# DECENTRALISED COMMUNITY-BASED EARLY WARNING SYSTEM (DCEWS) FOR LESOTHO

## TECHNOLOGY DESCRIPTION

### TECHNICAL DESCRIPTION

An Early Warning System (EWS) is a set of coordinated procedures through which information on foreseeable hazards is collected and processed to warn of the possible occurrence of a natural phenomenon that could cause disasters. These systems are acquiring more importance in view of increased climate variability and the ability to implement them has become fundamental for improving capacity to adapt to climate change. A DCEWS offers several adaptation benefits in the context of climate change. It allows communities to develop early warning systems tailored to their specific agricultural and climatic conditions. This means that the system can account for local vulnerabilities, crop types, farming practices, and the socio-economic context. By having localized information, farmers can receive accurate and relevant alerts about impending climate-related risks, enabling them to take timely actions. Overall, a DCEWS strengthens local resilience, fosters community engagement, and enables targeted adaptation actions. By combining scientific data with local knowledge, it enables the capacity of farmers to adapt to changing climate conditions and ultimately builds sustainable and climate-resilient agricultural systems.

Precise seasonal predictions and proper preparation for various climate hazards including droughts, floods and hailstorms would reduce crop failure by 80% during droughts, reduce livestock mortality and morbidity by 100% during droughts, heavy snow and cold fronts during the winter. This technology belongs to the non-market goods and targets smallholder crop and livestock farmers in rural areas of Lesotho including emerging commercial block farmers, fruit producers including semi-commercial to commercial dairy, wool and mohair farmers and poultry farmers throughout Lesotho.

### CURRENT TECHNOLOGY READINESS LEVEL (TRL) OR COMMERCIAL READINESS INDEX (CRI)

In Lesotho, DCEWS is at TRL 2 or early stages of concept formulation and initial proof of concept. The basic principles of the technology have been observed, but the application is mostly theoretical with limited practical testing. Moving from TRL 2 to higher levels will require: a) Defining system requirements and establishing a clear operational framework; b) Conducting feasibility studies; c) Engaging with local communities to understand their needs and gather feedback; and d) Securing funding and support for further development and field trials. Its CRI in Lesotho is in the early stages (CRI 3-4). This suggests that while the technology has shown potential and some level of technical validation, it still faces challenges in terms of market penetration, regulatory support, and financial viability.

## CLIMATE RATIONALE OF THE TECHNOLOGY

The climate rationale for DCEWS in Lesotho is deeply connected to the country's vulnerability to climate change. Lesotho faces increasing temperatures, unpredictable rainfall patterns, and increasingly frequent extreme weather events such as droughts, heavy snow and cold fronts as well as floods. These events negatively impact agriculture, water resources, and livelihoods, especially in rural communities. DCEWS help communities by providing timely and localized warnings about impending natural disasters, allowing them to take proactive measures to protect lives, property, and resources. By enhancing local capacity to monitor and respond to climate risks, these systems contribute to building resilience and reducing the adverse effects of climate change.

# AMBITION OF THE TECHNOLOGY

## SCALE FOR IMPLEMENTATION AND TIMELINE

The target is to establish DCEWS in every district by 2030 leveraging on the current six pilot areas supported by upgraded and modernized climate monitoring and forecasting systems. The timeline for realizing DCEWS covers the period 2024-2030 in line with national and development policies and the Early Warnings for All initiative, launched by the United Nations Secretary- in March 2022, which seeks to ensure that everyone is protected from hazardous weather and/or climatic hazards by the end of 2027. The activities will be phased out albeit staggered or concurrent where possible: a) **Planning and assessment phase (1-2 years):** This will entail **c**onducting initial assessments, identifying vulnerable areas, and engaging with local communities and stakeholders; b) **Capacity building phase (1-2 years):** Training local communities and authorities in climate data analysis, GIS techniques, and sustainable water management; c) **System development and pilot testing phase (1 – 2 years):** Establishing the early warning infrastructure, including communication systems and monitoring equipment. Testing the system in selected communities to ensure functionality and gather feedback; d) **Full implementation (1 – 3 years):** Expanding the system to cover more areas, based on the success of the pilot phase.; and e) **Monitoring and evaluation (ongoing).** This entails **c**ontinuously monitoring the system's performance and making necessary adjustments to improve effectiveness.

