The Economics of Early Response and Disaster Resilience: Lessons from Kenya and Ethiopia

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Acronyms

AHEaD	Analysis of Herd Dynamics model
ASALs	Arid and semi-arid lands
ASCU	Agricultural Sector Coordination Unit
BCR	Benefit to Cost Ratio
CAP	Consolidated Appeals Process
CCA	Climate Change Adaptation
DFID	Department for International Development
DRMFSS	Disaster Risk Management and Food Security Sector
DRR	Disaster Risk Reduction
EACC	Economics of Adaptation to Climate Change
ETB	Ethiopian Birr (local currency)
EWS	Early Warning Systems
FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning Systems Network
FSNAU	Food Security and Nutrition Analysis Unit
FTS	Financial Tracking Service
GDP	Gross Domestic Product
GoK	Government of Kenya
HEA	Household Economy Analysis
HERR	Humanitarian Emergency Response Review
HRF	Humanitarian Response Fund
IASC	Inter-Agency Standing Committee
IGAD	Intergovernmental Authority for Development
KSH	Kenyan Shilling (local currency)
LEGs	Livestock Emergency Guidelines
MDGs	Millennium Development Goals
MNKOAL	Ministry of Northern Kenya and Other Arid Lands
MoH	Ministry of Health
MT	Metric tonnes
MTIP	Medium Term Investment Plan
MVP	Millennium Villages Project
O&M	Operations and Maintenance
PCDP	Pastoral Community Development Programme
PDNA	Post Disaster Needs Assessment
PSNP	Productive Safety Nets Programme
R&R	Recovery and Reconstruction
RFE	Rainfall estimates
SFP	Supplementary Feeding Programmes
SPIF	Strategic Programme of Investment Framework
SRA/LRA	Short and Long Term Rain Needs Assessments
STM	Short Term Mean

ToT	Terms of Trade
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USD	United States Dollar
VFM	Value for Money
WFP	World Food Programme
WHO	World Health Organization
WSDP	Water Sector Development Program

1 Introduction

1.1 Introduction

The impacts of natural disasters and complex emergencies have been increasing over recent decades, putting the humanitarian system under considerable pressure. In 2010 natural disasters affected more than 217 million people, killed more than 297,000 people and caused $123.9 billion in economic damages.[1] The types, dimensions, and dynamics of humanitarian crises are further increasing, in some cases exponentially.[2] A variety of factors are contributing to this increase, including climate change, increasing vulnerability due to erosion of natural, social and economic capacities, and fluctuations in the global economy.

The costs of humanitarian crises are equally growing – not only do disasters and complex emergencies result in significant economic losses, but they also require mobilization of large amounts of humanitarian aid from the international community. According to a recent study on funding streams for emergency response, aid from governments reached US$12.4 billion in 2010, the highest figure on record. At the same time the CAP reached its highest ever figure of US$11.2 billion, double that of 2006. This aid is heavily targeted to a few countries - over the past ten years, almost 50% of humanitarian aid (amounting to just under US$90 billion) was consistently spent in just nine countries.[3]

There is growing consensus that greater investment needs to be made in preparedness to reduce the impacts of crises, and an even greater imperative for further work to build the resilience of communities to be able to cope with these events themselves. The scales need to tip, with greater emphasis placed on building capacities and reducing vulnerabilities to allow countries and communities to reduce risk and recover themselves, and thereby reduce the high levels of aid dependency that are becoming systemic in some parts of the world.

And yet, despite a rhetoric that has called for reform for the past decade, only 4.2% of total humanitarian aid in 2009 was for disaster prevention and preparedness. For every

[1] Guha-Sapir, D. et al (2010). "Annual Disaster Statistical Review 2010: The numbers and trends." Centre for Research on the Epidemiology of Disasters (CRED), Brussels.
[2] IFRC (2011). "World Disasters Report 2011: Focus on Hunger and Malnutrition."
[3] Kellet and Sweeney (2011).

$100 spent on the top twenty humanitarian recipients over the past five years only 62 cents are spent on preparedness.[4]

It is widely held that, broadly speaking, investment in building the resilience of communities to cope with risk in disaster prone regions is more cost-effective than the ever-mounting humanitarian response. Yet little solid evidence exists to support this claim. And while the past decade has seen significant attempts to reform the humanitarian system – particularly initiatives to expedite funding for emergency operations – efforts to increase the focus of humanitarian funding and response to risk reduction, remains a challenge.[5]

The June 2011 UK Government Response to the Humanitarian Emergency Response Review (HERR) presented disaster resilience as 'a new and vital component to [the UK Government's] humanitarian and development work.'[6] Building on this, the UK Government's Humanitarian Policy[7] puts resilience at the centre of its approach to addressing disasters, both natural and man-made. This includes commitments to embed resilience-building in all DFID country programmes by 2015, integrate resilience into their work on climate change and conflict prevention and improve the coherence of their development and humanitarian work.

Following the UN General Assembly in September 2011, the UK has agreed to develop a proposal on how resilience can be taken forward within the international system. Evidence on the cost-effectiveness of disaster resilience will be crucial in progressing this agenda.

[4] Kellet and Sweeney (2011).
[5] Ibid.
[6] www.dfid.gov.uk/Documents/publications1/hum-emer-resp-rev-uk-gvmt-resp.pdf?epslanguage=en
[7] "Saving lives, preventing suffering and building resilience"

1.2 Aims of the Study

The purpose of this work is to support this agenda by providing the first step towards:

- A solid evidence base on the cost effectiveness of building resilience to disasters as compared with the cost of relief and early response.
- Identify the types of interventions that can provide the highest "Value for Money" (VfM); and
- Incentivise donors, partner governments, multilaterals and implementing agencies to invest in and work more on resilience to disasters.

1.3 Scope of the Study

The Horn of Africa, specifically Kenya and Ethiopia, were selected as a focus for this study, with the aim that the methodology can be replicated elsewhere. The Horn repeatedly suffers from disasters – complex emergencies[8], droughts and floods are prevalent. And yet relief and humanitarian aid remain the predominant response to these crises. Kenya and Ethiopia were selected not only for their vulnerability to disasters, but also for practical reasons (e.g. security issues).

Within these two countries, the study specifically focuses on response and resilience for pastoralists in the face of drought. Pastoralism is one of the predominant livelihood systems in the region, is highly dependent on livestock by definition and involves the mobility of herds to access grazing and water. Pastoralism is a specialized livelihood system that has persisted for centuries – one could argue that it has been one of the most resilient livelihood systems because of the ability of pastoralists to adapt to changing conditions. However, significant shifts in natural, socio-economic and institutional conditions have resulted in high levels of vulnerability, and as a result pastoralists are heavily impacted by drought.

1.4 Outline of this Report

This report is structured as follows:

- Section 2 provides a brief overview of the local context in each country – with specific reference to the history and impacts of drought, how this affects pastoralists, as well as types of measures that are being used to build resilience.
- Section 3 describes the analytical framework and methodology used to undertake the analysis, in particular defining key concepts for the analysis.
- Section 4 describes the findings from the Kenya analysis.

[8] e.g. natural hazard and conflict combined, such as Somalia and South Sudan

- Section 5 describes the findings from the Ethiopia analysis.
- Section 6 provides some initial evidence on the value for money of resilience interventions.
- Section 7 draws key conclusions and recommendations.

This report is supported by three studies:

- The Kenya study, which focuses on data specific to Kenya;
- The Ethiopia study, which focuses on data specific to Ethiopia; and
- The Household Economy Analysis (HEA) study, which presents the detailed results of modelling under the HEA, described in greater detail below.

This report is further supported by the following annexes:

- Annex A: Consultations
- Annex B: "Who What Where" of Resilience Activities
- Annex C: Detailed Calculations
- Annex D: Evidence on Value for Money of Resilience Interventions

2 Disaster and Resilience in Kenya and Ethiopia

2.1 Humanitarian Crises due to Drought

The Horn of Africa is dominated by arid and semi-arid lands (ASALs). These areas are characterized by low and irregular rainfall as well as periodic droughts. The droughts can vary in intensity, but the region is no stranger to devastating conditions brought on by weather, conflict, government neglect or a combination of each. Between 1900 and 2011, more than 18 famine periods were registered in the region's history.[9] In 1985 a highly destructive drought in the area killed nearly 1 million people and in the last decade major droughts have occurred in 2001, 2003, 2005/06, 2008/09 and 2011. The most recent crisis—the 2011 drought—still affects large segments of the population. Ethiopia and north and eastern Kenya are both vulnerable, with greater than a 40% annual probability of moderate to severe drought during the rainy season.[10] In Kenya, over 80% of the land mass is defined as arid and semi-arid lands and in Ethiopia, 70% of the country's land is categorized as drylands.

Table 1: Historical Comparison of Drought Events in Kenya

Major drought events	GoK[11] and International Humanitarian Aid Received (US$)	Number People Affected[12]
2011	427.4m	3.75m
2009	432.5m	3.79m
2006	197m	2.97m
2003/2004	219.1m	2.23m
1998-2001	287.5m	3.2m

[9] http://www.globalhumanitarianassistance.org/wp-content/uploads/2011/07/gha-food-security-horn-africa-july-20111.pdf

[10] Horn of Africa Natural Probability and Risk Analysis, Bartel and Muller, June 2007.

[11] Government of Kenya

[12] Based on maximum numbers assessed for food aid assistance by government-led Kenya Food Security Steering Group (KFSSG). Data from Ministry of Northern Kenya.

Table 2: Historical Comparison of Drought Events in Ethiopia

Major drought events	International Humanitarian Aid Received (US$)[13]	Number People Affected[14]
2011	823m	4.5m
2008	1,078m	6.4m
2005	545m	2.6m
2003	496m	12.6m

In Kenya and Ethiopia droughts have a significant effect on the national economy. In Kenya, the 1998-2000 drought was estimated to have had economic costs of $2.8 billion.[15] More drastically, the Post Disaster Needs Assessment for the extended 2008-2011 drought estimated the total damage and losses to the Kenyan economy at a staggering $12.1 billion.[16] In Ethiopia, Oxfam estimates that drought alone costs the country $1.1 billion per year.[17] By comparison, in 2011 Kenya's GDP was $71 billion and Ethiopia's GDP was $95 billion.[18] Figure 1 below shows how Gross Domestic Product (GDP) growth tracks rainfall variability in Ethiopia.

In drought affected areas like the Horn of Africa, aid organizations have come to play a significant role in providing humanitarian response. In Kenya and Ethiopia, food aid comprises the majority of humanitarian aid. While food aid can save lives and fend off famine, it also arrives with its own set of problems, mainly because it almost always arrives late. During the 2006 drought, despite warnings that came as early as July 2005, substantial interventions did not start until February 2006. Additionally, during the recent 2011 drought, early warnings of poor rainfall were noted as early as May 2010. In February of 2011, the Famine Early Warning Systems Network (FEWSNET) issued a further warning that poor rains were forecasted for March to May. However, as **Figure 2** shows, humanitarian funding did not increase significantly until the UN declared a famine in July 2011. At this point, thousands had already suffered.

[13] Financial Tracking Service of UNOCHA

[14] Based on the CRED database (http://www.emdat.be)

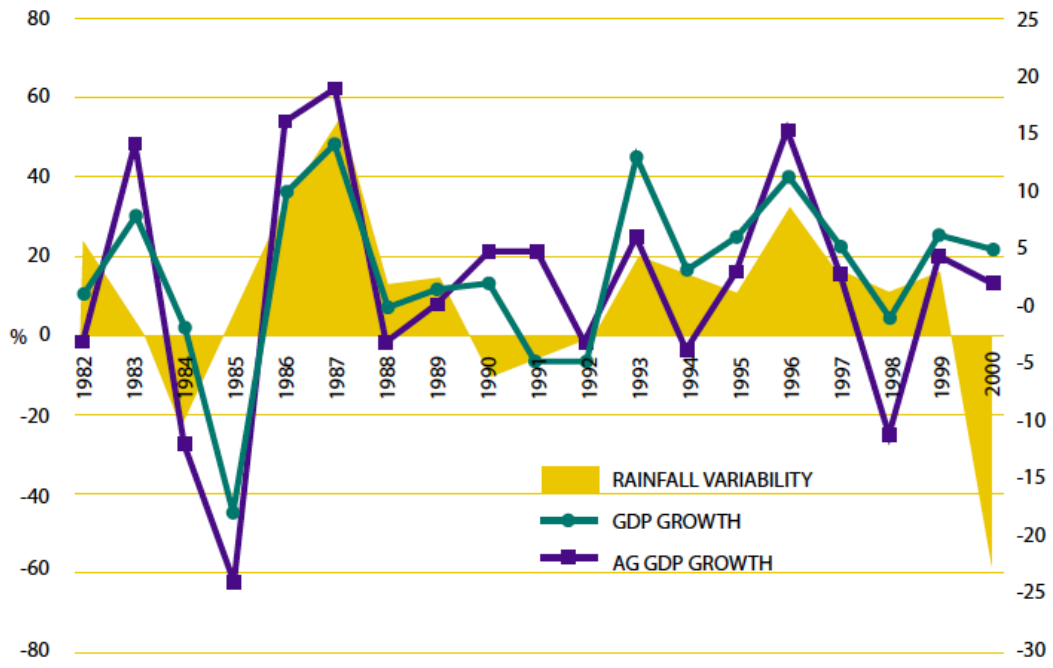
[15] Stockholm Environment Institute (2009). "Economics of Climate Change: Kenya".

[16] Republic of Kenya (2012) "Kenya Post Disaster Needs Assessment (PDNA): 2008-2011 Drought". With technical support from the European Union, United Nations and World Bank.

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

[18] CIA World Factbook, https://www.cia.gov/library/publications/the-world-factbook/geos/ke.html.

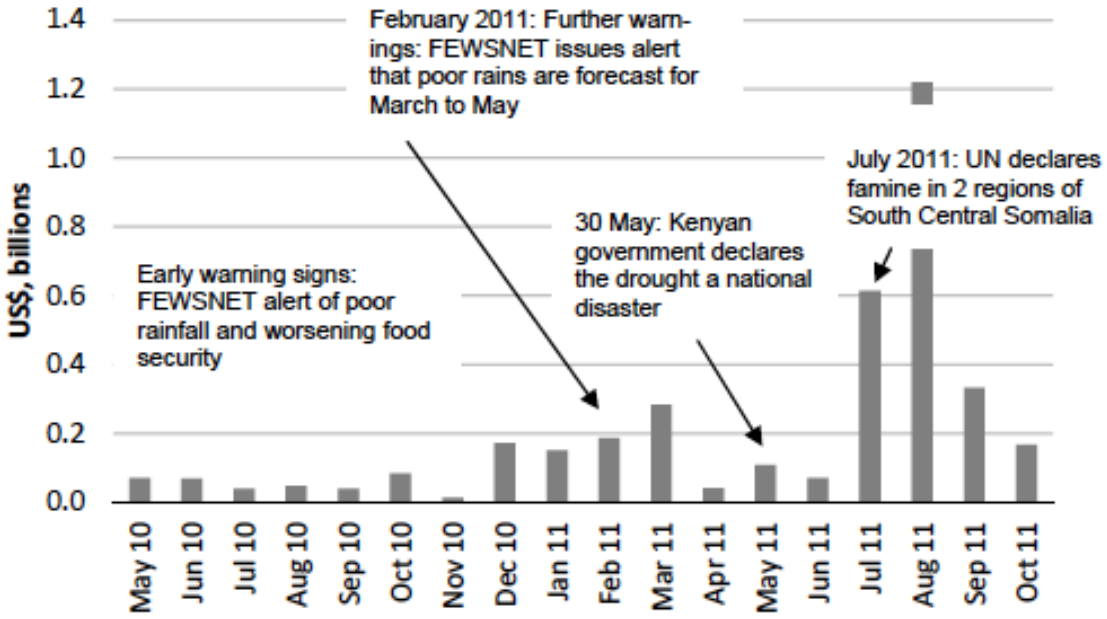
Figure 1: Economic Growth and Climate in Ethiopia[19]



When humanitarian aid is late, which occurs for a variety of reasons from lack of understanding of the on the ground situation to organizational and administrative delays, it not only directly affects lives but can also disrupt the market. By the time food aid is mobilized and distributed, an affected region may have already passed their time of need. With an influx of outside food sources, local market prices are then skewed. Even when food aid is still needed, the delayed distribution can create problems. For example, in Kenya during the 2011 drought, by the time food supplies were secured for the full caseload of affected people, the short rains had arrived and the saturated road network became impassable. Though humanitarian relief can and does help save lives, long-term initiatives should be implemented to help communities deal with a crisis in real time and to help prevent future crises.

[19] De Jong, the World Bank (2005) in World Bank (2010) "The Economics of Adaptation to Climate Change: Ethiopia". The World Bank Group, Washington, DC.

Figure 2: Humanitarian Funding for Ethiopia, Somalia and Kenya, 2010/2011[20]



2.2 Pastoralism

The drylands of the Greater Horn of Africa are inhabited by over 20 million pastoralists, whose livelihood is dependent on movement with livestock.[21] Pastoralism developed out of the need to constantly adapt to the extreme climatic uncertainty and marginal landscapes of the drylands, and has been practiced for centuries. Pastoralists have sophisticated methods to optimize water and land, moving and selling animals to deal with the effects of drought.

