CGIAR

Factsheet Climate Security in Ethiopia

Is climate a "risk multiplier" in Ethiopia?

A CGIAR study

Ethiopia experiences high climate variability, conflict, and political uncertainty while widespread food and nutrition insecurities are common throughout its population. CGIAR and WFP conducted a study to better understand how Ethiopia's climate, socio-economic, and political risks and insecurities are linked to each other. This information can orient strategies and planning of long-term peacebuilding efforts and mitigate conflict risk in a climate crisis and inform strategies to strengthen the role of food for peace.

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Climate and conflict in Ethiopia

Ethiopia is extremely exposed to climate impacts. Almost 90% of its surface is vulnerable to severe or extreme climate stresses (Figure 1). Extensive periods of droughts have become more frequent in the past decade and caused significant economic losses, primarily through their impact on agricultural productivity. With more than 10% of the population being very or chronically food insecure, climate impacts on the most vulnerable are extremely concerning. Border conflicts and internal fighting have displaced hundreds of thousands of Ethiopians over several decades, affecting already vulnerable communities. ACLED data (1997-2020) shows that battles, especially armed clashes, and protests have been the dominant type of conflict in the past five decades with a rate of fatalities compared to other conflict events (Figure 2).
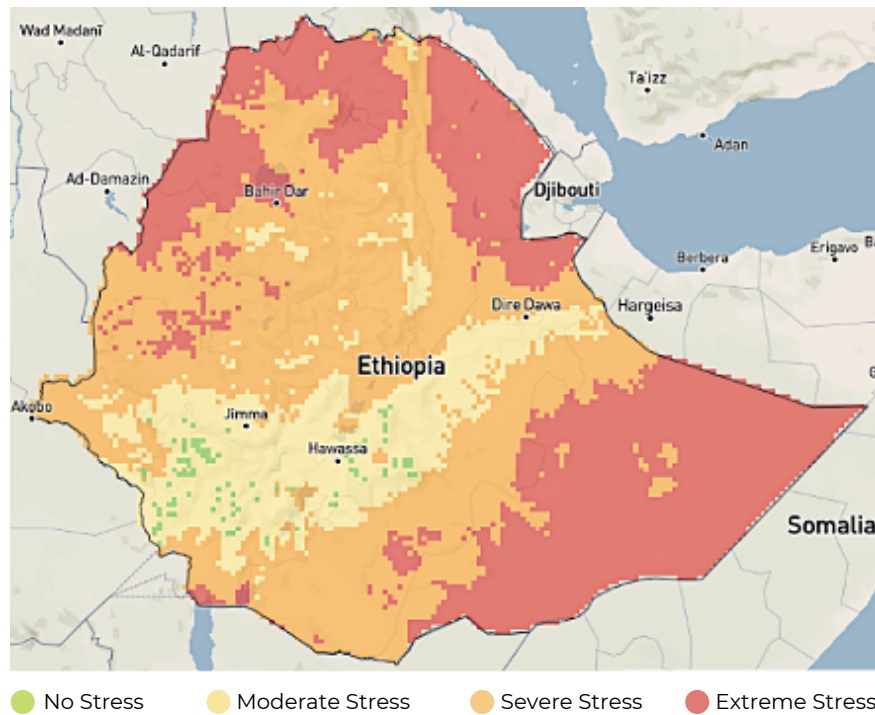

