

Technology Fact Sheet for Adaptation

B.5. Technology: Seasonal Forecasting and Early Warning (Telemetry Systems) ⁱ

Sector: Water Resources.

Subsector: Permanent Water Resources

B.5.1. Introduction

Telemetry monitoring is often thought to be too expensive and complex for many applications. However, wireless telemetry wherever you are, wherever your equipment is, using the latest radio, GPRS, and GSM data logger telemetry technology is now possible. Wireless telemetry systems are able to address the data acquisition needs of the water, environmental, industrial and meteorological communities with intelligent telemetry applications that can provide network monitoring for any parameter or signal. The type of low-cost telemetry monitoring system required depends on many factors such as the location of the site/sites of measurement and the number and distribution of sites.

B.5.2 Technology Characteristics

A radio frequency (RF) telemetry system with a shape memory alloy microelectrode was designed and fabricated. The total size and weight are 15 mm×8 mm and 0.1 g, respectively. Since the telemeter is small and light enough to be loaded on a small animal such as an insect, the system can be used for the neural recording of a freely moving insects. The RF-telemeter can transmit signals by frequency modulation transmission at 80-90 MHz. The transmitted signals can be received up to about 16 meters away from the telemeter with a high signal-to-noise ratio. The neural activity can be detected without attenuation by using an instrumentation amplifier with its input impedance set to 2 MΩ at 1kHz. The telemeter was loaded on a cockroach and the neural activity during a free-walk was successfully measured through this telemetry system.

B.5.3 Country Specific Applicability and Potential

Telemetry systems will have to be operated and managed by the Ministry of Water Resources which is responsible for the generation and compilation of hydrological data. Operation and maintenance will involve electrical and electronic systems of specialized equipments and this will involve some prior training of the staff responsible to operate and maintain the system. Developments in the wireless communication services and the data logging systems have made telemetry systems a necessity for many organizations.

B.5.4 Status of Technology in Country

These systems are not readily available on the market. They will have to be ordered and necessary infrastructural arrangements must be made before they are installed and commissioned for use. Easy to accept for all involved stakeholders, there is also the possibility of sharing data amongst institutions concerned. Wireless telemetry systems are gaining wide importance and they are contributing significantly towards sustainable development of water resources.

B.5.5 Opportunities and Barriers

Opportunities for investment in telemetry systems are greatest as it can lead to time and cost savings, in addition to improved management of water resources. Conditions most favorable for its implementation are improvement in the network of hydrological data collection, collection of hydrological data on a more regular basis and at a lower cost.

Barriers to implementation include lack of such systems available locally, lack of skilled personnel to operate and maintain the system.

B.5.6 Benefits to Economic/Social and Environmental Development

Economical Benefits:

- Creation of jobs to set up, operate and maintain the system
- Creation of opportunities in the commercial area where organizations will be able to market such products with an operation and maintenance contract
- Reduction of expenses associated with mobilization of staff in hydrological data collection

Social Benefits

- Improvement in monitoring of the hydrologic network will result in improvement in water resource management and this can eventually result in more water being made available for development opportunities on both small and large scale.
- Training elements from capacity building for staff who will be involved in the operation of the system and at the same time education elements for the public who will be made aware of the need for optimization of water resources
- Increases per capita water availability. Lack of water can have serious health effects and allow for the spread of disease and illness if the reductions continues, even for a modest lengths of time
- Improved monitoring systems will help towards a more efficient use of water resources and will also lead to reduction in wastage.

B.5.7 Climate Change Adaptation Benefits

Sudan suffers from severe floods and seasonal forecasting. Therefore, early warning systems are much needed to eliminate the damage to lives and properties; inevitably provision will have to be made for robust systems and security.

B.5.8 Financial Requirements and Costs

Costs to implement adaptation options are 160 thousands Euro for the 16 key stations. Additional costs to implement adaptation option are needed, compared to “business as usual” (extra storage capacity). These would involve regular training of staff, operation and maintenance costs.

ⁱ This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Adaptation - Sudan. You can access the complete report from the TNA project website <http://tech-action.org/>