सत्यमेव जयते
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति
Eastern Regional Power Committee
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सं /**NO. ERPC/EE/OPERATION/2025/**390 **दिनांक/DATE: 28.05.2025**

सेवा में /To
संलग्न सूची के अनुसार /As per list enclosed.

विषय : क्षेत्रीय आपदा प्रबंधन (पूर्वी क्षेत्र) पर 09.05.2025 (शुक्रवार) को भौतिक रूप से आयोजित दूसरी बैठक का कार्यवृत्त - संबंध में।

Sub: Minutes of 2nd Meeting on Regional Disaster Management (EASTERN REGION) held on 09.05.2025(Friday) physically - reg.

महोदय/महोदया,

Sir(s)/Madam,

कृपया **क्षेत्रीय आपदा प्रबंधन (पूर्वी क्षेत्र)** पर **09.05.2025 (शुक्रवार)** को 11:00 बजे **भौतिक रूप** से आयोजित दूसरी बैठक की संलग्न विवरण ।
यह आपकी जानकारी और आवश्यक कार्रवाई के लिए है। यह ईआरपीसी वेबसाइट (**www.erpc.gov.in**) पर भी उपलब्ध है।

Please find enclosed **MOM of 2nd Meeting on Regional Disaster Management (EASTERN REGION)** convened on **09.05.2025(Friday) physically** at **ERPC Secretariat, Kolkata** at **11:00 hrs.**
This is for your kind information and necessary action. The same is also available on ERPC website **(www.erpc.gov.in)**.

टिप्पणियाँ, यदि कोई हों, कृपया यथाशीघ्र इस कार्यालय को अग्रेषित करें।
Observations, if any, may please be forwarded to this office at the earliest.

इसे सदस्य सचिव के अनुमोदन से जारी किया जाता है।
This issues with the approval of Member Secretary.

भवदीय /Yours faithfully,
28/05/2025
(S.Kejriwal)
SE(Operation)
एसई (ऑपरेशन)

Eastern Regional Disaster Management Group in Power Sector-Distribution List

1. Special Relief Commissioner, Rajiv Bhawan, Bhubaneswar, Odisha-751001
2. Principal Secretary, West Bengal Disaster Management & Civil Defence Department, Nabanna, HRBC Building Room No. 203, 2nd Floor, 325 Sarat Chatterjee Road, Howrah -711102
3. Additional Chief Secretary, Disaster Management, Govt of Bihar
4. Additional Chief Secretary, Revenue and Disaster Management, Govt. of Odisha
5. Secretary, Department of Home, Jail and Disaster Management (Disaster Management), Jharkhand
6. Secretary cum Relief commissioner, Govt of Sikkim, Gangtok, Sikkim
7. Director of Civil Defence in the rank of ADG, West Bengal, Kolkata-700012
8. Directorate General of Fire Service, Home Guards & Civil Defence, Nuapatna, Cuttack, Odisha-753001
9. Directorate General, Civil Defence, Flat 59-60/84, New Punichak, Patna, Bihar-800 023
10. IGP, Home Guards & Civil Defence, Sikkim
11. Chief Engineer, Central Water Commission (CWC), Sewa Bhawan, New Delhi-for floods related early warnings.
12. Deputy Director-General, Indian Metrological Department (IMD), New Delhi- for Earthquake, and Cyclone related early warnings.
13. Group Director, Information & Communication Technology and Data Management Group, Indian National Centre for Ocean Information Services, Hyderabad, Telangana
14. Director, National Center for Seismology (NCS), Ministry of Earth Sciences (MoES), New Delhi - for Earthquake Monitoring and Hazard.

COPY TO:

1. Member , National Disaster Management Authority, Safdarjung Enclave,New Delhi
2. Directorate General-Fire Services, Civil Defense & Home Guards, Ministry of Home Affairs, R.K. Puram, New Delhi-110066

Eastern Regional Disaster Management Group in Power Sector-Distribution List

1. Chairman-cum-Managing Director, OPTCL, Janpath, Bhubaneswar- 751022.
2. Managing Director, Jharkhand Urja Sancharan Nigam Limited, Engineering Building, HEC, Dhurwa, Ranchi-834004.
3. Managing Director, Bihar State Power Transmission Company Limited, Vidyut Bhavan, Bailey Road, Patna-800001.
4. Principal Chief Engineer-cum-Secretary, Energy & Power Department, Govt. of Sikkim, Kazi Road, Gangtok – 737101, Sikkim.
5. Executive Director, ERLDC, GRID-INDIA, 14 Golf Club Road, Tollygunge, Kolkata – 700033.
6. Regional Executive Director (ER-I), NTPC Ltd., 2nd floor, Lok Nayak Jai Prakash Bhawan, Dak Bunglow Chowk, Patna-800001.
7. Regional Executive Director (ER-II), NTPC Ltd., 3rd Floor, OLIC Building, Plot No.N-17/2, Nayapalli, Bhubaneswar-751012.
8. Executive Director (O&M), NHPC Ltd., NHPC Office Complex, Sector-33, Faridabad-121003, Haryana
9. Executive Director (ER-I), Power Grid Corporation of India Ltd, Board Colony, Shastri Nagar, Patna-800023.
10. Executive Director (ER-II), Power Grid Corporation of India Ltd, CF-17, Action Area-I, Newtown, Rajarhat, Near Axis Mall, Kolkata-700091.
11. Executive Director (Odisha Project), Power Grid Corporation of India Ltd, Plot No-4, Unit 41, Niladri Vihar, Chandrasekharpur, Bhubaneswar, Odisha-751021.
12. Executive Director (Operation), Damodar Valley Corporation, DVC Tower, VIP Road, Kolkata-700054.(For nomination from level of Regional HOD of DVC(a CPSU))
13. Chief Engineer, SLDC, Bihar
14. Chief Engineer, SLDC, Sikkim
15. GM, SLDC, Jharkhand
16. GM, SLDC, DVC
17. Chief Engineer, SLDC, West Bengal
18. Director, SLDC, Bhubaneswar, Odisha

Minutes of the Meeting chaired by Member Secretary (ERPC) of 2nd Meeting on Eastern Regional Disaster Management held on 09.05.2025

Member Secretary, ERPC (*Chairman of RDMG-ER**) chaired the 2nd Meeting on Eastern Regional Disaster Management. The meeting was attended by senior officers of CEA, ERPC and representatives of CWC,IMD,Disaster Management Dept.(Govt of W.B),ERLDC, all SLDCs,GENCOs and transmission utilities . The detailed list of participants is given at **Annex-A**.*

On welcoming all the participants, he outlined the paramount importance of Disaster management in power sector and highlighted the following points:

- *As per **Section 36** of the **Disaster Management Act,2005**, each Ministry is required to prepare a Disaster Management plan related to their respective sectors. Accordingly, **MoP** in association with **CEA** has prepared a **Crisis and Disaster Management Plan-2022** for **Power Sector** to make Indian power sector disaster-resilient, achieve substantial disaster risk reduction, significantly decrease the loss by maximizing the ability to cope with disasters at all levels of administration as well as at the field level.*

- *In the Disaster Management Plan, a **four–tier institutional structure** has been envisaged i.e. at **Central level**, **Regional level, State level**, and **local unit/plant level** to effectively deal with disaster situations in the power sector.*

- *Accordingly, a **Regional Disaster Management group(RDMG)** was formed vide letter dated **3rd June 2024** subsequent to deliberations in the **50th ERPC** meeting.It comprises Representatives of Secretary in-charge of Rehabilitation and Relief of the affected States of the Region; Representatives of each State's Civil Defence, Regional HODs of CPSUs (NTPC, NHPC, PGCIL etc.); CMDs of State TRANSCOs/Power Departments,SLDC in charge of each state; Chief Engineer, Central Water Commission (CWC) for flood related early warnings; Deputy Director-General, Indian Meteorological Department (IMD) for Cyclone related early warnings and Scientist from Indian National Centre for Ocean Information Services.*

- ***Disaster Resource Inventory for power sector (DRIPS)** portal was launched by Hon'ble Union Minister of Power & Housing and Urban Affairs, **Shri Manohar Lal** on **21st August 2024**.*

  - *This shall facilitate regular update of spare inventory by all utilities on the portal and would allow for rapid identification as well as deployment of necessary resources in a disaster situation.*

  - *Nodal officers of all utilities (GENCOs, TRANSCOs, DISCOMs) must register on the portal. Verification and approval of registration shall be done by CEA.*

- *DRIPS can only be accessed by Nodal officers registered on the portal.*

❖ ***Chief Engineer, DP&T (Distribution Planning and Technology) Division, CEA*** *delivered a comprehensive presentation(**Annex-B**) encompassing the key regulatory aspects of Disaster Management in Power Sector - extant guidelines, institutional framework and coordination among regional disaster management groups.*

- *A practical demonstration on User interface of **DRIPS portal** was given and all ER utilities were urged to get registered as well as update their spare inventory status on the portal. This will help mitigate potential hazards arising out of future disasters by strategic planning and coordination among all power sector utilities across the country.*

- *Various provisions for funding of Disaster Management in Power Sector were outlined as follows:*

- *The 15th Finance Commission (XV-FC) has made provision for assistance to States under the Recovery and Reconstruction (R&R) funding window of the National Disaster Response Fund (NDRF) and State Disaster Response Fund (SDRF) to help disaster affected States on a long-term basis.*
- *Based on XV-FC recommendations, the Ministry of Home Affairs (MHA), Government of India (GoI) framed guidelines for the constitution and administration of the R&R funding window under NDRF and SDRF dated August 14, 2024.*
- *Presently, for immediate restoration of electricity supply in the affected areas, Inter Ministerial Central Team (IMCT) visits the disaster affected areas and recommends the assistance to be provided by GoI under NDRF /SDRF.*
- *For Power sector, the assistance is being provided for the damaged conductors, poles and transformers upto the level of 11 kV and LT lines with bare conductor, as per the following norms:*
  - *Rs.5000/pole*
  - *Rs.0.50 lakhs per km for repairing damaged LT lines.*
  - *Rs. 1.0 lakh/damaged distribution transformer*

- *All utilities and ER states were urged to get registered on the DRIPS portal. Should any issue come up during the registration process, the same may be resolved by contacting the designated authority in CEA.*

1. PART-A: CONFIRMATION OF MINUTES

Confirmation of Minutes of 1st Meeting On Eastern Regional Disaster Management held on 9th July 2024 virtually on MS Teams

The minutes of 1st Meeting On Eastern Regional Disaster Management held on 9th July 2024 was circulated vide letter dated 16.07.2024.

All Members of ER Disaster Management Group may confirm the minutes of 1st Meeting On Eastern Regional Disaster Management.

Deliberation in the meeting:

All members confirmed the Minutes of 1st Meeting On Eastern Regional Disaster Management.

2. PART-B: ITEMS FOR DISCUSSION

2.1 Status of ERS in Eastern Region

Transmission lines are the arteries of the electricity grid and these are most prone to damage due to earthquakes, cyclones, floods etc. In case of damage to the transmission line, temporary arrangements for the restoration of power supply can be made with the help of ERS, which consists of a special type of lightweight modular structures, with lightweight polymer insulators and number of stays. In this regard CEA has issued guidelines for requisition of ERS and also an advisory has been issued by the Ministry of Power to all state utilities.

As per Central Electricity Authority (grid standards) regulations, 2010 and "Disaster Management Plan for Power Sector" the following are mandated in case of the ERS:

i. Each transmission licensee shall have an arrangement for the restoration of transmission lines of 400 kV and above and strategic 220 kV lines through the use of Emergency Restoration System in order to minimise the outage time of the transmission lines in case of tower failures.

ii. Strategic locations should be decided for spares on a centralized/ regional /zonal basis.

All Transmission licensees (ISTS, State & Private) may update the ERS status.

Deliberation in the meeting:

DVC submitted that in the recent past, ERS had been deployed in the 220kV Chandrapura-Dhanbad line and was found to be in healthy condition.

WBSETCL informed that 10 nos. of 400 kV ERS towers can be catered from the existing stock of ERS.

BSPTCL apprised:

- *Existing ERS towers have been monetised by leasing to other agencies like Indian Railways and Highway authorities.*
- *16 additional ERS towers are in the procurement process to replenish the depleted stock.*

JUSNL informed that no testing of ERS has been done in the recent past.

OPTCL submitted that available ERS towers will be henceforth deployed periodically for testing purposes to ensure readiness against disasters.

CESC updated on having 7 ERS towers in place for both 220 kV & 400 kV levels.

The latest status of available ERS towers with all ER transmission utilities is attached at ***Annex-B.2.1***

Decision

- *The Committee recommended availability of ERS with all transmission utilities in ER in line with MOP norms.*
- *All transmission licensees were advised to test operability and healthiness of ERS towers after erection to ensure prompt action in the event of disasters. ERS should be deployed periodically as part of mock drill emulating real-time contingency.*
- *Transmission utilities that have ERS available at a centralized location outside ER were advised to explore availability of ERS in emergency on lease basis in coordination with other transmission licensees in close vicinity. The Committee emphasized mutual collaboration among all transmission utilities of ER in this regard.*
- *The committee advised all transmission licensees of ER to update the availability of ERS on DRIPS portal.*

2.2 Creation of Disaster Management Fund

The financial aspects of Disaster Risk Management play a crucial role in the development of planning to immediate relief post disaster. Disaster Management Act, 2005 ensures special provision for allocation of funds by Ministries and Departments, which states:

"(1) ***Every Ministry or Department of the Government of India shall make provisions, in its annual budget, for funds for the purposes of carrying out the activities and programmes set out in its disaster management plan.***

(2) **The provisions of sub-section (1) shall, mutatis mutandis, apply to departments of the Government of the State**."

Disaster Management Plan for Power Sector mandates each power utility shall create a fund for meeting the requirements of disaster management plan. The disaster management fund would be 1.5% of the annual revenue of the utility. Besides the above, every utility should have a core corpus of sufficient amount especially for immediate relief and rehabilitation depending upon revenue potential of the utility and the same should be replenished on an annual basis.

As per decision in 1st Meeting On Eastern Regional Disaster Management:

- In compliance with the provisions of Disaster Management Act 2005, all utilities were directed to update the following:
  - ✔Creation of the disaster management fund by utilities.
  - ✔Status of the funds available in the disaster management fund.
  - ✔Utilization pattern of the fund under various circumstances.

All ER utilities may update.

Deliberation in the meeting:

All SLDCs informed that they have an Emergency fund in place to combat any potential contingency. However, they do not have any specific "Disaster Management Fund" at present.

Decision

- *In compliance with the provisions of Disaster Management Act 2005, all utilities were directed to update the following:*
  - ✔*Creation of the disaster management fund by utilities.*
  - ✔*Status of the funds available in the disaster management fund.*
  - ✔*Utilization pattern of the fund under various circumstances.*
- *Also, the amount available in the fund needs to be ascertained in line with Disaster Management Plan for Power Sector (MOP, Govt. of India) i.e. 1.5% of the annual revenue of the utility.*

2.3 Sharing of warning alerts for impending natural calamities with the Power Sector Utilities

Power sector, in lieu of its vast network of infrastructure, is highly vulnerable to damages caused by natural disasters such as cyclones, floods, earthquakes etc. Considering this, the availability of information in advance shall aid the power sector utilities in minimizing the extent of damage and thereby faster restoration can be facilitated.

