

REPORT



CLIMATE CHANGE, VULNERABILITY AND HUMAN MOBILITY: PERSPECTIVES OF REFUGEES FROM THE EAST AND HORN OF AFRICA

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No.1 | June 2012

UNITED NATIONS UNIVERSITY
INSTITUTE FOR ENVIRONMENT AND HUMAN SECURITY
(UNU-EHS)

REPORT No. 1

JUNE 2012





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Acknowledgements

The research team would like to thank Dr. Clionadh Raleigh (Trinity College, Dublin) and Mr. Sönke Kreft (Germanwatch and UNU-EHS) for their support during the fieldwork. Moreover, the research team would like to express their thanks to Mr. Mathan Ratinam (Parsons School for Design) and Mr. Justin Benn (Vivo Media) for the valuable filming and recording of interviews.

In addition, the research team is grateful to Ms. Thérèse Rosenfeld, Mr. Serge Birtel, Ms. Mareike Nienkerke, Ms. Verena Rossow and Ms. Angela Wagner (all at UNU-EHS) for the support they provided in carrying out background research and preparing the literature review. Moreover, the research team extends its thanks to Mr. Andrea Milan (UNU-EHS) who provided the team with an extensive literature review and designed the graphs for the report.

The research team would also like to express its thanks to staff at all UNHCR offices in Ethiopia and Uganda and at UNHCR headquarters in Geneva, who assisted with the planning and logistical arrangements for all site visits and interviews.

Finally, the research team would like to express its gratitude to the many refugees who volunteered to participate and share not only their perceptions of climate change in their home countries but also their personal stories of fear and persecution, which touched all members of the research team immensely. We hope for a positive future for you and your children.

Table of contents

Introduction	9
I. Key findings	12
II. Methodology and limitations	14
III. Perceptions of climate variability and impacts of climatic stress	22
IV. <i>In situ</i> adaptation strategies	31
V. Migration and displacement	39
VI. Concluding comments	48
References	51
Annex	56





Introduction

The mass exodus of people from Somalia to Kenya and Ethiopia in late 2010 and throughout 2011, spurred by the intertwined impacts of severe drought and continuing civil war, has provided a devastating backdrop for the main aim of this exploratory study: to understand the extent to which refugees and internally displaced persons (IDPs) – as “people of concern” to the Office of the United Nations High Commissioner for Refugees (UNHCR) – have perceived, experienced and responded to climatic variability and long-term negative climatic change in the East and Horn of Africa.

According to the International Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC, 2007, 9.2.1, 9.4.4, 9.6.1), the East and Horn of Africa is projected to be one of the regions of the world most negatively affected by climate change. Environmental change in countries in the East and Horn of Africa already includes prolonged droughts, desertification, flash floods and land degradation, all of which will likely be exacerbated by climate change in the medium and long term. The interplay between climate change, conflicts, violence and refugee movement is considered to be particularly striking in this region.

Notwithstanding the current crisis, the region has long been a major hub for UNHCR’s work, as around five million people, or 14 per cent of the total number of people of concern to UNHCR (asylum seekers, refugees, IDPs, returnees, stateless persons) worldwide, live here (UNHCR, 2010)¹.

UNHCR has also observed that environmental considerations are increasingly affecting the movement of refugees and IDPs in the East and Horn of Africa. In light of these considerations, this study,

¹ Please note that these figures do not include the substantial influx of new refugees from Somalia into countries such as Ethiopia and Uganda due to the ongoing impacts of conflict, drought and food shortage crises in Somalia.



conducted by the United Nations University (UNU) in partnership with UNHCR, the London School of Economics (LSE) and the University of Bonn (Bonn University), sought to examine the personal experiences of people who have become refugees or IDPs in the East and Horn of Africa, to better understand:

- how they perceived and managed the impact of climatic change and increased environmental stress in their areas of origin;
- the ways in which growing environmental stressors interact with other factors affecting their lives and livelihoods;
- how, and to what extent, climatic and environmental change has contributed to their vulnerability or resilience;
- if, how and to what extent climatic change and environmental impacts have played a role in their decisions to move away from their homelands.

It is hoped that the findings from this study will contribute to the growing body of empirical evidence on the links between climate change and human mobility (Henry et al. 2004; Perch et al. 2008; Jäger et al. 2009; Afifi and Jäger 2011; Warner et al. 2009 a and b; Foresight 2011), and will assist UNHCR, as the agency mandated to provide international protection to and assist those who flee their homes because of the threat of persecution and violence, to consider its future policy and response to people who may be compelled to move in the face of increasing environmental stress and unsustainability.

I. Key findings

This study examines the perceptions and experiences of refugees in the East and Horn of Africa (specifically refugees in camps and settlements in Ethiopia and Uganda respectively, who originated primarily from Eritrea, Somalia and some from Eastern Sudan) in order to better understand if, how and to what extent the impacts of climate and environmental change in their countries of origin played a role in their movement away from their homelands. The study made the following key findings:

- a. Many of the refugees interviewed had perceived discernible shifts in weather in their home countries over the past 10–15 years. Many were able to distinguish between the occasional bout of bad weather (i.e. a flash flood or heatwave) and what they described as more “permanent” shift weather patterns. These shifts in climate were described variously as prolonged drought, disrupted rainfall patterns or intense flooding.
- b. The biggest impacts of these discernible shifts in weather included severe impacts on farming and livestock husbandry in the homelands of the refugees interviewed. For those who relied on agricultural and pastoral activities for a living, this had a direct and negative impact on their livelihoods and food security. Those not directly involved in agricultural and pastoral activities were also indirectly affected by declining turnover and profit amongst traders and by rising food prices as a consequence of diminished agricultural output.
- c. Although none of the refugees interviewed described the impacts of climatic variability as a direct catalyst for violent conflict, resource scarcity exacerbated by worsening weather conditions was often described as a multiplier or magnifier of pre-existing conflicts in refugees’ countries of origin.
- d. All refugees interviewed, whose livelihoods had been severely affected by climate variability in their homelands, described a wide range of traditional and innovative adaptation strategies to enable them to remain in their areas of origin. These methods ranged from adopting new cultivation techniques and reorganizing cropping cycles to abandoning farming altogether to take up alternative non-agriculture-based occupations.
- e. Where movement away from homelands was taken in response to worsening impacts of climatic variability, such movement was only taken as a measure of last resort and only after all efforts to adapt to the changing conditions had been exhausted.
- f. Where movement away from homelands did take place, in most cases it was internal, circular and temporary in nature, rather than cross-border and permanent. Many refugees described several stages of localized, in-country migration before fleeing across a border (usually as a consequence of experiencing the threat of political violence).
- g. Very few of the refugees interviewed made decisions to move away from their homelands permanently because of the impacts of climatic variability. Only those with assets and transferable skills made conscious decisions to leave (before their livelihoods completely failed) and for longer periods of time.

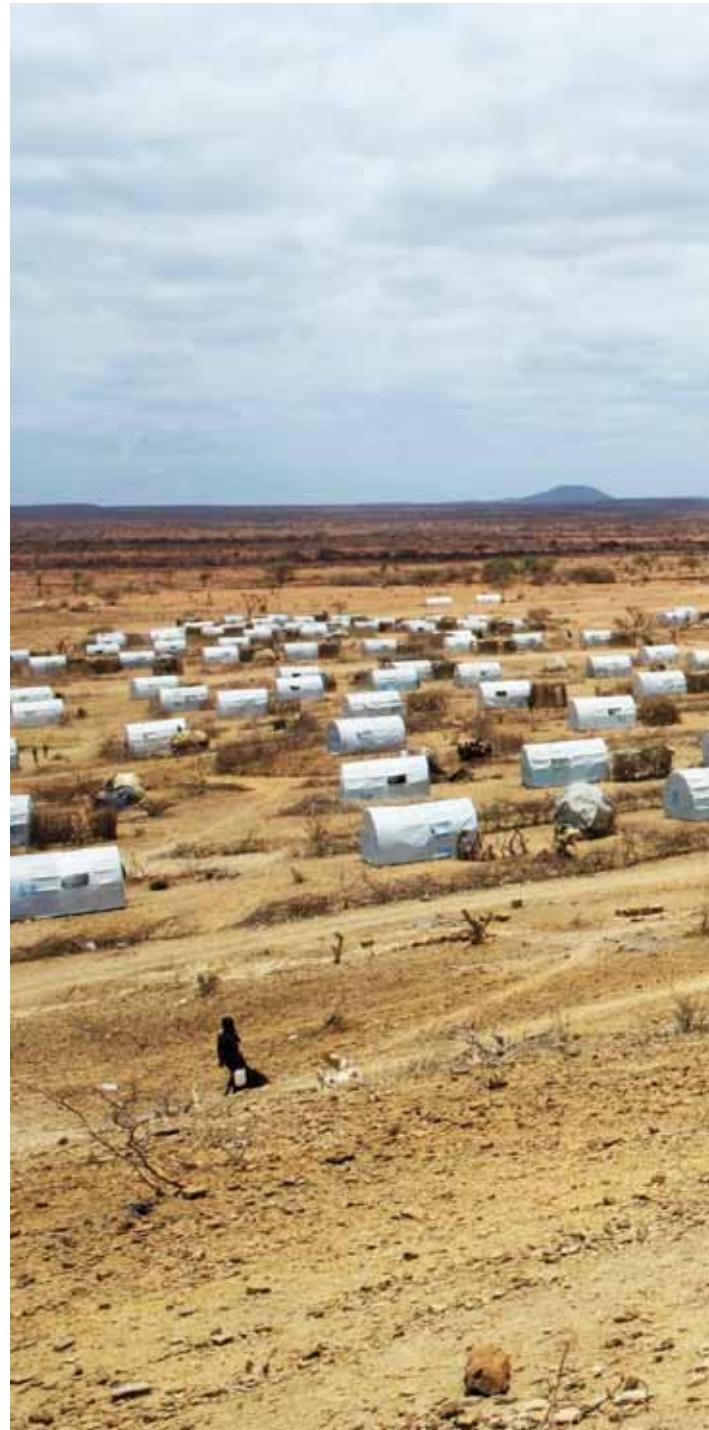
- h. Permanent relocation in response to climatic variability, though described in very few cases, was not only limited to those who were better off. In fact, the very poorest, once they had made a decision to move, would be more likely to relocate permanently, though internally.
- i. Cross-border movement, as a direct response to climatic variability, was rarely mentioned. For most, cross-border migration was typically a second migration, the first often being internal (and often induced by environmental considerations) and the second caused by violence, drought or a combination of both.
- j. Violent conflicts, state failure as well as state repression, reduced the adaptive capacity of those exposed to extreme weather and accelerated their vulnerability to other more acute political factors. Many refugees described how the inability of the state actors or *de facto* authorities to maintain order and to prevent violent acts, as well as oppressive acts by these actors themselves, reduced their ability to cope with and adapt to climatic events forcing them to move.

