









## LESSONS LEARNED

# Building Climate Resilience in Lesotho with Early Warning Systems

### UNEP Lessons in Climate Change Adaptation

PROJECT NAME	LOCATION	IMPLEMENTING AGENCY	EXECUTING AGENCY		
Improvement of Early Warning System to Reduce Impacts of Climate Change and Capacity Building to Integrate Climate Change into Development Plans		UNEP	Lesotho Meteorological Services		
GEF Project ID: 3841		<b>BUDGET</b>	<b>FUND</b>		
		\$1.7m (GEF) and \$3m (co-finance)	Least Developed Countries Fund (Global Environment Facility)		
STAKEHOLDERS	MAIN APPROACHES		SDGs		
<ul style="list-style-type: none"> <li>Communities and households</li> <li>Government ministries</li> <li>Schools &amp; local NGOs</li> <li>Department of Water Affairs</li> <li>Prime Minister's Office</li> <li>See <a href="#">Terminal Evaluation</a> for more</li> </ul>	 Early warning climate forecasting	 Adaptation policy and planning	 Piloting local adaptation technologies	 Awareness raising and education	  
				TIMEFRAME	
				2011-2017	

## Summary

In 2011, the Government of Lesotho secured funding from the Global Environment Facility's Least Developed Country Fund to reduce the negative impacts of climate change on vulnerable communities.

A central approach of the project was to build the resilience of vulnerable communities by strengthening Lesotho's climate information and forecasting systems, which contribute to communities' adaptive capacity regarding preparation for extreme weather events.

In addition, the project piloted a range of local adaptation strategies in six villages from three districts, including crop diversification, water

harvesting techniques, restoring grasslands with resilient species, participatory pasture management, and erosion control with stone lines, among others. The project also provided critical inputs for Lesotho's climate adaptation policy framework and increased public understanding of climate change through awareness-raising campaigns.

An analysis of project components produced key lessons regarding best practices for community engagement, monitoring and evaluation, policy mainstreaming, and much more. These lessons are now informing Phase II of the project.

©twenty20photos/Envato







## Climate Change in Lesotho

Lesotho's economy is closely tied to the climate, as water is both a source of energy and a commercial export while rainfed agriculture and grazing employ most households. Recurring droughts and volatile rainfall have depleted perennial springs and decreased crop productivity. Additionally, stronger storms and earlier or later frosts have affected agricultural and other livelihoods. By the year 2060, seasonal mean temperatures are expected to rise by 1.78–2.22°C. Additionally, climate impacts and limited adaptive capacity are exacerbated by non-climate drivers such as poverty, minimal access to key knowledge (no soil and seed testing or agricultural extension services), poor grazing and agricultural practices resulting in land degradation, pests, invasive plants, and a lack of water for irrigation and sanitation, among other factors.



©Gil.K/Shutterstock

## Project Outcomes & Achievements



### Component 1: Climate monitoring, predictions and early warning

Improved reliability of hydro-climatic data

1. Six automated weather stations added to the weather monitoring system
2. Telecommunication network equipped and updated, with end users in three pilot locations receiving early warning messages
3. 20 skilled personnel for operation and maintenance of climate monitoring stations
4. Skills increased amongst community groups on disaster management and adaptive responses



### Component 2: Science-based climate change adaptation policy and planning

Stronger capacity for resilient development planning

1. Six sets of climate hazard and vulnerability maps
2. Recommendations for integrating climate risks into climate-sensitive sectors
3. Multi-sectoral task force on climate adaptation policymaking operational with a financial sustainability plan



### Component 3: Local adaptation technologies

National policymaking is informed by best practice and local demonstrations of adaptation technologies

1. Five adaptation interventions tested by six villages in three districts with results made accessible (crop diversification, improved livestock breeds, soil erosion control, water harvesting techniques, increasing rangeland productivity)
2. Lessons, cost-benefit analyses, and recommendations for upscaling adaptation technologies available as policy briefs (best and worst practices) on energy options, range rehabilitation, crop diversification, and more



### Component 4: Public awareness and education

Increased public engagement and endogenous capacity to manage climate change impacts