Figure 1 Climate exposure to aridity in Ethiopia measured as Thornthwaite's aridity index. Source: Smallholder Adaptation Atlas (CGIAR, 2021)
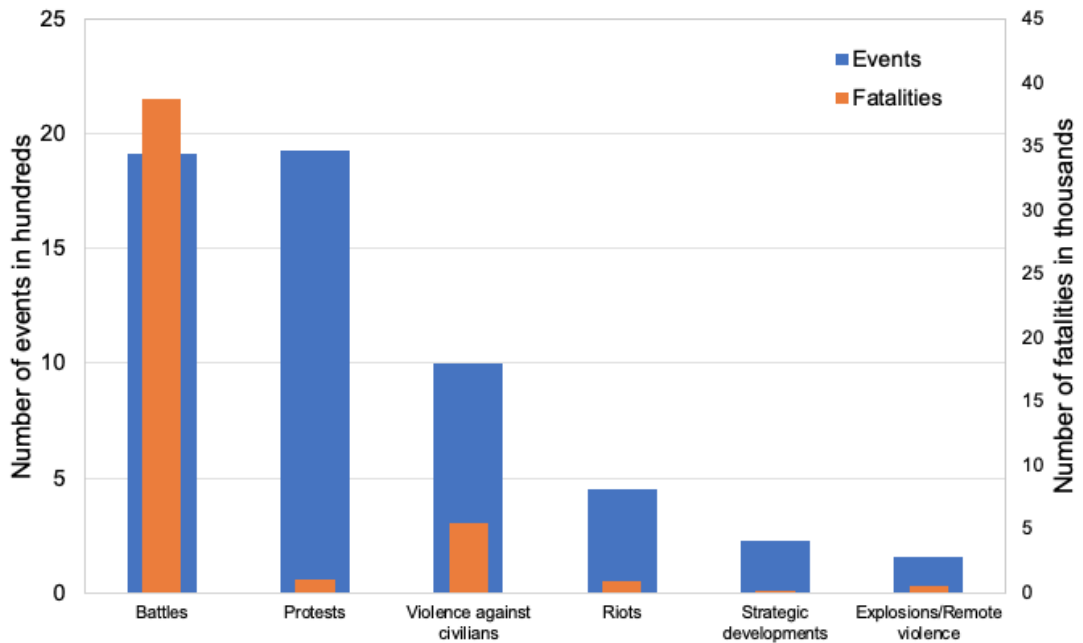
Figure 2 Overview of reported conflict events and fatalities in Ethiopia per event type, period 1997–2020. Data from the ACLED database.

Climate exacerbates food insecurity and poverty that can lead to more frequent conflicts

With a high proportion of the Ethiopian population relying on rainfed agriculture and pastoralism, climate variability exacerbates existing household level insecurities that are correlated with a higher likelihood and intensity of conflict. Climate is a threat multiplier. Drought and high temperature extremes are the main drivers hindering crop and livestock productivity, increasing household level food and nutrition insecurity, poverty and inequality and decreasing agricultural employment, which in turn are correlated with a higher likelihood and intensity of conflicts. For example, we find that an increase of ten days in the year with high temperature (>37 degree Celsius) increases the number of food insecure households, on average, by 3% and that the increase of one food insecure household is correlated with a 3% increase of the likelihood of future conflicts at woreda level. Similarly, high temperatures are positively correlated with the number of poor people in the