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Agricultural prices during drought in Ethiopia

An assessment using national producer data (January 2014 to January 2016)

Fantu Bachewe, Feiruz Yimer, Bart Minten, and Paul Dorosh

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ABSTRACT

We analyze the evolution of crop and livestock producer prices and wages of unskilled laborers in Ethiopia over the January 2014 to January 2016 period, during which time the country was massively impacted by El Niño triggered droughts, which started in 2015. The analyses reveal no evidence of widespread adverse price effects of the drought in the labor and cereal markets. Real prices of the major cereals were lower at the beginning of 2016 compared to two years earlier, especially for maize, sorghum and wheat, the crops that make up the major source of calories in the areas that were most hit by the drought. Conversely, prices of root crops and pulses increased. However, given the large importance attached to cereal consumption, the overall real food consumption basket price has declined compared to two years earlier. In particular, the decline in the cost of cereals in the food basket was estimated at 11.2 percent at the national level. However, the overall declines were lower in drought-affected (decline of 8 percent) than in non-drought affected areas (decline of 14 percent), indicating the adverse effect of failed harvests in the former areas. Considering crop and livestock prices jointly reveals that livestock-cereal terms of trade declined in the worst affected areas, mainly because livestock prices declined faster than cereal prices in such areas. In contrast, the livestock-cereal terms of trade considerably improved in areas less affected by the drought. The fluctuating behavior of cereal prices since January 2015 strikingly contrasts with the situation during the major drought of 1997/98. During that period, cereal production declined by 25 percent compared to the year before, with significant simultaneous real price increases of between 15 and 45 percent.

1. INTRODUCTION

Ethiopia has been enormously affected by El Niño triggered droughts since 2015. The *Belg* rains of 2015 failed in large parts of Ethiopia and there was further inadequate rainfall in the main *Meher* season mostly in the northern and eastern parts of the country but also beyond (FEWS NET 2016).[1] This rainfall failure has led to reduced agricultural output and to a loss of livestock in parts of the country. Consequently, this has led to hardships for a significant share of the rural population living in these drought-affected areas. FAO (2015) estimates that national cereal production in 2015 was 14.1 percent lower than in 2014, and the drought is therefore seen as the worst in decades. It has recently been estimated that 10.2 million people will require emergency food assistance in 2016, on top of the 7.9 million already covered by the Productive Safety Net Programme (HDR 2016).[2] FEWS NET (2016) reports that national-level admissions of malnourished children under-five years old to therapeutic feeding programs increased in February 2016 by 47 percent compared to a year earlier and WFP (2016) further states that 2.5 million people (children under five, pregnant women and nursing mothers) were in need for treatment for moderate acute malnutrition (MAM) in April. The effects of the drought are clearly severe and WFP (2016) evaluated the situation in April to be critical.

To help monitor the drought's effect on Ethiopia's food and agricultural economy, in this paper we seek to understand the evolution of some key prices in the last two years (January 2014 until January 2016).[3] We use producer price data collected at national level by the Central Statistical Agency (CSA), and differentiate the evolution of prices by how much impact the drought had in different areas of the country, as assessed by the Ethiopian government and development partners.[4] Moreover, we compare price evolution of the current drought

[1] While the *Belg* season, which is based on the shorter rains that start in March, is important in some parts of the country, the *Meher* is the main cropping season and depends on the major rains during May through to September.

[2] While the situation is closely monitored by the Ethiopian Government and other stakeholders and a large number of interventions are planned and implemented, current contributions to the humanitarian appeal for assistance, however, have only funded approximately 45 percent of identified needs for 2016 (FEWS NET 2016).

[3] January is in most regions the period just after harvest and, therefore, is normally one of the more food secure months with relatively lower food prices.

[4] While the disastrous effects of the drought are closely monitored and are clear in the areas affected (FEWS NET 2016; AKLDP 2016a, 2016b, 2016c), it is however not well understood how prices have been affected at the national level. The Agricultural Knowledge, Learning, Documentation and Policy Project

with another era of major droughts in the country. Monitoring the evolution of prices is important given that prices are among key factors that influence livelihoods and the welfare of rural populations in areas affected by drought, which, as a result of lower production, are more likely to be net food buyers, i.e. they spend more on food than they earn from the sales of agricultural products. It is to be noted that even in regular years, a large number of people in some of these areas are already net buyers of food. During drought, this situation becomes even worse. In particular, we look at the evolution of three broad categories of prices: crops, livestock, and wages.[5]

We expect a number of drought-related impacts on the prices in these categories. First, lower rainfall is expected to negatively affect local crop production, and we therefore expect crop prices to be higher in 2015 than in 2014, assuming no additional cereal imports. If markets are not well integrated, we would also expect prices in drought-affected areas to increase faster than in non-drought affected ones. Second, a lower demand for labor during periods of low rainfall as well as a larger supply of labor – as drought-affected households look for alternative livelihood options – are expected to lead to lower real wages. Third, during extended periods of low rainfall in which pasture areas decline and crop residue that can be used to feed cattle is scarce, the condition of cattle deteriorates. Furthermore, farmers keep cattle in part as a form of insurance against crop failure and for sales during periods of cash need (de Waal 1988 Fafchamps and Gavian 1997). Given the decline in crop income resulting from the drought, sales of farmers' livestock are therefore expected to increase and cattle prices to decline in 2015 compared to 2014.

2. DATA AND METHODOLOGY

We rely on two sources of data. First, the Ethiopian government and its partners have classified the woredas (districts) in the country into hotspot categories 1 to 3, whereby woredas severely affected by the drought are categorized as hotspot 1 and those with decreasing severity of drought as categories 2 and 3. The hotspot woreda classification is derived from using six multi-sector indicators – food availability; water, sanitation, and hygiene; access to markets; nutrition; and other contributing factors – at zonal, regional, and federal levels, agreed through expert consultations (HRD 2016). Operationally, this classification triggers a prioritized response, most notably in supplementary feeding (HRD 2016). According to this categorization, 24, 18, and 12 percent of woredas in the country fall within hotspots 1, 2, and 3, respectively. More details on the location of the different categories are given in Table 2.1 and the map in Figure 2.1. The map shows that the northern and the northeastern parts of the country especially have been hit hard by the drought.[6] The number of priority 1 woredas increased from 186 in December 2015 to 219 in March 2016, indicative of a deteriorated humanitarian situation.

Second, we rely on price data from the Central Statistical Agency (CSA) of Ethiopia. CSA collects monthly data on producer prices of different goods from a large number of woredas. We use the producer price data from over 400 woredas (CSA 2016a).[7] CSA also collects data on wages of casual laborers (CSA 2016b). Data on wages are collected along with retail prices of a large number of items from about 120 woredas in all regions of the country. In Figure 2.2 we map the woredas in which CSA collects producer and retail price data. It is

(AKLDP) has followed price trends on major wholesale markets (see http://www.agri-learning-ethiopia.org/el-nino-impacts-in-ethiopia-farmers-perspectives/). However, there is a lack of national producer level analysis, differentiated by degree of the effect of drought.

[5] Changes in agricultural and food prices are important given their crucial role in how they affect livelihoods and food consumption. The evolution of livestock prices is seen as an important indicator of hardship. Large drops in livestock prices are therefore often considered a predictor of upcoming famines and food insecurity (de Waal 1988; Fafchamps and Gavian 1997). Moreover, changes in wages are an indicator of effects of droughts on welfare, especially for the poorest in the population who usually depend on such income (Bachewe et al. 2016). Wage income especially might become more important as droughts unfold as farmers that find it difficult to make a livelihood from their own agricultural production, increasingly switch to labor markets.

[6] The National Disaster Risk Management Commission's (NDRMC) Emergency Nutrition Coordination Unit indicated in March 2016 that a total of 443 woredas were prioritized in all three categories, up from 429 woredas in the December 2015 classification. Given that our price analysis only covers the period up to January 2016, here we use the December 2015 classification.

[7] In each month, CSA enumerators in the woredas collect the price data by interviewing three retailers and consumers in a market selected for this purpose (CSA 2016c). We use a simple average of the three monthly price quotations in each market/woreda, which were observed to be rather similar. The prices we use are unweighted and as such can only be taken to reflect prices prevailing in those markets and may not necessarily represent the entire woreda.

important to note that some of the worst-hit areas are not well covered by the CSA price collection system. Some caution in interpretation is therefore warranted.

We use these price data together with the appropriate hotspot categories of the woredas mentioned above. For price deflation, we rely on the general Consumer Price Index (CPI) calculated by the CSA in order to express all prices in December 2011 Birr (CSA 2016c). In further analysis, prices will be presented by hotspot category in order to enable us to better understand the extent to which the worst drought-affected woredas are affected by differential price movements compared to other woredas.