1. Awareness campaign on climate change includes knowledge based on Lesotho's climate risks and opportunities for adaptation.
2. A protocol for recommendations for integrating climate change into national education curricula available and agreed by relevant stakeholders

**Table 1: Local Adaptation Technologies (Component 3)**

District	Project Interventions (2011-17)	Sustained Adaptation Practices (2020)
<b>Thaba-Tseka</b>	<ul style="list-style-type: none"> <li>• Merino rams for stock improvement</li> <li>• Fruit trees (apples)</li> <li>• Brush control</li> <li>• Water harvesting (4 spring water tanks)</li> <li>• Grazing management plans</li> <li>• Bamboo plantation trial</li> <li>• Fuelwood trees</li> <li>• Vegetable production in tunnels</li> <li>• Construction of stone lines</li> <li>• Rangeland reseeding</li> <li>• Keyhole gardens with shade nets</li> </ul>	<ul style="list-style-type: none"> <li>• Water harvesting was effective - 3 out of 4 tanks were completed and continue to be used</li> <li>• Rangelands around the village continue to be well-managed and the grazing land has been improved. However, the selected site for ram grazing became an area of conflict and was subsequently abandoned. Conflicts between area chiefs (Matlatseng) and local chiefs (Maputsoe) also led to the abandonment of a site with improved grazing land</li> <li>• The merino improvement plan was successful and sustained. Offspring from the original ram stock are still being properly cared for in the community</li> <li>• The improvement of rangelands with stone lines and reseeding was very successful. Degraded areas are now rehabilitated and well-managed, as per the grazing management plans.</li> <li>• Keyhole gardens with shades nets were successful, and have been maintained in every selected household</li> </ul>
<b>Quthing</b>	<ul style="list-style-type: none"> <li>• Conservation agriculture</li> <li>• Fruit trees</li> <li>• Water harvesting with incomplete spring water tank</li> <li>• Brush control and reseeding rangelands with <i>E. Curvula</i></li> <li>• Gully rehabilitation</li> <li>• Sorghum trials</li> <li>• Dual purpose poultry</li> <li>• Grazing management plans</li> <li>• Bamboo plantation trial</li> </ul>	<ul style="list-style-type: none"> <li>• Rangeland improvement through brush control and reseeding continue to be practiced</li> <li>• Whilst demonstrations on sorghum trials reportedly received positive feedback from local communities, there was no lasting impact due to the unavailability of sorghum seeds for local farmers</li> <li>• The dual-purpose indigenous poultry distributed to selected households are still visible in the village landscape, with a number of households having at least 10 chicken offspring from the original project stock</li> <li>• Conservation agriculture, defined as a “set of soil management practices that minimize the disturbance of the soil’s structure, conserves soil water and enhances biodiversity”, worked effectively in the first year but has since disappeared from the landscape</li> </ul>
<b>Mafeteng</b>	<ul style="list-style-type: none"> <li>• Conservation agriculture (maize)</li> <li>• Fruit trees</li> <li>• Fuelwood trees</li> <li>• Fodder production trials</li> <li>• Water harvesting (earthen dam)</li> <li>• 3 sorghum crop variety demonstrations</li> <li>• Keyhole gardens</li> <li>• Bamboo plantation trial</li> <li>• Grazing management plan</li> <li>• Brush control and reseeding rangelands with <i>E. Curvula</i></li> </ul>	<ul style="list-style-type: none"> <li>• Sorghum trials were successful with positive feedback from local farmers</li> <li>• Fodder production trials were successful and were well-received from local farmers, but a lack of seed availability hampered long-term sustainment</li> <li>• The earthen dam in the Ha Lekhari village has had successful long-term impact, particularly for drinking livestock. On the other hand, the earthen dam from Mafeteng village was initially effective for drinking livestock, but was not completed and is now partially silted</li> <li>• Keyhole gardens were highly effective with almost every household having at least 1 actively farmed keyhole garden</li> <li>• There has been evidence that the conservation agriculture interventions have led to successful harvests, however, this is mostly within the homestead rather than the main fields</li> <li>• Following the brush control, rangeland reseeding and grazing limits for a period of 5 years, there was evidence of range improvement</li> </ul>

