Ethiopia Country Report

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1 Ethiopia

1.1 Country Context

With a population of over 80 million, Ethiopia is the second most populous country in sub-Saharan Africa (SSA). Though Ethiopia's economy has been growing at an average rate of 7% in recent years[1], the country remains one of the world's poorest. With a low human development index of 0.383, Ethiopia is ranked 174 out of 187 countries in the UNDP's Human Development report of 2011.[2] The average Gross National Income (GNI) per capita is only US$971, which is far below the average value for sub-Saharan African countries of $1,966.[3] The purchasing power of rural households remains weak with almost 40% of the rural population living in poverty, and about 29% of the population living in extreme poverty with an income of less than one dollar per capita per day.

Ethiopia's economy is based mainly on agriculture, including crop and livestock production, which contributes 45% of the national Gross Domestic Product (GDP), more than 80% of employment opportunities and over 90% of the foreign exchange earnings of the country.[4] However, the Ethiopian economy, particularly agricultural development, is extremely vulnerable to external shocks like climate change, global price fluctuations of exports and imports and other external factors.

Ethiopia's climate is tropical in the south-east and north-east lowland areas, and cooler in the highland region located in the central part of the country. Over the past several decades, temperatures in Ethiopia have increased by 1.3°C per decade, and daily average temperature records indicate significantly increasing trends in the number of hot days and hot nights.[5] A recent survey conducted in Ethiopia indicated that a significant proportion of the population is experiencing changes in the type and severity of climate shocks as well as more variable rainfall. These changes in climate condition

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[1] www.oecd.org/dev/publications/africanoutlook;
[2] UNDP, 2011
[3] UNDP, 2011
[4] MoA, 2010
[5] McSweeney, 2009

have negatively impacted the population by contributing to asset losses through natural resource degradation and decreases in livestock assets.

Drought is one of the most probable climate shocks, regularly affecting food production, livestock production and livelihoods of the poor. Since the 1970s, the severity, frequency and impacts of drought have increased and the areas affected by drought and desertification are expanding.[6]

Livestock Population in Pastoralist Areas

Between 1974 and 2003, Ethiopia reportedly experienced about 54 natural disasters, with the worst famine the country has experienced in 1983-5. During this period, the number of affected people increased from nearly 2 million (between 1974 and 1978) to about 42 million (during 1999-2003).[7]

Oxfam estimates that drought alone costs Ethiopia US$1.1 billion per year.[8] Oxfam further states that this loss 'almost eclipses the US$1.3 billion per year that Ethiopia received in international assistance to tackle poverty and emergencies over the same period'.[9]

As described earlier, the economy of Ethiopia relies heavily on agriculture, which is very vulnerable to climate shock as it is the largest user of fresh water in Ethiopia. Farmers and pastoralists living in semi-arid and arid lowlands are heavily reliant on rain-fed agriculture and livestock rearing. Thus, when water is scarce due to drought or erratic rainfall, crops face greater risks of failing, more livestock resources perish, and pastoralists and farmers have to travel greater distances to access water for their households and animals. For instance, during the 2002-2003 drought, Ethiopia lost more than 1.4 million animals.[10]

[6] World Bank, 2009
[7] MoWR, 2007
[8] Save the Children and Oxfam, 2012
[9] Oxfam, 2011
[10] FAO, 2003 cited in ICRC, 2005

Animal Species	National (Millions)*	Pastoral areas (Millions)	as % of National figure
Cattle	52	15.60	30%
Sheep	3.3	0.99	30%
Goats	30	21.00	70%
Camels	2.5	2.50	100%
Horses		1.58	
Asses		3.89	
Total Head count	**87.8**	**45.56**	

(Sources: * MoA, 2010; ** HPG, 2008:6)

1.2 Pastoralism

Pastoralists in Ethiopia are found in seven regions including Afar, Somali, SNNP, Oromia, Diredawa, Benshangul Gumuz and Gambella Regional States. The main livelihood systems include pastoralism, farming and ex-pastoralism – those who have dropped out of pastoralism and now survive on petty income-earning activities.[11] Pastoralists constitute a minority in Ethiopia, with an estimated 12–15 million people (14% to 18%) out of the total population of 83 million people.[12]

Ethiopia's total livestock population has reached more than 88 million in head count, and is the largest in Africa.[13] The livestock sub-sector contributes an estimated 12% to total GDP and over 45% to agricultural GDP.[14] On average, the pastoral livestock population accounts for an estimated 40% of the total livestock population of the country.[15] IGAD estimated in 2010 that pastoralist livestock makes up 30% of the nation's cattle, 70% of the goats and sheep and all camels in the country.[16]

The pastoral population occupies a disproportionately large area of Ethiopia and produces much more than its share of national livestock output. The Ministry of Agriculture estimates that pastoralists use 60% of the country's land area,[17] though exact figures of the pastoral livestock population in Ethiopia are unknown.

In 2010, IGAD commented that the contribution of pastoral livestock to the national GDP had been underestimated in previous years. However, according to a revised formula to value livestock assets to the national economy, IGAD estimated that pastoralist livestock contributed 35 billion Ethiopian Birr (ETB)[18] out of the total national livestock value of 86.5 billion ETB to the national economy for 2008/09.[19]

In some cases, pastoral animals can also have an additional collective insurance value depending on how many animals are involved in livestock sharing schemes to pool risk.

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[11] Behnke et al., 2007
[12] PFE, 2006
[13] MoA, 2010
[14] Ibid
[15] Pantuliano and Wekesa, 2008
[16] PFE (2010) indicated that pastoralist regions contribute 20% of sheep, 25% of goats, 73% of cattle and 100% of the camel population of the country. (PFE, 2010) (PADS Vol. 2, Study 5 Animal Breeds)
[17] MoARD, 2005
[18] This was derived from cattle (20.258 billion ETB), sheep (2.254 billion ETB), goats (5.011 billion ETB) and camels (7.256 billion ETB).
[19] IGAD, 2010

It is estimated that about 10.5% of pastoral animals are involved in livestock sharing networks.[20] By using this figure and IGAD's estimate that pastoralist livestock contributes 35 billion ETB to the national economy, the collective insurance value of pastoral herds can be estimated at 3.7 billion ETB in 2008-2009.

The pastoral livestock population also contributes to transport services and provides products such as milk, meat, skin and hides, though the value of these components has largely been underestimated.[21]For instance, IGAD notes that the estimate of 51,692,400 ETB as the gross value of animal transport services in 2008-2009 was largely underestimated due to a lack of proper recording and methods of calculating the transportation services provided by equines and pack animals in pastoralist areas. This indicates that the contribution of pastoral livestock to Ethiopia's GDP is very significant and exceeds 90 billion ETB, approximately US$10.6 billion.[22]

Drought routinely affects pastoral areas. There are differing views as to why pastoralists in the Horn of Africa have become more vulnerable to the effects of drought. In 1988, Ellis and Swift suggested that East African pastoral systems have vegetation and livestock populations that are largely controlled by rainfall. They associated increases in livestock population with high precipitation, and a decline in the population due to decreasing access to vegetation and water resulting from low rainfall. According to these researchers, the livestock numbers in such systems change mostly in response to annual rainfall variation, which has a direct effect on availability of vegetation and water for livestock.