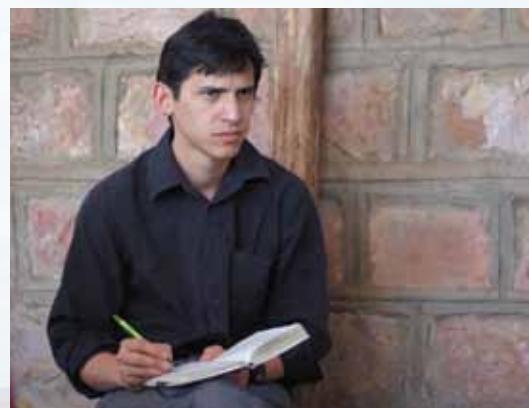
II. Methodology and limitations

Methodology

This project involved a number of activities by UNU, UNHCR, LSE and Bonn University, with a view to ultimately producing a project report and accompanying video. The planned activities included a site visit component to refugee camps in Ethiopia and Uganda during the first half of 2011. The project included the following activities as part of its method of inquiry:

- a desk review of literature which examined the links between climatic variability, conflict and displacement or human mobility in the East and Horn of Africa
- country visits which involved:
 - meeting with key informants (Government representatives concerned with refugee and environmental issues in Addis Ababa and Kampala, local UNHCR staff as well as refugee studies and environmental academics and NGOs in Ethiopia and Uganda);
 - field visits to UNHCR refugee camps to conduct individual, group and expert interviews;
 - where appropriate, filming and audiotaping the interviews with groups and individuals;
 - debriefing sessions to discuss the main observations and findings with the informants, including persons of concern to UNHCR; and
 - analysis and validation of findings with academic experts.





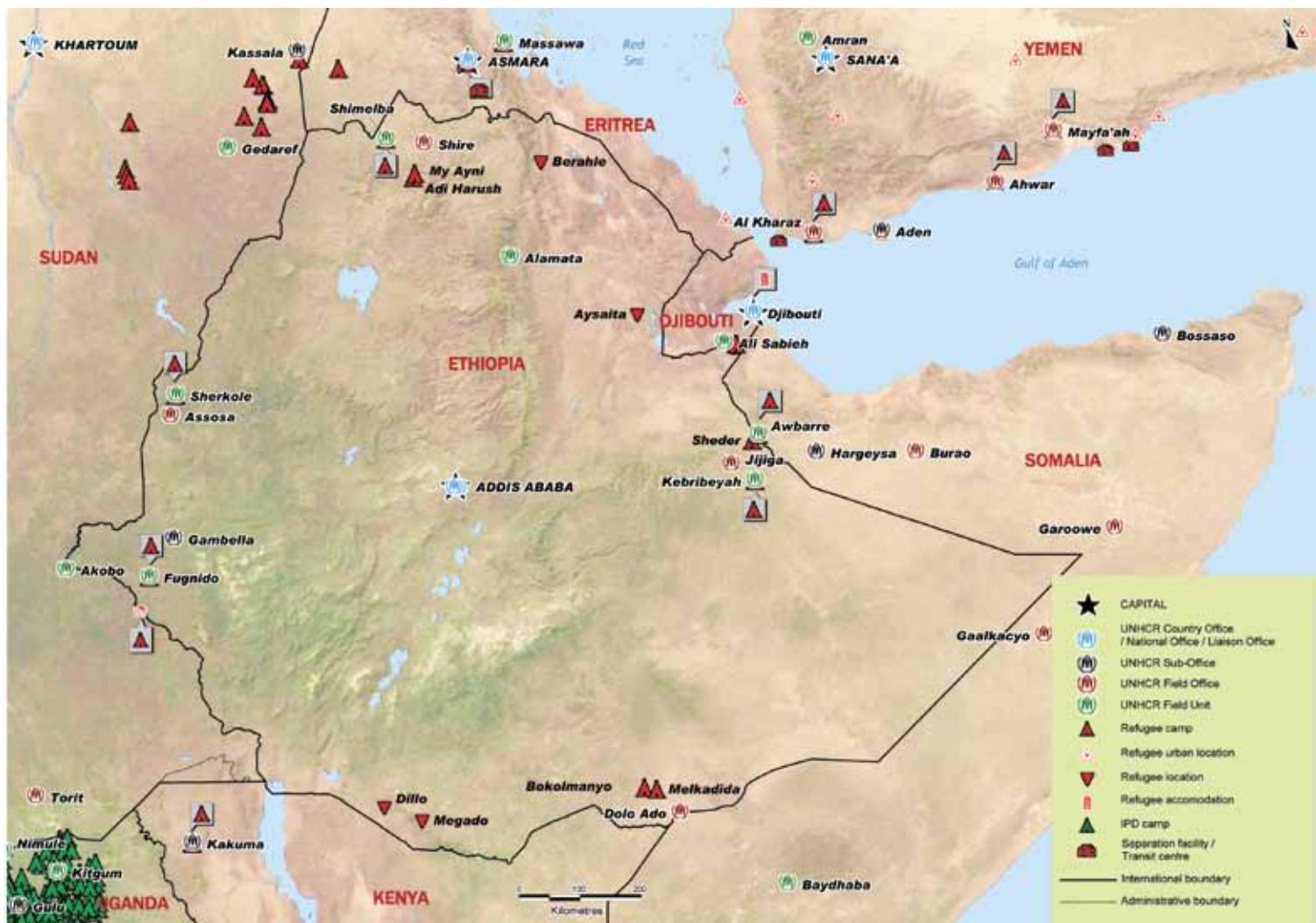


Figure 1: Refugee camps in Ethiopia. Source: UNHCR (2010).

Refugees in Ethiopia and Uganda

Field visits were carried out in two countries in the East and Horn of Africa – Ethiopia and Uganda. Initially, Kenya was also included as a country for investigation, but the unfolding influx of refugees from Somalia in early 2011 meant that security concerns made travel to refugee camps in the country logistically unfeasible. UNHCR offices in Ethiopia and Uganda identified where the agency could provide the necessary logistical support. Two small project teams, each comprising researchers from UNU, LSE, Bonn University, local UNHCR staff and interpreters, met with and interviewed expert key informants from the Government, academic institutions and NGOs as well as refugees and IDPs in each country.

Ethiopia accommodates refugees mainly from Somalia (117,720), Eritrea (59,090) and Sudan (24,980) (UNHCR, 2012, p. 58). Additionally, 365,000 people are IDPs (UNHCR, 2011, p. 66). Camps visited in Ethiopia included Shedi Camp in Jijiga with refugees from Somalia, My Ayni Camp in Shire with refugees from Eritrea, Fugnido Camp in Gambella with refugees from Sudan as well as one IDP camp.

Refugees in Uganda come mainly from the Democratic Republic of the Congo (74,500), Sudan (16,170) and Somalia (15,500) (UNHCR, 2012, p. 84). A total of 1.3 million are considered to be internally displaced (UNHCR, 2011, p. 84). Settlements visited during the field study included Nakiavale in the south-west, as well as Adjumani and Imvepi in the north.

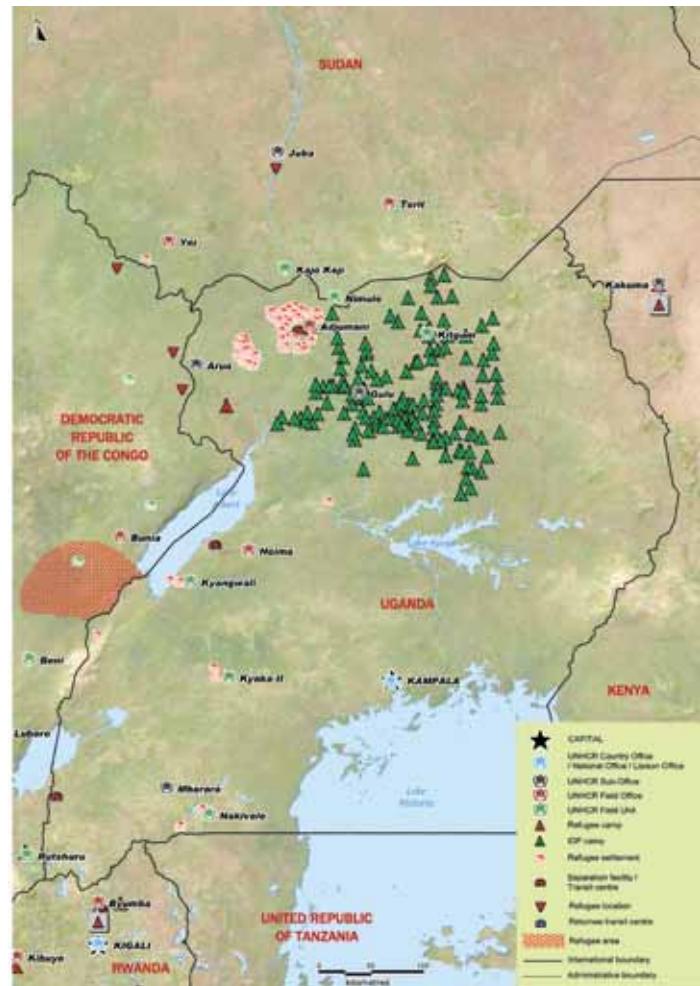


Figure 2: Refugee settlements in Uganda. Source: UNHCR (2010).