woreda and that an additional household falling into poverty is positively correlated with the likelihood of conflict (on average +2%) and insurgence of more battles (on average an increase by fifty of the number of poor households is correlated with an additional local battle) in the woreda.

The impact of climate on food insecurity can cascade in multiple, wider security risks

Our analyses also show that the impact of the climate on food security and poverty will result in the increase of multiple additional socio-economic risks that are connected to food insecurity and poverty (Figure 3). Using network analysis we are able to show that that there exists a clear interconnection between several key socio-economic dimensions (green), climate (purple) and conflicts (yellow). Figure 3 shows that the strongest nodes are between aridity (ecological system), food and nutrition insecurity, high population pressure, lack of education, agricultural productivity, number of people in a crisis and intensity (events and fatalities) and diversity (richness) of conflicts. This suggests that an increase exposure to climate impacts of a part of this system, such as food security and poverty, can generate in increasing risks and insecurities across multiple dimensions of the network, such as inequality, agricultural productivity, and crisis exposure.
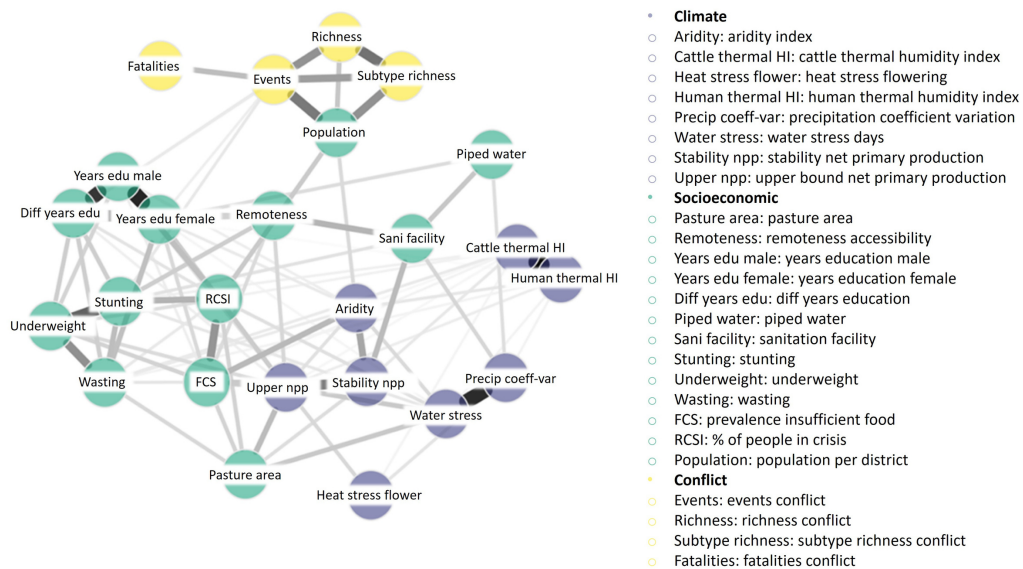