Based on their work in the semi-arid Borana Plateau, however, PARIMA researchers argue that it is not only the annual rainfall that controls the livestock population in a given arid or semi-arid pastoralist area, but also the interaction between the livestock population density and forage resources that affects the livestock population in a given drought-year.[23] By analysing the relationship between the livestock population density and the forage resources, herd pattern, and the consequences of drought over the past three decades (1980-2007), Desta and Coppock noted that livestock crashes in Borana appeared to be predictable. They seemed to suggest that livestock die off due to drought is likely to happen when the livestock density exceeds a certain threshold.[24]

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[20] Barrett et al (2006) and McPeak et al (forthcoming 2011) as cited in IGAD (2010)
[21] Ibid.
[22] At 1US$=8.51 ETB in 2008/09 Exchange rate
[23] Desta and Coppock (2002)
[24] They suggest that 'when stocking rates exceed a threshold size (over 30 head of cattle per square kilometre, for example), a major die off becomes more likely when the annual rainfall happens to be low (for example, less than 400 millimetres per year)'. Ibid.

Whatever the case may be, it is evident that more and more pastoralist households, especially the poorer households, are increasingly affected by severe drought, which occurs approximately every 3 to 5 years.[25]

[25]Aklilu and Catley,2010

2 Cost Comparison of Response

2.1 Top-down Analysis

2.1.1 What is the Cost of Humanitarian Response?

Cost of humanitarian aid

Over the years, multiple bilateral and multilateral donors have responded to the humanitarian needs of an affected population. The level of response has been determined based on annual appeal figures estimated by a multi-agency assessment. In most documents, annual humanitarian funding figures are available in aggregate form for all types of natural disasters. This makes it difficult to accurately estimate the value of drought related emergency funding. Moreover, it is difficult to find complete and consistent figures on the value of emergency funding. The problem becomes more difficult particularly when attempting to get emergency resources that went specifically to pastoralist areas. In this regard, information obtained from different sources including OCHA's annual HRF reports, USAID/OFDA reports, AidData, as well as the Financial Tracking Services (FTS) of OCHA were reviewed thoroughly.

The Humanitarian Response Fund (HRF) for Ethiopia was established in March 2006 in order to harmonize and improve coordination of humanitarian and emergency funding. This fund is being managed by the Humanitarian Coordination (HC) committee, with administrative support from OCHA.

From 2006 to 2011, OCHA has been publishing and disseminating status reports of humanitarian situations including resource allocation and utilization by sector. According to these annual HRF reports, the cost of drought related humanitarian response channeled only through HRF was on average $352m per year.

However, it was also observed that the figures obtained from OCHA on HRF utilisation did not include the value of emergency response interventions funded by other donors like USAID/OFDA and ECHO. These donors do not contribute funding to HRF though there has been a regular exchange of information between OCHA and these donors.[26] For example, USAID recently published the results of its humanitarian assistance effort (from 2002 to 2011) to eastern and central Africa for drought in Ethiopia and Kenya, an Ebola outbreak in Uganda, regional food insecurity throughout the Horn of Africa, post-election violence in Kenya, and crises in Somalia, South Sudan, Sudan, and the DRC, and

[26] OCHA, 2008:24

to Eretria, Djibouti, Burundi.[27] According to the report, from the total $11.6 billion funding to east Africa, the majority of funding was allocated to Ethiopia and Sudan, where each country received 33 per cent of the total allocation. This implies that over the last ten years, Ethiopia received over $3.8 billion (more than $380m per year). Since this funding was used mainly for drought related emergencies, it increases Ethiopia's average annual emergency cost to more than $732 million.

There is no proper documentation on the Consolidated Appeal Process (CAP) for Ethiopia. There is, however, a joint government/donor appeal document, which estimates food and non-food humanitarian support required every year. In many cases, estimated figures published in the joint appeal documents are subjected to repeated revisions depending on changes in disaster situations during a particular year. The information from the joint appeal document is usually incorporated in HRF annual reports.

The Financial Tracking Services (FTS),[28] which was developed and managed by UNOCHA, records all reported international aggregated humanitarian funding to natural disasters. For the purpose of this study, therefore, the financial information obtained from this source has been used for comparison of the humanitarian costs with costs of early response and resilience interventions.

[27] USAID, n.d.
[28] http://fts.unocha.org/

Table 1: Number of People Affected by Drought and Resource Flow

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
No. people affected (million)	8.74	13.46	2.59	3.61	7.49	1.51				4.5	5.99
Emergency aid flow (US$ m)[29]	92.33	496.41	58.92	544.67	393.12	276.00	1,077.82	707.75	616.69	822.52	508.62
Cost per Beneficiary	10.56	36.88	22.75	150.88	52.49	182.78				182.78	91.30

[29] http://ochaonline.un.org/ethiopia/AppealsFunding/FinancialTracking/tabid/2957/language/en-US/Default.aspx (2000-2011).

Based on the data in the table above, the average number of people affected by drought is about 6 million, and the average expenditure was US$509 million per annum. If we divide the total emergency aid flow by the number of people affected to get a per capita estimate for each year, then the average cost of aid for drought per person is US$91.

Economic losses: the case of Borena pastoralists from the 2011 drought

Drought does not only result in aid costs, but also results in significant losses. Estimated losses due to livestock are presented here, as a result of the 2011 drought.

According to some reports, the total population of the Borena zone is estimated to be 1.29 million people (or 215,000 households), and the average family size is six persons. The total livestock population of the Borena zone has been estimated at 1,216,143 cattle, 142,122 camels, 214,799 sheep and 591,243 goats.[30]

Borena was one of the most affected areas in Ethiopia by the 2011 drought. It has been difficult to obtain official estimates of the actual damage (e.g. loss of animals) resulting from the severe drought. However, according to the Food and Agriculture Organization (FAO), the total death rate could reach 60%, 40%, and 25-30% (an average of 27%) for cattle, sheep and goats respectively[31]. The FAO estimate did not include the mortality or morbidity rate of other animals such as camels and equines.

