



ZIMBABWE CASE STUDY

December 2012

COPING WITH DROUGHT AND CLIMATE CHANGE IN ZIMBABWE

Country	Zimbabwe [http://www.adaptationlearning.net/country-profiles/zw]
Region	Eastern Africa
Key Result Area	Adaptation
Thematic Sector	Agriculture/Food Security Disaster Risk Management Water Resources <i>Keywords: Drought, Drought monitoring, Capacity Building, Livelihoods, Early Warning Systems (EWS), Drought Risk Management</i>
Project Activity Dates	Start: October 2007 End: September 2012
Key stakeholders	Local Communities in the Chiredzi District and in particular the smallholder farmers within the Chiredzi District.

ABSTRACT

Long known as the breadbasket of Africa, Zimbabwe has for the last 30 years experienced dramatic losses in agricultural production resulting in critical food and fuel shortages. Coupled with the economic and political constraints, drought and climate change are testing the limits of agricultural production in Zimbabwe. In rural Zimbabwe, and specifically in the pilot project area Chiredzi district, drought is becoming an increasingly common occurrence. With approximately 70% of Zimbabwe's population deriving their livelihoods from subsistence agriculture and other rural activities, the most noticeable effects of these droughts are the devastating impacts on household food security and the livelihoods of the poor. In response, and as part of a set of three other regional Coping with Drought and Climate Change (CwDCC) projects in Ethiopia, Kenya, and Mozambique, this project is supporting effective adaptation among subsistence farmers in six locations in Chiredzi District.

BRIEF DESCRIPTION OF ISSUES

Background

The IPCC Third Assessment Report and Zimbabwe's INC suggest that by 2050 temperatures and rainfall over the country will be 2 – 4°C higher and 10 – 20% less than the 1961-90 baseline respectively. Model simulations show annual rainfall declining by 5 – 20% of the 1961-90 average by 2080 in all the country's major river basins.

It is estimated that only 37% of Zimbabwe receives adequate rainfall for rain fed agriculture. The country has been divided into five agro ecological zones on the basis of annual rainfall received and agricultural suitability of the land. Natural Region I receives the highest rainfall whereas Natural Region V, the location of Chiredzi District, is the driest. These areas receive little amounts ranging from 250 to 500 mm per annum. Inter-annual variability in rainfall is relatively high, ranging from 16 percent on the northern plateau to 48 percent in the Limpopo River Valley. Seasons in which rainfall is 20% or more below the long-term average for the country occur on average about once in four years. Once in 7 years, rainfall will be more than 30% below the long-term average.

In Chiredzi District, as for most of the country, rain fed crops are grown during one distinct cropping season from November to April across the district. Rainfall distribution is very poor, mid-season droughts are a common feature of the district's climate and frequent short seasons make it difficult for smallholder farmers in the area to secure food and decent livelihoods. Temperatures are always high in summer ($\pm 39^{\circ}\text{C}$) causing evaporation losses of 10-13mm per day (Lovell, 1998). The warm temperature regime creates opportunities for growing a range of crops throughout the year for as long as water is available.

In addition to the low and unreliable rainfall most of the soils of Chiredzi district are heavy clays, 2:1 clay lattice (*mountmorillonite*), that demand a lot of water before they can release any water for plant growth. The soils form seals when wet and as rainfall comes in heavy short duration storms, most of the rain-water runs away as run-off making most of the rainfall unavailable for crop use. The soils are very difficult to work on when wet as they become sticky and slippery. If farmers aim to utilize all the water that falls on their land they have to prepare their fields before the onset of the rains.

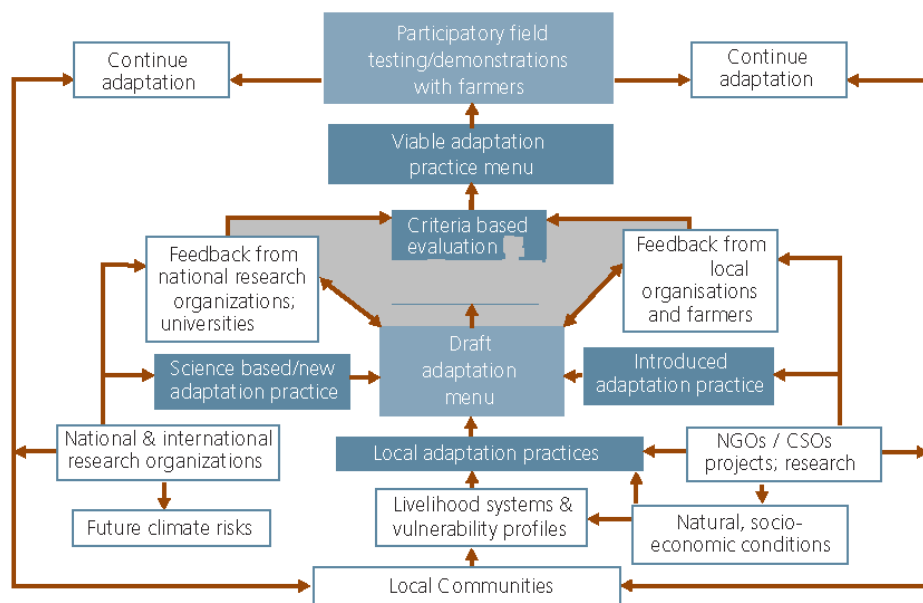
Households depend on food handouts in most years. In many rural areas, such as in Chiredzi district of south-eastern Zimbabwe, residents are poor and dependent on agriculture for their livelihoods. In 1995, 46% of the District's rural population was classified as either poor or very poor and this figure rose to 60% in 2005. Rain-fed agriculture, livestock production, and remittances are the main sources of livelihood in the District. In 2005, 60% of rural households in 13 Wards in Chiredzi were food insecure and food security for many rural households in the District worsened during the period from 1980 to 2004. During the same period, the long term average rainfall in Chiredzi District declined by about 15% and eight serious droughts were observed.

