

Sustaining the CAADP Momentum: Strategies and Policies to Support Household Resilience to Drought¹

Summary

Agriculture is the most important sector in Sub-Saharan Africa (SSA) and will be the hardest hit by climate change. Country agricultural sectors will be impacted by climate change in different ways. But, in most cases, climate change will bring substantial welfare losses, especially to smallholder farmers for whom agriculture is a main source of livelihood. However even without future climate change, current welfare losses from smallholder exposure to drought and rainfall variability are large. Thus, there is an urgent need for the AU and National Governments, through the Comprehensive African Agricultural Development Programme (CAADP) aligned national strategies and Climate Change Adaption Framework, to roll out tangible local, national, and continental policies that ameliorate adverse effects that current climate variability and future climate change have on vulnerable smallholders.

This policy brief identifies strategies and policy interventions that can anticipate and mitigate the impacts that drought, low rainfall and other adverse climatic events have on rural households in sub-Saharan Africa (SSA). Adaptation strategies include growing drought-resistant varieties of crops and use of water retention techniques such as drip irrigation, small dams and community water supply boreholes, as well as diversification of income to off-farm sources. The brief calls on regional organizations, national governments, and development partners to define robust integrated policies and actions that support and augment existing household agricultural and non-agricultural adaptation efforts.

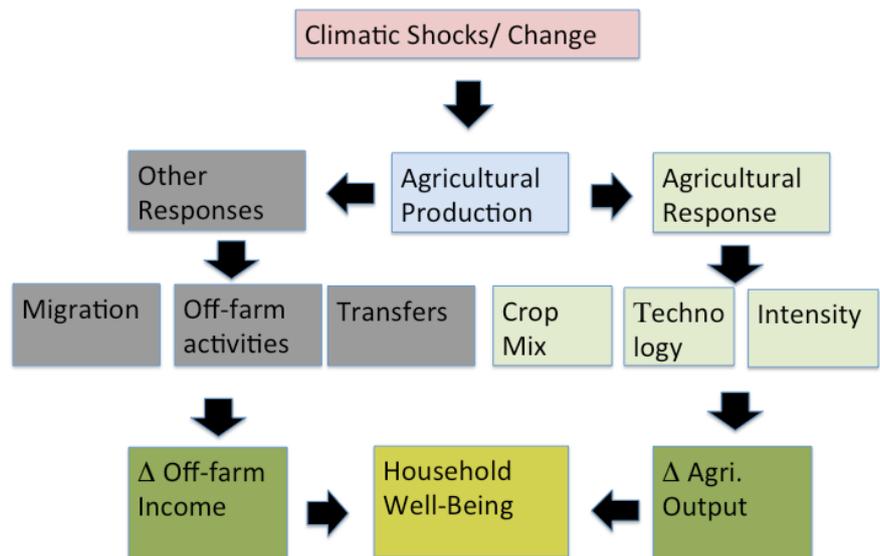


Figure 1: Household Agricultural and Non-Agricultural Resiliency Strategies

The Costs of Drought and Variable Rainfall

Rural households in sub-Saharan Africa rely on rain-fed agriculture and face significant costs from exposure to droughts and variable rainfall. For example, estimates indicate that **average** maize, sorghum, and wheat yield losses in drought years total around **14%** of household income in rain-fed areas of Ethiopia. Costs to households from continuous exposure to variable rainfall are estimated to be even greater at **42%** of potential household income. Less drought prone countries like Zambia show lower average losses from drought, but still face significant costs from rainfall variability – equivalent to what **8%** of household income for variability in maize production alone.

Costs associated with drought and rainfall variability are partially mitigated by household use of integrated agricultural and non-agricultural resiliency strategies (figure 1). **Agricultural strategies** include altering crop mix in favour of drought tolerant crops, use of drought resistant varieties,

and use of water retention techniques. Households may also adjust planting dates, and delay or reduce the use of fertilizer and other inputs in the face of rainfall uncertainty. **Non-agricultural strategies** include adult family member migration for employment opportunities in urban or other rural areas, off-farm employment, and receipt of informal transfers from family, friends, and social networks and receipt of formal transfers from non-governmental organisations (NGO) and government social protection programs.

Agricultural resiliency strategies and supporting policies

Agricultural technologies can greatly reduce household costs of drought and rainfall variability costs. Drought tolerant varieties can be particularly effective in reducing agricultural income fluctuations due to variable rainfall. Kostandini et al.

¹ This note draws on findings from collaborative research by Bradford Mills and Jianfeng Gao of Virginia Tech, Genti Kostandini of University of Georgia, Joseph Rusike of AGRA, and Anthony Murray of the USDA Economic Research Service on the welfare costs that exposure to rainfall shocks generate for rural households in Ethiopia and Zambia.