As per decision in 1st Meeting On Eastern Regional Disaster Management:

CWC and IMD were requested to share warning alerts i.r.o impending floods and cyclones of high damage potential with ERPC and all members of RDMG so that adequate preventive measures may be undertaken in advance to safeguard power sector establishments and the regional grid. Both CWC and IMD representatives agreed to the same.

CWC and IMD requested to update. Members may discuss.

Deliberation in the meeting:

*IMD representative delivered a presentation (**Annex B.2.3**) outlining the key facets of reliable weather forecasting ranging from pre-emptive warnings against impending heat wave, cyclones, heavy rainfall, etc to identifying areas vulnerable to potential hazards based on risk assessment with sophisticated probabilistic models.*

IMD further apprised:

- ✔*Sector specific and location specific impact-based forecasts are being shared through APIs across various time horizons: month-ahead, weekly and day-ahead.*
- ✔*Earthquake division under IMD shares city or region-specific updates on probable tremor activity via dedicated APIs.*

CWC submitted:

Flood data is shared with Secretaries of all state Govts. Seven forecasting stations are in place in North Bengal.

Presently, records of water level are shared with DVC as well as state Govts of West Bengal & Jharkhand.

Authorities entrusted with monitoring of Kosi & Gandak rivers may be contacted separately as these don't come under supervision of CWC.

Decision

- *CWC and IMD were requested to share warning alerts i.r.o impending floods and cyclones of high damage potential with ERPC and all members of RDMG so that adequate preventive measures may be undertaken in advance to safeguard power sector establishments and regional grid. Both CWC and IMD representatives agreed to the same.*
- *The Committee suggested utilizing a common platform like the existing Whatsapp Group named "**Disaster Management in Power Sector (ER)**" comprising all ER constituents for sharing weather forecast data by IMD as well as flood forecast based on monitoring of water level in reservoirs by CWC.*

2.4 Periodic Mock Drill Exercises in areas of generation, transmission and distribution of the power sector

In compliance with the **Disaster Management Plan for Power Sector (2022**) as drafted by **CEA** (as per Disaster Management Act 2005) and approved by Ministry of Power (Govt. of India) as well as in order to be prepared for any eventuality, periodic mock drill exercises are to be undertaken in various areas of generation, transmission and distribution of the power sector by considering various crisis and disaster situations like earthquake, flood etc. Depending on the vulnerability of the installation/plant, mock drills to handle such situations need to be undertaken. The utilities are also required to ensure that at least one mock drill exercise for every crisis/disaster situation to which the installation/plant is vulnerable is undertaken in each quarter. The adverse observations made on each event of Mock drill should be taken into account and prevention of occurrence of such undesirable events in the future needs to be ensured.

In this regard, Secretary (Security), Cabinet Secretariat, Govt of India has stressed on undertaking the following measures:

- ✔ Availability of details pertaining to local district authorities, revenue authorities, law enforcement, fire management authorities, etc., across the townships
- ✔ Adequate vetting of personnel/organisation responsible for township security by local law enforcement agencies.
- ✔ Regular conduct of mock drills in the townships, especially evacuation drills with ambulances and drills for handling major fire accidents.

 Action points:

As per deliberations in **1st MEETING ON REGIONAL DISASTER MANAGEMENT** (EASTERN REGION) dated **09.07.2024** :

- At least one mock drill exercise for every crisis/disaster situation, to which the installation/plant is vulnerable, must be undertaken in each quarter and quarterly report by the utilities to be shared with CEA for review and onward submission to the Ministry of Power (Govt. of India). (Action: All thermal GENCOs (Central, IPP), all hydro generating stations, all ISTS licensees. SLDCs to coordinate with respective GENCOs, STUs and DISCOMs within their jurisdiction)
- Utilities are requested to share the experience on the mock drill exercises and scope for improvements.

This has been deliberated repeatedly in several OCC meetings at ERPC level.
Mock Drill reports received from NTPC, NHPC and WBPDCL (on regular basis).

All other GENCOs (Central sector/state/private) and Transmission utilities (Central sector/state/private) are requested to share the details.

Deliberation in the meeting:

WBPDCL informed that mock drills are being conducted at all their generating stations and mock drill reports are being shared with ERPC on a regular basis.

Powergrid apprised of carrying out mock drills every month at all their substations in ER.

CESC informed that on-site Disaster Management plan is in place at all generating stations and periodic mock drills on Fire safety, chemical leakage & security threats are being carried out.

Sikkim sought training on conducting of mock drills on fire/electrocution safety.

Decision

- *At least one mock drill exercise for every crisis/disaster situation to which the installation/plant is vulnerable must be undertaken in each quarter and quarterly report by the utilities to be shared with CEA for review and onward submission to the Ministry of Power (Govt. of India).*
- *All GENCOs, TRANSCOs and Control Centres were advised to share mock drill reports with ERPC on a quarterly basis.*
- *All SLDCs were advised to coordinate with TRANSCOs for regular conducting of mock drills.*
- *Sikkim was advised to take initiative in conducting periodic mock drills and may seek assistance from NHPC. NHPC agreed to provide all possible assistance to Sikkim in this regard.*

2.5 Status of Emergency Operation Centres (EOCs)/Control Rooms and Back up EOC/ Control room in Power Sector

An Emergency Operation Centre (EOC) i.e. a centralized facility with full communication infrastructural facilities, should be set up at each power establishment level from which Disaster related operations can be directed and coordinated.

a) The objective of the EOCs shall be to provide centralized direction and control for any or all of the following functions:
    i. Receive and process disaster alerts and warnings from nodal agencies and other sources and communicate the same to all designated authorities.
    ii. Monitor emergency operation.
    iii. Requisition additional resources during the disaster phase.
    iv. Issue disaster/incident specific information and instructions specific to all concerned;
    v. Consolidation, analysis, and dissemination of damage, loss and needs assessment data.
    vi. Forward consolidated reports to all designated authorities.
    vii. Facilitate coordination among internal departments and external agencies.
b) The EOCs/Control Rooms shall have the following resources to effectively handle Crisis/disasters –
    i. State-of-the-art communication facilities (conventional and alternative communication systems) for seamless communication during threatening disaster situations or disasters.
    ii. Necessary IT support, disaster dashboard facility & connectivity with Distribution Companies, SCADA & breakdown management system, so that monitoring of network outage, list of breakdowns and supply of VVIP consumers & vital installations e.g. Police Station, Fire Station etc. can be directly viewed and necessary guidance for faster restoration/rebuilt of the system can be generated.
    iii. The EOC building should be disaster resistant, so as to withstand the disaster. Functionalities and features available in EOCs should be periodically checked and should be suitably upgraded as per requirement.

Backup EOC/ Control room should also be set up preferably at a remote location & kept ready to manage adverse situations if main control room dysfunctions or gets affected due to any disaster. Backup control room should be tested periodically for intended functionality by making it the main control room.

As per decision in 1st Meeting On Eastern Regional Disaster Management:

All utilities were urged to update the operational practices of the established Emergency Operation Centres (EOCs)/ Control Rooms and back up EOC/ Control rooms.

All ER utilities may update.

Deliberation in the meeting:

Bihar representative intimated that they have implemented EOC (Emergency Operation Centre) at SLDC.

Decision

All utilities were urged to update the operational practices of the established Emergency Operation Centers (EOCs)/Control Rooms and back up EOC/ Control rooms.The status of EOC implementation must be shared with ERPC.

2.6 Cybersecurity: Risk Assessment and Mitigation Plan

Developing a cyber risk assessment and mitigation plan is crucial for safeguarding critical assets and systems in the power sector against cyber threats. CEA (Central Electricity Authority) Guidelines on Cyber Security in the Power Sector, particularly for 2021, holds significant importance for various stakeholders involved in the power sector. These guidelines mandate the framework of a Cyber Crisis Management Plan for dealing with cyber related incidents for a coordinated, multi-disciplinary and broad-based approach for rapid identification, information exchange, swift response and remedial actions to mitigate and recover from malicious cyber related incidents impacting critical processes. Chief Information Security Officer (CISO) of the entity shall be responsible for implementation and regular review, on the basis of internal and external feedback, of the Cyber Risk Assessment and Mitigation Plan.

As per decision in 1st Meeting On Eastern Regional Disaster Management:

All Utilities were instructed:

- ✔To ensure compliance with CEA Guidelines on Cyber Security in the Power Sector.
- ✔To update the status of the Cyber Risk Assessment and Mitigation Plan developed by them and also provide the incidents of cyber threats in recent times.
- ✔To have proper CCMP (Cyber Crisis Management Plan) in place

All ER Utilities are requested to update the status of the Cyber Risk Assessment and Mitigation Plan developed by them and also provide the incidents of cyber threats in recent times.

Deliberation in the meeting:

ERLDC submitted:

- ✔*Eastern Regional Cyber Security Co-Ordination Forum has been formed and quarterly review meetings are being held to address cybersecurity issues.*
- ✔*SOC has been implemented by Bihar and the same is under implementation by DVC.*
- ✔*Mock operation is being carried out from the Backup Control Centre at NLDC and SOC is functional at NLDC.*
- ✔*Cyber mock drills need to be conducted at each SLDC as per guideline. To enable SLDCs to get accustomed with tabletop exercise and usage of tools, ERLDC team has planned to conduct mock drill at each SLDCs as per following schedule:*

S. No.	*SLDC*	*Tentative Date for Workshop/Mock Drill*
1	*West Bengal*	*Third Week of May 2025*
2	*DVC*	*2nd Week of June 2025*

3	*Odisha*	*1st Week of August 2025*
4	*Jharkhand*	*1st week of July 2025*
5	*Sikkim*	*1st week of October 2025*
6	*Bihar*	*Already done for 2025, to be conducted in Jan 2026*

Sikkim submitted that a proposal for SOC has been sent for PSDF funding. Training on cybersecurity issues was requested.

CESC informed:

- *CCMP plan is in place.*
- *Quarterly review meeting on cybersecurity is being held.*
- *Regular audits are being conducted with NCIIPC.*
- *IT-OT junction is islanded and the SCADA system has been upgraded.*

Decision

- *All Utilities were instructed:*

✔ *To ensure compliance with CEA Guidelines on Cyber Security in the Power Sector.*

✔ *To have proper CCMP (Cyber Crisis Management Plan) in place.*

✔ *To update the status of Cyber Risk Assessment and Mitigation Plan developed by them and also provide the incidents of cyber threats in recent times.*

✔ *Requirement of dedicated manpower for Cyber security at SLDCs was emphasized*

- *All SLDCs were advised to expedite implementation of SOCs at the earliest and may approach PSDF in this regard.*
- *The Committee opined in favour of imparting training on cybersecurity to all SLDCs for better implementation of cybersecurity guidelines i.r.o power sector.*
- *All SLDCs were advised to ensure implementation of Information Security (IS) policies & procedures prior to third party Cybersecurity Audits. Guidelines on Scope of Cybersecurity Audit in the Power Sector issued by CSIRT-Power, MoP may be referred to in this regard.*

2.7 Restoration plan for failure of Electricity Grid & Black Start Facilities

Integrated operation of National Grid (all-India grid) is a vast and complex task and demands utmost vigil and care from the viewpoint of disaster management. In the event of a grid failure, coordinated actions are required to be taken at the generation stations, substations and transmission lines under the directions of NLDC/RLDC(s) and SLDC(s) for speedy restoration of power supply.

IEGC, 2023 mandates:

i. SLDC of each State and the RLDC of each region shall prepare restoration procedures for the grid for their respective control areas,

which shall be updated every year by the concerned SLDC and RLDC taking into account changes in the configuration of their respective power systems

ii. Detailed procedures for restoration post partial and total blackout of each user system within a region shall be prepared by the concerned user in coordination with the concerned SLDC, RLDC or NLDC, as the case may be.

iii. NLDC, RLDC and SLDC shall identify the generating stations with black start facility, grid forming capability of inverter based generating stations, house load operation facility, inter-State or inter-regional ties, synchronizing points and essential loads to be restored on priority.

ER Utilities are requested to update on the following:

I. **Black Start procedure adopted by RLDCs/SLDCs.**
II. **RLDCs/SLDCs update the list of black start reserves identified.**
III. **The start-up procedure adopted for generating units.**

Deliberation in the meeting:

Bihar updated that a State Disaster Management plan has been prepared and is being reviewed every 6 months.

Decision

- *WB SLDC was advised to intimate WBSEDCL for exploring provision of black start in Purulia pumped storage plant.*
- *The Committee also suggested exploring the power drawl from Nepal through trans-national lines for the purpose of black start in Bihar. ERLDC was advised to put up the proposal to NLDC and the same may be implemented with approval from CEA.*

2.8 Mock Black Start

As per **IEGC Reg. 34.3**: A mock trial run of the procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter-based generating station and VSC-based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC.

Eastern region has 16 hydro power plants, which has the capability to play a crucial role during restoration after any grid disturbance. Mock black start testing along with grid forming capability is being carried out on yearly basis, as mandated by IEGC Reg 34.3, to ensure the capability & readiness of those generators for any contingency.

Also, diesel generator sets and other standalone auxiliary supply sources to be used for black start shall be tested on a weekly basis and the test reports are to be shared with the concerned SLDC, RLDC and NLDC on a quarterly basis.

As per IEGC Reg. 34.4: Simulation studies are to be carried out by each user in coordination with RLDC for preparing, reviewing and updating the restoration procedures considering the following:

a. Black start capability of the generator;
b. Ability of black start generator to build cranking path and sustain island;

c. Impact of block load switching in or out;
d. Line/transformer charging;
e. Reduced fault levels;
f. Protection settings under restoration condition

So far, Balimela, Burla, U. Indravati, TLDP-IV, and Subarnarekha have completed their mock black start tests, while Jorethang and Tashiding have confirmed tentative dates for FY25. The remaining generators are yet to schedule their tests and are requested to confirm their mock drill dates. Status of mock black start is as follows:

Sl. No.	Name of Hydro Station	2024-25 Actual Date of Test	Tentative date as on 18.02.25
1	U. Kolab		Yet to be informed
2	Balimela	15th January 2025	
3	Rengali		Yet to be informed
4	Burla	December-24	
5	U. Indravati	Sep-24	
6	Maithon	December-24	
7	TLDP-III		Yet to be informed
8	TLDP-IV	December-24	
9	Subarnarekha	3rd December 2024	
10	Teesta-V	N/A	N/A
11	Chuzachen		Yet to be informed
12	Teesta-III	N/A	N/A
13	Jorethang		25th February 2025
14	Tashiding		29-31 March 2025
15	Dikchu	N/A	Yet to be informed
16	Rongnichu		Yet to be informed

The rest of the generators are requested to confirm dates for black start of each generating unit. Also, the users are requested to share the data required for simulation studies before the scheduled date of mock drill.

