds in which downstream shocks were experienced, by project area



Livestock and Crop Disease

According to the baseline data, about 47 percent of households experienced either livestock or crop disease over the entire span of 2013. By October 2014, the first round of the IMS, the percent had sharply increased: 87 percent of households in Borena and 75 in Jijiga had experienced this shock in the previous month alone. Assuming "livestock disease" includes "poor livestock body conditions" and even deaths, these data are consistent with external reports for both livestock and crops in the areas (see Chapter 3). The average number of IMS months in which this shock was experienced was slightly higher in Borena than Jijiga, 4.2 versus 3.4 (see Figure 4.2).

Poor Crop Production

Represented in the questionnaire as "very bad harvest," this shock was experienced at roughly the same rate at baseline in Borena and Jijiga (40 percent of households). The rate increased precipitously over the 10-month period between the baseline and IMS Round 1. It remained relatively high across the IMS rounds in Jijiga, where agro-pastoral and non-pastoral households are more prevalent. In Borena, where pastoralism predominates, it dropped to quite low levels starting in November. Overall Jijiga households felt this shock more strongly, with the average Jijiga household experiencing poor crop production in 4.3 of the IMS survey rounds, and the average Borena household experiencing it only in two rounds.

Price and Demand Effects

As seen in Chapter 3 above, data from secondary sources indicate that the downstream effect of the drought on prices was very strong in both project areas. This is confirmed by the IMS data, which reveal that food price inflation was the shock most often experienced in both IE areas (Figure 4.2). A relatively large percentage of households had reported being exposed to this type of shock in the year prior to the baseline, 65 percent in Borena and 55 percent in Jijiga, suggesting that fluctuations in food prices is a chronic issue in both areas. In Borena the percent of households reporting price inflation fluctuated from 64 to 96 over the IMS rounds. In Jijiga, by contrast, the percent stayed relatively steady at near 90 percent. Clearly food price inflation was a consistent and widespread downstream impact of the drought.

Turning to demand for the products sold by households, whether livestock and livestock products (e.g., milk and meat) or crops, this type of shock is an indicator of whether there was reduced demand for the products households produce as a result of declining incomes.

Understanding of this type of economic shock is important since the large majority of the households in the PRIME IE areas are not salaried and depend on such product sales for being able to purchase food and non-food products on the market. At baseline, only 11 percent of households in Borena reported experiencing no demand for their products over 2013. By October 2014, the percent had risen to 60 percent, but was generally lower in the remaining months of the IMS. In Jijiga, the baseline prevalence was higher, at 30 percent. As in Borena, it fluctuated greatly over the rounds, rising to its highest at 50 percent in February 2015. Overall, the exposure to this shock was comparable across the areas (Figure 4.2).

In the case of product prices, data from secondary sources reviewed in Chapter 3 above reveal that the typical pattern was one of declining prices of livestock and livestock products and increased prices of staple food crops, leading to a decline in the TOT for pastoralists. Unfortunately, whether this pattern is born out for the survey households cannot be determined because data were not collected separately for livestock prices and staple crop prices. What we can ascertain is that "drop of price of livestock or agricultural products" was

experienced as a shock by over 85 percent of households in Borena in October 2014, the first IMS round. It declined steadily after that, falling to only 10 percent by March 2015. In contrast, the percent of households experiencing this downstream drought shock was quite low in Jijiga in October 2014, at 21 percent, but rose steadily thereafter, reaching 51 percent by March 2015. Note that when the data are broken down by pastoralist status, the general pattern of falling percent over the rounds prevails for pastoralists, agro-pastoralists and non-pastoralists alike.

Finally, with respect to input prices, a strong difference across the project areas can be discerned from the data, with this economic shock being felt the most intensely in Borena. In all survey rounds the percent of households experiencing a rise in input prices, whether livestock or agricultural inputs, was far higher in Borena than Jijiga. The average Borena household experienced an increase in input prices in 4.1 of the IMS months compared to only 2.8 for the average Jijiga household.

Conflict and Death

In general, the exposure of households in the PRIME IE area to conflict shocks and the ultimate negative impact, deaths of household members, over the IMS period was small compared to the other types of shocks. However, there was a noticeable increase in conflict-related shocks since the baseline.

In Borena, the percent of households experiencing theft of livestock or crops was 4.8 at baseline (for the entire year 2013). By contrast, 14.5 percent of households experienced such theft in the month leading up to the first IMS round in October 2014 and fluctuated below that thereafter. The incidence of other conflict-related shocks[25] was also relatively high in Round 1 and Round 4. Trends in Jijiga followed the same pattern. However, the incidence of thefts of livestock and crops started out far lower in October 2014 than in Borena. Overall, the average number of rounds in which conflict-related events were experienced was someone higher in Borena than Jijiga (Figure 4.2).

With respect to deaths, there was a slight increase in the percent of households experiencing deaths over the baseline value in Borena. In the entire 12-month period preceding the baseline in December 2013 only 2.6 percent of households experienced a death. By contrast, in only a one-month period, 3.8 percent of households experienced a death after the passage of two under-performing rainy seasons. These data thus suggest that the drought did lead to some deaths, whether due to the conflict it induced or food insecurity. The same may be true in Jijiga, but the contrast between the one-year incidence measured at baseline and the one-month incidence at IMS Round 1 is not as stark. Note, however, that the household-member-death

[25] Those surveyed were: theft of money, theft or destruction of assets, destruction or damage of house due to violence, loss of land due to conflict, and violence against household members.

rate in Jijiga was much higher than in Borena in both periods, perhaps due to ongoing ethnic conflict in Jijiga.

Evidence From the Qualitative Data

As part of the qualitative data collection, FGD and KII informants were also asked to tell enumerators what the impacts of the drought had been on their households and communities.

Borena

Livestock disease was mentioned as an impact of the drought in most kebeles, and in some as the cause of death of animals. Some respondents emphasized cattle in this category, mentioning for example a disease locally known as *Silisa* which attacks only cattle, drying the cattle's mouths and prohibiting them from eating fodder. This had caused the loss of an average of two to three cattle per household, and up to 10 cattle in a few cases, and there was a shortage of medicine to treat this (Yabello). Another disease, locally known as *Quledi*, also mainly infected cattle, is reportedly quickly transmitted from infected to healthy cattle. The meat is not edible (Yabello), and it renders the hide and flesh unusable (Teltele, reported in January), which precludes slaughter and selling of the meat. Some respondents reported that they had given vaccines, but they didn't work. However, but it was unclear if this was due to ineffective vaccines or generally poor conditions.

Respondents also referred to sheep and goat diseases (Teltele), with reported losses from two to 13 animals per household, and most households were affected. They also purchased and used drugs, which were not effective in saving the livestock. In Miyo woreda (reported in January), they identified the disease as foot-and-mouth disease, affecting mainly goats and sheep but also cattle. One respondent had lost 20 goats in one month. In Yabello woreda, respondents said that climate change was reducing the weight of cattle and goats, which resulted in a form of tuberculosis associated with weather patterns of cold mornings and hot daytimes. One respondent had lost 100 goats due to this disease over the past year. Chicken diseases also had devastating effects, with respondents having lost up to 60 chickens, and medicine purchased had not been effective. "When I got back to home from market purchasing drug for the infected chickens, I have found alive only two out of the 20 chickens." (Teltele, reported in November).

Crop Disease. Respondents described a common worm infestation which attacks crops such as beans, sorghum and maize in woredas such as Teltele, or the mix of beans, wheat and teff in others (Yabello, reported in November and January), but its current incidence was more severe than previous years. In Jauary in Yabello, respondents reported that the pesticide they purchased was not preventing the disease and it was spreading and having a worse effect, so they were forced to borrow money for purchasing additional pesticide. In another location in Yabello reported in December, respondents stated that "no beans and wheat grown in the area

remain from the disease and can be harvested from the field", whereas households that sow other crops are less severely affected. The pesticide supplied by the DAO of the Kebeles did not work to control the disease, and there was also insufficient stock of agricultural inputs to control the disease. Many other households did not use any pesticide due to fears of its effect on human health.

In Teltele woreda, most of the households had a poor harvest because of the worm crop disease, despite consulting agricultural development agents, purchasing pesticides, and applying it to prevent and control the damage of the worm. One participant said " The worm damaged my harvest and I have lost four quintal of beans by the disease….I bought a drug [pesticide] with 110 birr to protect my harvest… the agricultural workers [DAO] were not able to provide us a solution." Another reported that "…my family was able to harvest only two quintal of beans…In a good season, my family is able to manage to produce 10 to 12 quintal on the same plot of land." Due to the poor harvest, households are forced to buy the agricultural products that they usually were able to produce by themselves. In Dugadadawa woreda, respondents had lost their entire harvest whether they had one, two or 20 hectares, and most were left without seed for the coming season.

Adverse Market Effects. Respondents in most villages mentioned that market prices, particularly prices falling 50 percent or more for livestock for the past year, constituted a serious shock. Whether or not livestock selling was part of their regular livelihood plans, there were reports of distress sales for survival. FGD respondents stated that "we are forced to sell cattle only for 1,000 birr that can be sold previously for more than 4,000 birr due to hunger" (Yabello, reported in October). Previously they would sell an ox for more than 10,000 birr but now for not more than 3,000 birr (another kebele in Yabello, reported in October), or for 7,000 birr (Dugdadawa, reported in October). While cattle were more frequently mentioned in most kebeles, the prices of sheep and goats were reduced by half (Teltele, reported in December). The price of goats dropped from 800 to 300 birr, and sheep from 600 to 150 (Miyo woreda).

Some comments from FGDs mention the role of brokers in bringing the price down (Dugadadawa woreda). Some explained that previously they would sell their livestock directly to traders from Modjo/Adama and Kenya, but now the main buyers were brokers and local traders who pay a lower price and then sell to the larger markets (Yabello woreda respondents selling at Eleweya market). Other respondents from Yabello link this to the death of former Prime Minister Meles several years before, and presumably his policies. Still others point out that disease and drought have led to poor physical condition and appearance of animals, which also contributes to the low price (Miyo woreda FGD). Key informants also emphasized this factor (Yabello and Miyo in January, Yabello and Dugdadawa in March).

Other Downstream Impacts. A number of respondents mentioned that they had lost livestock to predators, mostly hyena, or losses due to "a raid" (Yabello woreda). A respondent

in another location in Yabello woreda had lost camels worth an estimated 13,000 birr to a raid. They incurred additional costs trying to find the lost livestock. Others mentioned the loss of homes and school classrooms to fire, and the death of family members, which from a livelihood perspective incurs immediate costs. Loss of family members can cause the longer-term loss of income.

With respect to health, in Teltele woreda, participants noted that children and elders were getting sick from an illness resembling diarrhea after drinking polluted water from the water well, with resulting expenses for medical treatment. In January some female FGD participants in a Kebele in Yabello noted an abdominal pain experienced by some children which may have been caused by eating beans infected by disease.

Finally, in a Kebele in Teltele, respondents highlighted that given the shocks and also the scarcity of land, most of the youth were unemployed, and were spending most of their time drinking alcohol (reported in November). Some of these youths were getting into fights and causing problems for other members of the community.

Jijiga

Livestock disease, especially affecting goats and sheep, was mentioned as a major problem in all kebeles over all rounds, consistent with the quantitative data. The main explanation given for the extent of the disease was the drought, which reduced access to fodder and water. Reduction in fodder and water reduced milk production from livestock, negatively impacting the children. One respondent from Kebrebeyah woreda stated that "only in the past month I lost 35 goats because of livestock disease that attacks the lungs. I have become the poorest of the poor." Access to vaccines to treat the goats was in short supply. The women in several villages in Kebrebeyah said that the livestock disease is threatening the only buffer they have to deal with the drought. Not only do livestock serve as a means for households to recover more quickly from shocks, but the income generated from their production and sales is often spent on school costs and medical care for children. As such, without the income, the education and health of children are compromised. Respondents in all rounds stated that the reduction of animals led to children being pulled from school. This pattern, also found in the quantitative IMS data (see Chapter 5), has a long term negative effect on future human capital.

The loss of goats also has a negative impact on social capital because goats and milk are often provided to the poor households by the better off ones in times of stress. In Gursum woreda, people stated that they were keeping their distance from others to avoid disease transmission from livestock. As more and more animals were affected by disease, the value of livestock in the market became reduced, as became evident in later IMS rounds in Kebrebeyah woreda. As one male FGD in Kebrebeyah put it, "…even hyenas refuse to eat the dead body of an animal with disease."

Crop production was negatively affected by the drought in all Kebeles surveyed in Jijiga. Poor harvests were mentioned across rounds in both Kebrebeyah and Gursum woredas. As one women's FGD stated in a Kebele in Kebrebeyah, "our maize and sorghum harvest were small and not enough to feed our families." Serious food shortages occurred over several months in many Kebeles, increasing their food insecurity. The losses forced families to purchase food by selling livestock and also affected social relationships because there was not enough food to share. The reduction in crop productivity forced many families to turn to charcoal production, migration and other income generating activities to cope with the shortfalls. Food aid was distributed but it was not enough or available to those with poor connections to Kebele officials.

The food insecurity resulting from poor crop production forced some families to migrate, send children to other relatives, and forced women to spend more time in alternative income generating activities (Kebrebeyah). The inability to feed their families resulted in several children becoming sick.

The poor crop production highlighted here in the qualitative data is supported by the IMS quantitative data (see Table 4.1). However it is not consistent with the information provided by FEWS NET, which indicated that there was a "normal harvest in November and December" in the region. It is also not consistent with the PRIME trigger indicators data, which reported that by December "crops were developing normally in most areas of Jijiga."

Access to fodder was also negatively affected by the drought, forcing many households to seek grazing land and water in other areas. This competition for fodder and water led to conflicts in several villages in Kebrebeyah. In villages that had effective conflict mitigation committees headed by elders, this tension was reduced. Conflict over grazing land led to reduced mobility for many households, making them more vulnerable. Pasture and water shortages in the dry season led many families to migrate for grazing land and water. Some had to pay to have access to pasture land in order to avoid conflict.

Access to water for both human and animal consumption became a serious problem over the six rounds. Women FGDs in most rounds stated that they had to spend more time and go farther to fetch water in both Gursum and Kebrebeyah woredas. This increased women's burden at home. Some women in Kebrebeyah had to go to town to get access to water.

More than once, each of the Kebeles brought up the issue related to the extra amount of time and further distance entailed for women to fetch drinking water. The additional time spent away from the household meant less time to tend to domestic tasks. One male FGD in a Kebele in Kebrebeyah stated that "women spend more time fetching water which increases the burden at home." This also had a negative effect on child care.

Relations Between Communities. For the most part, there was very little negative impact on relations with other communities over the six months. Qualitative survey participants largely

attribute the lack of disputes or conflict to two entities, their community elders and the traditional/indigenous institutions referred to as "Hair Deqemed" that encourages reciprocal hospitality between communities who share natural resources. One woman in a Kebele in Kebrebeyah said: "Conflict is an old mentality; we don't have that mentality today. From conflict we get only death not life. Even you managed to come here to visit us since there is no conflict." In addition to mutually agreeing on cultivating peaceful relations with other clans, some wealthier kebele members in Kebrebeyah also offer cash in exchange for grazing land (male FGD reported in October). Male FGD members in another kebele in Kebrebeyah say they offer one of their goats for every four that the hosting household with the grazing land already owns.

There were only a handful of instances in which participants indicated strained relations. In the women's focus group in a kebele in Kebrebeyah during October, it was noted that "sometimes the [conflict] effect will be long lasting since members from those communities enter into hostile mentality. Such hostile mentalities especially hamper our mobility in the dry season." The following month, November, was the only other time male FGD respondents in Kebrebeyah mentioned issues of conflict. Men in another kebele in Kebrebeyah indicated that "everyone is facing the same problems, which requires people to compromise." There was no major escalation over time or if there was conflict, it was rare and handled by traditional institutions. Finally, residents in one kebele in Kebrebeyah were still welcoming neighbors to their pasture land, but speculated "how far we can do that."

Although conflicts were mostly curtailed through interventions by elders, the drought did lead to some conflicts over pasture and water in two kebeles in Kebrebeyah (male FGD in October). Tension over grazing land and water access was increasing over the survey rounds.

4.3 Overall Measures of Shock Exposure

An accurate summary measure of overall shock exposure is needed for two reasons. First, such a measure helps to show which population groups were most exposed to the drought and how their drought exposure evolved over the IMS period. Second, it is needed for conducting the regression analyses of Chapters 7 and 8 below, in which the impact of drought exposure and resilience capacity on households' ability to withstand the shock are explored.