Yet, in recent years, the drylands of the Horn have become some of the most vulnerable areas in the world. This is due in part to decades of political and economic marginalisation, which has led to an erosion of the pastoral asset base. These structural forces disrupt migration routes and access to dry season grazing areas, severely curtailing pastoralists' abilities to move animals to different pasture, a key mechanisms for coping with drought. This is particularly true for poorer pastoralists, with smaller herd sizes. Rather than address this marginalisation and reinforce adaptive capacities, there has instead been a focus on providing emergency assistance, which has often

[20] Save the Children, Oxfam (2012). " A Dangerous Delay: The cost of late response to early warning in the 2011 drought in the Horn of Africa". Data taken from OCHA Financial Tracking Service (FTS)

[21] "Disaster Risk Reduction in the Drylands of the Horn of Africa" (2011). REGLAP Newsletter.

been either too late or inappropriate, and which has further undermined sustainable development in these areas.[22]

Pastoralists in Ethiopia are mainly found in seven regions including Afar, Somali, SNNP, Oromia, Dire Dawa, Benshangul, Gumuz, and Gambella. The main livelihoods systems include pastoralism, farming and ex-pastoralism – those who have dropped out of pastoralism and now survive on petty income-earning activities.[23] Pastoralists constitute a minority in Ethiopia, with an estimated 12–15 million of Ethiopia's 77 million people.[24] Livestock in pastoral regions accounts for an estimated 40% or so of the country's total livestock population.[25] The Intergovernmental Authority for Development (IGAD) estimates that in 2008/09 the pastoral livestock population contributed 34.8 billion ETB (Ethiopian Birr) out of the total national livestock value of 86.5 billion ETB to the national economy. According to the Ministry of Agriculture, Ethiopia's total livestock population has reached more than 88 million—the largest in Africa—and the livestock sub-sector contributes an estimated 12% to the total GDP and over 45% to the agricultural GDP.

Pastoralism is also the dominant production system in the ASALs, which stretch across the whole of northern Kenya (Turkana, Marsabit, Wajir and Mandera), much of eastern Kenya and the southern rangelands (Laikipia, Narok, Kajiado). The ASALs are home to about 10 million people and approximately 70% of the national livestock herd. In Kenya, pastoralism makes a significant contribution to the economy with livestock production accounting for 50% of agricultural GDP.[26] However, the ASALs have the lowest development indicators and the highest incidence of poverty in the country. Eighteen of the 20 poorest constituencies in Kenya, where 74% - 97% of people live below the poverty line, are in Northern Kenya. The highest rates of poverty are observed among those who are no longer directly involved in pastoralism – as populations grow, rangelands are reduced and both government and private sector investment in the sector remains low so the proportion of the population able to make a viable living on pastoralism is reducing. This trend is exacerbated by recurrent droughts and other

[22] Ibid; HPG Briefing note (2006). "Saving Lives through Livelihoods".

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

[24] 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.

[25] Pantuliano, S. and M. Wekesa (2008). Specifically pastoralists account for 20% of sheep, 25% of goats, 73% of cattle, and 100% of camel population in the country. Source: PFE, 2010

[26] Agricultural GDP represents approximately 30% of total GDP.

shocks leaving many dependent on casual labour, better-off clan members or environmentally destructive activities such as firewood or charcoal sales.

Both arid and semi-arid districts experience chronic food insecurity and in the last decade millions have become increasingly reliant on regular food relief. While the economy of the arid districts is dominated by mobile pastoralism, in the better-watered and better-serviced semi-arid areas a more mixed economy prevails, including rain-fed and irrigated agriculture, agro-pastoralism, bio-enterprise and conservation or tourism-related activities.

Pastoralism is adapted to dryland environments, and operates effectively as a livelihoods system in low and highly variable rainfall conditions. On the one hand, pastoralism as a system is growing in some ways, for instance as formal livestock export markets are expanded. However, large sub-populations within pastoral areas i.e. poorer households with few or no animals, are becoming increasingly vulnerable, for a variety of reasons, including:

- Declining sustainability as livestock holdings decrease for the poorer households, and the human population grows.
- Reduced rangelands due to overgrazing and tighter boundary controls and sale and enclosure of lands for a range of uses such as settled agricultural, reserves and conservancy. Wealthier pastoralists with larger herds control more land for commercialized pastoralism.
- Declining livestock and agricultural productivity due to low investment, poor husbandry practices and technologies (despite a growing livestock export trade).
- Environmental degradation and deterioration of natural resources to the point that production may decline below recovery levels.
- Loss of productive assets (livestock/farming/irrigated land) due to drought, floods, disease and livestock theft, particularly for poorer households.
- Breakdown of traditional institutions and social relations as migration patterns change.
- Limited access to markets for selling animals.
- Low socio-economic empowerment of women and youth.
- Geographic isolation in terms of infrastructure, communications and basic services.
- Increasing impoverishment of some communities and more vulnerable households.[27]

[27] Ibid.

In a drought, pastoral households sell animals in order to buy staple cereals. Because everyone is selling, and there are few buyers, prices fall substantially. If the animals have a buyer, this does not necessarily represent a loss to the overall economy, but their low value represents a loss of a key capital asset to the seller household. Further, many animals die from starvation. These pressures predominantly affect poorer households with smaller herd sizes, and can be a common reason for household descent into poverty.

2.3 Building Resilience for Pastoralists in the Face of Drought

For the purposes of this study, drought responses in Kenya and Ethiopia (and much of the Horn) have been broadly categorised into the following:

1) **Late humanitarian/emergency relief –** Interventions that address the direct impacts of a crisis or disaster on the target population. Primarily these take place during the crisis itself although may continue after (often as a result of late response).
2) **Early / pre-planned responses** – Interventions undertaken to prepare for, mitigate or reduce the impact of the next anticipated/likely disaster. These may be on-going activities or those which intensify or scale up as a crisis is becoming evident. It assumes appropriate Early Warning systems (EWS) are in place and responded to. Many of these activities overlap with the late humanitarian activities, the key difference being the timing of implementation.
3) **Disaster resilience activities** – This category encompasses a broad range of activities, each should fundamentally increase a community's resilience to disasters. The outcomes produced by these interventions should contribute to reducing the impact of a drought so that external humanitarian relief is reduced, less regularly required or, ideally, eliminated. The interventions listed in the table overleaf are not exhaustive but indicative of the wide range of activities considered 'resilience' building by many (views clearly vary). It should be noted that many 'normal' development activities are included.

The table on the next page further expands on these categories by listing typical drought response interventions in various sectors. As mentioned, the list is not exhaustive, but merely illustrative, showing how relief interventions in one sector can become more 'resilient' as they move along the relief to development continuum.

Annex B contains a "who, what, where" of projects and programmes that are addressing resilience in each of the countries.

Table 3: Categories of Support for Drought Response

Category	Humanitarian/Emergency Relief – when the disaster hits	Early response – anticipating the next disaster	Disaster resilience – Increased ability to withstand repeated disasters
Food / Cash Transfers	• Food aid in response to twice yearly long/short rains assessments and emergency 'flash' appeals. • Emergency ad hoc cash transfers (primarily by NGOs).	• Multi-year, planned food and/or cash transfers assessed using ongoing seasonal / EW assessments / information. Levels and targeting adjusted/upscaled as needs vary. • Food stores in place in all locations for pre-positioning stocks. • Mechanisms in place to purchase local food products for food aid, especially when surpluses available.	• Multi-year, planned food and/or cash transfers provided for most vulnerable. • Distribution systems privatised and local food commodities used whenever appropriate.
Effective Early Warning / Food Security Information Systems		• Timely, regular information analysed into reports for use by local and national stakeholders to trigger, upscale and downscale activities. • Communities and districts contribute to and receive EW/FSIS data and analysis monthly. Supported to implement drought contingency in plans.	• Timely, regular information analysed into reports for use by local and national stakeholders to plan and organise on-going development and emergency response. • Communities and districts active participation in EW/FSIS data collection and regular use. • Develop and implement local contingency / resilience building plans. On-going community development support.
WASH	• Water tankering, emergency borehole repairs, maintenance, fuel subsidies.	• Water user / management committees and local Water Authorities implement drought contingency plans with reserved funds.	• Implementation of Regional/District water strategies: expansion of water pans, boreholes, shallow wells, bikads etc. • Drip feed irrigation schemes where appropriate. • Ongoing training and capacity building support to District Water Offices/ Water user association.
Nutrition and Health	• Outreach therapeutic and supplementary feeding programmes (OTP/SFP).	• MoH supported to scale up facility-based and outreach therapeutic and supplementary feeding programmes	• MoH supported to scale up high impact nutrition and health interventions to all locations. • Trained and equipped community based health care

Category	Humanitarian/Emergency Relief – when the disaster hits	Early response – anticipating the next disaster	Disaster resilience – Increased ability to withstand repeated disasters
	• Blanket supplementary feeding programmes (BSFPs). • Emergency vaccination campaigns, cholera response etc.	(OTP/SFP). • Early blanket supplementary feeding programmes (BSFPs). • Pre-positioning of medical and nutrition supplies. • Timely vaccination campaigns, cholera response etc	workers able to provide basic preventative and curative health care to remote communities. • Local health committees prioritising and planning local health care. • Comprehensive coverage of facility-based and outreach health and nutrition services (including NIDs), stock out of medical and nutrition supplies.
Livestock	• Fodder distribution and water tankering, slaughter, de-stocking. • Emergency deworming and vaccination campaigns.	• Interventions as per Livestock Emergency Guidelines (LEGs). • Timely facilitation of commercial de-stocking, herd mobility and grazing agreements. • Timely deworming and vaccination campaigns with support of trained cadres of community health workers.	• A comprehensive livestock management strategy in place, including components to support ex-pastoralists who have to move out of the sector. • Ongoing facilitation of livestock market facilities, market information systems and linkages with buyers. • Fodder production and storage systems developed. • Communities facilitated to have on-going herd mobility and grazing agreements. • Support comprehensive coverage of quality vet services and drug supply able to implement regular deworming and vaccination campaigns. • Livestock insurance schemes.
Education	• School feeding programmes • Water tankering to schools and emergency sanitation	• School feeding incorporated into single food / cash pipeline planning. • School / community water and sanitation clubs/ committees implement school drought contingency plans	• Ensure comprehensive access to primary education via traditional and alternative school provision. • Expand provision of boarding schools for pastoralists (for girls and boys), teacher training and vocational and technical colleges.
Infrastructure			• Road construction, electrification, improved communication networks, expanded financial services etc

3 Key Concepts, Analytical Framework and Methodology

3.1 Key Concepts

What does resilience mean?

According to DFID, "disaster resilience is the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses - such as earthquakes, drought or violent conflict – without compromising their long-term prospects."

Or, in other words, according to John Twigg's "characteristics of a disaster resilient community":

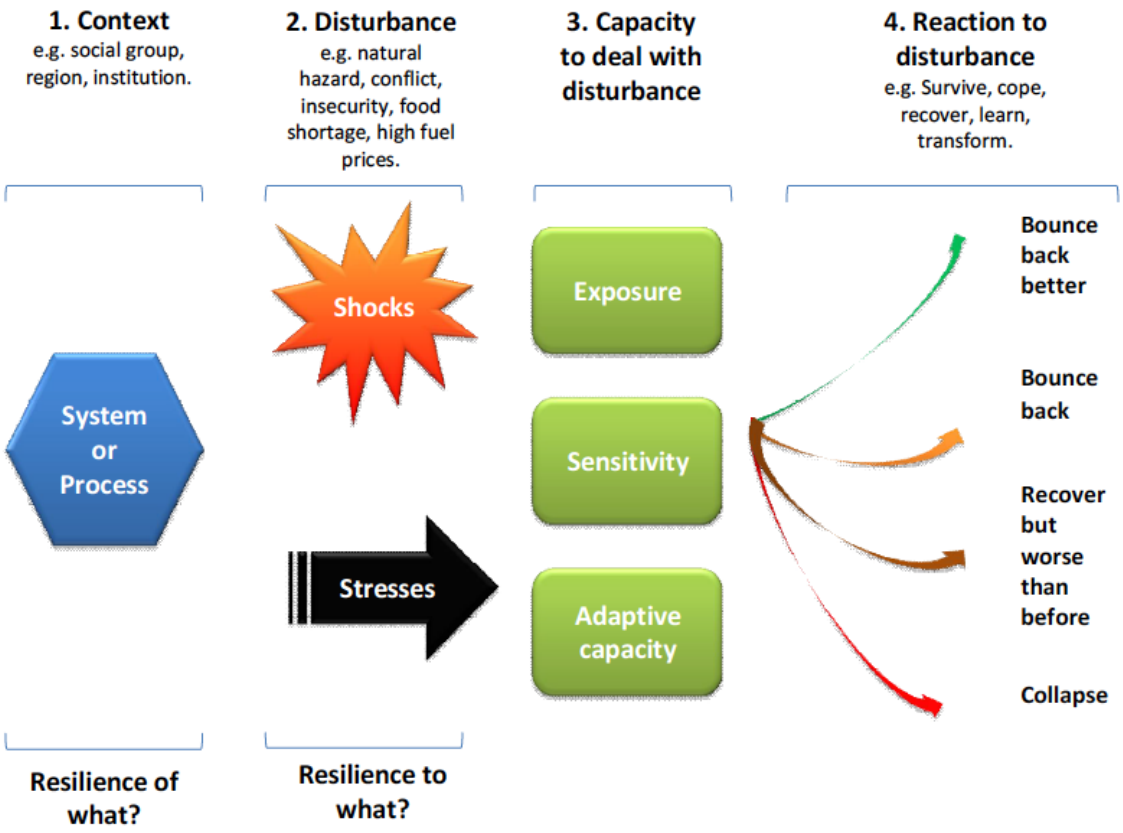
> "A focus on resilience means putting greater emphasis on what communities can do for themselves and how to strengthen their capacities, rather than concentrating on their vulnerability to disaster or their needs in an emergency."[28]

DFID's definition of resilience is comprised of four elements:

- Context – resilience of what?
- Disturbance – resilience to what?
- Capacity to deal with the disturbance – this includes the exposure to risk, the sensitivity or degree to which a system will be impacted by the risk, and the adaptive capacities of relevant actors.
- Reaction to disturbance – in the best case, the reaction to a shock is to "bounce back better".

[28] Twigg, J. (2007). "Characteristics of a Disaster Resilient Community". For the DFID Disaster Risk Reduction Interagency Coordination Group.

Figure 3: DFID's Approach to Resilience



Resilience is a process, not an end product

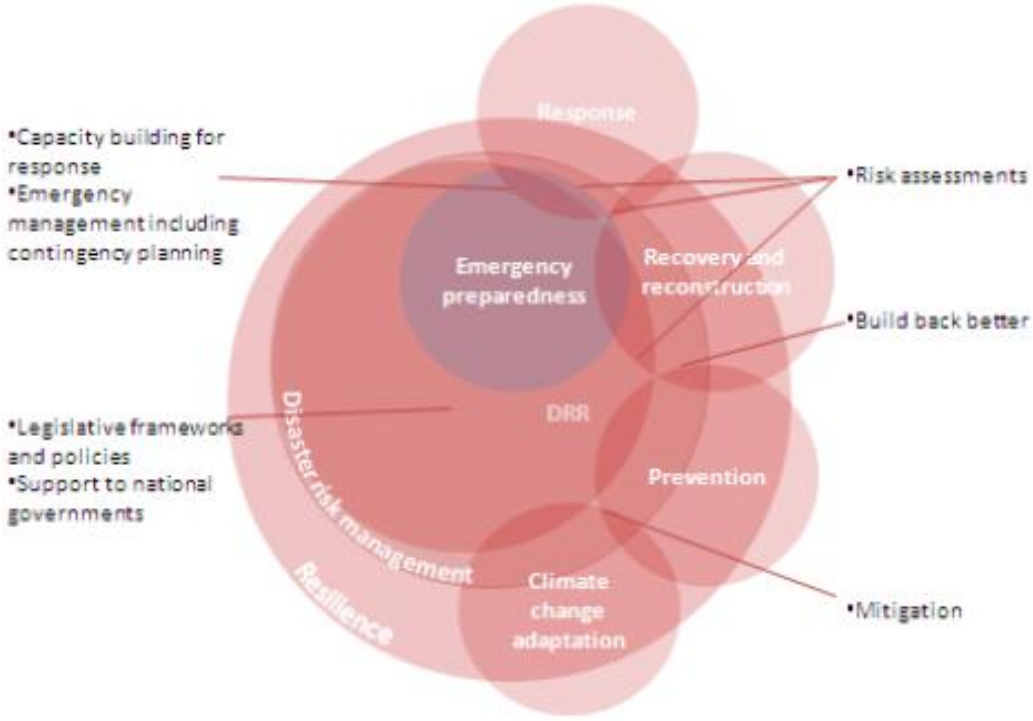
Many attempts have been made to define "resilience" and as a result many agencies report confusion over what constitutes a resilience building activity, and how one measures when a community is "resilient".

Resilience is not an end-point - no community is immune to the impacts of shocks, and those factors that affect vulnerability and resilience are constantly changing. Rather, the aim is to engage in a process that is building the resilience of people to cope with shocks, and that allows for flexibility and choice so that people can adapt and make good decisions as circumstances change.

The figure below was developed for the Food and Agriculture Organisation (FAO)/Inter-Agency Standing Committee (IASC)-funded report on funding streams for emergency preparedness. It shows how resilience encompasses a broad range of interventions – from relief to reconstruction, as well as preparedness and prevention, disaster risk reduction (DRR) and climate change adaptation (CCA). Furthermore, resilience activities can take place at a variety of levels – including building capacity and institutional

structures at a national level through to concrete activities such as ensuring access to basic services in a community. Building resilience is part of a process that encompasses activities from all of these spheres.

Figure 4: Concentric circles denoting connections between the various elements of DRR, resilience, emergency preparedness, etc.[29]



3.2 Analytical Framework

The aim of the study is to test a methodology for evaluating the *economics* of building resilience, particularly as compared with humanitarian response. Economic analysis is only one facet of the analysis – social, moral, political and institutional factors all have a bearing on prioritization. As a result, ***this study is not trying to provide a list of interventions that should be prioritized for reducing the impact of drought on pastoralists – rather it is providing insight into the economics of various choices, to contribute to a much wider decision-making framework.***

[29] Kellet, J. and H Sweeney (2011). "Analysis of Financing Mechanisms and Funding Streams to Enhance Emergency Preparedness: A synthesis report." Development Initiatives, UK. Funded by the Food and Agriculture Organisation (FAO) on behalf of the Inter-Agency Standing Committee (IASC) Task Team on Funding for Preparedness.

