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A Review on Need of Application of Ensemble Techniques for Streamflow Forecasting in India

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Water is the most essential resource, which is naturally available. Poor management of water can cause drought in some areas and also floods in some areas. Flood is one of the most disastrous events which can cause tremendous losses. In India, the techniques which are developed for real time flood forecasting are based on deterministic as well as statistical approach. The quantification of uncertainties is having the primary importance in flood modelling systems. The forecasts are simulated multiple times with slight changes in initial conditions as well as model parameters. This is known as 'Ensemble forecasting'. The Ensemble Techniques approach minimizes the uncertainties in the forecasting. This approach is used in Numerical Weather Prediction (NWP). The advance techniques like remote sensing, data acquisition and monitoring system, hydrologic modelling have led to progress in the flood forecasting techniques and skills. The ensemble approach has potential for creating and disseminating the probabilistic predictions, extending lead-time as well as quantification of predictability. Due to ensemble techniques, the capability to issue the flood warnings and alerts can be increased. In addition to forecast the flood, the ensemble techniques can be used for the reservoir operation, drought estimation, hydropower as well as water management. Hence, moving towards probabilistic approach from deterministic approach would be much helpful to develop reliable flood forecasting systems. Ensemble forecasting is the probabilistic approach and has the ability for giving information of probability of occurrence for the extreme events. The ensemble forecasting approach is used successfully in various countries of the world. India also needs the reliable approach for producing the operational forecasts.