Three summary measures of shock exposure can be constructed from the IMS data. The first is the total number of drought-related shocks experienced by households out of eight shocks. The shocks included are those listed in Table 4.1, with two exceptions. The first is that the category "very bad harvest" is excluded. It is excluded in order to render the index comparable across pastoralists and agro- and non-pastoralists (there is no equivalent shock for pastoralists). Second, the category "drought" itself is excluded because, while it is evident that all households were exposed to the drought in all IMS rounds, many Borena households did not report being exposed, rendering the index non-comparable across project areas.

The second measure is an index that takes into account the perceived severity of shocks in addition to the number shocks households were exposed to. Perceived severity is measured from survey respondents' answers to the question "How severe was the impact on your income and food consumption?" The five possible responses range from "None" to "Worst ever happened." The perceptions-based index of shock exposure is a weighted average of the incidence of each shock (a dummy variable equal to 0 if not experienced and 1 if experienced) and its perceived severity as measured on the 5-point scale.

Finally, in order to capture shock exposure using the IMS data in a more objective manner, a kebele-level index of shock exposure was constructed based on the percent of households in each of the 17 sampled kebeles reporting the following drought conditions, downstream drought impacts, and coping strategies:[26]

Drought conditions

1. Less fodder availability compared to this time last year
2. Less water availability compared to this time last year

Downstream drought impacts

3. Livestock or crop disease
4. Food price inflation
5. Lack of demand for a household's products
6. Experience of a conflict shock
7. Death of a family member

Drought coping strategies

8. Migration of some or all family members
9. Taking children out of school
10. Reducing food consumption
11. Selling assets domestic or productive assets
12. Taking out a loan (going into debt)
13. Sending children to work for money

[26] Drought coping strategies will be discussed in detail in the next chapter.

14. Relying on family members for food or money

15. Receiving humanitarian assistance (food aid or food/cash-for-work).

The 15 variables are combined into an index using PCA with a goal of creating an "exogenous" measure of shock exposure based on kebele-wide drought conditions affecting households.

Table 4.2 compares means of these measures both across population groups (project area and pastoralist status, where applicable) and with measures of drought exposure constructed from the AFDM data. The latter measures are simply the inverse of the Standard Precipitation Index (SPI), the soil moisture index and the NDVI described in Chapter 3. The indexes are inverted so that higher values represented greater (rather than less) shock exposure.

Table 4.2. Summary measures of shock exposure, by project area and pastoralist status

Measure	All	Project area		Pastoralist status		
		Borena	Jijiga	Pastoralist	Agro-pastoralist	Non-pastoralist
IMS 2014-15 data						
Number of drought-related shocks experienced	3.06	3.11	2.93	3.19[a]	3.12[b]	2.75[a,b]
Perceptions-based shock exposure index	10.4	10.7[a]	9.6[a]	11.0[a]	10.6[b]	9.2[a,b]
Kebele-level drought-exposure measure	32.8	41.1[a]	17.0[a]	--	--	--
AFDM data						
Rainfall deviation from norm	0.679	0.869[a]	0.32[a]	--	--	--
Soil moisture percentage of norm	50.0	65.3[a]	21.1[a]	--	--	--
Vegetation percentage of norm	44.9	58.7[a]	18.8[a]	--	--	--

[a,b] Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

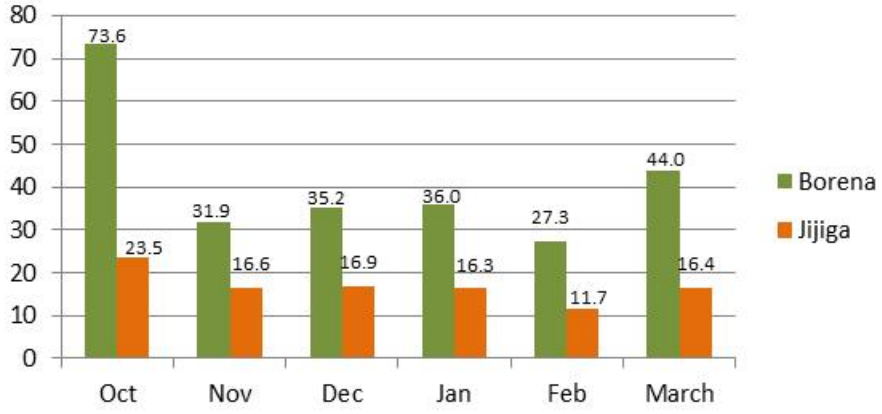
The number of drought-related shocks and the perceptions-based index of shock exposure indicate that shock exposure was slightly higher in Borena than Jijiga. The kebele-level drought exposure measure, by contrast, indicates that drought exposure was much greater for Borena than Jijiga. The latter measure is consistent with the AFDM data retrieved through satellite remote sensing. Rainfall, soil moisture and vegetation data all concur that drought conditions were substantially more severe for Borena than Jijiga.

Figure 4.3 maps out the perceptions-based measure, kebele-level measure, and one of the AFDM measures, soil moisture deficiency, across the IMS rounds for the regions. Here we see that the kebele-level shock exposure and soil moisture deficiency measures indicate that shock exposure was much higher in Borena than Jijiga in all rounds. The perceptions-based measure indicates that it was comparable in the regions and even higher in Jijiga in two of the rounds.

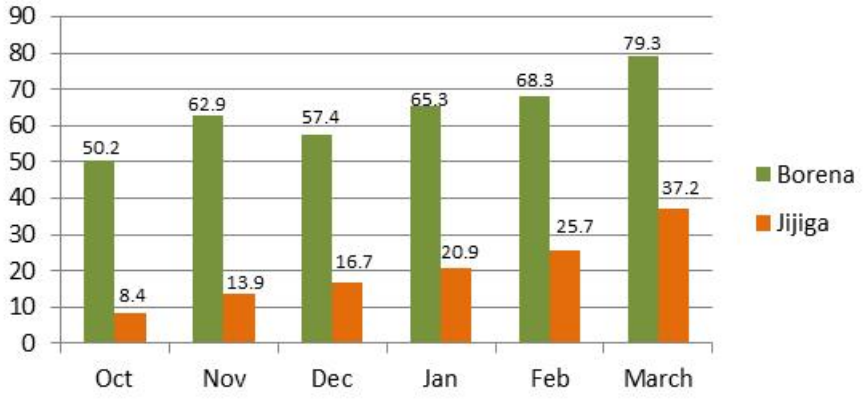
Figure 4.3. Shock exposure summary measures, by project area and round

a. Perceptions-based shock exposure index (Source: IMS data)

b. Kebele-level shock exposure measure (Source: IMS data)



c. Soil moisture deficiency (percentage-points below norm) (Source: AFDM)



Note also that the three measures give different indications of how drought exposure progressed over the IMS period. The perceptions-based measure and the kebele-level shock exposure measure both indicate much higher shock exposure in Borena in Round 1 than the others, while the soil moisture measure does not. The pattern given by measures based on IMS data are perhaps a reflection of the continued stress households were experiencing from the first wave of the drought. All measures do indicate a rise in shock exposure from Round 4 to Round 6.

The contrasting pictures of drought severity given by the different measures is partially because they are measuring different phenomena. The soil moisture data measure real-time drought conditions on the ground, while the perceptions-based and kebele-level shock exposure measures capture downstream impacts and/or households' responses to those conditions, which can happen in a lagged manner. However the strong difference in the Borena-Jijiga contrasts given by the perceptions-based index presents compared to the others may also point to a limitation of the measure. That is, perhaps simply counting the number of downstream impacts of a shock and using households' perceptions of the severity of that impact may not accurately represent differences across population groups in actual drought exposure.

Keeping this caveat in mind, note that both the number of shocks and the perceptions-based index indicate that shock exposure was greatest for pastoralists, followed by agro-pastoralists and non-pastoralists.[27] That non-pastoralists were less shock exposed makes sense since they are less likely to gain their livelihoods from either crop or livestock production (see baseline report), and their incomes are thus less affected by agro-climatic conditions.

4.4 Summary

IMS 2014-15 survey data confirm that households indeed experienced drought in the period between the PRIME baseline survey and the first round of IMS 2014-15 (October 2014). In both Borena and Jijiga household reports of drought or "too little rain" increased dramatically over the period. The data also confirm continued drought conditions between IMS Rounds 1 and 6, the second wave of the drought. Over 90 percent of households participating in the quantitative survey reported experiencing drought in both of those rounds. The qualitative data collected during FGDs and KIIs also pointed to drought as the key shock households were currently experiencing across the six-months of the IMS data collection.

With respect to downstream drought impacts, the quantitative data reveal that those most commonly felt by households in Borena were livestock or crop disease, food price inflation, and increases in the prices of inputs. Those most commonly felt by Jijiga households were livestock or crop disease, food price inflation, and "very bad harvest." The data confirm that the downstream effect of the drought on prices was very strong in both areas. After food price

[27] It is not possible to compare differences across the pastoralist status groups using the other drought exposure measures because they are measured at the Kebele, rather than household, level.

inflation, the most common economic shocks experienced were: increases in the prices of livestock or agricultural inputs, drops in the prices of products sold, and lack of demand for products sold. There was a noticeable increase in conflict-related shocks since the baseline, including theft of crops and livestock, and in deaths of household members, the ultimate negative impact. The qualitative data provide a rich source of detailed information on how households experienced these downstream impacts as well as others, including reduced access to fodder and water, cattle raids, and illness due to exposure to polluted water.

Overall summary measures of shock exposure constructed from the IMS quantitative data allow understanding of which population groups were most exposure to the drought and how their drought exposure evolved over the IMS period (the second drought wave). Two such measures are constructed. The first is a perceptions-based index based on data on the types of shocks experienced and their perceived severity as reported by survey respondents. The second is an index based on the percent of households in each of the 17 sampled kebeles reporting a series of drought conditions, downstream drought impacts, and drought coping strategies. This measure was constructed in order to provide an "exogenous" measure of shock exposure based on indicators of area-wide drought conditions. The perceptions-based measure indicates that drought exposure was roughly the same in Borena and Jijiga. Consistent with the AFDM remote sensing data, the kebele-based measure, by contrast, indicates that drought exposure was much greater for Borena. The different pictures given by the measures points to a limitation of the perceptions-based measure in accurately representing differences across population groups in actual drought exposure. Keeping this caveat in mind, the measure indicates that shock exposure was greatest for pastoralists, followed by agro-pastoralists and non-pastoralists.

5. Household Response: Coping Strategies for Dealing With the Drought

Drawing on insights from both the quantitative and qualitative data, this chapter uses the IMS data to explore how households responded to the drought conditions they faced.

5.1 Quantitative Data on Coping Strategies Employed for Dealing With the Drought

After asking survey respondents whether or not they experienced drought and its downstream impacts, they were asked the question "How will you cope with the stressful events you are experiencing?" Table 5.1 reports on the percent of households who reported, in at least one IMS round, they would employ various coping strategies to deal with the drought.

Overall, the most commonly-employed coping strategy was to reduce food consumption, employed by 99 percent of households. This is a particularly negative strategy since it puts household members' physical well-being at risk. The second most commonly-employed strategy (92 percent) was to sell livestock, an asset owned by nearly all households in the project area, including non-pastoralists (see Smith et al. 2015). Such distress sales deplete the asset base of households, undermining their future ability to recover from shocks. Another strategy that was almost ubiquitously (nearly 90 percent of households) employed was to rely on assistance from friends and relatives, including receiving money for food and borrowing money. Other common strategies were to send livestock in search of pasture, take up new wage labor, migration of some family members, and borrowing money from a savings and credit association or MFI.

Notably, 50 percent of all households expected to receive government or NGO humanitarian assistance at some time over the six IMS rounds.[28] Taking children out of school, a disruption that represents a particularly far-reaching negative coping strategy with long-term consequences for human capital, was employed by nearly 20 percent of households. Selling assets, also a negative coping strategy that undermines recovery, was employed by a small minority of households.

Consistent with the shock exposure data presented in Chapters 3 and 4, most coping strategies were employed more often by Borena than Jijiga households, with the largest differences seen for: slaughtering livestock, taking up new wage labor, sending children to work for money, borrowing money from a savings and credit association or MFI, drawing down on savings, receiving humanitarian assistance, relying on the assistance of friends or relatives, and taking children out of school. Three strategies that were more prevalent among Jijiga households were sending livestock in search of pasture, migration of the whole family, and sending children or an adult to stay with relative.

[28] This number represents the percent of households expecting to either (1)receive food aid from the government, (2) receive food aid from an NGO, or (3) participate in food-for-work or cash-for-work.

Table 5.1. Coping strategies employed in the wake of the drought, by project area and pastoralist status

Coping strategy	All	Project area		Pastoralist status		
		Borena	Jijiga	Pastoralist	Agro-pastoralist	Non-pastoralist
	(Percent of households)					
Management of livestock						
Send livestock in search of pasture	77.0	71.9[a]	88.8[a]	83.1	73.9	73.9
Sell livestock	92.2	95.4	84.8	97.3[a,b]	90.5[a]	87.6[a,b]
Slaughter livestock	40.9	50.7[a]	18.5[a]	62.3[a,b]	31.8[a]	26.2[b]
Coping strategies to get more food or money						
Labor strategies						
Take up new wage labor	51.5	64.5[a]	22.0[a]	48.4	60.5[a]	39.6[a]
Send children to work for money	7.5	10.1[a]	1.6[a]	5.0	7.7	10.7
Migration						
Migration of some family members	62.0	64.1	57.2	72.1[a]	61.1	48.8[a]
Migration of the whole family	9.6	6.7	16.3	8.2	12.0	7.3
Send children or an adult to stay with relatives	14.0	9.9[a]	23.4[a]	7.8[a]	13.7	23.7[a]
Sell or lease out assets						
Sell household items (e.g., radio, bed)	1.1	0.7	2.0	0.0	1.5	1.9
Sell productive assets (e.g., plough)	1.3	1.9	0.0	0.4	2.4	0.7
Lease out land	1.7	1.1	3.0	1.8	1.4	2.0
Borrow money or rely on savings						
Borrow money from a savings & credit association or MFI	44.6	64.1[a]	0.0[a]	57.6	42.1	30.1
Borrow money from a bank	0.5	0.7	0.0	0.4	0.7	0.0
Borrow money from a money lender	14.3	17.2[a]	7.7[a]	19.5	11.9	11.1
Draw down on savings	30.3	39.8[a]	8.5[a]	34.1	29.4	26.3
Rely on formal sources of assistance						
Receive food aid from the government	22.1	26.9	11.3	17.0[a]	20.3[b]	33.1[a,b]
Receive food aid from an NGO	22.4	31.3[a]	2.0[a]	24.8	19.4	24.2
Participate in food-for-work or cash-for-work	38.1	36.4	41.9	29.7[a]	39.9	47.1[a]
Rely on assistance from friends or relatives						
Receive money or food from family members	82.9	93.0[a]	59.8[a]	86.7	79.9	82.8
Receive remittances from a relative	16.1	19.8[a]	7.5[a]	20.7[a]	15.5	10.5[a]
Borrow money from friends or relatives	89.6	96.1[a]	74.7[a]	93.3[a]	88.6	86.1[a]
Coping strategies to reduce current expenditure						
Reduce food consumption	98.6	99.3	97.1	100	98.1	97.4
Take children out of school	19.2	24.8[a]	6.5[a]	20.2	19.7	16.8
Move to less expensive housing	2.0	0.7[a]	5.0[a]	1.4	2.6	2.0

[a,b] Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

As would be expected, pastoralists were more likely than either agro- or non-pastoralists to employ strategies involving livestock management: sending livestock in search of pasture and selling or slaughtering livestock. Agro-pastoralists were notably more likely to take up new wage labor than either pastoralists or non-pastoralists. With respect to migration, pastoralists were most likely to migrate some family members, although non-pastoralists were most likley to send children or an adult to stay with relatives. Financial strategies such as borrowing money or drawing down on savings was most prevalent among pastoralists, followed by agro-pastoralists and non-pastoralists.

It is interesting to note that the group identified by the perceptions-based index of shock exposure to be least shock exposed, that is, non-pastoralists, was the most likely to receive food aid from the government or an NGO and to participate in food/cash for work. One-third of non-pastoralist households expected to receive government food aid while under 20 percent of the other groups did so. NGO-received food aid was more balanced across the pastoralist status groups.