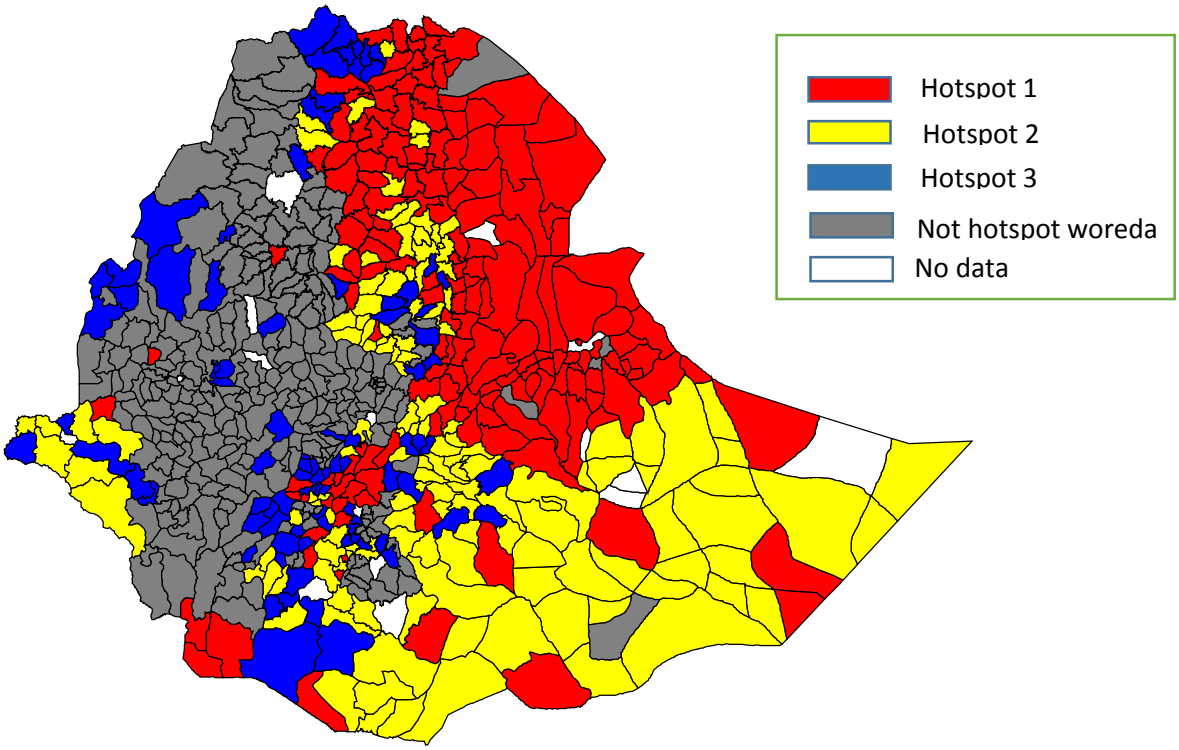
Table 2.1—Proportion of drought affected woredas by region

Region	Number of woredas	Percent of woredas categorized as			
		Hotspot 1	Hotspot 2	Hotspot 3	Uncategorized
All regions	743	24	18	12	47
Tigray	47	42.6	6.4	17.0	34.0
Afar	31	93.5	-	-	6.5
Amhara	139	28.8	18.0	9.4	43.9
Oromiya	279	16.5	18.6	5.4	59.5
Somali	55	40.0	54.5	-	5.5
Benishangul-Gumuz	20	-	-	40.0	60.0
SNNP	147	11.6	11.6	25.2	51.7
Gambella	13	-	53.8	38.5	7.7
Harari	1	-	-	-	100.0
Addis Ababa	10	-	-	-	100.0
Dire Dawa	1	100.0	-	-	

Source: Authors' computation using CSA producer price data

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

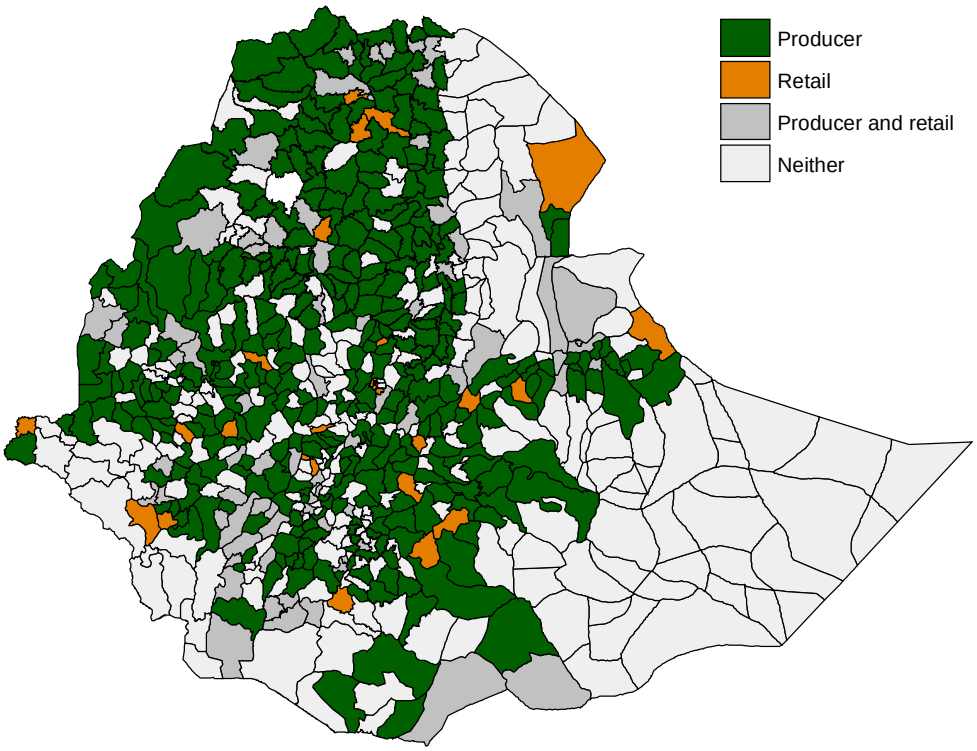
Figure 2.1—Hotspot woredas across the regions of Ethiopia



Source: Authors' computation

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

Figure 2.2—Woredas, by type of price data collected



Source: Authors' computation

3. AGRICULTURAL PRICES

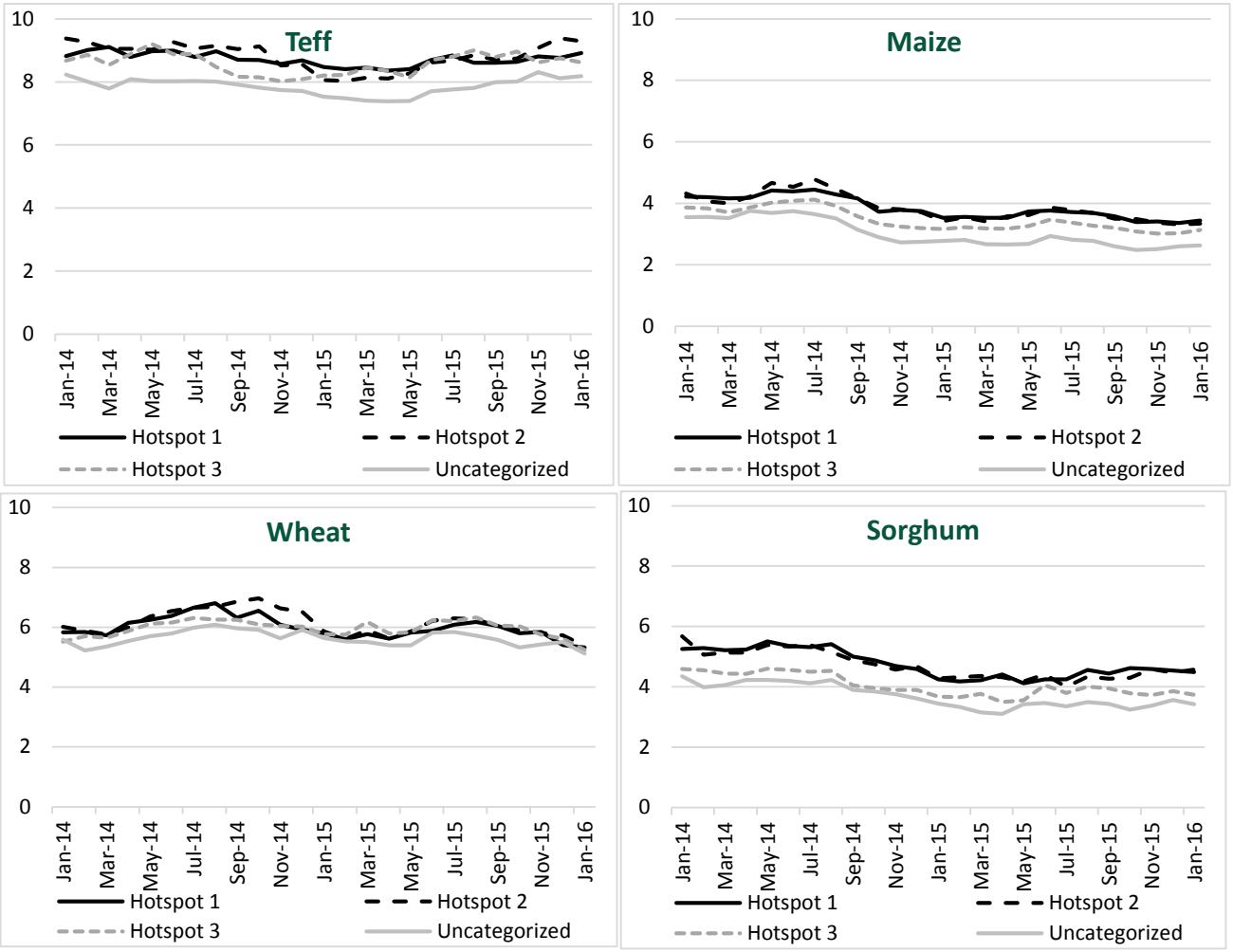
In this section we discuss the evolution of crop and livestock producer prices during the period from January 2014 to January 2016. We also compare trends in cereal prices during this same period with the prices of 1997 and 1998, during which the country also experienced a major drought. Finally, we use the terms of trade between livestock and cereal to study patterns of changes in their relative prices.

3.1. Cereal prices

Figure 3.1 presents the price trend of the four main cereals, teff, maize, wheat, and sorghum. Three main points can be deduced from the patterns. First, prices have, in general, declined. Compared with January 2014, the average price for cereals in January 2016 were 8.4 percent lower in hotspot 1 areas and about 11 percent lower for all woredas combined (Table 3.1).[8] A decline was seen in the other areas as well, with 13.7, 9.5, and 12.0 percent declines in prices for hotspot 2, 3 and uncategorized woredas, respectively. Second, prices of the four cereals are higher for hotspot 1 and 2 woredas throughout most of the last two years (Figure 3.1), indicating that the majority of woredas in these hotspot areas are usually food deficit areas. Higher food prices in these areas therefore often reflect the additional marketing costs required to transport products from the lower-priced food surplus areas. Third, the prices of these cereals in the three hotspot areas and the remaining non-hotspot areas show a similar trend over this period, consistent with earlier findings. This indicates the improved and relatively good market integration of cereal products seen in the last decade in Ethiopia (Minten et al. 2014), and this seems to continue to be the case during this era of drought.

[8] That is, cereal prices declined at monthly average rate of 0.35 percent in hotspot 1 woredas and at 0.45 percent in all woredas during the period.