- **Climate**
  - Aridity: aridity index
  - Cattle thermal HI: cattle thermal humidity index
  - Heat stress flower: heat stress flowering
  - Human thermal HI: human thermal humidity index
  - Precip coeff-var: precipitation coefficient variation
  - Water stress: water stress days
  - Stability npp: stability net primary production
  - Upper npp: upper bound net primary production
- **Socioeconomic**
  - Pasture area: pasture area
  - Remoteness: remoteness accessibility
  - Years edu male: years education male
  - Years edu female: years education female
  - Diff years edu: diff years education
  - Piped water: piped water
  - Sani facility: sanitation facility
  - Stunting: stunting
  - Underweight: underweight
  - Wasting: wasting
  - FCS: prevalence insufficient food
  - RCSI: % of people in crisis
  - Population: population per district
- **Conflict**
  - Events: events conflict
  - Richness: richness conflict
  - Subtype richness: subtype richness conflict
  - Fatalities: fatalities conflict

Figure 3 The climate security network showing interconnections between climate, socio-economic risks and insecurities and conflicts in Ethiopia.

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Afar, Somali and Tigray regions are currently the most exposed to climate security risks

Climate security risks are not the same everywhere in Ethiopia. Using spatial analysis, we can identify hot spots of climate insecurities (Figure 4). In Ethiopia, areas where persistent dry-hot climate conditions, chronic food insecurity and different socio-economic vulnerabilities converge present a moderate to severe conflict incidence. These areas encompassed the woredas of Elidar, Dubti, Mile, and Afambo in the north-eastern part of the Afar region. In Somali, affected areas included the northern woredas of Ayisha and Shinile, eastern woredas of Danot, Warder, Shilabo, Kebridehar, Denan, Shekosh, Gunagado, Aware, and Gashamo, and southern woredas of Dolo Odo, Filtu, and Moyale. Additional climate-security hotspots include border regions with Eritrea in the woredas of Gulomekeda and Erob in the Tigray region (Figure 4 – purple and red areas, respectively – right map).
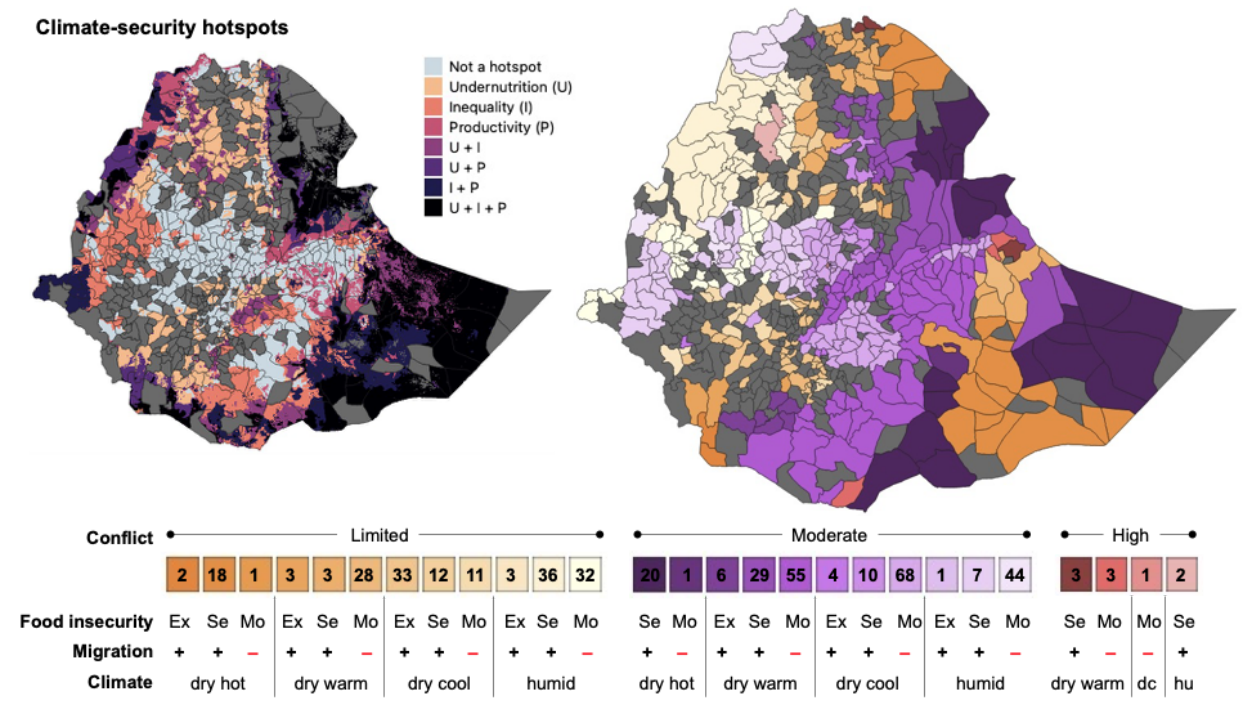

Figure 4 Hotspots of undernutrition, inequality, and low productivity within the conflict-security nexus. The left map shows areas of high undernutrition, inequality and low productivity, and their overlaps. Black areas indicate hotspot of climate, conflict, undernutrition, inequality, and low productivity. The map on the right shows the climate-security nexus as the intersection between food insecurity, climate conditions, and conflict. Dark red areas are hotspots of high conflict intensity, harsher climatic condition and severe food insecurity. The numbers indicate the number of woredas in each combination of conflict – climate – food insecurity. Food security levels (Ex: extreme, Se: severe, and Mo: moderate). Migration levels (+: immigration and -: outmigration). Climate levels (dry-hot, dry-warm, dry-cool, and humid). Dark grey areas have no conflict reported according to ACLED.

In addition, for the period 1980 – 2020, there exist a number of hotspots where harsh climate conditions and conflicts co-occurred with other insecurities, such as high prevalence of malnourished children, low education levels, and low agricultural productivity. These hotspots are in black in Figure 4 (left map) and cover the regions of Amhara, Benshangul - Gumuz, Gambela and SNNP in areas bordering Sudan and South Sudan and areas in the Oromia region bordering north-east Kenya.