# Lessons Learned

## Community Engagement

- Project activities and pilots are more likely to succeed if they engage in a clear and transparent manner with local communities and civil society at all stages, including via:
  - i) A thorough stakeholder participation/engagement plan and consultations in the development phase to assess differing interests, cultural sensitivities, and local knowledge of climate and other risks that could affect project activities, especially the transition to alternative livelihoods, which may impact stakeholders' sense of identity.
  - ii) A memorandum of understanding and by-laws with communities to establish clear commitments and obligations (e.g. travel for monitoring of livestock, weeding of pilot sites, or maintenance of water retention structures) for both the communities and the project management team during implementation.
  - iii) Participatory adaptive management cycles based on systematic monitoring and evaluation to share results with stakeholders and determine course corrections.
- This engagement is best achieved by drawing on existing networks, chieftainships, and local NGOs/CSOs and relevant government agencies, taking into consideration how to engage communities most effectively and acknowledging cultural perspectives.
- Prioritizing women and marginalized parts of communities with lower-cost adaptation interventions ensures greater uptake across the target population (see "keyhole gardens" below as an example).
- Using incentives (e.g. paid labour) sparingly can help avoid creating an atmosphere of solely remuneration-based participation in activities, while community in-kind or other contributions could build a sense of ownership to ensure continuation of activities after the project end date.

## Piloting Local Adaptation Practices

- Adaptation technologies providing benefits to individuals or households were more successful than those resulting in community-level benefits. The project explored potential reasons for this, such as low social cohesion or insufficient community engagement, but more study is required.
- Once farmers witness the benefits (fodder production, forage grasses, keyhole gardens, sorghum grain, for example) of ecosystem restoration or other pilot demonstrations, they are likely to continue such practices. Results should therefore be highly visible.
- For field pilots, it is important for the executing ministry to partner with - or delegate responsibility to - the Ministry of Agriculture. Communities should develop plans and assign roles for the maintenance of crop varieties, weeding, fruit trees, stone lining for soil erosion control, and seedlings. MoUs should be used for this purpose and nothing should be assumed with regards to responsibilities.
- Planting must be timed correctly with seasons and climatic conditions. Several pilots for tree planting faltered due to transplanting of seedlings during the wrong time of the year (due to budgeting and administrative delays) or during severe drought conditions. A lack of a properly qualified agrometeorological experts across target communities led to a mismatch between projected climatic conditions and crops chosen.
- The project's 'keyhole gardens' were highly successful, particularly for women, highlighting the importance of a gender lens and inclusion of marginalized populations in project design.
- Projects should take advantage of what people already know. Using villages' existing sources of chicken feed instead of importation reduces the likelihood of failures.

## Box 1: Community Ownership

A sense of community ownership is key for project success. The villages of Maputsoe and Ha Tokho are key examples of this ownership, having thoroughly mobilized themselves with the help of their chiefs to develop management plans for degraded pasture restoration. These initial foundations enabled sufficient cooperation to allow pasture areas to recover, demonstrating direct benefits for livestock and thus livelihoods. Having reaped the benefits of what they sowed, the communities decided to carry on with their pasture management activities. This contrasts starkly with other communities. For example, a small dam in another community failed and filled with silt as the community never developed a sense of ownership over the structure. This outcome can mainly be attributed to confusion over who was responsible for the dam's maintenance (see MoU and by-laws in "Community Engagement").

## Monitoring & Evaluation (M&E)

- Adequate risk analysis, regular monitoring, and adaptive management that regularly refined project implementation improved efficiency.
- This adaptive management will be hampered if a monitoring strategy is inadequately funded. A strong monitoring strategy requires an M&E expert, supported by in-depth baseline surveys, to collect information on useful indicators, share results, develop lessons learnt, and provide follow-up with communities for adaptive management decision making to address eventual challenges.
- Decentralizing decision making and involving local leaders from across all relevant communities in planning and implementation of interventions (with corresponding resource-use rules) while also establishing mutually agreed upon governance structures for conflict-resolution, non-compliance penalties, and benefit-sharing mechanisms can aid in this process.
- Building capacity for this scaling will require: (1) stakeholder learning regarding project successes and failures to date; (2) integrating climate adaptation issues into educational curricula, government trainings, and District Development Plans or ministries' operations; and (3) a "corps" of local trainers of trainers to ensure that capacity building efforts for adaptation measures (e.g. sustainable pasture management) are localized and replicated in communities across the target regions,