Furthermore, the themes discussed in this report are subject to high levels of uncertainty. For example, building resilience can mean many different things, to different groups of people, and therefore estimating a cost of resilience is very challenging. The approach in this paper has been to use conservative values throughout (using the higher end of costs, and the lower end of benefits) to ensure that any changes to the underlying assumptions and estimates only emphasize the overall findings.

This study effectively has two components, each of which is discussed below:

- The first is to compare the cost of drought under late humanitarian response, against the cost of early response, against the cost of building resilience to disasters. It should be noted that these categories are not mutually exclusive – in this context many interventions are common to late and early response, with the key difference being timing.
- The second is to identify the types of interventions that build resilience to disasters that can provide the highest "Value for Money" (in other words, maximize benefits per unit of cost).

3.2.1 First Component: Cost comparison of response

The first component of this study seeks to compare the cost of late humanitarian response, to early response, to building resilience to drought. While humanitarian action is clearly required in certain situations, the overall goal is to ensure that human populations can cope with crisis and continue to develop.

The analytical framework is built around three storylines to facilitate analysis.

Storyline A: Late response to drought results in humanitarian intervention. Food and non-food aid are required to ensure that the population affected survives. Because a humanitarian crisis has been reached, and response is late, loss of life and livestock are excessive. Furthermore, while aid helps to ensure that people survive, a downward cycle of asset depletion is evident, and the caseload for humanitarian intervention is seen to increase over time (both in terms of the number of people requiring aid, and the number of months that aid is required on average). When the next drought hits, households have typically not recovered asset levels from the previous drought.

Storyline B: Early response is taken to ensure survival at the time of early warning of a crisis. In this case, action is taken before the onset of significant livestock deaths. Interventions are not necessarily different from those taken in Storyline A, but importantly they are taken at the first signs of a potential drought. Food and other aid

are still required to ensure that the population affected survives. However, the impact is far less at this stage (populations have not yet reached destitution) and therefore per capita intervention costs are smaller, and the duration that aid is required is shorter. Furthermore, the unit cost of procuring and transporting food and other aid is much cheaper. It is further assumed that 50% of excess adult animal deaths can be commercially destocked and converted to sales through early intervention.[30] Evidence indicates that money raised through commercial destocking can then be used for other coping mechanisms, such as buying food for human consumption, and feed or veterinary services for remaining animals. It is also likely that a reduction in number of animals will reduce pressure on existing water and forage supplies for the remaining animals.

Storyline C: Investment is made in building the resilience of communities to cope with drought on their own. If the investment is made to the extent required up front, communities should be able to cope without external intervention for the foreseeable future (ceteris paribus). Clearly, resilience is not a static event; it requires evolving and adapting over time as a whole variety of factors can change to influence a community's coping capacity. It is also not expected that resilience will be built to a threshold that allows a community to cope with any event, no matter how extreme. However, the concept is to build resilience to a level that allows communities to cope with minimal external humanitarian or early intervention, given existing conditions – i.e. drought every few years.

The cost of building resilience cannot be estimated directly with any great certainty. Resilience interventions, as detailed in the previous section, can represent a whole host of activities, and the effectiveness of these activities at building transformational change will vary depending on factors such as how they are implemented and the local context. In addition, resilience activities will change over time as existing conditions change.

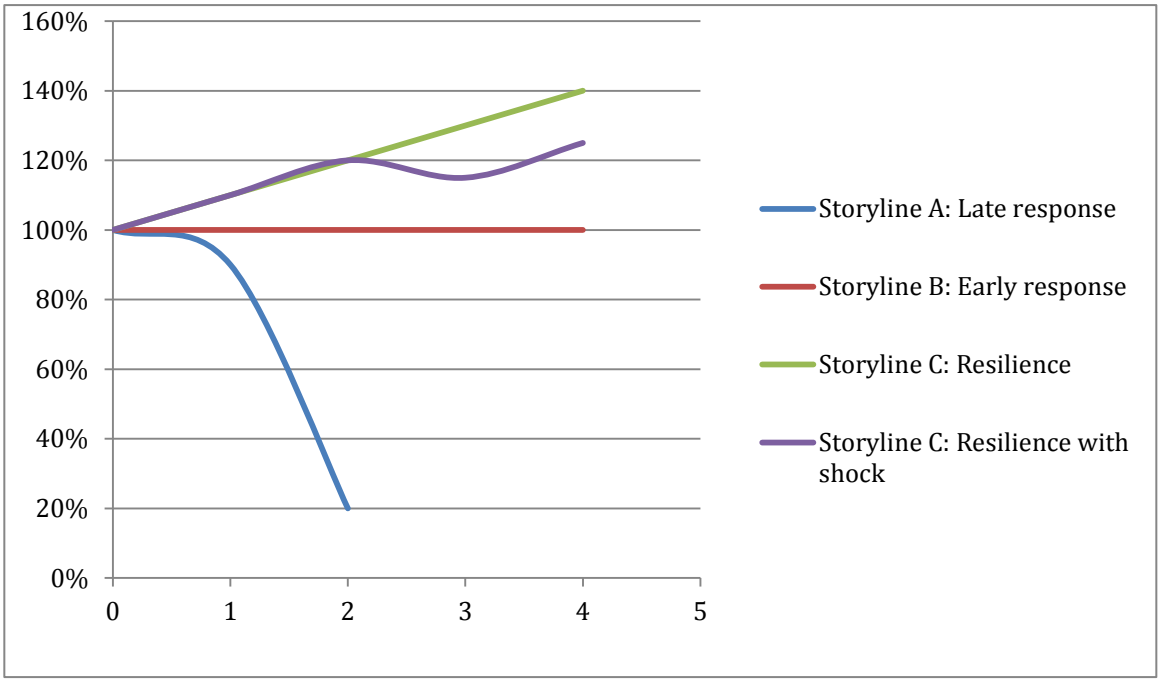
Figure 5 is a very simple graphical representation of each of these three storylines. Under Storyline A, asset depletion rapidly erodes community ability to bounce back, and a downward spiral is seen as households head towards destitution. Storyline B assumes that aid is provided to allow families to subsist, but there is no upward mobility or asset building. Storyline C is depicted twice, first to show the gradual climb to greater

[30] It is important to note that this analysis focused on commercial destocking as an early intervention, in which traders are facilitated to buy animals off of households before the animals reach a weakened state, ensuring that households get a good price and have money to spend on other needs, such as feeding and caring for remaining animals. This is very different from slaughter destocking which is a late response intervention, in which animals are slaughtered in a very weakened condition, at which point their value is significantly diminished.

resilience, as communities build their asset base. Clearly there could be setbacks as shocks will continue to affect these households, but the assumption is that they can reorient themselves back onto a path of growth (represented by the Storyline C with shock line).

Figure 5: Theoretical Representation of Storylines

Plots assets (100% is level of assets necessary to protect livelihoods[31]; y-axis) against time (x-axis)



The Household Economy Analysis (HEA)

This study relied heavily on data generated from the Household Economy Analysis (HEA), developed by Save the Children UK and implemented here by the Food Economy Group. This section provides a brief overview of the methodological approach that underpins the HEA.

HEA a livelihoods-based framework for analysing the way people obtain access to the things they need to survive and prosper. It was designed to help determine people's food and non-food needs, and identify appropriate means of assistance, whether related to short-term emergency needs or longer term development program planning and policy changes.

[31] See Figure 6 for definition.

HEA is based on the principle that an analysis of local livelihoods and how people make ends meet is essential for a proper understanding of the impact – at a household level – of hazards such as drought or conflict or market dislocation. These predictions at a household level can then be used to guide wider institutional and policy analysis.

The objective of HEA-based analysis is to investigate the effects of external hazards and shocks (whether negative or positive) on future access to food and income. Three types of information are combined: (i) information on baseline access to food and income; (ii) information on hazard (i.e. factors affecting access to food/income, such as livestock production or market prices) and (iii) information on household level coping strategies (i.e. the strategies households can use to protect and/or increase access to food or income when exposed to a hazard).

HEA scenario analysis compares conditions in the reference year to conditions in the current or modelled year, and assesses the impact of such changes on households' ability to meet a set of defined minimum survival and livelihoods protection requirements (see Figure 6).

In HEA outcome analysis, projected 'total income' – or the sum of all food and cash income households secure, converted into a common unit or currency (either percentage of kilocalories consumed (%kcals) or cash) – is compared against two thresholds – a survival threshold and a livelihoods protection threshold. These thresholds are defined on the basis of local patterns of expenditure. Figure 5 summarizes the components of each threshold.

A herd dynamics model – Analysis of Herd Dynamics (AHEaD) – developed by Mark Lawrence of the Food Economy Group has been used to project herd losses and gains. The model was developed in 2011-12 to capture the relationship between rainfall (quality and quantity of rains by season) and herd dynamics components. Assumptions about the relationships built into the model have been developed using HEA baseline data on herd dynamics, baseline data and field information from the Food Security and Nutrition Analysis Unit (FSNAU) of FAO, and secondary data on pastoral livestock production in East Africa and the Horn of Africa.

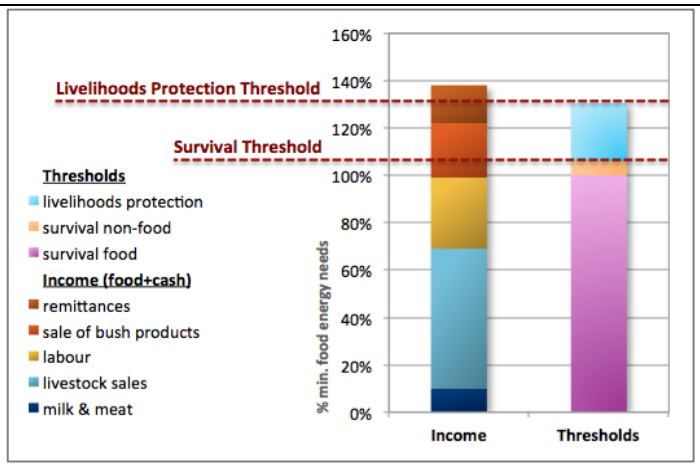
Figure 6: HEA Emergency Response Thresholds Compared to Total Income Levels

The Survival Threshold represents the total income required to cover:

a) 100% of minimum food energy needs (2100 kcals per person), plus

b) The costs associated with food preparation and consumption (i.e. salt, soap, kerosene and/or firewood for cooking and basic lighting), plus

c) Any expenditure on water for human consumption.



The Livelihoods Protection Threshold represents the total income required to sustain local livelihoods. This means total expenditure to:

a) Ensure basic survival (above), plus

b) Maintain access to basic services (e.g. routine medical and schooling expenses), plus

c) Sustain livelihoods in the medium to longer term (e.g. regular purchases of seeds, fertilizer, veterinary drugs, etc.), plus

d) Achieve a minimum locally acceptable standard of living (e.g. purchase of basic clothing, coffee/tea, etc.)

The HEA methodology used in this analysis estimates deficits (measured in metric tonnes (MT) of food required) and livestock losses for three drought scenarios (low, medium and high), though the focus of this report is on the high magnitude drought scenario, as this mimics the characteristics of the 2011 drought event. The methodology further simulates three scenarios, to support the Storylines described above:

- Late humanitarian response to drought, in line with Storyline A;
- Early response using commercial destocking of 50% of excess adult animal deaths, in line with Storyline B (B1); and
- Early response using a combination of commercial destocking and early interventions that can help to improve animal condition, also in line with Storyline B (B2).

More detail around the methodology and parameters of the analysis is given in Section 3.3 below, as well as the HEA report that accompanies this report.

3.2.2 Second Component: Value for Money of resilience interventions

The second component of this study is to identify the types of interventions that build resilience to disasters that can provide the highest "Value for Money" (VfM).

The UK Government requires the spending programmes of government departments, including DFID, to be justified according to the three concepts of *economy, efficiency, effectiveness* and *cost-effectiveness* (referred to as the "3E framework"). These three components define VfM of any given intervention*:*

- *Economy* requires that the cost per unit of input (e.g. products, materials, fuel, transport, salaries) be minimised, or at least kept within reasonable bounds.
- *Efficiency* dictates that the cost per output (e.g. delivered complete service or product, completed structure, person attended to, training course completed) should also be minimised or kept within an acceptable range.
- *Effectiveness* measures the cost of achieving the intended outcome of the activity (e.g. lives saved, improved health, greater security, enhanced livelihoods).

A final measure of cost effectiveness looks at the impact on poverty of a given intervention measured against the cost of input.[32]

It was not possible within the scope of this study to perform a detailed analysis of value for money evaluations on a range of resilience measures. The evidence to date suggests that the benefits delivered by resilience measures vary depending on factors such as context and how they are implemented. In other words, there is no "one size fits all" approach. Section 6 of this report provides some initial thoughts and insight related to VfM of resilience interventions, and could form the basis of a more detailed analysis.

3.3 Methodology

The study began with a scoping exercise, during which consultations were undertaken with key experts working in related fields and/or the region. The aim was to gain a better understanding of the key issues, and also to help focus the study and identify how it could be structured to best address data availability/gaps and build on existing work.

Data was collected through extensive consultation, both by phone/skype teleconference, as well as through face-to-face meetings. The full project team spent a

[32] Department for International Development (2011). "DFID's Approach to Value for Money."

week in meetings in Nairobi and a week in Addis Ababa, as well as a field visit to Shinile district in Ethiopia. Team leaders for Kenya and Ethiopia continued the data collection exercise over successive weeks. Annex A contains a detailed list of all consultations – for both the scoping phase as well as the country visits.

The data was then analysed from two perspectives, each of which are described in greater detail below. In both cases, the data was evaluated using multiple sources to allow the study team to triangulate and ensure that data was robust.

- *Bottom-up Analysis:* The HEA modelling provided detailed data on the impacts of drought events on household economies, over a five year period. This approach used relevant data at a household level to compare costs of response for a given area. It is the more detailed component of the analysis, because the study team was able to gather much more detailed data at this level to build up the storylines.
- *Top-down Analysis:* There was also a reasonable amount of evidence on the costs of response at a national level, aggregated for the country as a whole. These costs are not necessarily specific to pastoralists (and indeed humanitarian aid in drought has not been limited to pastoral areas), but rather represent the cost of drought, measured in aid and losses, for each country.

In reality, late humanitarian response is the predominant approach, and is being applied repeatedly with each event (an important exception to this is the Productive Safety Nets Programme (PSNP) in Ethiopia, which is described in greater detail below). This will continue for the next 20 years and beyond if practices don't change. By contrast, building resilience requires up front investment, which is usually justified because it generates benefits for years.

In each case, figures were modelled over a 20-year lifetime (an analysis for 10 years is also presented where applicable for comparison), discounted at 10%[33], to then compare costs across the three storylines. High magnitude droughts are estimated to occur every 3 to 5 years in Kenya and Ethiopia – a 5-year cycle is assumed in the modelling to be conservative. The cost of aid is inflated by 5% with each drought event (every fifth year) to reflect the increasing humanitarian caseload.[34] Throughout the analysis, where a range of values is applicable, the study team always picked values that would give a

[33] Discount rates are used in these types of analysis to reflect the time preference for money – in other words, a dollar today is worth more to someone than a dollar tomorrow. 10% is in line with central bank rates in both countries, as well as rates used for development projects.

[34] Data on increases in caseload were not available, but consultation with numerous stakeholders suggested that it is increasing by approximately 5% with each event.

conservative outcome – in other words, if the underlying assumptions are tested, the results should only become more pronounced. Annex C contains findings from sensitivity analyses.

3.3.1 Data Analysis – "Bottom-up approach"

The bottom-up approach relied heavily on the HEA analysis and herd dynamic model. The HEA model was undertaken for southern Ethiopia, which covers the majority of the vulnerable population, equivalent to 2.8m affected people. HEA data in Kenya is much more limited, and so the analysis was run for one livelihood zone - Wajir Southern Grasslands in Northern Kenya, for a population of 367k.

Box 1 contains more detail on the specific modelling parameters used in HEA analysis, and full details of the HEA modelling specific to this study can be found in the HEA report.

The outputs predict, for the relevant beneficiary population, the deficit measured in metric tonnes (MT) of food, and excess animal deaths (e.g. those that would not have died under normal conditions), as a result of the event. Because the model runs over five years, it shows how an event in year one continues to have an impact on households for successive years (in other words, a deficit in year 1 can require ongoing food aid, albeit for a shorter time, in successive years, due to asset erosion). It can be used, therefore, to quantify the need over 5 years as a result of an event in year 1. In order to simplify the model, the cumulative impacts for all five years are summed and represented as an impact in the drought year. Wherever possible, HEA statistics are compared against other similar statistics to triangulate findings.

Storyline A: Cost of late humanitarian response

The cost of late humanitarian response is estimated using three components – food aid, non-food aid, and livestock losses.

Estimating the cost of food and non-food aid:

- HEA was used to model the total deficit under a humanitarian response for households in southern Ethiopia and Wajir Grasslands in Northern Kenya, valued in metric tonnes (MT) of food required. This estimate was multiplied by the cost per MT to deliver food aid as estimated by the World Food Programme (WFP) for each country ($845 Ethiopia, $889 Kenya)[35], to get an estimate for the total cost of response. Importantly, this analysis models the cost of filling household deficits – this can be quite different from the actual aid supplied, which can often fall short of need.
- The Kenya Post Disaster Needs Assessment (PDNA)[36] assessed the Kenya drought from 2008-2011 and found that food aid over the four years accounted for 60-80% of the total cost of response. Therefore food aid estimates are inflated by 25% (to be conservative) to reflect the additional cost of non-food aid that is normally provided in a humanitarian response (e.g. water, nutrition, health, etc).

[35] The estimated cost of delivering food aid is based on figures from the WFP EMOPS costs for Kenya and Ethiopia, as presented in the 2011 DFID Nairobi paper "Value-for-Money in Humanitarian Aid for Kenya and Somalia." The cost includes purchase, landside transport, storage and handling, and hence is a good representation of the total cost of delivering food aid.

[36] Republic of Kenya (2012) "Kenya Post Disaster Needs Assessment (PDNA): 2008-2011 Drought". With technical support from the European Union, United Nations and World Bank.