For this analysis, the FAO's estimate on mortality was used to calculate the total number of animals that died in 2011 and the resulting economic loss. It is estimated that a total of 978,197 head of animals (729,685 cattle, 85,920 sheep and 162,592 goats) died. To find the total economic loss from the death of animals, the following assumptions/ parameters are used:

- The current price of animals is taken from Land O'Lakes:[32] the average price used for cattle, sheep and goat has been $328.42, $59.21 and $62.86 respectively. The price of cow and goat milk per litre is estimated at $0.52 and $0.38 respectively, and the price of butter is $6.29/kg.[33]
- A shared insurance contribution of 10.5% (of total livestock value lost from the area) is assumed.[34] Loss of 50% of the current values of livestock is assumed for animals sold for slaughter destocking.

[30] CARE-ETHIOPIA, 2009
[31] OCHA, 2011
[32] Land O'Lakes, Inc., 2010
[33] Estimates for cow milk and butter came from Land O' Lakes, Inc, 2010 and goat milk estimates from a 2009 estimate by Central Statistics Authority (CSA, 2009)
[34] IGAD, 2010

As Table 2 illustrates, due to the 2011 drought, the total economic loss of livestock and livestock products in Borena is estimated at US$384 million, equivalent to approximately $297 per person.

Table 2. Estimated Economic Value of Livestock and Livestock Products Lost from Borena Zone due to the 2011 Drought.

Animal Species	Total value lost from livestock loss (US$)	Value lost from milk (US$)	Value lost from Butter (US$)	Shared Insurance Values lost (US$)	Slaughter destocking-50% Value (US$)	Total loss	Loss per HH (US$)	Loss per person (US$)	ETB
Cattle	239,643,410	11,593,578	111,433,259	1,135,210	1,127,302	364,932,759	1,697	283	4,809
Sheep	5,087,514			534,189		5,621,703	26	4	74
Goats	10,220,929	1,774,676		1,073,198	5,972	13,074,774	61	10	172
Total	**254,951,853**	**13,368,254**	**111,433,259**	**2,742,597**	**1,133,274**	**383,629,238**	**1,784**	**297**	**5,055**

	Total loss	**US$**	**ETB**
	Per HH	1,784.32	30,333.47
	Per capita	297.39	5,055.58

According to several sources, one of the main factors attributed to the death of such a large number of animals was the fact that humanitarian aid was too late to protect the livelihoods assets, even though it helped to save lives. Had there been an early response, for example the provision of livestock feed, commercial destocking or water rationing and rehabilitation of water points, it would have been possible to protect the livelihoods of thousands of pastoralists in Borena.

2.1.2 What is the Cost of Early Response?

With an approaching drought related disaster, most transiently food-insecure households start coping relatively early. In the early stages, coping strategies tend to involve less costly actions such as the sale of non-productive assets or the migration of family members. In later stages, however, households approaching or at subsistence levels that have exhausted initial coping mechanisms are forced to sell productive assets or employ other costly coping strategies, such as removing children from school.

Additionally, it has been observed from the effects of previous disasters that short-term shocks can have long-term consequences and involve considerable setbacks to development. For example, 'studies show that households that suffered substantially during the 1984-5 drought, which resulted in a large-scale famine, continued to experience 2 to 3 per cent less annual growth per capita during the 1990's as compared with those who were not hit as hard.'[35] In other words, though emergency response, even when delivered late, can save lives, it cannot protect or save livelihoods.[36]

A timely and predictable intervention before a crisis occurs can prevent households from using destructive risk-coping strategies, and would reduce the need for a massive emergency response.[37] Drought is among the most probable hazards routinely affecting pastoralists in Ethiopia.[38] It has been estimated that there is a 40% likelihood that eastern and western Ethiopia will experience a severe drought in any given year. This implies that, with a sound early warning system, it will be possible to predict the effect of imminent drought in pastoralist areas. This suggests that early action will help to avoid or reduce the risk of losing productive assets.

It is based on this understanding that the Government of Ethiopia, with support from international donors and NGOs, introduced the Productive Safety Net Programme

[35] Dercon and Krishnan cited in Hess et al, 2006

[36] Hess et al (2006) indicated that as many as 1-2 million previously vulnerable people were pushed into destitution due to the long-term impact of the 2002 drought.

[37] Hess, et al 2006

[38] Asana et al, 2007

(PSNP) in 2005, which has introduced a multi-annual, predictable and increasingly cash-based model as the mechanism for providing support to the "chronically" food insecure.[39]

The World Bank assisted in design phases and a credit of $14.3 million and a grant of $55.7 million in November 30, 2004. With additional support obtained from other donors, the total funding of the first phase of PSNP, which was implemented from January 2005 to 31 December 2006, was $392 million.

Successive projects were designed to be implemented in two phases covering the periods from 2007 to 2010, and from 2009 to 2014. For these phases of the PSNP, a total budget of $1,030 million and $2,227 million has been allocated respectively.[40] On average about 4.5 million people have been targeted by the PSNP.

The resources allocated to the PSNP can be used during drought related emergencies. This is in addition to the humanitarian aid figures quoted in the previous section. Therefore, the annual relief aid assistance coupled with resource transfer in cash and food through the PSNP program makes Ethiopia the largest recipient of humanitarian aid in sub-Saharan African countries.

At the same time, the Government has aligned targeting of other complementary interventions with the PSNP to promote graduation of beneficiaries out of chronic food insecurity. So far, the PSNP has been implemented in the agriculture based livelihood areas of the country. Very recently, however, the PSNP has been piloted in pastoral areas.

2.1.3 What is the Cost of Building Resilience?

> *"Uncertainty about the exact nature of future climate change must not be interpreted as uncertainty in the need to act now to minimize future damage". (Ethiopia's Vision For a Climate Resilient Green Economy).*

For the past several decades, most governments in the Horn of Africa have tended to passively act after a disaster happens. Efforts have also concentrated on responses rather than mitigation through improved environmental management and agricultural practices. Very recently, however, the concept of disaster mitigation or resilience building is gaining the attention of many governments and donors.

[39] WorldBank, 2011; USAID, n.d.
[40] Ibid

Currently, the Government of Ethiopia (GoE) showed its commitment to shift from an ad-hoc assessment based emergency response to designing and implementing disaster risk reduction (DRR), early warning systems and disaster assessment based responses. A number of Government documents including the Strategic Programme of Investment Framework, Ethiopia's Vision For a Climate Resilient Green Economy, Economics of Adaptation to Climate Change in Ethiopia as well as Ethiopia's Agriculture Sector Policy and Investment Framework (2010-2020) underlie the importance of acting now to reduce the risk of damage by a disaster in the future.

Strategic Programme investment Framework (SPIF)

The goal of the SPIF is to reduce disaster risk and the impact of disasters through the establishment of a comprehensive and integrated disaster risk management system.