Deliberation in the meeting:

ERLDC updated the readiness of black start i.r.o ER generating units as follows:

Sl. No.	*Name of Hydro Station*	*Remarks*
1	*U. Kolab*	

2	*Balimela*	*All are ready for Black start except **TLDP- III***
3	*Rengali*	
4	*Burla*	
5	*U. Indravati*	
6	*Maithon*	
7	*TLDP-III*	
8	*TLDP-IV*	
9	*Chuzachen*	
10	*Jorethang*	
11	*Tashiding*	
12	*Dikchu*	
13	*Rongnichu*	
14	*Subarnarekha*	*Under breakdown since 20.03.25 due to Leakage in penstock*
15	*Teesta-III*	*Station Out*
16	*Teesta-V*	*Station Out*

WB SLDC apprised that SOP for mock black start is in place but the same has not been performed yet in TLDP- III owing to pending clearance from higher authority.

SLDC Odisha submitted that hydro stations of Burla, Balimela, Indravati, Rengali, Upper Kolab are ready for black start operation.

DVC informed about having carried out mock black start at Maithon Hydel station on 07.12.2024.

ERLDC emphasized that identification of feeders for power evacuation after black start also needs to be done.

Decision

- *All black start capable hydro generating units of ER to update their schedule of mock black start to ERLDC at the earliest. This is in compliance with IEGC 2023 (CERC).*
- *Besides hydro generating units detailed above, the Committee recommended for Mock Black Start in Purulia Pumped storage plant.*

Meeting ended with vote of thanks to the chair.

****

Annex A

Participants in 2nd meeting of Eastern Regional Disaster Management Group

Venue: ERPC Conference Hall, Kolkata **Time: 11:00 Hrs.** **Date: 09.05.2025 (Friday)**

Sl.	Name	Designation	Organisation	Contact No.	E-mail Id	Signature
1	N S Mondal	Member Secretary	ERPC	9958389967	mserpc-power@nic.in	
2	R Sutradhar	Executive Director	ERLDC	9436302714	rajibsutradhar@grid-india.in	
3	Dr. H.R.Biswas.	Sc-F & Head ACWC Kolkata	IMD	9433125951	hr.biswas@imd.gov.in 786hrb@gmail.com	
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5	SAIKAT BISWAS.	Dy. Director	CWC	7432945372	-do-	
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7	Bilash Achari	DGM	ERLDC	7003472016	bilash.achari@grid-india.in	
8	Chandan mallick	C.M.	ERLDC	9007059660	Chandan.mallick@grid-india.in	
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14	SHRABANI DAS.	ACE	WBSETCL.	9434910117.	Shrabani.das@wbsetcl.in	
15	RITA CHAKRABORTY	CE	SLDC: WB	9434910041	ce.wbsldc@gmail.com	

Participants in 2nd meeting of Eastern Regional Disaster Management Group

Venue: ERPC Conference Hall, Kolkata **Time: 11:00 Hrs.** **Date: 09.05.2025 (Friday)**

Sl.	Name	Designation	Organisation	Contact No.	E-mail Id	Signature
16	SAJAL K. BAG	Addl. C.E.	WBSLDC WBSETCL	7980098826	sajalkbag74@gmail.com	
17	ARUN KUMAR	GM	JUSNL SLDC	7070816390	sldc@gmail.com	
18	Rambaboo Singh	CE	BSPTCL	7763817721	operation.maint.@bsptcl.bihar.gov.in	
19	ARUN KR. CHAUDHARY	CE, SLDC	BSPTCL	7763817705	so.dept@bsptcl.bihar.gov.in	
20	ANINDYA SARKAR	SR. Mng. System Control	CESC.	9830230456	anindya.sarkar@rpsg.in	
21	KOUSHIK BANERJEE	GM(SO)	CESC	9831003281	koushik.banerjee@rpsg.in	9/5/25
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23	ARIJIT GHOSH	DGM (CESC GENERATION)	CESC Ltd.	8584024059	arijit.ghosh@rpsg.in	
24	Partha De	DGM	HEL	9830411322	partha.de@rpsg.in	
25	Arijit Mitra	Executive	CESC.	9830588581	arijit.mitra3@rpsg.in	
26	DEEP BISWAS	Sr. Mgr.	D.P.L	9434706458	deepbis1611@gmail.com	
27	Anup Das	Dy. Director	ERPC	9681214774	anupdas@nic.in	
28	K. SWATI	A.E	ERPC	7903336191	swati.cea@gov.in	
29	J. K. Panda	AEE	ERPC	9151621295	jkpanda.cea@gov.in	
30	Kunal Saurav	AEE	ERPC	9113799763	kunal.saurav.cea@gov.in	

Participants in 2nd meeting of Eastern Regional Disaster Management Group

Venue: ERPC Conference Hall, Kolkata **Time: 11:00 Hrs.** **Date: 09.05.2025 (Friday)**

Sl.	Name	Designation	Organisation	Contact No.	E-mail Id	Signature
31	MANJUNATHAM	DEPUTY DIRECTOR	CEA	9972223842	manjunatham.cea@gov.in	[signature]
32	P.K. DE	SE	ERPC	9831620142	SECOMML.ERPC@GOV.IN	[signature] 9.5.25
33	D.K. Khemka	AD-I	ERPC	7683889161	dilip.khemka.cea@gov.in	[signature] 09/05/2025
34	B.K. Roy	EE	ERPC	[illegible]	[illegible]@gmail.com	[signature]
35	Abhinaba Basu	EE	BSPTCL/ERPC	7070939184	ABASU.14BSPTCL@GMAIL.COM	[signature]
36	Pratham Kumar	EE	CEA	8076873558	Prathamkumar11@gmail.com	[signature]
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39	Amit Kr. Gupta	DM	JIPL	9681335176	JitplScheduling@Jindalgroup.com	[signature]
40	Abhayanand Thakur	GM(E) O&M/Safety	NHPC	9800935728	athakur@nhpc.nic.in	[signature]
41	Avinash Prasad Verma	Assist. Officer Safety	NTPC	9425180115	apverma@ntpc.co.in	[signature]
42	Afsar Ali	Dy Manager	NTPC	8267848793	afsarali@NTPC.co.in	[signature]
43	Anupkumar	AGM(OS,SSEA)	NTPC	9413354065	anupkumar@ntpc.co.in	[signature]
44	ARABINDA MUKHERJEE	ASO (safety)	NTPC	6289696426	amukherjee@ntpc.co.in	[signature]
45	Priyanka Singh	Senior special Secretary	Disaster Mgt & Civil Defence	9903391016	ss2.dmcd-wb@bangla.gov.in	[signature]

Participants in 2nd meeting of Eastern Regional Disaster Management Group

Venue: ERPC Conference Hall, Kolkata **Time: 11:00 Hrs.** **Date: 09.05.2025 (Friday)**

Sl.	Name	Designation	Organisation	Contact No.	E-mail Id	Signature
46	Sayantan Sengupta	D.M.O.	Disaster Management Deptt Govt of W.B	9883540168	bdmocuttack@gmail.com	9/5/25
47	Nawal kishor Rajak	Sr. Manager	NTPC (Kahalgaon)	9473199544	nkrajak@ntpc.co.in	09/05/2025
48	Abhaynath Kumar	Asst. officer (Safety)	NTPC (Nabinagar)	9424348870	AKumar73@ntpc.co.in	09/05/2025
49	S.K. Naik	Sr. DGM	POWERGRID Odisha, Bhubaneswar	9437962169	skNaik@powergrid.in	09/05/2025
50	Rajesh kumar	DGM	POWERGRID ER-I, RHQ	8210771699	rajeshkum@powergrid.in	9.5.25
51	Santosh Kumar Panda	manager	DVC LDC, HQ.	6370134794	santosh.panda@dvc.gov.in	9.05.25
52	N.V.RAMANA	Sr. GM (Head of Safety)	DVC, HQ Kolkata	9749480765	NYAYAPATI.RAMANA@DVC.GOV.IN	09/5/25
53	S.K. Sharma	Sr GM & Head DVC LDC	DVC LDC HQ	9434539423	Sanjay.Sharma@dvc.gov.in	9/5/25
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55	M.K. Kotani	Sr. DGM	Powergrid ER-2	9434748224	malayku@powergrid.in	09/05/25
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59	Bidesh Bid	Asst. Manager	Adhunik Power Jamshedpur	8788433402	bidesh.bid@adhunikpower.co.in	
60	Agniva Chatterjee	AS-I	ERPC	8100307502	agniva.cea@gov.in	@Chatterjee

List of Participants (Joined ONLINE)				
Name	**First Join**	**Last Leave**	**In-Meeting Duration**	**Email**
ERPC Kolkata	5/09/25, 10:28:11 AM	5/09/25, 2:26:36 PM	3h 58m 24s	ERPC@KolkataMST.onmicrosoft.com
Directorate of Fire & Emergency Service (Unverified)	5/09/25, 10:50:27 AM	5/09/25, 11:21:20 AM	30m 53s	
SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR (Guest) (Unverified)	5/09/25, 10:53:26 AM	5/09/25, 2:26:32 PM	3h 33m 6s	
Vikash Kr. Prajapati TTPS Lalpania (Unverified)	5/09/25, 10:58:22 AM	5/09/25, 11:54:00 AM	55m 37s	
Jeti Rabisankar (External)	5/09/25, 10:58:23 AM	5/09/25, 2:26:36 PM	3h 28m 13s	jetir@tatapower.com
Vivek Goel CEA (Unverified)	5/09/25, 10:58:23 AM	5/09/25, 11:59:10 AM	58m 6s	
Nishant Kumar Shankwar	5/09/25, 11:00:44 AM	5/09/25, 1:06:01 PM	2h 5m 17s	Nishant.Kumar@energy-sel.com
bkrai sikkim (Unverified)	5/09/25, 11:00:53 AM	5/09/25, 12:01:31 PM	1h 38s	
Pranav Rathore (External)	5/09/25, 11:02:30 AM	5/09/25, 2:26:36 PM	3h 24m 5s	pranav.rathore@indigrid.com
Vanrajsinh Dodia	5/09/25, 11:02:44 AM	5/09/25, 11:50:58 AM	37m 17s	Vanrajsinh.Dodia@energy-sel.com
Karan Sareen (External)	5/09/25, 11:03:38 AM	5/09/25, 1:00:46 PM	1h 57m 7s	eez218208@csciitd.onmicrosoft.com
Jitendra Prasad Malik (External)	5/09/25, 11:05:43 AM	5/09/25, 12:12:48 PM	52m 54s	Jitendra.Malik@gmrgroup.in
Rohit Kumar	5/09/25, 11:06:30 AM	5/09/25, 12:57:33 PM	1h 51m 2s	Rohit.Kumar@energy-sel.com
Rajib Sutradhar (External)	5/09/25, 11:15:01 AM	5/09/25, 12:16:35 PM	42m 2s	rajibsutradhar@erldc.onmicrosoft.com
Narayan Dash (Unverified)	5/09/25, 11:15:31 AM	5/09/25, 11:16:30 AM	59s	
CEA dpt (Unverified)	5/09/25, 11:17:34 AM	5/09/25, 12:38:47 PM	1h 21m 12s	
Saurabh Sharma	5/09/25, 11:20:12 AM	5/09/25, 1:57:54 PM	2h 37m 41s	Saurabh.Sharma@adani.com
Directorate of F & ES (Unverified)	5/09/25, 11:20:12 AM	5/09/25, 2:26:36 PM	3h 6m 23s	
bhaskar (Unverified)	5/09/25, 11:26:55 AM	5/09/25, 12:10:59 PM	44m 4s	
Vikash Kr Prajapati, TTPS Lalpania (Unverified)	5/09/25, 12:00:19 PM	5/09/25, 1:06:11 PM	1h 5m 51s	
sikkim (Unverified)	5/09/25, 12:03:51 PM	5/09/25, 2:26:36 PM	2h 22m 44s	
bhaskar (Unverified)	5/09/25, 12:10:01 PM	5/09/25, 1:41:11 PM	1h 31m 9s	
Vikash Kr Prajapati, Safety Officer, TTPS Lalpania (Unverified)	5/09/25, 1:08:51 PM	5/09/25, 2:26:28 PM	1h 17m 36s	
rabi mpl (Unverified)	5/09/25, 2:12:03 PM	5/09/25, 2:26:26 PM	14m 22s	

Annex B

Disaster Resilient Transmission & Distribution System

Disaster & Crisis Management Plan for Power Sector

- In compliance to Disaster Management Act 2005 and guidelines issued by NDMA in 2019, CEA notifies the Disaster Management Plan & Crisis Management Plan for Power sector.
- The Disaster Management Plan and Crisis Management Plan is being revised every year. Recently, these Plans are revised in December 2024.
- These Plans provide a framework and directions to the power sector utilities for all phases of the disaster/Crisis management cycle (i.e. Mitigation, Preparedness, Response and Recovery).

Disaster Management

- The overall coordination of disaster management vests with the Ministry of Home Affairs (MHA).
- The Cabinet Committee on Security (CCS) and the National Crisis Management Committee (NCMC) are the key committees involved in the top-level decision-making with regard to disaster management.
- The NDMA is the lead agency responsible for the preparation of DM plans and the execution of DM functions at the national level. In most cases, state governments will be carrying out disaster management with the Central government playing a supporting role.

Institutional Framework for Disaster Management in Power Sector

2. Regional Level Disaster Management Group (RDMG) composition:

a) Member Secretary (RPC) – Chairman
b) Representative of Secretary in-charge of Rehabilitation and Relief of the affected State of the Region
c) Representatives of each State Civil Defence
d) Regional HODs CPSUs (NTPC, NHPC, PGCIL etc.)
e) CMDs State TRANSCOs/Power Departments
f) SLDC in charge of each state.
g) Chief Engineer, Central Water Commission (CWC), for floods related early warnings.
h) Deputy Director-General, Indian Metrological Department (IMD), for Earthquake, and Cyclone related early warnings.
i) Group Head, Ocean Information and Forecast Services Group (ISG), for Tsunami related early warnings.
j) Head of RLDC

Institutional Framework for Disaster Management in Power Sector

- A four-tier structure has been put in place at Central, Regional, State and Local Unit Level, with intervention and response depending on the severity of the disaster /calamity for effectively dealing with disaster situations in power sector. The Groups at various levels is outlined below:
  1) Central Level Disaster Management Group (CDMG)
  2) Regional Level Disaster Management Group (RDMG)
  3) State Level Disaster Management Group (SDMG)
  4) Plant Level Emergency Management Group (EMG)
- Ministry of Power has designated National Load Despatch Centre (NLDC) as Central Control room to deal with disasters in the Power sector.

Institutional Framework for Disaster Management in Power Sector

3. State Level Disaster Management Group (SDMG) composition:

a) Principal Secretary / Secretary (Energy) of the State – Chairman.
b) MDs of Generation, Transmission, Distribution companies
c) Representatives of health and welfare agencies
d) Chief fire safety officer
e) Inspector General of Police
f) Director, Central Water Commission (CWC) for floods related early warnings
g) A representative from Metrological Department (IMD) of State for Earthquake and Cyclone related early warnings
h) A representative from Ocean Information Services Centre of State for Tsunami related early warnings
i) SLDC in charge

Institutional Framework for Disaster Management in Power Sector

4. Plant/Sub-station Level Emergency Management Group (EMG) composition:

a) In-charge of the installation
b) Plant/Substation safety manager
c) Chief Plant/substation Operation Administration
d) A representative of District Administration

Institutional Framework for Disaster Management in Power Sector

4. Plant/Sub-station Level Emergency Management Group (EMG) responsibilities:

a) To direct action in the affected area taking into consideration the priorities for the safety of plant/sub-station personnel, minimize damage to plant/substation, property and the environment.

b) To direct fire and security personnel for immediate action.

c) To ensure that all non-essential workers/staff in the affected area are evacuated to safer places

d) Set up communication points

e) Report all development and requirements/ assistance needed

f) Preserve all evidence so as to facilitate any inquiry into the cause and circumstances which caused or escalated the emergency

g) To coordinate with District Administration for necessary finance, medical facilities law & order etc.

