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Is climate a “risk multiplier” in the Central American dry corridor?

A CGIAR/World Food Programme (WFP) study

The Central American Dry Corridor (CADC) 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 CADC’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, mitigate conflict risk in a climate crisis and inform strategies to strengthen the role of food for peace.

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Is climate a “risk multiplier” in the Central American dry corridor?

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Climate and conflict in the CADC

Central America is classified as highly vulnerable to climate impacts given its exposure to climate hazards and the limited adaptive capacity of its rural population (Pachauri et al., 2007; Bouroncle et al., 2017). Specifically, Guatemala, El Salvador, Honduras and Nicaragua are projected to be affected more frequently by strong precipitation variability and intense droughts (IPCC, 2013). The region is strongly affected by intermittent droughts, hurricanes, and the El Nino-southern oscillation (ENSO) phenomena (CEPAL, 2011), with three countries in the region ranking in the top ten of the Global Climate Risk Index (Kreft & Eckstein, 2014). The Central American Mid-Summer Drought (MSD) is the most important driver of agricultural productivity and food insecurity in the CADC. The MSD is a dry period with a duration of approximately two weeks which typically occurs in the 'postrera' season (August–November). In extremely dry seasons (e.g., when ENSO is in a positive phase) the MSD can last for longer than two weeks, severely hindering crop, and livestock productivity, and often leading to food insecurity. Climate-related shocks on food production constrain rural prosperity and hinder food security especially for small-scale grain producers. This in turn leads to migration from rural areas toward cities. There is also competition for valuable natural resources and land in rural areas, which often result in violence and more migration (Rüttinger et al., 2015).

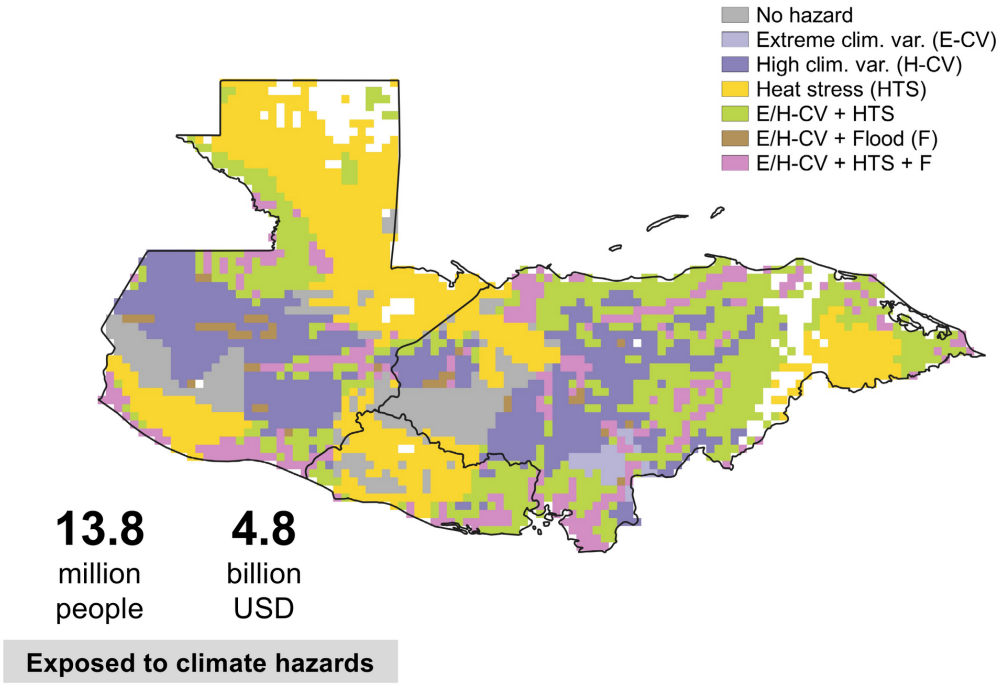

Figure 1 Map of the most important climate hazards in the three CADC countries considered in the analyses. In total, it is estimated that almost 14 million rural people and 5 billion US dollars in crop and livestock production are exposed to climate hazards. Source: own elaboration based on Ramirez-Villegas et al. (2021). Source of flood data: UNEP-GRID flood risk.