Survey respondents were also asked whether they actually employed (rather than planned to employ) 11 coping strategies specifically for dealing with food insecurity. These strategies are listed in Table 5.2, along with a "coping strategies index" (CSI), a summary measure of the degree of food insecurity experienced by households (Maxwell and Caldwell 2008). The strategies range in severity from relying on less preferred and less expensive foods to skipping entire days without eating. The numbers reported in the table represent the percent of households that employed each strategy at least once over the monitoring period.

The most commonly-employed strategies were to limit portion sizes at mealtimes and reduce the number of meals eaten in a day. The latter is considered to be quite a severe coping strategy, but was employed by a full 93 percent of households. Other common coping strategies were to rely on less preferred and less expensive foods and to borrow food or rely on help from a friend or relative to obtain food. Over one-third of all households resorted to skipping entire days without eating, the most severe of all of the coping strategies. Clearly, most households in the PRIME IE area were under a great deal of stress over the IMS period.

As for the broader coping strategies employed to deal with the drought, most of the food insecurity coping strategies were employed more often in Borena than in Jijiga. (The only exception is that sending household members to eat elsewhere was more commonly in Jijiga). Particularly large differences are found for consuming seed stock held for the next season and restricting consumption by adults in order for small children to eat. As summarized by the CSI, the food insecurity coping strategies were generally used more often by pastoralists, followed by agro-pastoralists and non-pastoralists. However, again, the pattern does not always hold. Non-pastoralists are much more likely to send household members to eat elsewhere than pastoralists, for example.

Table 5.2. Food insecurity coping strategies employed in the wake of the drought, by project area and pastoralist status

Coping strategy	All	Project area		Pastoralist status		
		Borena	Jijiga	Pastoralist	Agro-pastoralist	Non-pastoralist
	(Percent of households)					
Rely on less preferred and less expensive foods	86.2	92.4[a]	71.9[a]	86.6	87.2	83.6
Borrow food, or rely on help from friend/relative	84.1	91.5[a]	67.1[a]	86.6	81.8	84.5
Purchase food on credit	77.6	80.7[a]	70.4[a]	76.1	81.0	73.5
Gather wild food, hunt, or harvest immature crops	32.8	36.6[a]	24.3[a]	25.8	37.2	35.2
Consume seed stock held for next season	49.3	67.6[a]	7.5[a]	53.9	51.2	39.1
Send household members to eat elsewhere	26.4	24.5	30.5	22.7	25.5	33.2
Limit portion size at mealtimes	96.2	98.1	92.0	96.3	96.7	95.4
Restrict consumption by adults in order for small children to eat	73.7	93.9[a]	27.5[a]	88.6[a]	73.5[a]	52.1[a]
Feed working members at the expense of non-working members	6.9	9.7[a]	0.5[a]	8.8	7.6	2.8
Reduce number of meals eaten in a day	92.6	99.1[a]	77.6[a]	96.0	91.1	90.3
Skip entire days without eating	35.4	36.9	32.0	30.1	42.4	30.3
Coping strategies index	25.6	31.3[a]	11.4[a]	27.5	25.9	22.3

[a,b] Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

Turning to look at trends across the IMS rounds, for Borena, the common pattern is for coping strategies to be used most often in Round 1 and then to fluctuate below the Round 1 level thereafter (Table 5.3). These data indicate that households in the region were under the greatest stress in October 2014 and that the stress was relieved afterwards. This pattern is consistent with the IMS data collected on shock exposure as measured using both the perceptions-based shock exposure index and the kebele-level shock exposure index (see Figure 4.3). The Jijiga data reveal no particular trend, with the prevalence of some coping strategies increasing over the IMS rounds, some declining, and some fluctuating up and down. This same lack of a consistently inclining or declining trend is found in both regions for the food insecurity coping strategies (Table 5.4).

Some of the coping strategies used in response to the drought are of particular concern because they degrade households' ability to escape poverty and food insecurity. Yet doing so is essential for building resilience to future shocks, especially those associated with climate change (Constas et al. 2014; Lawlor et al. 2015). Reducing food consumption and pulling children out of school or sending them to work for money can negatively affect human capital formation. Selling or consuming productive assets (e.g., livestock and seeds) directly undermines future income generating capability. Purchasing food on credit or borrowing money from a money lender at high interest rates can throw households into long-term debt and thus undermine their future financial security.

Table 5.3. Coping strategies employed over the IMS period, by round and project area

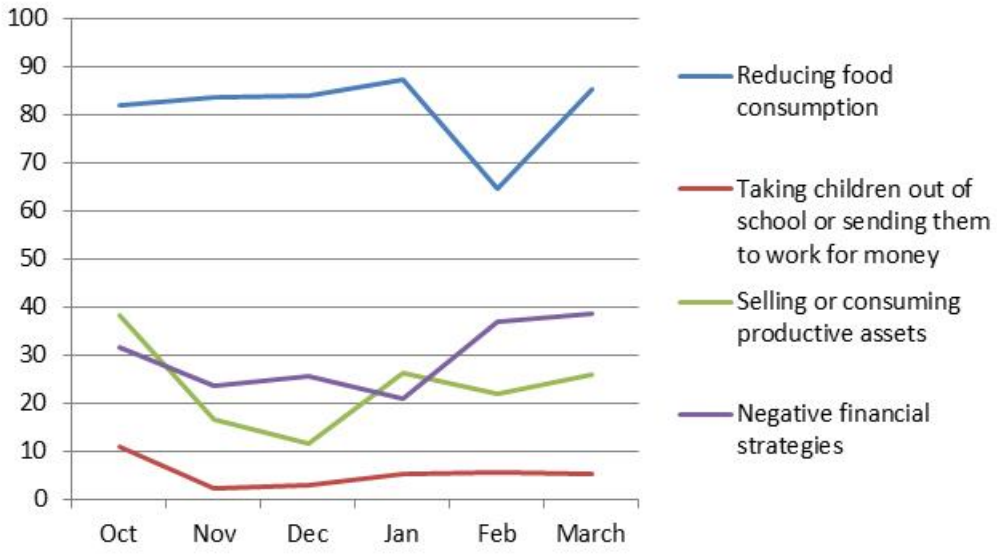
Coping strategy	Oct	Nov	Dec	Jan	Feb	March
Borena						
Send livestock in search of pasture	58.4	10.2	15.2	22.0	24.5	23.4
Sell livestock	84.3	52.2	51.8	46.7	40.3	62.1
Slaughter livestock	35.3	9.4	10.2	10.6	11.0	7.6
Take up new wage labor or send child to work	39.7	29.7	28.9	20.6	17.0	22.9
Migration of some or all household members	50.9	10.4	12.8	17.5	19.5	14.8
Sell or lease out assets	2.6	0.2	0.0	0.4	0.0	0.2
Borrow money or rely on savings	48.3	28.1	33.3	32.1	14.5	32.7
Rely on formal sources of assistance	28.1	15.2	12.8	24.1	21.3	25.0
Rely on assistance from friends or relatives	88.6	78.6	70.9	70.1	62.4	81.4
Reduce food consumption	92.3	85.1	83.8	85.7	61.1	87.1
Take children out of school	13.0	0.7	0.7	3.1	4.7	5.0
Move to less expensive housing	0.0	0.8	0.0	0.0	0.0	0.0
Jijiga						
Send livestock in search of pasture	64.3	44.9	52.5	52.5	58.4	54.1
Sell livestock	45.8	47.1	54.9	58.2	46.6	61.7
Slaughter livestock	1.2	8.0	6.7	4.5	0.0	2.2
Take up new wage labor or send child to work	3.6	12.8	7.9	7.3	5.2	4.0
Migration of some or all household members	40.6	25.7	29.7	25.4	17.5	13.0
Sell or lease out assets	6.0	0.5	0.0	0.0	0.0	0.0
Borrow money or rely on savings	5.8	8.2	4.0	0.6	0.0	0.0
Rely on formal sources of assistance	12.6	15.5	20.7	24.9	16.7	23.6
Rely on assistance from friends or relatives	44.6	47.8	49.3	45.2	54.6	46.7
Reduce food consumption	51.1	76.0	81.7	89.8	68.0	77.4
Take children out of school	6.0	0.0	1.7	0.0	0.0	0.6
Move to less expensive housing	4.8	0.0	0.6	0.6	0.0	0.0

Table 5.4. Food insecurity coping strategies employed over the IMS period, by round and project area

Coping strategy	Oct	Nov	Dec	Jan	Feb	March
Borena						
Rely on less preferred and less expensive foods	63.0	54.6	41.5	54.0	43.6	44.4
Borrow food, or rely on help from friend/relative	52.5	35.1	34.2	58.9	51.2	56.8
Purchase food on credit	29.7	27.3	24.5	19.9	36.5	39.3
Gather wild food, hunt, or harvest immature crops	23.9	19.7	1.5	0.2	2.2	0.0
Consume seed stock held for next season	30.7	11.0	4.7	27.4	24.3	30.2
Send household members to eat elsewhere	5.5	1.4	1.7	8.4	11.4	1.9
Limit portion size at mealtimes	81.7	71.2	75.2	90.6	60.6	76.1
Restrict consumption by adults in order for small children to eat	45.7	47.1	56.4	66.6	38.8	59.1
Feed working members at the expense of nonworking members	1.3	1.5	1.0	2.7	3.8	0.2
Reduce number of meals eaten in a day	74.8	66.7	80.3	96.1	70.7	81.4
Skip entire days without eating	13.8	7.6	3.3	3.3	12.9	8.2
Coping strategies index	33.6	29.3	29.2	34.8	25.7	35.3
Jijiga						
Rely on less preferred and less expensive foods	49.8	22.1	24.5	14.6	30.8	37.1
Borrow food, or rely on help from friend/relative	33.9	25.8	28.4	16.9	31.5	29.7
Purchase food on credit	36.2	18.3	24.1	23.0	38.2	36.4
Gather wild food, hunt, or harvest immature crops	12.2	0.0	1.7	0.0	15.6	0.0
Consume seed stock held for next season	3.7	1.6	2.8	0.6	0.0	0.6
Send household members to eat elsewhere	6.5	0.0	1.1	2.8	21.9	17.7
Limit portion size at mealtimes	43.2	54.4	54.4	44.4	64.4	73.5
Restrict consumption by adults in order for small children to eat	14.8	15.0	2.3	0.6	2.8	1.1
Feed working members at the expense of nonworking members	0.6	0.0	0.0	0.0	0.0	0.0
Reduce number of meals eaten in a day	51.7	37.7	33.9	29.8	34.6	36.6
Skip entire days without eating	8.0	2.1	2.3	0.0	20.9	18.7
Coping strategies index	15.6	7.7	9.2	6.1	15.9	13.7

Figure 5.1 highlights the trends in these negative coping strategies over the IMS period. The trends are difficult to interpret from the perspective of the entire drought period, as the six-month IMS period gives us only a small window. However, we can see that near the end of the period, when according to the AFDM soil moisture data the drought was deepening, use of three of the strategies showed an increase: reducing food consumption, selling or consuming productive assets, and negative financial strategies.

Figure 5.1. Trends in use of negative coping strategies over the IMS period



5.2 Qualitative Data on Coping Strategies for Dealing With the Drought

5.2.1 Borena

Reliance on Social Capital

The most important coping strategy used by households to deal with the drought was to rely on their social capital, or mutual support, to deal with its downstream impacts.

The FDGs and KIIs revealed a situation in which strong forms of mutual support were crucial to the survival of many community members during the drought, but these forms of mutual support were being overstretched to the breaking point by the recurrent drought and multiple shocks. For example, in Yabello a key informant reported in March that community support was high in early periods of the shocks. Households who had lost their cattle were given goats and cattle from better-off households, and people shared maize, wheat and milk with the less fortunate. Some households also lent money and adopted children from destitute families. With the intensification of the shocks, however, support decreased: "…almost everyone needed support in some way… the physical condition of the cattle had reduced their market value and the milk they produced, which severely affected income sources to buy grains and other basic necessities." In these circumstances, people relied on kin and blood ties for support, although there was little to share in such circles as well. Women FGD members (Yabello, reported in October) stated that the community puts an informal pressure on those households that are better off to share, but eventually all households without any saved food or livestock will be affected by shocks.

In IMS Round 1 (October), a respondent in a male FGD held in Yabello explained that the Borena people combine voluntary and compulsory social networks of resource redistribution to address problems ranging from daily food gaps to loss of herds through drought or raids. Compulsory obligations provide for redistribution of cattle to impoverished clan members, as decided by the clan according to specific rules, and individuals who refuse to contribute risk exclusion from the social network.

In contrast, voluntary mutual assistance is organized through relations of kinship, friendship, or cohabitation. For example, residents in a mixed-clan village (*ollaa*) exercise resource sharing or reciprocal borrowing in daily life, based on the neighborhood principle of *ollittii* with the ethos of sharing together in periods of scarcity and prosperity. The expression *ollaa fi duddaan ejjan* (one stands through the support of his back and that of his kinsmen), emphasizes how villagers support each other to stand upright economically, like the backbone supports the body. During frequent gatherings, villagers monitor each other's condition and consult on how to support those who have not recovered from the drought.

In the *bussa gonofa* system of clan resource administration and conflict resolution, and through the *dabare* (transfer) tradition, the Gosas (clan) support each other. Respondents reported sharing grains like maize, as well as sugar, coffee and milk. Some better off households transfer a cow to those who do not have milk for their children (presumably as a loan), and those who are fortunate enough to sell cattle at a good price lend money to others to purchase food. In a kebele in Yabello (reported in October), male FGD respondents made the distinction between *busa gonofa* in which clan members contribute money, and *dabare* in which they transfer cattle to those who do not have milk. They also point out the importance of *jifuu* (ritual ceremonies), in which the community shares food like meat, milk and butter. The male FGD respondents also cited *bussa* as a system of support for sharing food with other neighboring households requiring assistance.

Examples of Social Capital Being Applied. In October, male FGD respondents in Yabello and Dugdadawa stated that the longstanding culture of community support can bolster relations between clan members because it frequently brings people together to support each other. Examples of types of mutual support are:

- Giving money, grains, milk, other food items (e.g., coffee and sugar), household utensils, firewood and goats or cattle to those who have lost cattle due to disease, raids, predators, (Yabello reported in October and November; Miyo reported in November), or are unable to sell livestock due to lack of demand (Dugdadawa reported in October). Some specific examples include:

  (1) Collecting money, slaughtering a cow and sharing the meat in case of livestock disease (Dugdadawa reported in October);

  (2) "The community in my village collected more than 4,000 birr and replaced one ox that I lost due to disease" (Teltele reported in October); and

(3) Helping those who are unable to pay the required livestock tax fee and fail to sell at the market (Dugdadawa reported in February)

- Seeds for sowing for those who don't have them, such as those households that use their seed crops for food (Yabello reported in November; Dugdadawa reported in December).

- *Jifuu* (ritual ceremonies) where households contribute milk, butter and sugar and share meat. (Yabello reported in October).

- Marriage: money is contributed, at times mediated by leaders (Miyo and Teltele reported in October).

- Illness and death: cattle or funds for the individual or for his family member, including burial ceremonies (Teltele and Miyo reported in October). Examples include:

  (1) Setting up funds for severely ill members of the community (Yabello in October);

  (2) Community members helping to work the land for a family when a family member died (Teltele in October); and

  (3) Adult men are expected to provide 10 to 20 birr to family members of a deceased person, while women assist the family of the deceased in preparing or buying and delivering foods including coffee, a traditional drink called Ferso, and they providing household chores (Teltele in November).

- Birth. Other women provide the mother of a newborn with different food items such as milk or butter, and generally 20-30 birr per person, (Yabello in February, or according to financial capacity (Miyo in Feruary).

- Victims of House Fire. A community in Yabello raised 3,000 birr for the loss of a house in in October. In another village in Yabello, 10 quintals of grain and 3,000 birr were raised for the family that lost its house.

- Education and Child Care. Community members help pay for children to attend school (Dugdadawa in November), or university expenses of needy households, at public universities located far from the village (Yabello in December). Some community members in Yabello adopted and provided foster care for children from destitute families (March).

- The Elderly. In Yabello Male FGD respondents reported that there are two aged individuals who are regularly cared for and assisted by others, though the drought had reduced the level of support possible. In Miyo (March) a few community members gave goats to elderly neighbors who don't have grandsons nearby.