## Sustainability & Replicability

- Scaling of successful pilot interventions should take place at the watershed level for more resilient ecosystem services such as water retention and provisioning, and rebuilding of soils, but resolving underlying factors such as uncertainties over land tenure will be necessary to do so.

## Box 2: Policy Mainstreaming

Combined with identifying and mobilizing target communities, while simultaneously developing a National Policy on Adaptation (not achieved), the project team and resources were spread perhaps too thinly. Projects seeking to inform national climate change policy frameworks should establish dedicated structures and partnerships with relevant government ministries and assign team roles or responsibilities specifically for that purpose to ensure sufficient capacity. This could also help with aligning different ministries' policies, another obstacle that affected implementation. Although the project did not deliver a National Policy on Adaptation, it did provide critical inputs for Lesotho's climate policy processes via lessons learned, piloted technologies and activities. In providing those inputs, it was determined that adaptive management cycles are crucial, as they ensure that project stakeholders meet regularly as partners to assess progress (or a lack of it) and make corresponding "course" adjustments in implementation. This ongoing dialogue and collective decision making can improve implementation as well as help build broader support for and thus mainstream effective climate adaptation policies. However, adaptive management requires an effective monitoring and reporting strategy.



# Stakeholders & Partners

Institution/actor	Role and contribution to the project
Lesotho Meteorological Services, Ministry of Energy and Meteorology	Lead executing entity for the project: Overall coordination and oversight of project activities; provision of climate data for vulnerability mapping and research; early warning system; training of beneficiaries; science-based climate adaptation policy and planning; public awareness and education
Ministry of Agriculture and Food Security	Led the trials of the adaptation technologies and contributed to vulnerability mapping; beneficiaries of trainings on climate risk management mainstreaming; conducted research into resilient crop and livestock opportunities
Ministry of Health and Social Welfare	Contribution to vulnerability mapping and the training of beneficiaries
Disaster Management Authority, Prime Minister's Office	Coordination; mainstreaming; participation in training; participation in vulnerability mapping; development of climate policy; revision of disaster management plans; early warning system
Ministry of Finance and Development Planning	Participation in training; mainstreaming and development of climate policy; coordination with other projects
Division of Environmental Health, Department of Rural Water Supply	Participation in training of beneficiaries and in pilot site activities for health monitoring
Ministry of Tourism, Environment and Culture	Participation in training of beneficiaries; awareness raising; participation in policy development and mainstreaming
Ministry of Forestry and Land Reclamation	Participation in pilot activities; implementation of sustainable land management practices and anti-erosion activities
Department of Water Affairs and Rural Water Supplies	Implementation of pilot activities for water management
Households from the 6 selected villages (3 districts)	Beneficiaries of the pilot interventions on water harvesting, crop diversification (fruit trees), tree planting, sorghum trials, sheep breed improvements (for wool production) and poultry trials
Students and teachers in schools within the 3 districts	Beneficiaries of the process of developing a curriculum to mainstream climate change considerations into the primary and secondary school education system

Source: Adapted from the project's [Terminal Evaluation 2018](#)

## Multimedia & Resources

- Terminal Evaluation - [link](#)
- GEF project page - [link](#)
- Climate Change Toolkit for Teachers - [link](#)
- Climate Change Toolkit Additional Notes - [link](#)
- UNEP's climate adaptation web portal - [link](#)

## Contacts

### Jessica Troni

Head, Climate Change Adaptation Unit, UNEP

[Jessica.Troni@un.org](mailto:Jessica.Troni@un.org)

### Mosuo Letuma

Project Manager, Lesotho Meteorological Services

[emletuma35@gmail.com](mailto:emletuma35@gmail.com)

©Biscuit/iStockphoto