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2013 find that in many environments drought tolerant varieties can reduce mean yield losses in the face of drought by up to 20 percent and reduce yield variability by up to 15 percent and they perform better than landrace varieties and improved varieties from the private sector in most environments. In the cases of Ethiopia and Zambia, adoption of drought tolerant varieties for staple crops like Maize can decrease overall mean yield losses due to drought and rainfall variability by at least 20 percent and yield variability by at least 10 percent. These gains are equivalent to about 8 percent and 15 percent of total household income in Ethiopia and Zambia, respectively.

Gains from yield variance reductions are harder to see than straight yield gains. This may lead to lack of adoption by farmers and also underinvestment in yield variability reducing technologies by agricultural research organizations.

The ability of agricultural technologies to reduce farmer losses from drought and rainfall variability has implications for both country research and extension efforts. For research, systems should review the national agricultural research portfolio and ensure investments in research on yield variability reducing technologies are funded at levels consistent with benefits generated for farm households. For example, currently the International Maize and Wheat Improvement Centre (CIMMYT) and the International Institute of Tropical Agriculture (IITA) spend about 6 percent of their research funds on maize drought tolerance. Similarly, extension and outreach efforts should sensitize farmers on the benefits of technologies focused on stabilizing yields.

Efficient and responsive agricultural input and output markets can also stabilize household agricultural production and agricultural income streams in the face of rainfall shocks. Ready access to input markets allow farmers to rapidly reallocate of resources to change crop mix, varieties, fertilizer, and other inputs in response to rainfall conditions. For instance, in efficient and responsive markets farmers can purchase fertilizer and/ or high yielding variety seeds if early rains are strong. Similarly, efficient output markets can buffer rural households against adverse market price swings; where staple crop prices are low in abundant rainfall years when the households has a surplus and high in poor rainfall years when the household is a net consumer.

Policies to promote efficient and responsive markets focus mainly on lowering transaction costs. Key investments include transportation infrastructure to lower the costs and increase the speed of movement of goods. In rural SSA all-season roads that are passable during the rainy season greatly reduce transaction costs and increase market efficiency. Low internal and external barriers to trade also allow markets to respond rapidly to supply shortages, this includes minimal checkpoints and tolls on

roadways. Favourable market legal infrastructure can also reduce transaction costs, critical conditions include clear and fair commercial contract enforcement.

Agricultural crop insurance is increasingly promoted as a mechanism to reduce the impact that rainfall shortfalls have on agricultural incomes. Until recently it has been hard to cost effectively verify local rainfall shortfalls and associated crop failure, keeping insurance premiums high and insurance uptake lower. However, new index-based insurance products that rely on remote sensing rainfall and vegetative indexes have substantially reduced monitoring costs. Farmers still appear to be reluctant to purchase premiums at commercially viable rates, which is somewhat puzzling in light of the large costs they face from exposure to risk. Subsidies of index-based insurance products may be needed in the medium term to increase household familiarity and reduce informational barriers to adoption.

Non-agricultural resiliency strategies

Off-farm strategies form an important part of rural household efforts to stabilize income in the face of rainfall shocks. In fact income from agricultural production sometimes represents a minority share of rural household income, allowing considerable scope for households to intensify their off-farm efforts in response to negative rainfall shocks through off-farm employment, migration for employment, and receipt of informal and formal transfers. For instance, in Ethiopia 14 percent of rural households have adult members who migrate for employment purposes in the past 5 years. Further, 33 percent of households have an adult member engaged in off-farm employment, 17 percent of households receive informal transfers, and 21 percent of households have received transfers through public programs in the past year. Rural household income share from own-farm, off-farm, and transfers for other countries (Malawi, Madagascar, Ghana, and Nigeria) are given in figure 2.

The migration of adult household members for employment can diversify and stabilize household income by providing a steady source of non-farm income either year round or outside of the cropping season. The cost, particularly for year around migration, is loss of adult on-farm labour. Migration is a particularly effective mechanism for stabilizing income when households have accurate information on employment possibilities in areas to which they migrate. Further, effective mechanisms are needed to remit migrant transfers to the rural household. At a minimum, policies should not actively deter migration. Other supportive policies that allow households to effectively use migration as a mechanism to reduce the impact of rainfall shocks include provision of labour market information for destination areas and support of banking infrastructure so that household can receive migrant remittances in a cost-effective manner.