Institutional Framework for Disaster Management in Power Sector

The EMG group shall also maintain the following:

a) Safety data pertaining to all hazardous materials likely to cause an emergency.

b) Procedure of major and special firefighting materials etc.

c) Procedures for tackling harmful gases and other chemical leakages.

d) Emergency call out list of persons for emergency control, key personnel, fire safety, First aid, Medical, Security, police and District Administration Authorities.

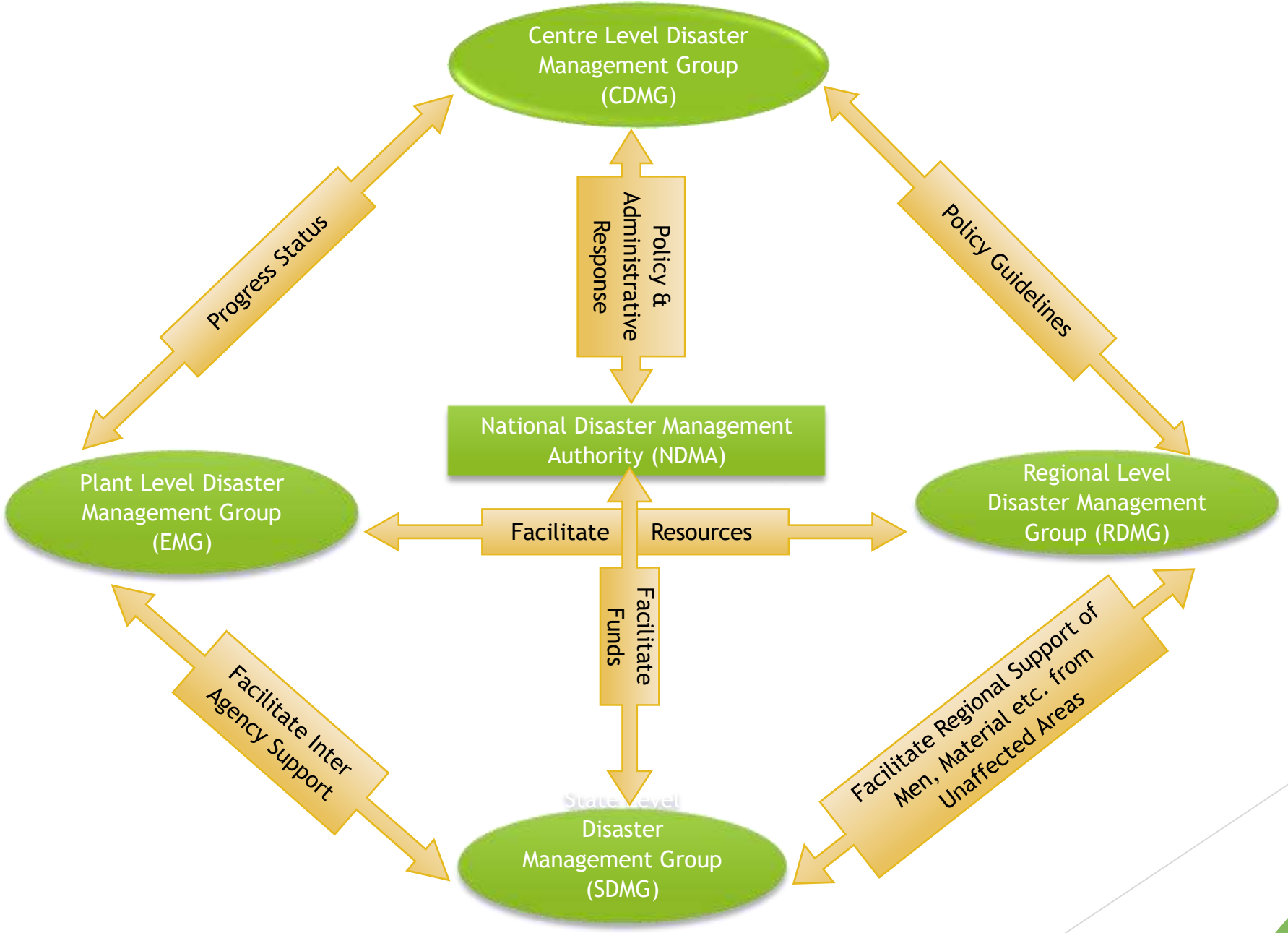
e) Emergency manuals, Blown up area maps, District Public address system, Emergency lights etc.

f) Identification of personnel for Mock drills & training.

g) List of essential raw materials, spares, tools and safety kits & its arrangement to fight emergency situation, ensure public safety, and faster restoration of supply.

h) List for agencies with contact number for outsourced manpower, special services and necessary plan.

Inter-Group Relationships in DM System of Power Sector



Funding by GoI for Disaster Management in Power Sector

- Presently, for immediate restoration of electricity supply in the affected areas, IMCT visits the disaster affected area and recommend the assistance to be provided by GoI under NDRF /SDRF.
- For Power sector, the assistance is being provided for the damaged conductors, poles and transformers upto the level of 11 kV and LT lines with bare conductor, as per the following norms:
- Rs.5000/pole
- Rs.0.50 lakhs per km for repairing of damaged LT lines.
- Rs. 1.0 lakh for replacement of one damaged distribution transformer.

R&R Funding

- The 15th Finance Commission (XV-FC) has made provision for assistance to States under the Recovery and Reconstruction (R&R) funding window of the National Disaster Response Fund (NDRF) and State Disaster Response Fund (SDRF) to help disaster affected States on a long-term basis.
- Based on XV-FC recommendations, the Ministry of Home Affairs (MHA), Government of India (GoI) framed guidelines for the constitution and administration of the R&R funding window under NDRF and SDRF dated August 14, 2024.
- A list of activities, on Build back Better (BBB) approach, which can be considered for funding under R&R Post Disaster Need Assessment (PDNA) have been mentioned under Annexure-II of the aforementioned guidelines. Power sector is not included in the list.
- However, for the states which have faced a disaster of severe nature, a flexible approach may be adopted in items other than those listed in Annexure-II, on case to case basis, provided that the same has been assessed by IMCT/PDNA team essential and justified and apprised by NDMA and recommended by SC-NEC.
- Recently, states of Himachal Pradesh and Sikkim have been allocated funds under PDNA as per the R&R guidelines by MHA.

Disaster Resource Inventory for Power Sector (DRIPS) Portal

- As per the directions of Hon'ble Minister, DRIPS portal has been developed as an Online Inventory of *spares for Distribution*, *Transmission* and *Generation sectors*, in-line with IDRN. The portal was launched by HMoP on 20.08.2024.

  https://drips.npp.nic.in or (www.npp.gov.in -----→ Login)

- This portal is facilitating the registration of inventory / equipment availability with the utilities which may be used by the affected States/Organizations during the disaster.

- Quicker decisions for resource requisitioning to mitigate the impact of disaster on Power sector in times of disaster/ natural calamity.

- The inventory list for essential equipment was finalized after several rounds of deliberations with the stakeholders under three heads: Discom (74 items), Transcos (118 items) and Gencos (45 items).

Disaster Response Inventory for Power System (DRIPS portal)

- The portal is under stabilization including registration of new utilities, requirement of multiple user registration from the same organization located at multiple locations, etc.
- The respective divisions of CEA for Hydro, Thermal, Transmission and Distribution have been roped in to update/facilitate for the registration of new utilities/updation of spare inventory details of their respective sectors.
- CEA is also taking up the matter regarding registration of Utilities and filling up of inventory data regularly with utilities including all RPCs meetings.
- All Utilities are requested to register on the portal by providing the information of Nodal officer to CEA.

Salient Features of DRIPS Portal

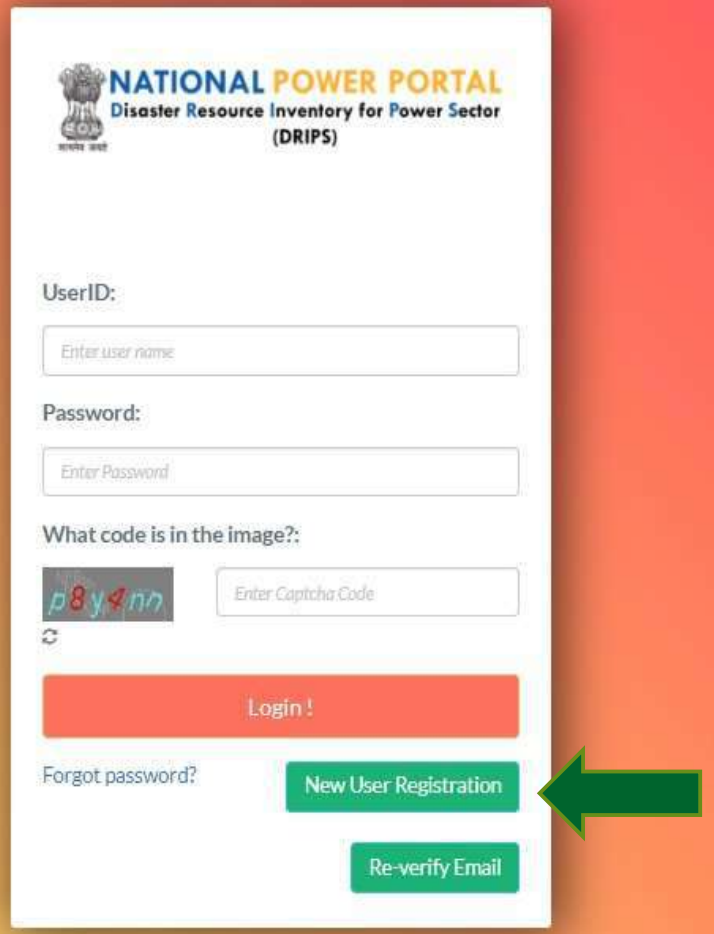
DRIPS can only be accessed by Nodal officers registered on the portal.

1) Registration of Entities (GENCOs, TRANSCOs, DISCOMs)
2) Verification & approval of registrations by CEA
3) 24x7 access and availability
4) Search facility for availability of stock inventory
5) Readily available Data of resource/inventary availability for quick decision making
6) Provision to add new inventory items in the portal master list
7) Details of nodal officers visible to users to facilitate communication

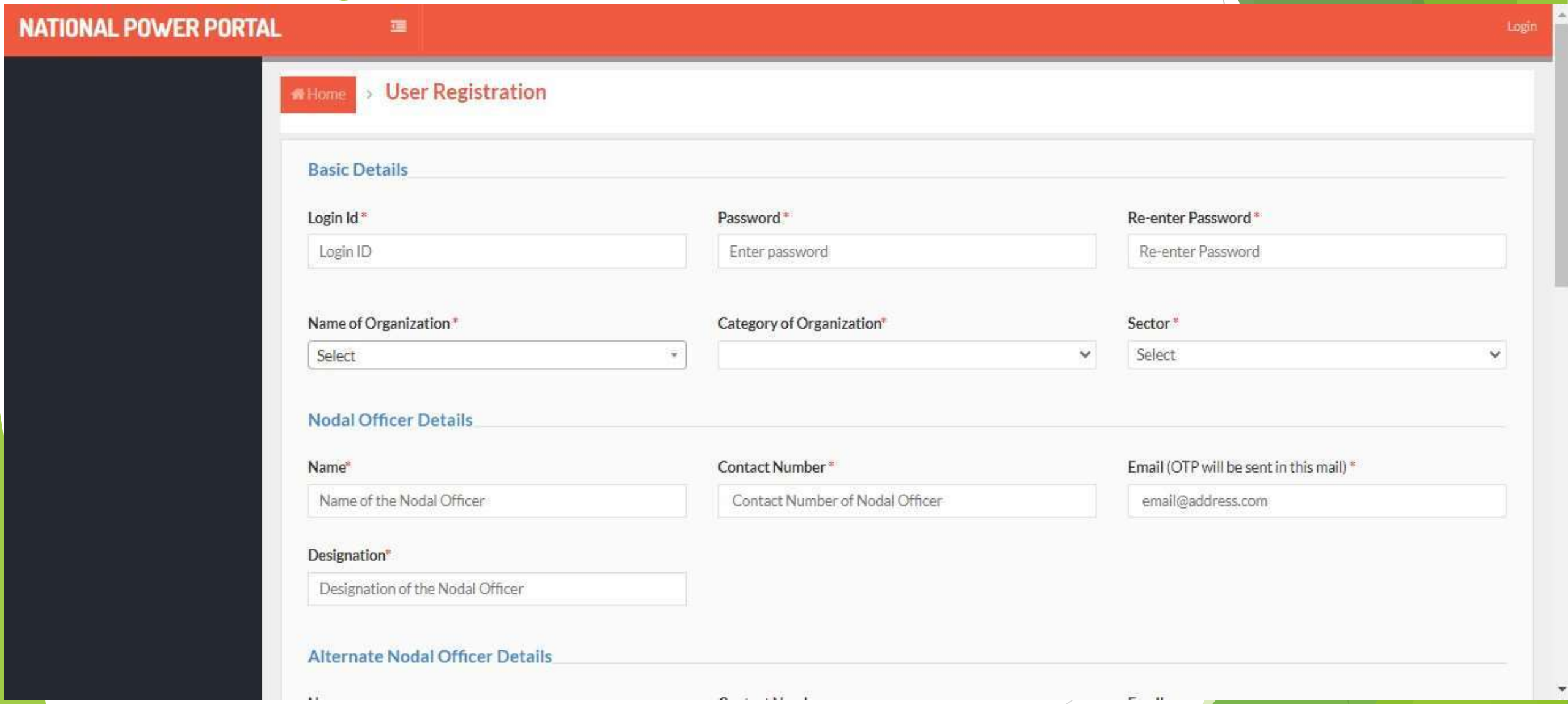
Registration/ Inventory Status

Sector	Registered utilities till date	No. of inventory entries made	List of Major Equipments
Generation	**29**	**236**	Centifugal Pump, Circuit Breakers, Crane, Drainage Pumps, Compressor, Drilling machine, Power Transformer, Shunt Reactors, Surge Arrester, Wave trap etc.
Transmission	**9**	**53**	Circuit Breaker, Battery System, Conductors, CVT, CT, Insulators, Isolators, PT, Surge Arrester, Wave Trap, Power Transformer etc.
Distribution	**24**	**97**	Circuit Breaker, Battery System, Conductors, Distribution Transformers, Distribution Box, Insulators, HT Cables, Poles, Surge Arresters, Power Transformers etc.