It emphasizes the need for a holistic approach on disaster risk management (DRM) as both development and humanitarian actions are inextricably linked and provide a fluid transition towards the strengthening of capacities and resilience of households and communities to protect lives and livelihoods. The interventions listed in the SPIF include all phases of disaster management, e.g. disaster prevention, mitigation, preparedness, response and recovery.

For the purpose of this study, only the costs in the right end column are considered to estimate the total cost for resilience building. As the table above shows, the government estimates about $324 million over five years is allocated to build resilience of vulnerable people in the country in general.

Agriculture Sector Policy and Investment Framework

During the last three years (2007-2010), 66% of the total budget of the Ministry of Agriculture and Rural Development (MoARD) went to the Disaster Risk Management and Food Security Sector (DRMFSS) and continued high levels of expenditure are committed over the next four years under funding from the PSNP and HABP. In this framework, the Ministry of Agriculture (MoA) committed, on average, $349.57 per annum for disaster risk management, which constitutes more than 58% of the agriculture sector investment.[41].

[41] MoA, 2010

Table 3: Strategic Programme Investment Framework (SPIF): Breakdown of Costs

	Programme Component	Total (2010-2015)	Cost of Resilience Intervention
	Prevention	**10,422,655**	**10,422,655**
1	Woreda Disaster Risk Profiling	9,527,192	
2	Information Management Support (Woreda Connectivity & information management)	11	
3	DRM Research, Communication and Awareness raising	895,452	
	Prevention and mitigation	**312,922,500**	**312,922,500**
4	Community Disaster Risk Management	10,312,500	
5	Disaster Mainstreaming	1,860,000	
6	DRR Programmes	300,750,000	
	Preparedness	**1,845,500**	
7	Rapid Assessment	1,845,500	
	Response	**807,589,799**	
8	Food and Non-food management systems	806,742,448	
9	DRM Volunteer Scheme	736,351	
10	Emergency Response	111,000	
	Recovery and Rehabilitation	**10,302,058**	
11	Recovery and Rehabilitation	9,177,058	
12	Capacity Development	1,125,000	
	Cuts across all components	**1,076,804**	**1,076,804**
13	Institutional Strengthening- International Collaborations and Engagements	519,000	
14	Institutional strengthening-DRM Coordination	557,804	
	Grand Total (US$)	**1,144,159,316**	**324,421,959**

2.2 Bottom-up Analysis

The results of the Household Economy Analysis (HEA) and herd dynamic models have been used to estimate the cost of humanitarian aid and animal losses at a micro-level. The model estimates the number of affected people and likely loss of household assets due to different magnitudes of drought (see separate report on HEA). These figures are then used to estimate the costs of responses for each sector.

This analysis uses that data to do a more detailed sector analysis of the costs of water and livestock interventions.

2.2.1 Water Sector

Ethiopia's Disaster Risk Management and Food Security Sector (DRMFSS), as well as its Livelihoods Integration Unit (LIU)[42] currently use the Water Economy for Livelihoods (WELS) Approach, which is a new approach to water and livelihoods that was developed to bring analytical rigor to understanding the inter-linkages between water security and food security. Coulter et al (2011) explain that, 'the premise behind both HEA and WELS is that an understanding of how people will be affected by shocks or hazards in a bad year is only possible if an understanding is achieved of how people piece together their livelihoods – and in the case of WELS, secure access to sufficient water to meet livelihoods needs – in normal years.'[43]

Access to safe water during a period of drought, which is one of the most common hazards in Ethiopia, is consistently a major problem. Most livelihoods assessments or food security assessments have focused on analyzing households' access to food, and less so on the importance and contribution of water to household survival, health and production, as well as the ability of these households to secure the resources they need to survive. Access to food, income and water are linked in important ways particularly during drought.[44] The WELS approach aims to link the household economy with access to water at the household level. For this study, therefore, WELS is used to determine the effect of drought on access to water across different livelihoods groups. In contrast to the HEA- which was applied to determine baseline values on access to water for all livelihood zones in Ethiopia- WELS has been piloted in only three livelihood zones to establish baseline values. Thus, there will be a lack of

[42] Coulter et al, 2011. These institutions have been using the Household Economy Approach (HEA) as the analytical framework by which to assess food and livelihoods-based needs of populations affected by a range of shocks such as those related to weather, markets, policies, or health.
[43] Ibid
[44] Ibid

baseline values for most pastoralist areas. Nonetheless, the following WELS concepts and descriptions are useful and relevant for this particular study.

The analysis uses water baselines (these address both water availability and water access within each geographical unit of analysis, or livelihood zone) and compares them with water thresholds to measure the deficit. Water thresholds have been developed to represent triggers for outside intervention, below which households will begin to deplete asset bases (whether financial, human/labor related, or otherwise) in order to secure enough water or will be at risk of incurring unacceptable health consequences (in the form of high degrees of dehydration or disease from consumption of unsafe / non-potable water).[45] These thresholds are described as follows:

- ***Water for Survival***: The Human Consumption Threshold (HCT) represents the minimum volume and quality of water required for survival- the SPHERE Project specifies **5 liters** as the minimum volume of water required for drinking and cooking per person per day.

- ***The Hygiene and Sanitation Threshold*** represents the minimum volume of water required to maintain hygiene and sanitation activities, specified by SPHERE standards as **10 liters** per person per day.

Thus, for human consumption, the SPHERE project specifies that a minimum of **15 liters** of water is required per person per day.

Table 4: Minimum Volume of Water Requirement

For human consumption (SPERE standard)	Lpcd
Survival threshold (drinking & cooking)	5
Sanitation and Hygiene	10
Total	**15**
Livestock (Average Voluntary intake)[46]	
Camels	13
Lactating camels	20
Ox/ Cattle	20
Shoats	4
Horses & donkeys	25,757
Total Voluntary intake	**25,814**

- ***The Water for Livelihoods Protection Threshold*** represents the minimum volume of water required to sustain household livelihoods activities so that food and income needs for livelihoods protection are met. As livestock constitutes the main livelihood source of pastoralists, access to water to protect and maintain the livestock is critically important. Table 4 shows the volume of water required for different species per day across seasons. However, it

[45] Coulter et al, 2010

[46] The average voluntary intake of water varies depending on the weather condition.

is to be noted that the amount of water per household per day varies from place to place and across wealth categories.

The HEA model was used to predict the number of people and livestock that would be affected by drought across pastoralist and agro-pastoralist households in the ASALs. Annual human and livestock population figures are estimated every five years based on the assumption that a drought with high magnitude occurs every five years.

Projected human and livestock population figures are used to calculate the minimum quantity of water required for survival, sanitation and hygiene and livelihoods protection.[47]

The volume of water required under an emergency situation and the cost of Emergency Water Trucking (EWT) is calculated. The cost of water provision under emergency response, early response and resilience-building water development actions was compared.

