Info Note

Climate change, agriculture and international migration: An African youth perspective

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Key messages

- Migration from East Africa has increased in the last decade. There are currently about 9 million East African international migrants, and more than half are younger than 30.
- Climate change is expected to accelerate youth migration due to its effects on agricultural livelihoods. Evidence suggests that migration is one of the most common responses to negative agricultural shocks.
- Our study shows that the frequency and intensity of drought in the region will increase in the coming decades.
- Some of the recommendations that can enhance adaptive capacity include: encouraging and supporting climate-smart agriculture (CSA); facilitating legal migration flows; and creating youth-friendly employment opportunities.

Background

Existing evidence indicates that Africa is already being affected by climate change resulting in substantial challenges for both human and natural systems. Eastern Africa is among the regions in Africa with disproportionately higher risk of adverse consequences of global warming and climate change. Climate change and variability are having significant direct and indirect impacts on agricultural production, agricultural value chains, food and nutrition security as well as the overall sustainable growth of the sector in the region. Over time, it is expected that climate change will exacerbate the prevalence of spatio-temporal climate variability in Eastern Africa, and these variabilities will manifest in the increased frequency and severity of extreme climate events and the increasing irregularity and unpredictability of weather patterns. To the region's farmers, these emerging changes represent an additional source of risks and uncertainty.

Rural livelihoods within Eastern Africa depend on rain-fed agricultural systems and fragile natural resources. Over the past four or five decades, the prevalence of drought and flood hazards have cost numerous human lives, caused a series of famines (Funk et al. 2008; Bezabih and Di Falco 2012), human displacement (Meze-Hausken 2000; Comenetz and Caviedes 2002; Mulugeta et al. 2007) and environmental degradation (Biazin and Sterk 2013). At the same time, international migration from East Africa has increased in the last decade. However, the evidence for these trends in Africa is far from satisfactory.

This brief summarizes preliminary findings from our study "Climate change, agriculture and international migration nexus: African youth perspective". Our study covers eight Eastern African countries: Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, Tanzania, and Uganda. We conducted an extensive review of existing evidence on climate change and migration to assess the implications of climate change on agricultural livelihoods and migration in Eastern Africa. We also used regional climate models to simulate the trends in climate extremes and provide climate projections for the region.

Impacts of climate change on international migration: Empirical evidence

Research on the impacts of climate change on international migration is often based on analysis of macro level cross-country data using the information available from developed countries as receiving nations. The studies often use temperature and precipitation and

assess the correlation between variations in these environmental factors and migration flows. While the studies differ in the number of countries and years covered (up to 30 years of migration data and up to 163 origin countries), the results are mostly consistent. The studies have found a positive and statistically significant relationship between temperature and international outmigration for agriculture dependent countries. The findings also indicate that the Gross Domestic Product (GDP) of agricultural countries is more negatively affected by higher temperature than those of non-agricultural countries (Afifi and Warner 2008; Naudé 2009; Backhaus et al. 2015; Cai et al. 2016).

Impacts of climate change on migration: The agricultural link

Globally, approximately 19 million people were displaced within their own country by sudden-onset disasters. Between 2008 and 2016 an estimated 228 million people were displaced by disasters such as floods, cyclones and drought (IOM 2018). While these kinds of displacements are visually striking and noticeable, a potentially stronger impact of climate change on migration unfolds more slowly and out of sight for agriculture dependent communities such as those in Eastern Africa.

Climate change affects migration through its impact on agricultural production and productivity. Climate variability and change is expected to increase landslides, land degradation, flooding and salination. Deterioration in the quality and availability of complementary environmental resources such as forests, water and other ecosystems is also anticipated. These changes will in turn diminish the size, suitability and productivity of farmland that is the basis for agricultural livelihoods, eventually pushing farmers to migrate. Existing empirical evidence supports the link between reduced agricultural production and productivity and increased migration (Massey et al. 2010; Wrathall and Suckall 2016). Similarly, an increase in variability of rainfall and temperature and frequent episodes of extreme weather events such as droughts or flooding will increase production risks and vulnerability of livelihoods (Gray and Mueller 2012; Bohra-Mishra et al. 2014; Mastrorillo et al. 2016).

Effects of climate induced change in agriculture can go beyond the farm households. For example, as more people abandon agriculture to join non-farm employment, and as food prices rise, real wages continuously decline. In addition, lower production and productivity of the agriculture sector leads to slower economic growth and fewer economic opportunities for the regions' population overall due to the linkages between agriculture and the rest of the economy. All these result in increased rural-urban migration and could eventually propel higher international migration from the region.

The East Africa region: Drought patterns and climate modeling forecasts

The livelihood of populations in many parts of Eastern Africa is strongly tied to subsistence and rain-fed agriculture. Given the historical importance of droughts in causing widespread famine and economic failures in Eastern Africa, there is much interest in understanding and accurately forecasting extremes such as drought in the context of climate change and variability. Recent years witnessed a rapid expansion of observational and modelling studies that document the characteristics and frequency of drought under current climate conditions and assess the impacts of global warming and climate change on future drought occurrences, severity, duration and patterns. However, there have not been many modelling studies done for the Eastern Africa region. The few existing studies for Eastern Africa are either on current conditions only or employed through coarse resolution global climate models. In our study, we use observational data and regional climate modelling to describe current drought patterns and projections of future drought in East Africa.