User registration



User registration



Designation

Designation of the Alternate Nodal Officer

Permanent Address

State*

-----Select-----

District*

-----Select-----

Zone*

-----Select-----

Address *

Enter Address

Pin *

xxxxxx

Landmark

Enter Landmark

Correspondence Address

Same as Permanent Address

State *

-----Select-----

District*

-----Select-----

Zone*

-----Select-----

Address *

Enter Address

Pin *

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Landmark

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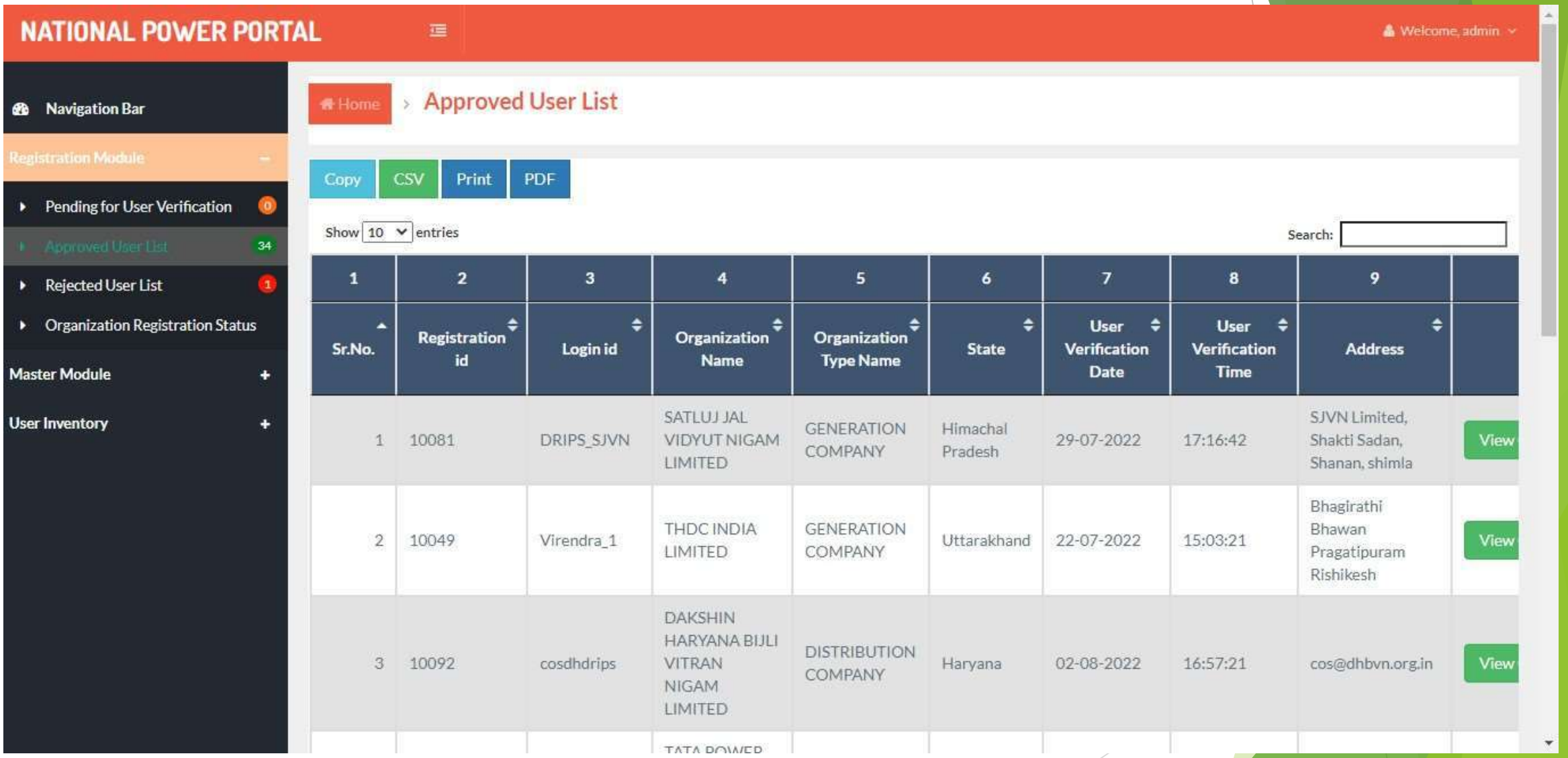
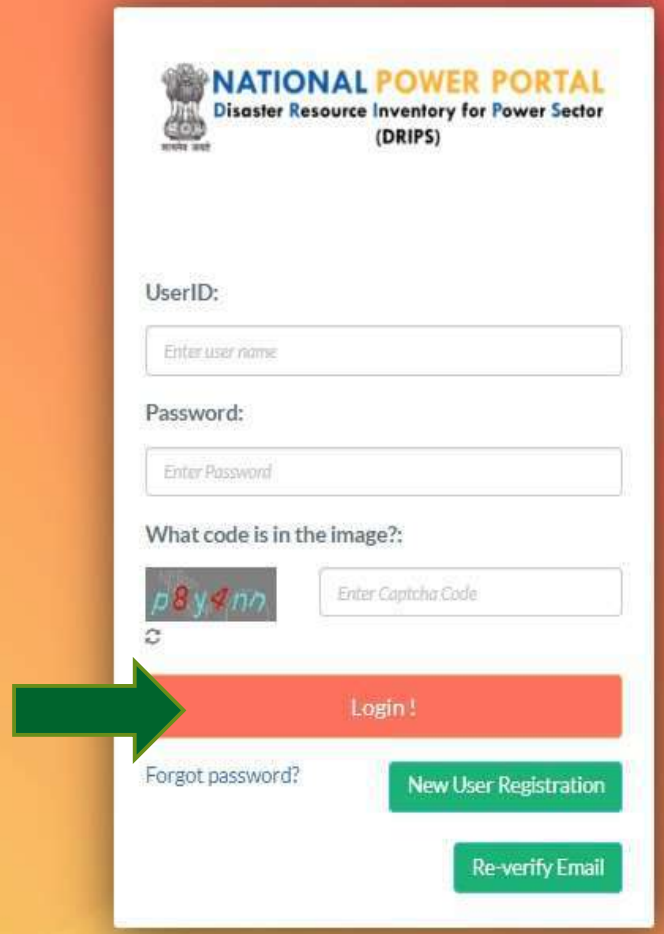
Remarks

Enter Remarks

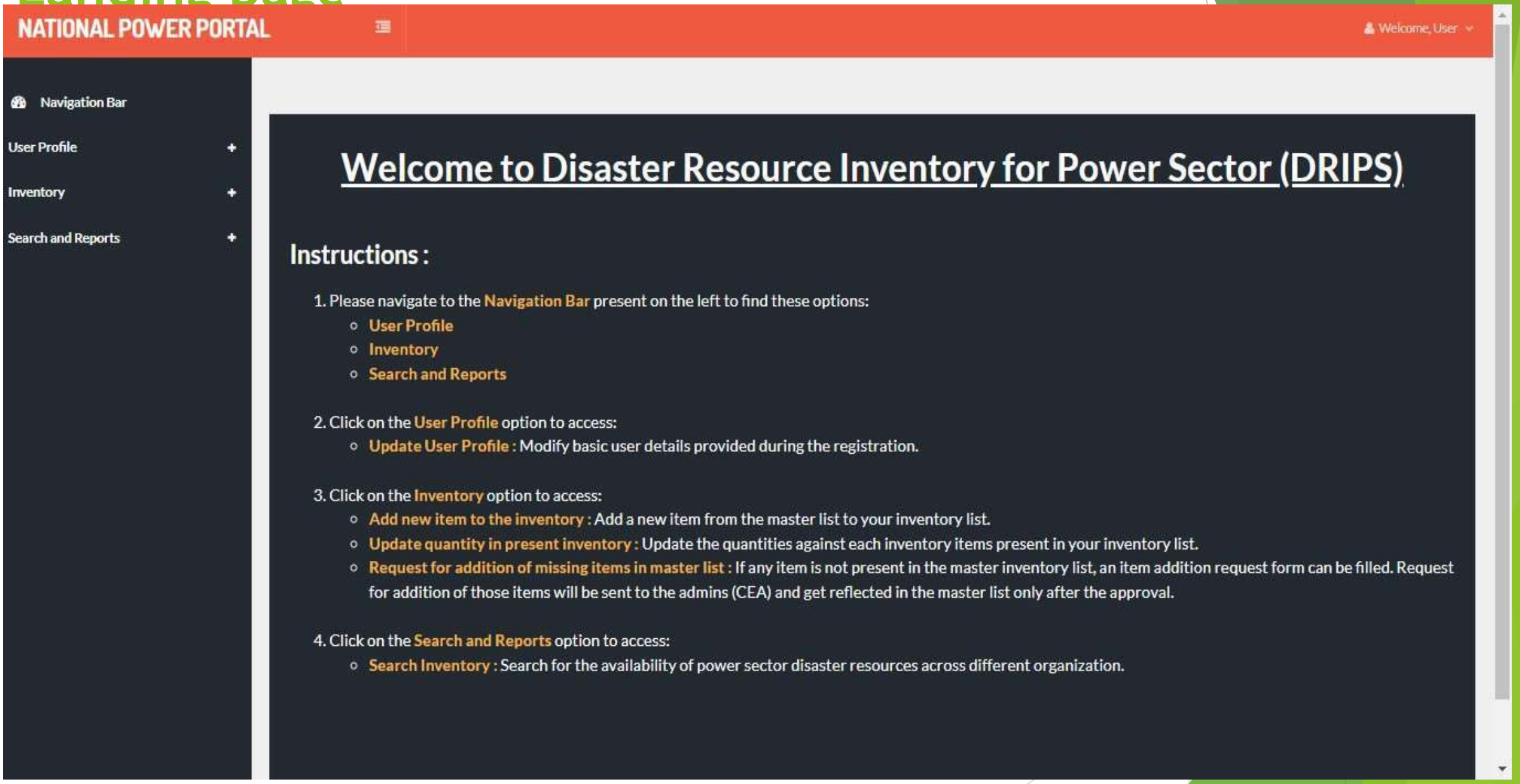
User reg. approval- by CEA



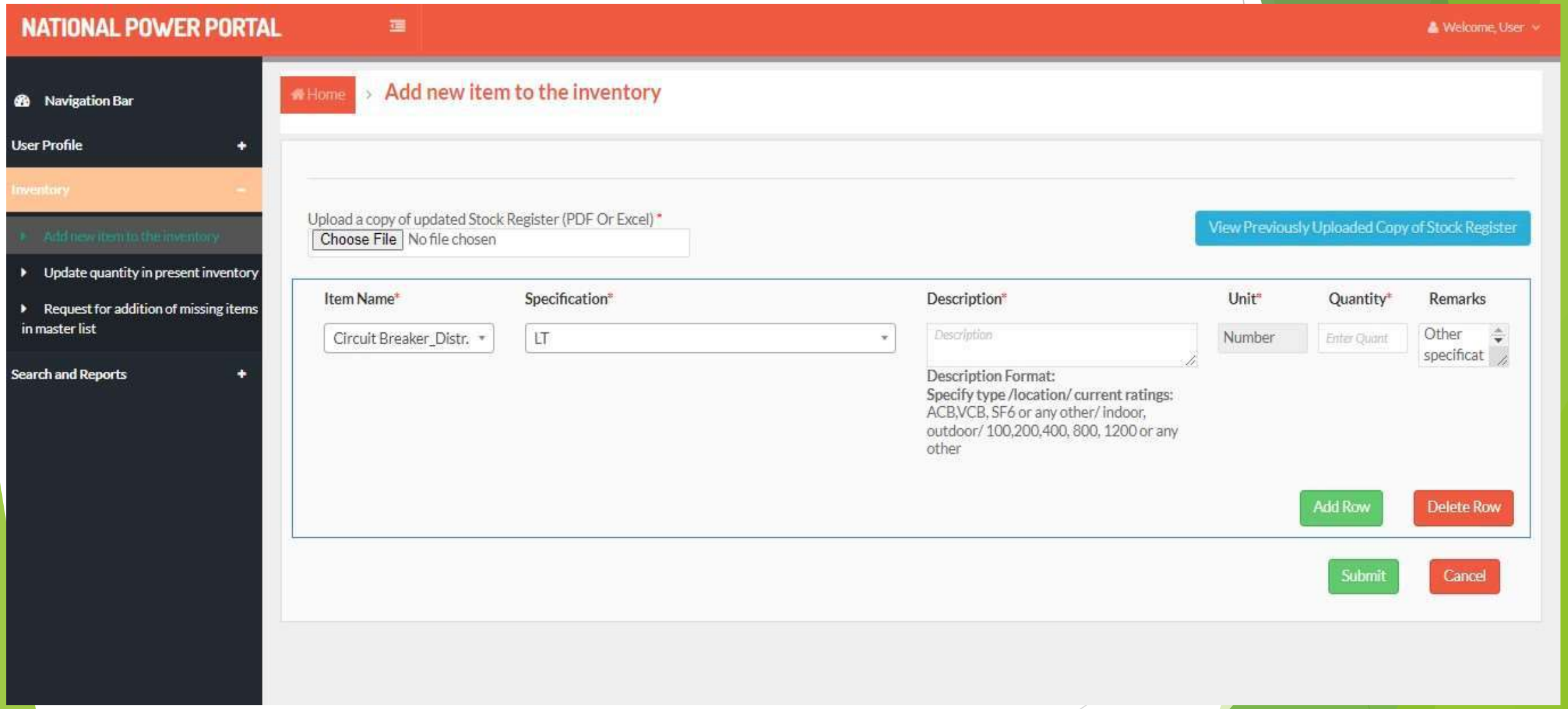
Log in


NATIONAL POWER PORTAL
Disaster Resource Inventory for Power Sector
(DRIPS)
UserID:
Enter user name
Password:
Enter Password
What code is in the image?:
p8y4nn
Enter Captcha Code
Login !
Forgot password?
New User Registration
Re-verify Email