For this analysis, it is assumed that pastoralists can get the minimum amount of water for survival, sanitation, hygiene and livelihoods protection without external support during a normal year (base year). However, the HEA model estimates that a certain number of pastoralist households cannot meet their water needs in any one given year. So, a minimum population figure of those who do not have access to water without external support is indicated under the pre-drought year in the HEA model. The population in need of external support increases variably during the subsequent years.

Using the HEA assumptions, the minimum quantity of water needed and the cost involved to improve access to water for the affected population and livestock is analysed in three storylines.

Storyline A: Late response to drought results in water provision via tankering

Droughts significantly affect availability and quality of water. Most water-related emergency humanitarian responses involve water trucking, emergency repair and rehabilitation of boreholes and wells as well as maintenance and repair of pumps, provision of fuel subsidies, etc. In most cases, however, they are late resulting in the need for costly water trucking.

[47] Note that with the HEA model there is a projected population of cattle, camel and shoats only. However, there are thousands of other animal species, which require a significant amount of water. The volume of water and associated cost of emergency water provision calculated in here is only for shoats, camel and cattle. So, it is a very conservative estimate of EWT. The actual value may be more than our estimation.

Getting information on the cost breakdown for each activity is very difficult. However, different organizations have documented their experience of the cost estimates for emergency water trucking or tankering. For example, OXFAM recently estimated the cost of Emergency Water Trucking (EWT) as $27.12 for transporting one cubic meter of water about 80Km from the water source in Harshin district of Somali Region. In another example, Save the Children and Oxfam estimated the cost of trucking 5L of water per day (basic survival quantity only) to 80,000 people in the Harshin district of Somali Region for five months was more than $3 million.[48]

These unit costs were used to estimate the cost of providing water for affected households to meet their minimum water requirement for drinking, cooking, hygiene and sanitation as well as to protect their animals. According to the analysis, a minimum of $18.81 billion, $5.73 billion or $4.86 billion per annum is needed under high, medium and low magnitude droughts respectively, for one event alone.

The main challenge associated with providing water through EWT is also a lack of capacity of services providers, such as high fuel cost and old trucks, which causes household members, especially women, girls and children, to travel long distances (between 5 and 8 hours) in search of water from unprotected sources. This means that there will be high prevalence of water born or water related disease due to a lack of adequate water for households. During the team's field visit to Shinile zone, it was observed that a school had stopped teaching due to the fact that children had to skip school to travel to remote areas to fetch water from river beds.

Storyline B: Early response to drought results in early water provision

Much of the water related pre-drought interventions in most pastoralist areas of Ethiopia involves development of new water supply schemes, maintenance and repair of pumps, and rehabilitation of existing water points as well as water trucking. There is a lack of inventory of existing water schemes in pastoral areas, both functional and non-functional. Though some rough estimates by the GoE indicate that in a given year about 30% of water schemes can be non-functional. Estimated financial resources required to repair/maintain and rehabilitate these non-functional water points is unavailable. Therefore it is very difficult to provide an accurate cost required for an early response action in relation to water resource rehabilitation and development.

However, anecdotal cost estimations can be found from contingency plans prepared for different pastoral Woredas by different organisations. For example, based on an

[48] Oxfam and Save the Children, n.d.

engineering estimate, FARM Africa (FA) estimated that between $5,000 and $6,000 is required to maintain and rehabilitate an underground water cistern of average capacity of 60 to 70 cubic metres that can serve about 1,550 people and thousands of livestock for a certain period. Thus, the per capita cost per annum is approximately between $3.22 and $3.87.

In some cases, contingency plans prepared to reduce the risk of disaster can provide a rough estimation of early response water related actions. Contingency plans of Dhas Woreda in Borena zone (Oromia) and Harshin Woreda (in Somali Region) include water trucking as an early action to reduce the impact of drought on human and livestock populations.[49] The Harshin Woreda Contingency plan estimated that a total of $67,620 was needed to supply 3360 cubic meters of water for 42 days (approximately $20.13 per cubic meter of water).

A multi-agency contingency plan, which was prepared for the first six months (January to June) of 2010, provided an indicative budget for water related activities including water trucking, maintenance and rehabilitation of non-functional water schemes as well as development of new water supply schemes. From these plans it is observed that the resources allocated for maintenance and rehabilitation of water structures is the largest followed by the budget allocated for water rationing, and then the development of new water supply schemes. The proposed indicative budget was around $4.4 billion: $1.5 billion for maintenance and rehabilitation, and $1.2 billion for water rationing and development of new water schemes. The total budget allocated for water supply and sanitation was more than $11.6 billion for only the first six-month period.

Storyline C: Resilience investment in water

Water Sector Development Programme

To understand the cost of water related resilience investments, the cost estimated by the Water Sector Development Programme (WSDP), which projected its investment plan over 15 years, has been considered.

The WSDP is prepared based on the Federal Water Resource development and management, defines concrete interventions in terms of projects and programs to achieve the water policy objectives, which are 'to enhance and promote all national efforts towards the efficient, equitable, and optimum utilization of the available water

[49] CARE Ethiopia, 2008; Oxfam, 2010

resources of Ethiopia for significant socio-economic development on a sustainable basis.'[50]

One of the specific objectives of the water sector policy is to manage and combat drought as well as other associated slow-onset disasters through efficient allocation, redistribution, transfer, storage and use of water resources. The WSDP document presents details of the cost breakdown by geographic location, types of water points to be developed including urban water supply, rural water supply, livestock water supply, and sewerage. The projects include mainly hand-dug wells, spring development, shallow-drilled wells, deep-drilled wells, stock ponds, birkad, subsurface dams, water harvesting, conventional sewerage, pour-flush toilets, septic tanks, and other recommended technologies.

In addition, it provides details of the investment cost projections in the short term (2002-2006), medium term (2007-2011) and long term (2012-2016) along with a projected population that will have access to improved water sources as a result of this investment. The investment includes costs related to studies and designs, construction, rehabilitation and expansion, in addition to operation and maintenance of potential water points. According to the investment schedule (see Table 5 below), the investment cost (including rehabilitation and maintenance) in the short, medium and long term is $876.25 million, $1,057.85 million and $1,001.65 million, respectively. According to the document, with this investment, the coverage of access to water supply in rural and urban areas will reach 70.9% and 98.2% by 2016 from the baseline value of 23.1% and 74.4% in 2001.