The CADC is also considered one of the most insecure regions in the world (Roser & Ritchie, 2019). Previous conflicts in the CADC, the Salvadoran Civil War (1979 - 1992), Guatemalan Civil War (1960-1996), left persisting landmarks in the development of the different countries. In El Salvador, almost 80,000 were killed during the civil war, 550,000 people were internally displaced and 500,000 became refugees in other countries (Manz, 2008). During the 36-year civil war in Guatemala, more than 200,000 people were killed or disappeared and additionally 1.5 million displaced, where most of the violence was directed at the indigenous population protesting against economic and political inequality (HMC, 2020). Since these wars, gangs' violence has increasingly affected the security in the region. The most prominent gangs formed in the USA and spilled over to the CADC after deportees from the U.S. were placed back to Central America. Although estimates vary considerably, it is believed that there are approximately 25,000 gang members in El Salvador, 14,000 in Guatemala, and 36,000 in Honduras (Fogelbach, 2011). Criminal activities by gangs also include land grabbing. During the 1970s and 1980s many of the arable lands, cultivated by local farmers for food crops, were occupied by criminal groups for the cultivation of coffee and sugarcane. Gangs recruits focus on the urban poor, including those that have migrated from rural areas.

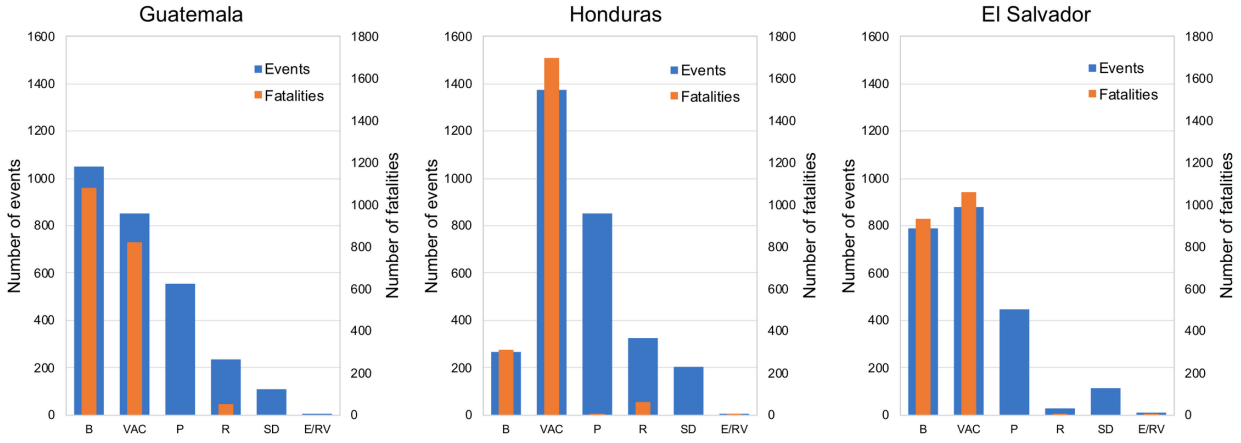

Figure 2 Overview of reported conflict events and fatalities in the CADC per event type, period 2018–2020. Data from the ACLED database. Letters in the x-axis refer to the event type as follows, B: battle, VAC: violence against civilians, P: protests, R: riots, SD: strategic development, and E/RV: explosion / remote violence.

Recent data from ACLED show that gangs and non-state armed groups are still by far the leading violent actors, as they are responsible for virtually all the battles (consisting solely of armed clashes) and violence against civilians (mostly attacks). In most cases, armed clashes occur between two different gangs or armed groups, whereas only seldom the military or police are involved. Both armed clashes and attacks against civilians take place in different areas of the countries, though they tend to have a greater concentration around the major cities (especially for Honduras and Guatemala). The average number of fatalities per events for these two conflict types (battles, and violence against civilians) ranges between 1 (Guatemala) and 1.3 (Honduras). Protests are also very frequently reported in the ACLED database for the CADC. Protests are primarily peaceful, and hardly lead to deaths. Overall, protests are more common in Honduras, followed by Guatemala, and finally by El Salvador (Figure 2).

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

A two-stage least square regression approach was used to assess how climate variability may indirectly affect conflict presence in a household's district in El Salvador. The hypothesis is that climate extremes have an indirect effect on conflict by exacerbating a variety of social insecurities, which in turn may increase conflict occurrence. The first stage of the analysis shows that precipitation anomalies and temperature extremes increase agricultural production costs, reduce agricultural income, and hence increase household level food insecurity, poverty and inequality. In the second stage we find that increased agricultural production costs and reduced agricultural income increase the likelihood and intensity of conflicts at municipal level. Higher poverty and agricultural costs also increase the intensity of battles.

