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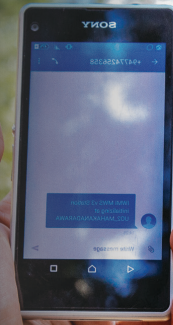
International Water Management Institute

Open source mobile weather stations for flood resilience

Relying only on manual precipitation measurements to manage reservoirs, the Irrigation Department of Sri Lanka was often unprepared for flood waves, resulting in rapid releases, breaches, and increased flood damages. The International Water Management Institute (IWMI) was asked by the Irrigation Department in January 2015 to provide a solution for improving flood resilience. The department needed data on hourly rainfall intensity so it could prepare reservoirs to receive and store intense rainfall, but traditional weather stations were too expensive for this application.

To provide an effective and affordable solution, IWMI developed a low-cost mobile weather station that transmits data through SMS, using open-source hardware and software. Five stations are being piloted in the catchment of the Nachchaduwa reservoir in Anuradhapura. The operation and maintenance of the stations are being studied to identify avenues for technical and policy development to better support flood risk reduction policies. LINK TO INFOGRAPHIC

HIGHLIGHTS

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5 cost-effective weather stations are being piloted in Sri Lanka, made from open source technologies and local materials.

A community of practice around open-source mobile weather stations was initiated in Sri Lanka at the project's launch.

A citizen science group installed IWMI stations in 20 schools in Sri Lanka schools for educational and early-warning purposes.

Seventeen public and private organizations across the globe are building their own weather stations using IWMI manuals.

APPROACH

IWMI responded to the Irrigation Department's request and installed 5 mobile weather stations in the upper catchment of the Nachchaduwa Reservoir, at locations identified by the Department, in April 2016. The weather stations record data to a microSD card every 5 minutes, and send a text message to the cellphones of the reservoir managers once per day or whenever a rainfall threshold of 10 mm/hour is exceeded. These notifications can be tailored to individual environments and needs. IWMI also organized a workshop to train key individuals in the technology and operation of these weather stations, thus linking users (such as the Irrigation Department and the Coordinating Secretariat for Science Technology & Innovation) to developers (such as the University of Moratuwa and A&T labs) and establishing a community of practice. The next phase of the project, in parallel with projects by other members of the community of practice, will test the weather stations at larger scales in Sri Lanka.

In phase I, the team developed the first of its kind open source mobile weather station, the stations were installed in the upper catchment of the Nachchaduwa Reservoir in Sri–Lanka.

In phase II, the team will also be further improving the weather station for better accuracy and reliability, and establishing, in addition to developing a community of practice for users of open source weather station to share experiences on costs, operations and maintenance with a local online knowledge–sharing platform. The team will also support national stakeholders to repair and maintain devices, and to pursue policy for use at scale both nationally and internationally.

"Sri Lankans are becoming increasingly affected by flooding. An early warning system is badly needed, and this project will help make our systems safer and more efficient."

– *Wimalananda Ratnayake, Secretary of the Ministry of Irrigation and Water Resources Management, Sri Lanka*

NEXT STEPS

In the second phase of the GFDRR Challenge Fund project, the achievements the first phase will be used to support creation of conducive policy and institutional environments for using weather stations at larger scales. IWMI will collaborate with the Coordinating Secretariat for Science Technology & Innovation in the effort, who have been working on developing a national climate observatory. IWMI will also create an online knowledge platform to link potential users of these devices with developers, and will serve as the policy and institutional collaborator for the 4ONSE project, a collaboration between the University of Moratuwa, the Irrigation Department, and the Institute of Earth Sciences aimed at improving sensor technologies.

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