Figure 3.1—Trends in real (December 2011) producer prices of teff, maize, wheat and sorghum, by woreda hotspot category, birr/kg



Source: Authors' computation using CSA producer price data (CSA 2016a).

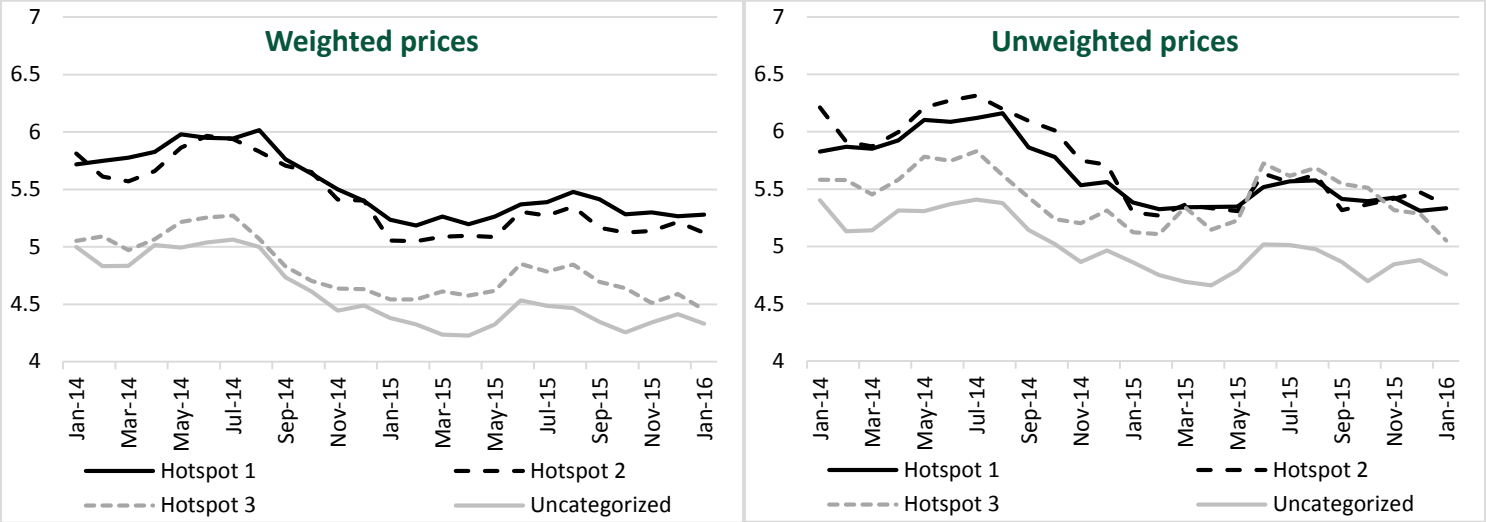
Note: Woredas in Hotspot 1 are the most severely affected by the drought.

When we look at specific crops, we note that maize shows a consistent decline in price in all the hotspot categories in 2015 compared to 2014. This is important as maize is the biggest contributor of calories in the food consumption basket of the country, and in particular, it is the main source of calories for poorer sections of the population (Worku et al. 2016). Compared to the period in January 2014, maize prices had declined by nearly 1 birr per kg at the beginning of 2016 (or a decline of 18 percent and 23 percent in the case of hotspot 1 and 2 areas, respectively). Prices of teff, mostly consumed by richer households, saw a decline at the beginning of 2015, but they then increased at the end of 2015 to the same levels seen at the beginning of 2014. Similar trends are noted in the case of sorghum, but prices at the beginning of 2016 were lower by 1 birr per kg (20 percent) than at the beginning of 2014. Finally, wheat prices increased by 1 birr per kg in the middle of 2014 but were slightly lower at the end of 2015.

Figure 3.2 shows the per capita consumption weighted average real price trend of all five cereals (the four cereals considered above, plus barley) as well as trends in unweighted real cereal prices. We calculate the weighted average cereal price by first computing for each region the weights to be attached with each of the five cereals. The weights are computed from the average consumption basket that Worku et al. (2016) obtained from the 2011 Household Income and Expenditures Survey (HICES) data, which we describe in further detail in section 4.1. The weight associated with each cereal is computed by taking the share of each cereal in total per

capita consumption of the five cereals.[9] These weights assign a higher/lower value to crop types that constitute a larger/smaller share in the cereal consumption basket of each region. In so doing, the weights provide further insight into how the welfare of each of the hotspot areas were affected by changes in cereal prices. We note overall that both unweighted and weighted average cereal prices were lower in 2015 than in 2014 for all hotspot areas, and that prices were on average rather stable over the last 12 months, except for the typical seasonal increases during the main rainy season. We also note that the uncategorized woredas – those not affected by the drought – had much lower prices throughout the period, i.e., before and after the onset of the drought.

Figure 3.2—Trends in unweighted real price of cereal (left) and per capita consumption weighted real price of cereal (right) by woreda hotspot category, birr/kg in December 2011 prices



Source: Authors' computation using CSA producer price data (CSA 2016a).

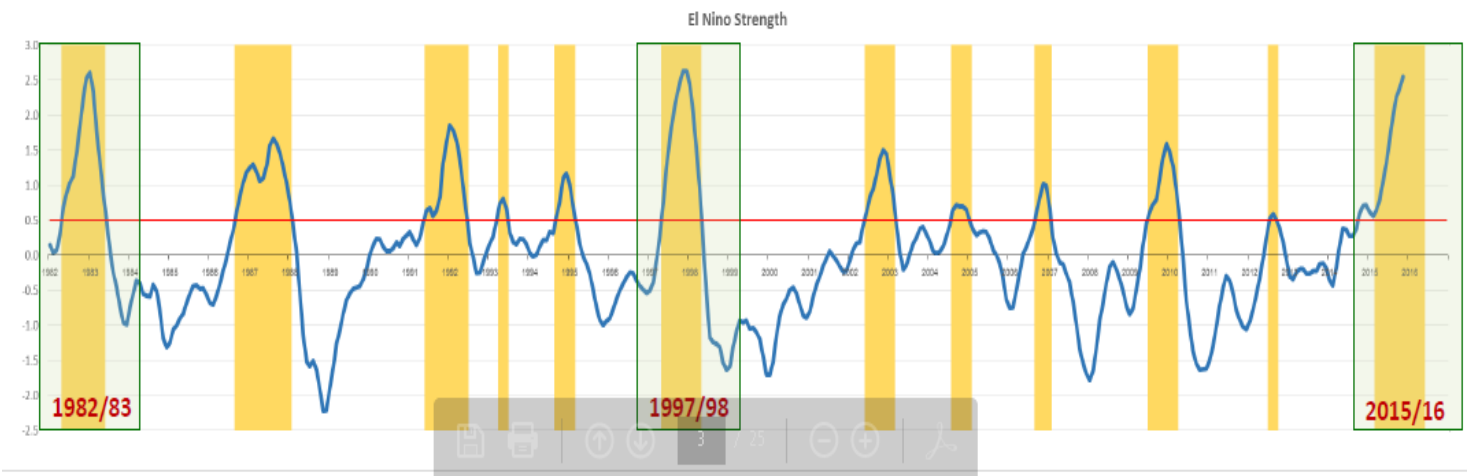
Note: Woredas in Hotspot 1 are the most severely affected by the drought.

3.2. Comparing recent cereal price evolution with that of a previous major drought in Ethiopia (1997-1998)

To put the price movements during the current drought in perspective with previous droughts in the country, we compare average price evolutions over the period 2015 to 2016 with the drought that hit Ethiopia in the *Meher* of 1997/1998. It has been stated that the current drought shows many similarities with the 1997-1998 drought (VAM-WFP 2015). For example, Figure 3.3 maps anomalies in sea surface temperatures over the last 30 years, showing similar deviations in 2015/16 as those that existed in 1997/98.

[9] That is, for each of the 11 regions, the weight attached to the price of each crop is computed as: $\text{Weight}_j = (\text{Per capita consumption of cereal}_j / \sum_{j=T,W,M,S,B} \text{Per capita consumption of cereal}_j)$ where T, W, M, S, and B stand for teff, wheat, maize, sorghum, and barley, respectively.

Figure 3.3—Sea surface temperature anomalies



Inter-tropical Pacific Sea Surface Temperature anomalies from 1982 to present. The current event and the two most intense events in record are highlighted. Red line is the El Niño threshold