[50] MoWR, 2002

Table 5: Summary of Quantity and Cost of Water Supply per day per M^3 (US$)

Description	Short Term (2002-2006)			Medium-term (2007-2011)			Long term (2012-2016)		
1. Target access to water (litre per capita per day)			15.00			20.00			25.00
2. Estimated total daily water requirement ('000 cubic metre)			634,415.63			1,347,616.50			2,544,278.13
3. Target rural population (million)			23.2			36.9			55.8
4. Cost of water supply per cubic metre			0.87			0.53			0.32
	Urban	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
5. Target population (millions)	10.7	23.2	33.9	14.5	36.9	51.4	17.8	55.8	73.6
6. Investment on water supply (million)	316.1	550	866.1	329.1	716.2	1,045.3	174.1	820.5	994.6
7. Investment cost per capita per investment period	29.58	23.70	25.56	22.64	19.41	20.32	9.76	14.70	13.51
8. Investment cost per capita per year	**5.92**	**4.74**	**5.11**	**4.53**	**3.88**	**4.06**	**1.95**	**2.94**	**2.70**

Source: MoWR, 2002

The Ministry of Water estimated that a total investment of US$2.9 billion is required to supply water to the rural population over 15 years (2002-2016). This is calculated based on a very conservative estimate of per capita investment for both rural and urban water supply. As the table above shows, the average investment cost per capita per annum is estimated to be $5, $4 and $3 during the short, medium and long term investment plan respectively.[51]

Estimated cost to meet MDG for water

A Millennium Development Goals Needs Assessment for Ethiopia was conducted in 2007. The Synthesis Report estimated that the costs for meeting the MDG drinking water target, for both urban and rural populations, for Ethiopia at $2.7 billion.[52] This

[51] MoWR, 2002

[52] Asana, et al, 2007

figure exceeds the cost estimated by the Ministry of Water Resources for the same period (2007-2016)[53] by more than half a billion USD.

The cost estimated for the Borena zone water supply project

At a district level, the investment plan of the Borena water supply scheme, which was developed by the Oromia Regional State-Water Mineral & Energy Bureau (OWMEB), was analyzed. OWMEB developed a Water Supply and Sanitation project for Borena zone with a project life span of 15 years.

The project has five sub-project components.[54] The detailed project design and cost breakdown reveals that the per capita cost of investment and operation & maintenance cost for water supply (for human, livestock and wildlife) over the coming 15 years (2010 -2025) will be $7.8 per annum, broadly in line with the WSDP figures.

In both the WSDP and Borena Water Supply scheme, it is observed that the cost of supplying one cubic meter of water is around US$ 0.50, which is far less that the cost of EWT (about $27).

Saved Energy

'... Women who walk long distances to collect water burn as much as 600 Calories or more of energy per day. This may be one third of their daily nutrition intake. Thus, closely located sources of water can improve the nutrition status of women and children...' (Unicef, 1999).

From the above analysis it is clear that it is very difficult to get exact figures for water resilience efforts. The cost of investing in resilience varies from place to place and can be affected by a number of factors such as infrastructure development, availability and access to industrial inputs, skilled human resources etc.

A study by the World Health Organization (WHO) showed that all low-cost water supply and sanitation improvements are cost-beneficial for all developing regions of the world. However, implementation of water supply schemes has to be done correctly. To meet minimum standards and be cost-effective, they require early intervention, good planning and participation of user communities in planning, implementation and management.[55]

[53] The cost estimate by the Ministry of Water Resources for the period 2007 to 2016 = $2.04 billion

[54] These include: Galchet-Arero (Project area 1), Megado-Forolle (Project area 2), Gobso-Moyale (Project area3), Mermero-Taltalle (Project area 4) and Bule Hora-Finchawa (Project area 5)

[55] WHO, 2007

The study specifically showed that in achieving the water supply MDG targets using low cost improvements, an estimated $4.4 return on a $1 investment is predicted in the six world regions.[56] The study indicated that the benefits of investments in water, sanitation and hygiene include productivity gained from reduced periods of illness due to water related diseases, time saved from travelling long distances to fetch water and queuing for long hours, reduced prevalence of gender based violence, and an increase in children staying in school. According to the findings of the 2011 Ethiopia Demographic Health Survey (EDHS) report, adult women, especially in rural areas, bear the burden of collecting drinking water.[57] According to the report, about 62% of water collection in Ethiopia is the responsibility of adult women. In rural households, adult women shoulder the burden of water collection ten times more than adult men (71% female compared to 7% male).[58]

Furthermore, the WHO study showed that, in achieving the water MDG target, 63% of the benefits are attributed to convenience time savings, 28% to productivity gains, and 9% to health care cost savings.[59] It is also estimated that in most sub-Saharan African countries the per capita health savings are at least $0.12 for the water MDG.[60] Other benefits also include energy saved from traveling long distances to fetch water.

2.2.2 Livestock Interventions

In terms of the practicalities of designing livestock interventions, these can be categorized according to their relevance at a particular stage of a typical drought cycle. Some interventions such as water supply and veterinary care are always needed, whereas other interventions are appropriate only at certain times. For example, support for destocking should occur during the alarm/alert phases whereas restocking should take place during the recovery phase.

Assigning different interventions to different stages in the drought cycle indicates that combined interventions are often needed. For example, in the alert/alarm phase destocking to remove some animals from the rangeland should be accompanied by efforts to protect the remaining livestock, such as veterinary care, feed supplementation and water provision. The need to combine different interventions simultaneously is a challenge, particularly if different interventions are assigned to different agencies, hence the need for co-ordination.

[56]WHO, 2007
[57]CSA and ICF International, 2012
[58]Ibid.
[59]WHO, 2007
[60]Hutton, Haller, & Bartram, 2007; WHO, 2007

Emergency situations in pastoralist areas are characterized by a lack of adequate water for both humans and animals and depleted food resources. The severity of the situation means that the off take rate or loss of livestock in drought affected areas increases. Research conducted by the Pastoralist Livelihoods Initiative (PLI) in Afar, Borana and Somali areas of Ethiopia attempted to quantify different causes of livestock mortality or off take rate during 'normal' and 'drought' years (see Table 6 below).

Table 6: Livestock leaving pastoralist herds in normal and drought years

Reasons for off-take	Afar herd		Borana herds		Somali herds	
	Normal year	Drought year	Normal year	Drought year	Normal year	Drought year
Starvation	0%	19.5%	0.7%	13.1%	0%	15.5%
Disease	10.1%	16.7%	12.5%	11.9%	12.6%	7.3%
Sale	6.0%	6.5%	8.4%	8.5%	7.0%	5.1%
Slaughter	0.6%	0.4%	1.7%	1.8%	4.1%	3.1%
Predation	4.7%	5.1%	6.8%	6.1%	6.1%	4.6%
Other	6.1%	5.3%	7.0%	6.2%	2.9%	1.2%
Total	27.5%	53.5%	37.1%	47.6%	32.7%	39.8%

According to the research, most of the excess livestock mortality recorded in drought years is caused by starvation. Evidence from Pastoralist Livelihood Initiative (PLI) impact assessments in southern Ethiopia showed that most households in the study areas allocate a significant proportion of their income (from commercial destocking) for purchasing livestock feed. For example, surveyed households indicated that they have spent up to 31% of their income on livestock feed and 6% on veterinary treatment.