BRIEF DESCRIPTION OF PROJECT

Solution: Adaptation Approach, Components and Description

The project, Coping with Drought and Climate Change in Zimbabwe, is working to enhance the capacity of agricultural and pastoral communities in Zimbabwe to adapt to climate variability and change. The primary project objective is to demonstrate and promote adoption of a range of gender-sensitive approaches for adaptation to climate change among rural communities currently engaged in agriculture in vulnerable areas of the Chiredzi.

In Chiredzi District, all rural farmers face the same set of management decisions on how to allocate limited resources among crop production, livestock production, and off-farm employment. One of the main considerations in adapting to climate change is how to make the most of limited amounts of water, and how to use climate risk information for agricultural planning. The work to be carried out under this project falls into five project components which will be implemented in three phases. Phase 1 was preparatory work (about 12-15 months), Phase 2 was pilot demonstration projects, and Phase 3 will be monitoring and evaluation activities.



Framework for selection, evaluation and prioritization of adaptation practices (Adapted from: FAO, 2003)

Project Targets

RESULT	TARGET
Objective: To demonstrate and promote adoption of a range of gender segregated approaches for adaptation to climate change among rural communities currently engaged in agriculture in vulnerable areas of Chiredzi district as a national model.	By end of project, number of farmers growing a mix of more than four crops including (sorghum, pearl millet, open pollinated variety (opv) maize, groundnuts, cowpeas and cassava increase to at least 60%).By end of project number of farmers using infield rainwater harvesting increase to at least 10%.
Outcome 1: National institutions have capacity to improve knowledge base to facilitate climate change adaptation	By end of project 100% awareness level is achieved among farmers in project area
Outcome 2: Livelihood strategies and resilience of vulnerable farmers/pastoralists in the selected pilot sites improved and sustained to cope with drought	Number of households using adapted crop and livestock management practices increase to 20% by end of project. NB: 20% of 1600 farmers
Outcome 3: Use of climate early warning systems by vulnerable communities in pilot sites increase and drought preparedness improved.	By end of project number of farmers using climatic information increase to 60%. (This is percentage of the 1600 farmers in pilot sites)
Outcome 4: Farmers/pastoralists outside the pilot site replicate successful approaches to cope with drought	By the end of the project lessons from project sites will have been documented and disseminated widely.

Results and Learning

1. Time and effort required to prove adaptation measures: It takes concerted effort, regular technical backstopping and multi-year refinement of field technologies based on local experience to ensure that effective climate change adaptation measures are accepted, adopted and sustained. Basic training, irregular support and field presence, and limited opportunities for monitoring and discussion are constraints associated with small projects. Emphasis on the field level challenges is needed. The effective time frame for the project was three years – some of the interventions (small scale irrigation, urea treatment, fisheries development) are only in their first or second year. The key issues that remain outstanding include (i) the reluctance of some farmers at the project sites to fully invest in moisture conservation and uncertainties about sustainability, (ii) the management requirements associated with small scale irrigations systems, (iii) the limitations of extension agents in providing effective rainfall forecasting advice to farmers, (iv) the ongoing availability of seeds and planting stock for the crop varieties that have been introduced by the project, and (v) the financial viability of crocodile farming.

2. Productivity and diversification benefits of agronomic measures: The positive response to new pearl millet varieties, new maize and hybrid sorghum varieties, the planting of cowpeas to effectively utilise the late rains, and the initial acceptance of cassava were important results from the farmer trials. This has been demonstrated at a pilot level by the project although further refinement and documentation of the successful measures and benefits are needed. The project has generated significant enough results in a small number of sites to warrant greater attention for replication and dissemination at a national level, subject to further refinement of the Chiredzi adaptation model.