## AMBITION FOR TECHNOLOGY READINESS LEVEL (TRL) OR COMMERCIAL READINESS INDEX

The ambition of DCEWS in Lesotho is to reach TRL 7-8 by 2030. This means the systems would be fully functional and prototypes demonstrated in an operational environment, with proven effectiveness in real-world conditions. Achieving this level would involve: a) Enhancing technical capabilities: Ensuring the systems are reliable and can operate under various conditions; b) Community engagement: Training and involving local communities in monitoring and responding to climate risks; c) Policy support: Establishing regulations and frameworks that support the implementation and maintenance of CBEWS; d) Funding and resources: Securing financial support

for development, deployment, and ongoing maintenance. The ambition for advancing the TRL and CRI of boreholes in Lesotho is high, driven by the need to ensure reliable and sustainable access to groundwater for domestic use. The aim is to achieve CRI 7-8 by 2030. This would mean that the systems are not only technically viable but also commercially sustainable, with strong market acceptance, regulatory support, and financial viability.

## EXPECTED IMPACTS OF THE TECHNOLOGY

**Enhanced Disaster Preparedness**: Timely warnings about natural disasters like floods, landslides, and droughts will help communities take proactive measures to protect lives and property.

**Reduced Vulnerability**: By providing early warnings, these systems reduce the vulnerability of rural communities to climate-related hazards, improving their resilience.

**Improved Agricultural Practices**: Farmers can better plan their activities based on weather forecasts, leading to more efficient use of resources and higher crop yields.

**Water Resource Management**: Early warnings about droughts and floods help in better management of water resources, ensuring a more stable water supply.

**Community Empowerment**: Training and involving local communities in monitoring and responding to climate risks empower them to take ownership of their safety and well-being.

**Economic Benefits**: Reduced damage from natural disasters and improved agricultural productivity can lead to economic benefits for rural communities.

## POLICY ACTIONS FOR TECHNOLOGY IMPLEMENTATION

### EXISTING POLICIES IN RELATION TO THE TECHNOLOGY

**National Climate Change Policy (2017):** The policy framework aims to reduce the negative impacts of climate change on vulnerable communities by strengthening public understanding of climate change and improving climate information and forecasting systems.

**Agricultural Subsidy Policy (2003)** enhances agricultural resilience and disaster preparedness. Subsidies encourage the adoption of resilient agricultural practices, which can reduce the vulnerability of communities to natural disasters.

**Irrigation Policy (2002)** Effective irrigation policies can reduce the vulnerability of communities to natural disasters by ensuring a stable water supply for agriculture.

**Range Resource Management Policy** (2014) The policy promotes community involvement in rangeland management. Engaged communities are more likely to take ownership of early warning systems, ensuring their sustainability and effectiveness

**National Seed Policy (2016)** The policy aims to ensure the availability and access to quality seeds, which is crucial for maintaining food security and livelihoods. This is particularly important for communities that rely on agriculture, as it helps them recover quickly from natural disasters and other shocks.

**Food and Nutrition Policy 2016-2025 (2016)** The policy aims to ensure food and nutrition security for all communities. By addressing malnutrition and promoting healthy diets, the policy helps communities become more resilient to food crises, which is a key component of early warning systems.

## PROPOSED POLICIES TO ENHANCE TECHNOLOGY IMPLEMENTATION

- Strengthening Regulatory Frameworks.
- Capacity Building and Training.
- Early warning communication and dissemination protocols

## COSTS RELATED TO THE IMPLEMENTATION OF POLICIES

**Capacity building**: Total estimated cost of about USD0.21 million for the whole project.

**Installation of multi-hazard monitoring equipment**: Total estimated cost of about USD 50 million.

**Setting up early warning communication and disseminating systems:** Total estimated cost of about USD0.195 million for the entire duration of the project.

The total estimated costs are **USD 50.405 million**

## USEFUL INFORMATION

### CONTACT DETAILS

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### LINKS TO TNA REPORTS

https://tech-action.unepccc.org/country/lesotho/