- Livestock losses are modelled using the herd dynamics model (AHEaD) and valued using average animal values (see Table 4[37]). It should be noted that a) these livestock are lost over successive years as a result of the drought in the first year and b) the average does not reflect the significant variation in livestock losses that will occur in each household.

Table 4: Estimated Value of Livestock

	Kenya[38]	Ethiopia[39]
Camel	$513	$635
Cattle	$323	$328
Shoat (sheep/goat)	$33	$61

[37] It is important to note that, while the most relevant livestock values were used, values are subject to high levels of fluctuation.

[38] National Livestock Information System, Ministry of Livestock Development, Government of Kenya. Based on national average livestock prices from 2004-2010.

[39] Data is taken from the Ethiopian Livestock Market Information System, for February to May 2012. http://www.lmiset.net/Pages/Public/Home.aspx

Box 1: HEA Modelling Parameters

HEA models the impact of response under each of the three Storylines – late humanitarian response (A), early response with destocking (B1) and early response with destocking and improvements to animal condition (B2) – over a five year time horizon to capture the cumulative effects of an event.

Within each Storyline, low, medium, and high magnitude drought scenarios have been modelled using rainfall estimates (RFE) and terms of trade (ToT) as inputs. The high magnitude drought uses data that is equivalent to the most recent 2011 drought event. The reasoning behind these parameters is outlined in greater detail in the HEA report.

- **High magnitude drought event:** 25% of annual Short Term Mean (STM) remote sensing rainfall (RFE) levels, with rainfall levels in season 1 half those of season 2. 2010-11 terms of trade levels, with ToT in subsequent years set at reference year.
- **Medium magnitude drought event:** 50% of annual STM RFE levels, with rainfall levels in season 1 half those of season 2. Price of staple in relation to livestock (i.e. kg staple per livestock head) approximately 10-15% lower than 2010-11 ToT levels.
- **Low magnitude drought event:** 75% of annual STM RFE levels, with rainfall levels in season 1 half those of season 2. Price of staple in relation to livestock approximately 20-25% lower than 2010-11 ToT levels.

RFE data is also used as input to the model to calculate changes in herd size, number of milking animals in herd, milk yields, livestock mortality rates, rates of conception, and number of births each year for herds in each livelihood zone run under the model.

Storyline B1 adjusts the model to account for early response using commercial destocking of 50% of excess animal deaths (e.g. animal deaths that are in excess of normal death rates due to the drought).[40] The impact of destocking is integrated into the HEA model, and hence influences the overall household deficit, giving an estimate for reductions in animal losses as well as food aid required.

Storyline B2 further adjusts the model to account for changes in animal condition that can arise through interventions such as supplementary feeding or veterinary services, that have a positive impact on conception and production of animals, thereby reducing household deficits even further. These improvements have been modelled using improvements in rainfall as a proxy determinant for these herd parameter changes, equivalent to approximately 25% increase in annual rainfall compared to the short term mean rainfall amounts.

[40] This equates to on average, less than 1 camel, 1-2 cattle, and 6-8 shoats per household that are destocked. Clearly this will vary by household depending on the household herd size, but is broadly in line with average commercial destocking rates currently seen in the region.

Storyline B: Cost of early response

The HEA modelling undertaken for this study estimates the food deficit and number of animals lost under late humanitarian response, as well as early response, using commercial destocking of 50% of adult animals[41] that would have otherwise died (this results in a similar level of destocking on a per capita basis to actual evidence, though it is clear that there is not the current capacity to do destocking at this level across either country). The model uses a second early response scenario that combines a change in rainfall as a proxy to estimate the potential impact of an improvement in animal condition on household economies, combined with commercial destocking – the model incorporates the reduction in aid costs and losses as a result. The food deficit and animal losses are valued using the same approach defined above for Storyline A, with the exception that food aid that is delivered early is typically less expensive. Hence the estimated cost of delivering food aid under Ethiopia's Productive Safety Nets Programme (PSNP) is used, with a value of $487 per MT of food aid (2010/11).[42]

Storyline C: Cost of building resilience

The cost of building resilience is very difficult to estimate – most interventions can build resilience, but their costs, and outcomes, can vary substantially depending on how they are implemented and on the local context (to the extent that the same intervention can build resilience in one community and erode it in another). The intention in this analysis was to use best estimates for what it might cost to build resilience, in order to allow a comparison with the cost of late humanitarian response, acknowledging that there is significant uncertainty around these costs.

The analysis done for Kenya attempts to cost in detail a range of resilience building measures necessary for pastoralists. The list includes a variety of livestock and WASH interventions, as well as livelihoods diversification and investment in roads, with a total estimate of $137 per capita per year[43]. This is considered an overestimate, as not every

[41] Households do not typically destock young animals.

[42] DFID (2012). "Ethiopia's productive Safety Net Programme 2010-2014: A value for money assessment". This estimate also includes internal transport, storage and handling costs. Other estimates suggest that the cost of food aid provided early could be even lower; for example, see World Bank (2009), "Project Appraisal Document for a Productive Safety Net APL III Project" which cites a cost of $422 per MT (2009 data). A "Cost Benefit Analysis of Africa Risk Capacity Facility" found that the cost could be even lower, citing an example of food aid in Niger where early food aid was 1/3 the cost of late food aid.

[43] The figures that support this estimate can be found in Annex D, Table D1; in some cases an average is taken. They can be broken down as follows (per capita, per year): $24 livestock interventions; $25 WASH interventions; $60 livelihood interventions, $11 road interventions; $17 education support costs.

household or community will require the full extent of this package of interventions. It should further be noted that education was considered a very important component, but official costs of education investment were exceptionally high and therefore are not included here due to significant uncertainty around these figures.

According to the UN Millennium Project report "Investing in Development", a typical low income country in Sub Saharan Africa needs to increase public investments to an average of $110 per capita per annum over a five to ten year period in order to meet the Millennium Development Goals (MDGs). It can be assumed that communities that have met the MDGs[44] will be resilient to drought. This figure is not used in the analysis, but provides a benchmark that suggests that the Kenya estimates are a reasonable assumption. The Kenya costs are modelled for the first 10 years of analysis, in line with the MDG assumption and representing a period of upfront investment. For simplicity it is assumed that benefits will start immediately during the period of expenditure and continue to accrue for another 10 years, reflecting the long-term impacts of building resilience.

Further, added to these costs, is "residual risk", i.e. on-going food aid and losses that will continue to occur in a drought. Because there is little evidence as to the speed or magnitude with which this change will take place, a very conservative assumption is taken, to include 100% of the required aid under Storyline B2 in the first year, 50% in year 5, and 25% each year thereafter, to reflect a decreasing reliance on aid.

3.3.2 Data Analysis – "Top-down approach"

Storyline A: Cost of late humanitarian response

As above, the cost of late humanitarian response is estimated using three components – food aid, non-food aid, and livestock losses.

Estimating the cost of food and non-food aid:

- The cost of food aid was estimated using national level figures on food aid requirements. In the case of Kenya, food aid is estimated by using the short and long-term rain needs assessments (SRA/LRA) and multiplying them by the estimated cost per person of delivering food aid.[45] Estimates for Ethiopia were estimated using

[44] Eradication of extreme poverty and hunger, universal primary education, gender equality, reduced child mortality rates, improved health, access to safe water, environmental sustainability.

[45] The estimated cost of delivering food aid is based on figures from the WFP EMOPS costs for Kenya and Ethiopia, as presented in the 2011 DFID Nairobi paper "Value-for-Money in Humanitarian Aid for Kenya and Somalia."

data from UNOCHA's[46] Financial Tracking Service (FTS) for humanitarian aid, using figures specific to drought, and excluding the cost of refugee operations for the major camps on the border with Somalia.
- As above, food aid estimates are marked up to give a conservative estimate for the additional cost of non-food aid.

Estimating livestock losses:
Aid is not the only cost incurred in a drought – numerous losses in lives, livestock, milk and meat production, health impacts, and economic activity, all add to the economic burden. The value of these losses can be hard to measure, but are significant, as once a family gets past the initial stage of relief, they have to recover their livelihoods and asset base, rebuild their herds, etc.

Livestock are the major asset holding of pastoralists, and are quantified as follows:
- Additional losses from livestock are estimated using figures from the PDNA in Kenya. The PDNA calculates the value of deaths of domestic animals as a result of the 2009 and 2011 droughts, as well as the decline in production of milk, meat, and other by-products, and health care costs.
- In Ethiopia, livestock losses are estimated using HEA estimates of excess deaths (i.e. deaths that are additional to those that would occur normally/outside of drought times) for Somali and Oromiya Regions of Ethiopia (referred to hereafter as 'southern Ethiopia'). This is not comprehensive but covers a significant portion of the area affected by drought. Animal deaths are estimated using data from the herd model for camel, cattle, and sheep and goats (referred to collectively in the region as shoats), and valued using average livestock prices for each. Annex C contains a detailed explanation of these calculations.

Storyline B: Cost of early response
The early response storyline assumes that response is early enough to shorten the amount of time that food aid is required, decrease the unit cost of food aid, and to avoid some loss of livestock through schemes such as commercial destocking.

The HEA modelling estimates the food deficit and number of animals lost under humanitarian and early response scenarios (see Storyline A: Cost of late humanitarian response
The cost of late humanitarian response is estimated using three components – food aid, non-food aid, and livestock losses.

[46] United Nations Office for the Coordination of Humanitarian Affairs

Estimating the cost of food and non-food aid:

- HEA was used to model the total deficit under a humanitarian response for households in southern Ethiopia and Wajir Grasslands in Northern Kenya, valued in metric tonnes (MT) of food required. This estimate was multiplied by the cost per MT to deliver food aid as estimated by the World Food Programme (WFP) for each country ($845 Ethiopia, $889 Kenya), to get an estimate for the total cost of response. Importantly, this analysis models the cost of filling household deficits – this can be quite different from the actual aid supplied, which can often fall short of need.
- The Kenya Post Disaster Needs Assessment (PDNA) assessed the Kenya drought from 2008-2011 and found that food aid over the four years accounted for 60-80% of the total cost of response. Therefore food aid estimates are inflated by 25% (to be conservative) to reflect the additional cost of non-food aid that is normally provided in a humanitarian response (e.g. water, nutrition, health, etc).
- Livestock losses are modelled using the herd dynamics model (AHEaD) and valued using average animal values (see Table 4). It should be noted that a) these livestock are lost over successive years as a result of the drought in the first year and b) the average does not reflect the significant variation in livestock losses that will occur in each household.

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Cattle	$323	$328
Shoat (sheep/goat)	$33	$61

Box 1 for greater detail). The percentage decrease in the cost of response under Storylines B1 and B2 was applied to national level figures on the cost of humanitarian response to estimate the potential change. The total cost also includes an estimate of what it would cost to implement commercial destocking, as well as additional measures to improve animal condition – it is not feasible to introduce commercial destocking across the whole of the two countries; rather these costs are used as a proxy to account for the cost associated with implementing an early response measure.

Storyline C: Cost of building resilience

It is very difficult to estimate how much it would cost to build resilience at a national scale for each country – as discussed previously, resilience is a process, and can encompass a very wide range of activities. Nonetheless, costed estimates from various national development, disaster risk reduction, and adaptation plans are used to provide a proxy for the cost of building resilience. Further to this, resilience measures will not reduce the impact of drought completely, and hence a scaled continuation of residual risk is included in the cost estimate.

Resilience activities also have many additional benefits that accrue outside of disaster times, such as health and education improvements, increased income, etc. The top-down analysis purely compares costs, whereas the bottom-up approach attempts to incorporate some of the benefits of building resilience into the analysis.

3.4 Variations between the two countries

There are some important variations between the two country analyses below, which should be carefully noted when interpreting the findings. It is important to note that the differences mean that the cost figures are not comparable between the two countries:

- The Kenya national level analysis incorporates findings from the Kenya PDNA on losses associated with the 2009/2011 drought. These loss estimates are much higher than the Ethiopia analysis, which had to rely on much more limited loss data. The estimation of losses in Kenya is very comprehensive, covering a range of sectors. Further, in relation to livestock, the analysis includes valuation of a full range of animals and associated losses, as well as health costs to treat animals.
- HEA baseline data is much more comprehensive for Ethiopia than Kenya. As a result, the Ethiopia modelling was conducted for a population of 2.8 million, whereas the Kenya modelling was conducted for a population of 347,000. The implication is that the Ethiopia modelling covers a much wider range of households, poverty groups, and pre-existing conditions. As a result, some of the impacts are different – for instance, the impact of destocking is much greater in the Ethiopia model, because destocking tends to have a greater impact on wealthier households with large herd

sizes that can sell more animals, and the Ethiopia sample contained a wider range of poverty groups. The Kenya modelling was undertaken for a livelihood zone in Wajir, which is one of the most vulnerable.

- Further to this, the baselines in Wajir were conducted in 2005/06, which was already below average for rainfall. These act as the reference year for the rest of the analysis. By contrast, the reference years for Ethiopia were almost entirely slightly above normal in terms of rainfall. Not only is Wajir generally an area vulnerable to drought and market shocks, they also have low total income and had a large deficit in the reference year, and a very significant proportion of their total income came in the form of food aid during the reference year. This makes for very high deficits, faced by the majority of the population. It also usefully demonstrates how drought affects a population that is still recovering from the previous drought. The result is that deficits, and hence costs on a per capita basis are higher for Wajir than southern Ethiopia.

3.5 Limitations

- This type of study is very dependent on the availability of good data. Because this analysis was so data intensive, the study team sought to gather the most robust data possible, often comparing numerous sources. The study was also directed to some degree by the data, designed to work with what was available. Data variability was high – impact of droughts, livestock prices, costs of even simple measures such as installing water access, all had widely differing estimates. To accommodate these differences, the study team always took a conservative approach, such that any sensitivity analysis (e.g. analysis that tests the assumptions underlying the model) is likely to only accentuate the conclusions reached in this report. Annex C contains sensitivity analyses that vary the following assumptions:
    - The discount rate is reduced from 10% to 5%;
    - The percentage of need averted by resilience measures is reduced to 75% in the first year/drought, 25% in year 5, and 10% each year thereafter (from 100%/50%/25%/25%); and
    - The potential benefits that can arise as a result of investing in resilience, outside of reduced aid and losses, is increased from a ratio of 1.1:1 to 2:1.
- The cost of resilience is particularly hard to estimate because “resilience” can cover so many different activities. Hence the analysis relied heavily on proxy values to give an indication of what could be achieved for a given cost.
- The HEA modelling uses wealth groups (very poor, poor, etc) to estimate the impacts of events on household economies. For the sake of simplicity, the data presented in this report is aggregated and not presented by wealth group. However, as

highlighted in the context section above, the impact of droughts on pastoralists can vary significantly by wealth group. An analysis by wealth group could yield interesting findings, but was not within the scope of this work.

4 Cost Comparison of Drought Response - Kenya

4.1 Overview

This section presents the data and analysis for Kenya. As described in previous sections, the analysis attempts to compare the cost of late humanitarian response, to early response, to building resilience to drought in Kenya. The analysis is approached from two perspectives – the first attempts to build up local or project level data ("bottom-up approach") for the Wajir southern grasslands, and the second uses national level aggregated data on the cost of response ("top-down approach"). All costs and losses are modelled over 20 years, using a 10% discount rate, and assuming a five-year drought cycle for high magnitude events. The detailed outputs from the modelling, as well as sensitivity analyses, can be found in Annex C.

4.2 Kenya – Bottom-Up Assessment

This analysis approaches the cost comparison from a bottom-up perspective – using disaggregated project and sector level estimates to compare the cost of response. The HEA and herd dynamics modelling estimates the food aid requirements and animal losses for a high magnitude drought in Wajir Grasslands, assuming a drought in year 1, and calculating losses over 5 years. This analysis is done for three storylines – Storyline A, in which humanitarian aid arrives late; Storyline B1, in which early response uses commercial destocking of 50% of adult animals that would have otherwise died[47] ; and Storyline B2, in which destocking is combined with additional early response measures, such as supplementary feeding and veterinary services, which are assumed to improve animal condition and hence conception and production. The destocking Storyline B1 results in similar levels of destocking on a household basis to levels actually seen in previous events, and hence there is confidence around these figures. Storyline B2 attempts to simulate improved animal condition, using improved rainfall characteristics to model the resulting change in production and consumption, and therefore provides an initial indication of potential benefits only.

Table 5 below summarizes the findings for a high magnitude event, defined using the characteristics of the most recent drought (2011). These data are used throughout the analysis below. In the HEA modelling, early response brings some households out of a deficit, and hence the number of beneficiaries declines in each scenario.

[47] Note that the modelling accounts for adult and immature animal deaths, but only 50% of adults are destocked.

Table 5: Summary of HEA Analysis for Kenya – Wajir Grasslands, high magnitude drought (USD),

Scenario	Number Beneficiaries (Year One)	Food Deficit MT Total (5 years)	a. Costs of Food and Non-Food Aid	b. Value of Excess Animal Deaths	Total Losses (a+b)
A	367,065	158,452	176,079,785	81,304,247	257,384,032
B1	313,039	144,743	88,122,944	61,880,697	150,003,641
B2	287,802	108,762	66,216,865	18,693,483	84,910,348

4.2.1 Kenya - What is the Cost of Late Humanitarian Response?

Estimating the cost of food and non-food aid:

The WFP estimates a cost of $889 per MT of food aid in Kenya. When this is multiplied by the household deficit, measured in MT of food required in the HEA model, this equates to a total cost of food aid per high magnitude drought in Wajir Grasslands of $141m. This can be inflated to incorporate non-food aid requirements to a total of $176m for a total beneficiary population of 367k as determined by the HEA modelling. This figure is the total household deficit, measured in food aid, that results over five years as a result of a drought in year one – the effects do not persist only in year one but continue beyond, with the largest impact in year one but residual impacts in subsequent years due to continuing deficits. In order to simplify the analysis, the impacts are summed together and presented in the model in the first year. These costs are solely in relation to a drought in year one, and do not account for the fact that other events are likely to occur in the four subsequent years that could deepen this condition.