- Labor and Other In-Kind Support to Vulnerable Households. Community members in a kebele in Dugdadawa organized and maintained the residences of those severely affected by shocks and also provided labor to maintain farms (November).

Respondents provided additional information on the mutual support provided in their communities. First, regarding borrowing and lending, this practice provides an alternative to gift-giving and is often equally important. It was mentioned in most communities during the early months of the survey (eg. Dugdadawa and Yabello in October). Almost all households borrowed or lent money in some communities for both living and productive expenses (e.g., fertilizer) (Yabello in November). For example, households borrow money from those who sell their livestock in the market during the market day (Dugdadawa in November), especially when they are unable to obtain money from the sale of their own livestock (due to low demand and price, disease, etc). Even when the majority of community members were unable to provide support to others, in some kebeles in Yabello (October) there were some households who are able to lend money.

Livestock have particular significance as assets. For example, when a household loses its cattle, other members of the community (mainly clan members) provide cash or cattle to that household. However, the same asset replacement is not provided when households lose other livestock such as goats and sheep, although lesser forms of support may be provided such as sharing food items like milk, sugar and cereals (Yabello reported in December). As discussed above, livestock diseases posed major challenges including their transmissibility, and this often required coordination with government. For example in a kebele in Yabello, a male FGD stated that households with chickens used poultry vaccine and drugs, generally without success, borrowing money from each other to do so. The community reported the outbreak of disease and the need for a reliable drug supply to the concerned government body and administration, and they were waiting for a positive response. Although respondents mentioned other shocks involving livestock, such as the collapse in prices and loss due to predators and raiders, they did not mention any efforts or strategy to address them.

Sharing water resources is another form of social capital mentioned by a kebele manager in Yabello in January. "Members are using the available water in equal and proper manner… Currently, each household gets 20-liter jar of water once in three days from the main water source, the hand-pumped water point, in the center of the kebele. Households are also sharing … the water fetched from distance places." Some households also share their donkeys to transport water from distant areas.

Support groups as intermediaries to support relations were mentioned by several respondents. Women's support groups with monthly contributions of grains and money helped to overcome the burden of shocks in some villages (Yabello in October and November; Teltele in December). There was mention of households organizing themselves in groups of five and assisting each other in their agricultural labor (Yabello in November).

Limitations of Social Capital As the Drought Progressed. As the shocks extended during the period from October 2014 to March 2015, responses provided in FGDs and KIIs increasingly expressed the dwindling support of mutual self-help in communities. As explained by a male FGD in a kebele in Yabello in March: "In the early period of the drought every member of the community has something to share, whether in the form of cash, crop, cattle or dairy products, however as each household exhausted their resources, lending and giving a hand to the needy decreased considerably." In Dugdadawa in December one respondent remarked: " …this time [shock season] is not suitable to help others. We all are found in difficult time. The situation does not allow supporting others." In March in one kebele in Yabello a key informant stated that: "almost everyone needs support in some way; the physical condition of cattle has reduced their market value and the milk they produce, which severely affects our income sources to buy grains and other basic necessities." As a result of the disease which infected cattle, some communities had discontinued the former arrangement of contributing money to the owner of a cow to slaughter and share its meat (Teltele FGD reported in February). In December respondents in a kebele in Teltele stated that the majority of households were affected by the crop disease and needed assistance. One stated that " …now no one is in position of helping others….I can't assist others since I am facing the problem of providing for my family [due to the shocks] and struggling to feed ten family members."

Not all respondents painted the same picture regarding dwindling social capital and increased isolation. In a kebele in Miyo the men's FGD in March said that while all members of the kebele were affected by the drought, households still were supporting each other mainly by sharing food items and borrowing money. A slight twist on this was given by women respondents in January in the same kebele. They felt that the shocks had increased the level of interdependence of households in the community by binding and interlocking them in lending and borrowing cash and consumables. In addition, members were more reliant on local retailers and petty traders since they are giving and selling their items in credit for many households and members of the community.

The dominant trend, though, was of a reduction in sharing in the face of the shocks. The following changes in social support were identified across the communities:

> **Reduced Moral and Social Support.** One negative effect of the shocks was the absence of social support among members in the community, and the steady decline in their motivation to help each other as the drought deepened (male FGD in Yabello reported in March). As life becomes more stressful, community members worry about their situation and do not have time for communication and play with other community members (Teltele respondents in October). The drought makes most members of the community very busy, reducing the frequency of face-to-face interactions: " ….we are not able to meet and discuss on issues that concern all of us …We all are in a hurry in search of water and pasture for our cattle." (Yabello male FGD reported in March).

Cancellation or Postponement of Cultural Activities. The drought slows down social and cultural activities, traditional ritual ceremonies (*jifuu*) are neglected, and during the dry season household members travel longer distances in search of water and do not have time to participate (male FGD in Yabello reported in October). People often wait for the rainy season and the time immediately after that to conduct rituals, visit relatives and arrange weddings (female FGD in Miyo reported in March).

Nonobservance of Life Cycle Traditional Support. In contrast to better times before the drought, villagers were unable to support mothers who had given birth in a kebele in Yabello in February, although in a kebele in Miyo female respondents stated in March that women are still helping each other in different ways, including contributing 20 to 30 birr (based on their financial capacity) for these mothers.

Lack of Community/Clan Oversight Meetings. The area of local democratic governance also appears to suffer from persistent shocks. In October, a male FGD in Yabello stated that experiencing shock would not affect relationships and community interaction negatively, and they would continue to solve problems in a democratic way. Then in February, respondents from the same kebele noted that with many of the men migrating to other areas in search of water and pasture, it was impossible to hold the clan meeting that helped to identify and organize support for affected households. A male FGD in Miyo mentioned in March that there was now an absence of traditional *Gerey* meetings, as well as the weekly market opportunities for socializing and meeting.

Reduced Extent of Assistance From Household to Household. Most of the households were affected by livestock disease and low market demand, so the support provided by other households to each other was insufficient compared with the actual problems households faced. In November one respondent from Miyo reported losing 20 goats and receiving only a few goats from her sister as support. The drought had reduced the level of support that the community provided to the elderly as well (Yabello male FGD reported in December).

Limitation of Who is Supported. According to a male FGD in Yabello reported in March, the only significant support a household would likely receive is from his relative in blood or marriage. "Everybody in the drought period starts looking for his relatives in blood and marriage, because your needs will eventually become too big to ask your neighbors" (male FGD in Miyo reported in March). Households rely more on kin and blood ties for support, although this is also limited (male respondents from a keble in Yabello reported in March).

Shift Towards In-Kind Support. After suffering shocks, while money, food or assets may only be provided by relatives, the broader community may still provide in-kind assistance (female FGD from Yabello reported in March). "The most anyone can ask in these times… is to look out for your home and cattle in your absence (male FGD in Dugdadawa reported in March). Support tends to be offered in labor. Male FGD informants from a kebele in Teltele disclosed in March the following types of support being organized and rendered to one another: preparing a farm for a household whose head has passed away; and helping to build a household's water storage holes.

Disruption of Support Groups. A women's FGD in Teltele reported in December that the shocks were affecting a saving and credit association composed of 50 women who previously saved 5 birr per month. During the drought the contributions had stopped. Other support systems among community members were not working, such as the contribution of money and labor to households in need. (e.g., collecting firewood for a needy household) Female FGD respondents from a kebele in Yabello reported a similar problem with a women's association, composed of 49 members. This women's association was established with the support of CARE Ethiopia. Members were failing to contribute the expected 30 birr per week during the previous four weeks, and they had decided to suspend meetings.

Providing Support to Other Households Using External Assistance (Food Aid). Several households from kebeles in Miyo and Yabello were receiving food aid through CARE Ethiopia and PSNP (Productive Safety Net Programme) and they were sharing it with the most impoverished households (January through March).

When discussing how they dealt with the drought, Borena respondents clearly emphasized the importance in their culture of community solidarity and concern for clansmen and neighbors. The fact that as the drought progressed members of the community were not able to support each other was considered a real problem. This is illustrated by the following comment from Yabello: "not being to help each other in times of drought was the last thing our fathers would have taught us, but who would have thought times would be so harsh."

During the six-month monitoring period respondents stated that peace and stability were being maintained among clansmen and neighbors (Yabello reported in October), thus maintaining their culture of solidarity. In addition, several FGDs maintain that the problems of loss of livestock and poor harvest were addressed by the community members together which strengthens their relationships (Yabello reported in October). The absence of demand for livestock in the market led members of several communities to lend money and share what they had. Those who got lucky and sold their livestock could buy lunch for their neighbors and friends, thereby boosting the levels of assistance and cohesiveness of the community (Dugadadawa reported in November).

Respondent comments in later rounds of the survey bring up some of the negative effects drought and its down-stream impacts had on the Borena culture of solidarity. The cattle disease had caused disagreements, as the owners of healthy livestock were not willing to let their livestock drink water together with infected livestock or those showing any symptom of sickness (Tetele reported in February). A Yabello key informant reporting in March explained that "…it was customary and obligatory to help people in need, but we can't force that when one may have just enough for his family only. These acts of deviation from the customary support to one another are taken by those who need the assistance negatively, leading to a heightened feeling of hostility in many occasions."

It is evident that with limitations on cultural activities and life cycle events as mentioned above, community cohesiveness could be affected in the long-term. Female respondents in a kebele in Yabello reported in November that shocks were reducing the capacity of households to perform traditional activities that facilitate good relationships among members of the community, because of a shortage of money to engage in these practices. One of the female participants related that when she gave birth to a baby, she was not able to properly receive and serve guests with food, drinks and tobacco.

Linking social capital, which refers to vertical linkages between households/communities and some form of higher authority or power (see Chapter 7), may be required to tackle shocks requiring liaising with government, and examples mentioned of this did not suggest communities were getting good results. For example, in Yabello (in October), households of one kebele had signed a petition to the concerned government body regarding crop and livestock disease, stating that they had purchased drugs and pesticides without much success, and that adequate chemicals were not in stock at the kebele's agriculture and livestock centers. A similar request was made in a kebele in Teltele, and there was limited responsiveness by the government agencies, at least as discussed during interviews. Where there seemed to be more response to their requests to government was in helping to target external assistance programs (Yabello reported in February).

Reliance on Community Leaders

In Borena, community leaders include mainly clan leaders and local government or kebele officials. Qualitative survey respondents agreed that the extensive interdependence among households within villages depends largely on the harmony among its members. The role of the village head (*abbaa ollaa*) is essential in maintaining these harmonious relationships required for the mobilization of village resources to support the poor members (Yabello reported in December). Some comments convey the view that in normal times, leaders were effective in organizing support for those members in need of assistance. With the occurrence of the drought and other shocks, leaders found themselves in the same condition as the less fortunate and did not have the time and chance to organize community support for the poor by conducting meeting with heads of families. Given that the Borena are largely a patriarchical society, households were represented by male adults who make most of the decisions. Getting the male adults to make decisions becomes difficult when they are migrating (Yabello reported in December).

Opinions about the effectiveness of village leaders were fairly evenly divided. Some suggest that the community leaders were effective to some extent in organizing support among members of the community, at times negotiating and calming members who got into disagreements (male FGD Yabello in October). Common resource mobilization roles would include collecting funds for the slaughter of diseased cattle, and organizing work on the farms of individuals unable to work (Dugadadawa reported in October). At times they were able to raise funds or in-kind

support for special cases of individuals in need, such as for university students (Yabello male FGD reported in October). Another example cited was the collection of 5000 birr for an individual with mental problems (Miyo reported in January). Community leaders facilitated discussions about the use of common resources (Miyo reported in October), and responded to situations such as organizing the search for lost camels, or support for villagers who lost livestock to hyena (Yabello reported in October). Clan leaders have a strong role in mobilizing support and solving problems among their members. Mobilizing this support can require coordination with those who live outside a given administrative area, which can take additional time (male FGD in Yabello reported in November).

However some respondents felt that community leaders had not been that effective in organizing members of the community to support those in need (Teltele reported in November), and that they failed to anticipate likely future developments and plan accordingly (Yabello reported in October). A number of female FGD comments reflected an expectation that leaders would mobilize support, and a lack of comprehension as to why the leaders apparently were not doing more (Teltele reported in December).

Many comments also suggest that leaders are limited in time and resources, and that many of the problems such as disease are beyond their power to influence very much (male FGD in Yabello reported in November). In a kebele in Teltele leaders reported the occurrence of a disease to the woreda administration in November, but made no additional effort to organize support for members of the community affected by the disease. "Organizing support requires time and resources. All leaders in the community rely on the same resources, cattle primarily, and look to the same opportunities as the rest of the community. Thus, we don't have the luxury of time and resource to sit and organize this support", said one key informant/ community leader in Yabello in March. Another key informant stated: "I have been moving around in search of pasture and water, our *Gerey* (a traditional grouping of heads of households ranging from 18–20) has not met for more than six months as everybody has a greater responsibility to feeding his family. However, a month ago the community requested us to write a letter to the local authority requesting fodder for our cattle and we complied with the request and submitted a letter to the local government office. We are still waiting for their reply since then." Coordinating support within the community is sometimes done effectively, but in one example, fundraising was limited to 15 birr per family given the poor financial condition of most households (Dugdadawa reported in January).

Many of the comments about leader effectiveness revolved around their ability to obtain assistance for their villages, from government and from external assistance agencies. A male FGD in Miyo reported in February that community leaders [kebele administrators and clan leaders] had been effective at identifying families that were experiencing severe shortages of food, including women and children facing malnutrition, and thereby organizing support from an NGO (GOAL Ethiopia) operating in the kebele. In another example (Teltele reported in

December), the PSNP safety net project had ceased in the area, and even though kebele leaders had compiled a list of households in need of support, no support was provided.

Reliance on External Assistance

There was little mention of external assistance (e.g., food aid) as a key coping strategy by FGD and KIIs respondents. However, as mentioned above, village leaders did make attempts to obtain assistance for those in needs in their villages, with limited success. As also mentioned above, several households from kebeles in Miyo and Yabello were receiving food aid through CARE Ethiopia and PSNP, which they were sharing with more impoverished households (January through March).

There were a number of NGO and PSNP-supported project activities in the area that were supporting collection action in the protection of water holes, pasture areas, and the maintenance of schools (Dugadadawa). For example one kebele in Dugadadawa reported the construction and protection of boreholes that were shared among the households in the community. Through time, however, the drought and related shocks did have a negative effect on collective action regarding resource protection, as mentioned by a male FGD in Miyo (in March). Thus this form of external assistance may not have been dependable in the face of the drought.

Migration, Livelihood Coping and Diversification Strategies

Households used a variety of strategies beyond relying on social capital to cope with the shocks, from temporary employment to migration with livestock seeking water and pasture. The latter can be a positive means of responding to the shocks, for example where migrants go to live with relatives in other areas that have more abundant water and pasture (male FGD respondents in Dugdadawa reported in March). Adult men temporarily migrate to neighboring communities and urban areas for daily labor opportunities, for example sharecropping, road construction and gold mining. Payment terms for day laborers may not be very favorable, with a typical wage being $1/day. Migration is in part a long-term response to structural problems such as a severe shortage of farmland (Teltele FGD respondents reporting in March). Migration increased because of the shock.

Most communities that reported patterns of migration with livestock seeking water and pasture indicated that migration can be very stressful, negatively affecting community well-being (Yabello and Miyo respondents reporting in October). Migrants would generally include boys from as young as age eight, which would affect their schooling among other things. According to several respondents in Yabello, the migration with livestock did not cause any problems regarding relations with other villages.

As discussed above, children, women and the elderly were often more affected by drought and its down-stream effects since they remained in the villages while adult men and youths moved

to other places with their livestock (Yabello male FGD reported in December). For example, many of the shocks mentioned above (such as loss of sheep and goats to disease) were largely felt by women, who have the responsibility of feeding their families (female FGD in Teltele reported in November). The migration of men also has some effect on family relationships and emotional attachments (Yabello male FGD reported in October and February).

Other strategies mentioned by households to cope with the drought were renting out portions of their land, and collecting and selling firewood. One respondent mentioned that owing to his inability to borrow money for medical treatment, he was forced to rent a portion of his land for a year for 500 birr (Teltele reported in December).

5.2.2 Jijiga

In Jijiga, the coping strategies that members of the community use to support each other in response to shocks were both positive and negative. For the most part, the strategies did not change much over time, and tended to be more positive in nature.

