Working towards climate-resilient agricultural systems in Zimbabwe

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Continued collaboration between policymakers and researchers is crucial for effective and dynamic climate-smart solutions

A farmer checks a new groundnut variety in Zimbabwe. AgMIP scientists consider groundnut as a climate-smart legume that is nutritious, soil-enriching and resilient to climate change. Inset: Government representatives at an AgMIP-CLARE Multi-stakeholder Workshop in Zimbabwe.

Key messages

- **Climate action is urgently needed:** Successive droughts and unseasonal climate events in Zimbabwe have already taken a toll on the country's economy. Climate projections indicate more dry conditions
- **Rainfed farming will be the worst hit:** Poverty amongst the population who depend on rainfed farming and are already living in harsh conditions will worsen

About AgMIP CLARE

Given the need for more effort to enhance climate action, the AgMIP (Agricultural Model Intercomparison and Improvement Project) CLARE (Climate Change Adaptation and Resilience) project provides tools, and information to better understand vulnerabilities of agriculture to climate change, and its performance under plausible future pathways, towards enhanced climate change adaptation and resilience. The collaboration with multi-scale and multidisciplinary experts and stakeholders to undertake and validate forward-looking research is set to guide actionable agriculture and climate change policy decisions.

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AgMIP The Agricultural Model Intercomparison and Improvement Project

- **Growing awareness on importance of climate research:** Policymakers are aware that research-based climate change adaptation should be central to agricultural systems transformation
- **Proactive public-private response:** The government, development agencies and the private sector have started to diligently incorporate climate change adaptation, but there are gaps in linking local-specific climate change adaptation requirements to national-level policy decisions.
- **Need to address gaps through science-policy collaborations:** Continued dialogue and collaborations are crucial for effective and dynamic climate-smart solutions.

Linking science to decision-making: Research-based solutions for addressing gaps

- **Data and evidence** for context-specific effective responses, climate change impacts and suitable adaptation options can inform agricultural program design and align resources with activities
- **Forward-looking research** that helps understand climate projections, farming systems specific vulnerabilities and adaption impacts can enhance policy coordination and mainstream climate change adaptation in agriculture
- **Evidence-based assessments** can then more effectively support the rationale for climate finance and action
- **Capacity building** is critical for agricultural policy review and for the uptake of research processes and products. It is important to build human and institutional capacity in research, extension, climate services and especially for decision-makers to plan and guide research and use research outputs to inform decisions.

Introduction

Multiple challenges, including climate change and COVID-19, are affecting agricultural systems and livelihoods in Zimbabwe. An unstable macro-economic environment will exacerbate poverty, food insecurity and malnutrition, particularly among smallholder farmers.

Zimbabwe is projected to face drier conditions, with the Southern and Western regions of the country being more affected (World Bank, 2021). Increasing temperatures will worsen the current dry conditions, e.g. causing soils to dry up quicker, limiting available soil moisture and affecting plant growth negatively. Seasonal rainfall is expected to decrease, with late onset of the season, season shortening and higher frequency of extremes such as prolonged dry spells, droughts, floods and intense rainstorms. A higher prevalence of diseases, due to variations in climatic conditions, has potential to adversely affect crops and livestock. There is also evidence that semi-arid conditions are expanding in the country. This will increase vulnerability to climate risk, resulting in food insecurity.

Despite the availability of the National Climate Policy (2017), National Climate Change Response Strategy (2014), and climate smart agriculture manuals and framework, an understanding of current and potential vulnerabilities and adaptation options at national and sub-national levels remains limited. Agricultural, food security and climate policies and practices are often designed at the national level with limited vulnerability assessments that capture specificity in local contexts and the projections of future conditions.

Forward-looking research is required, which forms the basis for improved understanding and determination of climate risks and adaptation options for informed action. However, to generate research results and products is not enough. Currently, a lot of research is being conducted, with limited influence on policy-making and action. This necessitates policy review to facilitate the uptake of the research products and strengthen relevant data collection for continued research-informed decision processes.

