

**MINUTES OF THE MEETING ON NCRMP INCLUDING DEVELOPMENT OF “WEB-DCRA & DSS TOOL FOR CYCLONE & ASSOCIATED IMPACTS” UNDER NCRMP PHASE –II IN THE WAKE OF CYCLONE ‘AMPHAN’ HELD ON 22.05.2020 AT 3:15 PM IN OPS. ROOM, NDMA BHAWAN, NDMA**

A meeting was held to take stock of progress of NCRMP, with special reference to development of Web based Dynamic Composite Risk Atlas (Web-DCRA) & Decision Support System (DSS) Tool under the Chairmanship of Sh. G.V.V. Sarma, Member-Secretary, NDMA on 22.05.2020 at 3:15 PM in Ops. Room, NDMA Bhawan, NDMA. The meeting was attended by all the Members of NDMA. List of participants is at **Annexure-I**.

2. The meeting started with a welcome note from the Member-Secretary, NDMA. Initiating the discussion, Dr. Pradeep Kumar, Spl. Secretary & Project Director, NDMA made a presentation giving a detailed account of the progress made so far under different Components of NCRMP (Phase I & II), viz., Early Warning Dissemination System (EWDS), Cyclone Risk Mitigation Infrastructures (MPCS, Roads/Bridges, Saline Embankments, and Underground Electrical Cabling), and development of Web-DCRA & DSS Tool for Impact Forecast. The highlights of the overall progress achieved are as follows:

- (i) NCRMP Phase I covering AP and Odisha has been completed (December, 2018). EWDS has been commissioned and is operational in both the States. As many as 535 MPCS, 1087 Km Road, 88 Km Saline Embankment, and 34 Bridges have been constructed. All these assets are being put to effective use for risk mitigation from time to time. For instance, during ‘FANI’ Cyclone (April, 2019), about 20 million people were alerted through LBAS; all 366 MPCS, Saline Embankments and some 390 Km of Evacuation Road built under the Project were used in Odisha. Also, some of the MPCS are being used as Temporary Medical Centre for COVID-19 purposes.
- (ii) NCRMP Phase II covers six States, Viz.; Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal. The scheduled completion date is 15<sup>th</sup> March, 2021. EWDS works awarded in Goa; at tender stage in other States. As regards CRMI works, 177 MPCS, 204 Km Road, 413 Km UGC works have been

completed. In West Bengal, all the planned MPCS (146 Nos.) have been completed, and were used during ‘AMPHAN’ cyclone. Some MPCS have also been used for COVID-19 related medical camps.

- (iii) A Consultancy assignment has been awarded to RMSI for Development of Web-DCRA & DSS Tools costing approx. Rs. 1.5 crore, and is scheduled for completion by December, 2020. The objective is to develop an Impact Forecast Model to be housed/hosted at IMD HQ, New Delhi. IMD has agreed to host the Web-DCRA and they are making necessary procurement in this regard.
- (iv) The Model has been developed and is currently in Testing/Experimental Phase. That way, it is still a Work in Progress. Accordingly, at this juncture, no warning/advisory is envisaged using this Model/Tool.
- (v) The Model was tested during cyclone ‘FANI’ (April, 2019), and recently during cyclone ‘AMPHAN’ as well. However, as per norms, it (the Model) ought to be tested during some more live cyclones, before it could be made fully operational and fit for use by IMD for making Impact Forecasts.
- (vi) It was also informed that ADCIRC model outputs from INCOIS and Digital Terrain model (sub-meter resolution) from Survey of India (SoI) are awaited. In the absence of these inputs, the Model is incomplete.

3. Further, a detailed presentation through Skype was made by RMSI on Web-DCRA & DSS Tool outputs based on IMD’s cyclone track forecast for the Cyclone ‘AMPHAN’. The presentation highlighted present status of development of the Web-DCRA & DSS Tool alongwith the System’s functional architecture, utilization of the Tool in Cyclone risk management, comparison with efforts/approach of IMD, INCOIS and NRSC in case of any cyclonic event, and Steps/approach followed by RMSI for testing the Web-DCRA & DSS Tool in the context of recent Cyclone ‘AMPHAN’ which hit West Bengal and Odisha States.

A detailed discussion was held on the outputs, generated through the Web-DCRA Tool using IMD’s Cyclone Track forecast dated 18<sup>th</sup> May, 2020, in terms of

Impact forecast of Wind, Surge and Flood Hazards for affected States of West Bengal and Odisha due to Super Cyclonic Storm ‘AMPHAN’.

