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HOW WEATHER VARIABILITY AND EXTREME SHOCKS AFFECT WOMEN'S PARTICIPATION IN AFRICAN AGRICULTURE

Gianluigi Nico, Carlo Azzarri, and Claudia Ringler

Agriculture is strongly affected by environmental factors, including variability in temperature and precipitation, which in turn shape the livelihoods farmers derive. In this context, the intensity of engagement in agriculture is directly influenced by temperature and rainfall patterns (ILO 2018). Both extreme weather shocks (that is, heat waves, droughts, and floods) and weather variability (that is, changes in temperature and rainfall patterns) can significantly disrupt participation in agriculture and related sectors, particularly when farmers' capacity to cope with and adapt to these shocks is low. This policy note summarizes the results of a study designed to quantify the impact of climate variability and extreme weather shocks on the intensity of individuals' participation in the agricultural sector in Africa, where intra-annual weather variability is high, and dependence on rainfed agriculture is significant. The study specifically focused on changes in the number of weekly hours worked in response to weather variability and climate extremes, and explored both the impact on women's participation and their potential to mitigate the negative effects of these shocks.

Agricultural Exposure to Climate and Weather Shocks

Agriculture has long been Africa's primary source of employment. Recent estimates for 30 countries—based on the latest available national household survey data for each country—suggest that 159 million people aged 15 years or more were engaged in agriculture at least one hour a week, including about 74 million women, who constituted 46 percent of all agricultural employment in the sample countries. In addition to those directly involved in agriculture, an estimated 307 million people depended on the sector indirectly. This results in a combined total of almost 466 million people depending either directly or indirectly on agriculture, which represents 51 percent of the total population in the countries analyzed (Table 1). While in North Africa the share of women involved in agriculture is less than a third of the total (30 percent), in the other African regions the same share is almost half (45 percent for West and Central Africa, and 49 percent for East and Southern Africa).

Given the dominance of the agricultural sector for employment across Africa, changing climatic conditions are among the continent's most important challenges. For the past two decades, many African countries have recorded average yearly temperatures above the long-term national average. At the same time, precipitation has followed a declining trend on the African continent. This exposes the agricultural sector to increasing vulnerability given the region's high reliance on rainfed production. Climate change is projected to cause greater variability in rainfall generally, as well as in the occurrence of extreme events.

TABLE 1. Number of African people employed in or dependent upon agriculture by region (latest available data)

Region	Employment in agriculture (million)			Additional members of agricultural households (million)	Total number of dependents on agriculture (million)
	Women	Men	Total		
North Africa	2.076	4.936	7.012	16.253	23.265
West and Central Africa	31.239	38.130	69.368	147.890	217.258
East and Southern Africa	40.402	42.246	82.649	142.809	225.458
Sample total	73.717	85.313	159.029	306.953	465.982

Source: Constructed by authors from labor force surveys and household income and expenditure surveys conducted over various years.
Notes: The sample data include 30 countries covering more than 80 percent of Africa's total population and nearly 86 percent of its total employed population. Data from household surveys date as far back as 2003 for some countries, but for the majority of countries they were conducted between 2014 and 2019. Employment/engagement in agriculture is defined as being involved in the sector in any capacity—whether in production, processing, packaging, transport, marketing, and so forth—for at least one hour in the week prior to the date of the household surveys.

Female Participation in Agricultural Employment by Shock-Affected Area

To explore women's participation in agricultural employment in shock-affected areas in the sample countries, the authors matched descriptive statistics from a 21-country subset of the nationally representative household surveys with monthly grid-cell time-series data on temperature and rainfall for the 1979–2019 period. A subnational area was categorized as being affected by a rainfall or temperature shock if monthly average precipitation and temperature values during the planting and growing season in any of the six months prior to the household surveys for the relevant crops were higher or lower than 1 (positive or negative) standard deviation from the long-term monthly average computed for the same months during 1979–2019. This ensured that potential shocks during both the planting and growing season would be captured.

