

Dagupan City, Pangasinan, Philippines

Combining Indigenous and Scientific Knowledge in the Dagupan City Flood Warning System

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Abstract

The kanungkong is a bamboo instrument which was traditionally used to call community members to assemble at the village hall for meetings, alert people or call children home. The flood early warning system set up in eight villages in Dagupan City, Philippines, has revived the use of the kanungkong along with staff gauges as flood markers in strategic locations in the villages of the city. The indigenous knowledge is combined with modern scientific knowledge and equipment for use in disaster risk reduction.

Background

Eight flood-prone barangays (villages) in Dagupan City in the province of Pangasinan in northwestern Philippines, namely Mangin, Salisay, Tebeng, Bacayao Norte, Bacayao Sur, Lasip Grande, Lasip Chico and Pogo Grande, have incorporated the use of the kanungkong to relay warning messages to households in the communities, especially those living along the riverbanks. These villages prioritized flood preparedness and mitigation activities under the Program for Hydro-meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) project. The community members held workshops to discuss the early warning system and had community drills.

Story/Event

Dagupan City is prone to heavy flooding. In 2007, typhoons with monsoon rains hit Northern and Central Luzon in August and November causing swelling of the river system in Dagupan City. This event put the kanungkong based early warning system to the test. Because the Barangay Disaster Coordinating Council (BDCC) monitored the flood markers and reported these to the Emergency Operations Center of the City Disaster Coordinating Council (CDCC), the villages were prepared in case heavy flooding occurred. The system successfully allowed the entire community to prepare and respond to the disaster with sufficient time.



Figure 1a & b. The kanungkong is a communication medium in the village early warning system.

Indigenous Knowledge

The kanungkong is a communication device which was used extensively in the past by the people of Dagupan City, nearby municipalities and provinces in Northern Luzon (Figures 1a & b). Its uses include calling the community to assemble at the village hall for a meeting, alerting citizens of a robbery incidence during the night, calling attention to midwives to assist a pregnant woman getting ready to give birth, and calling children to come home. With modern ways of communication, it has been forgotten.

Kanungkong comes from the word mangkanungkong which literally means to make a sound. The kanungkong is made of bamboo and when hit with a stick produces the sound kung, kung, kung. The village-level early warning system uses the kanungkong as a local relay and communication medium. For flood monitoring, and as the basis for the relaying of messages, staff gauges or flood markers have been put up and are monitored in strategic locations in the villages.

Presently, people have become familiar with the warning codes adopted in the city, which conform to international disaster warning color standards. In order to put the kanungkong into a system, an agreed upon rhythm and sound (i.e. number of strikes of the kanungkong at designated time intervals) were made to correspond to specific actions. One kanungkong for every 5 houses relays the warning to the households along the river banks. Table 1 explains the warning codes.

Staff gauges have been constructed at the lowest point in the barangays to correspond to the alert warning, based on information from past flooding in the communities (Figures 2a, b & c). A common zero point was initially suggested to be standardized by the city government but the system now operates with each barangay having

Table 1. Warning codes adopted in Dagupan City

Color	Alert Level	Warning Signal by the Kanungkong
White (Ready)	Normal	
Yellow (Get Set)	Alert (warning, there is danger)	5 strikes of the kanungkong at 20 minutes interval
Orange (Go)	Prepare for evacuation or proceed to holding area (heavy flooding approaches)	10 strikes at 20 minutes interval
Red	Full evacuation (evacuate from homes to designated safe areas) Forced evacuation	Non-stop (15 strikes at 10 minutes interval) Non-stop (20 strikes at 5 minutes interval)
Green	Back to normal	

its own agreed upon flood markings at strategic places in the barangay. The gauges show critical levels to determine when people have to prepare to move out and proceed to evacuation centers.

The monitoring and relay of information of flood level from the staff gauge is done by the barangay warning and communications team by hand-held radio to the BDCC. The kanungkong is then sounded and relayed from point to point (every 5 houses apart) (Figure 3). Each BDCC has a radio connection with the CDCC, and information is relayed from one to the other through its Emergency Operations Center by radio.

The flow of the early warning system is illustrated in Figure 4.

The Emergency Response and/or Disaster Risk Management Plan details the responsibilities of the CDCC and BDCC committees and personnel with regards to warning and evacuation. As part of the plan, the early warning system has been drawn up through a series of consultations, study visits and workshops.



Figure 3. The Barangay Disaster Coordinating Council gives out the initial warning using the kanungkung



Figure 2a, 2b & 2c. Staff Gauges showing warning levels monitored by warning and communications team

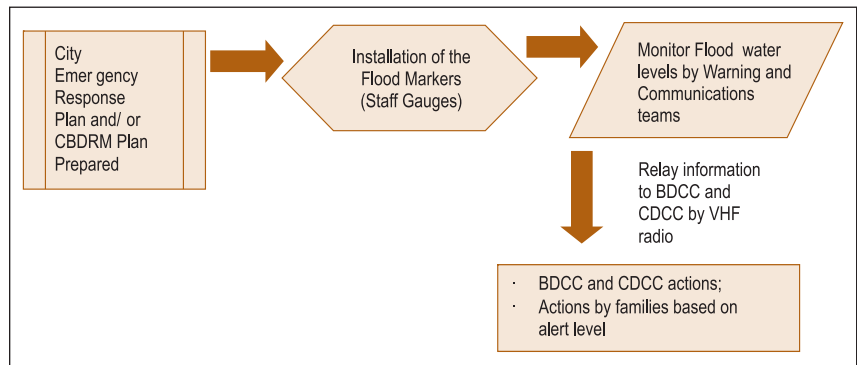


Figure 4. Relay of information to the community through the kanungkung.

Lessons Learned

The Dagupan City flood warning system, a combination of indigenous and modern scientific knowledge, is an effective response to the perennial problem of flooding in the city. In formulating the system, some important lessons were realized which are as follows:

1. The use of the kanungkong has mobilized local capacity while reviving and maintaining a local practice which is now used in disaster preparedness.
2. It is important to involve the community in risk assessment (i.e. hazard, vulnerability and capacity assessments) and designing of the early warning system.
3. It is important to test the warning system and evacuation procedure through table top exercises and practical community drills.
4. “Learning from good practice” visits to the communities involved in community based disaster preparedness and mitigation encourages the communities as well as local government officials to continue the good work. Study visits by local officials and community members to similar projects afford critical reflection on how to improve their own preparedness and mitigation activities.