The Web-DCRA models outputs included (a) Wind Hazard Map showing Model simulated Maximum Sustained Wind Speeds and Affected Populations, (b) Surge Hazard map showing Storm Surge Heights across different affected districts of West Bengal and Odisha States, and (c) Estimated Exposure losses due to Wind and Surge hazards. The major highlights of Web-DCRA model simulation are as below:

- Simulated Maximum sustained speed (286 Km/h) is observed just comparable with that of IMD’s forecast (275Km/h).
- Simulated Storm surge heights are reported in the range of 0.4 – 6.0 m in West Bengal, and 0.2 – 2.4 m in Odisha.

Process of Flood simulation, using Hydrologic and Hydraulic models, carried out for the Cyclone ‘AMPHAN’ and Flood Inundation maps thus generated for the State of West Bengal and Odisha were also discussed. The Flood simulation outputs included Flood Simulation maps for West Bengal and Odisha States showing spatial distribution of Flood Depths alongwith Flood Extent, and estimated Exposure losses due to Flood Hazard.

The NRSC Flood Inundation map based on Satellite imagery for West Bengal was also analysed/compared with the Flood Simulation output (Flood Inundation map) generated through the Web-DCRA Tool. It is observed that the NRSC Flood Inundation map highlights inundation due to rains in the part of West Bengal as on 21<sup>st</sup> May, 2020, whereas, the RMSI’s Model Simulation map gives information about Flood Depths alongwith Flood Extent for the cyclone ‘AMPHAN’ affected areas of West Bengal.

4. The Member-Secretary, NDMA emphasised that RMSI should expedite completing the design and development of Web-DCRA and DSS Tools, paving way for its successful installation and commissioning at IMD well before the next cyclone season (October, 2020).

5. He further observed that while Early Warning Dissemination can be done by the States/Local Authorities, Issue of Early Warning is the sole prerogative of IMD. The Web-DCRA & DSS Tool developed under NCRMP will augment the technical capability of IMD for making Impact forecasts and issuing related bulletins. However, IMD must get requisite data/inputs pertaining to tides/surge along the coast for ingesting into the model. This data is awaited from INCOIS. Similarly, DTM data is awaited from Survey of India (SoI). It was decided that the PMU of NCRMP should pursue and see that these bottlenecks are removed positively within two weeks.

6. With this Tool (Web DCRA) in place at IMD, they will be able to say not only about cyclone's movement/track but also the areas/villages likely to be impacted/inundated due to tidal/surge effect. In other words, this is called the Impact Assessment Modeling, which is to be done by IMD and NOT NDMA. The PMU (NCRMP) has consulted IMD and they agreed in principle to host; however, there are some hardware/procurement issues which are being sorted out.

7. Regarding utilization of Cyclone Shelters by the States, Member-Secretary observed that the shelters built under NCRMP are called Multi-purpose cyclone shelters because the idea is that it will be used exclusively as cyclone shelters for at the most 3-4 days in a year, and for the rest of the year it will be used by the local community for various other purposes. Experience also tells that when they are not used for various bona fide purposes, they may not be usable at the time of requirement. It was a conscious decision taken at the time of conceiving/designing the Project to make it multi-purpose. Therefore, when MPCs have been used as COVID quarantine centres, it does not contradict the Project Development Objectives (PDO).

8. Based on the discussions, the action plan/way forward is summarised below:

- i. Reports may be obtained from both Odisha and West Bengal on the extent of utilisation of the assets created by NCRMP during the preparedness and response for 'AMPHAN' cyclone. Expeditious steps should be taken to complete the Phase II works.

- ii. RMSI to expedite and complete design and development of Web-DCRA & DSS Tool as per the deliverables well ahead of the next cyclone season (October, 2020).
  - iii. The Web-DCRA will be hosted at IMD HQ, New Delhi on their Server. Accordingly, IMD to expedite procurement of necessary hardware/ infrastructure for successful hosting of the same, well-ahead of the next Cyclone Season. INCOIS to be reminded to share outputs of ADCIRC model in the desired format required for its integration with Web-DCRA. This set of information will be required from INCOIS for every advisory of live cyclone event. The outputs from INCOIS will include Surge, flood-depth grids (latitude, longitude, flood depth, and velocity).
  - iv. Survey of India (SoI) to be reminded to share the requisite High-resolution DTM for integration with the Web-DCRA & DSS Tool.
  - v. Assuming that necessary infrastructure for hosting Web-DCRA is in place at IMD, the DCRA based Impact Forecast Model will be put to test in next cyclone season again. Necessary SOP in this regard will be worked out by NDMA and shared with IMD, INCOIS, NRSC, SoI, States and other stakeholders/Agencies.
  - vi. The Coastal States to be urged to update their exposure data in consultation with their Space Application Centre. Updated Exposure data will help improve accuracy of the Risk Maps generated by Web-DCRA Application.
9. The meeting ended with a vote of thanks to the Chair and the participants.

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