POLICY BRIEF

Drought Impacts on Crops Sector and Adaptation Options in Burkina Faso : A Gender Focused Computable General Equilibrium Analysis

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Key messages

- Droughts degrade economic performance in Burkina Faso, restricting agricultural production and threatening standard living of the population.
- Women are more vulnerable to agricultural drought shocks than man, destroying productive capital and losing salaried jobs.
- Programs to support and promote the rural sector such as the livestock sector can help women and rural households protect themselves from drought shocks.

- Encouraging and strengthening the use of climate-smart agricultural technologies, such as irrigation systems, integrated soil management, and improved drought-tolerant seeds, can help mitigate the vulnerability of the agricultural sector and reduce food insecurity and poverty.

Agricultural droughts in Burkina Faso cause agricultural production to plummet, threatening food security and poverty

Burkina Faso has experienced recurrent droughts since the 1970s. Between 1969 and 2020, drought affected more than 15 million people in Burkina Faso. In 2011, for example, the drought resulted in the loss of half a million tons of grain and caused a food shortage that affected 2.8 million people (USAID, 2019). In addition, estimates predict reductions in rainfall and increases in temperature by 2050 (USAID, 2019). Such shocks would increase drought events and have adverse effects on economic activities, particularly agricultural activities.

Droughts pose a threat to the stability of food production from agriculture in Burkina Faso, but also to the production system as a whole, as well as the services it provides. These effects affect both rural and urban households and both men and women. However, women are less resilient to drought shocks, especially given their low capacity to access productive resources, such as land, uninsured credit and low capacity to migrate.

The economic and social situation in Burkina Faso is also generally poor, including gender inequality. Approximately 41.4% of the population still lives below the poverty line, and the average per capita income is $1,335 for women versus $2,077 for men (PNUD, 2019). In addition, income poverty affects relatively more women (43.7%) than men (40.6%) (Agbodji et al., 2015). Between 2014 and 2016, 20.7% of the population of Burkina Faso was food insecure and rural areas are the most affected by extreme poverty, with 94.4% suffering from hunger (INSD, 2015).

If no action is taken, drought shocks will lead to increased poverty, food insecurity and mortality

Since the droughts of the 1970s, Burkina Faso has experienced multiple development projects including water and soil conservation, agroforestry, desertification control and land management. The government of Burkina Faso with the support of non-governmental organizations have implemented programs for the development of innovative adaptation practices against climate shocks such as the development of irrigation systems, the adjustment of sowing dates, the development of crops more tolerant to climate stress and agroforestry. Since 2015, the government's

National Climate Change Adaptation Plan (NAPA) has allowed the integration of adaptation measures into sectoral policies. The objectives of the NAPA are multiple : from protecting the pillars of economic growth to protecting water resources and ecosystems, ensuring food security and protecting the population from extreme weather events.

Key findings

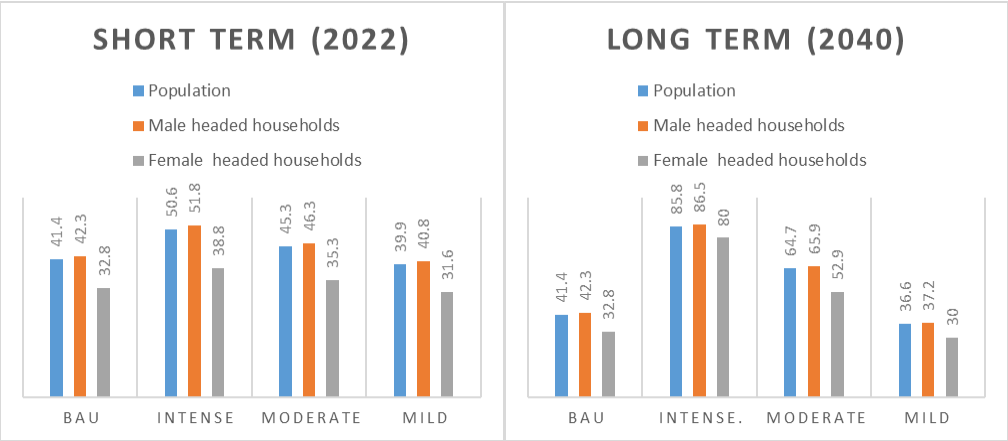
Droughts have effect on economic performance and households welfare in Burkina Faso.