Mutual Support

The most common positive strategy used by communities to support the poor was some type of safety net provision for more needy households. Every kebele has some sort of reciprocal means of helping less fortunate households. Such means of assistance came in forms like providing milk, cash or in-kind offerings (e.g., goats, crops, other food items). Kebele members in Gursum and Kebrebeyah helped to guard each other's crops from birds and other invaders (rhinos, monkeys) or water sources in a kebele in Kebrebeyah (male FGD reported in October). Female FGD members in a kebele in Kebrebeyah also noted in October that they have a practice of taking in migrants who come from desperate households. These women indicated how they would mobilize resources and labor to help reconstruct demolished houses in newly established settlement areas. Neighbors in another kebele in Kebrebeyah helped weed each other's fields. While not a community-wide response, credit to buy seeds and livestock was extended to family/kin in Gursum and Kebrebeyah as well.

One community in Kebrebeyah addressed drinking water problems by collectively sharing the scarce amount available at an old watering hole (male FGD reported in October). In October, residents in a kebele in Kebrebeyah discussed how their community members took it upon themselves to mobilize and divert a river to use for crops and grazing lands (male FGD). By November, the river was drying up, but members still pulled together to help one another as noted by one participant; "…as the river water dwindles every day, we are grading the grazing land in collaboration with each other." However, the government restricted use of the river to only produce fodder, which reduced available grazing land for the community's livestock. One of the FGD members said, "As the drought deepens, everyone clinches their hand, and members of the community pulled together to grade the grazing land."

Mutual support was also seen in collective action in the form of soil and water conservation. These activities were being promoted by PSNP and NGOs operating in the areas. Soil conservation activities (e.g., terracing, soil bands, tree planting) were common across all kebeles over time, with the exception of one kebele in Kebrebeyah, which reported few to no activities in the last three months (January – March). Male FGD members in another kebele in Kebrebeyah reported that soil conservation activities are rarely performed, usually in a disorganized manner that are unsustainable. Three kebeles cited tree planting at one point in time, once each in a kebele in Gursum (October), and a kebele in Kebrebeyah (December). A new tree was introduced that grows quickly and whose leaves are edible (KII in Gursum reported in January).

Water conservation or harvesting activities (e.g., pond construction, river diversion, dams, water basins, watering holes) were second most commonly indicated across time in most of the kebeles. A kebele in Kebrebeyah community was involved in diverting a river in October, but the activity was not mentioned in subsequent months.

Road construction and/or repair were mentioned in three kebeles at different times. Activities occurred in Kebrebeyah in October, December and March. Road construction occurred in Gursum during October, December, January and February.

Livelihood Diversification

Livelihood diversification was mentioned in no more than two rounds of FGDs in six of the eight kebeles where qualitative data were collected in Jijiga. Charcoal production and sales was mentioned in two different kebeles in Kebrebeyah, and firewood sales, food and water sales by women in a kebele in Gursum (female FGDs in October). Beekeeping was another activity that was taken up in response to the drought, as mentioned in two different kebeles in Kebrebeyah. Although women were diversifying their income sources to feed their families, men also collected a major portion of the money to buy chat (female FGD in Kebrebeyah).

According to a female FGD in Kebrebeyah (October), people in the respondents' kebele would also pursue daily farm labor. This was negatively affected due to the poor production because of the poor rainfall conditions (male FGD Kebrebeyah reported in October). The better off farmers hired labor when tractor rental prices were too high (although it was noted that this had a positive impact on those who were hired) (male FGD Kebrebeyah). Some poor people turned to begging to cope.

Migration

Migration was also a common response to the drought. Although migration is a typical activity during the dry season, extended periods of poor rains led to earlier migrations (male FGD Kebrebeyah). Sending children to live with other family members until the hard times passed was less common. Children were often expected to work to support the household.

Selling Livestock

Selling livestock in order to be able to buy seeds or food for the household was common in kebeles in Gursum and Kebrebeyah. Male FGD members in two different kebeles in Kebrebeyah stated that the better of households extended the cash they received from selling livestock to other needy households.

Other Coping Strategies

A coping strategy that was mentioned twice was buying water from Somaliland or "bottees" (traveling water tanks) at a high price (female FGD Kebreybeyah in October). Another coping strategy to deal with the drought was to have elders pray. Many households mentioned using traditional medicines for treating crop and/or livestock diseases, but a large number of the male FGD respondents mentioned purchasing "oxada" from communities in Somaliland. Sharing medicines was not uncommon. Selling crops such as groundnuts during peak price times occurred once in a kebele in Gursum (reported in October) and was mentioned twice in another kebele in Gursum (October and November).

Some FGD respondents mentioned how they sought services from the government, but it was not clear whether they actually received the assistance (male FGD in Kebrebeyah). Consuming ground roots that were intended as fertilizer was mentioned in a kebele in Gursum and a kebele in Kebrebeyah (both in the October FGDs).

Limits of Coping Strategies As the Drought Progressed

As in Borena, the qualitative data point to some signs that as the drought progressed there were limits to coping. The impact of the drought on household relationships occurred at two levels; within the household and at the broader community level. At the household level, quarreling between spouses (which would sometimes lead to divorce) was not uncommon; it was mentioned in all but one kebele in Kebrebeyah. Male seasonal migration seemed to be less associated with burdens on the family as compared to the impact of children being separated from their families in order to seek work. This also means fewer children attending school (female FGD in Kebrebeyah reported in October).

Similar to Borena, the impacts at the community level appear to have worsened over time. For instance, female FGD participants in a kebele in Kebrebeyah responded in October and November that there was a strong care and support mechanism in place in their kebele, and that "We support one another in the face of hardship." However these positively-oriented social bonds were not brought up in subsequent discussions. Instead, both male and female FGDs began to note the lack of social interactions with families and friends due to ceremonies being postponed and fewer people going to the market. Male FGD members in one kebele in Kebrebeyah also noted that markets, which used to bring people together, "lost their glamour and hype."

As early as November, male participants in one kebele in Kebrebeyah said "everybody is hiding out when called for help. People don't have much to share and everyone understands that." In addition, respondents indicated "feeling of protectiveness and individuality is seen as our problem worsens." By December, women in a kebele in Kebrebeyah observed that community members were not going out in public as much to avoid being asked for money contributions. This was also brought up in January by a key informant in Gursum who said, "Repetitive request for support has forced people to lead a very private life that is odd to the culture." Relations were also strained in another kebele in Kebrebeyah because of the inability of community members to be able to help each other with cash or in-kind contributions.

Finally, the impact of migration on the community was observed by male FGDs in Kebrebeyah to put those who stay behind at greater risk since there is no one to help watch out for their house, livestock and children. Losing young people to migration also has contributed to a loss of practicing traditions.

5.3 Summary

The findings in this chapter indicate that households were using both positive and negative responses to deal with the negative consequences of drought. That reducing food consumption was a coping strategy used by almost all households is a strong indication that the drought and its downstream impacts were exacerbating food insecurity in both regions. It can explain why 50 percent of households planned to rely on some type of humanitarian assistance (food aid or cash) at some time over the IMS period. The use of other negative coping strategies that undermine future resilience to shocks, for example, taking children out of school and selling productive assets, increased in the last two rounds of the IMS when drought conditions were worsening.

A very common positive coping strategy was to rely on assistance from friends and relatives, including receiving money for food and borrowing money. The qualitative data concur that people's reliance on social capital to get them through this drought period was critical. However it was only a reliable coping strategy in the early months of the survey because over time social capital was eroded. As the downstream impacts of the drought began to accumulate, there was a steady erosion of social support making it harder for better off households and community leaders to support those in need.

As the food security situation deteriorated over time, more households in Borena were taking children out of school either to migrate with the animals, to work to support the family, or to live with relatives. This response can negatively affect the long term human capital of a household and degrade their opportunities to escape from poverty and food insecurity in the future. Also in Borena, the governance systems in the communities were starting to be negatively affected because community leaders were migrating to distant locations in search of water and pasture making it more difficult to hold clan meetings. It is at these meetings that

support is mobilized for the poor. Other traditional ritual ceremonies where food redistribution takes place were also neglected.

In Jijiga indications that coping abilities were becoming strained as the drought progressed include quarrels between spouses over food shortages, sometimes leading to divorces, and, at the community level, the breakdown of mutual support mechanisms. Patterns of migration where males of households leave for long periods of time seeking water and pasture for livestock can lead to stressful conditions for families. Children, women and the elderly are often more negatively affected by the drought and its downstream impacts because they remain behind in the villages.

The drought exposure data presented in the previous two chapters indicated that Borena was more severely exposed to the drought than Jijiga. Quantitative and qualitative data on coping strategies concur, revealing that most drought coping strategies, whether positive or negative, were employed by a greater percentage of households in Borena than Jijiga.

6. Household Food Security and Resilience in the Face of Drought

As noted in the introduction, household resilience is the ability of a household to mitigate, adapt to, and recover from shocks and stressors. In this report, resilience is measured using food security as the basis for determining whether a household has been able to maintain or recover its well-being after experiencing the drought.

This chapter starts out by examining trends in food security over the IMS rounds compared to the baseline for the two PRIME IE regions. It then turns to look at how resilient households were to the drought using direct indicators of resilience based on the IMS data.

6.1 Changes in Food Security Between the Baseline and IMS Period

The measure of food security relied on in this report is the inverse of an experiential indicator of food insecurity, the Household Food Insecurity Access Scale (HFIAS) (Coates, Swindale and Bilinsky 2007). The HFIAS is an index constructed from the responses to nine questions regarding people's experiences of food insecurity in the previous four weeks. Responses range from worry about not having enough food to actual experiences of food deprivation associated with hunger, with the nine conditions related to food security being:

1. Worry that the household would not have enough food.
2. Any household member was not able to eat the kinds of foods preferred because of a lack of resources.
3. Any household member had to eat a limited variety of foods due to a lack of resources.
4. Any household member had to eat some foods that they really did not want to eat because of a lack of resources to obtain other types of food.
5. Any household member had to eat a smaller meal than he/she felt they needed because there was not enough food.
6. Any household member had to eat fewer meals in a day because there was not enough food.
7. There was ever no food to eat of any kind in the household because of lack of resources to get food.
8. Any household member went to sleep at night hungry because there was not enough food.

9. Any household member went a whole day and night without eating anything because there was not enough food.

Survey respondents indicate whether or not they or another household member experienced the event or feeling in question and, if yes, how often in the last 30 days (rarely, sometimes or often). A score is then calculated based on these frequency responses. The inverse of the score is taken for the analysis of this report so that the measure increases with increasing household food security.

The HFIAS can also be used to categorize households into four groups: "food secure," "mildly food insecure," "moderately food insecure," and "severely food insecure." The groups are formulated based on the assumption that the severity of food insecurity progresses from feeling worried, through concerns about dietary quality, and finally, experiencing an actual lack of food. A food secure household experiences none of the nine conditions listed above, or just experiences worry, but rarely. At the other end of the spectrum, a severely food insecure household has cut back on meal size or the number of meals eaten in a day often, and/or experiences any of the three most severe conditions: running out of food, going to bed hungry, or going a whole day and night without eating.

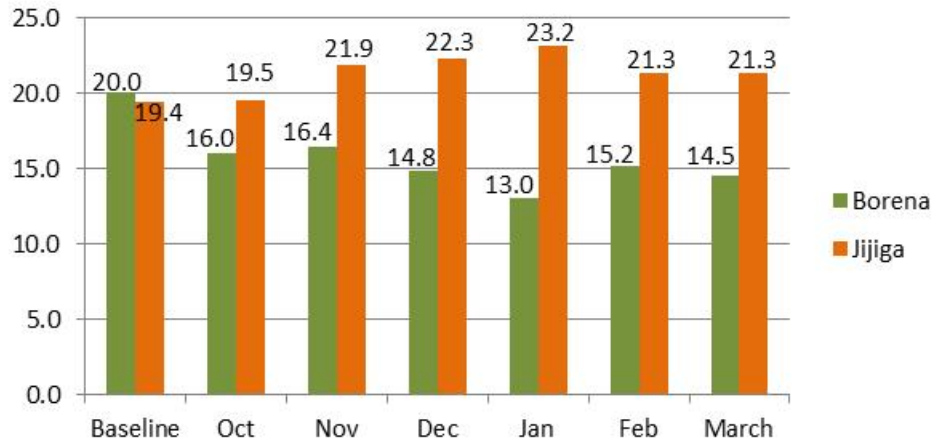
The HFIAS combines information on the sufficiency of food consumption with information on the quality of households' diets, both of which are important dimensions of food security. A measure focused specifically on dietary quality is also employed here, a dietary diversity score based on the consumption from 12 food groups in the last 24 hours. In addition to the fact that dietary quality is very low in both IE areas, it was observed from the baseline data that in this population greater shock exposure is associated with *better* dietary quality, as measured using dietary diversity. This is because households start to diversity their diet away from the typical daily eating pattern when they are under stress. This factor should be kept in mind when interpreting the IMS dietary diversity data.

Table 6.1 reports on the changes in these food security indicators from the baseline to the IMS rounds for the two project areas. For Borena, the index was lower in all IMS rounds than it was at baseline, indicating a decline in the average households' food security over time. It fluctuated up and down over the monitoring period but showed a downward trend (see Figure 6.1). The percentage of *food secure* households fell from just over one-quarter of households at baseline to one percent by IMS Round 6, that is, there were practically *no* food secure households by the end of the IMS period, one year after the onset of the drought. The percentage of *severely food insecure* rose precipitously, from 30 at baseline to almost three-quarters of all households by Round 6, with a progressive increase over the IMS rounds. This increase is consistent with the increases in drought exposure over the second wave of the drought seen in Chapter 4 (see Figure 4.3). Dietary diversity was higher in Round 1 than it was at baseline, but showed a declining trend thereafter. Given the caveat regarding the dietary diversity measure above, this

Table 6.1. Food security at baseline compared to IMS rounds, by project area

	Baseline	IMS rounds					
		Oct	Nov	Dec	Jan	Feb	March
Borena							
Food security index	20.0	16.0	16.4	14.8	13.0	15.2	14.5
Food security groups							
Food secure (%)	25.7	3.3	14.0	12.4	0.7	1.7	1.0
Mildly food insecure	3.7	5.8	1.8	0.0	1.0	0.2	0.0
Moderately food insecure	38.7	31.9	20.3	13.9	20.2	18.9	25.8
Severely food insecure	30.3	59.0	63.9	73.7	78.1	79.2	73.2
Dietary diversity score	4.5	5.2	4.8	4.9	4.7	3.6	4.2
Jijiga							
Food security index	19.4	19.5	21.9	22.3	23.2	21.3	21.3
Food security groups							
Food secure (%)	28.3	12.4	35.7	38.2	46.6	22.1	20.9
Mildly food insecure	3.8	7.1	6.4	9.0	14.0	16.8	12.4
Moderately food insecure	20.0	44.3	31.1	26.0	23.0	32.5	38.7
Severely food insecure	44.3	36.2	26.8	26.9	16.3	28.6	28.0
Dietary diversity score	3.5	4.6	4.6	4.4	4.9	4.4	4.6

Figure 6.1. Food security index at baseline compared to IMS rounds, by project area



trend confirms that conditions were becoming unusually stressful and progressively worse over time.

For Jijiga, the food security index is *higher* in all IMS rounds compared to the baseline; it increases over Rounds 1 through 4 and then declines (Figure 6.1). The percent of food secure households fell between the baseline and Round 1, rose between Rounds 2 and 4, and then tapered off to below baseline values in Rounds 5 and 6, reflecting the deteriorating drought conditions shown by the AFDM soil moisture data (Figure 4.3). The percent of severely food insecure households was significantly lower in Round 1 than the baseline and fell from 36 to 28 over the rounds. Dietary diversity increased from the baseline to the IMS rounds, and remained steady across the rounds. These changes over time in food security indicate that Jijiga

households were on average more resilient to the impacts of the drought than Borena households.