3. Risk and diversification in livelihood development strategies: Livelihoods development outside of the agricultural sector was a major challenge that the project could not fully address. It required greater technical expertise and a full examination of livelihoods options, markets and management constraints, both of which were not provided by the project.

4. Potential effects of improved extension advice for local rainfall forecasts: Farmers in drought-prone areas of Chiredzi District place a high priority on seasonal rainfall forecasts in balancing risks related to rainfall failure or weakness, and in making their planting decisions and investment of scarce resources. This project has highlighted the lack of confidence in the current national forecasting process for farming decisions, and the potential for improvements through relatively simple supply of basic rainfall/temperature information and innovative approaches through extension agents in assisting farmer-oriented local forecasts. However, without follow-up action the sustainability and potential for improved forecasting is uncertain.

5. Technology and management gaps to be addressed in Chiredzi model: Greater focus on the management aspects of adaptation measures alongside the technology aspects is necessary for further development and dissemination of the Chiredzi model. This includes community organisation of irrigation systems and pasture development, orchard maintenance and management, post-harvest value addition and marketing of agricultural products.

6. Improved seasonal forecasting of rainfall and for strengthening extensionist-farmer decision processes offers great promise for Zimbabwe. The low confidence in and utilization rate (17%) of farmers in the current weather forecasts necessitate a systemic change in the forecasting products and processes for agricultural purposes. The development of this method is a notable contribution toward more functional and reliable forecasting methods in Africa. However, it still requires empirical, controlled testing and focused policy deliberation on how to effectively implement the improved system. A follow-up program is clearly warranted.

7: Improvements in food security: The shift from maize-based agricultural production toward more diversified models and from rainfed to small-scale irrigated agriculture has demonstrated improvements in food security and household incomes at the project sites (Outcome 2). This has important implications for government policies and rural development programs to address climate change.

BASELINE LEVEL (APRIL 2008)	IMPACT DUE TO PROJECT
31% of farmers practice mixed crop production. The rest (69%) depend on one crop - maize (25%); or two crops (44%) -Sorghum and maize.	An additional 9% of farmers practice mixed crop production (612 farmers)
Less than 2% of farmers using in-field rainwater harvesting	30% of farmers use in-field rainwater harvesting (2040 farmers)
41% of households (total number of households in the pilot areas was some 3000) depend on rain fed agriculture as a sole livelihood strategy.	Numbers of households dependent on rain-fed agriculture as a sole livelihood strategy halved
Maize: 0.55t/ha	Doubling of yields to 1.1 t/ha
Sorghum: 0.56t/ha	Yields increased 10 fold to 5 t/ha
Pearl millet: 0.4 t/ha	Yields more than doubled to 1t/ha
Livestock mortality: 20% in drought years	No livestock mortality in 2009-2010 drought conditions due to abundant production of stover.

Lessons learned:

1. Develop institutional capacities and policy frameworks at national and local levels: Observations from Chiredzi district show a lack of capacity and leadership in local government around climate change adaptation. Strong local institutions are a critical success factor for adaptation. Environmental change is dynamic, so new challenges will always be emerging. These challenges require well-resourced institutions. For example, the presence of Chiredzi Research Station is quite strategic in the development of new technologies relevant to the biophysical conditions of the district and beyond. But the institution needs resources and human capacity to carry out this role. Cassava was successfully introduced as an adaptation option, where previously there had been no experience of it but its uptake remains less than 1% among the 4 Wards where the project was located because of limited availability of planting material, the lack of promoters of the crop and limited knowledge of the crop among farmers, suggesting a key role in institutional support to replicate the measure.

2. Use bottom-up and participatory processes in project design: Bottom-up project design and participatory processes are crucial for strong ownership and identification of adaptation responses that are acceptable in the local, cultural context. The community participatory climate risk analysis made it possible to generate more information on the temporal and spatial dynamics of drought and its impacts in the project area than could be obtained from modelling *per se*. Irrigation development was jettisoned as an adaptation option. Stakeholders decided that improving the efficiency of rain-fed crop and livestock production as a climate resilient technique would be more socially acceptable, cost-effective and technically feasible.

3. Farmer-managed demonstrations are an effective way of trying adaptation measures: The crops pilot demonstration projects clearly showed the importance of farmer managed trials, since it was possible to screen technologies that will not be easily adopted by farmers because of the constraining farmers' circumstances. The project exposed farmers to many adaptation options to choose from. Some interventions such as "basins" for infield rainwater harvesting were jettisoned by the farmers themselves because they are labour intensive and not appropriate for households where labour is a constraint and draught power was available.

