

ZIMBABWE

Climate resilience and improved food security



In the face of climate change, the most appropriate and profitable crops, based on robust research information, must be promoted at the local and national scale. Photo: Sabine H, ICRISAT

The integrated approach and projections of the Agricultural Intercomparison and Improvement Project (AgMIP), co-designed with stakeholders for influencing local to national decision processes, informed various publications and presentations. Highlights for areas like Nkayi district in Zimbabwe:

- **Poverty can be halved by 2050** under sustainable development pathways;
- **Women can play a large role** by managing the expansion of more profitable and climate resilient groundnuts;
- **Adaption to climate change can be made easier** with strong investments in sustainable development and use of heat tolerant cereals and drought tolerant legumes.

Improving farming systems

AgMIP (www.agmip.org) is a collaborative effort to improve the state of agricultural simulation and to understand climate impacts on the agricultural sector at global and regional scales. Within AgMIP ICRISAT has led the regional integrated assessment and stakeholder engagement in Southern Africa, Crop Livestock Intensification Project, CLIP, implemented in Zimbabwe, Malawi, Mozambique. The AgMIP impacts explorer makes study results available to users at

http://agmip-ie.alterra.wur.nl/zimbabwe_nkayi

If a more conducive environment was given, farmers could benefit much more from farming.

- By implementing improved management practices, farmers can increase crop yields by over 200% ;
- Reconfiguring farms, improving cereal management could increase farm net returns from US\$ 300 to \$650 or from US\$-1,600 to US\$2,250, for the extremely poor and those with large herds respectively ;
- Converting land beyond food self-sufficiency in maize to more profitable and climate resilient crops, such as groundnuts and fodder legumes, can increase their farm net returns to US\$ 1,120 and US\$ 2,940 respectively. Improving groundnut markets would increase the net returns to US\$ 1,489 and US\$ 3,566, respectively. Groundnuts are an opportunity to increase income for the poorest;
- Farms with cattle could improve livestock production via better feed quality from crop residues and higher quantities of nutritious forages ;
- Having improved farm management today, adaptation to climate change also becomes easier.

Climate change impacts by 2050

Minimum and maximum temperatures are consistently increasing over the region.

- In the 2050s, temperatures are expected to increase from 2°C up to 3°C ;
- Precipitation changes are variable: A decrease by about 25% is possible by the 2050s in the region (according to the climate simulations by CSAG).

Results on climate, crops and livestock impacts can be found in these communications outputs and publications: http://agmip-ie.alterra.wur.nl/zimbabwe_nkayi

(References: Antle et al. 2017; Descheemaeker et al. 2017; Homann-Kee Tui et al. 2017a, b and AgMIP CLIP 2018.

Impacts on farming systems under future climate and socio-economic conditions

Negative impacts on the rangelands result in reduced feed intake for livestock and hence productivity. Farms with higher stocking density would be more at risk. Supplementary feeding will be required to offset losses. Groundnuts in most cases can benefit from climate change and higher carbon dioxide levels – more than offsetting the effects of high temperature and higher return on drought-tolerant varieties. Future high temperatures could reduce plant life cycle and lower yields for maize and sorghum. This can be offset and negated by improved soil fertility, higher productivity.

Vulnerability

- 65% of current farming households may be exposed to greater vulnerability due to climate change;
- Improved management practices implemented today, and geared towards farmers at different levels of resource endowments, could improve yields from 130% to 200%;
- The poorest farmers, by expanding more profitable groundnuts (managed and controlled by women) could benefit most.

Sustainable development pathways could make farmers less vulnerable to climate change (vs fast economic growth pathways). Poverty levels could halve and climate resilient groundnuts could reduce the vulnerability of extremely poor. Especially the extremely poor would benefit, who have no livestock but benefit from larger shares cultivated with more profitable groundnuts. Sustainability pathways were not only associated with reduced poverty and mitigating destitution, also with strengthening the link between women empowerment, food security and nutrition.

Stakeholder engagement processes

Co-designing scenarios helps preparing an enabling environment for scaling climate change adaptation, under uncertain futures (Homann-Kee Tui and Valdivia, 2017; Homann-Kee Tui et al., 2017 a, b). Decision makers clearly acknowledged the approaches and proposed solutions, trajectories for desirable change, research priorities and investment options. Science can contribute more effectively to fasten decision processes (technical + policy) along desired trajectories (credibility, legitimacy, confidence, ownership). We can test transformative interventions, about future worlds that matter, for diverse farming systems, with a broader look at food systems, gender, climate change, extreme events, conflict prevention. The approach further helps to bridge communication science and stakeholders, not only on passing information, but engaging in analyses and implementation.

References: AgMIP CLIP and related projects Publications on climate variability and change, 2017, and two from 2018, with material being collected in 2017

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