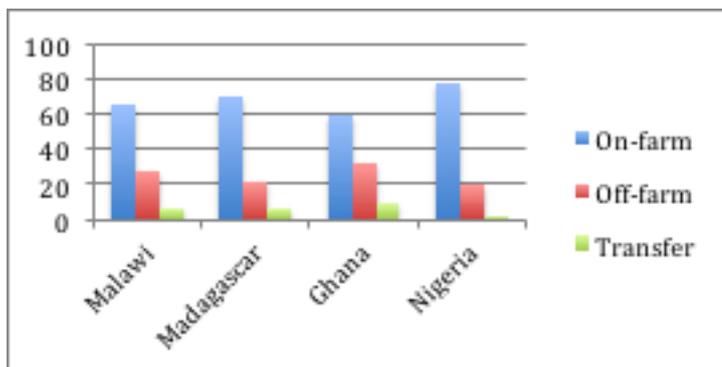


Figure 2: Household Income Shares

Source: Davis et al. 2010.

As noted, off-farm employment is often a major source of income and clear evidence exists that off-farm employment diversifies income and increases resilience to climatic shocks. However, evidence also exists that, particularly in rural economies with limited off-farm employment opportunities, wealthier households have disproportionate access to off-farm employment. Policies to support household efforts to diversify income through off-farm employment must, therefore, focus on the generation of opportunities for low-income households. Addressing constraints to micro-enterprise generation is a promising pathway, with interventions including support for micro-enterprise credit programs and entrepreneur basic skills training. Clear legal frameworks for property rights and economic-contracts also support micro-enterprise development and the general thickening of off-farm opportunities in rural economies.

Transfers provide another important pathway for income diversification and stabilization in the face of rainfall shocks. Many rural societies already have quite strong informal social safety nets through relatives, kinship groups, and village birth cohorts that provide assistance to individual households during times of need. However, evidence also suggests that informal transfers can only provide limited protection against covariate shocks like droughts. The basic reason being that if you are affected by drought, your neighbour is also affected and will be unable to assist you.

Public social protection programs, on the other hand have been shown to be effective in reaching and safeguarding chronically poor households in rural SSA (delNinno and Mills 2015). However, these programs are most effective in addressing the long-term needs of the chronic poor rather than the short-term needs of vulnerable households and those who temporarily become poor due to drought or low rainfall. Lack of program effectiveness in these situations is, in part, do to difficulties in rapidly scaling up assistance programs in response to rainfall shortfalls and other crises. The need

for more adaptive social protection programs to safeguard households in these situations is widely recognized. Key investments in such adaptive programs include early warning systems to rapidly identify areas facing rainfall deficits. Proven methods to rapidly and efficiently identify vulnerable households are also needed. Two promising areas of investment to identify vulnerable households are food security scoring measures like the dietary diversity index that have a strong correlation with short-term need and household registries that generate pre-existing lists of vulnerability households so that they can be rapidly reached during rainfall shortfalls.

Conclusions

Several important factors need to be kept in mind when designing policies to reduce the costs that drought and low rainfall generate for rural households in SSA. Perhaps most importantly, rural households in SSA already employ effective, but incomplete, resiliency strategies. External interventions need to support and facilitate, rather than crowd out, existing effective household efforts to diversify and stabilize income through off-farm employment, migration, and use of social protection programs.

Government and development agencies need to follow the lead of rural households and generate integrated strategies to support existing household efforts across agricultural and non-agricultural income sources. A balanced portfolio of investments will include support for interventions that have been proven to work like drought resistance technologies, rainfall early warning systems, and off-farm employment creation by addressing credit and entrepreneur skill constraints. However, existing interventions should be balanced with pilot new and particularly promising interventions like indexed based crop insurance and adaptive social protection programs that respond rapidly to rainfall shortages.

Finally, as part of the dynamic process of policy and program formulation, evidence-based research on program effectiveness is needed to continually refine the effective mix of program intervention.

Evidence also exists that, particularly in rural economies with limited off-farm employment opportunities, wealthier households have disproportionate access to off-farm employment. Policies to support household efforts to diversify income through off-farm employment must, therefore, focus on the generation of opportunities for low-income households.

Further reading

Details on the research synthesized in these policy notes can be found in two working papers on the AGRA website.

Rainfall Variability, Migration, Off-farm Activities, and Transfers: Evidence from Rural Ethiopia

Weather Shocks, Diversification Strategies and Consumption in Rural Ethiopia

References

Davis, B., P. Winters, G., Carletto, K. Covarrubias, E.J. Quinones, A. Zezza, K. Stamoulis, C. Azzari, and S. DiGiuseppe. "A Cross-Country Comparison of Rural Income Generating Activities." *World Development*. 38:1 (2010): 48-63.

delNinno, C., B. Mills. 2015. *Safety Nets in Africa : Effective Mechanisms to Reach the Poor and Most Vulnerable. Africa Development Forum. Washington, DC: World Bank; and Agence Française de Développement.* © World Bank. <https://openknowledge.worldbank.org/handle/10986/21369>

Kostandini, G., R. La Rovere, T. Abdoulaye. "Potential impacts of increasing average yields and reducing maize yield variability in Africa." *Food Policy* 43 (2013): 213-226.

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