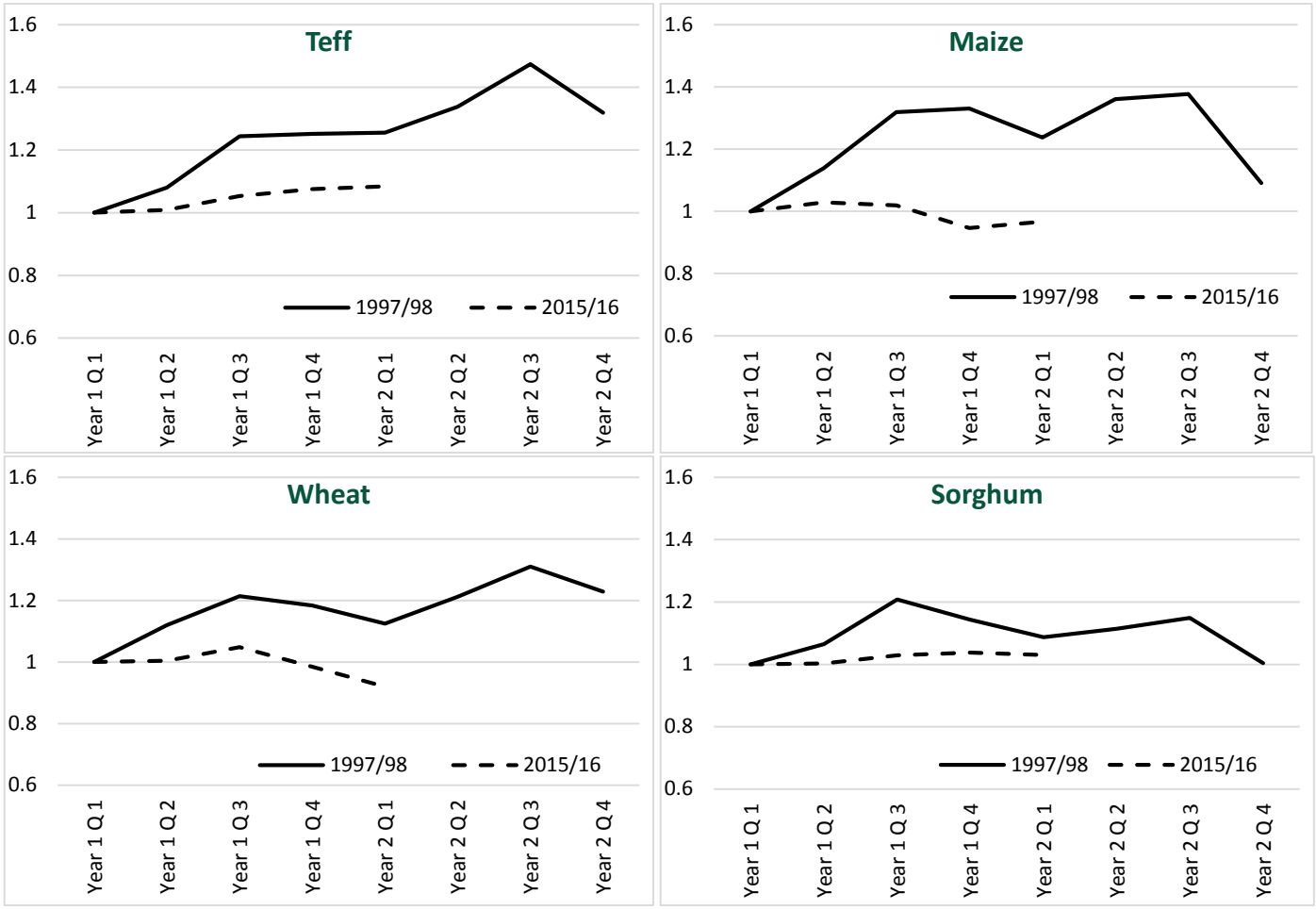
Source: VAM-WFP (2015)

Based on estimates made by CSA, total cereal production in 1997/98 was 25 percent lower compared to the previous year, 1996/97 (CSA 1998). We compare the price evolution of that period with the current situation in the country. We do this assessment using indices constructed from quarterly average real prices from CSA of the four main cereals and the wages of unskilled laborers. In Figures 3.4 and 3.5, the indices in each quarter of 1997-1998 and 2015-2016 are computed, taking the first quarter of 1997 and 2015 as the base quarter, respectively. The comparison of prices for these two periods indicates that cereal prices have generally been stable during the recent drought, in contrast to 1997-1998 where prices of all four main cereals increased relatively fast at national level. In the third quarter of 1998, real prices of sorghum, wheat, maize and teff were 15, 31, 38, and 47 percent higher, respectively, than in the first quarter of 1997, before showing a large drop in the fourth quarter, likely because of incoming food aid.[10]

Compared with average prices in the first quarter of 2015, prices of maize and wheat were only slightly higher in the second and third quarters of 2015 before they declined in the fourth quarter of 2015. Beginning from the second quarter of 2015, teff and sorghum prices are 5 to 8 and 3 to 4 percent higher, respectively, relative to the first quarter of 2015. This compares with the rather high rises of price indices during 1997-1998. Quarterly average price indices were higher than 1.0 during 1997-1998 for all crops and in all quarters. Relative to the first quarter of 1997, wages were lower in all quarters of the same year and in the third quarter of 1998. Relative to the first quarter of 2015, wages were lower also in the second and third quarters of 2015, while they were slightly higher in the remaining period. However, increases in wages were slow in the latter period, which could be attributed to the seasonality of agricultural labor and wages (Bachewe et al. 2016).

[10] Although food aid pledges by donors covered almost all of the estimated food shortfall requirements in 1997/1998, deliveries fell well short of target levels. This was in part due to the closure of the Massawa and Assab ports in Eritrea, following border conflicts, and the congestion of the port in Djibouti.

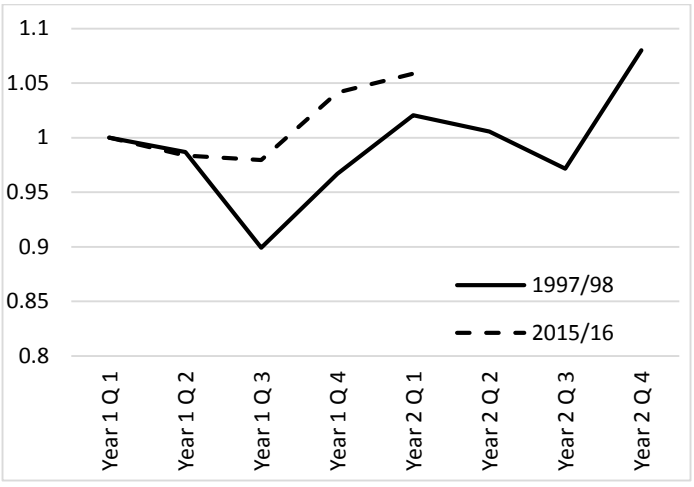
Figure 3.4—Trends in price indices of cereal crops during 1997/98 and 2015/16



Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

Figure 3.5—Trends in wage indices during 1997/98 and 2015/16



Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

3.3. Other crops

When we look at the pulses category [11], a different picture emerges. The prices of pulses have increased substantially over the period considered. Prices of pulses increased by 2.5 birr per kg or more in the three hotspot categories and in the uncategorized non-hotspot area. January 2016 prices in all woredas were at least 31 percent higher relative to January 2014 (Figure 3.6 and Table 3.1). The higher pulse prices could be explained by local factors, such as reduced supply as national production was already down in 2014/15 according to the estimates by CSA, as well as international factors, noting the higher international prices in 2015 than in 2014.

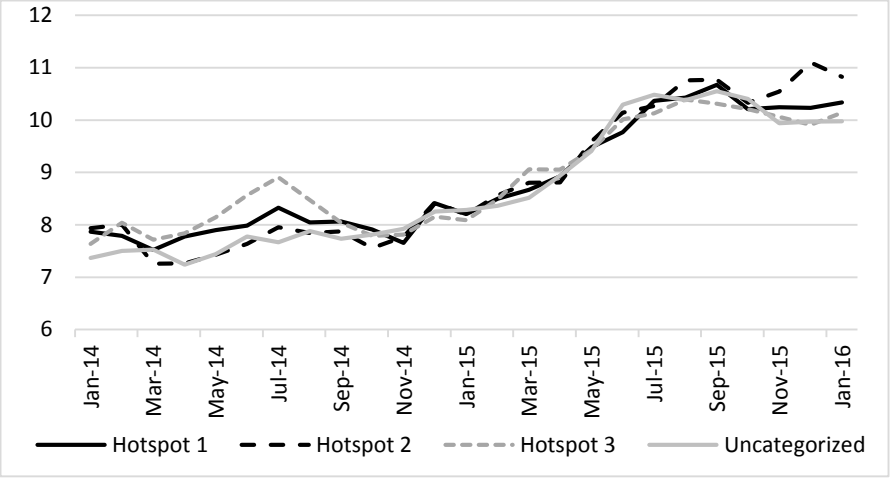
Table 3.1- Real price changes (comparing January 2016 to January 2014) of major agricultural products and livestock, by woreda hotspot category

		Woredas categorized as			
Item	Overall	Hotspot 1	Hotspot 2	Hotspot 3	Uncategorized
Crops					
Cereals (weighted)	-11.3	-7.7	-11.9	-11.9	-13.4
Cereals (unweighted)	-10.7	-8.4	-13.7	-9.5	-12.0
Teff	-0.0	1.1	-1.0	-0.9	-0.7
Maize	-22.0	-18.4	-22.6	-19.0	-26.0
Wheat	-8.1	-8.8	-10.7	-5.2	-8.1
Sorghum	-19.8	-14.6	-20.5	-21.3	-23.6
Pulses	34.3	31.3	36.4	32.7	35.4
Oilseeds	9.0	13.0	0.0	-2.1	14.5
Enset/kocho	-9.3	-11.4	-15.5	9.5	-16.5
Root crops	29.2	9.7	59.7	39.9	29.6
Livestock					
Cows	-4.0	-11.1	-7.7	-6.3	2.8
Oxen	-7.3	-15.9	-12.8	-6.3	-0.1
Sheep	-0.5	-8.7	-5.2	7.1	4.3
Goats	-2.1	-3.4	-4.7	-1.1	-1.1

Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

Figure 3.6—Trends in real pulses prices by woreda hotspot category, birr/kg in December 2011 prices



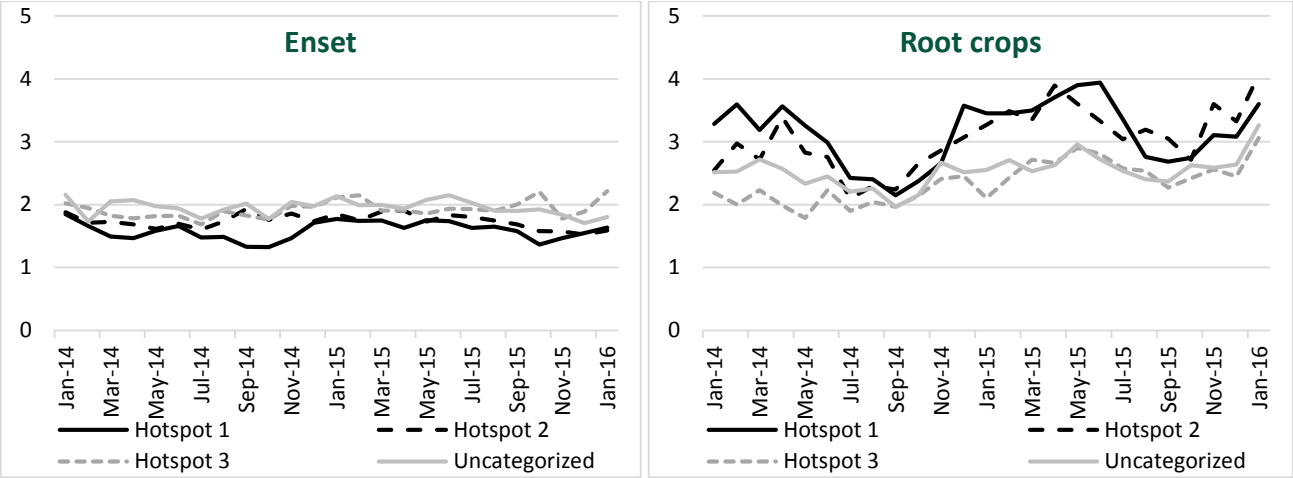
Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

[11] Pulses includes chickpeas, haricot beans, horse beans, lentils, field peas, vetch, and soya beans.