Present-day drought patterns in Eastern Africa

We assess drought patterns and frequency of extreme dry days under current climate conditions using observations and high-resolution regional climate model simulations. Daily precipitation observation over Eastern Africa is obtained from the climate hazards infrared precipitation with the Climate Hazards group Infrared Precipitation with Stations (CHIRPS) dataset. CHIRPS is constructed by merging station data and infra-red satellite estimated precipitation, which makes it attractive for a data sparse continent such as Africa. The data used here covers the time period from 1983 to 2016 and is interpolated onto a 0.250 grid resolution. We also use simulated precipitation data from the International Centre for Theoretical Physics (ICTP) regional climate model (RegCM4). Here we plot only the observed current drought pattern from the CHIRPS precipitation data, using the Standardized Precipitation Index (SPI) measure.

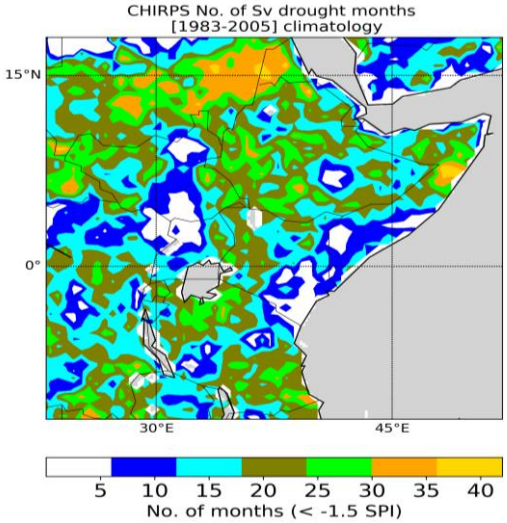

Figure 1. Occurrence of severe to extreme drought (number of months for which SPI12 < −1.5).

The results suggest that severe and extreme drought occurred frequently over central Tanzania, regions bordering Sudan and Eritrea, Ethiopia and northern Somalia. It is important to note that SPI is a normalized index and hence the frequency of drought is not influenced by the level of aridity of the region. Analysis of the simulated drought generally suggests the models reproduced some aspects of the observed drought pattern.

Future projections

In the climate projection, we investigate how the characteristics of extreme climate events are projected to change under enhanced greenhouse gases (GHGs) by analyzing the current and future climate simulations under RCP8.5 concentration pathways over the greater Horn of Africa. We simulate precipitation for the future period (2077-2099) at a spatial resolution of 0.24 degrees from ICTP's regional climate model (RegCM4). As indicated earlier we focus on droughts due to their importance for livelihoods in the region. Below we plot the projected number of dry days, which is used as a proxy for drought, from the regional climate model.

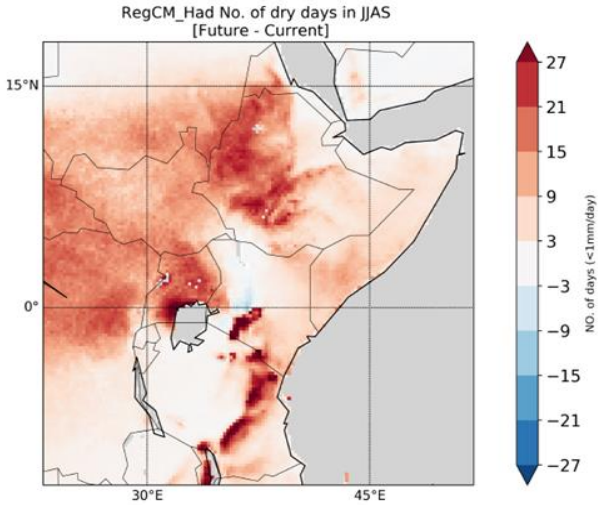

Figure 2. Projected changes in frequency of dry days in the late 21st century (2077-2099) relative to current (1983-2005).

The modeling results indicate that Eastern Africa's 21st century droughts will be longer and more frequent than those associated with the present-day climate. This suggests that, with more frequent and longer droughts, Eastern Africa may experience significant migration in the coming decades.

Climate change, agricultural livelihoods and youth migration in Eastern Africa

Magnitude of international migration

There is significant migration in Africa. In 2017, 38 million Africans were living outside of their country of origin, the majority of whom (65%) were residing in another African country. International migrant stock from the case study countries has almost doubled in less than three decades, from around 4.6 million in 1990 to 8.7 million in 2017. This is excluding irregular and unregistered migrants. In terms of absolute size in Eastern Africa, Somalia, South Sudan and Sudan had by far the largest number of international emigrants in 2017, while as a percentage of their population size, Eritrea surpasses Sudan to belong among the top three.