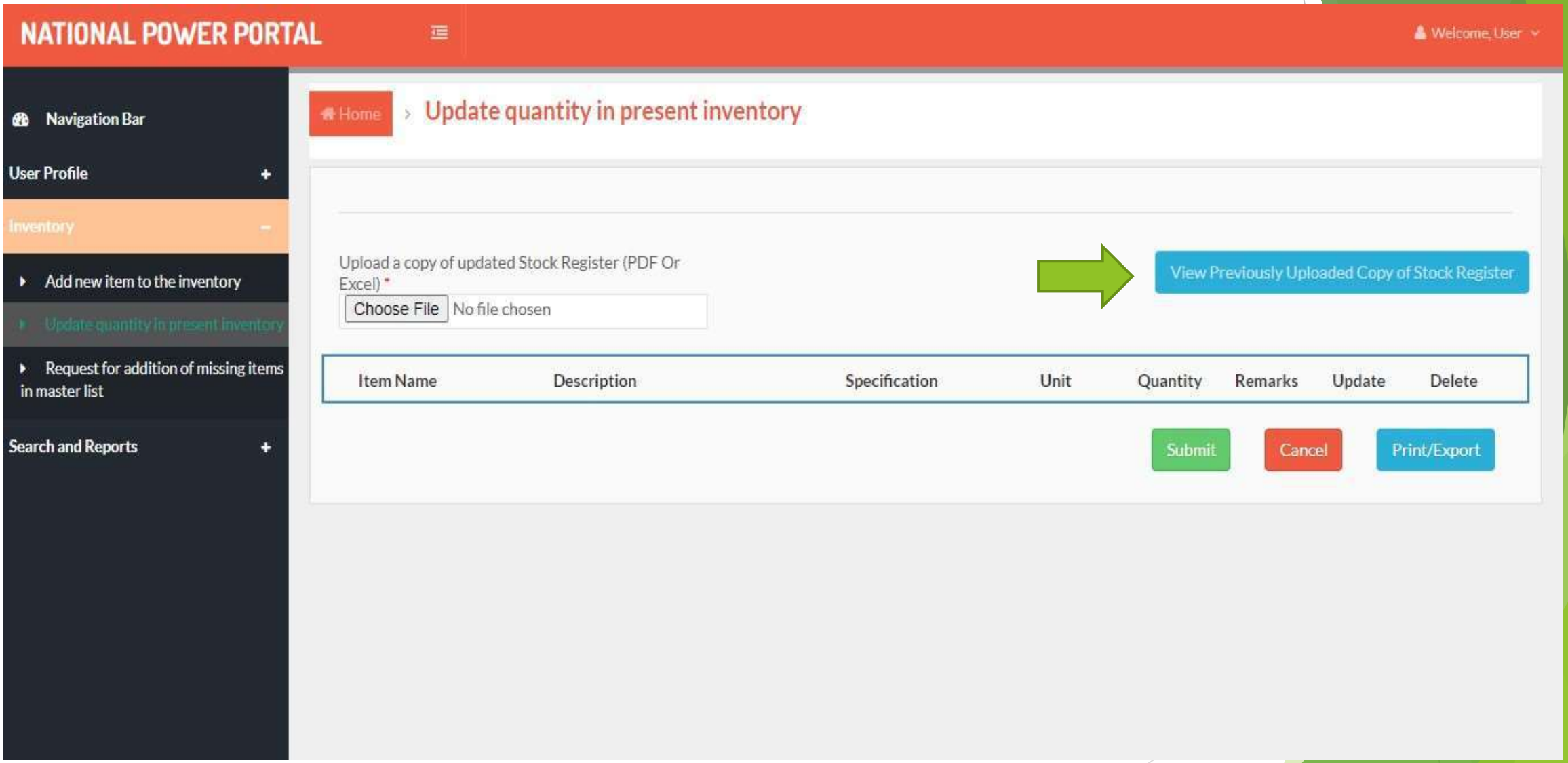
Landing page



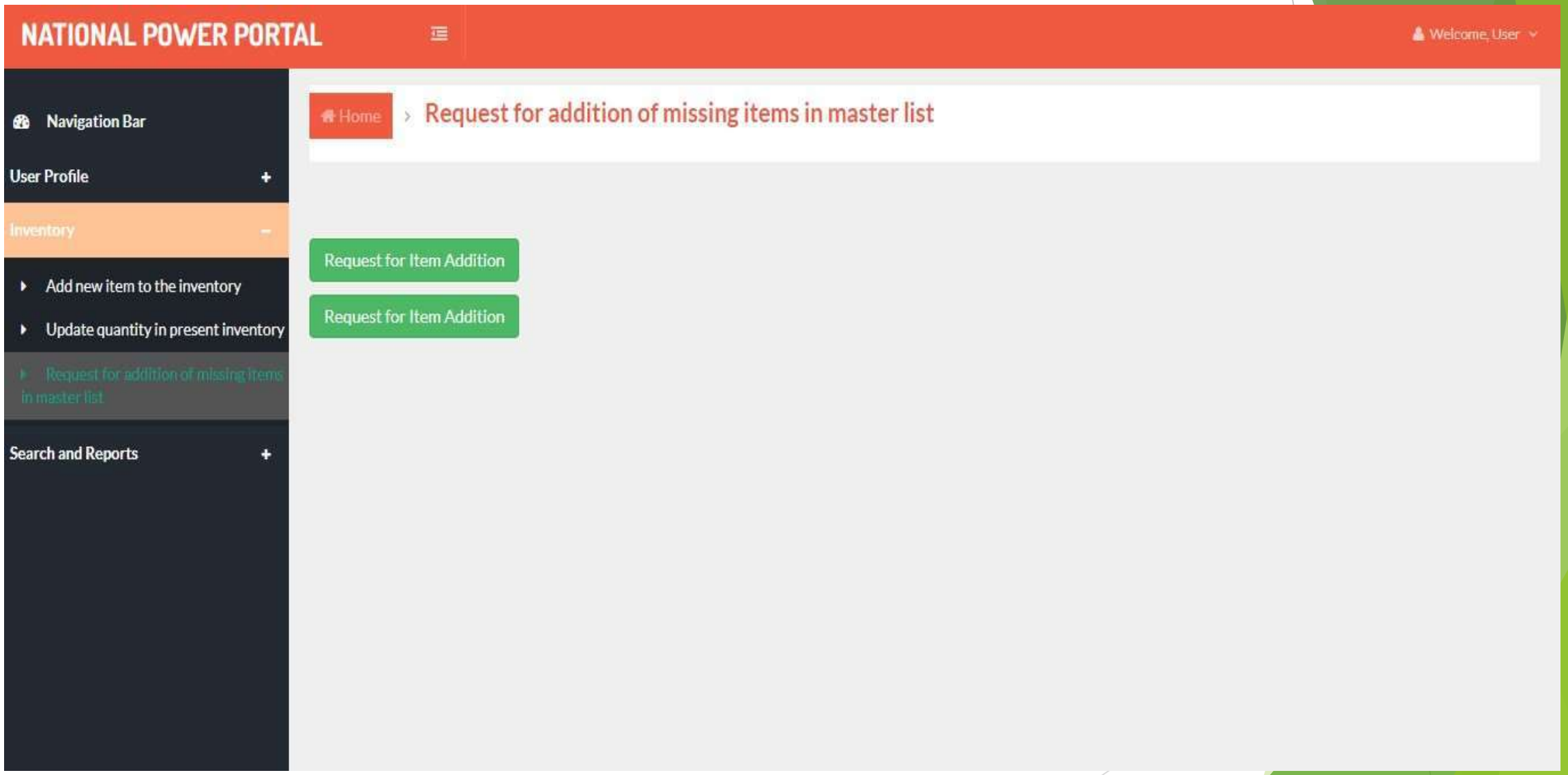
Add inventory



Update inventory



Request to include new item



Master Inventory- (*requested item will be added here post*

				100 Amps or any other		COMPANY		if any	14:42:32	
4	10496	Distribution Box	33kV	**Specify No. of outgoing feeders /kVA/ current ratings:** 1 to 10 or any other / 10, 50, 100 Amps or any other	Number	TRANSMISSION COMPANY	Active	Other specifications, if any	29-06-2022 14:42:59	
5	10497	Distribution Box	66kV	**Specify No. of outgoing feeders /kVA/ current ratings:** 1 to 10 or any other / 10, 50, 100 Amps or any other	Number	TRANSMISSION COMPANY	Active	Other specifications, if any	29-06-2022 14:43:24	
6	10498	Battery System (Bank and Charger)	48 V	**Specify Current/ A-h:** 50,100,200,500 A or any other/ 100,200,500,1000 A-h or any other	Number	TRANSMISSION COMPANY	Active	Other specifications, if any	01-07-2022 12:11:55	
7	10499	Battery System (Bank and Charger)	110 V	**Specify Current/ A-h:** 15, 30, 50, 60, 100,200,500 A or any other/ 100,200,500,1000 A-h or any other	Number	TRANSMISSION COMPANY	Active	Other specifications, if any	01-07-2022 15:15:44	
8	10500	Battery System (Bank and Charger)	220V	**Specify Current/ A-h:** 50,100,200,500 A or any other/ 100,200,500,1000	Number	TRANSMISSION COMPANY	Active	Other specifications, if any	29-06-2022 10:43:23	

NATIONAL POWER PORTAL

- Navigation Bar
- Registration Module +
- Master Module –
  - Inventory Item Names
  - Inventory Item Details Master Form
  - Approve Inventory Addition Requests
- User Inventory +

121	10494	Conductors_Trans.	AAAC	Specification if any	Km	COMPANY	Active	specificatio any
122	10495	Distribution Box	415 V	**Specify No. of outgoing feeders /current ratings**: 1 to 10 or any other / 10, 50, 100 Amps or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
123	10496	Distribution Box	33kV	**Specify No. of outgoing feeders /kVA/ current ratings**: 1 to 10 or any other / 10, 50, 100 Amps or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
124	10497	Distribution Box	66kV	**Specify No. of outgoing feeders /kVA/ current ratings**: 1 to 10 or any other / 10, 50, 100 Amps or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
125	10498	Battery System (Bank and Charger)	48 V	**Specify Current/ A-h:** 50,100,200,500 A or any other/ 100,200,500,1000 A-h or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
126	10499	Battery System (Bank and Charger)	110 V	**Specify Current/ A-h:** 15, 30, 50, 60, 100,200,500 A or any other/ 100,200,500,1000 A-h or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
127	10500	Battery System (Bank and Charger)	220V	**Specify Current/ A-h:** 50,100,200,500 A or any other/ 100,200,500,1000 A-h or any other	Number	TRANSMISSION COMPANY	Active	Other specificatio any
128	10501	Conductors_Trans.	ACSR	**Specify type**: Wolf, Dog, Kundah, Zebra, Moose, Panther or any other	Km	TRANSMISSION COMPANY	Active	Other specificatio any
129	10502	Conductors_Trans.	AL59	Specification if any	Km	TRANSMISSION	Active	Other specificatio

Inventory Search page

NATIONAL POWER PORTAL

Welcome, admin

- Navigation Bar
- Registration Module +
- Master Module +
- User Inventory −
  - Update Inventory details of Organization
  - Search and Reports −
    - Search Inventory

Home › Search Inventory

Quick Search


Distribution Transformer


Circuit Breaker


Conductor Distribution


Poles

Detailed Search

State* All States

District* All Districts

Category of Organization* All Categories

Sector * All Sectors

Name of Organization * All Organizations

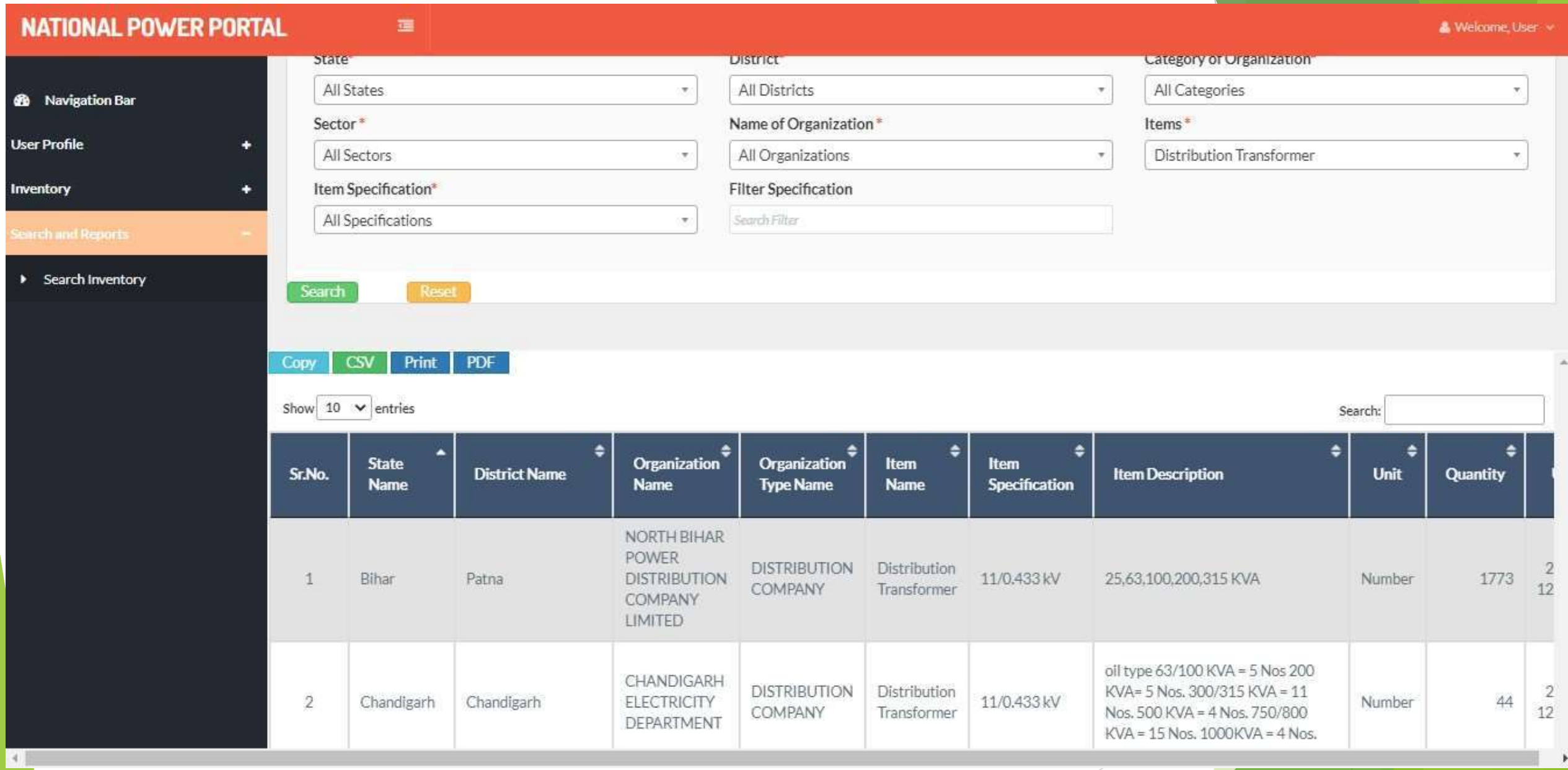
Items * All Items

Item Specification* All Specifications

Filter Specification Search Filter

Upto Date* 02-Feb-2023

Search Reset


NATIONAL POWER PORTAL
Welcome, User
Navigation Bar
User Profile
Inventory
Search and Reports
Search Inventory
State *
All States
District *
All Districts
Category of Organization *
All Categories
Sector *
All Sectors
Name of Organization *
All Organizations
Items *
Distribution Transformer
Item Specification*
All Specifications
Filter Specification
Search Filter
Search
Reset
Copy
CSV
Print
PDF
Show 10 entries
Search:
Sr.No.
State Name
District Name
Organization Name
Organization Type Name
Item Name
Item Specification
Item Description
Unit
Quantity
1
Bihar
Patna
NORTH BIHAR POWER DISTRIBUTION COMPANY LIMITED
DISTRIBUTION COMPANY
Distribution Transformer
11/0.433 kV
25,63,100,200,315 KVA
Number
1773
2
Chandigarh
Chandigarh
CHANDIGARH ELECTRICITY DEPARTMENT
DISTRIBUTION COMPANY
Distribution Transformer
11/0.433 kV
oil type 63/100 KVA = 5 Nos 200 KVA= 5 Nos. 300/315 KVA = 11 Nos. 500 KVA = 4 Nos. 750/800 KVA = 15 Nos. 1000KVA = 4 Nos.
Number
44