4. Local knowledge systems of climate forecasting do not seem to have forecasting value: Indigenous indicators, such as the physiological behaviour of trees (*mopane* in the case of Chiredzi), behaviour of frogs and sounds of birds, are related to the response of certain animals and plants to the already prevailing weather stimuli, rather than the coming season. The indicators seem to be of diagnostic nature rather than prognostic with no obvious specific lead time. Farming practices are not in fact influenced by any indigenous knowledge for climate forecasting but follow a pre-determined calendar. Thus their planting dates are almost constant irrespective of the season and this leads to frequent poor germination and replanting at great cost to the farmers.

5. Farmers see value in climate risk information: Farmers with access to climate risk information showed interest to continue getting climate risk information and developing rules of thumb particularly in making decisions on when to plant, determining plant density, when to weed using cultivator and when to harvest. The most sought after information include: observed rainfall and medium range (10-14 day) rainfall outlooks.

6. Promoting farmer use of climate forecasting tools is best done as a 'learning by doing' approach: Use of locally observed rainfall records to evaluate planting decisions increased among farmers in the pilot project area where village level rainfall monitoring sites had been established. By developing a culture of using locally observed climatic data, and simultaneously slowly introducing the farmers to climate forecast products, a firm foundation for the uptake of medium range and seasonal forecasts has been established. A project survey carried out in June 2011 showed that demand for medium (10-14 days) range and seasonal climate forecasts grew to about 43-83.5% of the farmers across the four pilot WARDs. Areas with the highest interest in climate products reflect the influence of the extension worker(s) the project is working with.

7. Attribution of impacts to project requires special M&E design: Evaluating project impact on protecting/improving livelihoods against the effect of drought requires taking the (dynamic) climate baseline into account. This can be done via monitoring of conditions in a control group.

Mainstreaming Components

The project has substantially raised the profile and national recognition of climate change risks and adaptation opportunities in southern Zimbabwe. It has provided a framework for implementing an adaptation strategy in drought prone areas and developed the momentum and testing of some important tools for enhancing community resilience to climate change. The project experience has the potential to contribute directly and strategically to the current development of a national climate change policy and to adaptation practices throughout the country.

The project has only partially succeeded in developing the national, district and community level preparedness and mechanisms for adaptation. Institutional mainstreaming of adaptation has focused on technical manuals and extension staff training in the hope of downstream dissemination. For example, the commitment and institutional capacity to implement the priority measures for Save River basin and Chiredzi District adaptation is at best, uncertain, and in hindsight such expected capacity building results may have been beyond the scope of a medium-sized project.

Sustainability

The prospects for sustainability appear to be mixed, although they are considered satisfactory. On the one hand, the agricultural productivity and related income effects of the agronomic and livestock measures will support sustainability (financial drivers) at the project sites and perhaps even nearby villages. On the other hand, the measures that depend upon national or district level services to advance climate change adaptation may lack the necessary resources and motivation to carry on with some of the project activities (e.g., District CAMPFIRE outputs, crocodile markets). The process of integrating Met stations into government network however is likely. When the project ends, there will be even less support for extension outreach to promote the project adaptation measures. How the outputs of the project are promoted, adopted and utilized within government institutions to refine policies and programmes remains to be seen.

Replicability

The optimized crop pilots through this initiative have the potential to benefit about 6,600 households in Chiredzi district, and many thousands more households at the national level. Replication of livestock interventions has potential to benefit more than 60% of the 12,400 households in Chiredzi District whose vulnerability to drought and climate change is exacerbated by their current lack of access to animal drawn draught power. Indirect benefits through improvement in wildlife management have the potential to benefit an additional 1000 households in the Chiredzi district. The project is encouraging replication of optimized crop production through Farmer Field schools (FFS). FFS is a group-based learning process that has been used by a number of governments, NGOs and international agencies to promote Integrated Pest Management. FFS are being used in the project as a learning platform for farmers to increase learning and improve production strategies on the ground. Exchange visits for neighboring farmers, public awareness campaigns and tours by policy makers are some of the tools planned to encourage replication of best practices.

Barriers to replication of the adaptation measures include credit and input bottlenecks which results in farmers resorting to their own traditional varieties of grains despite poor performance, and the lack of supportive policies and institutions.

Funding

GEF (SCCF): US\$983,000
Government of Zimbabwe: US\$680,000
NGOs: US\$175,000
UNDP: US\$75,000
Others: US\$25,000
TOTAL: US\$1,938,000

Timeframe

2007-2012

Profile Updated: December 2012

Previously Created: December 2010

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References used: Project Implementation Review(3785) 2009; CwDCC, Regional Component Design and Endorsement Workshop & Kenya Host Site Visits – Field Trip Report, May 2009; GEF Project Documents; Special Climate Change Fund Work Program, Review of MSP and FSP, SCCF/LDCF-Council Meeting, December 2006; Mission Report, Zimbabwe Pilot Site Regional Visit, October 2010, Environmental Management Agency, Harare.

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