Real-time monitoring networks

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

Description

Real-time monitoring networks are systems of sensors and radars, and the accompanying computer systems, to track changes in hydrological conditions in near real time. Real-time monitoring provides an important source of information for early warning systems and timely flood preparedness. Remote sensing data on measures such as rainfall, wind, water levels and slope movement send information to a server immediately after data collection, thus increasing lead- time before a potential natural disaster such as flooding or landslides. Increasing lead-time is vital for issuing timely warnings, taking action and reducing potential impacts on people, assets and infrastructure. Real-time monitoring also provides important information on gradual changes in climatic conditions and trends over time.

Implementation

Sensors or radar are used to monitor environmental or climatic conditions in near real-time (e.g. groundwater and surface water levels, wind speeds and direction). These may include both weather radar and rain gauges, but also systems of sensors monitoring operations and conditions of wastewater and sewer and storm water systems. The sensors or radar are connected to a computer system, allowing viewing of data as it is collected. Real-time monitoring networks are often linked to early warning systems if the sensors detect dangerous meteorological conditions such as very high rainfall or surface water going above a certain threshold.

The complexity of the systems can vary, from simple measurements of flow and water table heights, to more complex calculations including a variety of measures, such as snow melt, temperature, soil moisture, etc.

Environmental Benefits

- Mitigates flooding or landslide events that are destructive to local ecosystems.

Socioeconomic Benefits

- Informs of developments as they happen, allowing for immediate action in case of an emergency for example evacuation, construction of temporary flood protection, or relocation of important assets.
- Improves estimates for predicting future trends in climate change.
- Improves water resource operation and use efficiency with, for example, water supply reservoirs, hydropower, cooling water and water diversions.
- Reduces flood risks and damage and increases community resilience and response efficiency.

Opportunities and Barriers

Opportunities:

- Provides near-instant and high-quality meteorological data
- Resulting information improves disaster preparedness and response, protecting people, assets and infrastructure
- Helps optimize daily operation and maximize resource use benefits and allocation.

Barriers:

- Requires high technical expertise to install and operate, and can be fairly expensive
- Maximum efficiency requires relatively well established and managed information systems for water, storm water and wastewater management.
- Correctly interpreting and utilizing data requires capacity building and related communication and action protocols.

Implementation considerations*

Technological maturity:	4-5
Initial investment:	3-5
Operational costs:	2-3
Implementation timeframe:	2-4

* 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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