THANK YOU

Annex-B.2.1

ERS status of Eastern Region

Utility	Voltage level	Length in CKM	Total number of ERS towers	Number of ERS towers available	Number of ERS towers in use/unavailable	Number of ERS towers required as per MoP norms	Location of ERS
OPTCL	400 kV	1196.87	29	27	2	1 set	**Available:** Mancheswar: 27
	220 kV	6835.48	0	0	0	2 set	
	132 kV	8717.11	0	0	0	2 set	
PGCIL ER-I	765 kV	1075.17	24	24	0	1 set	Gaya
	400 kV	11569.95	16	16	0	3 set	Purnea
			16	16	0	set	Jamshedpur
	220 kV	481.68	0	0	0	1 set	
	132 kV	94.09	0	0	0	1 set	
Adani transmission limited(ATL)	400 kV	959.32	3	3	0	1 set	Sami(Gujarat): 1, Koradi(Maharashtra): 1, Akola(Maharashtra): 1
PGCIL (Odisha)	765 kV	1845.00	9	9	0	1 set	Rengali (Supension type: 6, Tension type: 3)
			15	15	0	set	Angul (Supension type: 9, Tension type: 6)
	400 kV	3355.00	3	3	0	1 set	Rourkela (Supension type: 2, Tension type: 1)
	220 kV	61.00			0	1 set	
PGCIL ER-II	400 kV	5840.00	10	10	0	2 set	Durgapur
			16	16	0	set	Siliguri
	220 kV	1041.00	0	0	0	1 set	
	132 kV	332.00	0	0	0	1 set	
	765 kV	639.00	0	0	0	1 set	
WBSETCL	220kV	4051.22	6	6	0	1 set	Durgapur
			2	2	0	set	Jeerat
			1	1	0	set	New Town
			3	3	0	set	New Jalpaiguri
			4	4	0	set	Laxmikantapur
	400 kV	2492.51	0	0	0	1 set	
	132 kV	9670.58	0	0	0	2 set	
	66 kV	333.00	0	0	0	1 set	
Indigrid (ENICL, OGPTL & PKTCL)	400 kV	1556.70	1	1	0	1 set	Bhopal, IndiGrid, maintains a centrally located ERS set at Bhopal, which is deployed across all five regions on a need basis.
	765 kV	612.00	0	0	0	1 set	
JUSNL	220 KV	2599.51	3	3	0	1 set	Hatia
			2	2	0	set	Jamshedpur
			3	3	0	set	Dumka
	400 kV	360.94	0	0	0	1 set	
	132 kV	4067.80	0	0	0	1 set	
DVC	220 kV	2975.64	7	7	0	1 set	Maithon: Suspension /Running angle 0 to 20 deg S/C ERS Tower: 4 Tension / Dead End 0 to 60 deg S/C ERS Tower: 2 Tension / Dead End 0 to 90 deg S/C ERS Tower: 1
	400 kV	482.69				1 set	
	132 kV	4005.21	0	0	0	1 set	

ERS status of Eastern Region

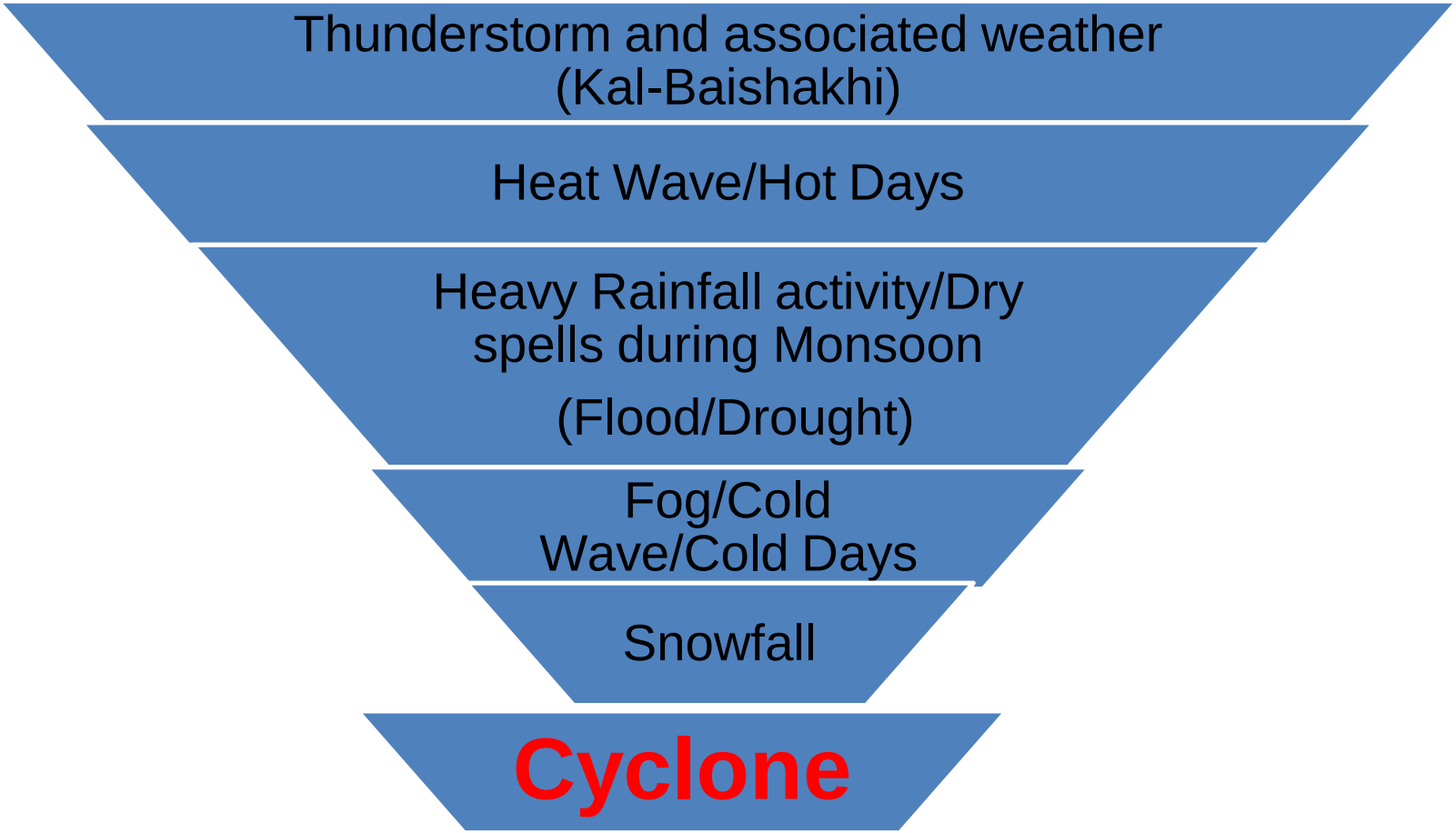
Utility	Voltage level	Length in CKM	Total number of ERS towers	Number of ERS towers available	Number of ERS towers in use/unavailable	Number of ERS towers required as per MoP norms	Location of ERS
BSPTCL	132kV	12194.38	42	13	29	3 set	**Available**: Fathua: 2, Purnea: 2, Muzaffarpur: 4, Gaya: 5 **In use**: 132kV Supal-Kathiya:4 132kV Chandauti-new Chandauti: 8 132kV Auraiya: 1 33kV supply near Masan River: 6 132kV Majhaul-Balia: 4 132kV Dehri-Kochas 3 **Under maintenance**:
	220 kV	5476.29	0	0	0	1 set	Fathua: 1, Purnea: 1, Muzaffarpur: 1
	400 kV	600.00	0	0	0	1 set	
TOTAL		**95521.14**	**215**	**184**	**31**		

Annex B.2.3

Pre-cyclone Preparedness : Early Warning System

Dr. Habibur Rahaman Biswas
Rreginal Meteorological Centre, Kolkata
Emails: hr.biswas@imd.gov.in, 786hrb@gmail.com

weather Hazards throughout the year



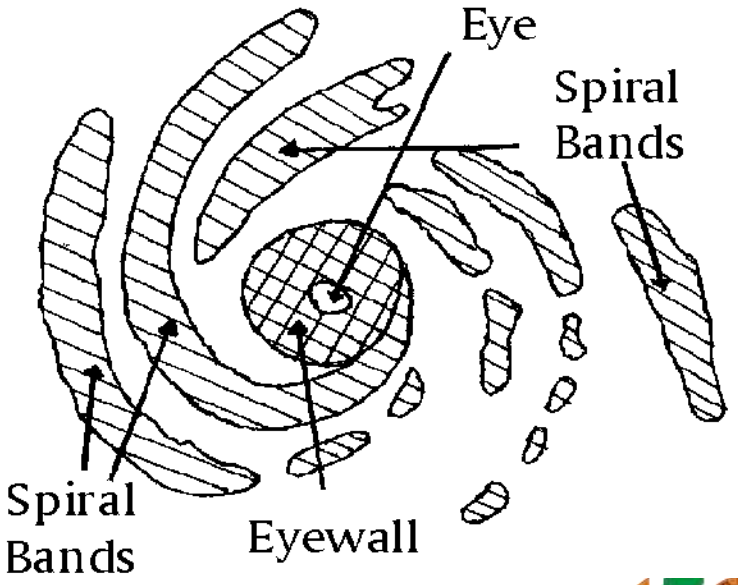
Tropical Cyclone:

A tropical cyclone (TC) is a rotational low-pressure system in tropics when the central pressure falls by 5 to 6 hPa from the surrounding and maximum sustained wind speed reaches 34 knots (about 62 kmph).

The word cyclone derived from Greek word 'cyclos' means 'coiling of a snake'. Name coined by Heary Piddington worked as a Rapporteur in Kolkata .

. A fully grown CS is of diameter 150 to 1000 km and height 10 to 15 km. It has four major components of horizontal structures

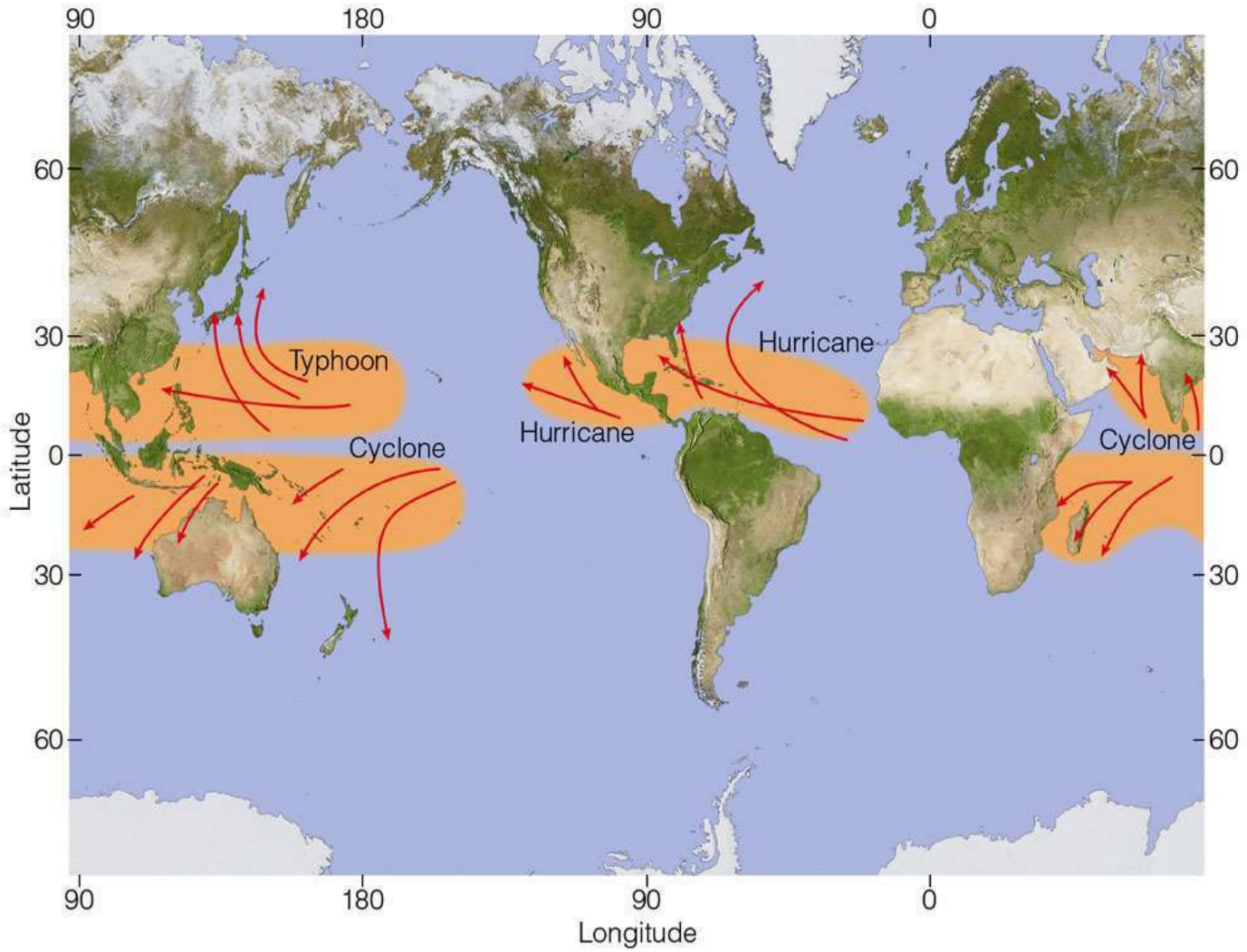
- Eye
- Wall cloud region (Eye Wall)
- Rain/spiral bands
- Outer storm area