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

When assessing for statistical relationships while controlling for confounding variables, a network analysis showed that in areas with high conflict intensity and diversity, the main climate drivers of conflict are lack of precipitation, intensity, and magnitude of the mid-summer drought (Figure 3). Our analyses also show that the impact of the climate on food security and poverty will result in the increase of multiple additional socioeconomic risks that are connected to conflict. For instance, in El Salvador the network indicates extreme climate events are strongly connected to income from agriculture, household wealth status, poverty and finally conflict.

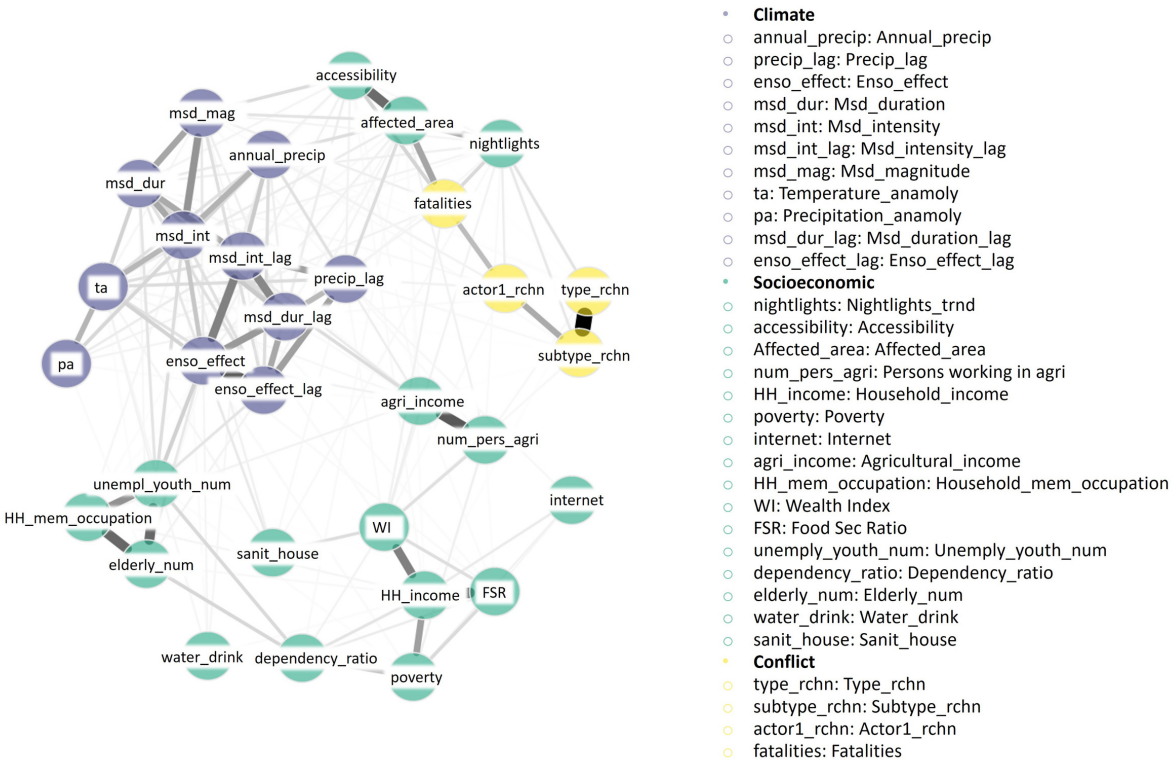

Figure 3 The climate security network showing interconnections between climate, socio-economic risks and insecurities and conflicts in El Salvador.

Household income is also strongly linked with the type of employment of household members and with youth unemployment. While wealth in general is strongly connected with agricultural income and employment as well as to access to safe water for drinking. This suggests that climate may have exacerbating effects on part of the socio-economic system such as food security and poverty, that could, in turn, generate increasing risks and insecurities across multiple dimensions of the network, such as employment, agricultural productivity, and access to essential services, potentially leading to increased conflict.

There exist “climate insecurity hotspots” at sub-national level where high levels of climate variability, conflict intensity and diversity co-occur with other existing socio-economic insecurities

Using spatial analysis, we can identify hotspots of climate insecurities (Figure 4). In Guatemala, particular attention should be given to the rural and peri-urban areas around Guatemala City, which show high conflict occurrence while at the same time being socially vulnerable with the presence of low school attendance, access to mining, and high density of cash crops. We also highlight the subsistence farming areas in Huehuetenango, Quiché, and Baja Verapaz, though classified as having limited and moderate conflict, the high social vulnerability could be exacerbate by adverse climatic conditions.

