

GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI,
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION
LOK SABHA
UNSTARRED QUESTION NO. 3691
ANSWERED ON 18.03.2021

FLOOD FORECASTING

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Will the Minister of JAL SHAKTI be pleased to state:

- (a) whether India has recently shifted towards deterministic forecast whereas advanced countries like USA, EU and Japan have already shifted towards ensemble forecast coupled with Inundation modelling;
- (b) if so, the details thereof; and
- (c) the steps taken/being taken by the Government to modernise not only the telemetry infrastructure but also raise the technological compatibility with river basin specific hydrological, hydrodynamic and inundation modelling so that the country can witness probabilistic based flood forecast with a lead time of more than seven hundred ten days at par with the developed world;

ANSWER

THE MINISTER OF STATE FOR JAL SHAKTI & SOCIAL JUSTICE AND EMPOWERMENT
(SHRI RATTAN LAL KATARIA)

(a) & (b) Central Water Commission (CWC) issues flood forecasts based on deterministic model (Conventional statistical correlation methodology as well as rainfall runoff / hydrodynamic modeling technology using digital models) as a non-structural measure of flood management to concerned State Governments depending on the requisition from them at identified locations. At present, there are 1741 hydro-meteorological sites being operated by CWC across the country covering 20 river basins for gauge, discharge and sediment observations. Many of these stations are used as flood monitoring stations for formulating flood forecasts. CWC also issues inflow forecasts to identified reservoirs for proper reservoir regulation. Flood forecast formulation methodology used by CWC includes deterministic conventional statistical methodology using statistical regression equations between the levels of upstream and downstream stations as well as with flows between upstream and downstream reservoir stations. Unit hydrographs of intervening catchment area is also used for getting rainfall contribution generated between these stations. This method provides advance warning time from 6 to 24 hrs depending upon the terrain. Presently, CWC flood forecasting network has been expanded to 328 Flood Forecast Stations (198 Level Forecast for villages/towns on the bank of the rivers and 130 Inflow Forecast Stations for dams and barrages) covering 23 States & 2 UTs including NCT of Delhi and 20 river basins for taking proper mitigation measures by respective State Governments. Annually, about 8000 flood forecasts are issued by CWC during floods.

The ensemble forecast which includes the associated probabilities with the flood warnings is not being used at present.

(c) The hydro-meteorological data collection and transmission of CWC is being modernised through the use of satellite based automatic data acquisition system. Flood forecasting by CWC uses all the latest technology including remote-sensing, Geographical Information System (GIS), internet, artificial intelligence and machine learning in development / running / formulation and calibration of mathematical models and for providing inundation alerts which are closely at par with international standards. CWC is formulating three day advisories of flood using satellite based real time rainfall estimates and three day rainfall forecast through Numerical Weather Prediction models being shared by Indian Meteorological Department (IMD) on a seamless fashion. Mathematical model has been used for formulation of advisories and these advisories are shared with stakeholders using a dedicated website. The three day advisories are likely to be extended to five day advisories for all basins from the year 2021. Besides this, CWC is also providing inundation forecast in the same platform using two-dimensional models for main Brahmaputra and is also shared with beneficiaries through the same website. In addition, CWC has signed an MoU with M/s Google Inc. for using their vast repository of high resolution Digital Elevation Models (DEMs) and the power of dissemination to send alerts regarding inundation through Google platform using the flood forecasts issued by CWC.