In Figure 3.7 we further provide trends in real producer prices of enset (unprocessed 'kocho'), which is consumed in large parts of SNNP and some parts of Oromiya, and of root crops.[12] Enset prices fell by 9 percent on average and by at least 11 percent in all hotspot categories, except hotspot 3 (Table 3.1). The decline in enset prices might be associated with the fact that most woredas in which enset is consumed are not severely drought-affected or enset production is relatively more drought-resistant. Root crop prices appear to have generally increased. They further show their typical high seasonality with significantly lower prices observed in the third quarters of each year. Root crop prices in January 2016 were 29 percent higher than prices in January 2014, averaged over all hotspot categories. However, the increase was less pronounced in hotspot 1 woredas compared to the other ones. On the other hand, hotspot 2 woredas showed an increase of almost 60 percent. These root crops are, however, relatively less important in the food consumption basket (see below).

Figure 3.7—Trends in real producer prices of enset and root crops by woreda hotspot category, birr/kg in December 2011 prices



Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

3.4. Livestock prices

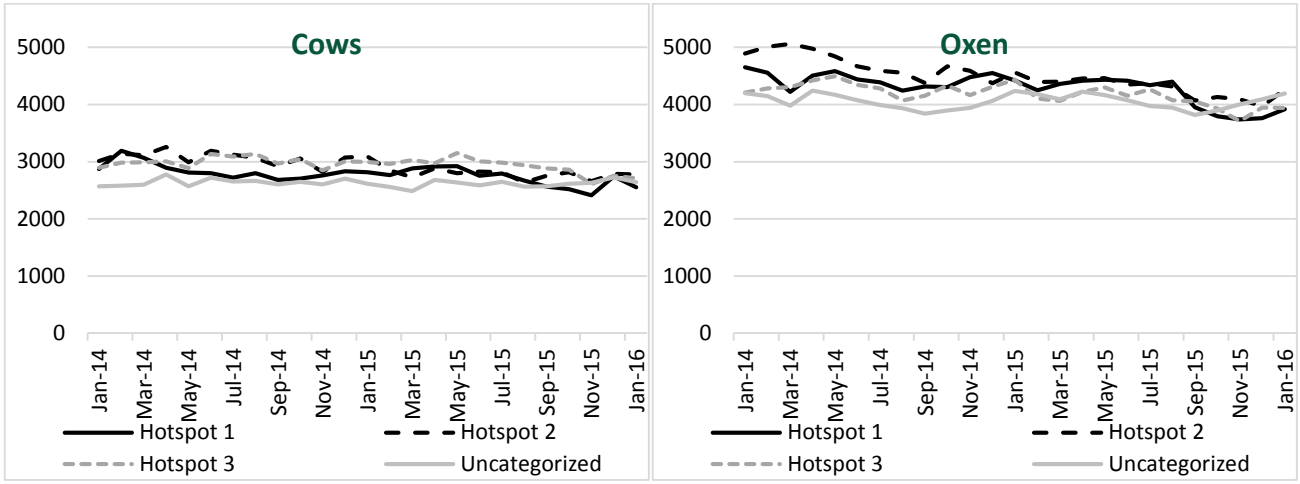
With regard to livestock, four categories – cows, oxen, sheep and goats – are examined, again differentiated by hotspot area. In contrast with cereals, where we see stable prices, and pulses, where prices are rising, we note that livestock prices have been declining over time, especially so in the most drought-affected areas, yet livestock prices were rather stable in the non-drought affected areas.

Figure 3.8 shows the evolution of cattle prices at the producer level ("producer cattle prices"). This figure illustrates, especially in hotspot 1 and 2 areas, that cattle prices have been characteristically declining. In hotspot 1 woredas, cow prices were on average about 300 birr lower in January 2016 compared to prices at the beginning of 2014. This reflects a decline of over 11 percent. In hotspot 2 areas, cow prices declined by over 230 birr or by nearly 8 percent. In contrast, cow prices increased in areas not affected by the drought. Patterns in oxen prices were similar across hotspot woredas, however, the decline in oxen prices were larger in hotspot 1 woredas. Over a period stretching from the beginning of 2014 to the beginning of 2016, the price for oxen declined by 740 birr, indicating a decrease of about 16 percent. We especially observe a dramatic decline since September 2015. Oxen in hotspot 2 woredas were characterized by a slightly lower decline than hotspot 1 of 630

[12] Root crops includes potatoes, sweet potatoes, and godere (*Colocasia esculenta*, taro).

birr, equivalent to 13 percent (Table 3.1). As in the case of cows, no important upward nor downward trend was noted with regard to prices of oxen in the uncategorized woredas.

Figure 3.8—Trends in real producer cattle prices by woreda hotspot category, birr/head in December 2011 prices

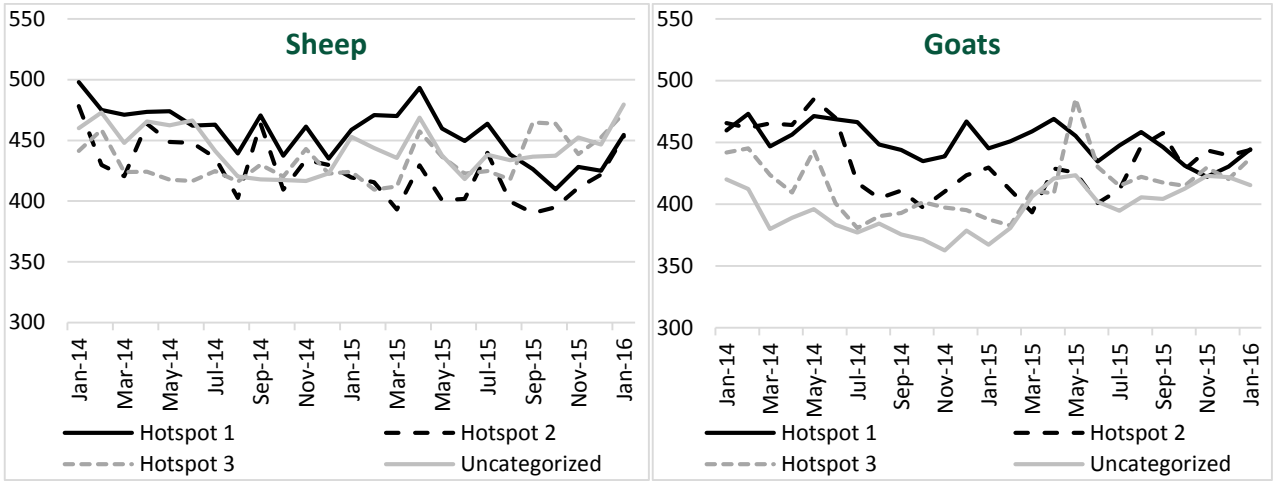


Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

Figure 3.9 illustrates the price trends for sheep and goats. In the case of sheep, we note a decline of 9 percent and 5 percent for woredas in hotspot 1 and hotspot 2 categories respectively. For goats, this decline is 3.4 percent and 4.7 percent, respectively. This is in contrast to woredas in hotspot 3 or that are uncategorized in which sheep prices increased by 7 percent and 4.3 percent, respectively, and goat prices declined only by 1 percent. These results indicate that national livestock prices overall have not been affected by the drought, as seen by prices in the uncategorized woredas which reflect 47 percent of all woredas in the country. However, the important decline in the drought-affected areas indicate widespread hardship has been experienced in those areas. This decline is especially seen in hotspot 1 and 2 woredas, representing 42 percent of the country's woredas. This decline in prices in these areas is likely due to increased supply of livestock to markets, livestock that may be of relatively poor quality (FEWS NET 2016).

Figure 3.9—Trends in real producer sheep and goat prices by woreda hotspot category, birr/head in December 2011 prices



Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

3.5 Terms of trade between livestock and cereals

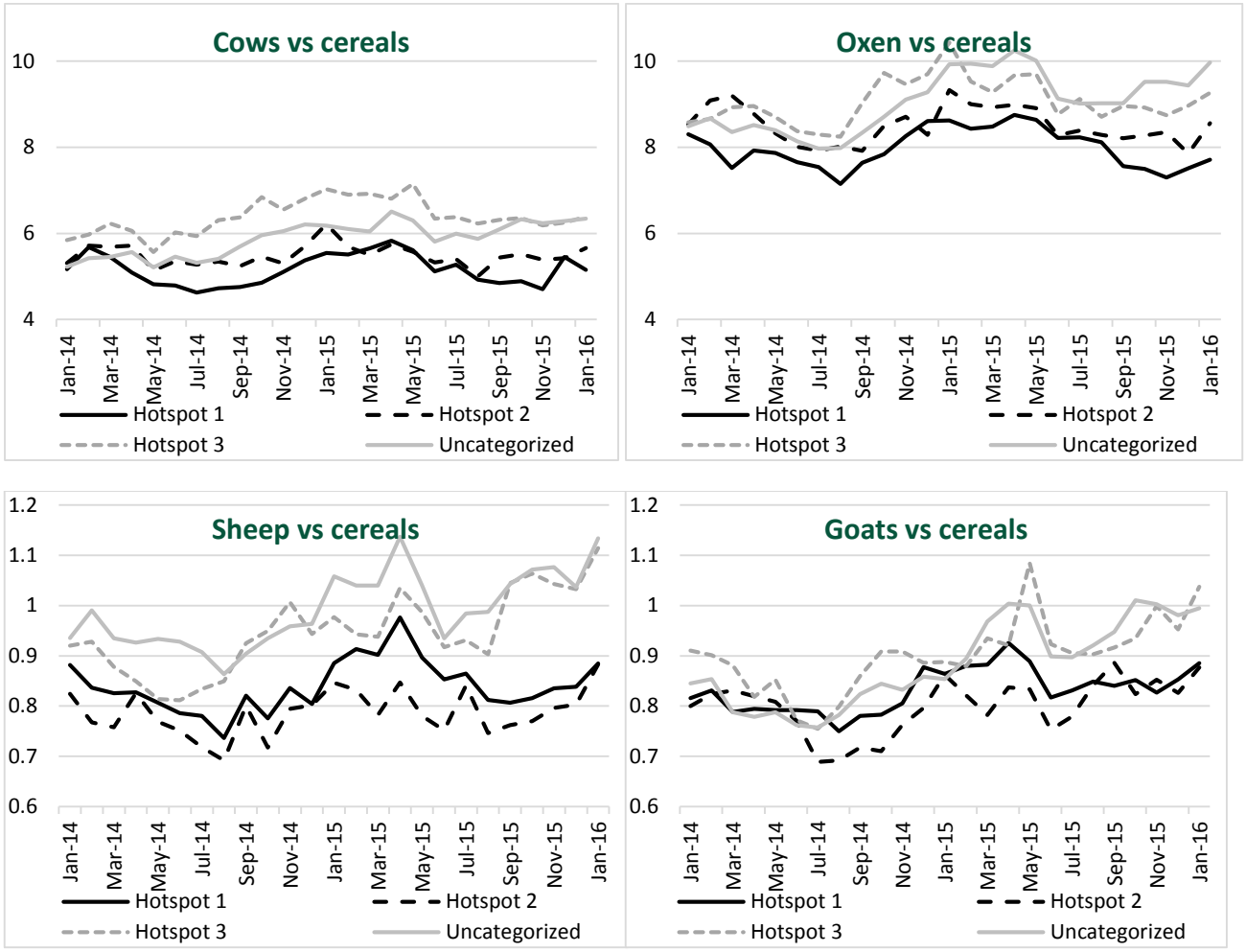
We compute the terms of trade between each livestock type and cereals as a ratio of real livestock prices and the per capita consumption weighted price of 100 kg of cereals (see section 3.1 for computation of weighted cereal price). Figure 3.10 below shows trends in the terms of trade of each of the four livestock species versus cereals. The terms of trade show similar patterns during 2014 in areas both severely affected and less affected by drought. However, the terms of trade start diverging in the two areas beginning in the period January to March 2015, at which time the terms of trade in drought affected areas either decline or remain the same, while they improve in less affected areas. Accordingly, the terms of trade (ToT) of cows versus cereals increased 8.4 percent nationally, but slightly declined in hotspot 1 woredas by 0.4 percent (Table 3.2). The decline in the terms of trade in the case of oxen was even higher at 7 percent. Comparing the ToT for different livestock species against cereals in January 2014 and January 2016, this indicates that they either declined, which is observed only in hotspot 1 areas, or have the lowest growth in those areas.

In areas not affected by drought, the terms of trade between cows and cereals increased from 5.2 in January 2014 to 6.3 in January 2016; that is, in uncategorized woredas, one cow was worth of 5.2 quintals of cereals in January 2014 and 6.3 quintals in January 2016. Expressed another way, it increased by 21.4 percent. Similarly, the ToT of oxen, sheep, and goats versus cereals increased at 17.5, 21, and 18 percent, respectively, in uncategorized areas. This is considerably higher relative to changes in the respective ToT observed in hotspot 1 woredas. The pattern in livestock-cereal ToT observed for hotspot 1 and uncategorized areas results from patterns in prices of the two items: a) a faster decline in cereal prices in areas less affected by the drought relative to a lower decline in the worst affected areas, and b) a faster decline in livestock prices in worst affected areas relative to slow decline or increases observed in prices in less drought-affected areas. The pattern in livestock prices, as well as in livestock-cereal ToT, implies that, despite increases in cereal prices that were avoided in areas worst hit by the drought, households in such areas suffered from relatively lower livestock prices and reduced values of livestock assets.

In Figure 3.11 we provide a map of the distribution of the terms of trade of cereals versus the average of sheep and goats (shoats) and cereals versus the average of cows and oxen (cattle) for the months of January 2014 and January 2016.[13] Consistent with Table 3.2, the map shows that the terms of trade of shoats and cattle versus cereals improved in the western half of the country, which is composed mostly of uncategorized and hotspot 3 areas (Figure 2.1). This includes areas such as Western and Central Amhara, Western and South-western Oromia, and Benishangul-Gumuz. The change in the terms of trade is shown by the large number of woredas in those areas that changed colors from light-red to dark-red. In contrast, the relatively little improvement or the worsening of terms of trade in hotspot 1 and 2 woredas is depicted by colors that showed little change or that changed from dark-red to lighter-red. This includes a large number of woredas in the eastern half of the country such as, the Eastern and Central parts of Tigray, parts of Afar and Somali regions where data is available, Eastern Amhara (particularly for cattle), and Central and Southern SNNP.

[13] In these maps we use zonal average prices for woredas with no price data or we assume that markets surveyed are representative of zones.

Figure 3.10—Trends in terms of trade of livestock types with cereal crops, by woreda hotspot category



Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

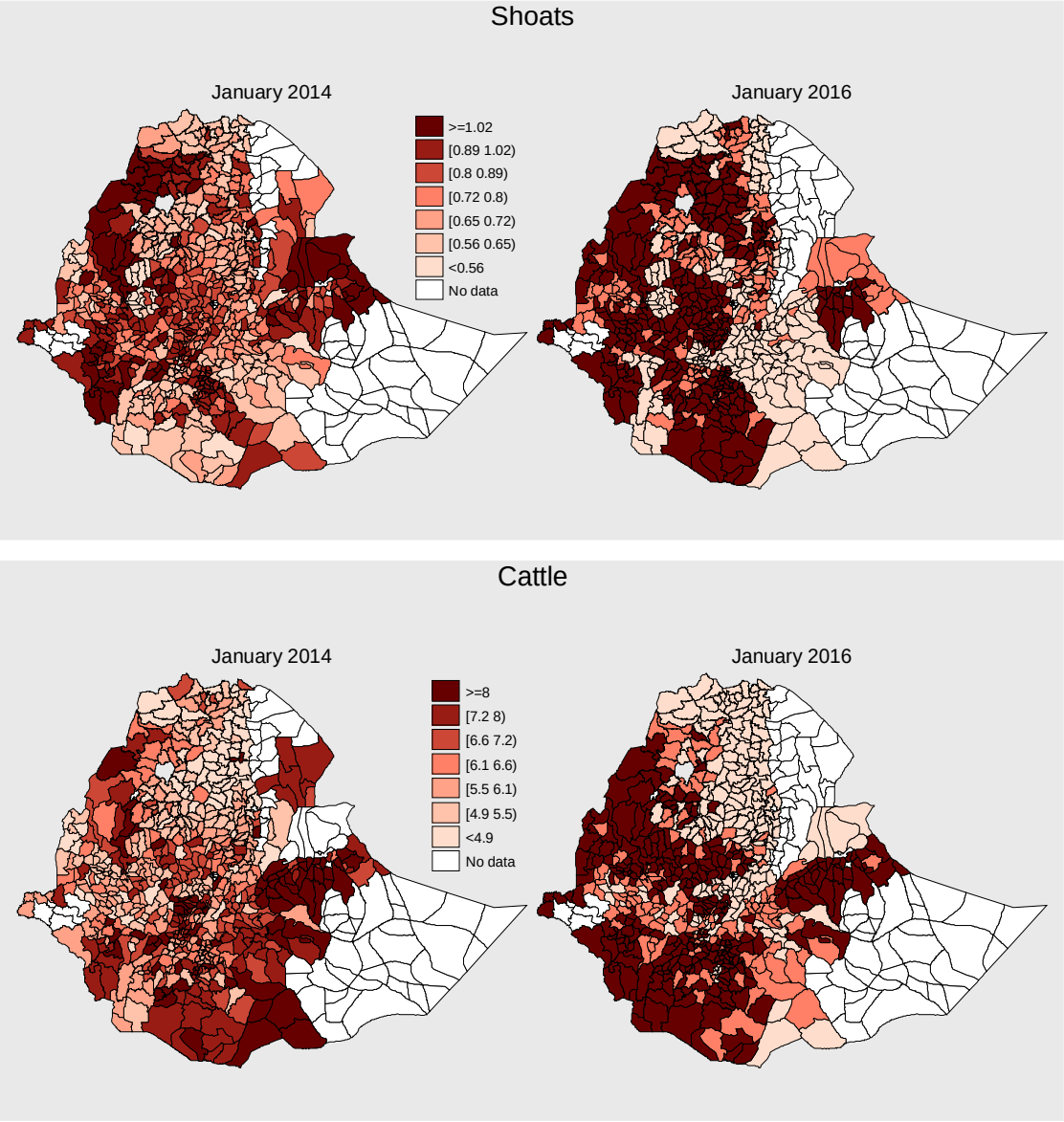
Table 3.2—Changes in terms of trade between livestock and cereals (comparing January 2016 with January 2014), by woreda hotspot area

		Woredas categorized as			
Items compared	**Overall**	**Hotspot 1**	**Hotspot 2**	**Hotspot 3**	**Uncategorized**
Cattle vs cereals	8.4	-4.5	2.7	8.5	19.0
Cow vs cereals	11.3	-0.4	6.6	9.3	21.4
Ox vs cereals	6.7	-7.1	0.3	7.9	17.5
Shoats vs cereals	13.6	4.3	8.4	17.5	19.5
Sheep vs cereals	13.8	0.4	7.2	21.1	21.2
Goat vs cereals	13.5	8.6	9.6	14.0	17.7
Shoat vs teff	-0.2	-3.5	-8.1	5.2	3.0
Shoat vs maize	29.2	17.7	17.5	27.4	40.0
Shoat vs wheat	7.9	4.7	4.4	9.5	10.7
Shoat vs sorghum	29.5	16.4	17.5	38.8	37.4

Source: Authors' computation using CSA producer price data (CSA 2016a).