6.2 Qualitative Data on Food and Livelihood Security During the Drought

Borena

Due to a combination of drought and the resulting livestock and crop disease and adverse market conditions, respondents were facing a multi-factor livelihood disaster. FGD and KII respondents often mentioned the impacts of this situation on their incomes and food consumption. With crop harvests plummeting, leading to a direct loss of foods for consumption, households were forced to buy the agricultural products that they normally would produce (Teltele reported in December). In Dugdadawa woreda (reported in January), respondents said that after the withered harvest caused by crop disease, there was a scarcity of agricultural products, and more villagers were needing to procure these products on the market. This led to the increase in price of one kilogram of maize from 2.5 birr to 6 birr, and a kilogram of bean had reached 25 birr. Some households were also left without seeds for planting in the subsequent season (Dugdadawa and Yabello). Male FDGs in Yabello reported a failure of harvest in late 2014, leading to a situation in which villagers went days without meals. Some households borrowed money on the expectation of a good harvest, and then were forced to sell their cattle to pay back the loan as well as purchase food items, mainly cereals.

Livestock sales are an important source of income, particularly when other income sources fail. Families depend on selling their cattle or goats to purchase commodities. In Yabello (reported in October), respondents mentioned that "we do not have enough grazing land and water for our livestock…we can't fatten cattle that survived the disease to sell due to the scarcity of water and fodder. Thus, we do not have enough money for food consumption." With the fallen demand for livestock, they either could not sell or were forced to sell at very low prices. In November one respondent in Yabello reported: "Last week on Thursday, some of the heads of households brought their livestock to Eleweya market for selling. However, they came back from the market paying taxes for cattle they didn't sell." In Miyo woreda (reported in January), the combination of drought and livestock disease were decreasing income and depleting the wealth of most households.

Numerous respondents indicated that their livelihoods were affected by high and rising input costs. In Dugdadawa (reported in February), male FDGs said they paid 800 birr for *Dap* fertilizer and 600 for urea, and rising fuel costs had increased the price of transport by 50 percent. In Yabello (reported in January), respondents from one kebele said they paid 320 birr for one round of treatment of the insecticide to prevent and control the worm which is damaging crops. They paid for the insecticide by selling their goats or borrowing the money.

They also found it frustrating to pay market tax even when they were unsuccessful with a sale (30 birr for a camel, 20 birr for a cow and 10 birr for a goat or sheep).

The common report coming from qualitative survey respondents was that they did not have enough food to eat or to purchase the basic things for subsistence (Yabello reported in October). Male FGD respondents from one kebele in Yabello stated that "most members of the community were reporting that they had little or nothing to get by in the coming month." Food insecurity was common, and some were unable to pay school fees as a result (male FGD from one kebele in Yabello reported in October). As the male FGD respondents from one kebele in Teltele reported in December, "the problems [mainly crop and livestock disease] affected most families of the village…Now there is no food to eat in most families…The people have started eating leafs of coffee."

In some villages, respondents were clear about the impact of food insecurity being the greatest for children, and in some cases the elderly (Yabello and Miyo). Because many of the cattle were moved to other places in search of water and pasture, the amount of milk produced and consumed had fallen, with young children and women being those most affected (Yabello female FDG reported in December). In a kebele in Teltele (reported in February), some families reported that they had stopped drinking milk of diseased cows. This disproportionately harmed children, since they are the main consumers of milk. A further problem was that community members often refrained from consuming the milk products that were available, due to the danger of transmission of disease from the livestock to humans (male FDG in Tetele reported in March).

In Dugdadawa woreda (reported in March), respondents raised the issue of the burden on women, who have the main responsibility for child rearing and domestic work, presented by the shortage of food and drinking water. A case in point: the absence of maize in many households was forcing people to search for *Inset* (false banana) in the forest, which had never been a common food in the area, and women often were responsible for obtaining and preparing this food. In one kebele in Teltele, female FDG respondents pointed to the situation of women who were facing the responsibilities of feeding children when dealing with the loss of sheep and goats (due to disease) while men migrated to urban areas for work or to take livestock to other areas. They also mentioned the poultry diseases particularly affected the livelihood of women headed families and others who earn their income from selling chicken and eggs. Women-headed households were also affected by the shocks because most of them support their families by selling goats and sheep. In Miyo (reported in February) one female participant said, "I cannot send my children to school due to the animal disease problem. I am feeding my children by selling goats and sheep….The disease has killed most of the goats that I had." In Dugdadawa, participants said that weakening markets were affecting not only livestock traders, but also the incomes of retailers and those selling food and beverages, some of whom are women.

When livelihoods were disrupted due to reduced household income and migration in search of water and fodder, interruption of schooling was a common result. Female FGD respondents from one kebele in Yabello stated that they also had a shortage of funds for buying clothing and paying school expenses. One respondent couldn't pay the registration fee of 160 birr for her daughter to attend 10th grade. Households were having trouble feeding children and providing them milk, let alone sending children to schools (Yabello and Miyo reported in October).

Jijiga

Not surprisingly, the three most common shocks (drought, livestock disease and crop disease/raids) are very much related and had a complex and severe negative impact on households. The primary impact households experienced across time was reduced agricultural productivity (crops and/or livestock), which thereby decreased household income. As one male FGD in a kebele in Kebrebeyah stated, "…we don't have a choice but to simply watch the destruction of our crops" (December). Poor harvests were experienced in all kebeles in Gursum as well as most of the kebeles surveyed in Kebrebeyah (male FGDs reporting in October). One male FDG in a kebele in Kebrebeyah said "we have no crops for consumption or seed" (November).

An extreme case was reported in a male FGD in Kebrebeyah (October) in which households were reported to resort to consuming ground roots that were intended as an organic crop fertilizer, as well as using farm residuals as fodder for their livestock. This example serves to illustrate the extent of the loss experienced.

Livestock losses were high in most of the kebeles in Gursum and Kebrebeyah as well (male FGDs reporting in October and November). For most of the communities, the loss of livestock to disease or the decrease in value of their production and market value translated to a great economic loss for households. Livestock disease and death reduced the availability of milk for children (male FGDs in Gursum and Krebrebeyah, reported in February). As a male FGD participant stated in Kebrebeyah in December and February, " we can't do anything other than accepting its consequences...we don't have any other choices."

Not only did livestock serve as a means for households to recover more quickly from shocks, but the income generated from their production and sales was often spent on school costs and medical care for children. As such, without the income, the education and health of children were compromised. This problem was stated by both male and female FGDs in both Gursum and Kebrebeyah in October, November and December. Families began dropping their children out of school beginning in October (male focus group in two kebeles in Kebrebeyah). This trend continued through all of the survey rounds. In one kebele in Kebrebeyah, a male FGD stated that some families pull their children out of school and send them to Somaliland to work (reported in October). Children were sent to Somaliland to work from a kebele in Gursum as well (male FGD reported in February).

The major outcome from these shocks was increased household vulnerability and food insecurity, indicated by many participants that said they could not adequately feed their families. Households in all of the kebeles surveyed said the crop and livestock loses made it difficult to feed their families. Food and money shortfalls led to family quarrels between husband and wife and in some cases led to spouse abuse and divorce (female FGDs and KIIs in kebeles in both Gursum and Kebrebeyah reported in all rounds of the survey).

Families relied on the kindness of others to get through this drought period. Better off households in one kebele in Kebrebeyah were contributing goats to the most needy households. Families that had already migrated were also helping those left behind. As one female FGD stated in October in Kebrebeyah, "we also have a practice in which already migrated households adopt some members of desperate households in their newly established localities." Children are sent to these relatives until the hard times pass.

The lack of food also led to more children being sick (KIIs in Kebrebeyah, reported in January). The loss of income affected households' ability to get adequate medical care as well (KII in a kebele in Kebrebeyah). The drought also negatively affected the occurrence of traditional ceremonies where food redistribution often took place (male FGD in Kebrebeyah, reported in November and December).

6.3 Household Resilience in the Face of the Drought

Table 6.2 presents measures of resilience by project area and pastoralist status over the IMS rounds using three indicators. The first is the round-by-round change in the food security index from its baseline value. By this measure, the higher the change in food security, the higher a household's resilience to the drought conditions experienced thus far. As can be seen, Borena households were less resilient than Jijiga households in all rounds. A pronounced pattern can also be seen in differences across the pastoralist status groups: pastoralists were less resilient than agro-pastoralists and agro-pastoralists less resilient than non-pastoralists. Again, this pattern likely reflects that greater effects of agro-climatic conditions on the former two groups, who are more dependent on livestock rearing and crop production for their livelihoods.

The second indicator of resilience is the percent of households who were able to maintain or improve on their baseline food security. Overall, only from 31-44 percent of households were resilient to the drought across the rounds. Here we see that a much larger percentage of households were resilient in Jijiga than Borena. The difference across the regions widened over the IMS rounds: in Round 1 it was 22.6 percentage points (48.2 versus 25.6); by Round 6 it had risen to 31.9 percentage points. A similar pattern can be found for difference across the pastoralist status groups: there is a widening over time of the differences between pastoralists and non-pastoralists, perhaps due to the deteriorating TOT for pastoralists associated with increasing food prices and declining livestock prices (see Chapter 3).

Table 6.2. Resilience in the face of the drought, by project area and pastoralist status

Coping strategy	All	Project area		Pastoralist status		
		Borena	Jijiga	Pastoralist	Agro-pastoralist	Non-pastoralist
Change in food security index from baseline to…						
Round 1	-3.29	-4.61[a]	-0.25[a]	-4.54	-2.83	-2.28
Round 2	-2.43	-4.27[a]	1.77[a]	-3.65	-2.29	-0.88
Round 3	-3.41	-5.86[a]	2.17[a]	-4.73[a]	-3.97[b]	-0.47[a,b]
Round 4	-4.45	-7.65[a]	2.88[a]	-6.78[a]	-4.48[b]	-0.97[a,b]
Round 5	-3.44	-5.47[a]	1.20[a]	-5.79[a]	-3.46[a]	0.02[a]
Round 6	-3.87	-6.09[a]	1.22[a]	-5.80[a]	-4.26[b]	-0.30[a,b]
Percent of households resilient (maintained or improved on baseline food security) as of…						
Round 1	32.4	25.6[a]	48.2[a]	26.9	34.3	37.3
Round 2	44.1	36.0[a]	62.6[a]	35.7[a]	47.1[a]	50.9
Round 3	38.2	28.4[a]	60.7[a]	34.2	35.7	48.9
Round 4	32.7	16.3[a]	70.0[a]	23.6[a]	34.0	43.4[a]
Round 5	34.0	26.7[a]	50.5[a]	26.5[a]	33.6	45.5[a]
Round 6	31.2	21.5[a]	53.4[a]	22.1[a]	28.1[b]	50.5[a,b]
Index of perceived ability to recover from downstream impacts of the drought, mean						
Round 1	1.93	1.88[a]	2.06[a]	1.87[a]	1.92[b]	2.03[a,b]
Round 2	1.94	1.91[a]	2.02[a]	1.88[a]	1.96[a]	2.01[a]
Round 3	1.96	1.95	2.01	1.92[a,b]	1.98[a]	2.00[b]
Round 4	2.10	2.15[a]	1.99[a]	2.09	2.09	2.14
Round 5	2.01	2.02	2.00	2.04[a]	1.94[a,b]	2.11[b]
Round 6	1.96	1.96	1.94	1.93	1.98	1.96

[a,b] Subgroups with the same superscript are significantly different at the 0.05 level. Comparisons are across columns.

A final indicator of resilience is given by an index of households' "perceived ability to recover from the downstream impacts of the drought" that they experienced in the month prior to the survey. This perceptions-based index is constructed based on households' subjective reports of their ability to recover from the actual shocks they experienced. The shocks used in the measure are the same downstream shocks employed to construct the perceptions-based shock exposure measure (see Section 4.3). Regarding each shock that they experienced, survey respondents were asked "To what extent were you and your household able to recover?" The possible responses were:

1. Did not recover;
2. Recovered some, but worse off than before;
3. Recovered to same level as before;
4. Recovered and better off; and
5. Not affected.

The ability to recover (ATR) index is the mean value of respondents' responses to the question across all of the shocks experienced.[29]

The lower panel of Table 6.2 contains the results for the ATR measure of resilience. It tells a somewhat different story from those based on changes in food security. While according to this measure Borena households were less resilient than Jijiga households as of Rounds 1 and 2, it shows little difference in resilience for the last four IMS rounds, when drought conditions were becoming more severe in both areas. Further, it shows very little difference between pastoralists and non-pastoralists in the last four rounds. The different pictures given by the perceptions-based measure and the more objective measure based on changes in food security is partly due to the fact that that latter is a long-term measure of resilience (resilience from baseline to the time of each round, that is, 11-16 months later) while the former is more short-term, referring to the ability to recover from the shocks experienced in the previous month.

6.4 Summary

In this chapter resilience to the drought is measured using two indicators: (1) the change over the drought period in household food security; and (2) an indicator of whether households were able to maintain or increase their food security over the drought period. The underlying measure of food security relied on is the inverse of the HFIAS. This scale also allows classification of households into four groups: food secure, mildly food insecure, moderately food insecure and severely food insecure.

Changes in food security over time differ for Borena and Jijiga. In Borena, food security was lower in all IMS rounds than it was at baseline, indicating a decline in the average households' food security over time. It fluctuated up and down over the monitoring period but showed a downward trend. The percentage of food secure households fell from just over one-quarter of households at baseline to one percent by IMS Round 6, that is, there were practically *no* food secure households by the end of the IMS period, one year after the onset of the drought. In Jijiga, food security was higher in all IMS rounds compared to the baseline. While the percent of food secure households fell between the baseline and Round 1, the percent of severely food insecure households was significantly lower in Round 1 than the baseline and fell from 36 to 28 percent over the rounds, indicating a greater resilience to both waves of the drought than in Borena.

The qualitative data from both regions on households' experiences of food and livelihood security during the second drought wave highlight common conditions of economic hardship and simply not having enough food to eat. With reductions in crop production, households were forced to buy the food they would normally produce themselves even in the face of rising

[29] Households that claimed to be "Not affected" were reclassified to fall under category 3: recovered to the same level as before. The few households that had not experienced any shock in a particular round were also reclassified to fall under category 3.

food prices. Similarly, households unable to sell their livestock due to reduced demand and low prices found themselves in a situation where "we do not have enough money for food consumption." Children and women felt special burdens. Children were taken out of school due to the need to use funds to buy food that previously were used for schooling expenses. Further, children, the main consumers of milk saw a reduction or complete stoppage in their milk consumption. Women were finding it difficult to feed children and other family members and perform their domestic chores due to the disruption caused by the drought. Further, their income generating activities, such as retail sales, were disrupted, reducing their incomes and money available for food.

Overall, only about one-third of households were resilient to the first wave of the drought, 26 percent in Borena and 48 percent in Jijiga. Pastoralists were less likely to be resilient than agro-pastoralists, and agro-pastoralists less likely to be resilient than non-pastoralists.

7. The Relationship Between Household Resilience and Pre-Drought Resilience Capacity

It is clear from the quantitative and qualitative data presented in previous chapters that most households in the PRIME IE area were negatively affected by the drought in at least some way. This chapter uses regression analysis to explore the effect of households' resilience capacity before the onset of the drought on their resilience to it, that is, their ability to manage or recover from it. It starts by undertaking analysis of the relationship between shock exposure and resilience in Section 7.1. In Section 7.2 it then turns to analyze the relationship between resilience capacity—including absorptive capacity, adaptive capacity, and transformative capacity—and resilience to the drought.

The empirical methods employed are laid out in Chapter 2. As discussed there, the analysis focuses on the first wave of the drought, which occurred between March and October 2014. Two measures of resilience are employed: (1) the change in food security over the course of the drought; and (2) a dummy variable for whether a household was resilient or not, defined as the condition in which a households' food security at the end of the first drought wave is greater than or equal to what it was at the beginning of the wave.[30] Food security is measured using the inverse of the HFIAS, as described in Chapter 6.

A number of measures of shock exposure based on different data sources are employed in order to get a full picture of its effect and adequately control for it in the analysis. The measures are described in Box 7.1. In order to implement the empirical growth model with transitional dynamics, two of the measures are based on changes over time:

- Change in the rainfall deviation from baseline to Round 1
- Change in the soil moisture deficit from baseline to Round 1.

Three of the measures capture the total magnitude of the shock over the drought wave:

- 12-month rainfall deviation from norm at the time of Round 1
- Cumulative (net) rainfall deficit from baseline to Round 1
- Cumulative soil moisture deficit from baseline to Round 1

The final measure is the perceptions-based drought exposure index calculated using the data from IMS Round 1, described in Chapter 4. This is an index of households' exposure to the downstream impacts of the drought at the end of the first wave.

[30] In practice December 2013 (the time of the baseline survey) is used to mark the beginning of the drought period. As can be seen from Figure 3.3, rainfall changed relatively little between December 2013 and March 2014, the onset of the drought.