Selection of participants and research methods

Experts and stakeholders in the field of climate change and human mobility in the Horn of Africa (e.g., Government representatives, refugee and environmental NGOs and local UNHCR staff) in Addis Ababa and Kampala were approached before refugee camps were visited in the respective countries. Semi-structured interviews were conducted on an individual basis with these key informants to gather information and obtain an overview of the issues, as well as to understand their views and experiences.

In the refugee camps, focus group interviews with up to 10 people at a time were conducted with refugees from Somalia, Eritrea, Sudan, Democratic Republic of the Congo and Rwanda, as well as with two groups of Ethiopian and Ugandan IDPs. The interviewees comprised those who originated from rural areas and whose livelihoods were primarily natural resource-based (e.g., farmers, pastoralists). It was a working hypothesis that the impact of climate-related impacts would be strongest and most direct among this population. Former urban residents were nevertheless also included in order to obtain a broader understanding of movements from the respective countries.

Besides livelihood activities and place of origin, the selection of the target population aimed at a balanced representation in terms of ethnicity, gender and age. At each refugee or IDP camp or settlement, interview groups were comprised of a family unit, a group of male heads of household, a group of women and a group of elderly (> 50 years of age) men and women. Focus group discussions were the primary tool for gathering data, which was determined to be the best method to gather a range of views in a short period of time. The setting of a focus group discussion is also more natural than a one-to-one interview and explicitly makes use of group interaction to generate information and insights. The statements made by the participants are in a group context and subject to a dynamic discussion process – they may be commented on, discussed and contested by other participants.

It proved useful to generate narratives and thus gain insights into the perceptions and experiences of informants about issues related to climate conditions, conflict, violence and mobility.

The content of the discussions was structured chronologically, beginning with the time before the participants left their place of origin, and ending with the time they fled their countries and sought refuge in the camps. Information was sought concerning their livelihood activities, their perception of changing climatic conditions, how they were affected and how they coped with and adapted to climatic stress and trends, as well as the reasons for their flight from their homes. Each discussion was facilitated by an interviewer. Audio records and notes were taken, and the discussions were filmed where consent was given.

Limitations

Many refugees, especially those from Sudan and those staying in Uganda, had lived in refugee camps for periods between 10 and 20 years, making the recall period for the subject of interest very long. It was thus difficult to assess whether in their narratives they were describing "normal" climate variations or trends that could indicate climate change. This was exacerbated by the fact that climate in the region is characterized by a high degree of variability.

Gathering narratives was important as it gave insights into the way people perceived, experienced and evaluated certain events and processes. As Meze-Hausken (2004) has shown through systematic comparisons between perceptions of climate change and meteorological data, there can be a mismatch between these data sources (i.e. perception and scientific data) for different reasons: on the one hand, individuals' perceptions of changing rainfall could be linked to the changing need for rainfall or other environmental factors that lead to reduced water availability; on the other hand, the paucity of available scientific data might lead to a mismatch with the perceptions of individuals.

Another limitation of the study is that the target population was generally comprised of refugees (with the exception of two groups of IDPs). Therefore, participants in the interviews repeatedly emphasized political reasons for their movement, making it difficult to assess the role of climate-related events as an element contributing to their movement. This was further exacerbated by two factors. Firstly, despite assurances to the contrary, the researchers were sometimes perceived to be part of UNHCR, the agency assisting the refugees. Those participating in the interviews were on the one hand cautious about their statements, while on the other hand raising their immediate problems in the hope that the researchers could provide solutions. Secondly, the field visits to each camp or settlement were very brief, lasting a few days only. The development of relationships of trust with the refugees, that would have allowed a more in-depth understanding, was limited. The use of interpreters to facilitate the focus group discussions (some were professional interpreters but others were refugees who spoke English) at times distorted the content of the narratives and also made the development of trust challenging.

A final limitation relates to the regional focus of the study. The primary focus of the study was to gather information from refugees originating from the East and Horn of Africa. This objective was only partly accomplished, as refugees from Ethiopia – one of the key countries in the region – were not interviewed. The reason for this gap is that it was not possible to visit refugee camps hosting Ethiopian refugees in Eritrea or Kenya owing to the security situation in those countries at the time.





III. Perceptions of climate variability and impacts of climatic stress

What does the literature say?

Recent academic studies have recognized the importance of studies on perception of climate change (Deressa et al., 2011; Tröger et al., 2011). A few studies have examined the nexus between climate change and mobility from the perspective of those affected. A number of recent studies have, however, recorded a growing perception among communities in the East and Horn of Africa of negative climate impacts being linked to the phenomenon of climate change. A 2010 inter-agency report (UN-OCHA et al., 2010) consulted with over 60 pastoralist community leaders representing approximately 100,000 pastoralists in the East and Horn of Africa. The study notes that pastoralists have registered climate variability in the form of increasing weather extremities and unpredictability over the past 40 years.

The community in the Somali region of Ethiopia, examined by Radice et al. (2011), is convinced that the droughts experienced over the past two decades are a result of climatic changes. For the local people Meze-Hausken (2004) interviewed, some kind of climatic change was considered the underlying cause of the frequent harvest failures experienced in the past years and the reason why the animal stocks they managed had recently become considerably smaller. In yet another region of Ethiopia, the Shinile and Borana zones, Riché et al. (2009) analyse the perceptions of communities as well as government officials and non-governmental agencies. With respect to temperature, the perceived increase in dryness and reduced rainy season are consistent with climate change projections for Ethiopia and local precipitation data. In Borana, the decrease in rain frequency and the changes in distribution and predictability have already led to

increased water scarcity and depletion of resources, which in turn is also leading to more competition and conflicts over pasture and water resources. Whilst there is a lack of data in many regions, overall the studies mentioned indicate a very clear link between people's observations and meteorological data.

According to the IPCC Fourth Assessment Report (IPCC, 2007, 9.2.1, 9.4.4, 9.6.1), agricultural production and food security (including access to food) in many African countries and regions are likely to be severely compromised by the effects of climate change and climate variability. Subsistence and smallholder farmers, including pastoralists and agro-pastoralists, are likely to be most severely affected (Morton, 2007, p. 19680). The effects of climate change, as Morton (2007, p. 19683; see also Tröger et al., 2011) highlights, will increase the likelihood of crop failure, increase diseases and mortality among livestock, impact livelihoods by forcing households to sell their assets, cut health and educational expenditure and migration, and increase the likelihood of indebtedness and dependency on external help. Furthermore, there could be possible feedback through unsustainable adaptation strategies which lead to environmental degradation.

With regard to agricultural production, the IPCC has projected reductions in yield in some African countries to be as much as 50 per cent by 2020, and crop net revenues could fall by as much as 90 per cent by 2100 (IPCC, 2007). Additionally, climate change-induced resource scarcity is projected to increase the risk of violent conflicts between competing groups (Homer-Dixon, 1994, 1999; IPCC 2001; WBGU, 2007). Discussions are ongoing about whether climate change should be considered as a

cause of conflicts or better understood as a threat multiplier (see for instance Barnett and Adger, 2007; Evans, 2010). Nevertheless, potential interaction between the two processes is recognized by the United Nations as a significant future challenge, as expressed by Secretary-General Ban Ki-moon (2007, cited in Evans, 2010, p. 5): "... changes in our environment and the resulting upheavals – from droughts to inundated coastal areas to loss of arable lands – are likely to become a major driver of war and conflict". As underlined by the IPCC in 2007, conflicts which have recently occurred in the Greater Horn of Africa, namely in Somalia, Ethiopia and Sudan, caused by structural inequalities, resource mismanagement and unstable governments, were often exacerbated by environmental degradation. Climate stressors may therefore intensify or become a contributing factor to conflicts (Abdalla, 2006; IPCC, 2007).

Study findings

Experts' views

Perceptions of climate change in the East and Horn of Africa amongst academic and Government experts interviewed in Ethiopia and Uganda were based on access to scientific data, academic literature and their personal observations of environmental and climatic changes in their countries. The general perception was that climate change was a real and unfolding phenomenon, whose impacts were being felt in the East and the Horn at a more rapid rate than suggested by recent academic and scientific literature. Permanent shifts in the timing of the wet and dry seasons as well as an increase in frequency and severity of extreme weather events (i.e. droughts and floods) were most often cited as examples of climate change from both scientific/academic and personal perspectives. Moreover, in the cases of Uganda and Ethiopia, there is a clear increase in the temperatures over the past two decades, as can be seen in the annex of this report.