Hence, a livelihoods based intervention should consider protecting the livelihood assets as opposed to focusing on recovery actions in the aftermath of a drought. Supplementary feeding protects livestock and thus the pastoralists' livelihood. Therefore, it is worth estimating the cost of livestock feeding as an early response to drought related disaster. This section also looks at the cost of veterinary services.

<u>Supplementary Livestock Feeding</u>

As the table below shows, the cost of livestock feed required to maintain the breeding female animals (cattle and shoats) is estimated based on the following assumptions:

- The feed supply intervention targets households with a deficit, and specifically addresses cattle and shoats;
- Each animal is fed for three months to improve the body condition;

- The amount of feed required per animal per day is 0.25kg and 1kg for shoats and cattle respectively; and
- The breeding population constitutes 20.6 % and 62.35% of the total cattle and shoat population respectively.

Table 7 estimates a total cost of supplementary feeding for southern Ethiopia (base do the HEA modelling) at $1.12 billion in order to maintain breeding females for five years.

Table 7: Cost of Supplementary Feeding

High Magnitude drought (southern Ethiopia)							
Cost of supplementary feeding						**Estimated cost of Cost of restocking**	
Livestock Species	Number of breeding (female)	Daily amount of feed required per animal (kg)	Number of days	Total quantity of feed required (Ql)	Total cost of feed ($m)	Livestock price ($)	Total cost ($m)
Cattle	905,611.64	1	90	815,050.47	$15.49	$328	$297
Shoats	12,894,571.08	0.25	90	2,901,278.49	$55.12	$63	$811
Total				3,716,328.97	$70.61		$1,108.01

As the table above shows, the cost of recovery interventions to replace all the breeding females for households with a deficit is 16 times the cost of supplementary feeding under a high magnitude drought scenario in southern Ethiopia.

Box 1 provides an additional example of a cost comparison between early response supplementary feeding and the cost of recovery actions after the drought has passed in the Afar Region, Ethiopia.

Box 1: Supplementary Feeding vs Restocking [61]

During the 2005-6 droughts the Afar Pastoral Development Association (APDA) undertook a supplementary feeding programme for livestock. Cattle were the preferred species and two breeding animals were selected from each vulnerable household and were fed on concentrate feeds acquired from factories in Addis Ababa. A total of 800 households benefited from this intervention, which took two months before the rains came. Each animal was given 1.5 kg of concentrates every day for two months. De-worming and other veterinary treatments were carried out alongside feeding and water trucking implemented to provide adequate water for livestock. The total cost of this intervention came to about Ethiopian Birr (EB) 800,000 (USD 89,500). To restock 800 households with two cows each, it would cost nearly EB 4.2 million (USD 470,083). Thus, it is much more economical to protect the current assets of pastoralists.

The cost of animal treatment and vaccination

Livestock diseases are of particular concern during a drought in most pastoralist areas in Ethiopia. Drought weakens livestock conditions and increases the risk of disease outbreak. Thus, poor health conditions of animals coupled with poor quality and quantity of feeding conditions may increase morbidity and mortality of animals. Importantly, when an animal's body condition is weakened, death due to opportunistic diseases may increase.

In this regard, veterinary services can help protect animals from acute disease outbreaks that may cause high rates of animal mortality.[62] However, timing of veterinary services is critical, and they may be most appropriate as a resilience building measure to protect animals during non-drought times. The cost of treating and vaccinating animals during drought years varies with location, the number of affected livestock that are affected by the magnitude of drought, local capacity and access to necessary veterinary drugs.

For the purpose of this study, costs estimated in different national and local level contingency plans are considered for analysis. The multi-agency plan provided cost estimates for veterinary interventions. The estimated cost was calculated based on the assumption that curative and prophylactic treatments, with a focus on internal and external parasites and miscellaneous infections, should address 10% of the livestock

[61] Pantuliana and Wekesa, 2008

[62] LEGS, 2009

population. At the national level it was estimated that US$1.22 per animal was required for the first six months – this encompassed costs of treating animals, supporting Community Animal Health Workers (CAHWs) and private pharmacies, and livestock disease surveillance. If we assume the same level of support could be needed for the target livestock population during the remaining six months (July –December) of 2010, then the average cost per head of animal would be US$2.44 per annum.

However, the local level estimation of animal treatment and vaccination cost per head of animal per annum is greater than the national average. For example, Oxfam and its local government partner also estimated the resources required for animal treatment and vaccination. As indicated in the Harshin Woreda drought contingency plan, about ETB 467,040 (US$ 27,472.94) was needed to treat and vaccinate about 25,000 animal heads for four months (from September to December) in 2010. Thus, the unit cost per animal head would be US$ 1.10 for four months. A simple extrapolation of this unit cost for 12 months shows that under a drought condition about US$ 3.30 per animal head is required for livestock treatment.[63]

[63] Oxfam, 2010.

3 Conclusions

Ethiopia has been one of the major humanitarian aid recipient countries among sub-Saharan African Countries. Most of the humanitarian aid for Ethiopia comes from USAID. The majority (70%) of this aid comes mainly in the form of food aid.

The evidence gathered from the literature and field level observation suggests that humanitarian intervention saves lives, but it cannot help build the capacity of an affected population to withstand disaster shocks on their own. As a result, governments, donors and nongovernmental organizations agree that more focus is required on interventions that build the capacity of vulnerable households in pastoralist areas. The paradox, however, is that many donors still pay scant attention to increasing the size of funding for resilience interventions and keep the volume of humanitarian aid larger than resilience funding.

The data collected in this study has attempted to provide a baseline of data on costs of water and livestock interventions at different stages of response.

Bibliography

Aklilu, Y., & Cately, A. (2010). *MIND THE GAP: Commercialization, Livelihoods and Wealth Disparity in Pastoralist Areas of Ethiopia* . Addis Ababa: Feinstein International Centre, Tufts University .

ALNAP. (2011). Humanitarian Action In Drought-Related Emergencies Drought-Related Emergencies. ALNAP.

Asana D., A. A., Noel, S., Shone, G., Barron, J., & Soussan, J. (2007). *Water And Poverty Linkages In Afric.* Stockholm Environmentlinstitute.

Behnke et al (2007). "Piloting the Productive Safety Net Programme in Pastoral Areas of Ethiopia, Revised Programme Proprosal."

CARE-Ethiopia. (2009). Value Chain Analysis Of Milk And Milk Products In Borana Pastoralist Area. Addis Ababa: CARE Ethiopia.