There remains a need to build human and institutional capacity at national and sub-national levels to help plan, guide and apply research to inform climate change adaptation decisions. This is to support the generation of relevant information, making use of climate projections and guiding technical extension and climate services. Feedback from applications by farmers is critical for tailored adaptation interventions.

Results from AgMIP CLARE

1. There is need for research-based climate planning and action

Researchers and experts in Zimbabwe identified the integration of forward-looking research in policy processes as critical. This integration enables climate planning and action.

Multiple ways were identified through which research can enhance climate change adaptation planning and action in support of national and sub-national goals and processes.

Plausible agricultural development pathways: Improving forward-looking research methods for analyzing impacts of climate change and performance of specific agricultural systems under future conditions involves identifying key drivers of change to influence policy making as conditions change. Differentiating particular farming systems, distributional impacts on farm types and communities, and considering whole-farm decisions is critical to ensureing that national policies meet local needs.

Consistency in policy and decision-making: There is need for increased efforts in widening the evidence base for adaptation in agricultural decision-making.

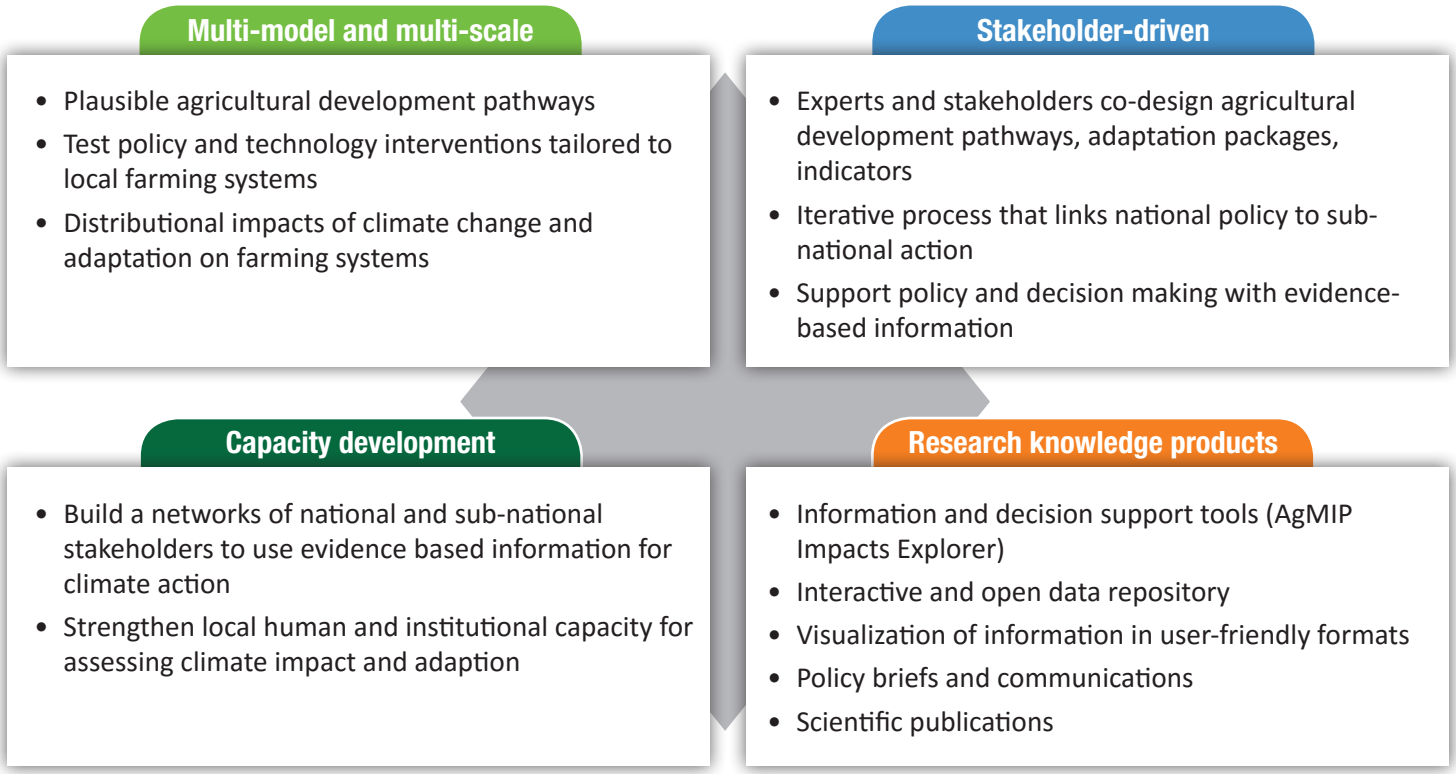

Figure 1. AgMIP research tools and data to support climate adaptation decision-making.

Comparative analyses of different farming systems, vulnerability and impact of adaptation interventions could inform and subsequently improve policy coherence, planning, coordination and sustainability of actions.

Integrated agricultural initiatives: There is need to build a collaborative environment that takes advantage of and engages with agricultural research and development investments and platforms in order to consult different perspectives and to inform and increase adaptive capacity through policy processes. These can include Livelihoods and Food Security Programme (LFSP), Zimbabwe Agriculture Growth Programme (ZAGP), Zimbabwe Agriculture Knowledge and Innovation Services (ZAKIS), and Zimbabwe Resilience Building Fund (ZRBF) programme.

New initiatives such as forecast-based financing and macro-insurance should tap into research generated by AgMIP CLARE to guide impactful actions and increase farmers' resilience against possible climate and other shocks.

Strengthening national climate policy frameworks: Research projects such as AgMIP CLARE could participate in and contribute to the implementation of national programs such as National Climate Policy (NCP), National Climate Change Response Strategy (NCCRS), Climate Smart Agriculture (CSA) Framework and Green Climate Fund (GCF) country programme. This can feed into the ongoing National Adaptation Programme (NAP) processes and climate research programs through anticipatory planning and action.