"Rainy seasons and dry seasons have changed. The total amount of rain has not changed but distribution of rainfall has changed and this disrupts the seasonal activities of the people."

Uganda Meteorological Department

Experts in development, climate adaptation and food security who were interviewed, all consistently expressed the view that changing rainfall patterns in the East and Horn of Africa and changes in the distribution of rainfall will likely worsen the access of certain people to food and other resources needed to sustain human life. The experts considered these people to be (a) pastoralists, (b) farmers currently living on marginal lands, (c) people who were already food insecure, and (d) people who had local histories of tensions over resource conflicts.

"Drought has affected cropping systems. Some areas used to grow millet but have changed to sorghum as sorghum is more drought tolerant. This affects health and nutrition."

Ministry of Agriculture, Ethiopia

Refugees' perceptions and experiences

Because most of the refugees interviewed had been reliant on rain-fed agriculture or pastoralist activities (requiring adequate rainfall to ensure fodder for their cattle) in their home countries, their perceptions of climatic change were largely based on their observations of changed rainfall patterns and amount of rain, which had a direct impact on their farming activities and livelihoods. Those interviewed most frequently described these changes in terms of how they practically experienced climate in the course of their livelihood activities, that is, as drought, flooding and disrupted rainfall patterns.

Many of those interviewed had noticed a discernible shift in seasons, namely the wet and dry seasons (particularly the start date of the two or three wet seasons per year) as well as an overall reduction in rainfall over the past 10 to 15 years, with the most dramatic decrease in rainfall being experienced in the past five years. Many explicitly distinguished between the occasional bout of bad weather (i.e. a flash flood or heatwave) and what they called more "permanent" shifts in weather patterns.

"First, the rain did not come on time. I noticed it becoming more windy and sunny. There was not enough rain in the key months – June and July. Now the rain would only come for three or four days at a time. No longer did we have the prolonged rainfall we needed for a successful harvest."

Elderly farmer from Eritrea, My Ayni Camp, Ethiopia





“It went from sustained rain to rain not starting on time to raining for only two to four days and not longer than that.”

Elderly farmer from Eritrea, My Ayni Camp, Ethiopia

Interviews held with elderly farmers and pastoralists (> 50 years of age), especially those from Sudan, Somalia and Eritrea, were particularly revealing as many noted that they were well aware that their regions were drought-prone but that the droughts experienced in recent years were, to them, more severe and prolonged than those they had personally experienced in all the years they had been working on the land.

“It [drought] happens since the world was created, but not like this since five years ago.”

Farmer from Sudan, Fugnido Camp, Ethiopia

“Once we experienced a lack of rain like never before. This was in 2006–2007.”

Farmer from Sudan, Fugnido Camp, Ethiopia

Refugees from Sudan, who had been present in Ethiopia and Uganda for long periods, some for over 20 years, made a particular point of indicating that they had noticed negative trends in climatic conditions in their respective host countries. In Uganda in particular, as beneficiaries of a government policy which sees most refugees being allocated small plots of land on which to establish small-scale vegetable gardens (to supplement food rations), interviewees complained of a recent trend of failed harvests because of prolonged arid conditions and the more frequent onset of crop-destroying pests.

Very few refugees interviewed demonstrated that they were aware of climate change as a global phenomenon. Some did indicate their awareness of changing weather and environmental patterns that they had experienced as being related to climatic changes affecting a region larger than their own or even just their country. None offered a scientific explanation for the changes they had perceived, however very few had experienced any form of formal education. Others, however, invoked religious or spiritual reasons for worsening climatic conditions, such as God's will or displeasure at situations of poor political governance or perceived personal failings.

“The weather has become odder and odder. There used to be floods but today there are no floods. People suffer from famine during the droughts. If there is an absence of rain, nobody can do anything – it is a decision of God.”

Elderly farmer from Eritrea, My Ayni Camp, Ethiopia

From the focus group discussions with refugees, four areas can be identified that are affected by climate change and climate variability: a) farming and livestock husbandry, b) food and livelihood security, c) social cohesion, and d) conflict.

Farming and livestock husbandry

Climate-related events, such as droughts, and trends such as declining precipitation were perceived by the refugees interviewed to have had severe effects on farming and livestock husbandry in their countries of origin. Refugees, especially those from Eritrea and Somalia, reported the loss of their harvest and death of cattle due to severe droughts. In their narratives, the drought event of 1984–1985 in the Horn of Africa was still very present and a landmark in their memory of the impact of climatic events. Droughts were nevertheless described as recurrent events that regularly prevent people from carrying out farming activities and lead to regular losses in respect of agricultural production. Besides the impact of these shock events, the refugees interviewed also decried continued decline in agricultural yields due to decreasing amounts of rain and changing seasonal patterns. For example, one Tigrinya farmer from Eritrea reported that in good years he harvested up to 40 to 50 quintal (100 kg) of grain. Before they fled from Eritrea their yield had decreased to only three to four quintal, and sometimes they did not have any yield at all. Decreasing rainfall was also reported as affecting the availability and quality of grassland, which has an effect on the health and value of livestock.

In addition to the impact on agricultural output, changing climate was also perceived by the refugees as having had an effect on their livelihood systems. On the one hand, refugees reported shifts in agriculture-related livelihood activities: changes of crop plants to species more adapted to short wet periods and a change of activities from farming to cattle herding. Others reported shifts to non-agricultural activities.

“It was during the time when Reagan was President of the USA, in 1984. There were no grazing possibilities for the cattle at all. I can remember that there was no rain and a lot of cattle died.”

Agro-pastoralist from Darfur, Fugnido Camp, Ethiopia

“Rainfall has been decreasing since the year before liberation – I noticed a very big difference in the height of grass. In the early days it was like savannah grass, now it is short and thin.”

Tigrinya pastoralist from Eritrea, My Ayni Camp, Ethiopia

Food and livelihood security

As most of the refugees interviewed were partly or wholly subsistence farmers, declining yields and diminishing livestock had a direct impact on their livelihoods and food security. Refugees reported that during years with unfavourable climatic conditions, they had to ration food, eat less and often suffered from hunger. During extreme events mortality, especially among young children, is reported to have risen. People said that they had to dispose of assets and borrow money in order to buy food and seeds for the next planting season. The possession of livestock was considered an important asset, not only as a source of milk and meat but also as a product that could be sold in order to get

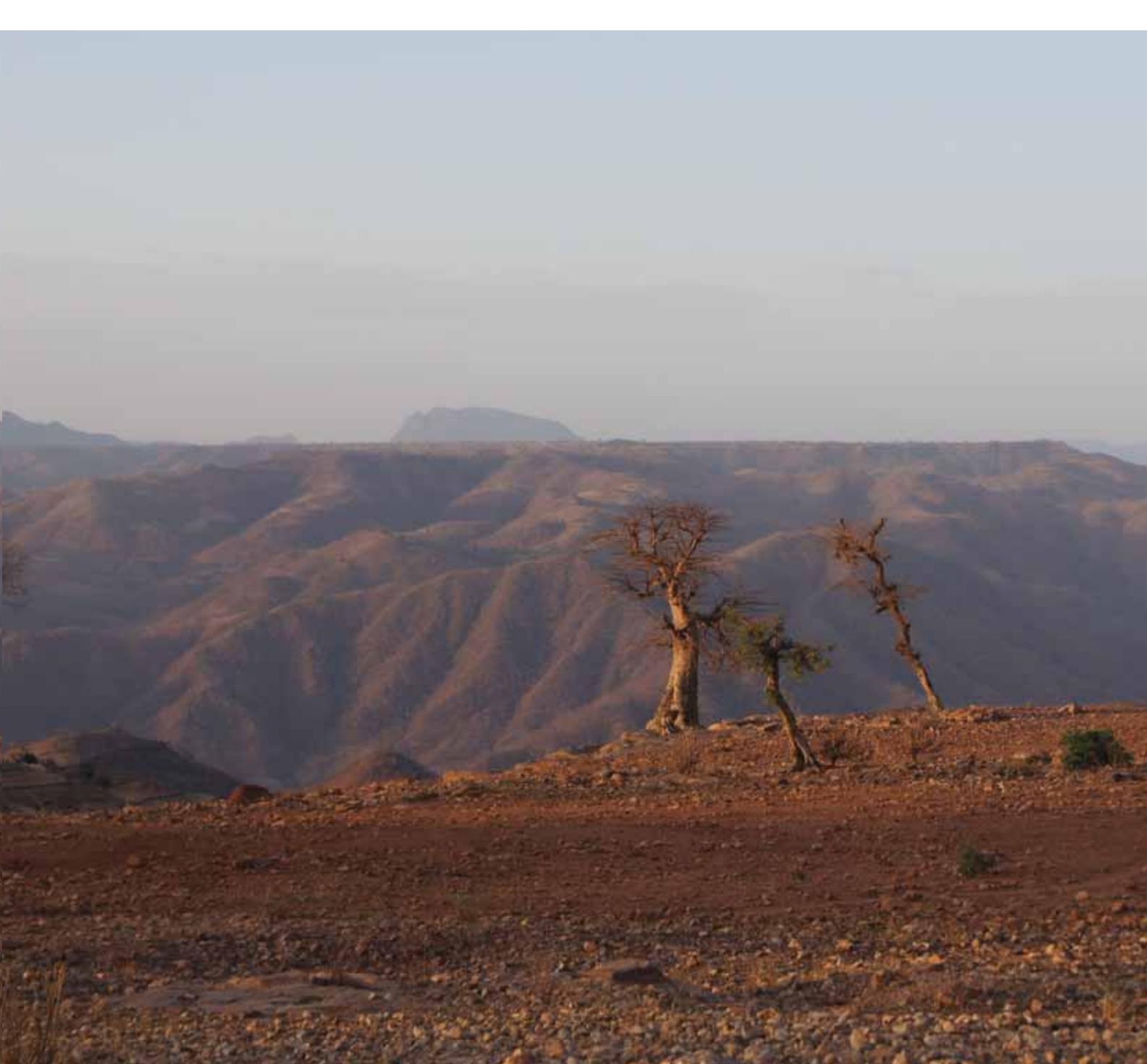
money to buy food. Refugees who were not directly engaged in agricultural activities, and therefore not directly affected by climatic events, remarked that they were indirectly affected because losses and declining income among farmers and pastoralists decreased their purchasing power, which led to declining turnover and profit among traders. Furthermore, refugees originating from urban areas reported rising food prices, which they attributed among other reasons to the poor agro-climatic conditions.