The per capita cost of food aid based on HEA data in year one alone is $186. For comparison, on a per capita basis, it is estimated that food aid costs approximately $54 per person per year in Kenya.[48] Inflated to reflect non-food aid costs, this would equate to at least $68 per person per year. The HEA figure is significantly higher because the HEA models costs for a high magnitude event whereas the WFP figures are averaged over a longer time frame characterized by both good and bad drought years. Wajir is

[48] Figure estimated in Kenya report, based on personal communication with WFP. This is cheaper than some other estimates but excludes supplementary WFP programmes such as school feeding, food for assets and supplementary feeding programmes.

also one of the most vulnerable areas and therefore may be representative of the higher end of costs, and this should be considered when interpreting these results.

It is also worth noting that the HEA modelling estimates the total cost of food aid that would be required to fill the food deficit, whereas the WFP figures refer to the cost of actual food aid delivered, and hence the findings could reflect a significant gap between need and actual aid supplied. The aim of this analysis is to represent the full economic cost, to the extent possible, and so the HEA figures are used here.

Estimating losses:
The herd dynamic model estimates the number of animals (camel, cattle, shoats) that would die under a high magnitude drought. These animals are valued using the livestock prices cited previously.

Livestock losses using HEA data are estimated at $81m in Wajir Grasslands for a high magnitude drought. This is equivalent to $221 per person, over five years, or $44 per year. By comparison, the PDNA estimates that livestock damage and losses averaged $435 per person for 2008-2011, or approximately $110 per year per person (this is specific to North Eastern Province). The HEA estimate is likely lower than the PDNA estimate because the PDNA losses are calculated for two high magnitude droughts – one in 2009 and one in 2011 (combined into one for the analysis), whereas the HEA assumes a high magnitude drought only once in year one of the modelling. Further, the HEA model shows lower excess deaths for Wajir on average, partly due to a higher mortality rate (i.e. more deaths) in the reference year, in which the gu rains, which are the main rains for pastoralists in northern Kenya, were only 50% of the short term mean rainfall (STM) for 1996-2007.

Total cost of late humanitarian response
The total cost of late humanitarian response is estimated at $257m in a high magnitude drought for a total population of 367k ($176m food aid plus $81m livestock losses). This is assumed to occur every five years in the model.

4.2.2 Kenya - What is the Cost of Early Response?

Under HEA modelling, early response with commercial destocking of 50% of excess adult mortality reduces total costs and losses by 42%, from $257m to $150m. When the cost of destocking is incorporated, early response could save $107 million in a single drought in Wajir Grasslands alone. This represents both the reduced need for food aid and a lower unit cost of food aid (representing a 50% decrease), as well as a reduction in animal losses (representing a 25% decrease). The cost of commercial

destocking per household is approximately $4.50 per household, or $275k for the affected population (this assumes that commercial traders are introduced to engage in destocking, rather than NGOs or others buying the animals themselves, meaning that costs are lower).[49]

When destocking is combined with improved animal condition, the decrease is much more significant, with total costs and losses decreasing to $85m. When the costs of introducing these early response measures are incorporated, the total savings are anticipated to be $167m in a single event.

When these figures are considered in a single high magnitude drought, the cost of introducing a destocking programme is $275k. Assuming an early response scenario that also results in lower food aid costs as described previously, the total benefit (reduced aid and avoided losses) is $107m for a population of 367k. When the costs of destocking are offset against these benefits, the benefit to cost ratio is 390 : 1. **In other words, for every $1 spent on commercial destocking, $390 of benefits (avoided aid and animal losses) are gained.**

4.2.3 Kenya - What is the Cost of Resilience?

As described in the methodology, the estimated cost of a package of resilience building measures for pastoralists laid out in the Kenya report, at $137 per person per year, over 10 years, is used for this analysis. This figure is applied to the total population under the Wajir HEA modelling to arrive at a total proxy cost for building resilience of $50m per year.

Because the effects of resilience interventions do not impact on the population immediately, but rather take time to reduce vulnerability, the aid and losses from Storyline B2 are assumed to persist – with full costs occurring in year 1 (in addition to resilience costs), 50% in year 5, and 25% thereafter (to reflect the fact that there are likely to always be segments of the population in need of aid). Annex C contains sensitivity analysis to vary this assumption – while there is a high degree of confidence that resilience will significantly reduce aid costs, there is very little evidence to suggest

[49] The cost of commercial destocking is estimated at $4.5 per person (including overheads and administrative costs), based on a Save the Children programme in Ethiopia. (Save the Children, 2008. " Cost Benefit Analysis of Drought Response Interventions in Pastoral Areas of Ethiopia, Draft Report). This figure is further confirmed by Catley A and Cullis A (2012) who estimate $4.5 per person as well based on a specific project budget.

how much or how quickly this will reduce, and hence the estimates provided here are purely based on expert opinion.

4.2.4 Kenya - Cost Comparison of Response

The following table compares the cost of response for each of the storylines, using the HEA data modelled for Wajir grasslands, over the modelled beneficiary population of 367k. Clearly, this analysis could produce different results in other regions, but this gives an indication of the different types of costs incurred.

Table 6: Cost Comparison of Response for Storylines (USD million) – Wajir Grasslands

	Storyline A	**Storyline B1**	**Storyline B2**	**Storyline C**	**Storyline C – with benefits**
Interventions	**Late Hum. Response**	**Destocking**	**Destocking + Improved animal condition**	**Resilience**	**Resilience with benefits**
Aid costs -assumed every fifth year.	$176m	$88m	$66m	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter
Losses (animal deaths) – assumed every fifth year.	$81m	$62m	$19m	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter
Cost of programme – assumed every fifth year.		$0.28m	$5.8m	$50m annually ($137 per capita for beneficiary population)	$50m annually ($137 per capita for beneficiary population)
Additional Benefits		In addition to a reduction in aid costs and losses, the additional income from destocking can be used for other household needs		**EXTENSIVE:** Additional benefits from MDGs are extensive – increased income through education and ability to access services, reduced morbidity and mortality from health and food security interventions, etc.	Valued at a return of $1.1 for every $1 spent
Total Net Cost over 20 years, discounted at 10%	**$606m**	**$354m**	**$214m**	**$464m**	**($54m)**
Total Net Cost over 10 years, discounted at 10%	**$425m**	**$248m**	**$150m**	**$451m**	**$77m**

The modelling suggests that early response through commercial destocking in Wajir alone would save over $250m in humanitarian aid and animal deaths discounted over a 20-year period (this is for a population of approximately 367k)**.** Under a scenario where interventions are applied to improve animal condition, such as vet services, or supplementary feeding, **the difference could be as much as $392m.** When this is extrapolated to other regions, the total figures would be much higher.

The cost of building resilience is somewhat less than the cost of late humanitarian response over 20 years ($464m and $606m respectively). However, this analysis takes no account of the significant benefits that would arise from resilience interventions – the costs and benefits will depend very much on the different types of interventions that are used.

Sector specific cost benefit analysis of resilience interventions is used below to show how the benefits, when quantified and incorporated into the analysis, significantly offset the costs of resilience. The findings for three sectors – livestock, water and education – offer evidence that the benefits are consistently higher than the costs, ranging from just below breaking even, to $27 of benefit for every $1 spent. The benefits quantified are very tangible – savings that contribute to a household's economy. **If we assume that we only generate $1.1 of benefit, for every $1 spent on resilience measures, a very conservative assumption, the net cost over 20 years is converted to a benefit of $54m,** as compared with aid and losses of $606m in late humanitarian response. The sensitivity analysis contained in Annex C varies this to $2 of benefit for every $1 spent. The model is very sensitive to this change, with net benefits increasing further to $477m.

These factors are combined to model the "value for money" of investing in resilience. The costs of building resilience are offset against the benefits – the reduced aid cost and avoided losses of animals under Storyline B2[50]. A very conservative assumption around the additional benefits that would accrue from investments in resilience that deliver significant health, education and other gains are further incorporated. **When the costs of building resilience are offset against the benefits, the benefit to cost ratio is 2.9 : 1. In other words, for every $1 spent on resilience, $2.9 of benefit (avoided aid and animal losses, development benefits) are gained.** When this is modelled over a 10-year time frame – in other words, within the context of two high magnitude droughts, every $1 spent on resilience generates $2.0 in avoided losses.

[50] It is likely that these avoided losses would be greater if communities are more resilient, but they represent a good proxy value.

4.2.5 Kenya - Sector-based Cost Benefit Analysis

In order to investigate costs and benefits a bit further, this section presents both the costs and benefits for various interventions that could contribute to building resilience. Three sectors are considered – livestock, water and education.

It should be noted that this does not imply that these interventions will always contribute to building resilience – it is essential that they are implemented in a participatory way, with dedicated resources for maintenance over the longer term to ensure that these measures are implemented well. There are many examples of these types of interventions that do not deliver any benefits because of the way in which they are implemented. Nor does the analysis suggest that there is the capacity, or institutional and governance structures required, to take these to scale currently. Rather, the intention is to show where there is an economic argument to invest further in appropriately designed resilience interventions.

Livestock Interventions

Over the longer term, resilience can be built by ensuring that pastoralists have access to functioning livestock markets, veterinary care, and adequate feed and water. The Kenya report that supports this study estimates the cost per person of a more complete set of long term livestock interventions, including livestock market support, comprehensive vet care via private franchise, livestock insurance and peace building support, at a total cost of approximately $24 per person per year (this is assumed to continue for 10 years, and then decrease by half to $12 per person per year after year 10, as private networks take hold).

The benefits of such a package of measures, under the assumption that they are implemented well and ensuring that the livestock trade is working efficiently, would include avoided costs of aid, and animal losses (these are assumed at 67% in the model, based on HEA model estimates that livestock measures would result in this level of benefit). There would also be numerous unquantifiable benefits, for instance increased sense of security and confidence on the part of pastoralists, as a result of greater control over how they manage their herd.

If not implemented well, some of these measures can result in greater conflict, for example if markets are inappropriately cited, they can result in new tribal interactions. Equally, there are numerous example of livestock market infrastructure being installed without the appropriate management systems or commercial buyers in place and hence a waste of money.

Table 7: Benefits and Costs of Livestock Resilience Measures - Kenya

	Package of Livestock Resilience Measures
Assumed population (HEA beneficiaries)	367k
Cost for total population	$8.8m each year (reducing to $4.4m in year 10)
Benefits	67% of aid and excess mortality in a high magnitude drought is avoided per Storyline B2
Benefit to Cost Ratio (BCR) (20 years, 10% discount)	**5.5 : 1**

A full package of livestock interventions that build resilience would result in $5.5 of benefit for every $1 spent. This analysis only considers benefits that accrue in a high magnitude event, whereas clearly access to functioning livestock markets and effective animal health can reap significant benefits in non-drought times as well.

Water Interventions

A key requirement for communities in the face of drought is access to water. Humanitarian response largely involves the use of trucks to deliver water to communities, a very expensive (but necessary) measure.

Community based water schemes can be considered as both an early response and/or resilience building measure. As with all of these measures, how and where they are implemented has a massive effect on whether they deliver benefits, and there is a great deal of discussion around permanent water posts both building and eroding resilience.

However, assuming that these schemes are implemented appropriately, there is the potential for significant gains. Three types of intervention are compared – shallow wells (20m depth) with a handpump, drilled boreholes (100-160m) serving 1000 people, schools and clinics, and drilled boreholes serving 5000 people, school and clinics. The model assumes a 10% recurring cost to cover operations and maintenance (O&M) and community capacity building. A further 50% of capital cost is allocated in year 10 to account for overhaul/upgrade.

The additional benefits of access to clean water are numerous, and include decreased incidence of water borne illness, reduced time collecting water, and increased attendance at school. The analysis values reduced time collecting water, using Kenya specific data and international standards for water access to be within half an hour walking distance. The time spent collecting water is high in drought periods, when

pastoralists often have to travel for a full day to get water on a regular basis, decreasing in normal times.

Further to this, the World Health Organization (WHO) published a global study on the costs and benefits of access to water and sanitation.[51] The study estimates the benefits for access to clean water for East Africa, and includes a range of benefits, including time savings, increased productive days, avoided health costs, and avoided morbidity and mortality. The benefits for time savings are excluded, given that these are calculated separately for the study presented here, and the remainder used as a proxy for the additional benefits.

Benefits will also include the reduced cost of food and non-food aid, as well as the reduced loss of animals. It is not known how much clean water can contribute to this reduction. Therefore, as a very conservative proxy, the avoided cost of emergency water provision (such as water tankering) as one part of the aid package is included in the model, estimated at $2 per person[52]. (See Annex C for greater detail on cost calculations.)

Table 8: Benefits and Costs of Water Interventions

	Shallow well	**Drilled Well, 5000 people**	**Drilled Well, 1000 people**
Assumed population (HEA beneficiaries)	367k	367k	367k
Cost for total population, installation and O&M (discounted over 20 years)	$3.2m	$14.6m	$73m
Benefits, including avoided cost of water aid, time savings and other benefits (discounted over 20 years)	$83m	$83m	$83m
BCR	**26 : 1**	**6 : 1**	**1.1 : 1**

[51] Hutton, G. and L. Haller (2004). "Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level." World Health Organization, Geneva

[52] ILRI (2010), "An Assessment of the Response to the 2008-2009 Drought in Kenya: A report to the European Union Delegation to the Republic of Kenya." ILRI, Nairobi. This study found that water tankering averaged $2 per person, though it should be noted that the variation in cost is significant depending on distance and amount of water supplied. As cited in the Kenya report, the recent WESCOORD annual report listed all emergency WASH expenditure provided by GoK and other agencies during the 2011 drought, at a crude annual average cost of US$1.87 per head.

All three water interventions yield positive benefit to cost ratios, suggesting that they are value for money. **The shallow well yields an estimated $26 of benefit for every $1 dollar spent.** Even the drilled well serving only 1,000 people has a marginally higher benefit than cost. The results help to demonstrate the importance of design parameters in estimating value for money – for example, the more people that can benefit, the greater the benefit to cost ratio. It also highlights the important of design being fit for purpose – while the shallow wells have the highest ratio, the findings do not suggest that shallow wells should be prioritized. Shallow wells can run dry in a drought, and are only appropriate in areas with a higher water table. If they are used across the board, the ratio can be reversed if they are not delivering water in a drought. By contrast, the drilled wells, while more expensive, reach to a much greater depth and therefore are more likely to be able to ensure water supply in a drought.

Education

This scenario uses Baringo in Kenya as an example of how education can transform resilience by providing an internal safety net, as educated family members with paid employment send home remittances in times of drought. Evidence from Baringo on increases in incomes and decreases in reliance on food aid are used to construct this scenario.

Box 2 contains more details on Baringo and the way that education is becoming a pastoral risk management strategy. (See Annex C for greater detail).

Table 9: Costs and Benefits of Education

	Assumptions	Total
Assumed population (HEA beneficiaries)		367k
Cost for total population (discounted over 35 years)	Cost of constructing 412 schools @ $400k each; and $17 per person per year for running costs.	$225m
Benefits (discounted over 35 years, begin to accrue in year 15)	Revenues increase by $360 per household; 43% reduction in reliance on food aid (per Baringo case study)	$90m
BCR		**0.4 : 1**

This scenario is modelled over 35 years, simply because benefits such as increased revenues and decreased reliance on food aid cannot begin to be realized until a child has completed their schooling. The comparison of benefits to costs of investing in education yield a return of $0.4 to $1, suggesting that costs outweigh the benefits. However, there are clearly many benefits in year 1 to 15 of investing in education that were not accounted for in the model.

Box 2: Education in Baringo, Kenya

Research on the education levels of pastoral households in Baringo in 1980 and 1999[53] found that increased household education was becoming a critical component of pastoral risk management strategies during drought. The research was based on interviews with pastoral households in three communities Baringo in 1980 and again in 1999. At both times the communities were experiencing severe drought but in the intervening period there had been extensive investment in formal education[54] services in the area. Consequently the average number of household members who had completed primary education had risen from 3% to 18% and secondary from 0.3% to 7%. Over the same period the number of households who reported having an "income remitter with a salaried waged position" rose from approximately 9% to 26%. Total annual cash income increased from Ksh 27k to Ksh 56k in households with secondary education, and those reliant on food aid dropped from 66% to 23%. The contribution of livestock as a source of income reduced overall from 76% to 42%. The research also found that financial and food security benefits were greatest for those household where someone had completed secondary education.

4.3 Kenya – Top-Down Assessment

4.3.1 Kenya - What is the Cost of Late Humanitarian Response?

As described in the methodology, the cost of humanitarian response was estimated using three components:

- The cost of food aid;
- The cost of non-food aid; and
- Estimated losses.