Synergies across sectors: Misalignment between sectors, stakeholders and policymaking tends to be compounded by limited collaboration between public and private sectors in terms of the research that they are conducting. There is need for collaborative research to develop and evaluate adaptation technologies within the agriculture sector and this should also feed into policy formulation processes.

Technical capacity: A program is needed to strengthen national forward-looking research capacities on new climate and integrated farming systems simulation methods. There is also need to build expert, stakeholder and decision-maker capacity through more inclusive and equitable science partnerships that effectively link science to decision-making.

Science partnerships: Systematically involving experts, stakeholders and decision-makers in research planning, identifying research questions, design, implementation and interpretation of results helps produce research that is useful and can enable policy leveraging the above.

Research is therefore central for determining possible future pathways and adaptation to future climate conditions for agriculture.

Research-informed policy and decision-making for climate adaptation in Zimbabwe

> *The AgMIP tool has offered important insights on future climate scenarios. For me, the next steps will include on-the-ground assessment on farmers adopting the adaptation packages and how current policy frameworks are helping farmers adapt.*
>
> **Mr Busani Bafana,** *a Journalist and Communication Specialist In Bulawayo, Zimbabwe*

Science communication
Foster collaborations, link to application, involve stakeholders in research planning, execution and interpretation of results

Universities
Multiply knowledge, aid capacity development of scientists, policymakers and practitioners

CCMD
Feed science-based adaptation approaches into NAP and NDC processes

> *Forward-looking approaches in terms of climate simulations and integrated modeling have enormous potential. We have introduced this subject in our curriculum to capacitate students that enroll with us.*
>
> **Dr Thulani Dube**
> *Social Scientist, Lupane State University*

> *The AgMIP CLARE work complements the CCMD mandate on climate change assessments and planning for adaptation and mitigation actions with a focus on local-level interventions supported by national policies.*
>
> **Mr Washington Zhakata and Mr Kudzai F Ndidzano**
> *Director and Deputy Director, CCMD*

Researchers ⟷ **Consultative process** ⟷ **Policymakers**

Practitioners

Science-based approaches

Research is central for determining possible future pathways, and adaptation to future climate conditions for agriculture