In the harshest climate conditions (dry-hot weather), there exist highly localized hotspots for each of these insecurities. For instance, hotspots of dry-hot climate, moderate conflict intensity and highest rates of stunting, wasting and underweight are mostly located in the Afar zone 2 and in the Gode and Degehabur woredas in the Somali region (dark brown – top right map, Figure 5). On the other hand, hotspots of climate security risks and inequality are in the coastal areas of Degehabur and Warder woredas in the Somali region, in the Borena and Bale woredas in the Oromia region and in the centra parts of the Afar regions (dark red – bottom left map, Figure 5). Finally, hotspots of climate security risks and low agricultural productivity in the dry-hot climate areas are in the Shinile Dire Dawa, Karahe, Worder, Liben and After woredas in the Somali region (dark blue – bottom right map, Figure 5).
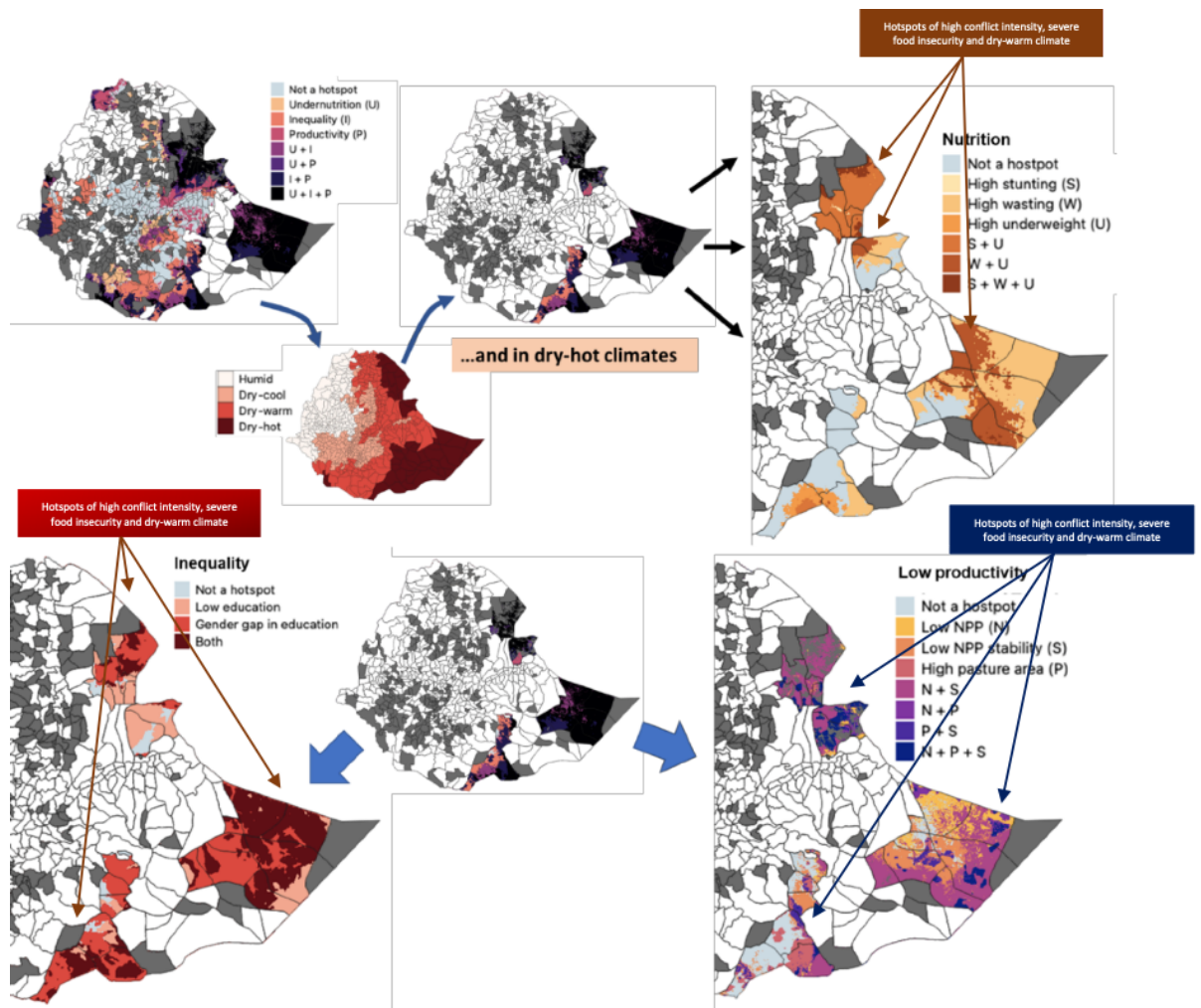
Figure 5 Hotspots of undernutrition, inequality, and low productivity within the conflict-security nexus. The top – left map shows the hotspots only in those areas where climate hasher (dry-hot). The top-right map shows the hotspots of nutrition insecurity within the clusters of dry-hot climate. The bottom two maps show the hotspots of inequality and low agricultural productivity within the clusters of dry-hot climate (on the left, inequality; and on the right low agricultural productivity). Dark grey areas have no conflict reported according to the ACLED database.

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