Drought early warning systems

Challenge: Disaster preparedness **Adaptation response:** Early warning

Description

A drought early warning system's main purpose is to warn local communities when there is risk of a drought, improving preparedness and decreasing risks associated with crop and food loss. This technology is particularly important for agriculture and water resource management. Effective warning systems require drought monitoring using appropriate drought indicators, meteorological data and forecasts, a warning signal, public awareness and education, institutional cooperation, and data sharing arrangements. The unpredictable weather patterns resulting from climate change, such as the occurrence of increasingly severe droughts, make this technology important for climate change adaptation efforts in many countries. Assessing risks and vulnerabilities and improving preparedness for natural disasters can minimize threats and avoid expensive relief efforts following such an event. An early warning system combined with the slow onset of a drought can give sufficient lead-time to local decision makers to mitigate drought threats, for example by arranging for emergency food supply, planning water harvesting programmes or introducing improved dry-land farming initiatives.

Implementation

Technical experts should select a suitable drought indicator for the local region, such as the Standardized Precipitation Index (SPI). Accessibility of remote sensing and local climate and meteorological data are key for producing the relevant indices. Improving data collection and sharing among institutions is an important part of the process. The roles and responsibilities of all stakeholders should be clear, and necessary training should be part of the planning process. A local database should receive all data and include essential processing models that produce a warning message when drought risk reaches a predefined threshold value. The local population should also be educated on drought risks and warning responses, and dissemination programs/networks should be established.

Environmental Benefits

- Improves land use practices, which can help decrease soil and land degradation.

Socioeconomic Benefits

- Strengthens overall drought management, including preparedness, response and recovery. Effective systems can give a lead-time of up to a few weeks.
- Mitigates human fatalities, health risks and poor water and food security.
- Reduces high costs related to post-drought rehabilitation and relief efforts.
- Improves network connectivity within and between local communities.

Opportunities and Barriers

Opportunities:

- Provide important climate change adaptation benefits in regions suffering from water scarcity and drought risk

- Technological advances allow citizens to receive warning system data directly on their smartphones, improving efficiency and dissemination reach
- Provides benefits for all societal groups, including those most vulnerable.

Barriers:

- There is often a lack of long-term datasets, or coordination and cooperation for data sharing amongst institutions. Both are essential for effective drought warning systems
- The warning has a degree of uncertainty, which can lead to false alarms
- Certain droughts may not be preventable, only preparedness can be improved.

Implementation considerations*

Technological maturity:	2-3
Initial investment:	2-4 (depending on scale and technical level of system)
Operational costs:	2-4
Implementation timeframe:	2-3

* This adaptation technology brief includes a general assessment of four dimensions relating to implementation of the technology. It represents an indicative assessment scale of 1-5 as follows:
Technological maturity: 1 - in early stages of research and development, to 5 – fully mature and widely used
Initial investment: 1 – very low cost, to 5 – very high cost investment needed to implement technology
Operational costs: 1 – very low/no cost, to 5 – very high costs of operation and maintenance
Implementation timeframe: 1 – very quick to implement and reach desired capacity, to 5 – significant time investments needed to establish and/or reach full capacity
This assessment is to be used as an indication only and is to be seen as relative to the other technologies included in this guide. More specific costs and timelines are to be identified as relevant for the specific technology and geography.

Sources and further information

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