- Co-develop plausible agricultural development pathways for climate adaptation
- Identify key drivers of change to influence policy
- Comparative analysis widens evidence base for policy decision-making and sustainable actions
- Strengthen national climate policy frameworks
- Build capacity of experts, stakeholders and decision-makers

Address identified gaps

Draw/revise climate adaptation plan

- **Co-develop** priority research agenda
- **Improve** access to climate and socio-economic data
- **Create** platforms to share research findings
- **Capacitate** researchers and policymakers
- **Share** successes and information on all channels
- **Disseminate** key research outputs
- **Invest** in local-level climate research
- **Engage** stakeholders to validate tools and key results to support the NAP processes
- **Mainstream** research, allot budgets for collaborative climate research

Implement plan → **Monitor & evaluate**

Guiding propositions

For science to contribute to national climate change adaptation Zimbabwe can build on existing opportunities

Investment in climate research capacity can make use of and strengthen existing programs:

- NAP processes and training programs for provincial staff and stakeholders.
- Collaboration with government institutions like AGRITEX, MSD, ZINWA.
- Link these with national-level research (DRSS), universities, and development agencies.

Forward-looking research
Analyze climate projections, farming systems specific vulnerabilities and adaption impacts

Research stations
Climate-proof agricultural technologies, through demonstrations and feedback with extension services and development agencies

> *This methodology is transformative in that it gives scientists, policymakers and practitioners an understanding of the likely climate direction or the convergence or divergence of models when it comes to the future scenarios. It enables researchers to understand the certainties around climate modelling or the confidence in the projections.*
>
> **Dr Elisha N Moyo,** *Climate Scientist, CCMD*

> *There is a growing demand for AgMIP CLARE integrated assessments and collaborative research tools … They can test the impacts of adaptation packages under specified farming systems and climatic conditions. This can support mainstreaming climate change adaptation through better tailored technology packages.*
>
> **Mr Gevious Sisito,** *Principal Research Officer, Matopos Research Institute*

NAP - National Adaptation Plan; **AGRITEX** - Agricultural Extension Services; **MSD** - Meteorological Service Department; **ZINWA** - Zimbabwe National Water Authority; **DRSS** - Department of Research and Support Services, **CCMD** - Climate Change Management Department

2. Bridging research-policy gaps

For science to contribute to Zimbabwe's national climate change adaptation decision processes using coherent approaches to sustainable agricultural development, the country must make use of its strengths and build on existing opportunities. Table 1 outlines the specific strengths, opportunities, weaknesses and constraints as they relate to science policy collaboration and the strengthening of climate change adaptation in agriculture.

3. Going into action

Stakeholders provide guiding propositions for developing climate adaptation planning using science-based approaches that address identified gaps by:

1. Developing a priority research agenda for climate change adaptation planning based on cross-sectoral consultative processes through higher level coordination mechanisms such as the Research Council of Zimbabwe (RCZ).
2. Improving access to climate and socio-economic data such as climate and weather data, production, income, commodity and expenditure survey (PICES) made available as public goods for assessments and to contribute to national processes through the respective Ministries.
3. Establishing and supporting platforms for interaction between policymakers, scientists and practitioners to share recent research findings through conferences and symposiums, research and demonstration tours.
4. Capacitating and motivating researchers on the writing of policy relevant communications such as policy briefs and communications. This facilitates public acknowledgements of research contributions.
5. Making policy relevant research information and success stories available and accessible via platforms, networks, databases and online media through mandatory instruments.
6. Sustaining and disseminating key outputs from research projects that influence policymaking to support adaptation planning and implementation. Deliberate efforts have to be made to involve key actors and organizations such as Ministry of Agriculture, Meteorological Service Department (MSD), Zimbabwe Vulnerability Assessment Council (ZimVAC), United Nations (UN) Agencies, National Rainfall Forecast for Zimbabwe and Southern Africa Regional Climate Outlook Forum.
7. Investing in climate research capacity to make use of and strengthen existing local level research programs,