Box 7.1 Measures of shock exposure employed for regression analysis of the first shock wave

Rainfall-based measures of shock exposure (Kebele level)

(1) Change in the rainfall deviation from baseline to IMS Round. This measure captures the *change* in the inverse of the 12-month Standard Precipitation Index (SPI) percentile from baseline to Round 1. The 12-month SPI is the number of standard deviations that observed 12-month precipitation deviated from the climatological average (see Figure 3.3 for a graphical representation of the 1-month SPI). Downloaded from the AFDM specifically for IMS kebeles, the 12-month SPI is employed in order to capture the difference over time in long-term drought exposure.

(2) 12-month rainfall deviation from norm at the time of Round 1. This is simply the inverse of the 12-month SPI at the time of Round 1. It captures the total magnitude of the rainfall shock households were exposed to during the first shock wave. The data used also include rainfall during some months leading up to the onset of the shock (October 2013-February 2014), but as noted above, these months were of relatively normal rainfall (see Figure 3.3).

(3) Cumulative (net) rainfall deficit from baseline to Round 1. This measure is the sum of the inverse of the 1-month SPI across the 10 months from the baseline to Round 1 and is an additional measure of the total magnitude of the rainfall shock.

Soil moisture-based measures of shock exposure (Kebele level)

(4) Change in the soil moisture deficit from baseline to Round 1. This measure is the change in the inverse of the soil moisture deviation index presented in Chapter 3. It is calculated as 100 minus the original index provided by the AFDM.

(5) Cumulative soil moisture deficit from baseline to Round 1. This measure is the sum of the monthly soil moisture deficit in in each kebele between the baseline and round 1. It is a measure of the total magnitude of the change in the shock based on actual on-the-ground conditions.

Perceptions-based measure from the IMS data (Household level)

(6) Perceptions-based drought exposure index at Round 1. As discussed in detail in Section 4.3, this measure is calculated using IMS data on the number of downstream drought-related shocks households were exposed to as well as the perceived severity of the shocks as measured on a five-point scale. It captures drought exposure at the end of the first wave of the drought.

It is important to keep in mind that the sample size of households for this regression analysis is quite small, 414 households. Thus we can expect that some results that are nearly statistically significant might have been statistically significant if the sample size were larger.

7.1 Household Resilience and Drought Exposure

Resilience is only meaningful in the context of a shock. In order to understand the relationship between households' resilience in the face of the drought and their resilience capacity, it is thus important to first understand how the severity of their drought exposure effected their resilience. In a regression analysis "in the face of the drought" means including measures of drought exposure as an independent variable. We do that in this section, exploring the various measures of drought exposure as a precursor to the resilience capacity analysis of the next section.

Table 7.1 presents the regression results for the empirical growth model (see Chapter 2, equations 1, 2 and 3), for which the dependent variable is the change in food security over time. In order to take into account any differences in the effect of shock exposure in Borena and Jijiga, a regression is first run with an interaction term between the shock exposure measure and a dummy variable with Borena households assigned 1 and Jijiga households 0. If the interaction term is statistically significant, then only the results from this regression are reported. If it is not statistically significant, then a second regression is run with no distinction made between the regions.

When the change in rainfall deficit is employed as the measure of shock exposure (Table 7.1, Column 1), the shock exposure coefficient is not statistically significant. However, when the change in soil moisture deficit is employed (Column 4), the coefficient is negative and statistically significant for Borena (at the 5 percent level) indicating, as would be expected, that the degree of drought exposure had a negative impact on household resilience there. It is not significant for Jijiga.

The coefficients of both measures of the total magnitude of the rainfall shock (columns (2) and (3)) also indicate that the drought had a negative impact on households' resilience in Borena. However, they indicate that it led to greater increases in food security over time, and thus had a positive impact on resilience in Jijiga, a counter-intuitive result that is not supported by the rest of the regressions.

The coefficient on the cumulative soil moisture deficit (column 5) is not statistically significant. By contrast, when the household-level, perceptions-based measure is employed (column 6), and kebele characteristics are accounted for (using kebele fixed effects), the results indicate that shock exposure has a negative impact on resilience, with the coefficient being highly statistically significant (t=-4.52). Separate regressions run for Borena and Jijiga confirm negative effects for both regions.

Note that several other of the independent variables controlled for have statistically significant coefficients in most of the regressions. Households' baseline food security has a negative association with changes in food security over time, as expected in a dynamic model. The number of adult equivalents and percent of adult females has a positive association in almost all

Table 7.1. Change in food security over the drought period: Effect of exposure to the drought

	Rainfall-based measures of shock exposure			Soil moisture-based measures of shock exposure		Perceptions-based drought exposure index (kebele fixed effects), R1
	Change in rainfall deviation from baseline to R1 (1)	12-month rainfall deviation from norm at R1 (2)	Cumulative (net) rainfall deficit from baseline to R1 (3)	Change in soil moisture deficit from baseline to R1 (4)	Cumulative soil moisture deficit from baseline to R1 (5)	(6)
Shock exposure	1.634	6.92**	0.489*	0.079	-0.004	-0.246***
Shock exposure*Borena		-10.23***	-0.836**	-0.164**		
Baseline food security	-0.947***	-0.94***	-0.954***	-0.946***	-0.939***	-0.968***
Adult equivalents	0.393**	0.31*	0.408**	0.334*	0.392**	0.311*
Percent females 0-16 a/						
Females 16-30	0.008	0.01	0.005	0.009	0.009	0.006
Females 30 plus	0.038*	0.04	0.039*	0.041*	0.039*	0.035*
Males 0-16	0.008	0.01	0.005	0.008	0.008	0.010
Males 16-30	0.014	0.01	0.014	0.009	0.012	0.006
Males 30 plus	0.021	0.02	0.025	0.020	0.021	0.022
Education: None a/						
Primary	0.160	0.43	0.158	0.188	0.092	0.320
Secondary	0.175	0.32	0.279	-0.023	0.111	-0.465
Female-adult-only hh	1.101	1.28	1.473	1.031	1.193	0.984
Non-pastoralist a/						
Agro-pastoralist	0.080	0.04	0.172	0.152	0.111	0.014
Pastoralist	-0.486	-0.60	-0.472	-0.445	-0.469	-0.477
Asset index	0.093*	0.10*	0.102**	0.093*	0.095*	0.110**
Project area: Borena a/	-6.496***	-9.85***	-3.831***	-0.743	-2.788**	
R-squared	0.637	0.645	0.640	0.643	0.637	0.683

NOTES: Stars represent statistical significance at the 10(*), 5(**) and 1(***) percent levels; t-statistics are robust to heteroskedasticity. N=414.
a/ Reference category.

models. Household wealth is confirmed to have a positive association with households' ability to maintain their food security over time. And, finally, even after controlling for these other factors, including pastoral status, households in Borena are likely to have been less resilient to the drought than households in Jijiga.The results from probit regressions where the dependent variable is the resilience dummy variable (see Chapter 2, equation 4) are presented in Table 7.2. Here the equations controlling for the cumulative rainfall deficit from baseline to Round 1 and the perceptions-based measures of shock exposure both confirm that the drought had a negative impact on households' resilience—in both Borena and Jijiga.

Table 7.2. Whether a household was resilient to the drought: Probit estimates of the effect of exposure to the drought

	Rainfall-based measures of shock exposure		Soil moisture-based measure of shock exposure	Perceptions-based drought exposure index (kebele fixed effects), R1
	Cumulative (net) rainfall deficit from baseline to R1	12-month rainfall deviation from norm at R1	Cumulative soil moisture deficit from baseline to R1	
Shock exposure	-0.122**	-0.114	-0.001	-0.038***
Shock exposure*Borena b/				
Adult equivalents	0.089*	0.091**	0.078*	0.105**
Percent females 0-16 a/				
Females 16-30	0.004	0.003	0.003	0.003
Females 30 plus	0.006	0.006	0.005	0.006
Males 0-16	0.003	0.003	0.003	0.005
Males 16-30	0.004	0.004	0.004	0.003
Males 30 plus	0.007	0.007	0.007	0.009
Education: None a/				
Primary	-0.184	-0.118	-0.088	-0.290*
Secondary	0.049	0.096	0.114	-0.200
Female-adult-only hh	-0.184	-0.199	-0.208	-0.315
Non-pastoralist a/				
Agro-pastoralist	0.006	-0.029	-0.035	-0.050
Pastoralist	-0.052	-0.087	-0.084	-0.104
Asset index	-0.012	-0.013	-0.013	-0.015
Project area: Borena a/	-0.250	-0.287	-0.054	
Pseudo R-squared	0.056	0.048	0.051	0.003

NOTES: Stars represent statistical significance at the 10(*), 5(**) and 1(***) percent levels; t-statistics are robust to heteroscedasticity. N=414.

a/ Reference category.

b/ The interaction term between shock exposure and region was not significant in any of the regressions. Therefore, as explained in the text, it was not included in the final regression models run.

7.2 Household Resilience and Pre-Drought Resilience Capacity

Resilience capacity is measured in this report using indexes of absorptive capacity, adaptive capacity, and transformative capacity, as defined in Chapter 1. The indexes are constructed from multiple indicators, as follows:

- Absorptive Capacity
  - Bonding social capital
  - Shock preparedness and mitigation (e.g., livestock off-take)
  - Access to informal safety nets
  - Availability of hazard insurance
  - Household ability to recover from shocks
  - Whether any household member holds savings
  - Asset ownership
- Adaptive capacity
  - Bridging social capital
  - Linking social capital
  - Human capital
  - Aspirations and confidence to adapt
  - Exposure to information
  - Diversity of livelihoods
  - Access to financial resources
  - Asset ownership.
- Transformative capacity
  - Bridging social capital
  - Linking social capital
  - Access to formal safety nets

- Access to markets
- Access to infrastructure
- Access to basic services
- Access to communal natural resources
- Access to livestock services

The three indexes are combined into an overall index of resilience capacity. Each of the index components is described in detail in the baseline report (Smith et al. 2015). Figure 7.1 shows how the index values differ for Borena and Jijiga. Clearly, the average household in Borena had greater resilience capacity at the onset of the drought than the average household in Jijiga.

Figure 7.1. Indexes of resilience capacity, by project area

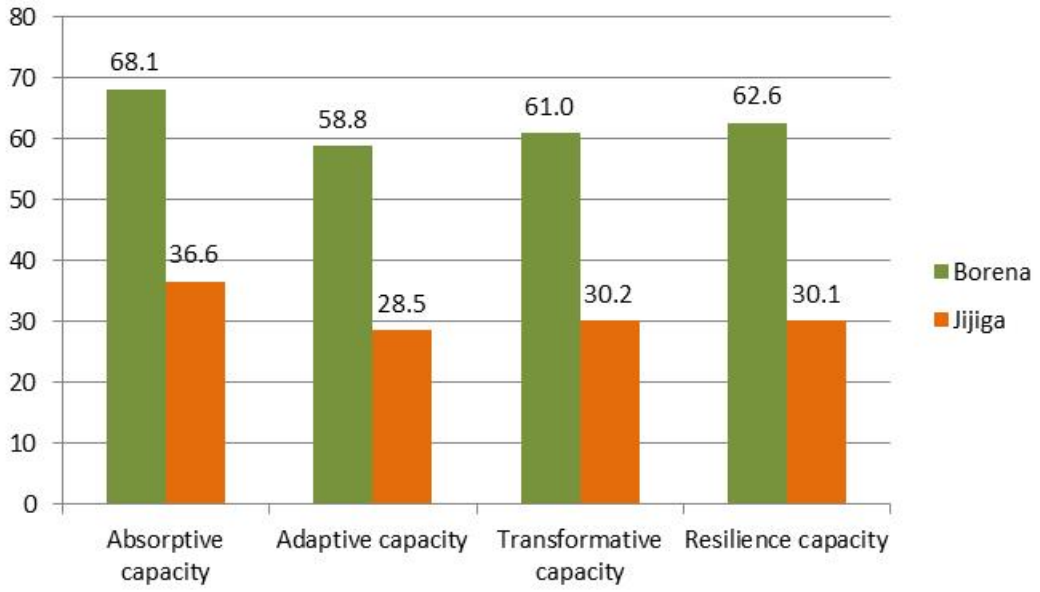


Table 7.3 contains the regression results examining the effect of absorptive capacity, that is, the ability of households to minimize their exposure to a shock where possible and to recover quickly when already exposed. Absorptive capacity comes into play in the immediate aftermath of a shock.

As can be seen, all six regressions yield coefficients on the interaction term between project area and absorptive capacity that are positive and statistically significant. The results indicate that in Borena, where shock exposure and initial absorptive capacity were highest, households' pre-drought absorptive capacity had a positive impact on their ability to recover from the drought. The result is strongly robust to the measure of shock exposure employed, whether that be based on rainfall, soil moisture, or households' own perceptions of their exposure to the drought.

Table 7.3. Change in food security over shock wave 1: Effect of absorptive capacity

	Rainfall-based measures of shock exposure			Soil moisture-based measures of shock exposure		Perceptions-based drought exposure index (kebele fixed effects), R1
	Change in rainfall deficit from baseline to R1	12-month rainfall deviation from norm at R1	Cumulative (net) rainfall deficit from baseline to R1	Change in soil moisture deficit from baseline to R1	Cumulative soil moisture deficit from baseline to R1	
Absorptive capacity	-0.019	-0.018	-0.021	-0.021	-0.024	-0.021
Absorptive capacity*Borena	0.056**	0.061***	0.058**	0.060**	0.00011***	0.047*
Shock exposure	2.158	6.596**	0.500	0.067	-0.00040	-0.238***
Shock exposure*Borena	-4.191	-10.496***	-0.875**	-0.158*	-0.021**	
Baseline food security	-0.959***	-0.965***	-0.974***	-0.968***	-0.959***	-0.983***
Adult equivalents	0.345*	0.258	0.354**	0.282	0.329*	0.277
Percent females 0-16 a/						
Females 16-30	0.010	0.007	0.006	0.010	0.008	0.006
Females 30 plus	0.038*	0.037	0.038*	0.041*	0.038*	0.034
Males 0-16	0.009	0.006	0.007	0.009	0.007	0.011
Males 16-30	0.007	0.005	0.010	0.005	0.007	0.003
Males 30 plus	0.021	0.022	0.025	0.020	0.023	0.022
Education: None a/						
Primary	0.198	0.393	0.171	0.173	0.027	0.350
Secondary	0.196	0.328	0.337	-0.002	0.139	-0.371
Female-adult-only hh	0.966	1.075	1.266	0.808	1.116	0.857
Non-pastoralist a/						
Agro-pastoralist	0.352	0.204	0.333	0.316	0.194	0.140
Pastoralist	-0.218	-0.472	-0.346	-0.325	-0.534	-0.413
Asset index	0.080	0.084*	0.092*	0.081	0.087*	0.103**
Project area: Borena a/	-4.391	-12.738***	-7.054***	-3.838*	5.322	
R-squared	0.642	0.650	0.644	0.648	0.644	0.685

NOTES: Stars represent statistical significance at the 10(*), 5(**) and 1(***) percent levels; t-statistics are robust to heteroskedasticity. N=414.

a/ Reference category.

Table 7.4 presents the results for adaptive capacity, which is the ability to make proactive choices about alternative livelihood strategies based on changing conditions, and transformative capacity, which refers to system-level changes that enable more lasting resilience, such as policies and infrastructure. Only the regressions yielding a statistically significant coefficient on the resilience capacity variables are shown. When the cumulative soil moisture deficit measure of shock exposure is employed, both adaptive and transformative capacity are shown to have a positive effect on households' resilience to the drought, but only in Borena. When the perceptions-based drought exposure index is employed, adaptive capacity is shown to have a positive effect PRIME IE area –wide. While the evidence is not as strong as for absorptive capacity, these results are suggestive that adaptive and transformative capacity play a role in supporting households' resilience to shocks as well.