Coulter, L., Kebede, S., & Zeleke, B. (2010). Water Economy Baseline Report Water and livelihoods in a highland to lowland Transect in Eastern Ethiopia. Working Paper 16. Research Inspires Policy and Practice Learning in Ethiopia and the Nile region . RiPPLE. Addis Ababa

CRED. (2004). Thirty Years Of Natural Disasters 1974-2003: The Numbers. Presses universitaires de Louvain.

CSA and ICF-International. (2012). Ethiopia Demographic and Health Survey 2011. Addis Ababa and Calverton, Maryland, Ethiopia and USA: Central Statistical Agency and ICF International.

Desta, S. and L. Coppock (2002). "Cattle population dynamics in the southern Ethiopian rangelends, 1980-97." Journal of Range Management,55: 439-451.

DRMFSS (2012). Strategic Programme and Investment FrameWork. Disaster Risk Management Food Security Sector of The Ministry of Agriculture.

Feinsten International Centre.(2007). Food for Thought: Livestock Feeding Support during Drought. Pastoralist Livelihoods Intiative. Policy Brief. Number 2. . Feinstein International Center.

Feintein International Centre (n.d.). Impact Assessment Livelihood-based Drought Interventions in Moyale and Dire Woredas. Feintein International Centre.

Hess, U., Wiseman, W., & Robertson, T. (2006). Ethiopia: The Integrated Risk Financing To Protect Livelihoods and Foster Development (Discussion Paper).

HPG. (2009). Getting it right: Understanding livelihoods to reduce the vulnerability of pastoral communities. Synthesis Paper. London, United Kingdome: Regional Pastoral advocay project and overseas Development Instiitute.

Hutton, G., Haller, L., & Bartram, J. (2007). Global cost-benefit analysis of water supply and Sanitation intervention. Journal of Water and Health , 481-502.

ICRC. (2005). Regional Livestock study in the Greater Horn Of Africa: Ethiopia Country Profile. Nairobi, Kenya: International Committee of the Red Cross.

IGAD. (2010). The Contribution of Livestock to the Ethiopian Economy – Part II. IGAD LPI Working Paper No. 02 - 11 . Roy Behnke, Odessa Centre, Great Wolford and United Kingdome.

Land O'Lakes, Inc., 2010. 'The next stage in dairy development for Ethiopia: Dairy Value Chains, End Markets and Food Security. Cooperative agreement 663-a-00-05-00431-00. USAID and Land O'Lakes, Inc.

LEGS. (2009). Livestock Emergency Guidelines and Standards. Warwickshire, United Kingdom: Practical Action Publishing.

MoA. (2010). Ethiopia Animal Health Year Book (2009/10). Addis Ababa: Federal Ministry of Agriculture Animal and Plant Health Regulatory Directorate (APHRD).

MoARD. (2010). Ethiopia’s Agricultural Sector Policy And Investment Framework (PIF)2010 -2020 (Draft Report) . Addis Ababa: Ministry of Agriculture and Rural Development.

MoARD. (2010b). Ethiopia’s Agricultural Sector Policy And Investment Framework (PIF)2010 -2020 (Draft Report) . Addis Ababa: Ministry F Agriculture And Rural Development.

MoWR. (2002). Water Sector Development Program Main Report Volume Ii. Ministry Of Water Resources Water Sector Development Program Main Report Volume Ii October 2002 . Addis Ababa: The Federal Democratic Republic of Ethiopia Ministry of Water Resources.

MoWR. (2007). Climate Change National Adaptation Programme Of Action (Napa) Of Ethiopia. Addis Ababa, Ethiopia : Fdre-The Minstry Of Water Resources National Meteorological Agency.

OECD and WWC (2008). Donor Profile on Aid to Water Suupply and Sanitation: Aid at a glance and development co-operation policies. OECD and World Water Council .

Oxfam (2011). Briefing on the Horn of Africa Drought 2011: Disaster Risk Reduction – fundamental to saving lives and reducing poverty. Oxfam.

Oxfam (2010). Harshin Woreda Contingency Plan.

Oxfam and Save the Children. (n.d.). From doing things right to doing the right thing – the way forward!- The opportunity cost of Emergency Water Trucking in Harshin district: Harshin Water Security project July 2011 – June 2013. Oxfam.

Pantuliano, S. and M. Wekesa (2008). "Improving Drought Response in Pastoral Areas of Ethiopia" Overseas Development Institute.

PFE. (2010). Proceeding Climate Change and pastoralism: The Emplication on Suatainable Pastoral Development in Ethiopia. of 5th National Conference on Pastoral Development in Ethiopia. August 25th -26th,2010. Addis Ababa. Ethiopia

PFE (2006). Inclusion of a 'Chapter on Pastoralism'. Ethiopia: Building on Progress: A Plan forAccelerated and Sustained Development to End Poverty (PASDEP). In Pantuliano, S. and M. Wekesa (2008). "Improving Drought Response in Pastoral Areas of Ethiopia". Overseas Development Institute.

Ripple, SNV, and MELTA (2010). Learning about Community Water and Sanitation Action Plans.

RiPPLE. (2009). Financing in the Water Sanitation and Hygiene (WaSH) sector in Ethiopia: Evidence From Benishangul-Gumuz Regional State (Synthesis Paper) . Addis Ababa, Ethiopia : RiPPLE.

Save the Children and Oxfam (2012). A Dangerous Delay The cost of late response to early warnings in the 2011 drought in the Horn of Africa. Joint Agency Briefing Paper. Save the Children and Oxfam.

UNDP. (2004). Reducing Disaster Risk: A Challenge For Development. A Global Report. New York: Bureau for Crisis Prevention and Recovery of the United Nations Development Programme, .

UNDP. (2005). Linking the National Poverty Reduction Strategy to the MDGs :a case study of Ethiopia.

UNDP. (2011). Human Development Report 2011. Sustainability and Equity: A Better Future for All. NY.

UNICEF (1999). Towards better programming: A Water Hand Book . Water, Environment and Sanitation Technical Guidelines Series - No. 2. New York: UNICEF/Programme Division.

USAID. (n.d.). The Productive Safety Net Programme. USAID.

WaterAid. (2004). Water Works: Successes and challenges from a gravity water supply, sanitation and hygiene promotion scheme- Bale, Ethiopia. Addis Ababa, Ethiopia : WaterAid .

WHO. (2007). Economic and health effects of increasing coverage of low cost household drinking-water supply and sanitation interventions to countries off-track to meet MDG target 10. Geneva, Switzerland: Public Health and the Environment Water, Sanitation and Health, WHO.

WorldBank. (2011). Project Performance Assessment Report: Ethiopia Productive Safety Net Project. the World Bank.

World Bank. (2009). Global Facility for Disaster Reduction and Recovery: Disaster Risk Management Programs for Priority Countries. Global Facility for Disaster Reduction and Recovery GFDRR Secretariat. Washington. USA.