GCRFAFRICAP
CLIMATE SMART AGRICULTURE FOR DEVELOPMENT

POLICY TOPIC SUMMARY **March 2022**

Agricultural Resilience under Climate Risks

KEY MESSAGES

- **Climate extremes and associated risks are already impacting agri-food systems in Malawi, South Africa, Tanzania and Zambia. These are projected to increase in frequency and severity by 2050, with implications for food and nutrition security.**
- **Ensuring that the agri-food systems of these countries, and sub–Saharan African countries more widely, are resilient to climate risks, is an imperative now and for the future welfare of populations and national economies.**
- **While policies have been adopted in the four countries which include adaptation and resilience of the agri-food sector to the effects of climate change among their objectives, pillars or actions, implementation remains a serious barrier. Without appropriate adaptation, crop yields are projected to fall, and crop failures increase in likelihood, particularly if maize remains the dominant crop.**
- **With reduced crop diversity, food production and nutrition supply are greatest if production is concentrated to the highest-yielding agricultural commodities, although this comes at potential costs of reduced risk-spreading across crops and an over-reliance on maize.**
- **In the face of the projected increased risks of climate change to the agri-food sectors in these countries and in sub-Saharan Africa widely, more willingness and efforts are required from national stakeholders to drive policy implementation and as appropriate, to revise and/or adopt new policies that reflect the knowledge emerging from AFRICAP's modelling, forecasting and other research.**

Key findings

- The research integrating scenarios, modelling and expert views carried out in Malawi, South Africa, Tanzania and Zambia reveals that in 2050, climate risks will continue to impact agricultural productivity and overall production, with implications for food and nutrition security.
- Climate change extremes will increase in frequency and severity by 2050, including droughts, intense rainfall, and days in the growing season above 35 degrees. These increases are largest with high climate risk (RCP8.5), with associated challenges for agricultural resilience.
- Across the four countries, weaknesses in adapting to climate change by 2050 will lead to reduced crop yields while strengths in adaptation to climate change – even with high climate risks - could increase crops yields.
- With no adaptation to climate change, average maize yields could fall by over 25% by 2050. Crop failure rates could increase by more than 50% with low climate risks and more than double with high climate risks. Irrigation could increase yields by 10% or more in some cases. Incremental adaptations such as shifting planting dates and pre-existing crops varieties can

also improve yields by more than 10%. Development of new crop varieties that can cope with climate extremes and average temperature and rainfall changes will further enhance yields.

- High climate risk and high technology / market efficacy scenarios are associated with the largest food production and most favourable nutritional outcomes as the highest-yielding crops are prioritised in intensified agricultural systems. However, these scenarios are also associated with reduced crop diversity and an expansion of maize, meaning that crop failure rates may increase and resilience to climate change might reduce through a lack of risk-spreading across multiple crops.
- High climate risks will be more challenging to agricultural production in 2050, when increased temperatures and higher atmospheric CO_2 will favour outbreaks and survival of many crop pests and diseases.
- Approaches to build agricultural resilience include: the adoption of sustainable farming practices in the form of, for example, conservation agriculture and wider agroecology; sustainable soil and land management; sustainable water management and improved irrigation; improved weather forecasting and availability of weather information and early warning systems; crop breeding for climate resilience; increased crop diversification away from maize; management of crop pest and diseases.