Table 7.4. Change in food security over shock wave 1: Effect of adaptive and transformative capacity

	Adaptive capacity		Transformative capacity
	Cumulative soil moisture deficit from baseline to R1	Perceptions-based drought exposure index (kebele fixed effects), R1	Cumulative soil moisture deficit from baseline to R1
Capacity	-0.018	0.038*	-0.031
Capacity*Borena	0.000108**		0.000117*
Shock exposure	-0.001	-0.247***	0.000025
Shock exposure*Borena	-0.020**		-0.021**
Baseline food security	-0.952***	-0.978***	-0.948***
Adult equivalents	0.369**	0.329*	0.364**
Percent females 0-16 a/			
Females 16-30	0.010	0.009	0.008
Females 30 plus	0.039*	0.038*	0.038*
Males 0-16	0.006	0.009	0.006
Males 16-30	0.008	0.007	0.011
Males 30 plus	0.020	0.023	0.022
Education: None a/			
Primary	0.183	0.339	0.224
Secondary	0.076	-0.414	0.173
Female-adult-only hh	1.297		1.232
Non-pastoralist a/			
Agro-pastoralist	0.217	1.129	0.165
Pastoralist	-0.452	0.089	-0.450
Asset index	0.075	-0.372*	0.086*
Project area: Borena a/	5.286	0.085	5.756
R-squared	0.643	0.686	0.642

NOTES: Stars represent statistical significance at the 10(*), 5(**) and 1(***) percent levels; t-statistics are robust to heteroskedasticity. N=414. Only regressions showing statistically significant coefficients for adaptive and transformative capacity are shown.
a/ Reference category.

Did greater household resilience capacity reduce the negative impact of the drought on households' resilience? We can look at this in a more direct manner by including an interaction term between a measure of resilience capacity and shock exposure in the regression equation (see Chapter 2, equation (6)). Table 7.5 presents the results when an interaction term between absorptive capacity and shock exposure is included, for two measures of shock exposure: the 12-month rainfall deviation from the norm at the time of Round 1 and the change in soil moisture deficit from the baseline to Round 1. Regressions for both shock measures yield a positive and statistically significant coefficient on the interaction term, coupled with a strongly statistically significant negative coefficient on shock exposure. The result directly indicates that absorptive capacity reduced the negative impact of exposure to the drought on households' resilience.

Table 7.5. Regression analysis: Did greater absorptive capacity reduce the negative impact of the drought?

Shock exposure measure	12-month rainfall deviation from norm at R1	Change in soil moisture deficit from baseline to R1
Absorptive capacity	0.018	-0.020
Shock exposure	-4.497***	-0.162***
Absorptive capacity*Shock exposure	0.036**	0.001**
R-squared	0.642	0.645

NOTES: Stars represent statistical significance at the 10(*), 5(**) and 1(***) percent levels; t-statistics are robust to heteroskedasticity. N=414. The dependent variable is the change in food security over the drought wave. The independent variables are those controlled for in Tables 7.3 and 7.4.

7.3 Summary

This chapter explored the relationships between household resilience to the drought, the degree of their exposure to the drought, and their pre-drought resilience capacity using regression analysis. The analysis focused on the first wave of the drought spanning the time between the baseline (December 2013) and the first round of the IMS data collection (October 2014). Resilience capacity is measured using indicators of its three dimensions, absorptive capacity, adaptive capacity, and transformative capacity. Households in Borena were stronger than households in Jijiga along all three dimensions prior to the onset of the drought.

The regression analysis confirms that the more severely a household was exposed to the drought, the less likely it was to recover from it, that is, the less resilient it was. This negative relationship between drought exposure and resilience is stronger for Borena than Jijiga. The analysis suggests that households' absorptive capacity had a positive impact on their resilience to the drought in Borena. This result is strongly robust to the measure of shock exposure employed, whether that be based on agro-climatic conditions or households' own perceptions of their exposure to the drought. The regression analysis found no impact on resilience to the drought in Jijiga, perhaps due to the combination of lower drought exposure and low pre-drought absorptive capacity in the region. While the evidence is not as strong for adaptive capacity and transformative capacity, the analysis is suggestive that they do play a role in

supporting households' resilience to shocks as well. Adaptive capacity is shown to be positively associated with households' resilience in both Borena and Jijiga and to reduce the negative impact of exposure to the drought on households' resilience.

8. Does Resilience Capacity Help to Prevent the Use of Negative Coping Strategies?

The final research question explored is whether households' pre-drought resilience capacities helped prevent them from employing negative coping strategies in response to the drought that compromise their ability to recover from future shocks and stressors. In this chapter this question is explored with a focus on four types of coping strategies, as identified in Chapter 5 (Section 5.1):

(1) Reducing food consumption

(2) Selling or consuming productive assets, including

- Selling agricultural productive assets
- Slaughtering livestock
- Consuming seed stocks held for the next season.

(3) Employing negative financial strategies, including

- Taking out a loan from a money lender
- Purchasing food on credit

(4) Negative coping strategies related to care for children

- Taking children out of school
- Sending children to work for money

Probit regression analysis is used to explore whether households' resilience reduces the use of these strategies, as outlined in Chapter 2 (see equation (8)). In addition to the drought exposure measures, household characteristics, and resilience capacity measures employed in the last chapter, a dummy variable indicating whether the household expected to receive humanitarian assistance in order to cope with the drought is included as an independent variable. The use of coping strategies is measured over two time periods. This first is IMS round 1, which captures the use of the strategies immediately following the first wave of the drought. The second time period is "any time over the IMS period", which captures use in the six months following the drought wave, a period in which the second drought wave was in full progress.

8.1 Use of Negative Coping Strategies in IMS Round 1

Table 8.1 summarizes the results for the use of the negative coping strategies in IMS Round 1 (October 2014). Four shock exposure measures are employed, as identified in the table notes, and results are shown for the whole sample, for Borena, and for Jijiga. If a coefficient on a measure of resilience capacity is statistically significant and negative, indicating that resilience capacity reduces the use of the strategy, then the corresponding box in the table is colored red. A purple-colored box indicates that resilience capacity *increases* the use of the coping strategy.

Absorptive Capacity

The results suggest that absorptive capacity helped to prevent households in Borena from reducing their food consumption as a coping strategy for dealing with the drought. It helped prevent households in Jijiga from selling or consuming productive assets that will be needed to bolster income in the future. However, they also suggest that households with greater absorptive capacity were more likely to take children out of school or send them to work in order to cope with the drought in Borena.

Adaptive Capacity

The regression results suggest that adaptive capacity helped to prevent households from reducing food consumption, with the evidence being strongest for Borena. While adaptive capacity worked to prevent households from selling or consuming productive assets in Borena, the regression analysis suggests that it increased the use of this coping strategy in Jijiga.

Transformative Capacity

The evidence is strong that transformative capacity prevented households from reducing their food consumption in the face of the drought. For Borena, this result is robust across all four measures of shock exposure employed. It also helped prevent sales or consumption of productive assets in Borena. However, as for adaptive capacity, the results suggest that the greater a household's transformative capacity the more likely it was to sell or consume productive assets in Jijiga. This result holds for two of the measures of shock exposure.

Transformative capacity is the only type of capacity that appeared to help prevent the use of negative coping strategies related to children in the immediate aftermath of the drought wave, as evidenced in the regressions for two shock exposure measures. This result applies to the entire PRIME IE area.

Table 8.1. Effect of resilience capacity on the use of negative coping strategies in IMS Round 1: Summary of results

	Absorptive capacity			Adaptive capacity			Transformative capacity			Resilience capacity		
	All	Borena	Jijiga	All	Borena	Jijiga	All	Borena	Jijiga	All	Borena	Jijiga
Reduce food consumption												
Shock measure 1								10%			10%	
Shock measure 2								10%				
Shock measure 3					5%			5%			5%	
Shock measure 4		10%		5%	1%		5%	1%			1%	
Sell productive assets												
Shock measure 1			5%									
Shock measure 2							10%		5%			
Shock measure 3					5%	1%		1%	1%		5%	5%
Shock measure 4												
Use negative financial strategies												
(No statistically significant results)												
Take children out of school &/or send them to work												
Shock measure 1							10%					
Shock measure 2												
Shock measure 3							10%					
Shock measure 4		5%										

NOTE: Red-shaded cells indicate coefficient on use of strategy is negative and statistically significant at least at the 10 percent level.

Purple-shaded cells indicate a positive, statistically significant coefficient

Shock measures:

1= 12-month rainfall deviation from norm.

2= Cumulative (net) rainfall deficit from baseline to R1.

3= Cumulative soil moisture deficit from norm at R1.

4= Perceptions-based drought exposure index at R1.

Resilience Capacity

The results for resilience capacity, the summary measure combining absorptive, adaptive and transformative capacity, confirm that households' resilience capacity helped to prevent them from reducing their food consumption as a drought response in Borena. It also helped prevent Borena households from depleting their productive assets. However, they also confirm that resilience capacity was associated with a greater likelihood of productive asset depletion in Jijiga.

8.2 Use of Negative Coping Strategies Over the Entire IMS Period

When the entire six-month span following the first drought wave, a time of an additional climate shock, is taken into account, we find strong evidence that both adaptive capacity and transformative capacity helped to prevent households from either taking their children out of school and/or sending them to work for money. This result applies to both Borena and Jijiga (see Table 8.2).

Other results are that absorptive capacity helped to prevent households from employing negative financial strategies in Borena, and adaptive capacity helped to prevent them from reducing their food consumption in Jijiga.

8.3 Summary

This chapter explored whether households' pre-drought resilience capacities helped prevent them from employing negative coping strategies in response to the drought and thus compromise their ability to recover from future shocks and stressors. The use of four types of coping strategies is explored: (1) reducing food consumption; (2) selling or consuming productive assets; (3) employing negative financial strategies (taking out a loan from a money lender or purchasing food on credit); and (4) employing negative strategies related to the care of children (taking children out of school and/or sending them to work for money).

When looking at the use of the coping strategies immediately following the drought (in IMS Round 1), the results differ for Borena and Jijiga. For Borena, the regression analysis gives evidence that all three types of resilience capacities, absorptive capacity, adaptive capacity and transformative capacity, helped to prevent households from reducing their food consumption as a response to the drought. Adaptive and transformative capacity helped to prevent households from depleting their productive assets. And transformative capacity helped prevent them from undermining the human capital of their children by pulling them out of school or sending them to work for money. However, there is some evidence that households with greater absorptive capacity were more likely to use these strategies involving children.

Table 8.2. Effect of resilience capacity on the use of negative coping strategies in any IMS round: Summary of results

	Absorptive capacity			Adaptive capacity			Transformative capacity			Resilience capacity		
	All	Borena	Jijiga	All	Borena	Jijiga	All	Borena	Jijiga	All	Borena	Jijiga
Reduce food consumption a/	--	--	--	--	--	--	--	--	--	--	--	--
Sell productive assets												
Shock measure 1												
Shock measure 2												
Shock measure 3												
Shock measure 4						10%						
Use negative financial strategies												
Shock measure 1												
Shock measure 2												
Shock measure 3												
Shock measure 4	10%											
Take children out of school &/or send them to work												
Shock measure 1				5%			1%			5%		
Shock measure 2				5%			1%			10%		
Shock measure 3				5%			5%			5%		
Shock measure 4							5%					

NOTE: Red-shaded cells indicate coefficient on use of strategy is negative and statistically significant at least at the 10 percent level.

a/ It is not possible to undertake the analysis for this strategy because only 3 sample households did not employ it.

Shock measures:

1= 12-month rainfall deviation from norm.

2= Cumulative (net) rainfall deficit from baseline to R1.

3= Cumulative soil moisture deficit from norm at R1.

4= Perceptions-based drought exposure index at R1.

The regression analysis suggests that resilience capacity had less of a preventative effect in Jijiga at the time of IMS Round 1, again perhaps because all three dimensions of resilience capacity were much lower in that region at the onset of the drought. While absorptive capacity was found to reduce asset depletion, both adaptive and transformative capacity were found to increase it. This perverse result may be due to the fact that households with greater adaptive and transformative capacity start out with greater asset bases.

When looking at the use of coping strategies over the entire IMS period, a period in which the second drought wave was in full progress, we find strong evidence that both adaptive capacity and transformative capacity helped to prevent households from either taking their children out of school and/or sending them to work for money in both regions. Absorptive capacity helped to prevent households from employing negative financial strategies in Borena, and adaptive capacity helped to prevent them from reducing their food consumption in Jijiga.

9. Conclusions

A major drought occurred in the PRIME IE area starting in March 2014, three months after the PRIME baseline survey was implemented. The severity of the drought is confirmed by data from multiple external sources—including satellite remote sensing data, government rainfall classifications, FEW NETS reports, and PRIME trigger indicator data—in addition to the PRIME IMS experiential shock data collected directly from households. The drought unfolded in two waves. The first, from March-September 2014, corresponded to the failure of the *Ganna/Diraa* rains of 2014. The second wave, beginning in October 2014, corresponded to the failure of the *Hagaya* rains in Borena and an unusually arid dry season following the *Karan* rains in Jijiga. The data sources indicate that Borena was hit harder by this drought than Jijiga.

The drought led to major pasture and water shortages and livestock and crop diseases, and led to deterioration in livestock body conditions, livestock deaths, and crop failures. Soaring cereal prices and plummeting livestock prices led to a deterioration in the livestock-to-cereal terms of trade, which was to the detriment of pastoralists and farmers alike. The latter struggled to obtain food through market channels rather than relying on their own crop production. Further, there were extensive abnormal migration patterns as pastoralists and agro-pastoralists searched for water and pasture for their animals.

Women, children and the elderly were the most negatively affected by these downstream impacts of the shock. Women were negatively affected because they were left behind to take care of family members, including children, with limited access to resources for doing so, including harvested food and livestock products. Children were negatively affected because access to milk was seriously compromised in that many were taken out of school or sent to work for money so that households could save money or make more money to buy food. In normal times, families and communities take care of the elderly, making sure they have adequate food and that their crops and livestock are taken care of. But during the drought, the needs of the elderly were neglected, partly because community leaders, who normally make decisions regarding helping the needy, had migrated with the livestock in search of better fodder and water conditions.

One of the most important coping strategies to deal with the drought used in both Jijiga and Borena is reliance on social capital. Over the six rounds of the IMS data collection this social capital started to erode. In the face of such a large covariate shock, better-off households were not able to support the poorer households with redistribution of food and animals as they do in normal times. As noted above, community leaders, particularly clan leaders, were also forced to migrate with their animals in search of water and fodder, making it more difficult for governance structures to function to enable the redistribution of food and resources. This migration also led to a breakdown of social relationships both internal to households and within

the community. And at times the stress of drought conditions led to increased inter-ethnic conflict due to competition over pasture and water.

A number of NGOs and the United Nations specifically the Office for the Coordination of Humanitarian Affairs (OCHA) provided humanitarian assistance in both Borena and Jijiga in response to the drought. The IMS data confirm that at least half of households had received assistance either in the form of food aid or food/cash-for-work at some time over the IMS period. The FEWS NET and PRIME trigger indicator data also report that truckloads of fodder and water were taken in to assist households. This social protection undoubtedly bolstered household food and livelihood security in some way, but it was not enough.

The large majority of households were not resilient to the drought. By the end of the IMS data collection in March 2015, only 31 percent of households had been able to maintain or recover their initial food security. Further, the assistance did not prevent households from utilizing negative coping strategies that undermine their ability to recover from future shocks. For example, by the end of the IMS data collection nearly one-quarter of households were selling or consuming their productive assets; 40 percent were using negative financial strategies, such as taking loans from money lenders and buying food on credit.

In short, the social protection was too little, too late. Social protection is a critical part of a crisis response. A "crisis modifier," such as that triggered in response to the 2014-15 droughts in Borena and Jijiga, bolsters households' resilience if it is timely, of long enough duration, and correctly targets those in need, especially in the case of a major shock. As shown by the analyses of the IMS data in Chapters 7 and 8, households' resilience capacities did bolster their resilience to the drought and reduce their use of negative coping strategies. However, their positive coping strategies, such as relying on their social capital and informal safety nets, were nevertheless being overwhelmed. Negative coping strategies were leading to a depletion of households' asset bases, their financial security, and their future human capital.

Household resilience capacity can only buffer households so far. As we have seen in this report, no matter how much resilience capacity a household has to manage shocks and stresses, if a drought is severe enough, it is hard to be resilient to it. Even though Borena had the strongest resilience capacity at the onset of the drought, it was hit the hardest and households there were the least resilient. A comprehensive approach to assistance in a shock-prone environment such as that of the Ethiopian drylands is a combination of social protection, including insurance mechanisms, to address immediate crises and long-term investment in households' and community's resilience capacities. Such an approach will protect them from the most severe impacts of droughts, such as food insecurity, conflict and death, and enable them to respond to drought conditions in a positive manner so that their long-term food and livelihood securities are not jeopardized.

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