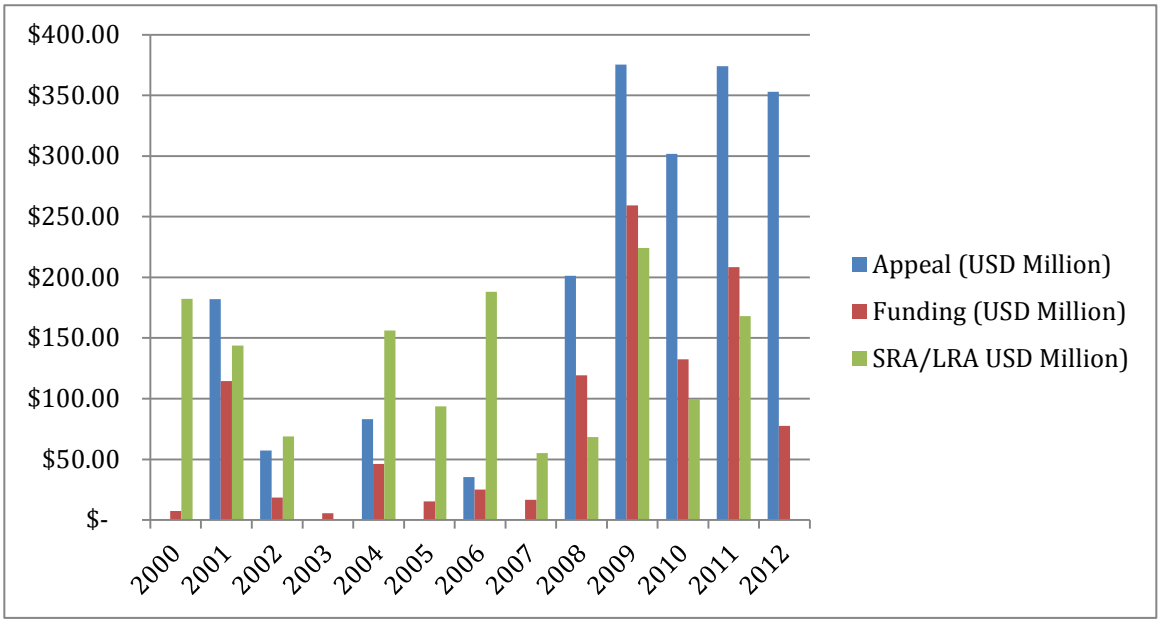
Estimating the cost of food and non-food aid:

While data is collected on humanitarian appeals and levels of funding, these figures do not necessarily reflect *needs* and hence the magnitude of the crisis. Humanitarian appeal and funding amounts, by year, were compared with the figures from the short and long rain assessment (SRA/LRA) data. These assessments are conducted twice yearly, and report the number of people in need of food aid for the whole of the country for 6 months. Figure 7 below maps appeal, funding, and SRA/LRA figures (the average of the two represents the needs for a year). Given that the SRA/LRA figures represent actual estimates of people in need, these figures are used in the model.

[53] Little, P., A. Aboud and C. Lenachuru (2009). "Can Formal Education Reduce Risks for Drought-Prone Pastoralist?: A Case Study from Baringo District, Kenya". Human Organisation

[54] Baringo received disproportionately high investment during this time given it is the home district of the then President Daniel Arap Moi

Figure 7: Humanitarian Appeals, Funding, and Estimated Need based on the SRA/LRAs[55]



- *Cost of aid – estimate based on SRA/LRA :*
  The WFP estimates that the average yearly expenditure per capita on food aid in Kenya is $56[56], and this can be inflated to incorporate non-food aid to $70. The total number of people in need for the whole of Kenya is multiplied by the WFP average cost, and marked up to incorporate non-food aid costs. **On this basis, average requirements for food and non-food aid based on the SRA/LRA between 2000 and 2010 are a minimum of $131m per year**, with the highest recorded need in 2009 at $224m.

- *Cost of aid – appeal estimates:* The Kenya PDNA has done a significant amount of analysis around the 2009-2011 drought event. By comparison with the above figures, it estimates aid through the Consolidated Appeals Process (CAP) for four years (2008-1022) of $960m. When these funds are combined with Government of Kenya (GoK) humanitarian spend, and averaged over the four years of analysis, the estimate is $425m per year, significantly higher than the average estimated funds required based on the SRA/LRA. These figures are summarized in Table 10 below.

[55] Note that data for 2003, 2012 are missing for the SRA/LRA.

[56] The estimated cost of delivering food aid is based on figures from the WFP EMOPS costs for Kenya and Ethiopia, as presented in the 2011 DFID Nairobi paper "Value-for-Money in Humanitarian Aid for Kenya and Somalia." This is equivalent to the full cost of delivering food aid, including transportation and distribution costs.

Table 10: Humanitarian aid appeal amounts and GoK spend, 2008-2011

Data	Amount (US$, millions)
Humanitarian Aid – allocated amount, 2008-2011 (PDNA)	$960
GoK humanitarian aid 2008-2011[57]	$739
Total	$1,699
Yearly average over 4 years	$425

Estimating Losses

The PDNA further estimates the total damages (destruction of physical assets, e.g. livestock and crops), losses (in flows to the economy)[58], and needs (the financial requirements to achieve economic recovery and reconstruction after the drought) as a result of the 2009/2011 drought. These estimates are in addition to the cost of humanitarian aid. The PDNA estimates these figures across all sectors, including livestock, which represents the vast proportion of losses in the drought. Table 11 below summarizes the findings. The cost modelling presented in this report uses the total figures for damages and losses, to be consistent with the aid figures, which are for drought as a whole (not specific to pastoralists – this is the focus of the bottom-up analysis). Needs are not included in the analysis to eliminate the possibility of double counting. The model assumes these losses every five years (in a high magnitude event).

Table 11: Damages, Losses, and Needs (2008-2011)

Data	Total Amount (USD, millions)	Livestock Sector (USD, millions)	Livestock as a % of Total
Damages and losses	$12,100	$8,426	70%
Needs: estimated recovery and reconstruction (R&R) costs	$1,770	$1,282	72%

Source: PDNA, 2012

Total cost of late humanitarian response

Table 12 summarizes the costs and losses described above that are inputted to the model. The combined impact of the average cost of humanitarian aid year on year, with

[57] The GoK spent an average of $173m per year on humanitarian aid between 1999 and 2010. In the 2011 drought they spent $219m.

[58] This is specifically defined as "changes in the normal flows of the economy that may arise in all sectors of economic and social activity due to the external shocks brought about by the disaster."

damages and losses in a major event (inflated by 5% every five years to reflect increasing caseloads due to erosion of assets), results in a total economic cost of humanitarian response of **$29.8 billion** discounted over 20 years.

Table 12: Summary Table of Cost of Humanitarian Aid and Losses

	Amount (USD, millions)
Humanitarian Aid – yearly average	$131m
Damages and Losses – every fifth year	$12,100m

This is an underestimate for the following reasons:

- It is believed that these types of events are increasing, and may be occurring as often as every 3 years.
- The figures recorded for total CAP and GoK spend between 2008 and 2011 are four times higher than the figures used for this estimate.
- The Economics of Climate Change Study in Kenya estimates that, due to population growth and GDP changes, these economic impacts of drought could increase by as much as five times by 2030 (in other words, they estimate losses based on damages alone at $5-10 billion per event by 2030).[59]
- While loss of livestock and livestock products are included for high magnitude events every five years, clearly these losses also occur in medium and smaller magnitude droughts, but the data was not available to quantify this.

4.3.2 Kenya - What is the Cost of Early Response?

The scenario of early response assumes that if aid is delivered on time, as a crisis is becoming evident, that deficit levels are lower and therefore the magnitude of response required is less, and the unit cost of delivering aid is decreased. It also assumes that early response measures such as commercial destocking, early supplementary feeding, and veterinary services can reduce mortality of animals, and increase conception and milk production.

The HEA analysis for Wajir Grasslands estimates that early response through commercial destocking alone can reduce the cost of food aid by 50% and the value of animal losses by 24%. (These figures are conservative, and are higher if other interventions that improve the condition of the animals are included – see the bottom up analysis for greater detail). It is also estimated that it costs approximately $0.75 per person for commercial destocking (see bottom up analysis for greater detail). If we apply these figures to the 3.8 million people affected in the 2011 event, and adjust overall aid and

[59] Stockholm Environment Institute (2009). "Economics of Climate Change: Kenya".

losses for the country as a whole according to the HEA analysis, **the total cost discounted over 20 years is $22.3 billion.**

Similarly, when we apply the reductions in aid and losses that can occur under Storyline B2 in the HEA modelling (food aid by 62% and animal losses by 77%), and incorporate the cost of a package of destocking and measures to improve animal condition, **the total cost discounted over 20 years is $7.2 billion.**

4.3.3 Kenya - What is the Cost of Resilience?

A variety of national level plans that aim to build resilience to drought are present in Kenya, in addition to several documents that try to estimate the cost of measures that build resilience. Table 13 summarizes these cost estimates.

Table 13: Estimates for Development/Disaster Risk Reduction (USD)

Plan/Policy	Estimated Cost
Draft Eliminating drought – over 10 years	2.4 billion
MTIP for Northern Kenya and Arid Lands (cost for 5 years, 2012-2016)	5.1 billion for 5 years
Economics of Climate Change	500 million per year
PDNA estimate for DRR (2012-2016)	2.1 billion

- ***Draft* Eliminating Drought Emergencies in Kenya** – This Country Programme Paper and Action Plan builds on the PDNA and the Kenyan Government's commitment to the IGAD-led Horn of Africa Drought Management Programme. Its production has been co-ordinated by the Agricultural Sector Co-ordination Unit (ASCU) and provides a 10-year estimate of investment required to end drought emergencies in Kenya. It contains measures and cost estimates for activities under seven themes: peace and security, humanitarian relief (linking relief to development, one year only), infrastructure, building human capital, sustainable livelihoods, coordination and institutional framework, and national drought contingency. It should be noted that this document is still in draft form to be approved by government.
- **Medium Term Investment Plan (MTIP) for Ministry of Northern Kenya and Other Arid Lands (MNKOAL).** Published in February 2012, the MTIP for the Ministry of Northern Kenya is a five-year plan that details the costs of implementing the Vision 2030 Development Strategy for Northern Kenya and other Arid Lands. It excludes costs already included in the other sector MTIPs but includes additional activities not highlighted by the Vision 2030 document.

- **The Economics of Climate Change study in Kenya** 2009 estimates the cost of adaptation per year. This estimate includes adaptation to all disaster events (includes flood, etc), and is therefore an overestimate compared with the figures that are specific to drought. The study costs four categories of adaptation – two are development activities that are targeted towards the large economic costs of current climate variability (accelerating development to cope with existing impacts and increasing social protection), and the second two are associated with tackling future climate risk (building adaptive capacity and institutional strengthening, and enhancing climate resilience, e.g. infrastructure design, flood protection measures). The immediate needs (for 2012) for building adaptive capacity and starting to enhance resilience (immediate priorities) are estimated at $100 – 150 million/year. However, a much higher value of $500 million/year or more is warranted if the categories of social protection and accelerated development (to address the current adaptation needs) are included. This is the figure used here.[60]
- The PDNA makes an estimate for costs of disaster risk reduction. However, the methodology used to derive these estimates is not clear from the report, and the figure is quite low relative to other figures.

The modelling assumes a cost of resilience at $500 million per year, which is an approximate mid-point for the various studies above. It further assumes that residual risk will occur, e.g. ongoing aid and losses that would occur under Storyline B2. These are assumed to be 100% of aid and losses under early response in year 1, 50% in year 5 and 25% every fifth year thereafter (i.e. in each drought event). Modelled over 20 years, **the total discounted cost is $9.2 billion.** Clearly, this estimate does not account for the myriad of benefits that would occur from building resilience - benefits such as health and education occur year round and can be substantial (these are brought in with greater detail in the bottom-up analysis below).

4.3.4 Kenya - Comparison of National Level Costs

Table 14: Summary of National Level Cost Estimates over 20 years (discounted) - Kenya

	Humanitarian	Early Response (B1)	Early Response (B2)	Resilience
USD million	$29,771m	$22,330m	$7,168	$9,168m

[60] Ibid.

In other words, these findings suggest that late humanitarian response costs nearly $21 billion more than resilience building activities over 20 years.

When this analysis is conducted on a 10-year timeframe, the results are similar, and still make a very strong case for greater investment in early response and resilience.

Table 15: Summary of National Level Cost Estimates over 10 years (discounted) - Kenya

	Humanitarian	Early Response (B1)	Early Response (B2)	Resilience
USD million	$20,891m	$15,670m	$5,033m	$7,134m

This is clearly a rough estimate – the costs associated with each area of response could vary significantly, particularly in relation to building resilience, where the evidence base is thin. Further, these subdivisions of costs are somewhat artificial – humanitarian response can be designed to build resilience and therefore ideally each type of response needs to be part of a greater cycle of disaster management.

The individual cost estimates are considered to be conservative – the cost of late humanitarian response is estimated using lower bound figures and is likely to be higher. The cost of resilience will be offset by avoided losses, as resilience measures often result in much wider gains, such as reductions in disease, improvements in education and income, etc, that are not accounted for here.

5 Cost Comparison of Drought Response - Ethiopia

5.1 Overview

This section presents the data and analysis for Ethiopia. As described in previous sections, the analysis attempts to compare the cost of late humanitarian response, to early response, to building resilience to drought in Ethiopia. The analysis is approached from two perspectives – the first attempts to build up local or project level data ("bottom-up approach") for households in southern Ethiopia, and the second uses national level aggregated data on the cost of response ("top-down approach"). All costs and losses are modelled over 20 years, using a 10% discount rate, and assuming a five-year drought cycle for high magnitude events. The detailed outputs from the modelling can be found in Annex C, along with sensitivity analyses.

5.2 Ethiopia – Bottom-Up Assessment

This analysis approaches the cost comparison from a bottom-up perspective – using disaggregated project and sector level estimates to compare the cost of response. HEA modelling estimates the food aid requirements and animal losses for a high magnitude drought in southern Ethiopia, assuming a drought in year 1, and calculating losses over 5 years. This analysis is done for three storylines – Storyline A in which humanitarian aid arrives late, Storyline B1 in which early response uses commercial destocking of 50% of adult animals that would have otherwise died, and Storyline B2 in which destocking is combined with additional early response measures, such as supplementary feeding and veterinary services, which are assumed to improve animal condition and hence conception and production. The destocking Storyline B1 results in similar levels of destocking on a household basis to levels actually seen in previous events, and hence there is confidence around these figures. Storyline B2 attempts to simulate improved animal condition, using improved rainfall characteristics to model the resulting change in production and consumption, and therefore provides an initial indication of potential benefits only.

Table 16 below summarizes the findings for a high magnitude event, defined using the characteristics of the most recent drought (2011). These data are used throughout the analysis below. In the HEA modelling, early response brings some households out of a deficit, and hence the number of beneficiaries declines in each scenario.

It should be noted that Southern Ethiopia covers a much larger area than the Kenya modelling.

Table 16: Summary of HEA Analysis for Southern Ethiopia (USD), high magnitude drought

Scenario	Number Beneficiaries Year One	Food Deficit MT Total (5 years)	a. Costs of Food and Non-Food Aid	b. Excess Animal Deaths	Total Losses (a+b)
A	2,848,854	441,149	465,963,631	1,148,356,061	1,614,319,692
B1	1,787,978	273,281	166,379,903	783,148,375	949,528,278
B2	600,132	122,106	74,341,006	135,069,454	209,410,460

5.2.1 Ethiopia - What is the Cost of Late Humanitarian Response?

Estimating the cost of food and non-food aid:

The WFP estimates a cost of $845 per MT of food aid in Ethiopia. When this is multiplied by the household deficit, measured in MT of food required in the HEA model, this equates to a total cost of food aid per high magnitude drought for Southern Ethiopia of $373m. This can be inflated to incorporate non-food aid requirements, to a total of $466m for a total beneficiary population of 2.8m. This figure is the total household deficit, measured in food aid, that results over five years as a result of a drought in year one – with the largest impact in year one but residual impacts in subsequent years due to continuing deficits. In order to simplify the analysis, the impacts are summed together and presented in the model in the first year. These costs are solely in relation to a drought in year one, and do not account for the fact that other events are likely to occur in the four subsequent years that could deepen this condition.

Using the HEA modelled figures, the per capita cost of food aid in year one alone is $104. For comparison, on a per capita basis, WFP estimates that food aid costs approximately $77 per person per year in Ethiopia.[61] When this is scaled up to include the cost of non-food aid, this equates to a total cost of food and non-food aid of approximately $96 per person per year, in line with the HEA model predictions.

[61] The estimated cost of delivering food aid is based on figures from the WFP EMOPS costs for Kenya and Ethiopia, as presented in the 2011 DFID Nairobi paper "Value-for-Money in Humanitarian Aid for Kenya and Somalia."

Estimating losses:

The herd dynamic model estimates the number of animals (camel, cattle, shoats) that would die under a high magnitude drought. These animals are valued using the livestock prices cited previously. Livestock related losses are estimated at $1,148m for southern Ethiopia for a high magnitude drought. This is equivalent to $403 per capita over five years, or $81 per person per year – this is an average and clearly will differ significantly by household.

Total cost of late humanitarian response

The total cost of late humanitarian response is estimated at $1,614m in a high magnitude drought for a total population of 2.8m (equivalent to $466m in aid costs plus $1,148m livestock losses). This is assumed to occur every five years in the model.

5.2.2 Ethiopia - What is the Cost of Early Response?

Under HEA modelling, early response with commercial destocking of 50% of excess adult mortality reduces total costs and losses by 41%, from $1,614m to $950m. When the cost of destocking is incorporated, early response could save $662m for southern Ethiopia in one high magnitude drought event. This represents both the reduced need for food aid and a lower unit cost of food aid (representing a 35% decrease), as well as reduction in animal losses (representing a 68% decrease). The cost of commercial destocking per household is approximately $4.50 per household (this assumes that commercial traders are introduced to engage in destocking, rather than NGOs or buying the animals themselves).[62] The Feinstein International Center conducted a similar comparison, for a single event (see
Box 3), and found that local food aid plus restocking cost 125 times more than commercial destocking (note that their model assumes no food aid required with commercial destocking, in contrast to the findings here which assume that deficits persist though at a lower level).

When destocking is combined with improved animal condition, the decrease is much more significant, with total costs and losses decreasing to $209m. When the costs of destocking, veterinary services and supplementary feeding are incorporated, this is equivalent to a saving of $1,303m in a single event.

[62] The cost of commercial destocking is estimated at $4.5 per person (including overheads and administrative costs), based on a Save the Children programme in Ethiopia. (Save the Children, 2008. " Cost Benefit Analysis of Drought Response Interventions in Pastoral Areas of Ethiopia, Draft Report). This figure is further confirmed by Catley A and Cullis A (2012) who estimate $4.5 per person as well based on a specific project budget.