Note that for North Africa, adequate data were only available for Tunisia, where no droughts or heat waves were identified during the period under study. As a result, North Africa was excluded from the rest of the analysis presented in this note (Figure 1).

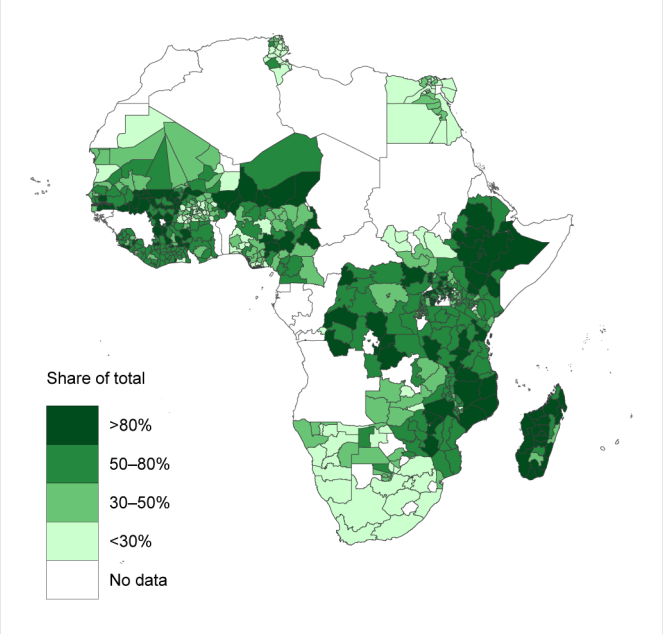
In general, women were more likely than men to engage in agriculture in drought-prone areas or areas affected by heat waves (Figure 2). In the two regions analyzed—that is, West and Central Africa, and East and Southern Africa—women represented a larger share of agricultural employment in areas affected by heat waves and droughts, and a lower share in areas unaffected by extreme weather events—making the reverse true for men. More than half of all women engaged in agriculture in the two regions were engaged in areas affected by heat waves. Similarly, an estimated 59 percent of female farmers in West and Central Africa were farming in areas affected by drought, whereas more male farmers in the same region were engaged in areas unaffected by drought (55 percent). A similar pattern was found in East and Southern Africa. Although these results could be affected by other factors, they indicate women's overall greater exposure to heat waves and drought events compared with men's exposure.

Effects of Extreme Shocks and Weather Variability on the Intensity in Agricultural Employment

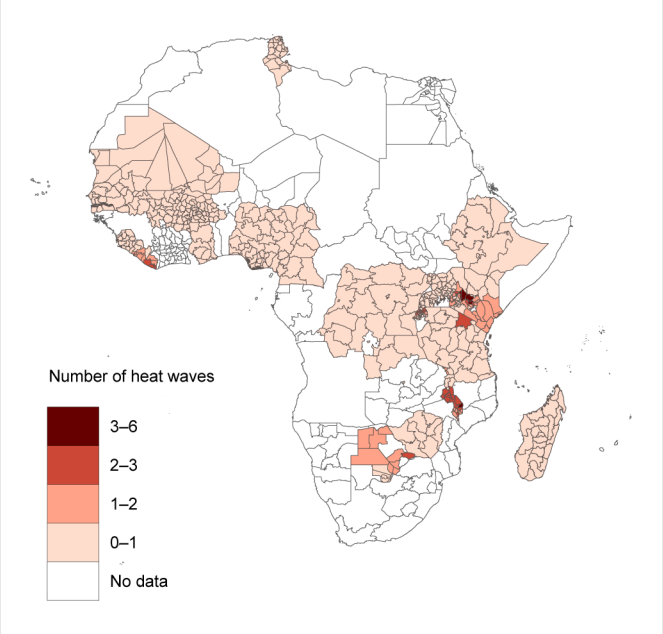
Results of the analysis conducted suggest that the intensity of women's and men's participation in agricultural activities is negatively and strongly correlated with temperature variability. Extreme weather events were associated with the most detrimental effects, reducing the number of weekly hours men and women engaged in agricultural activities by an average of 40 percent in the case of heat waves and 14 percent in the case of droughts. The effects of heat waves and drought events appear to be especially severe in West and Central Africa, where respondents reduced their number of weekly hours worked by an average of 49 and 23 percent, respectively. Flood events had a greater impact in East and Southern Africa, where survey respondents decreased their weekly working hours by an average of 26 percent.