Climate change, agricultural livelihoods and youth migration

The Eastern Africa region, particularly the Horn of Africa, has recently suffered from repeated drought, flooding and other disasters, resulting in significant displacement. In 2016, Eastern Africa had the highest number of displaced people in all of Africa, accounting for 63% of the continent's disaster related displacement (IDMC 2017). It is estimated that the number of climate migrants in Eastern Africa could be as high as 10.1 million by 2050 (Rigaud et al. 2018).

Agriculture is the backbone of the Eastern African economies and the main source of livelihood for most people in the region. Agriculture employs more than two-thirds of the labor force in all these countries, except Sudan and Kenya. As a result, any threat to agriculture will affect the livelihood of most of the population in these countries. Existing evidence shows that migration is one of the most common responses or coping strategies to negative agricultural shocks caused by climate change. For example, a study in Tanzania shows that a 1% reduction in agricultural income induced by weather shock increases the probability of internal migration by an average of 13 percentage points within the following year (Kubik and Maurel 2016).

The share of Eastern Africa's youth population (35%) is the highest in Africa. There is a large youth population joining the labor market in both urban and rural areas, and often with more education than the previous generation. Climate change exacerbates youth employment challenges in the region. Environmental and agroecological changes result in lower crop and livestock productivity, more land scarcity and higher risks of extreme weather events. As a result, the region is expected to experience a significant increase in international youth migration in the coming decades.

Although detailed data on youth migration is not available for many African countries, the limited available indirect evidence suggests that there is already significant youth migration. The median age of international migrants in the East Africa region is 27, while the global average is 39. Similarly, 43% of migrants in East Africa are aged 10 to

34 years old, with this age group accounting for 35% of all international migrants. Similarly, case studies from some Sub-Saharan African countries show that 60% of internal migrants are between the age of 15 and 34 years old in Sub-Saharan Africa (Mercandalli and Losch 2017).

Conclusions and policy implications

Climate change is expected to influence human mobility in all regions of the world. Although assigning specific numbers has been controversial, there is a broad consensus that climate change will result in unprecedented levels of migration in the coming decades. Poor countries and communities such as those in Eastern Africa will be affected the hardest because of their limited coping and adaptive capacity. Agriculture dependent communities in this region are especially vulnerable given that climate change damages the environmental resources and ecosystems that form the basis for their livelihoods.

Our study provided an in-depth analysis of climate-agriculture-migration linkages from an extensive review of empirical literature. For the case study countries, we focused on drought due to its importance for agricultural livelihoods. We found suggestive evidence that international migration in East Africa is positively correlated with drought experience. In terms of forecasts for the region, our climate model shows that 21st century droughts will be longer and more frequent than those associated with the present-day climate. In light of past migration trends for the region in general and for youth in particular, we expect that Eastern Africa is likely to experience significant international migration in the coming decades.

In this note we discuss two of the adaptation options that we recommend for expanded institutional support and further exploration of studies like the current one:

CSA: Use of climate-resilient agriculture approaches is one strategy to address migration away from rural areas and provide more opportunities to youth employment. Existing evidence from several Sub-Saharan African countries suggests that adoption of CSA leads to improved agricultural yields, food security, livelihoods and income in the context of climate change and variability. However, adoption by smallholders in Eastern Africa is limited suggesting that farmers are facing constraints to adopt CSA. Eastern African governments and development agencies can facilitate adoption of CSA by supporting the development, piloting and scale-up of appropriate CSA technologies. In addition to improving overall resilience of agriculture to climate change, CSA can also open new opportunities for youth employment creation. For example, a new strategy in northern Ethiopia allocates rehabilitated communal land for youth groups to engage in apiculture, horticulture and other sustainable livelihood activities (Holden and Tilahun 2018).

Facilitating smart migration: Many governments in developing countries have a knee-jerk reaction towards rural-urban migration with the impulse towards prohibiting it. Similarly, countries in the Global North discourage international migration from the Global South. However, research and historical evidence suggests that migration is often a last resort coping strategy and that coordinated and well managed migration at times could be good for the migrant, their family and the host community in some cases. The 2030 Agenda for Sustainable Development recognizes the relevance of migration for development and reflects this by incorporating the phenomenon in the Sustainable Development Goals (SDGs). Out of the 17 goals, 11 contain targets and indicators that are relevant to migration or mobility. In the context of climate variability and change, facilitating orderly and planned migration, such as allowing and facilitating internal migration from exposed areas prior to shocks, and securing agreements between receiving and sending countries for international (labor) migration, can improve the adaptive capacity and recovery of households exposed to environmental shocks. Planned migration is also likely to reduce the risk of large-scale and chaotic displacement at breaking point. This is particularly important for youth. Currently thousands of young people are taking risky unplanned and unmanaged irregular migration crossing deserts and seas to reach their goal of a better and safe life. In 2015 alone, more than five thousand people died on the sea trying to cross the Mediterranean into Europe. Legal migration avenues from the region both within and outside Africa may reduce irregular migration that is expected to become worse with climate change (IOM 2018).

Further Reading

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