“During such a year we managed to feed our families with only very little, we had to borrow money from others to buy seed. Some families sold their cattle, sheep and goats in order to get food. Those who didn’t have cattle faced a bad situation without anything.”

Tigrinya agro-pastoralist from Eritrea, My Ayni Camp, Ethiopia

“The environment has changed in central Somalia. It is getting dryer. We were not directly affected [...] but these changes did have an impact on pastoralists and farmers around the town. Indirectly, our business was affected because the drought affected the buying power of people.”

Shopkeeper from central Somalia, Shedr Camp, Ethiopia





Social cohesion

Less direct and more subtle is the impact of climate change and climate variability on the social fabric and moral economy of a community. It can be assumed that sustained stress and increasing resource scarcity in a community will lead to a transformation of the ways people within the community interact and organize themselves. During the focus group discussions, although these issues were rarely raised, those who did mention social organization, reported that climatic stress had a negative impact on the way different segments of society supported each other.

“Before, Eritreans used to help each other. All Eritreans helped each other and there was a ‘good attitude’. But now the attitudes of Eritreans have changed – because of the drought. People do not help each other anymore and that makes it harder to survive.”

Saho farmer from Eritrea, My Ayni Camp, Ethiopia

Conflict

From the empirical evidence gathered during the field visits, it is also difficult to make any clear statement with regard to the relationship between climate stressors and conflicts. The refugees interviewed did not report any conflicts – at least not violent forms of conflict – occurring as a result of environmental stress within their community. Anecdotal reports were made of conflicts between ethnic groups and between farmers and pastoralists. However, it is difficult to single out environmental causes, as these events are mostly related to broader conflict constellations.

“We were victims of cattle raids by the Murle tribe who came during the dry season. They would come and burn the houses and the stored food as well. Our village was attacked four times. We were living with those tribes together side by side.

Then in 1962 the attacks by the Murle started. Later they associated themselves with the northern Sudanese government. They would come to attack the village and kill people.

After each attack by the Murle, the people would move to another village, and then they were attacked again. We decided to move further and then we moved to Pochalla town. After we were attacked there as well, we decided to leave the country.”

Anyuak Pochalla man from Sudan, Fugnido Camp, Ethiopia

The minority Bantu farmers from Somalia, for example, who were particularly affected by violence after the breakdown of the Siad Barre regime in 1991, reported that Somali pastoralists were grazing on their farms, looting their grain stores and destroying their villages. An Eritrean Saho farmer who was internally displaced from the border region to the western part of Eritrea as a result of the Eritrean–Ethiopian war, described their conflict-laden relationship with the local farmers in the places to which they were relocated. Local farmers regularly drove their cattle onto the farms of IDPs, and sporadically physical violence occurred between local people and IDPs. From the anecdotal evidence gathered, climate change-induced resource scarcity could be considered as a multiplier of conflicts.

IV. *In situ* adaptation strategies

What does the literature say?

The effectiveness of *in situ* adaptation plays an important role in determining whether and when individuals will move in response to climate stressors, which may be a form of adaptation (see Afifi 2010 and 2011 for examples from Niger and Egypt).

A few studies (e.g., RoR, 2006; RoS, 2007) identify general *in situ* adaptation activities and needs as well as recommendations with regard to adaptation strategies, including drought early warning systems for disaster preparedness; community-based forest and rangeland management rehabilitation; introduction of drought-resistant seed varieties; replacement of household goat herds with sheep herds to reduce pressure on fragile rangelands; land use conversion from agricultural activities to livestock raising; promotion of non rain-fed agriculture and improving agricultural techniques, etc.

A study by Deressa et al. (2009) which focuses on farmers in Ethiopia, concludes that the different *in situ* adaptation strategies include “planting trees, soil conservation, use of different crop varieties, changing planting dates and irrigation”. The study, moreover, considers farmers who have not been able to adapt to be those who lack information, money, labour and land. Oxfam (2008) distinguishes between pastoralists’ traditional adaptation methods, such as changing the herd composition and moving to alternative water sources, and adaptation to recent environmental changes. One such new adaptation strategy by communities in the Wajir District in Kenya and in the Kotido District in Uganda is to explore rainwater harvesting as an alternative to the exploitation of groundwater, which is increasingly unreliable with a fluctuating water table.

Whilst GebreMichael et al. (2011) have found similar adaptation strategies of pastoralists in Niger and Ethiopia, they question Oxfam’s distinction of adaptation measures: because the pastoralists’ system has always been changing, “it is not easy to distinguish these practices from more recent processes of local innovation, which is equally a reflection of flexibility and adaptability” (GebreMichael, 2011, p. 6). Furthermore, as a result of the heterogeneity of the communities and ecologies in the pastoral areas, “it is extremely difficult for outsiders to recognise local adaptation, as these may be only small incremental changes in what appear to be ‘traditional’ practices” (2011, p. 6). GebreMichael et al. moreover emphasize that there are many difficulties in separating climate change impacts from other pressures on pastoral systems. The authors argue that “the root causes of pastoralists’ vulnerability to climate stressors lie in their marginalization in decision-making and in the unfavourable government policies”, and therefore their inability to adapt, as well as their adaptation methods, cannot be understood by focusing only on the technical adaptation to climate change.

In general, programmes introduced to reduce drought vulnerability have changed as compared to the programmes used in the 1970s (Turner, 2010). For example, nowadays there is more reliance on community-based initiatives to respond to climatic changes, such as the establishment of grain banks, microfinance schemes and small-scale irrigation. However, in the past there were more tendencies to apply large-scale irrigation systems, new crop cultivars and borehole programmes (Ribot, 2002).



Study findings

Experts' views

Experts interviewed were more familiar with adaptation strategies undertaken by local citizens (i.e. Ethiopians and Ugandans) than with those undertaken by refugees in their countries of origin. They observed that because large numbers of the population in their respective countries were farmers and pastoralists, this meant that they were dependent on rainfall to sustain them. Therefore, the droughts had a significant negative effect on their livelihood, and if incapable of developing adaptation strategies, their survival would be threatened.

“98% of the agriculture in Uganda is rain-fed, so without rain at the right times, people do not know what to do.”

GIZ, Uganda

Experts noted that since the animals are prone to droughts, the pastoralists often need to settle close to water sources. Therefore, some governments provided dams that secure the livelihood of the animals and their owners. This adaptation strategy does not deviate the pastoralists too much from their original activities, as compared to a situation where they would have to completely change their activities by moving to neighbouring cities and working in the informal labour market.

“The Government in Uganda is developing dams in the Karamoja region – trying to get pastoralists to settle and become agriculturalists.”

Ministry of Agriculture, Uganda

It was obvious from the interviews that the adaptation strategies of the farmers were efficient in the traditional occasional/ seasonal dry season. However, this did not necessarily apply to the longer droughts they were exposed to in their regions of origin. Therefore, drastic climatic changes entirely changed their lives, given their absolute exposure and vulnerability to such changes.

“People are trying to adapt but the changes are so intense that they cannot do this fast enough.”

GIZ, Uganda

Refugees' perceptions and experiences

A few of the interviewees who suffered from droughts relocated their fields to be closer to rivers and streams, but in most cases they commuted between their home and new places of work.

“Due to the severe droughts in the late 1970s, I switched from pastoralism to farming by moving towards the river. My farming activities were successful since I lived close to the river, but still I relied on rainfalls. I left in the year 2007 due to the unrest.”

Elderly Somalis, Nakiavale Settlement

Others did not move in the first place and preferred to stay in their home villages.

“During the dry seasons, not everyone moved to the wetlands. For some, these were too far away. Instead, we relied on adequate food storage to see us through.”

Rwandese farmer women, Nakiavale Settlement

Many of the farmers who were desperate due to the dry seasons, left for the next towns or even for the capital cities to take up casual jobs in the informal sector and sent the money back home

to support their families. However, it was also the pull factors of the cities that attracted them, even though they ended up living in city slums.

Changing the principal economic activity from farming, hunting, cattle herding or pastoral work was also an option for many farmers.

“Because there was no rain we changed from farming and raised cattle instead.”

Elderly farmers, My Ayni Camp, Eritrea

“During the drought, we tried other activities like fishing, collecting wild fruits, hunting, and milking the cattle.”

Elderly farmers, My Ayni Camp, Eritrea

An interesting and seemingly effective adaptation strategy was selecting specific grains that required less water to cultivate. However, interviewees noted that if rainfall kept declining, such a strategy would no longer be sustainable.





“After the rains became less, we changed our cultivation system – we changed cropping to a short-term cultivation system. We selected grains that could be produced with less rain. Short-term grains only needed 30 days of water.

The short-term crop was successful for a while but not as successful as the seeds we used before.”

