Invitation of Proposals for Addressing Key Challenges

The India Meteorological Department (IMD) invites proposals from individuals, private organisations, startups and other stakeholders for addressing the identified challenges and exploring opportunities for collaboration with the Department.

The following is a list of challenging areas pertaining to IMD for which innovative solutions and proposals are invited. The proposals may include the proposed approach and roadmap for implementation, indicative timeline and financial implications, if any, for consideration by IMD.

1. Autonomous development of low-cost sensors for Surface and upper air Meteorological Observation System.
2. Techniques for automatic dissemination of forecasting and warning to Public and Stakeholder (e.g. ChatGPT).
3. AI/ML technique for determining cyclone genesis track, intensity based on Satellite, Radar NWP model data.
4. User friendly mobile App for weather information communication to public and various stakeholders
5. Thunderstorm and heavy rainfall detection and prediction using Radar, lightning & other data and AI/ML Technique especially for nowcasting (forecasting upto 3-6 hours).
6. Creation of an ICT tool for farmer's weather advisory for resilient agriculture with specific prescriptions for a given crop based on weather forecast and stage of the crop at a specific location (say Panchayat).
7. Integration of IMD weather API to analyse and predict possible Pest/Disease for a given crop at a specific location.
8. Integrated Flood Inundation Mapping for Enhanced Transport Risk Assessment and Management
9. Big Data Analysis & Info-Graphics for development of Observed & Forecast Air Quality Products.
10. Development of a data analytics and forecasting platform based on weather analyse and forecast from IMD. It would be a data-driven solution that uses variety of machine learning and artificial intelligence techniques to extract insights, identify patterns and trends from the data and generate accurate and timely forecasts.
11. To make customized drone which can fly through air with different kinds of weather instruments including weather sensors, Air quality monitoring sensors and Aviation Meteorological Instrument. The objectives are to develop a sustainable alternative of weather balloons.
12. Tool for Mosaicking of Doppler weather radar.
13. Post processing tools to improve weather prediction models output for location specific heavy rainfall, thunderstorm, fog, hailstorm and squally winds.
14. Accurate forecasts of the intensity of tropical cyclones (TCs) is still a challenge especially with respect to rapid intensification and rapid weakening. Forecast improvements are also particularly needed for track forecast of recurving cyclones. Sudden change in track of cyclone a few hours before landfall is another challenge.

Prediction of location specific heavy rainfall and wind in association with landfalling cyclones are other challenges.

15. A comprehensive understanding of micro-meteorological and chemical processes responsible for the haze or fog formation over the Ganges Basin and fog impact on health and ecosystems is not clearly addressed yet. High-resolution mesoscale model, coupled with interactive aerosol model with chemical details of species is also the need of the hour.
16. Weather Prediction Models are used for generating forecasts of weather and climate parameters. However, the present day forecast models are known to have systematic errors and random biases. Inaccurate treatment of physical processes in the models (Physical parameterization schemes) is one of the largest sources of the errors in weather and climate prediction models. Therefore, it is important to improve physical parameterization schemes in the models. Forecast improvement based on Post processing (like bias correction) of NWP model products are still challenging especially for heavy rainfall and extreme temperatures over the hilly region.