When these figures are considered in a single high magnitude drought, the cost of introducing a destocking programme is $2.1m. Assuming an early response scenario that also results in lower food aid costs as described previously, the total benefit (reduced aid and avoided losses) is $665m, for a population of 2.8m. When the costs of destocking are offset against these benefits, the benefit to cost ratio is 311 : 1. **In other words, for every $1 spent on commercial destocking, $311 of benefit (avoided aid and animal losses) are gained.**

Box 3: Money to Burn? Comparing the Costs and Benefits of Drought Responses in Pastoralist Areas of Ethiopia[63]

A recently published paper from the Feinstein International Center compares the cost of two drought response scenarios. The "food aid plus restocking" scenario involved provision of food aid, substantial livestock herd depletion, followed by restocking. The "commercial destocking" scenario involved a timely commercial destocking program at the onset of drought, without the need for food aid or restocking. The scenarios were modelled for a household comprised of 6 people, with a herd size of 30 shoats. The cost of commercial destocking was estimated at $4.53 per household, the cost of local food aid plus restocking was $565 per household, and the cost of imported food aid plus restocking was $620 per household.

Local food aid plus restocking costs 125 times more than commercial destocking, and imported food aid plus restocking costs 137 times more than commercial destocking.

5.2.3 Ethiopia - What is the Cost of Resilience?

As described in the methodology, the Kenya study estimates the cost per person of a full package of resilience measures for pastoralists, at $137 per capita per year, assumed to be incurred for 10 years, and this figure is also used for the Ethiopia analysis. **This figure is applied to the total population under the southern Ethiopia HEA modelling to arrive at a total cost of $390m per year.**

[63] Catley, A and A Cullis (2012). "Money to Burn? Comparing the Costs and Benefits of Drought Responses in Pastoralist Areas of Ethiopia." The Journal of Humanitarian Assistance, Feinstein International Center.

Box 4: Cost Comparison with the Pastoral Community Development Programme

The Pastoral Community Development Programme (PCDP) was a World Bank/Government of Ethiopia programme that ran from 2003 to 2008. The programme specifically aimed to sustainably improve the livelihoods of pastoralists living in the arid and semi-arid Ethiopian lowlands, by increasing, stabilizing and diversifying incomes, improving infrastructure, and increasing access to public services. *The intention here is not to suggest that the PCDP is a model for improving resilience – but rather to simply use the costs of the programme as an indication of what was considered a reasonable investment cost for pastoral development.*

The programme aimed to reach 450,000 households, at a total cost of $60m, equivalent to $130 per household, or approximately $22 per person. The parameters under the community investment fund were:

- Up to $600 per small community (defined as 100 people) was designated for micro-projects, or $6 per person;
- Up to $15k per larger community (defined as 500 households) was designated for micro-projects, or $5 per person; and
- Up to $75k was designated for inter-community subprojects for larger social infrastructure.

Clearly there is no clear rule for how many micro-projects would be required to build resilience. However, if we consider the aid costs alone incurred under late humanitarian response, estimated at $104 per capita, this money could have been spent on between 17 and 20 micro-projects per person, per year under the PCDP.

Along similar lines, the PCDP comprehensively targeted a range of community development interventions, at a cost of $22 per person. In other words, for every one person reached with humanitarian aid, 5 people could have been reached under the PCDP.[64]

5.2.4 Ethiopia - Cost Comparison of Response

The following table compares the costs associated with each of the storylines presented above, using HEA data for southern Ethiopia. Because the effects of resilience interventions do not all impact the population immediately, but rather take time to reduce vulnerability, the aid and losses from Storyline B2 are assumed to persist - with full costs occurring in Year 1 (in addition to resilience costs), 50% in year 5, and 25% thereafter (to reflect the fact that there are likely to always be segments of the population in need of aid).

[64] Clearly this does not suggest that the PCDP was implemented such that it achieved "resilience" for $22 per person – rather the aim is to compare the costs of resilience building programmes with humanitarian aid.

Table 17: Cost Comparison of Response for Storylines – Southern Ethiopia (USD Million)

	Storyline A	Storyline B1	Storyline B2	Storyline C	Storyline C – with benefits
Interventions	**Late Hum. Response**	**Destocking**	**Destocking + Improved animal condition**	**Resilience**	**Resilience – with benefits**
Aid required costs assumed every fifth year.	$466m	$166m	$74m	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter
Losses (animal deaths) – losses assumed every fifth year.	$1,148m	$783m	$135m	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter	Residual risk: Full costs under B2 in year 0, decreased by 50% year 5, 25% carries on every event thereafter
Cost of programme		$2.1m	$102m	$390m ($137 per capita for beneficiary population)	$390m ($137 per capita for beneficiary population)
Additional Benefits		In addition to a reduction in aid costs and losses, the additional income from destocking can be used for other household needs		**EXTENSIVE:** Additional benefits from MDGs are extensive – increased income through education and ability to access services, reduced morbidity and mortality from health and food security interventions, etc.	Valued at a return of $1.1 for every $1 spent
Total Net Cost over 20 years	**$3,800m**	**$2,240m**	**$734m**	**$2,945m**	**($1,075m)**
Total Net Cost over 10 years, discounted at 10%	**$2,667m**	**$1,572m**	**$515m**	**$2,912m**	**$11m**

The modelling suggests that early response through commercial destocking in southern Ethiopia would save $1.6 billion in humanitarian aid and losses over a 20-year period, (this is for a population of approximately 2.8m)**.** Under a scenario where interventions are applied to improve animal condition, such as vet services, or supplementary feeding, **the difference could be as much as $3.1 billion.**

The cost of building resilience is nearly $1billion less than late humanitarian response (A). However, this analysis takes no account of the significant benefits that would arise from resilience interventions – the costs and benefits will depend very much on the different types of interventions that are used.

Sector specific cost benefit analysis is used below to show how the benefits, when quantified and incorporated into the analysis, significantly offset the costs of resilience. **If we assume that we only generate $1.1 of benefit, for every $1 spent on resilience measures, a very conservative assumption, the net cost over 20 years is converted to a net benefit of $1.1 billion,** presenting a very strong case for investing in resilience.

These factors are combined to model the "value for money" of investing in resilience. The costs of building resilience are offset against the benefits – the reduced aid cost and avoided losses of animals under Storyline B2[65], as well as a very conservative assumption around the additional benefits that would accrue from investments in resilience that deliver significant health, education and other gains. **When the costs of building resilience are offset against the benefits, the benefit to cost ratio is 2.8 : 1. In other words, for every $1 spent on resilience, $2.8 of benefits (avoided aid and animal losses, development benefits) are gained.** When this is modelled over a 10-year time frame – in other words, within the context of two high magnitude droughts - every $1 spent on resilience generates $2 in avoided losses.

5.2.5 Ethiopia - Sector-based Cost Benefit Analysis

In order to investigate costs and benefits a bit further, this section presents both the costs and benefits for various interventions that could contribute to building resilience. Two sectors are considered – livestock and water.

It should be noted that this does not imply that these interventions will always contribute to building resilience – it is essential that they are implemented in a participatory way, with dedicated resources for maintenance over the longer term to

[65] It is likely that these avoided losses would be greater if communities are more resilient, but they represent a good proxy value.

ensure that these measures are implemented well. There are many examples of these types of interventions that do not deliver any benefits because of the way in which they are implemented.

Livestock Interventions

Over the longer term, resilience can be built by ensuring that pastoralists have access to functioning livestock markets, veterinary care, and adequate feed and water. For the Ethiopia analysis, the range of measures included in Scenario B2 are considered for longer term resilience of livestock – e.g. access to commercial destocking (in other words, in its fullest sense, functioning livestock markets), veterinary care, and access to feed. These are valued using data gathered in the Ethiopia report, and are described in greater detail in Annex C.

The benefits of such a package of measures, under the assumption that they are implemented well and ensuring that the livestock trade is working well, would include avoided costs of aid and animal losses . There would also be numerous unquantifiable benefits, for instance increased sense of security and confidence on the part of pastoralists, as a result of greater control over how they manage their herd.

If not implemented well, some of these measures can result in greater conflict, for example if markets are inappropriately cited, they can result in new tribal interactions. Equally, there are numerous examples of livestock market infrastructure being installed without the appropriate management systems or commercial buyers in place and hence a waste of money.

Table 18: Benefits and Costs of Livestock Resilience Measures - Ethiopia

	Package of Livestock Resilience Measures
Assumed population (HEA beneficiaries)	2.8million
Cost for total population	$102m per year; decreasing by half after 10 years.
Benefits	87% of aid and excess mortality losses in a high magnitude drought are avoided in line with Storyline B2
BCR (20 years, 10% discount)	**3.8 : 1**

A full package of livestock interventions that build resilience would result in at least $3.8 of benefit for every $1 spent. This analysis only considers benefits that accrue in a high magnitude event, whereas clearly access to functioning livestock markets and effective animal health can reap significant benefits in non-drought times as well.

Water

A key requirement for communities in the face of drought is access to water. Humanitarian response largely involves the use of trucks to deliver water to communities, a very expensive (but necessary) measure.

Community based water schemes can be considered as both an early response and/or resilience building measure. As with all of these measures, how and where they are implemented has a massive effect on whether they deliver benefits, and there is a great deal of discussion around permanent water posts both building and eroding resilience.

However, assuming that these schemes are implemented appropriately, there is the potential for significant gains. Two types of intervention are compared – underground water cisterns (a commonly used measure in drought-affected areas), and a full package of water investment costs as costed in the Water Sector Development Program (WSDP), of the Ministry of Water. Clearly, there are numerous other water measures that may be appropriate, as described in the Kenya analysis. These were selected because cost data was available for the analysis.

In the case of the underground cistern, the model assumes a 10% recurring O&M costs for maintenance. A further 50% of capital cost is allocated in year 10 to account for overhaul/upgrade.

The additional benefits of access to clean water are numerous, and include decreased incidence of water borne illness, reduced time collecting water, and increased attendance at school. The analysis values reduced time collecting water, using the assumption that rural households typically travel over an hour to water sources, and international standards for water access to be within half an hour walking distance. The time spent collecting water is high in drought periods, when pastoralists often have to travel for a full day to get water on a regular basis, decreasing in normal times.

Further to this, the WHO published a global study on the costs and benefits of access to water and sanitation. The study estimates the benefits for access to clean water for East Africa, and includes a range of benefits, including time savings, increased productive days, avoided health costs, and avoided morbidity and mortality. The benefits for time savings are excluded, given that these are calculated separately for this study, and the remainder used as a proxy for the additional benefits.

Benefits will also include the reduced cost of food and non-food aid, as well as the reduced loss of animals. It is not known how much clean water can contribute to this reduction. Therefore, as a very conservative proxy, the avoided cost of water tankering

as one part of the aid package (estimated at $2 per person[66]) is included in the model. The Ethiopia report that accompanies this report uses a more complex modelling of water deficits based on the HEA modelling, and estimates a cost of $7 per person if everyone was provided with minimum water requirements – indicating that the avoided cost could be higher. (See Annex C for full details.)

Table 19: Benefits and Costs of Water Interventions

	Underground Cistern/Tank	WSDP
Assumed population (HEA beneficiaries)	2.8m	2.8m
Cost for total population, installation and O&M (discounted over 20 years)	$24m	$119m
Benefits, including avoided cost of water aid, time savings and other benefits (discounted over 20 years)	$659m	$659m
BCR	**27 : 1**	**5.5 : 1**

Both water interventions yield positive benefit to cost ratios, suggesting that they are value for money. **The underground cisterns yield an estimated $27 of benefit for every $1 dollar spent.** The more comprehensive water management plan yields a benefit of $5.5 for every $1 spent. While the underground cistern yields the highest ratio, it is likely that a variety of measures will be required. Furthermore, benefits will be maximized when measures are implemented in a participatory manner, with full community buy-in, and sufficient budget and resources to ensure that capacity and O&M issues are addressed.

5.3 Ethiopia – Top-Down Assessment

5.3.1 Ethiopia - What is the Cost of Late Humanitarian Response?

As described in the methodology, the cost of late humanitarian response was estimated using three components:

- The cost of food aid;
- The cost of non-food aid; and
- Estimated losses.

[66] ILRI (2010), "An Assessment of the Response to the 2008-2009 Drought in Kenya: A report to the European Union Delegation to the Republic of Kenya." ILRI, Nairobi.

Estimating the cost of food and non-food aid

There are a number of estimates for humanitarian aid in Ethiopia. These are described in greater detail in the Ethiopia report, and are summarized here:

- The Humanitarian Response Fund (HRF) for Ethiopia was established in March 2006 to harmonize and improve coordination of humanitarian and emergency funding. According to HRF, during the last six years, the cost of drought related humanitarian response was on average $351.7 million per year, which was allocated only from the HRF (this figure excludes funding for refugee operations). However, these figures obtained from OCHA on HRF utilisation do not include emergency response interventions supported by other donors such as USAID/ OFDA. According to a USAID report on funding to the region, they have supplied an additional $3.8 billion during the last 10 years (an average of more than $380 million per year).[67] Since this funding was used mainly for drought related emergencies, it increases Ethiopia's average annual drought emergency cost to more than **$732.6 million** per year.
- According to the FTS at OCHA, emergency aid for droughts has averaged **$509m per year** over the last 10 years. This figure was used in the modelling, because the FTS is widely used for recording humanitarian aid and therefore considered to be comprehensive.

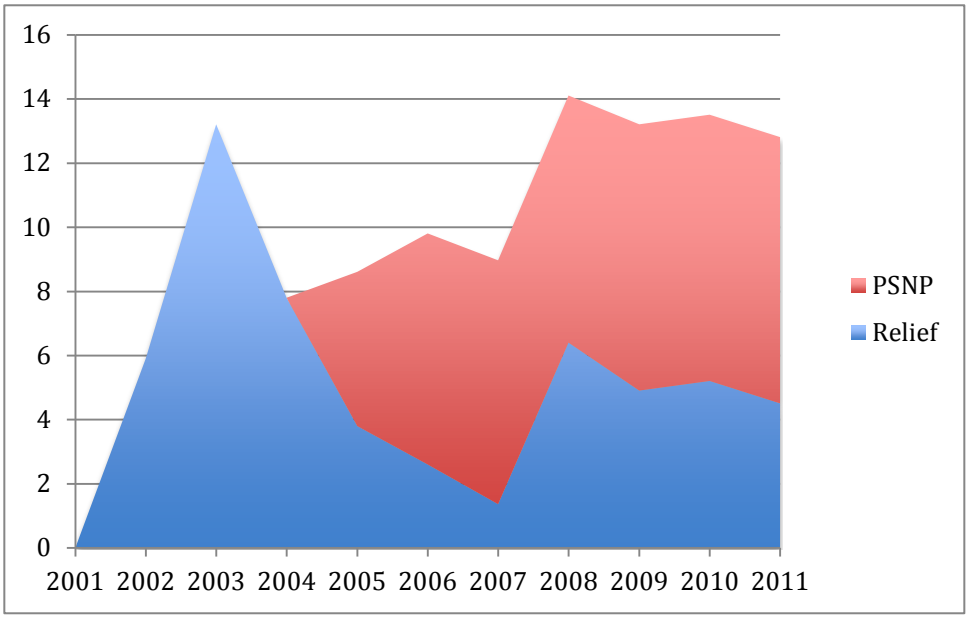
It is also important to note that relief spending has changed over the last decade in Ethiopia due to the Productive Safety Nets Programme (PSNP).

[67] USAID (n.d.) "The Productive Safety Net Programme" USAID

Table 20 below shows how relief figures alone may mask the total need as PSNP transfers appear to have begun to displace relief spending.

Table 20: Beneficiary numbers – PSNP versus relief

The Y-Axis indicates the caseload of beneficiary numbers in millions



Source: Sida, L, B Gray, and E Asmare (2012). "IASC Real Time Evaluation of the Humanitarian Response to the Horn of Africa Drought Crisis: Ethiopia."

Estimating Losses

In the case of Ethiopia, there is not an equivalent report to the PDNA for Kenya, which estimated losses from drought quite extensively, including needs, damages and reconstruction costs. The Ethiopia modelling therefore relies more heavily on a quantification of lost animals, using the HEA modelling. As a result, these figures are quite a bit lower than those presented in Kenya.

The HEA modelling estimates that in southern Ethiopia (Oromiya and Somali regions), under late humanitarian response, the value of animals lost over 5 years is $1,148 million, or an average of $230m per year. This figure is only for one part of the country, and therefore is an underestimate, but would bring the total yearly cost of drought to $739m (using the FTS figure of $509m).

Table 21: Summary Table of Cost of Humanitarian Aid and Losses

	Amount (USD, millions)
Humanitarian Aid – yearly average	$509m
Losses – yearly average	$230m
Total Yearly Average	$739m

Total cost of late humanitarian response

The combined impact of the average cost of humanitarian aid year on year, with estimated livestock losses, **results in a total economic cost of humanitarian response of $7.3 billion, discounted over 20 years.**

These figures are an underestimate for the following reasons:

- It is believed that these types of events are increasing, and may be occurring as often as every 3 years.
- This estimate does not include the loss of life, health costs and loss of education, all of which represent a substantial economic loss.
- While loss of livestock is included for high magnitude events every five years, they are only estimated for the regions included in the HEA modelling. Furthermore, these losses also occur in medium and smaller magnitude droughts, but the data was not available to quantify this.
- Further to this, the livestock loss figures presented here are significantly less than those modelled under the PDNA in Kenya, which was able to account for more categories of loss (such as economic flows from livestock loss). This suggests that this more simple analysis may be underestimating the full economic cost.
- The PSNP is displacing some of the aid costs, providing essential needs earlier in the lifecyle of a drought, but these costs are not included here.

5.3.2 Ethiopia - What is the Cost of Early Response?

The scenario of early response assumes that if aid is delivered on time, as a crisis is becoming evident, that deficit levels are lower and therefore the magnitude of response required is less, and the unit cost of providing that aid is less due to reduced procurement, delivery and distribution costs. It also assumes that early response measures such as commercial destocking, and measures that improve animal condition (such as early supplementary feeding, and veterinary services) can reduce mortality of animals, and increase conception and milk production.