Policy barriers and enablers

- Possible policy enablers to build resilience in agri-food systems across the four countries include increased awareness of the impact of climate risks on national food production systems and increased commitment to address them to increase resilience in relevant sectoral policies domestically (e.g. a shift away from maize, including diversification of crops and varieties in Zambia).
- All four countries have already adopted policies that address resilience of their agri-food sector to climate risks. Some of the representative policies adopted are:
    - **Malawi: National Resilience Strategy (NRS) 2018-2030**: Breaking the cycle of Food Insecurity. Pillar 1: Resilient agricultural growth, Pillar 2: Risk reduction, flood control and early warning and response systems. These two pillars of the NRS 2018-2030 cover a range of approaches for a resilient agri-food system such as: sustainable irrigation development, drought mitigation, agricultural diversification, market development, value addition and exports, early warning systems, flood prevention and control.
    - **South Africa: 2015 Draft Climate Change Adaptation and Mitigation Plan for Agriculture, Forestry and Fisheries**, Section 4: Adaptation measures. A variety of measures relevant for building resilience of the agri food systems in South Africa are included such as conservation agriculture, water infrastructure and water conservation measures, irrigation farming, coping with fire and dealing with outbreaks of pest and diseases, early warning systems. Sub-section 4.7 stresses that building resilience of the agri-food sector is one overarching objective of adaptation to climate change.
    - **Tanzania: 2014-2019 Tanzania Agriculture and Climate Resilience Plan (ACRP)**. Part 2: Priority Resilience actions and key investment. The ACRP outlines four action areas to build the resilience of the agri-food system to climate risks. These are: (1) improvement to land and water management; (2) increase yields through climate-smart agriculture; (3) protection of the most vulnerable against climate related shocks; and (4) strengthening knowledge and systems to target climate actions.

- **Zambia: Second National Agriculture Policy (NAP) of 2016**. Objective 9: To mainstream environment and climate change in the agriculture sector. Under this objective, the measures considered for resilience building of the agri-food sector to climate risks include the promotion and strengthening of agriculture production methods that are resilient to climate change; the promotion of awareness about climate change adaptation; the promotion of environmentally friendly and climate-smart farming systems; the promotion of weather based insurance schemes especially among smallholder farmers; local and national capacity building at institutional level to carry out climate change risk assessments.

- However, the implementation of these policies is a major challenge in all four countries and represents a significant barrier to each country's desire to undertake the resilience actions prescribed by these policies.
- Although some coordination platforms have been established, bringing together relevant government departments and other national and international agencies to discuss policies and the transformation of agriculture and food systems in the face of climate risks, by and large institutions are still working in siloes and this represents a barrier to policy implementation and effectiveness.
- The potential that technological adoption and market efficacy will focus agricultural production on a smaller number of crops and animals presents a barrier to agri-food resilience. The demand for higher yields and profits could lead to increased homogenization of production systems and increase their vulnerability to crop pest and diseases, particularly under high climate risk.

Policy pathways

- A hybrid agricultural system consisting of technology-driven, highly productive but homogenized commercial farms in a more heterogeneous farming landscape that also includes a mix of small and medium size farms using carefully chosen and relevant technologies, e.g. a diversified range of improved climate-smart crop varieties, could help to reduce the vulnerability of of the agri-food sector to pest and diseases and thus enhance its resilience to climate risks, while at the same time increasing food production.
- Effective implementation of adopted agri-food systems policies needs to be a priority across the four AFRICAP countries, and sub-Saharan Africa more widely. This requires substantial investment and capacity building at the sub-national level for action and implementation plans, monitoring and evaluation.
- There is a need to strengthen coordination and collaboration among all national institutions and agencies - including state and non-state actors - so that policy processes (from formulation to implementation) are carried out synergistically and given the best possible chance to address the vulnerabilities of the countries' food systems to the risks caused by climate change.

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About the Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) Programme
The Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) programme is a four-year research programme focused on improving evidence-based policy making to develop sustainable, productive, agricultural systems, resilient to climate change. The programme is being implemented in Malawi, South Africa, Tanzania, Zambia, and the UK led by the University of Leeds, in partnership with the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), a pan-African multi-stakeholder policy network. The programme is funded by the UK Government from the Global Challenges Research Fund (GCRF), which aims to support research that addresses critical problems in developing countries across the world. It is administered by the UK's Biotechnology and Biological Sciences Research Council (BBSRC) - UK Research and Innovation (UKRI).

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