**Phase 2 Innovation – Flood monitoring and early warning system Based on IOT:**

**Introduction**

In most countries in the world, flood had caused damages to properties and it involved a large amount of loss to individuals and governments. During flood, it is important to have efficient flood response operation system to manage all activities among different related agencies. These last decades, lots of flooding risk technologies has been developed to minimize the danger of flood in inhabited areas. Currently, the Philippine government funded the Project NOAH of the Department of Science and Technology (DOST). They installed Automated Rain Gauges (ARG) and Water Level Monitoring Stations (WLMS) along the country’s major river basins (RBs). However, project NOAH is still under development in which some essential information are not yet available to view in their website. Most of these technologies being developed commonly apply in weather forecasting, flood detection and monitoring system using sensing devices, modelling software, Internet and mobile technology. However, these systems are usually for one-way communication only. In order to get an update or latest information, local communities need to access the website. And in accessing this website, it requires computer or smart phone that has an Internet feature, and most individual could hardly afford to purchase one. In addition to that, individuals are busy for their daily routine, and monitoring activity cannot be their priority . These are the reasons why communities are blinded with the current status of the nearby river watershed. The unawareness led to the overflow of the watercourses of the river waterway and the subsequent inundation of various localities causing extensive damages to properties and human life. The City of Ilagan is located at the central portion in the province of Isabela. It is the River Basin of its neighbouring towns particularly in the southern portion of the province. Floods caused by these rivers flow down very slowly because of surface retention over the extensive flood plain, extremely gentle slope, retardation of flood by several gorges and river meander.

**History:**

* In 2013, five community-based flood early warning systems were installed in the Singora and Jiadhal rivers.
* The system installed in the Singora River sends flood warning signals to 20 flood-vulnerable communities downstream; 25 flood-vulnerable communities receive warnings from the system installed in the Jindal River.
* During the flood season of 2013, the flood early-warning system installed in the Jindal River successfully informedcommunity members of pending floods, helping them save assets and lives**.**
* **Problem:**

The Hindu Kush Himalayan region is one of the most dynamic and complex mountain systems in the world. It is also extremely fragile and sensitive to the effects of climate change. Climate change is gradually increasing the frequency and magnitude of extreme weather events and natural hazards in the region, which has led to higher levels of risk and uncertainty.

One of the effects of climate change is the formation of meltwater lakes on the lower sections of glaciers in the Himalaya region. Because such lakes are inherently unstable and subject to catastrophic flood surges they are potential sources of danger to people and property in the valleys below them.

**The solution**

The Community-based Flood Early-warning System is an ICT-enabled system to detect and respond to flood emergencies that are prepared and managed by the communities. The wireless system manages flood or flash flood risk by providing early warnings to downstream communities and enhances cooperation between upstream and downstream communities in the sharing of flood information.

This ICT solution consists of two units – a transmitter and a receiver. The transmitter is installed along the riverbank, and the receiver is installed at a house near the river. A flood sensor attached to the transmitter detects rising water levels. When the water reaches a critical level, a signal is wirelessly transmitted to the receiver. The flood warning is then disseminated via mobile phone to concerned agencies and vulnerable communities downstream. Critical flood levels are set with the help of the local community.

**New innovative system for early flood warning**

An innovative system developed through a Tamworth Regional Council-led project will give residents of Bundle and Wolman earlier flood warning notice. Tamworth Regional Council and the NSW State Emergency Service Western Region has worked with consultants Water Technology Pty Ltd and the Bureau of Meteorology over the last year to develop the Flood Early Warning System.

The project was jointly funded by Council, the NSW Government and the Australian Government under the Natural Disaster Resilience Program.

Tamworth Regional Council Manager Strategy, Assets and Design, Graeme McKenzie said the system is the first of its type in the NSW State Emergency Service Western Region.

“The system uses flow monitoring in creeks and rivers in conjunction with predicted rainfall from the Bureau of Meteorology to identify the risk of flooding and the possible magnitude of the flooding,” he said. “The SES and Council will receive automated alerts and the Wolman and rundle communities will benefit significantly through improved flood management and earlier warning of flood events in the upper reaches of the Peel Catchment.’’

Tamworth Regional Council storm water engineer Aidan Pugh said the key to the new system was the addition of a river gauge in Duncan’s Creek.

“With Wolman being at the junction of the Peel River and Duncan’s Creek, flooding of Wolman can occur from either source,” he said. “The installation of the gauge provides real time monitoring of flows – this has not been available for the SES or Council before.

“The remainder of the system is the really clever bit which uses the predicted rainfall and actual rainfall to allow early warning in relation to possible flooding.”

Residents of rundle and Wolman have been invited to a community information session tomorrow at Wolman Community Hall from 10.30am to learn more about the Flood Early Warning System and have the chance to increase their knowledge of flood in Wolman. They will also be encouraged to sign-up to receive SMS notifications to ensure they are better prepared for moderate or major flooding.