Eritrean family, My Ayni Camp

Another strategy was to rent water pumps from wealthier families, in order to fill the gap created by unreliable rains. Nonetheless, this made farmers dependent on other people. When the latter moved away for various reasons, the farmers were again left vulnerable to the worsening climatic conditions.

“Wealthier farmers who rented us pumps for irrigation moved away and we did not have any pumps for irrigating the land. We first tried to pursue local strategies and tried to move our cropping activities closer to the river and tried to water the plants manually.”

Bantu Somali family, Shadr Camp, Ethiopia

Some NGOs showed farmers new techniques that helped them adapt to the situation where it became very dry and difficult to apply the traditional farming techniques and basic adaptation strategies. These new techniques included borehole digging, searching for alternative food sources, food saving and replanting trees.

“NGOs from Norway came to teach us about land management, crop rotation, how to avoid soil degradation, and agro-forestry. If we go back [to Sudan] and the weather is bad, we will know what to do.”

Elderly Sudanese farmer, Imvepi Settlement, Uganda

The latter strategies used to be effective, but with the longer and more severe droughts, they no longer had the same impact. For example, when it became drier, the rivers dried out as well, and the crops and animals died in turn. The new techniques no longer provided the farmers with an alternative for their deteriorating livelihoods.

“I used water from the river. However, as it got drier, the river also dried up and the crops died.”

Elderly Eritrean farmer, My Ayni Camp, Ethiopia

An indicator of absolute desperation was that some left the region or even the entire country, as in the case of some farmers who left Eritrea for Ethiopia.

As for the cattle herders who were also suffering from droughts and who consider their cattle an investment asset, some of them applied a short-term adaptation strategy by selling some of their animals to cover their daily expenses and keep the rest for unforeseen future risks.

“Because of lack of rain, I totally stopped farming and turned to raising cattle instead. I used money from the sale of animals.

I could not work in another place because of fear of the government and of violence.

I tried to work as a pastoralist but the money was not enough to send to my family. I also felt bad because I was not with my family – for this reason I decided to leave Eritrea altogether.”

Elderly Eritrean farmer, My Ayni Camp, Ethiopia



V. Migration and displacement

What does the literature say?

Terms and concepts such as environmental or climate change migration, environmentally induced or forced migration, ecological or environmental refugees, and climate change refugees are often used in academic literature on the subject; however, there is no general agreement on a precise definition.

The lack of one clear definition can directly be related to the main ambiguities associated with the term "environmental migration": Firstly, "the main reason for the lack of definition relating to migration caused by environmental degradation or change is linked to the difficulty of isolating environmental factors from other drivers of migration" (Dun and Gemenne, 2008). Secondly, there is the problem of whether environmental migration is considered forced or voluntary migration. Hugo (2008, p. 11) argues that "population mobility is probably best viewed as being arranged along a continuum ranging from totally voluntary migration, in which the choice and will of the migrants is the overwhelmingly decisive element encouraging people to move, to totally forced migration, where the migrants are faced with death if they remain in their present place of residence. [...] Environmentally induced migration is concerned with moves toward the forced end of this continuum".

Whilst a precise definition may be important for practitioners and policymakers to develop policy responses and decide on the legal rights of such migrants, currently terms such as "climate change refugee" or "environmental refugee", which are widely used in the media and in some academic literature, are misnomers under international law and risk undermining the legal definition of a refugee and the protection regime which exists for such persons (Laczko and Aghazarm, 2009). UNHCR has also rejected the notion of environmental refugee and holds the view that the 1951

Geneva Convention Relating to the Status of Refugees protects those fleeing from climate change-induced events only in specific situations which can be interpreted as "persecution" on one of five grounds set out in the Convention (UNHCR, 2008).

Tacoli (2009, p. 516), looking in more depth at the questions of climate change and migration, argues that the "key problem with the concept of environmental refugees is the implicit assumption that there is a direct causal link between environmental change and migration. This oversimplified view is based on 'common sense' rather than on an understanding of the complex relationship between environmental change (and perceptions of it) and human agency, which includes adaptation that reduces the need to move away from affected areas, as well as the multiple factors that affect migration decisions. It also overlooks the fact that migration requires financial resources and social support, both of which may decline with climate change, which may thus result in fewer rather than more people being able to move".

A number of academic studies have focused on climate change as a new driver, in the complex mix of factors, prompting movement away from places of habitual residence, along a continuum of forced displacement (in the event of sudden-onset disasters) through to voluntary migration (where the impacts are more slow-onset). The nature of this movement is influenced by a range of factors, including: financial resources, social networks, accessibility of the destination and ethnic, linguistic or historical ties (Foresight 2011; Newland, 2011). Increasingly, experts note that, contrary to initial predictions that climate change would lead to mass exoduses across borders, most climate change-related migration is likely to be internal or over a nearby border, and even then mainly circular in nature (Jäger et al. 2009; Warner et al. 2009a; Warner et al. 2010; Kniveton et al. 2009; Kailin, 2009; McAdam, 2011).



The attention to the nexus between displacement and migration induced by environmental factors, including climate change and conflict or human security, has also increased. A recent report by the United Nations Secretary-General, "Climate Change and its Possible Security Implications", and another prepared by the High Representative and the European Commission to the European Council, "Climate Change and International Security", define migration as one of the channels through which climate change works as a threat multiplier for existing threats to security, exacerbating economic, political and social problems (EC, 2008; UN, 2009). However, empirical evidence to draw conclusions on this nexus is not yet sufficient (Barnett and Adger, 2007).

With respect to environmental migration in the Horn of Africa, Kibreab argued in 1997 that the large-scale migration taking place in the region had been falsely directly linked to environmental degradation. Instead, Kibreab argued, the displacement was the result of a disruption of long-standing traditional resource management systems for coping with spatial and temporal variability by conflict and "scorched-earth" government policies. Weiss and Reyes (2009) on the other hand strongly emphasize that both gradual environmental change and extreme environmental events influence population movements in the region. "Due to already significant levels of social vulnerabilities, poverty, and harshly arid ecosystems, the negative consequences of increased population pressures, compounded by environmental degradation, are more severely evidenced in the Sahel and the Horn of Africa" (Weiss and Reyes, 2009, p. 100). Drought, in particular, is considered to be a major cause of rural–urban migration in both temporary-distress and permanent forms, especially in Ethiopia. Environmental migration in this fragile region can therefore exacerbate existing environmental problems as well as contribute to conflicts and increased pressure on resources.

Study findings

Experts' views

Prolonged drought and severe flooding experienced in recent years were identified by experts interviewed as key factors leading to an increase in rural–urban migration within the countries in which they were situated (i.e. Ethiopia and Uganda). Few were able to comment on cross-border migration situations, with the exception of the migration of pastoralists along the so-called “cattle corridor” which diagonally bisects Uganda and which extends into Rwanda, the Democratic Republic of the Congo and Tanzania, and the migration of Ethiopian pastoralists into Kenya.

“People are moving from the country to big urban areas [in response to climate change] in Uganda.”

Climate Change Department, GIZ, Uganda

“Movement as a form of adaptation [to climate change] has increasingly taken place in the last 10 years, particularly from rural to urban areas... Farmers are moving to cities in search of alternative forms of livelihoods. For example, many of the young Boda Boda [motorcycle taxi] drivers in Kampala are farmers from the countryside.”

Ministry of Agriculture, Uganda

“In the south-west of Uganda, people from this region have always moved in response to environmental change as they are pastoralists. However, movement of people from the south-west is becoming more permanent. The cattle corridor... has seen some Ugandan pastoralists moving more permanently south across the border into Northern Tanzania.”

Ministry of Agriculture, Uganda

“Ethiopian pastoralists have for a long time crossed the border into Kenya when water was scarce and then moved back again. Because of prolonged drought, this has changed this coping mechanism of this society. Now they not only move across borders but to other regions in Ethiopia. This creates conflicts with other groups.”

International Organization for Migration, Ethiopia

Refugees' perceptions and experiences

Internal movement

Overwhelmingly, stories of mobility associated with moving away from worsening impacts associated with climate variability followed a specific pattern. That is, where movement related to climatic stressors did occur, such movement was taken as a last resort (only after all efforts to remain and adopt other methods of adaptation had been exhausted), particularly where the land being left was self-owned and only after all efforts to remain and try a number of alternative forms of adaptation had failed. Where movement occurred, in most cases it was likely to be internal, circular and temporary rather than cross-border and permanent.

“Permanent movement to another place [because of drought] was not an option because we owned our own land.”

Lau woman from Sudan, Fugnido Camp, Ethiopia

Many refugees interviewed reported several stages of localized, in-country migration before fleeing across a border. Some of the interviewees reported that their first decision to move internally was driven by worsening impacts of climate variability (i.e. prolonged and severe drought and lack of crops or fodder). This internal movement would typically be to an urban centre in search of an alternative livelihood. Many spoke of confronting political violence only once they reached these larger townships, which then caused them to flee across a border. For these people, climate stressors can be seen to play a key role in their trajectory towards becoming a refugee.

“Because of severe drought, my family and I moved permanently to the river some distance away. But this was difficult because of fighting going on in that area and eventually we moved because of it.”

Lau woman from Sudan, Fugnido Camp, Ethiopia

Circular movement is something that many refugee families reported having done during normal dry seasons. They would often travel to areas which were wetter and swamplier. Such movement was reliant on a number of factors including: (a) owning land or having access (ability to rent) land or family ties in other areas, (b) those areas being relatively close to the place of habitual residence (i.e. usually not more than 10–30 km away), and (c) having in place social structures to enable this to occur (i.e. an older child to care for children at home for a number of weeks or months while the parents were away).