Note: Woredas in Hotspot 1 are the most severely affected by the drought. 'Shoat' is average of sheep and goats combined.

Figure 3.11— Distribution of terms of trade of sheep and goats (shoats) and cattle versus cereals during January 2014 and January 2016



Source: Authors' computation

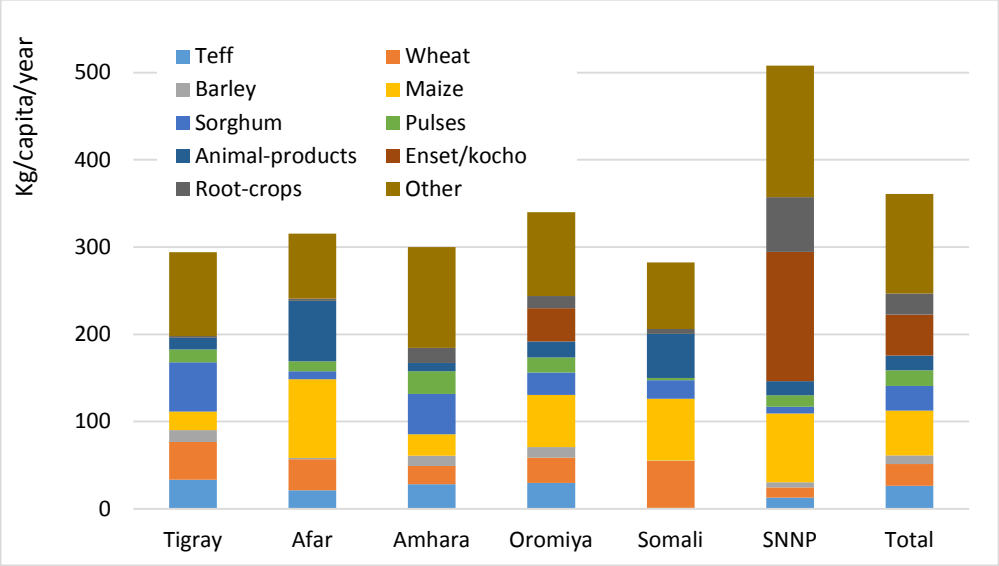
4. CONSUMPTION AND WAGES

4.1. Consumption

To better understand to what extent price changes affect the consumption basket, we examine the quantity consumed of different crops and products. Figure 4.1 shows this data for the four major regions, as well as for the Afar and Somali regions, the two pastoralist areas that were badly hit by the drought. We use the average consumption basket, obtained from the Household Income and Expenditures Survey (HICES) in 2011 (Worku et al. 2016). Figure 4.1 illustrates that cereals are, in quantity terms, very important in these regions. They comprise 60 percent in Tigray, go down to 53 percent and 56 percent in the pastoralists Afar and Somali areas, and still remain at 50 percent in the Amhara and Oromia regions. In contrast, they comprise only 24 percent of the quantity consumed in SNNP due to the high levels of consumption of enset and root crops.

The most important crop that contributes to calorie intake is maize. It accounts for nearly 20 percent of the average calories consumed per capita. Sorghum accounts for 12 percent, while teff and wheat make up 11 percent and 10 percent of calories consumed, respectively.[14] Figure 4.1 shows how different cereals have different levels of importance by region. Maize is the most important cereal in the hard-hit areas of Somali and Afar; consumption of this crop is as high as 71 kg and 90 kg per capita per year, respectively. Maize is also high in SNNP at 79 kg per capita. Wheat is also an important crop in the affected areas. Annual per capita wheat consumption stands at 36 kg in Afar, 54 kg in Somali, and 44 kg in Tigray. Fortunately, none of these crops have shown price rises over the period considered.

Figure 4.1—Annual per capita consumption, kg/capita/year



Source: Authors' calculations from CSA, HICES 2011.

We use these consumption data to place a value on the change in costs of the consumption basket, at least for the starchy crops, in the four different areas considered. We use the average consumption basket, together with CSA's producer and retail price series[15], to investigate the extent to which the cost of cereal, kocho/enset, and root crop per capita consumption was impacted by price changes between January 2014 and January 2016. Table 4.1 shows the changes in January 2016 compared to January 2014 by woreda hotspot category[16]. The results illustrate that the costs of the regular consumption basket of cereals has decreased by 11.2 percent over the period considered. That reduction was less in the hotspot 1 category, at 8 percent, than in the non-affected (uncategorized) areas with 13.9 percent. The lower reduction of the cost of the consumption basket by severity of drought-affected areas is an indication of the failed harvests in the drought-affected regions, as these costs have declined less in these areas. If we include the other important crops in the consumption basket, we see that the reduction of the costs in cereals has been lower overall, driven by the increases in prices of root crops. However, the costs of the consumption basket still came down by almost 10 percent if cereal and root crop consumption are combined, and by 8.7 percent when cereals, root crops and kocho as a whole are valued. Valuation using retail prices at the bottom of the table shows a similar pattern as the valuation by producer prices. It is further to be noted that while the real price decreased, nominal costs increased given prevailing inflation rates in the

[14] Barley and other cereals are less important. While processed cereals account for almost 5 percent of expenditures, they however contribute relatively less towards calories, with 2 percent of calories provided by this category.

[15] Given that a large proportion of the population relies on producing food for their own consumption, the valuation of consumption is not straightforward, and we therefore opt to present both.

[16] As we do not have data on consumption baskets at the woreda level, we used the regional consumption baskets coming out of the HICES of 2011 and imputed those at the woreda level, in order to aggregate these data to a hotspot category.

country – the January 2016 general, food, and non-food Consumer Price Indices (CPI) increased by 10.2, 12.4, and 7.9 percent, respectively, compared to a year earlier.

Table 4.1-Changes in real costs of real per capita consumption spending computed using producer and retail prices, comparing January 2016 with January 2014, by woreda hotspot category

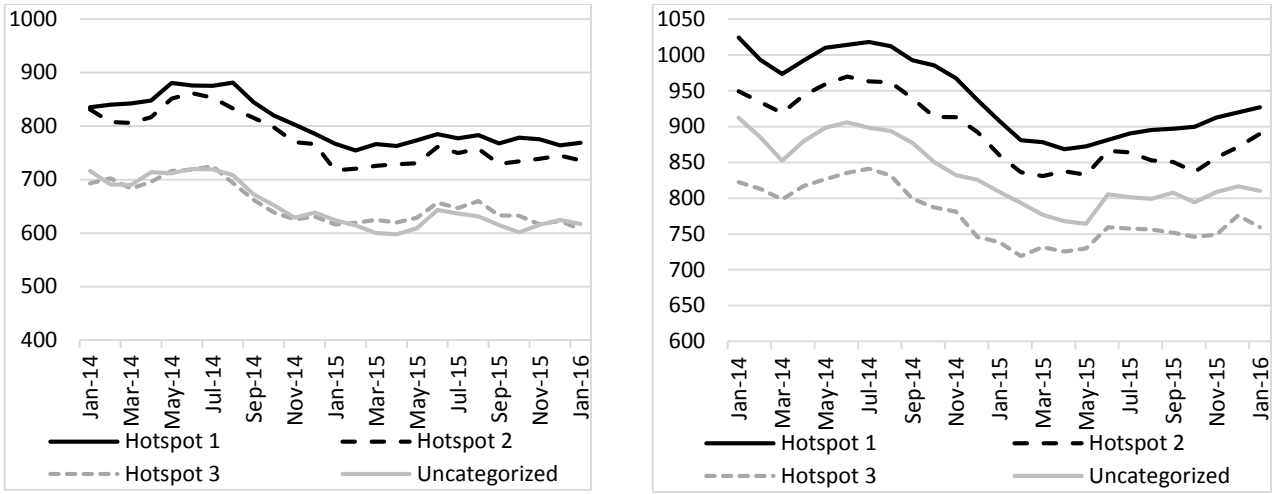
		Woredas categorized as			
Item	Overall	Hotspot 1	Hotspot 2	Hotspot 3	Uncategorized
Valuation using producer prices					
Cereals	-11.2	-8.0	-11.4	-12.4	-13.9
Cereals and root crops	-9.8	-7.8	-10.2	-10.2	-11.8
Cereals, root crops and kocho	-8.7	-7.3	-9.7	-6.5	-10.6
Valuation using retail prices					
Cereals	-9.3	-9.5	-6.2	-7.7	-11.2
Cereals and root crops	-7.8	-8.3	-5.7	-5.3	-9.5
Cereals, root crops and kocho	-10.8	-10.0	-9.3	-8.6	-12.8

Source: Authors' computations

Note: Woredas in Hotspot 1 are the most severely affected by the drought. 'Shoat' is average of sheep and goats combined.

Figure 4.2 further shows the evolution of the value of the cereal consumption basket by month, using producer prices on the left and retail prices on the right. The graph illustrates that the cost of the cereal consumption basket especially decreased towards the end of 2014, and has been rather stable since in all hotspot categories. However, notably the cost of the cereal consumption basket is considerably higher in the most drought-affected woredas. This situation however, pre-existed before the onset of the drought, as most of these affected areas are net importers of cereals.

