

# Early Warning System

## The Problem

Andhra Pradesh (AP) has a vast coastline of about 974 km spread over nine out of thirteen districts of the state making it vulnerable to tropical cyclones. In last 40 years, the state has faced more than 60 cyclones of different intensities. The resultant strong winds, heavy rain, and flooding causes loss of lives and injuries, widespread damages to crops and property, and loss of livestock.

An early warning system (EWS) is a small but a critical part of a rapid response system to a natural disaster. EWS provides a potentially exposed population with valuable information that should trigger a relevant reaction to mitigate the negative impact of cyclones in AP. Application of the cutting-edge methodology for environmental risk assessment using the real options analysis allows estimations of the risk-adjusted benefits and costs of the EWS. Andhra Pradesh has a robust and effective early warning system. However, a piece of information has a value only if it is used. According to the latest available survey by the Ministry of Home Affairs, only 71% of the population in AP is aware of EWS and acts on a warning issued by EWS (compared to 99% in Odisha).

The current study looks into the cost of strengthening village implementation of the states' EWS by building awareness among communities to act upon the warnings to mitigate the losses. This study has focused on "preventable damage" which is limited by prevention of loss of human lives, injuries, loss of livestock and mitigation of property loss. Further it is assumed that there is 12 hours lead time for the warning.

## Solutions

Interventions	BCR	Total benefit (INR crore)	Total cost (INR crore)
Community level improvement in EWS in Andhra Pradesh	20.8	119,724	5,747

Total costs and benefits are discounted at 5%

The full paper by **Alex Golub** of American University with **Elena Golub** of Golub Consult is available on [www.appriorities.com/disaster-management](http://www.appriorities.com/disaster-management).

## Community level improvement of EWS

### The Problem

About 30 percent of the vulnerable population in AP is not aware of the EWS in the state compared to Odisha where around 99 percent of the population have the awareness.

### The Solution

There is a wide scope for increasing the efficacy of the EWS in AP by increasing the awareness about the system and training communities to respond appropriately to such warnings.

30% of the exposed population is not responding to EWS in Andhra Pradesh



● exposed population not responding to EWS

Improvement of efficiency of EWS in Andhra Pradesh up to the same level as in Odisha is a necessary action to mitigate damages from tropical cyclones in Andhra Pradesh.

**Costs**

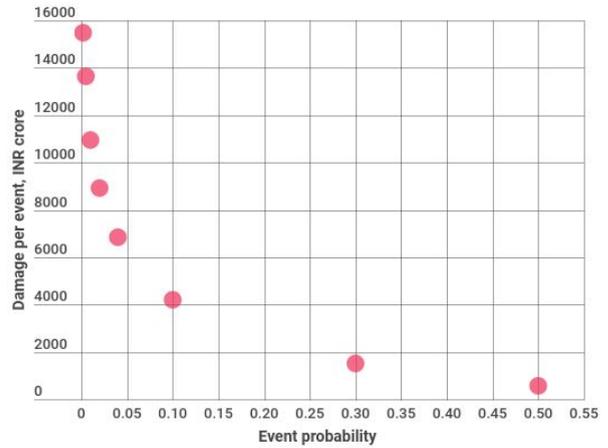
For cost estimations, it is assumed that every 4 years each household should receive an emergency kit (cost about Rs. 2500), and one representative of all households should participate in training. Also, two community leaders (per 100 population) would be given more intensive training about the system costing Rs. 1900 per community leader. Finally, a community communication (warning system) should be maintained and upgraded costing Rs. 1283 per household. All the above costs are incurred every four years over 2017-2051. The total cost for 35 years at 5 percent discount rate is approx. Rs. 5,750 crores.

**Benefits**

If all people listened to the EWS in the case of Andhra Pradesh, almost all fatalities could be prevented (UNDP, 2014), most livestock could be saved, preventable damage to houses are estimated at about 10% of the value. For the calculations of the EWS benefits, 40 percent of other material damage was also included as preventable damage. However, loss of crops was excluded from the preventable damage since EWS is unlikely to have any impact on such losses.

The benefits are calculated on the basis of inclusion of population, which was not responding to the EWS earlier, which is around 30 percent of the total population. The present value of incremental benefits through this intervention is around Rs. 119,724 crores for 35 years (2017-51) at 5 percent discount rate.

Simulated preventable damage from a tropical cyclone in Andhra Pradesh and probability of event occurring



Source: author's paper.