HEA modelling for southern Ethiopia estimates that early response through commercial destocking alone can reduce the cost of food aid by 64% and the value of animal losses by 32%, as a result of household deficits decreasing through additional income from destocking. (These figures are conservative, and are higher if other interventions that improve the condition of the animals are included – see the bottom-up analysis for greater detail). It is also estimated that it costs approximately $0.75 per person for commercial destocking (see bottom up analysis for greater detail). When this percentage reduction is applied to the total estimated cost of late humanitarian

response, this would equate to $339m per year. **Discounted over 20 years, this would equate to a total cost of $3.3 billion.**

Similarly, when we apply the reductions in aid and losses that can occur under Storyline B2 in the HEA modelling (food aid by 84% and animal losses by 88%), and incorporate the cost of a package of destocking and measures to improve animal condition, **the total cost discounted over 20 years is $1.4 billion.**

5.3.3 Ethiopia - What is the Cost of Resilience?

A variety of national level plans that aim to build resilience to drought are present in Ethiopia, and these are used as a proxy value for estimated costs for resilience.

- The Disaster Risk Management and Food Security Sector (DRMFSS) of the Government of Ethiopia was established to coordinate and lead on the implementation of the disaster risk management approach of the Government. The DRMFSS recently developed a Strategic Programme of Investment Framework (SPIF) that guides identification of priority interventions and estimates investment cost of disaster mitigation (or resilience building). Table 17 below details the various costs included in the SPIF; approximately $324m over five years is allocated to resilience-based components. The money allocated for five years of response could fund approximately 15 years of resilience building measures.
- The Government also has an Agriculture Sector Policy and Investment Framework. In this framework, the Ministry of Agriculture committed, on average, $350m per annum for disaster risk management, which constitutes more than 58% of agriculture sector investment. This is a much higher estimate than the SPIF.

Table 22: SPIF Breakdown of Costs (USD)

Programme Component	Total Budget (2010-2015)	% of Total
Prevention (disaster risk profiling, information mgmt support, DRM research)	10,422,655	1%
Prevention and mitigation (CBDRM, mainstreaming, disaster programmes)	312,922,500	27%
Preparedness (rapid assessment)	1,845,500	<1%
Response (food and non food emergency response)	807,589,799	71%
Recovery and rehabilitation	10,302,058	1%
Institutional strengthening	1,076,804	<1%
Grand Total	**1,144,159,316**	

For this analysis, the figure of $350m per year is used as this is more in line with the Kenya estimates. It is also the higher estimate, and better to err on the side of over-budgeting for resilience than under-budgeting. It further assumes that residual risk will occur, e.g. ongoing aid and losses that would occur under Storyline B2. These are assumed to be 100% of aid and losses under early response in the first five years, 50% in the second five years and 25% thereafter (i.e. in each drought event). This would result in a total discounted cost over 20 years of **$4.0 billion.** Clearly, this estimate does not account for the myriad of benefits that would occur from building resilience - benefits such as health and education occur year round and can be substantial (these are brought in with greater detail in the bottom-up analysis below).

5.3.4 Ethiopia - Comparison of National Level Costs

Table 23: Summary of National Level Cost Estimates over 20 years - Ethiopia

	Humanitarian	Early Response (B1)	Early Response (B2)	Resilience
USD billion	$7,254m	$3,331m	$1,426m	$3,956m

In other words, these findings suggest that late humanitarian response costs $3.3 billion more than resilience building activities over 20 years. Further, resilience activities would bring wider development gains and contributions to GDP growth, which are not accounted for here but could offset a significant portion of the cost.

When this analysis is conducted on a 10-year timeframe, the outcome is similar. However, as detailed in the bottom up analysis, the cost of resilience is reversed when the benefits of building resilience are incorporated.

Table 24: Summary of National Level Cost Estimates over 10 years (discounted) - Ethiopia

	Humanitarian	Early Response (B1)	Early Response (B2)	Resilience
USD billion	$5,091m	$2,338m	$1,008m	$2,964m

Box 5 below presents a costed plan for the Dhas District Disaster Management Contingency Plan. The plan breaks out costs according to stages – normal, alert, emergency and recovery. The emergency and recovery response is estimated to cost a total of $3.2m. This is compared with an estimated $183,000 for alert stage interventions, and $137,000 for resilience building measures. While there is no indication of whether these activities are comprehensive for the full range of resilience building activities that would be necessary, the magnitude of difference is substantial.

The total investment required for emergency response and recovery could fund investment in resilience at the levels specified for 24 years consecutively.

Box 5: The Dhas District Disaster Management Contingency Plan, Ethiopia

The Dhas district disaster management contingency plan was prepared in 2008 by the Dhas District Disaster Management Committee, Borana Zone, facilitated by Care International. Community level assessment was the main input.

Hazard assessment and risk analysis were used to categorize impacts of hazards based on historic data. Three categories were defined – catastrophic, major and moderate – and impact levels were defined for each. Types of interventions required were identified for the four stages of response – normal, alert, emergency and recovery. Populations requiring assistance were identified for each set of interventions, and costs specified.

Stage	Resource Requirement (USD)
Normal – activities targeted at "building livelihood resiliency" including rangeland resource management, water resource development, market accessibility, enhancing capacity of community level organizations, alternative livelihoods, etc.	$140,038
Alert – early destocking, livestock vaccination, enclosure management, peacebuilding activities, etc.	$186,566
Emergency – food and non-food aid, emergency animal offtake, monitoring	$2,883,659
Recovery – rehabilitation of rangeland, restocking, resettlement, livestock vaccinations, disease surveillance, etc	$396,065
Grand Total	**$3,606,327**

6 Value for Money of Resilience Interventions

The analysis presented in the previous two sections focuses largely on a cost comparison of late humanitarian response, early response and measures to build resilience. Clearly, resilience interventions can often bring a multitude of benefits outside of disaster times, but these are hard to capture in the analysis. Livestock, water, and education interventions (in the case of Kenya) were investigated in greater detail to give a sense of how the benefits of resilience can offset the costs.

Further to this discussion, and given that building resilience can involve many different types of activities, there is a need to have greater clarity around which interventions to implement first – which will deliver the greatest gains in the shortest timeframe? Which deliver greatest benefit per unit of cost? In the face of limited budgets, should we prioritize livestock or water or education investments in year one?

It was not within the scope of this study to do a detailed analysis of the relative value for money of different resilience building interventions for pastoralists. And indeed, much of the evidence to date suggests that the value for money of resilience depends on *how* measures are implemented, rather than what is implemented.

International experience on the value for money of resilience interventions offers these rules of thumb, which are highly applicable to the range of interventions presented above[68]:

- **The value for money of resilience interventions is context specific, and depends on how the intervention is implemented.** Clearly, effective implementation requires additional overheads, to ensure that feasibility studies, long term participatory approaches, capacity building, monitoring and evaluation, etc are incorporated into project design. But these marginal costs are minimal compared with the risk of a project either delivering no benefits (water pump is broken and no one has the money/knowledge to fix it) or delivering negative benefits (conflict over use of pump).
- **Participatory approaches are key to realizing benefits.** There are numerous examples of development projects that, in theory, should deliver greater benefit than cost, but which deliver a negative return, because they were not designed in close participation with those who are key to its success. Inclusive, participatory processes for producing and implementing development plans at community and district levels are key to ensuring solutions fit local contexts and needs, and that

[68] Cabot Venton, C (2010). " Cost Benefit Analysis for Community Based Climate and Disaster Risk Management: Synthesis Report." Tearfund, Oxfam America.

benefits are delivered that outweigh costs. Similarly, interventions that intend to build resilience are too often capital projects without any budget allocated for the necessary operations and management – for example, one community visited had a health centre built through an international donor, but no doctors or nurses to staff it, and no supplies for treatment – a prime example of a complete waste of money.

- **A focus on interventions that bring wider development gains are generally going to be more cost effective**. These are often referred to as no/low regrets options. For example, facilitating commercial destocking will clearly address immediate needs in relation to drought years, but will also deliver benefits year on year by strengthening market networks.
- **Inclusion of the private sector in the provision of services wherever possible.** Willingness to pay should not be ignored but facilitated as the private sector can often provide many services cheaper and more sustainably than government or NGOs. For example, pastoralists will pay for veterinary health care services if the right enabling and regulatory environment is in place. The most sustainable water programmes in the ASALs are operated on a cost-recovery basis. There are too many examples where pro-bono humanitarian interventions have undermined longer-term community or commercially led initiatives.
- **Soft (or non-structural) resilience measures are often more cost effective and more robust in relation to uncertainties than hard (structural) resilience measures.** Infrastructure is often designed to a specific threshold – e.g. drilled boreholes for deep wells can be expensive, and are drilled to a depth based on current knowledge of groundwater depth. If these parameters change, for example groundwater tables decrease due to over-extraction or climate change, expensive infrastructure can be rendered useless. By contrast, soft resilience measures, such as rainwater harvesting, or soil and water conservation techniques, are typically low cost and can be adapted to deliver benefits in changing conditions.
- **The design of both soft and hard measures for risk reduction should be fit-for-purpose to ensure returns.** An intervention that works in one community will not necessarily work in another community. Community participation in choice and design of measures is critical in order to realize sustained benefits. The additional costs associated with ensuring communities are supported to drive their own development are not currently systematically quantified.
- **Resilience programming needs to take a holistic view, even if activities are only undertaken in a subset of communities.** Introducing agro-pastoralism for one group of communities may increase their resilience by diversifying food sources and income, but may erode resilience for other pastoralists by interrupting grazing patterns and herd mobility.
- **Longer-term support can strengthen value for money arguments.** Resilience and development interventions are often programmed over one to three years, whereas

sustained support, even if minimal (e.g. refresher training on health, for local development committees / water user associations etc) can double or triple value for money estimates by ensuring that benefits are sustained over the long term.

Annex D attempts to provide more detail specific to the value for money of resilience interventions as examined in this study.

- Table D1 in Annex D attempts to define the VfM of a range of potential adaptation options, using DFID's three categories – economy (cost per input) and effectiveness (cost of achieving the intended outcome) are dealt with qualitatively, to identify those factors that need to be considered to maximize VfM. The efficiency (cost per beneficiary) is where most data was collected for this project, and best estimates are noted in the table for comparative purposes.
- Effectiveness is perhaps the most useful measure – it is outcome based, and as such measures the wider benefits of an intervention, such as health benefits, reductions in mortality and improved education and livelihood opportunities. Table D2 in Annex D attempts to tease out some of the factors that affect both costs and benefits related with different interventions, and reports on some of the anecdotal cost benefit data that exists in the literature.

7 Conclusions and Recommendations

7.1 Conclusions

The evidence above clearly points to three conclusions:

Early response is far more cost effective than late humanitarian response. The assumptions used in this analysis were conservative, and the findings nonetheless indicate that early response can decrease costs and losses substantially, with very high benefit to cost ratios indicating tremendous potential to improve value for money. Modelling of household level data for Wajir grasslands in Kenya suggests that early response could save between $107m and $167m for a population of 367k in a single event alone. In southern Ethiopia, with a beneficiary population of 2.8m, household level data suggest that early response could save between $662m and $1.3billion in a single event. A perceived risk in responding early is that humanitarian funds will be released incorrectly to situations that turn out not to be a disaster. However, these figures suggest that donors could mistakenly release funds two times in Kenya, and seven times in Ethiopia, before the cost is even equivalent to the cost of humanitarian aid in one event.

There is a great deal of uncertainty around the cost of building resilience. Nonetheless, the estimates presented here suggest that, while the cost of resilience is comparatively high, the wider benefits of building resilience can significantly outweigh the costs, leading to the conclusion that investment in resilience is the best value for money. The model accounts for the time lag in resilience benefits reducing humanitarian cost, and therefore is a reasonable estimate of how the shift in balance from humanitarian aid to resilience might look over time. The cost of resilience would have to approach $200 per capita per year for 10 years (almost 50% higher than the figure assumed in this paper) before the modelled costs of resilience begin to approach the cost of humanitarian response.

Early response and resilience building measures should be the overwhelming priority response to disasters. These two categories of response are not mutually exclusive – indeed commercial destocking, if taken to its fullest extent, would represent a functioning livestock marketing system, which would be considered a resilience building measure. The findings in this study fully support an economic imperative for a shift to greater early response and resilience building.

There are many resilience-building measures that are likely to be value for money. There are others that may be a complete waste of time and resources, particularly if not designed and implemented well. Furthermore, an intervention that is value for money in one context will be ineffective in another context. Hence there is a need for local participatory analysis and community buy-in. More work needs to be done on the relative VFM of different interventions, particularly quantifying benefits over the longer term. This is especially true for expensive interventions such as education and roads, which are essential basic services.

There are also a number of important conclusions that can be drawn from the HEA modelling:

Drought recovery takes longer (or may be impossible) when a community is not resilient. The HEA modelling shows that the impact of a drought is not only felt in the drought year but for several years after. In fact, deficits persist beyond the drought year throughout the entire 5-year scenario period at levels higher than reference year levels, for both Storylines A and B1. Herd recovery also takes time – at least 5 to 6 subsequent consecutive years of average rainfall levels – an infrequent occurrence in Ethiopia or Kenya.

Destocking interventions alone are often not sufficient to meet deficit levels faced by in-need households. One of the main reasons for this is that destocking primarily benefits middle and better off households, who have more animals that could be destocked and sold that would otherwise die. Poor households have very few animals to begin with, and can usually only destock one or two animals at most – which is usually not sufficient to meet the significant deficits faced mostly by those very households.

Other intervention types, such as supplementary feeding interventions, are required to have an impact on animal mortality, conceptions, abortions, births, and milk production rates. It is only these interventions that affect herd dynamics that will limit herd mortality rates and buoy birth rates, which will in turn speed recovery periods so that deficits in subsequent years are lower and resilience is higher.

These conclusions are mainly intuitive – most people can reason that resilience and early response are likely to be more cost effective strategies than repeated humanitarian aid and erosion of assets. So then why does response come late? A variety of issues were mentioned in the literature and consultations:

- Institutional inertia and rigidity – systems are set up for humanitarian response.
- Procurement procedures in agencies are not responsive and flexible enough.

- Poor coordination amongst NGOs – many are trying to do the same thing and lack of coordination results in late response.
- Lack of evidence of disaster – donors don't want to fund early and end up funding a non-disaster.
- Political will – it is more visible to fund a disaster, where results can be clearly demonstrated, as compared with funding resilience, where the result is that the disaster did not happen.

The following table shows just how little is spent on disaster preparedness.

Table 25: Donor Spend on DPP and DRR (USD)

	Average annual donor spend on DPP	Average donor spend on DPP as a percentage of humanitarian aid	Average annual donor DPP spend per beneficiary of the current drought	Donor spend on DRR as a percentage of total ODA
Kenya	2.22m	0.91%	59 cents	1.4%
Ethiopia	3.3m	0.59%	69 cents	0.9%

Source: Oxfam (2011), "Briefing on the Horn of Africa Drought 2011". Donor spend figures adapted from Global Humanitarian Assistance Report 2011.

7.2 Recommendations

"The separation of relief and development is both artificial and unhelpful. Not only are the recipients the same, but also the underlying causes that create the need are the same—the vulnerability of dryland communities. But what often takes place, are emergency interventions that undermine development (for example some food aid and water trucking interventions), and long term programming and investments that do not pay sufficient attention to the inevitability of drought."[69]

Funding models must be changed to integrate relief and development in a coherent cycle.

The findings of this analysis fully support the HERR recommendation to change funding models by increasing predictable multi-year funding. Humanitarian funding is often restricted to a very short time frame, and has a clearly delineated humanitarian mandate. Development financing is longer term but does not have the flexibility to be

[69] REGLAP MAGAZINE, Disaster Risk Reduction in the Drylands of the Horn of Africa: Good practice examples from the ECHO DCM partners and Beyond, Edition Two, December 2011

re-allocated in times of crisis. Too often, NGOs lament that they could do much more with $1m over three years for a consistent and reliable water and sanitation programme, as compared with $25m that has to be spent in six months for humanitarian aid (for example). USAID has pioneered a crisis modifier in Ethiopia, in which development funding can be shifted into a humanitarian mode when needed – this was seen as a very successful innovation. These types of mechanisms need to be more widespread. Along similar lines, funding should be allocated under an umbrella mechanism that covers all four stages of drought cycle management – mitigation, preparedness, relief and reconstruction.

In the short term, a more cost effective approach would be to prioritize early response measures. Even if there is hesitation over whether a high magnitude drought will occur, the cost difference is such that it will still be much more cost effective to invest in measures such as commercial destocking, and measures to improve animal condition. Further, these services as an early response measure also help to build resilience in the longer term. Ways to take these types of interventions to scale should be investigated.

Spending on resilience needs to increase significantly, both in the short and the long term. Current efforts to build resilience for pastoralists have remained largely at a pilot/demonstration level. Donors and governments need to shift far greater portions of funding into resilience, and in the short term this will also require continued funding to humanitarian aid as asset depletion is reversed. The gap in general development spending by governments and donors between the most drought affected areas and other higher potential parts of the countries requires further examination. Findings can be used to advocate for higher long term revenue and capital allocations to these areas.

Adequate resources and capacity must be committed to building resilience. Short-term interventions, with no provision for long-term operations and maintenance, are unsustainable. Value for money can be justified for many resilience interventions, but these can quickly become a waste of money if they are not part of a longer-term plan of support and founded on participatory approaches.

7.3 Areas for further work

- Investigate innovative funding mechanisms that integrate development and relief, such as the crisis modifier introduced by USAID in Ethiopia.

- It would be useful to replicate and build on this work in another region experiencing drought, to test the methodology, particularly given that HEA data is not available in many areas and therefore a different approach may be required.

- Undertake a similar analysis within the context of a complex emergency (e.g. natural hazard and conflict), as well as rapid onset disaster. These are likely to bring up a very different set of issues to slow onset drought.

- Develop a more systematic approach to determining the relative costs and benefits of resilience measures, using both qualitative and quantitative data, so that measures can be prioritized.

- Conduct further research into the potential reductions in aid that can occur as a result of building resilience. This analysis assumed a stage reduction, with full aid and losses occurring in year 0, 50% in year 5, and 25% thereafter, but this was purely based on expert opinion and the evidence base on this is very thin.

- Expand the HEA and herd dynamic modelling to look at impacts by wealth group. This could be very informative, both in terms of targeting of the PSNP/HSNP, as well as showing the differential impacts by group.