In Honduras, the southern areas (Choluteca department) show significant social and biophysical vulnerability, while also showing moderate to high conflict. In these areas, we find occurrence of poorly productive staple crop systems, combined with high accessibility to mining concessions and some presence of cash crops (cotton, coffee). We also highlight the areas of western Honduras (Copán, Intibucá, Lempira) where nutritional insecurity is high, but conflict has low intensity and diversity.

In El Salvador, vulnerability hotspots tend to cover border areas (with both Honduras and Guatemala), and though these areas do not show high conflict, they show high prevalence of stunting. High conflict areas of El Salvador tend to be associated with access to opportunities for deforestation, whereas the moderate conflict cluster shows low agricultural productivity for staple crops, high density of cash crops, and to a lesser degree access to deforestation spots.

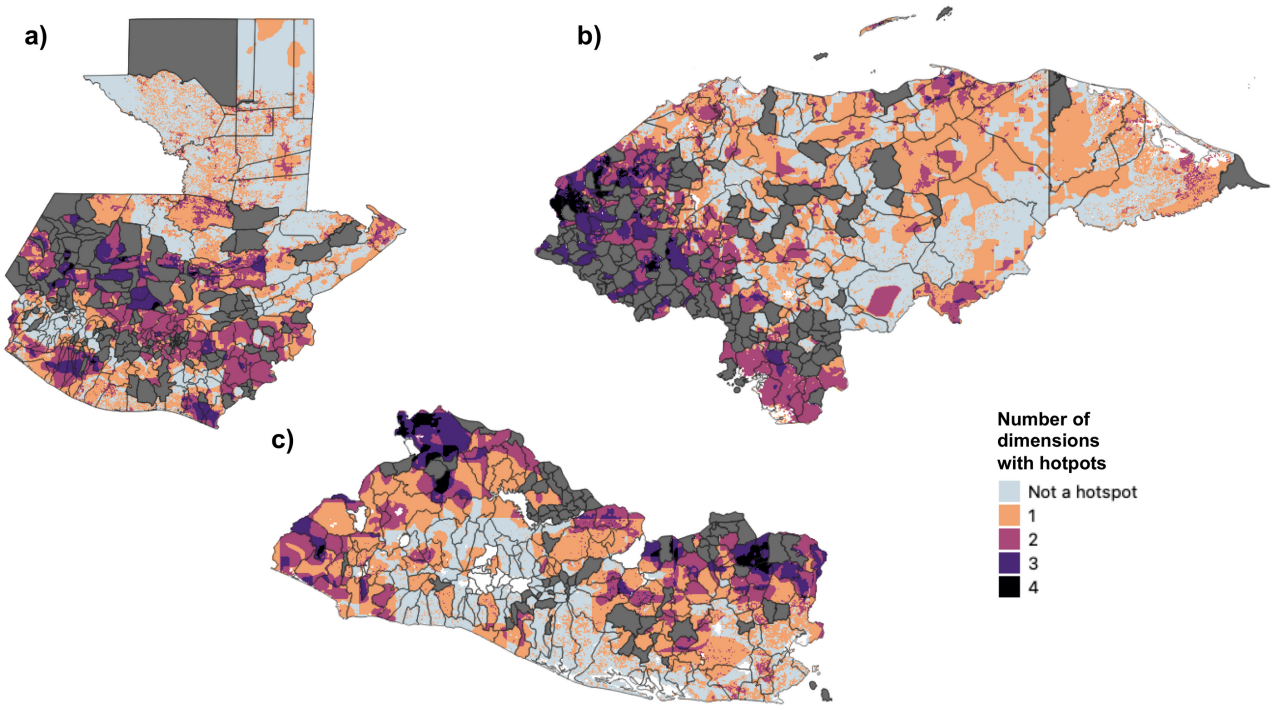

Figure 4 Multi-dimensional hotspots overlaid on the conflict–food insecurity–climate nexus in CADC for Guatemala (a), Honduras (b), and El Salvador (c). Dark grey areas are those where no conflict has been reported. The values show the count of dimensions highlighted as hotspots from a total of four dimensions, namely, high undernutrition, inequality, low productivity, and high potential for access to valuable resources (mining, forest, cash crop cultivation). High potential for access to valuable resources means that resource depletion activities potentially exacerbating conflict can take place easily in these areas .

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