



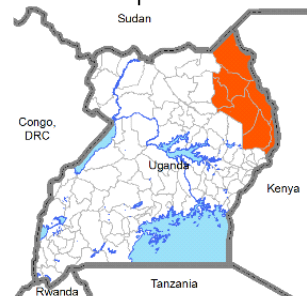
MINISTRY OF WATER AND ENVIRONMENT
CLIMATE CHANGE DEPARTMENT

Economic Assessment of the Impacts of Climate Change in Uganda

Briefing Note: Agricultural production in the Karamoja region

An Economic Assessment of the Impacts of Climate Change has been completed at the national level in Uganda. As part of this nation-wide study, this case study seeks to assess the impacts of climate change and their costs in the Karamoja region. For further information see www.cdkn.org, or <http://ccd.go.ug/index.php/projects/cdkn> or contact olivier.beucher@baastel.com

This briefing note presents the key messages from the Karamoja case study, which assesses the current and future impacts of climate variability and change in a region that is heavily dependent on agriculture. In many cases recent droughts have resulted in losses of 50 to 100% of total expected production for affected households. Whilst the future impacts of climate change are uncertain, it is estimated that future extreme events could result in losses between 9% and 32% of total production in 2050. Further to this, International Food Policy Research Institute (IFPRI) modelling of percentage impacts on yield from long term rainfall and temperature trends indicates potentially significant impacts on the value of important current crops such as maize (up to 12% reductions) and beans (up to 20%). A number of adaptation strategies are recommended, with a high priority in particular on improving water availability, crop diversification, providing pasture for animals and support to livestock holding and capacity building on climate change and resilience strategies.



Introduction

Insecurity in the Karamoja region has hindered economic development but peace building programmes implemented in the last few years have resulted in a considerably improved current situation with the prospect of making the transition from emergency support to longer-term development. Among current challenges is how best to develop agricultural activities in drought-prone areas with the increased uncertainty of climate change.

This case study focuses on agricultural production in three specific village locations in the Abim district (Oryeotyene North ward village, Western mixed crop farming - Agricultural zone); the Napak district (Nakayot village, Central sorghum and livestock - Agro-Pastoralist zone); and Amudat district (Lopedot village, South eastern cattle maize - Pastoral zone). The study collected field data via questionnaires and semi structured interviews of local officials and a sample of households in the three villages. It then evaluated a range of current and possible future adaptation options.

Current Impacts

Each of the three villages has had very recent experience of severe drought events and two of the villages have had recent experience of serious flooding. In many cases climate events have resulted in losses of 50 to 100% of total expected production for affected households. Estimates of total impacts on crop production value, and livestock product income, were made for recent severe climate events in each village (Figure 1 gives some examples).

Although it is not valid to make direct comparisons between these loss figures for climate events between crop production and livestock product sales, **the study provides some evidence for the importance of holding livestock to provide greater resilience to climate events.** While livestock production and income may be very badly hit by drought in loss of water supply, losses of pasture and increased disease incidence, the overall impacts are generally not as comprehensive as for crop production.



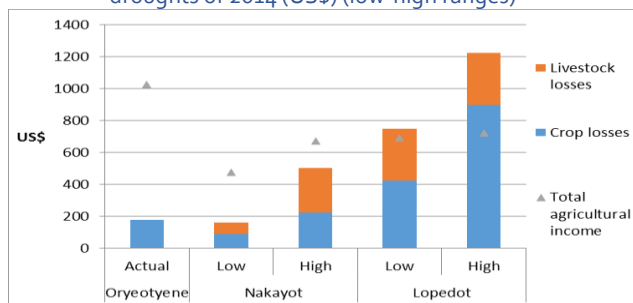
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Figure 1: Estimated average losses per household from the droughts of 2014 (US\$) (low-high ranges)



NOTE: A range low to high range is not given for Oryeotyene due to much more reliable loss values in the survey than the other two villages

Climate Change

The study also considers future impacts from climate change although these are only illustrative in the case of extreme climate events projections as detailed changes in frequency and intensity are not available.

For Oryeotyene Northward projections of losses of **crop value** from future climate events (floods/droughts) up to 2050 produced total losses of potential crop production of around 9% (for a less severe scenario) and 18% (a more severe scenario). For Nakayot similar projections produced respective estimates of 15% to 32%, and for Lopodot 19% to 28%.

Illustrative estimates of future impacts from extreme climate events for **livestock value** show total losses up to 2050 of around 11% (less severe scenario) to 16% (more severe scenario) for Lopodot and 12% to 26% (more severe scenario) for Nakayot.

Estimates for overall changes to yields of crops due to climate change up to 2050 were also made for the three locations. These were based on IFPRI modelling¹ of percentage impacts on yield from long term rainfall and temperature trends and are therefore different from the analysis of sudden events presented above. The

modelling indicates potentially significant impacts on the **value** of important current crops such as maize (up to 12% reductions) and beans (up to 20% reductions) depending on the climate model used. While these figures are illustrative and based on several key assumptions, they have implications for adaptation in terms of the possible need for crop diversification and other adaptation strategies in the medium and long term.

These findings regarding recent and future losses in crop production due to climate change impacts **highlight the risks to investment in agriculture in the light of plans for expansion of crop production** in the region. The large losses in recently introduced crops in Lopodot indicate the high risks that may be attached to such plans. The conclusions in this localised case study indicate that **there should be more research at the district level to ascertain risks to investment in crops from climate impacts and the level of support that is needed** in livestock production in providing resilience in affected villages.

Adaptation

The gap between living standards in Karamoja and the rest of the country is projected to widen. As a consequence, one can expect significant 'autonomous adaptation' in the region as individuals respond to income and livelihood opportunities in the rest of the country and migrate. Yet this will not be enough to improve livelihoods for the people of these villages, and there is an urgent need to address the local responses to the existing climate variability. The case-study gives an overview of the types of adaptation response that came from the stakeholder consultation with an indicative qualitative assessment of costs and benefits and priorities:

Table 1: Indicative Costs and Benefits of Types of Adaptation Responses

Type of Response	Costs	Benefits	Policy priority
1 Capacity building on climate change resilience	Moderate	High	High
2 Improvement of crop storage	Medium/High	High	Medium / High
3 Out migration / resettlement	Medium / High	Unclear	To be Determined
4 Crop diversification	Medium/High	Moderate/High	Medium / High
5 Household income diversification	High	High	Medium / High
6 Improving water availability	High	High	Very High
7 Pasture for animals	Moderate	High	High
8 Flood control	High	High	To be Determined
9 Rehabilitating on degraded land	High	High	Medium Term
10 Improvement of transportation	High	High	(Medium / High) Tbd

The analysis carried out indicates improvements in stable income are urgently needed for the people of these villages. At the same time consequences of extreme events need to be mitigated, given the huge losses they cause to the farmers. The evidence indicates that many of these actions are of high value in the current situation and many are urgently needed, especially those addressing extreme events. Climate change will make the need even greater.

¹ The International Food Policy Research Institute (IFPRI) provided the most detailed available modelling results for climate change impacts on agricultural yields per crop