One woman spoke about regular experiences of flooding. When this happened, she and her husband would move to an area 15 kilometres away from their farm. They would leave an older child at home to look after the other children. The land they moved to was provided by elders in the family.

“At times we would move to an area near the river – it would take two days by foot to get there. We would stay there for three to seven days and then return.”

Lau woman from Sudan, Fugnido Camp, Ethiopia

“During the dry season I would go with the cattle to a big river near the border with South Sudan [Bahr al Ghazal]. It took me around three days of travelling. I would stay there for around three months. Many people did this in the same manner. The family was always left behind.”

Darfuri farmer from Sudan, Fugnido Camp, Ethiopia

“We moved from the southern part of Eritrea to the west, near the border with Sudan, which was more fertile. We rented this land. I found it difficult to send money to my family because of Government check-points. Government had many restrictions on movement. If I had not been able to rent land from my brother’s widow, I would not have moved.”

Elderly farmer from Eritrea, My Ayni Camp, Ethiopia

Temporary relocation is the next stage along the continuum in response to climate stressors. Such migration was normally reported to have been undertaken by the male head of household in search of an alternative livelihood such as casual labour or new skills, where drought had become too prolonged. In such cases, original farmland was kept and maintained by remaining family members (usually the wife and children). Only when social ties would start to suffer or break down would the relocation of the entire family take place.

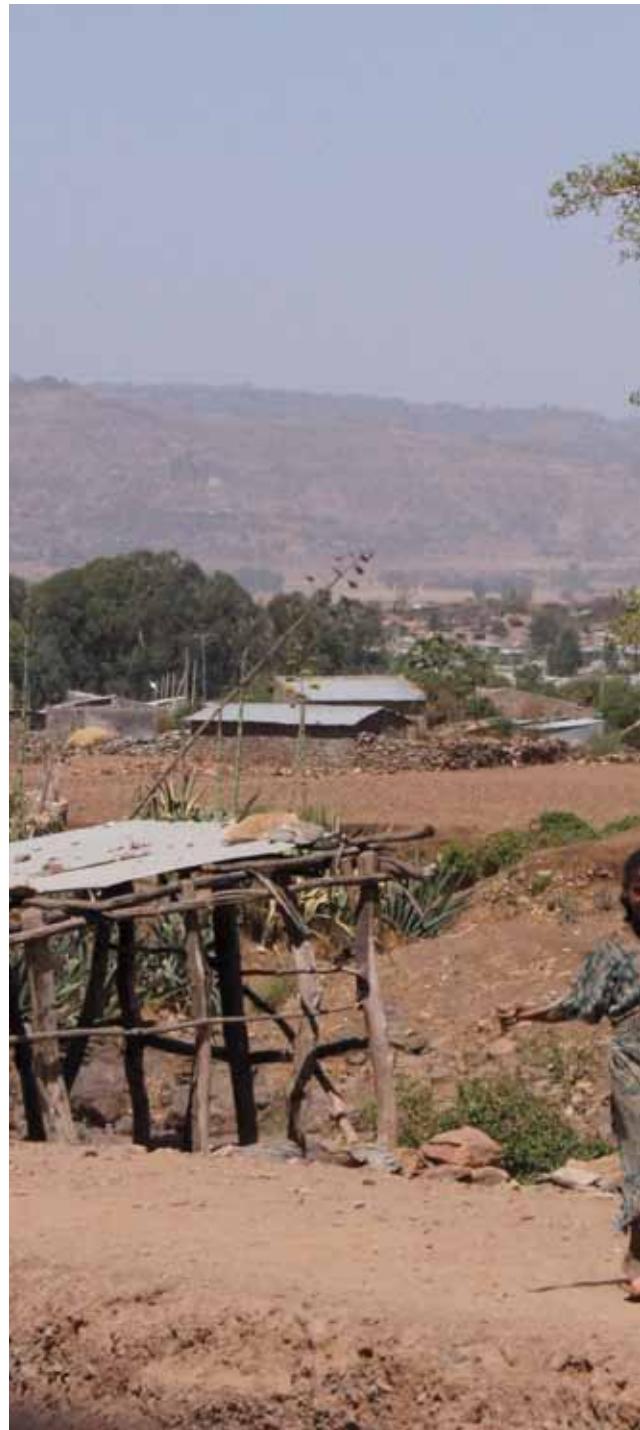
Very few of the refugees interviewed made decisions to move away from their homelands permanently because of the impacts of climate variability. Only those with assets (including intangible assets such as family connections capable of supporting those who relocated for a period) and transferable skills (including education) managed to make decisions to leave earlier (before livelihoods completely failed) and for longer. Those without such resources reported that they had no choice and no other destinations to go to, so they remained until political violence forced them to flee for their immediate safety. In the context of IDPs interviewed from the Mount Elgon region in South Eastern Uganda, who were resettled in Kyriandongo by the Ugandan government as a result of severe flooding resulting in landslides in the Mount Elgon region, they noted that without the government's intervention they would never have come to Kyriandongo because of the distance away from their homelands and their lack of skills, assets and family ties with people in this area.

The interviews revealed that where permanent relocation in response to climate stressors was being considered, such a coping mechanism was not only limited to those who were better off. In fact, the very poorest, once they had made the decision to move, would be more likely to relocate permanently (albeit internally) because of lack of networks, assets, education and skills which would keep them tied to a place.

“We were involved in agricultural activities in Bimbi. We grew fruit trees and cereals. We owned land near the Shibele River. Our family received irrigation water from the river. However, recently water availability declined because of less rain. Rain did not start at the normal time. This reduction in water led to a decline in agricultural output compared to input ...

I [the husband] moved to a nearby market town to sell products. The town was five hours away [walking]. I also worked as a carpenter in the town. When the rain came I would return to farm in Bimbi. But because of my absence, my wife was not able to sustain the farming work by herself. So at one point, when it hadn't rained for a long time, the whole family decided to move to the market town. Different families had different levels of resilience to the drought. Our threshold was low because we had young children to feed.”

Bantu Somali family, Shadr Camp, Ethiopia





Cross-border movement

Cross-border movement, directly as a response to climate-related impacts, was rarely mentioned during the course of the interviews. Where refugees did recount stories of crossing an international border, it was usually because they were already living close to that border and were more familiar with places, customs and people in the neighbouring country than in other regions in their own countries. For most of those interviewed, cross-border migration was typically a secondary movement, caused by violence, drought or a combination of both.

“When the drought came [in 1993] in Sudan, it spread everywhere. There was nowhere to move in Sudan.”

Nuer woman from Sudan, Fugnido Camp, Ethiopia

“When there was drought in Southern Sudan, we would often come to Ethiopia.”

Lau woman from Sudan, Fugnido Camp, Ethiopia

Climate stressors, displacement and conflict

Stories of conflict arising due to resource scarcity or cultural clashes as a result of influxes of newly displaced persons to new host communities, regions or countries were virtually non-existent. Most of those interviewed emphasized the way in which pre-existing conflict (rather than conflict as a result of climate stressors) exacerbated the effects of climate variability and accelerated their vulnerability to other more acute political factors (i.e. looting of crops by government troops, taking of children for military service, violence towards family members and communities).

“The drought made the conflict worse. Everyone became afraid of everyone. Some raiders came and took away the little food we had raised on our farm.”

Now we are in a very hard time: the people at home face conflict and famine. They are starving. If we could go back, we would have only dry land and death to greet us.”

Pastoralist from Somalia, Shadr Camp, Ethiopia

“Before, we sometimes had drought, but we managed because we had peace and ways to move shorter distances to cope with the weather problems. But the hostility today ruins our way to live – we are cut off from every way of coping.

So now when the rains do not come, we either starve or we flee far away. My future is in God’s hands.”

Elderly Somali farmer, Shadr Camp, Ethiopia

“After the war a lot of deforestation took place – the army was cutting down trees for weapons. Trees were used for firewood and the construction of houses. There was no grazing left for the cattle. Animals died because of toxins in the soil. We moved to a village near the border of Eritrea and Ethiopia.”

Saho man from Eritrea, My Ayni Camp, Ethiopia

“The drought and the war – they ran side by side. It is difficult to say which one forced us to move.”

Pastoralist from Somalia, Nakiavale Settlement, Uganda

“We had droughts in the 1970s and 1980s. However, the government supported us at that time, which allowed us to survive. As for the seasonal shifts in the years 2006–2007, they are accompanied by longer, drier seasons.

And since there was the war, we did not receive any support from the government. Therefore, there are combined factors that made us suffer: droughts and war. If war did not exist, then we might have been able to stay, but now that the land is looted, there is no way for us to claim it.”