- Drought episode reduce agricultural value added, labor force participation in farm and in off-farm activities and increase unemployment.
- The decline in crop yields reduces value added in both the agricultural and non-agricultural sectors. While the direct impact is greater in the agricultural sector, once transmitted to the non-agricultural sector, the average net effect is relatively more unfavorable to urban households.
- The drought leads a decline in real consumption for all households. Droughts affect more urban households than rural households affected in terms of reduced real consumption.
- Drought shock reduce agricultural production and per capita food availability decrease by 10.4%, 7.3%, and 4.6% in the short term and by 11.1%, 7.5%, and 4.0% in the long term depending on the intensity of the drought for rural households.
- Similarly, the per capita supply of foodstuffs decreases by 8.8%, 5.9% and 3.3% in the short term and by 9.2%, 5.8% and 2.6% in the long term for urban households and according to the nature of the drought.

Drought period reduce more the employment of female than male employment in non-farm sectors and, but increase more the poverty rate of male-headed households than female-headed households.

- Women are more representive in both households and are more likely to bear the brunt during drought episodes, probably largely increase in household burdens.
- Drought shocks contribute to an increase in the incidence of poverty in the country for severe, moderate, and mild droughts, respectively, and especially among male-headed households than female-headed households depending on the level of drought intensity.

Figure 1: Drought impacts on poverty by household head gender



Government try to implement measures to protect people from climate shocks through agricultural and non-agricultural activities and improve economic performance.

Referring to the agro-economic literature and the National Climate Change Adaptation Plan, we identified three potential alternative measures for adaptation to drought shocks :

- Adoption of drought-tolerant crop varieties
- The adoption of integrated soil management
- Development of irrigation capacities

According to a World Bank study on the climate-smart investment plan for Burkina Faso, investing 55 million USD in integrated soil management (ISM) or in water resources and irrigation capacity development and or in new improved seeds lead to increase in agricultural yields by 29%, 56% and 39% respectively (World Bank, 2019).

- Simulation results show that the implementation of either strategy would offset the adverse effects of severe drought on poverty, economic growth and employment.
- The results obtained with irrigation development are, however, slightly more important in terms of poverty reduction for both female and male-headed households, economic growth and real consumption of urban households than the adoption of drought-tolerant crop varieties and integrated soil management (table 1).

- The simulations also suggest that, in the end, the spillover effects of such investments could not only positively affect value added in the agricultural sector, but would also be relatively more beneficial for the non-agricultural sectors. Similarly, the investments would be beneficial for rural households and also for urban households.

Table 1: Drought impacts on poverty by household head gender

	Short term				Long Term		
Population groups	**BAU**	**Irrigation**	**Crop varieties**	**ISM**	**Irrigation**	**Crop varieties**	**ISM**
Headcount Poverty							
Areas							
- Urban	13.2	9.9	11.0	12.1	0.7	2.5	6.1
- Rural	51.1	42.7	46.0	48.5	3.8	15.2	28.8
Household head gender							
- Male	42.3	34.9	37.7	40.0	3.0	11.9	23.3
- Female	32.8	29.0	30.2	31.2	3.2	12.0	20.7
Population	41.4	34.3	37.0	39.1	3.0	11.9	23.0

Conclusion and policy implications

We have shown how the light, moderate and severe droughts that Burkina Faso is currently experiencing affect its economic performance and significantly degrade household welfare.

Considering the relative impact of different drought adaptation options on the welfare of the population, we recommend that priority be given to the development of irrigation followed by the adoption of drought tolerant crop varieties and integrated soil management.

This recommendation is also based on the fact that these are long-term investments, which can help cope with the hazards associated with agricultural activities.

This study uses a microsimulation and gender-specific computable general equilibrium model to analyze the potential socioeconomic impacts of agricultural drought shocks in agriculture sector.

The model is calibrated with the 2013 Burkina Faso gender-based social accounting matrix updated for 2018. This initial SAM is constructed by the Ministry of Agriculture and Hydro-agricultural Development and that we have made it gender specific with data from the ongoing multi-sector survey.

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