FIGURE 1. Subnational share of agricultural employment and number of extreme weather events in the six months prior to the household surveys

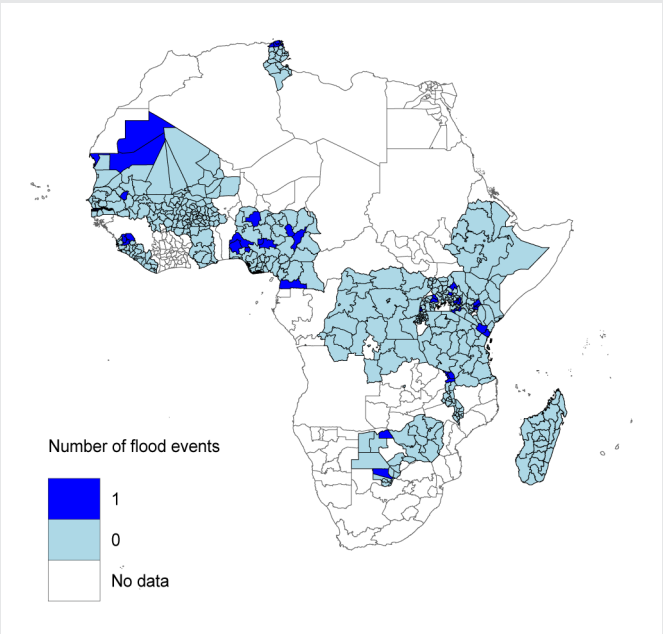
a. Agricultural employment/engagement



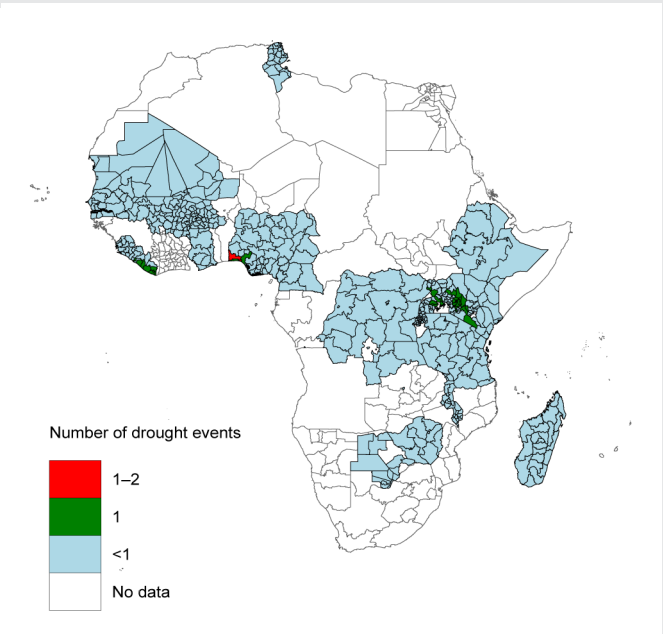
b. Heat waves in the six months prior to the household surveys