Elderly Somali farmer, Nakiavale Settlement, Uganda

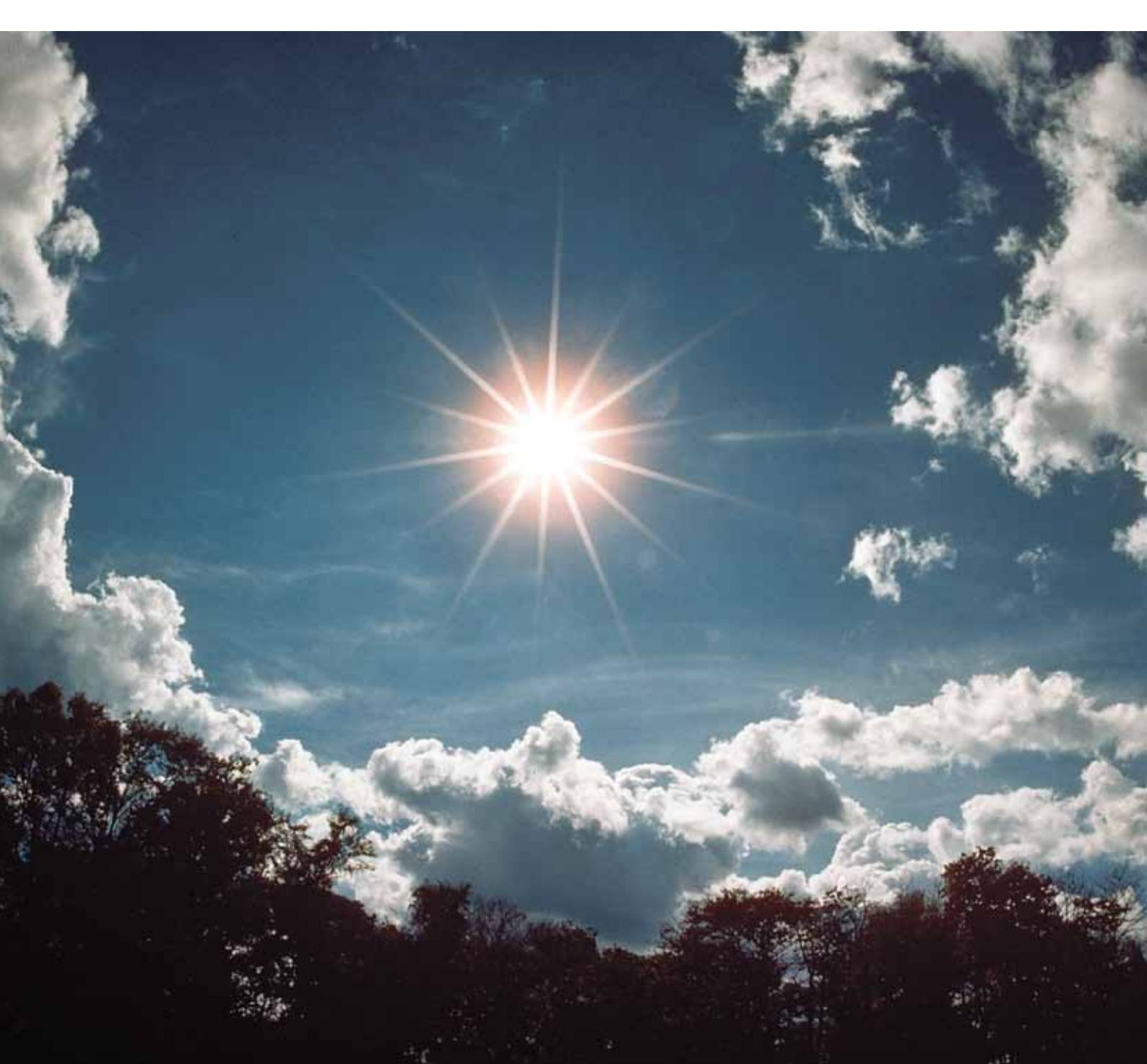
VI. Concluding comments

The East and Horn of Africa is projected to be a region which will be particularly exposed to the negative impacts of climate variability. Agricultural production and food security are likely to be severely compromised. The citizens of countries in the East and Horn of Africa have particularly low capacities to cope with and adapt to projected stresses as they are already facing high levels of poverty and are repeatedly victims of violent conflicts. The fact that the states in the region often lack the resources to assist their citizens in times of crisis further aggravate their vulnerabilities. Today, the East and Horn of Africa is already a region of particular concern for UNHCR not only because of the number of refugees originating from the region but also because of the severity of crises that occur there.

The aim of this exploratory study was to understand the extent to which refugees and IDPs in the East and Horn of Africa have perceived, experienced and responded to climatic events and trends in recent years. For this purpose, expert interviews as well as focus group discussions with refugees and IDPs in Ethiopia and Uganda were carried out in spring 2011. Experts, as well as refugees, have observed significant changes in climate. They reported an increase in frequency and severity of extreme climatic events and observed shifts in seasons as well as unreliable and untimely rainfall. These climatic trends and events not only had a negative impact on agricultural production and food security, but also led to deteriorating social cohesion and the occurrence of resource-use conflicts. Pastoralists and farmers, who are the most exposed groups to climatic stresses, have developed a wide range of coping and adaptation strategies including mitigation of the negative impacts of the stress (e.g., building water reservoirs), changes in production practices (e.g., terracing), diversification of and complete changes to livelihood strategies.

Mobility is an important strategy that has been used to adapt to and cope with climatic stress in the past. Pastoralism, for example, is a livelihood strategy based on mobility that has evolved as an adapted way to co-exist with conditions of high climate variability characteristics in the East and Horn of Africa. More recently, people have used internal migration – often to the urban centres – as a way to cope with the negative impacts of climatic events. For many of those interviewed, internal movement would often result in individual's confronting political violence in larger urban settings, which would then cause them to flee across a border. This study found that cross-border movement hardly ever occurs as a direct reaction to climatic stress. It was evident from the reports of refugees interviewed that broader political conditions, breakdown in civil order as well as excessive state oppression, severely reduced their ability to cope with and adapt to climatic crises.

The links between primary internal movement/displacement related to climate variability, followed by a secondary cross-border movement are complex and should also be more thoroughly investigated to examine what, if any, role climate factors play in the trajectory of an individual becoming a refugee in this climatically vulnerable region of the world.







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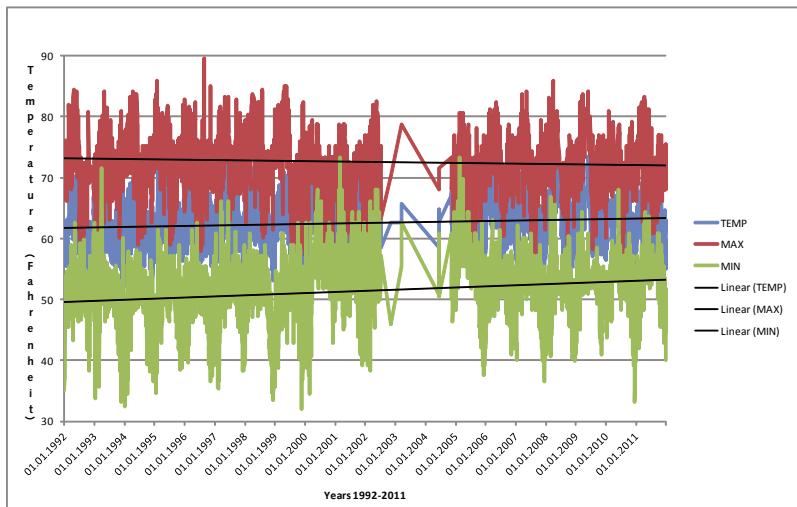
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Annex

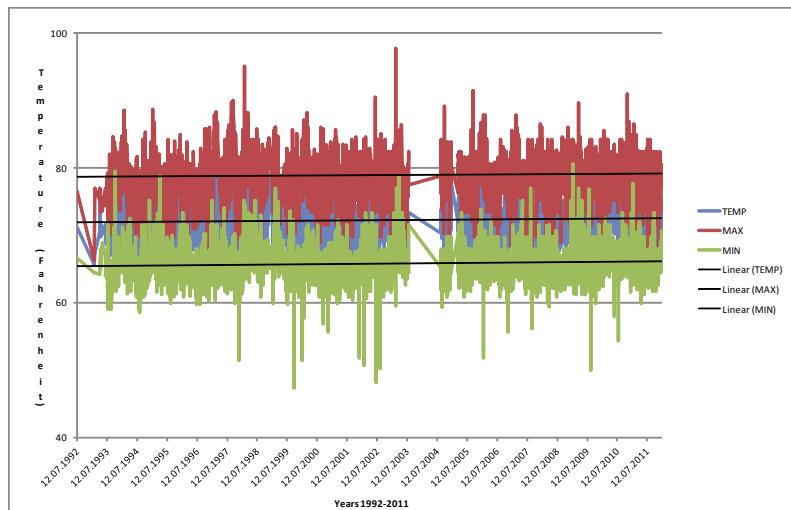
Addis Ababa Bole (Ethiopia) meteorological station – Temperature data



Source: NOAA Satellite and Information Service

In the case of Ethiopia, the minimum Fahrenheit temperature has increased over the past two decades and the maximum temperature has hardly changed. Therefore, the average temperature has increased as well.

Entebbe Airport (Uganda) meteorological station – Temperature data



Source: NOAA Satellite and Information Service

In the case of Uganda, the minimum and maximum Fahrenheit temperatures have increased consistently, leading to a similar increase of the average temperature over the past two decades.

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Imprint

United Nations University
Institute for Environment and Human Security (UNU-EHS)

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Tel.: + 49-228-815-0200, Fax: + 49-228-815-0299
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Copyright UNU-EHS 2012
Design: Andrea Wendeler
Copy-editing: WordLink
Proofreading: Katharina Brach
Print: Druckerei Paffenholz, Germany
Print run: 500

The views expressed in this publication are those of the author(s).
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United Nations University of any of the views expressed.

ISSN: 2304-0459
ISBN: 978-3-939923-62-6
e-ISBN: 978-3-939923-63-3

This report should be cited as:

Afifi, T., Govil, R., Sakdapolrak, P. and Warner, K. (2012).
Climate change, vulnerability and human mobility:
Perspectives of refugees from the East and Horn of Africa.
Report No. 1. Partnership between UNU and UNHCR.
Bonn: United Nations University Institute for Environment and
Human Security (UNU-EHS).



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