Table 1. Strength, Weaknesses, Opportunities, Constraints (SWOC) analyses for science-policy collaboration for climate change adaptation in agriculture by experts and stakeholders in Zimbabwe

Strength	Weakness
• Institutional structures exist that can be revitalized/strengthened to take up research, e.g. Department of Research and Support Services (DRSS), Agricultural Research Council of Zimbabwe (ARC), Research Council Zimbabwe (RCZ), Zimbabwe Economic Policy Analysis And Research Unit (ZEPARU), research and academic institutions. • Existence of inclusive engagement platforms and processes, e.g. National climate change institutional framework, Green Climate Fund (GCF) country programme, agricultural working groups. • Existence of policy and legislative frameworks, e.g. Research Council of Zimbabwe (RCZ), Scientific and Industrial Research and Development Centre (SIRDC) • Education 5.0, promoting research-based innovation	• Limited interface to use research evidence in policy processes • Research messages not responsive to policy needs and not adequate to inform policy processes and implementation • Limited coordination and working in silos among government entities, development agencies and research • Capacity gaps in climate related research
Opportunities	**Constraints**
• Models that reflect processes and realities, scalable decision support • Political willingness and research oriented decision-makers including ministers • Research to determine impacts of policies supporting investments and visualize returns on those investments • New research approaches that can create better evidence base for funding adaptation action • National and international networks for research policy integration, e.g. AgMIP, Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)	• Limited knowledge-sharing platforms • Limited resources and competition • Limited policy monitoring and accountability systems • Inadequate human capacity and development thrust • Fragmented structures and processes • New threats like Covid-19

e.g. National Adaptation Plan (NAP) training programs for provincial staff and stakeholders. This should enable collaboration with other institutions like MSD, Zimbabwe National Water Authority (ZINWA), and link those with national-level research and development agencies.

8. Strengthening NAP process with evidence-based data and information on how adaptation policies, technologies and strategies may impact smallholder farmers. Engage stakeholders to demonstrate the tools and key results to support the NAP development process.
9. Mainstreaming research through appropriate budgetary allocations. These should support collaborative climate relevant research proposal development to support Zimbabwe's commitments, e.g. the NAP and Nationally Determined Contributions (NDC) processes, in response to identified gaps.

Conclusion

Climate change worsens poverty for large parts of the population in Zimbabwe. There are multiple efforts to incorporate climate change adaptation in agricultural programs. However, there are gaps between research and policy that limit context-specific and effective responses to climate change through relevant mitigation and adaptation interventions. Resolving the disconnect between research processes and policy making through evidence-based decisions will support the contribution of climate action to agricultural transformation. Forward-looking research and the improvement of researchers' and stakeholders' capacity can be used more effectively to enhance policy coordination and the mainstreaming of climate change adaptation in agriculture. The process of improving research policy linkages and capacity development can contribute to processes that support access to climate finance for local action. This would strengthen Zimbabwe's approach towards meeting the national vision 2030, Sustainable Development Goal (SDG) targets, and climate change commitments under the Paris agreement.

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Acronyms

AgMIP	Agricultural Model Intercomparison and Improvement Project
ARC	Agricultural Research Council of Zimbabwe
CLARE	AgMIP, Climate Change Adaptation and Resilience
CSA	Climate Smart Agriculture
DRSS	Department of Research and Support Services
GCF	Green Climate Fund
LSFP	Livelihoods and Food Security Programme
MSD	Meteorological Service Department
NACOF	National Rainfall Forecast for Zimbabwe
NAP	National Adaptation Plan
PICES	Production, Income, Commodity, Expenditure Survey
SARCOF	Southern Africa Regional Climate Outlook Forum
NCP	National Climate Policy
NCRS	National Climate Change Response Strategy
RCZ	Research Council Zimbabwe
ZAGP	Zimbabwe Agricultural Growth Programme
ZAKIS	Zimbabwe Agricultural Knowledge and Innovation Services Project
ZEPARU	Zimbabwe Economic Policy Analysis and

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