c. Flood events in the six months prior to the household surveys



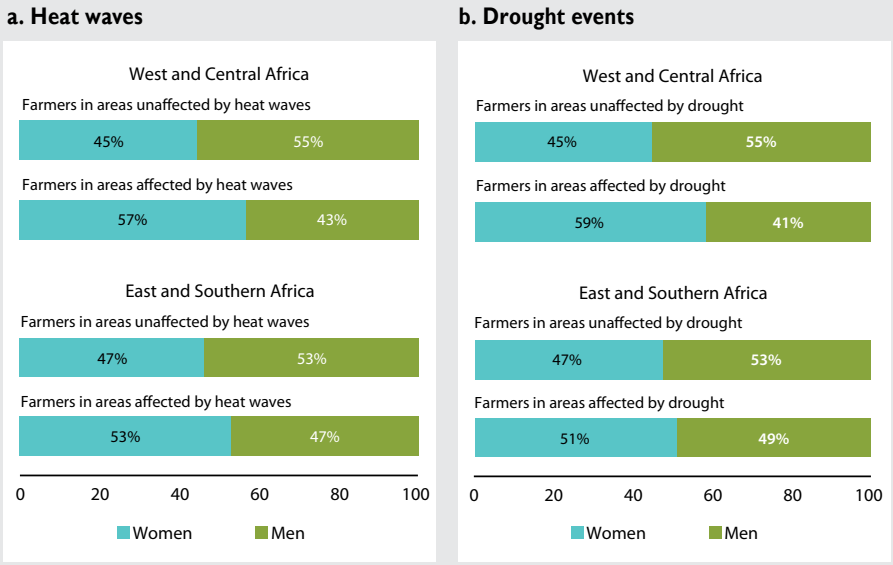
d. Drought events in the six months prior to the household surveys



Source: Constructed by authors based on Fick and Hijmans (2017).

Notes: Data are based on the lowest administrative level for each survey. Climate-shock-affected areas were identified in 21 of the surveys included in the analysis, which was sufficient to allow for regional level inferences. As previously stated, adequate data for North Africa were only available for Tunisia, but no droughts or heat waves were identified in that country during the 2013–2014 agricultural season. Employment/engagement in agriculture is defined as being involved in the sector in any capacity—whether in production, processing, packaging, transport, marketing, and so forth—for at least one hour in the week prior to the date of the household surveys.

FIGURE 2. Agricultural employment disaggregated by gender and shock-affected areas



Source: Constructed by authors based on household survey data.

Notes: Employment/engagement in agriculture is defined as being involved in the sector in any capacity—whether in production, processing, packaging, transport, marketing, and so forth—for at least one hour in the week prior to the date of the household surveys.

Women's participation in agricultural activities did appear to mitigate the negative effects of extreme weather events on the intensity of agricultural work undertaken at the household level. Their work hours declined less, on average, than men's. Results from the analysis provide strong evidence that women take on larger roles in the case of heat waves. Women's participation in agricultural activities mitigated the negative impact of heat waves on farm labor by an estimated 40 percent compared with men's participation. Similarly, women's participation in agriculture mitigated the negative impacts of droughts in West and Central Africa by an estimated 28 percent compared with men's participation.

Summary

Study results indicate that the number of hours worked by female farmers during extreme climate events declines less than the comparable number of hours worked by male farmers. As such, women play a pivotal role in enhancing agricultural performance and mitigating the negative effects of extreme weather events. Indeed, the results of the study show that women's engagement in agricultural activities mitigates the negative impact of heat waves on the number of weekly hours worked by an estimated 40 percent on average, albeit with substantial subnational and regional differences. Growing evidence suggests that this is due to men's larger mobility and employment opportunities outside agriculture. When economic opportunities in the agricultural sector decline in response to extreme weather events, male farmers have more opportunities to secure alternative income sources, such as in urban construction or service-sector jobs. As such, extension services and practitioners should increase their direct engagement with female farmers on drought-related, heat-stress, and flood-tolerant agricultural technologies. Importantly, investors should increase their contributions to agricultural R&D geared toward reducing women's labor burden both within and outside agriculture, paying attention to such tradeoffs as workloads, food security, individual and household wellbeing, and the availability of assets.

References

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Gianluigi Nico *is employed at the World Bank;* ***Carlo Azzarri*** *and* ***Claudia Ringler*** *are employed at the International Food Policy Research Institute (IFPRI).* *This publication was prepared under the Gender, Climate Change, and Nutrition Integration Initiative (GCAN). GCAN was made possible with support from Feed the Future through the U.S. Agency for International Development (USAID). The policy note has not been peer reviewed. Any opinions are those of the authors and do not necessarily reflect the views of IFPRI, the World Bank, USAID, or Feed the Future.*