

Flood Early Warning System: Viable Low-cost Adaptation for Lakeshore Municipalities in the Sta. Cruz River Watershed

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Floods are among the most devastating hazards confronting the Philippines. Unfortunately, many households and communities are becoming more at risk because of improper land use and rapid environmental degradation, coupled with the impacts of global climate change. The lakeshore municipalities in the Sta. Cruz River Watershed are no exception, given that the area is contiguous to the largest lake in the Philippines—the Laguna de Bay.

Recent experience has shown that flooding can be very costly as it can result in the destruction of private assets as well as public infrastructure. It can also lead to loss of production and income, displacement of communities, spread of illnesses and diseases, injury, and even death.

A study⁵ conducted by researchers from the University of the Philippines Los Baños (UPLB) revealed that the average value of direct property damage incurred by households per flooding event is about PHP 10,450 (USD 261.25)⁶. This is a hefty sum given that the average household income is only about PHP 5,125 (USD 128.13) per month.

Because of its huge economic and social impacts, governments around the world are looking for ways to effectively address flooding. One of the most popular is the construction of flood-control infrastructure such as dams, dikes, and floodways. Although effective in mitigating floods, there are two problems usually encountered with these options: (i) huge financial outlay, and



Aerial photograph of flooding in Sta. Cruz, Laguna during Typhoon Ondoy

(2) length of time required for the construction of the structures.

On the other hand, there are options that can minimize the impact of floods that are relatively inexpensive and quick to implement. One example is the Early-Warning System (EWS). The strategy employed in an EWS does not prevent the occurrence of floods per se, but it can minimize the risk and potential damage by providing up-to-date advisory to households and communities to prepare for the hazard, and if necessary, evacuate before flooding occurs. Its effectiveness in minimizing loss of lives as well as damage to property is well documented (Basha and Russ

2007; Mercy Corps Practical Action 2010).

In the Philippines, the establishment of an EWS minimized the losses in Bulacan's aquaculture industry during Typhoon Marce in 2004. The same positive effect happened in Dumangas, Iloilo in 2008 when Typhoon Frank left no casualties due to an EWS in place.

In the case of the Sta. Cruz River Watershed, a locally-developed technology by the Department of Science and Technology-Advanced Science and Technology Institute (DOST-ASTI) is being proposed. The installation of the system requires several steps which include:

- (1) the acquisition and setting up of the Automated Weather System (AWS) and Water Level Monitoring System (WLMS) stations, (2) training and capacity building of personnel, (3) research and field validation to establish thresholds for meteorological parameters, (4) establishment of a database containing contact information of households, and (5) setting up of the monitoring and communications office.

Using the Contingent Valuation Method⁷, it is estimated that the expected benefit from installing a technology-based early warning system, which uses "SMS" or "text-messaging", for the municipalities of Sta. Cruz, Victoria, and Pila is about PHP 65.6 million (USD 1.64 million) per year. On the other hand, the locally-developed technology of DOST-ASTI can be set up for an initial investment of only PHP 2 million (USD 50,000) and an annual operations cost of PHP 1.7 million (USD 42,500). This translates into an estimated benefit of about PHP 33.00 (USD 0.83) for every PHP 1.00 (USD 0.03) worth of investment.

If the DOST-ASTI early warning system is put in place, the lakeshore communities in the Sta. Cruz River Watershed area would greatly benefit from the project because the system will provide accurate and timely flood warnings to households.

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⁵ From an IDRC-funded and SEARCA-administered study entitled, *Building Capacity to Adapt to Climate Change in Southeast Asia*

⁶ At the time of the study, the conversion rate was PHP 40 = USD 1.

⁷ The Contingent Valuation Method is a survey-based valuation technique used by economists which estimates the benefits of a project by directly asking people about their maximum willingness-to-pay for the good or service provided by the project.

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