Figure 4.2—Trends in real cost of per capita cereal consumption using producer prices (left) and retail prices (right) to value consumption by woreda hotspot category, birr/kg in December 2011 prices

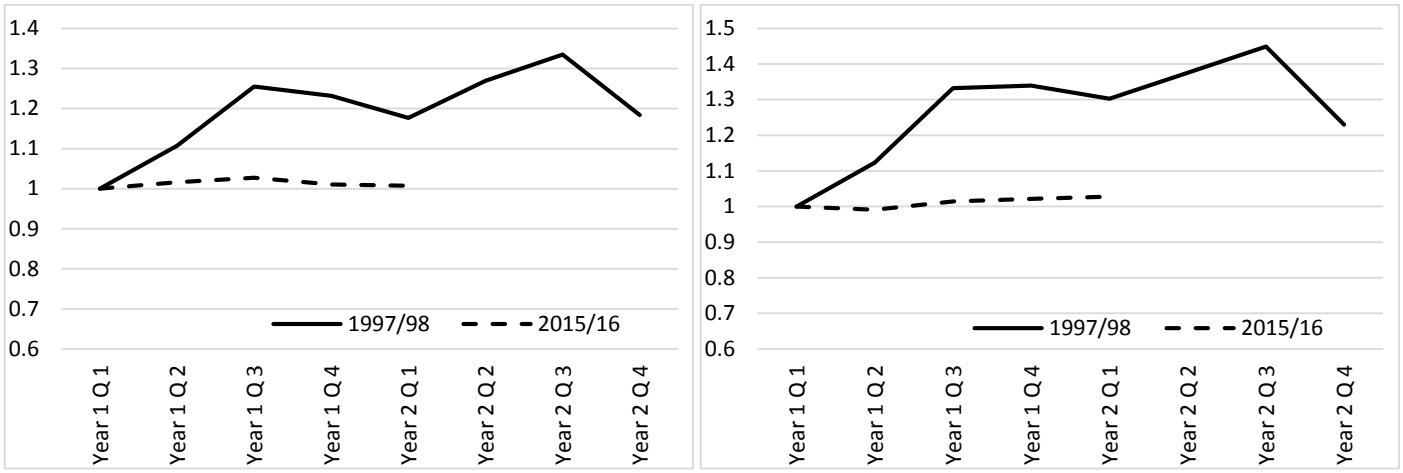


Source: Authors' computations

We also compare the changes in the cost of the cereal consumption basket of the two drought periods discussed earlier (Figure 4.3). To make the comparison, we rely on the same consumption basket described in the 2011 HICES data. We value consumption quantities again by producer prices and retail prices. The graph shows, using producer prices, that the costs of the consumption basket went up in the third quarter of 1998 by 33 percent compared to the beginning of 1997. However, it then declined by 14 percent, to increase by 18.4 percent only in quarter 4 of 1998. In contrast, in the current drought, the cost of cereal consumption has remained almost

the same with increases of less than 3 percent in all quarters of 2015 and in January 2016, compared to the costs in the beginning of 2015.[17]

Figure 4.3—Comparison of indices of the real costs of the cereal consumption basket during the droughts of 1997/98 and 2015/16, using producer prices (left) and retail prices (right) to value consumption



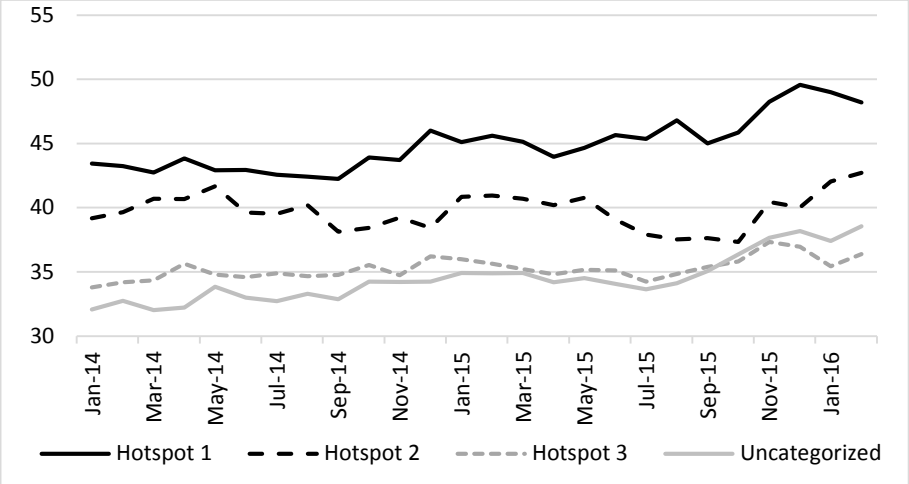
Source: Authors' computations

4.2. Wages

Finally, we look at the evolution of wages of casual laborers over the same period. Surprisingly, based on these CSA data, wages for unskilled labor for hotspot 1 and 2 areas are found to be relatively higher than for the other areas (Figure 4.4). Further, we see no deterioration (yet) in these wage rates in 2015, with the exception of the final months in the hotspot 1 category, where we note a slight decline in real wages at the beginning of 2016 compared to two months earlier. We do not note that decline in other areas, however. Rural wages in Ethiopia have been characterized by important real growth over the last decade and that growth seems to have continued up to the end of 2015 (Bachewe et al. 2015). The overall results therefore suggest that, while there are reported incidences of rapid declines in wages in some affected areas (as documented by the AKLDP studies), this is not (yet) widespread over the period studied. However, even though wages might not have declined, this does not imply that everybody that sought work would get access to labor income at those wages, as there has likely been lower demand for on-farm jobs due to lower requirements by farmers for hired-in labor because of the drought reducing crop production levels.

[17] It is to be noted that the year before the drought in 1997/98 was a relatively good agricultural year as grain production had increased in 1996/97 by 3.9 percent compared to 1995/96, according to CSA estimates. This might have led to slightly lower producer prices at the beginning of the period considered.

Figure 4.4—Trends in real wages by woreda hotspot category, December 2011 birr



Source: Authors' computation using CSA retail price data (CSA 2016b).

Note: Woredas in Hotspot 1 are the most severely affected by the drought.

5. CONCLUSIONS

A number of important findings emerge from analyzing the CSA producer price data over the January 2014 to January 2016 period, reflecting some of the effects of the drought on Ethiopia's agricultural and food economy.

First, cereal prices have been declining over the period studied. This implies that markets do not anticipate that there are major shortfalls in supply at the national level, possibly because of larger than normal imported quantities of cereal in 2015 and expected large additional imports of wheat this year.[18] Wheat and maize prices are especially on the decline, which is important to note, given their share in the total calories consumed within the affected areas. We estimate that the costs of the cereal consumption basket at the national level declined by 11 percent in January 2016 compared to January 2014. We further note that there are small differences between the drought-affected (decline of 8 percent) and non-drought affected (decline of 14 percent) areas in price evolutions of cereals over this period.

Second, pulses and root crops, on the other hand, do show an increase in prices. Price increases of pulses were as high as 34 percent at the beginning of 2016 compared to the beginning of 2014. The prices of root crops overall also showed an important increase of 29 percent over the same period. Prices of enset, however, declined. When considering the typical consumption basket of consumers in the country overall, as well as in the drought-affected areas, the price of the food consumption basket for an average household has decreased compared to 1 or 2 years earlier. This is the case in the drought-affected as well as in the non-drought affected areas. It is estimated that the costs of the consumption basket of cereals, root crops, and enset declined at the national level by 8.7 percent.

Third, livestock prices, when in decline are a good predictor of upcoming food insecurity, show a clear downward trend for the most drought-affected areas (hotspot 1 and 2 areas) for all of the four categories of livestock analyzed. Prices for these livestock categories have declined in these drought-affected areas by between 3 percent and 16 percent. This contrasts with woredas that have not been affected by drought, as we do not observe a decline in livestock prices in these areas. This price decline is likely caused by a lack of pasture regeneration and therefore degenerating body conditions of livestock, as well as lack of livelihood opportunities because of losses in agricultural output, driving increased sales of livestock. Considering crop and livestock

[18] Using simple assumptions on supply and demand elasticities (-0.5), one would have expected that prices would have increased by 20 percent in the case of a shortfall of 10 percent (and assuming constant demand). Seemingly because of expected imports or because of less than anticipated shortfalls at the national level, cereal prices do not yet show an increase.

prices jointly, reveals that livestock-cereal terms of trade declined in the worst affected areas, mainly because the decline in livestock prices was faster than the decline in cereal prices in such areas. In contrast, the livestock-cereal terms of trade considerably improved in areas less affected by the drought.

Fourth, wages of unskilled laborers have not yet been characterized by large-scale downward trends. We note a slight downward trend, though, in hotspot 1 areas in the period November 2015 to January 2016, confirming reports of some important localized effects on wages, and labor markets more generally, in these drought-affected areas (AKLDP 2016a, 2016b, 2016c).

Fifth, when we compare the movement of prices in these last two years with price evolution during another drought-stricken period in the country, 1997/98, during which cereal production was estimated to have been 25 percent lower compared to the previous agricultural season, we note that prices appear to follow a different pattern. While the current drought is creating enormous hardship, it might be less severe in terms of food and agricultural prices, than was experienced in the drought during the 1997/98 period, likely because of the large wheat imports in the country in 2015, as well as the expected imports in 2016.

Overall, the analysis of the CSA prices suggest that there is no indication of major large-scale effects of the drought in the wage and cereal markets, but there are troubling indications in the drop in livestock prices that may suggest major hardships for pastoralists and small farmers owning livestock. While the costs of consumption baskets might not have increased over the period considered at the national level, as well as in the drought-affected areas, however there is a clear need to further assist those households that have directly been affected by the drought because of their loss of livelihood due to the drop in or loss of agricultural output, in addition to depletion of their agricultural or other assets.

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About the Authors

Fantu Nisrane Bachewe is an Associate Research Fellow in the Development Strategy and Governance Division of IFPRI, working under the Ethiopia Strategy Support Program (ESSP) jointly with the Ethiopian Development Research Institute (EDRI) in Addis Ababa; **Feiruz Yimer** is a Research Officer at the Ethiopia Strategy Support Program-Ethiopian Development Research Institute, Addis Ababa**; Bart Minten** is the ESSP Program Leader and a Senior Research Fellow in the Development Strategy and Governance Division of IFPRI, based in Addis Ababa; and **Paul Dorosh** is Division Director of the Development Strategy and Governance Division of IFPRI, based in Washington DC.

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
2033 K Street, NW | Washington, DC 20006-1002 USA
T: +1.202.862.5600 | F: +1.202.457.4439
Skype: ifprihomeoffice | ifpri@cgiar.org | www.ifpri.org

IFPRI–ESSP ADDIS ABABA
P.O. Box 5689, Addis Ababa, Ethiopia
T: +251.11.617.2000 | F: +251.11.646.2318
mahlet.mekuria@cgiar.org | http://essp.ifpri.info

ETHIOPIAN DEVELOPMENT RESEARCH INSTITUTE
P.O. Box 2479, Addis Ababa, Ethiopia
T: +251.11.550.6066; +251.11.553.8633 | F: +251.11.550.5588
info@edri-eth.org | www.edri-eth.org

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