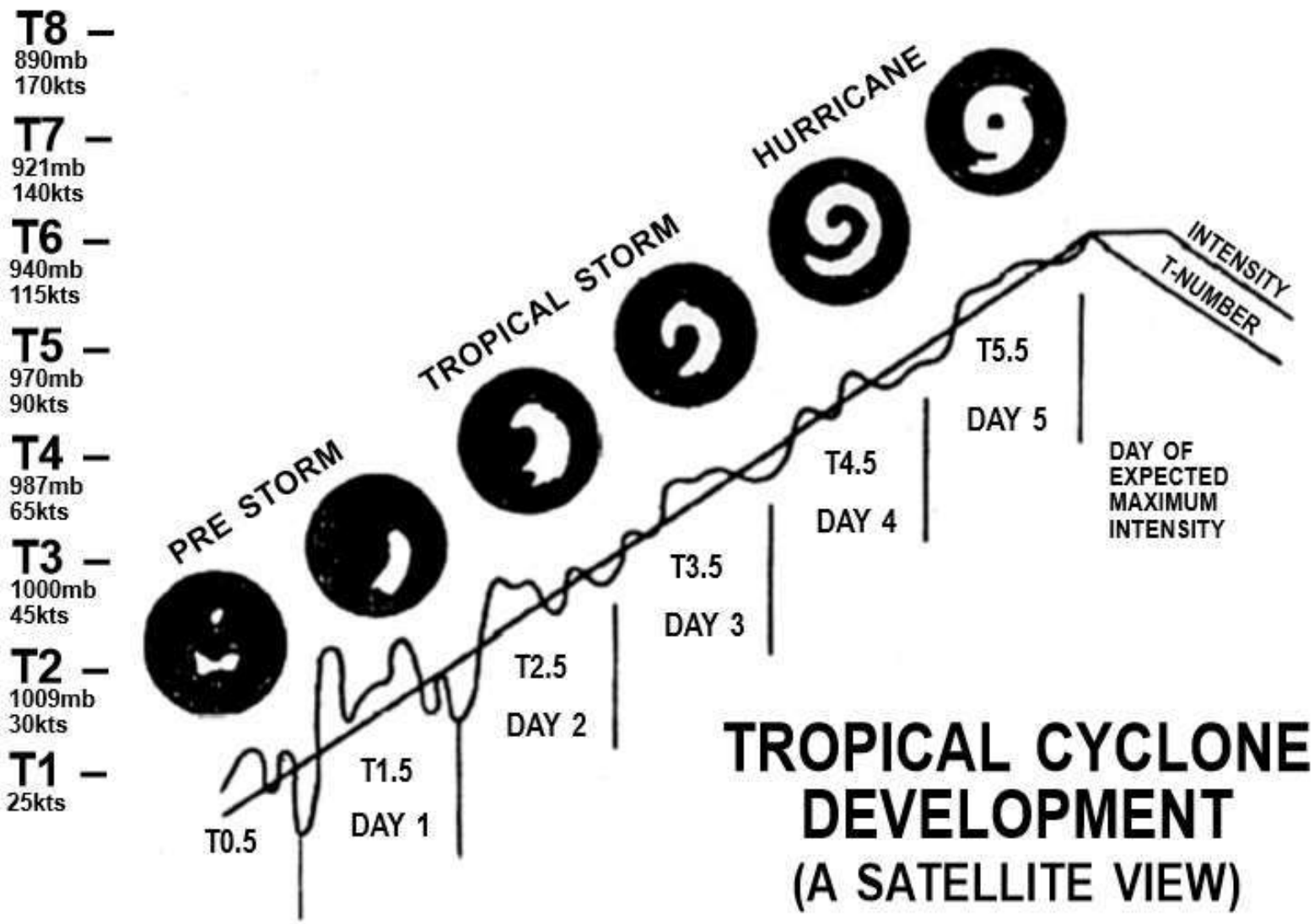


Classification of Tropical Cyclone

Low Pressure System	Associated wind speed Knots (Kmph)
LOW	<17 (<31)
Depression	17-27 (31- 49)
Deep Depression	28-33 (50- 61)
Cyclonic Storm	34-47 (62-88)
Severe Cyclonic Storm	48-63 (89-117)
Very Severe Cyclonic Storm	64-89 (118-167)
Extremely Severe Cyclonic Storms	90-119 (168- 221)
Super Cyclonic Storm	≥119(222)

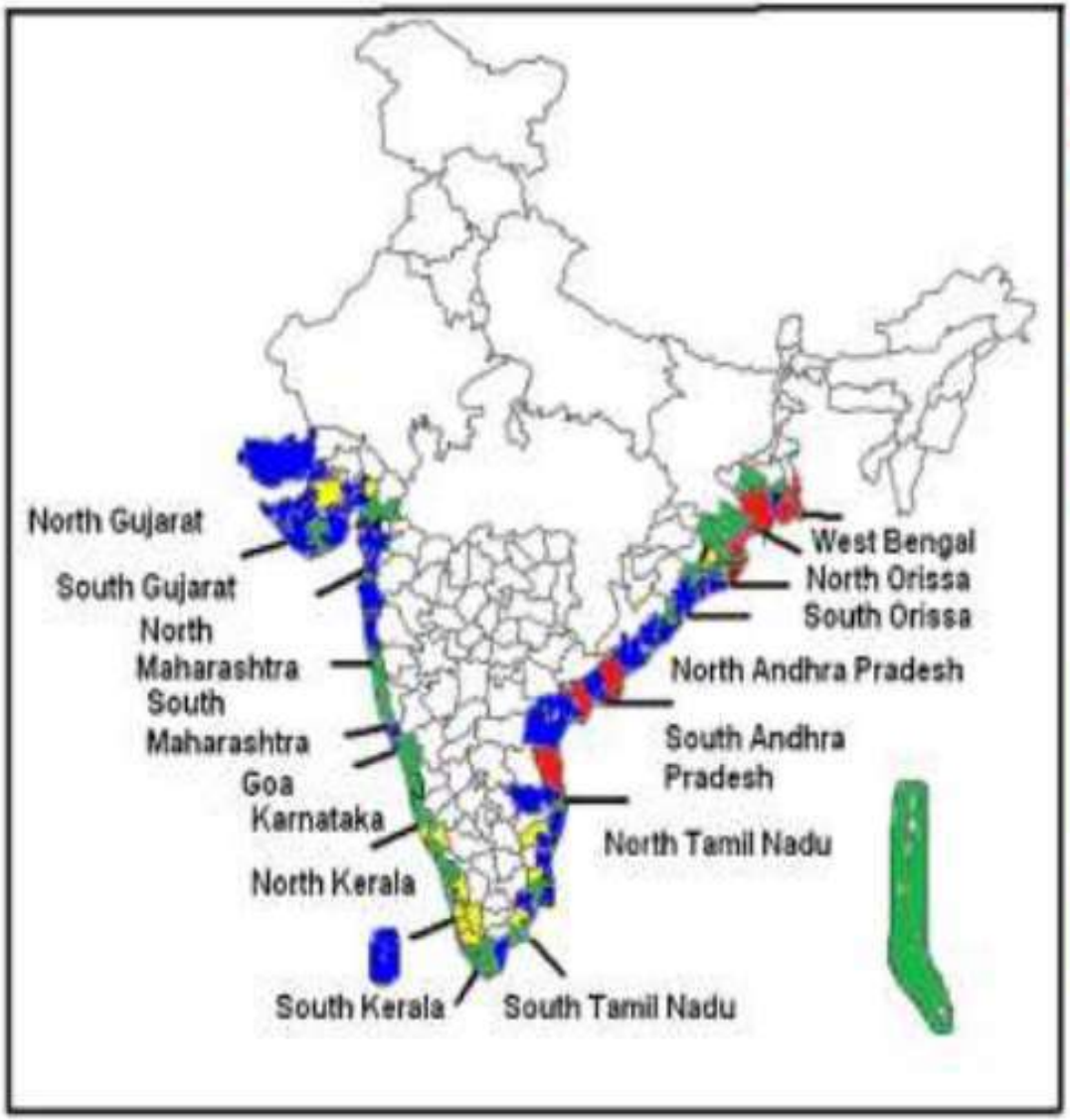
TC is called Hurricanes over Atlantic Ocean, Typhoon over Pacific ocean,Willy-willies over Australian sea and simply as Cyclones over North Indian Ocean.





Model of tropical cyclone development used in Intensity analysis

Cyclone Hazards prone area



Cyclone hazard prone districts of India (72)

Very highly prone

Highly prone

Moderately prone

Less prone

Very Highly Prone (10)

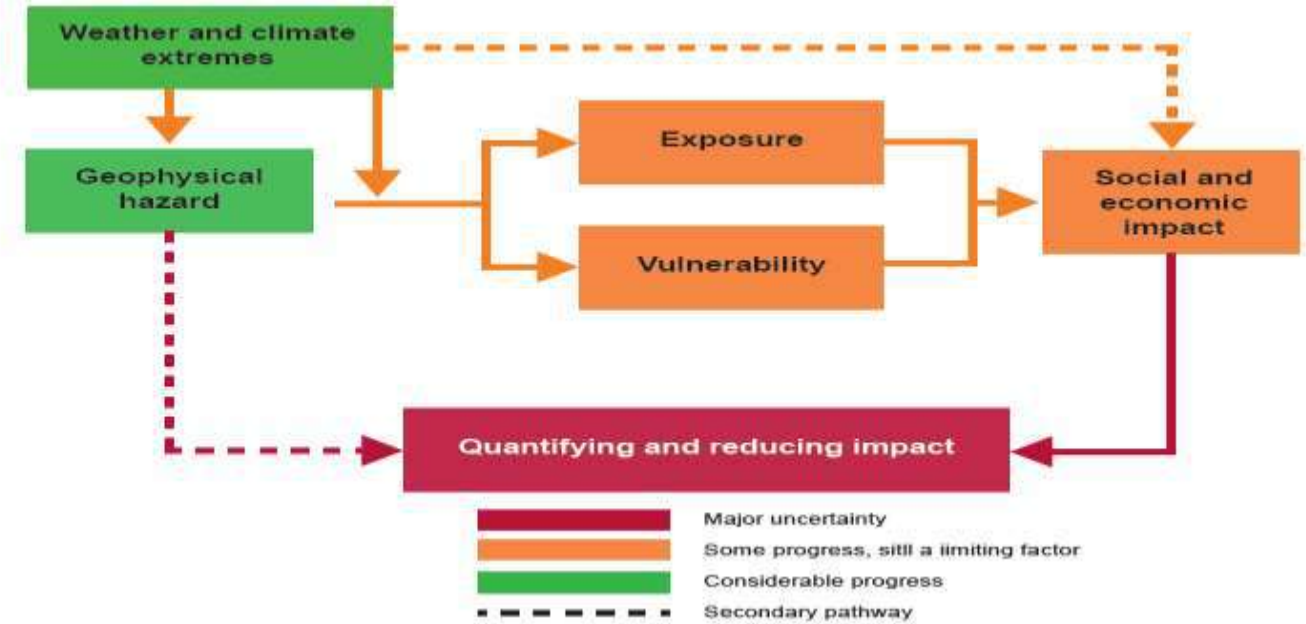
State	Districts
Andhra Pradesh (AP)	Nellore
	East Godavari
	Krishna
Odisha	Balasore
	Kendrapara
	Jagatsinghpur
	Bhadrak
Puducherry	Yanam
West Bengal	South 24-Pragana
	Medinipur

Risk Based warning: Participation of Evereone

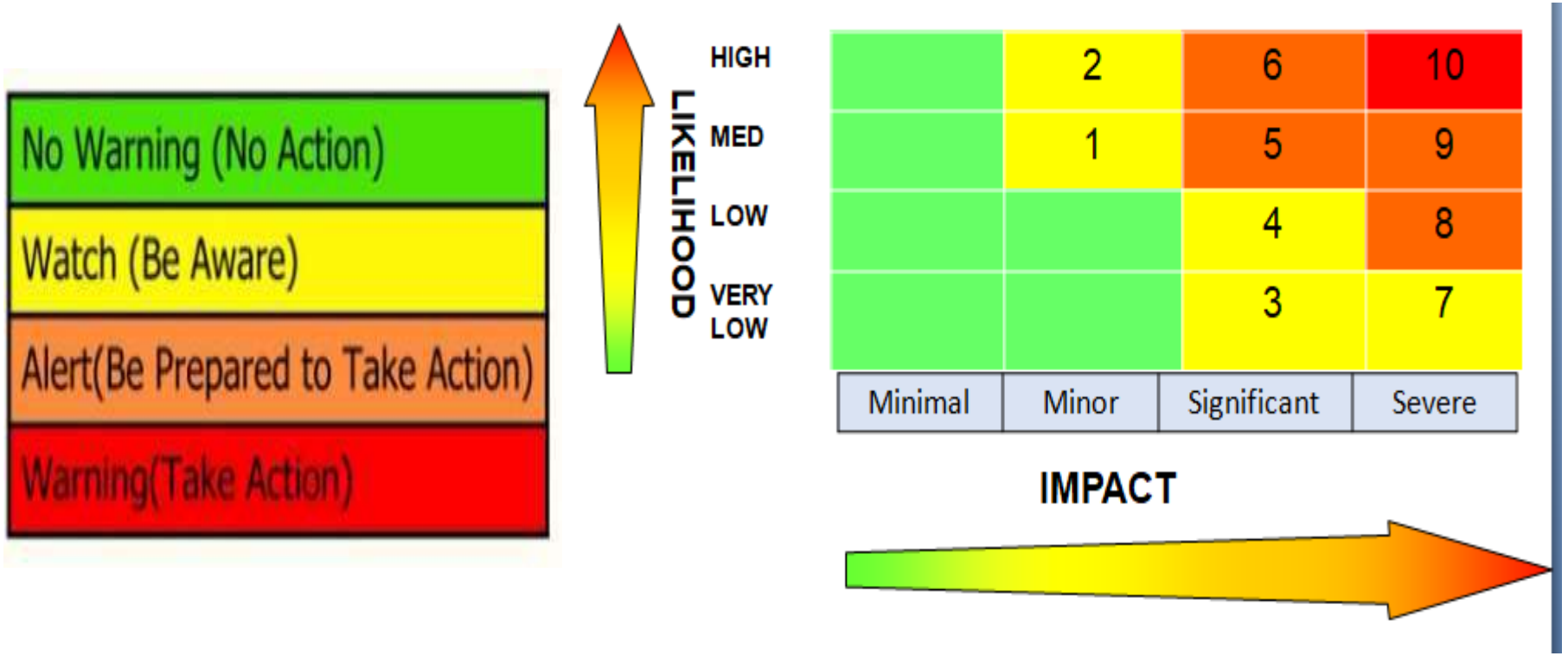
There are Paradigm shift of weather warning services which needs Participation of everyone for Minimization of due to natural disaster

Observations
Forecast
Warning

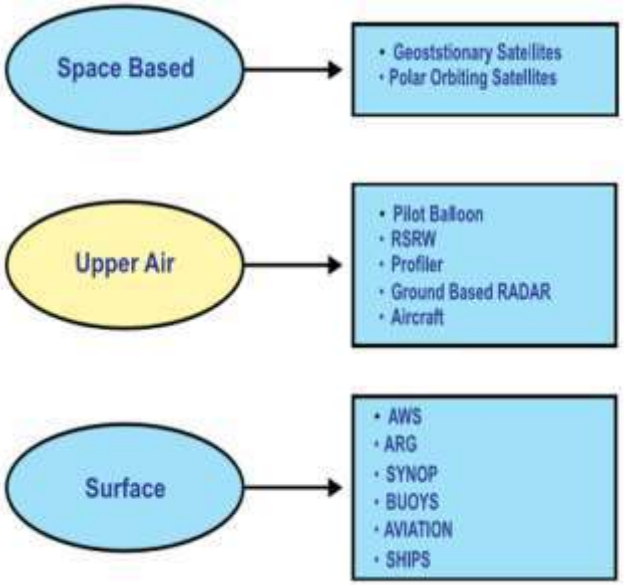
Observations
Forecast
Expected
Impacts
Risk based
warning



RISK MATRIX


No Warning (No Action)
Watch (Be Aware)
Alert(Be Prepared to Take Action)
Warning(Take Action)
LIKELIHOOD
HIGH
MED
LOW
VERY LOW
2
6
10
1
5
9
4
8
3
7
Minimal
Minor
Significant
Severe
IMPACT

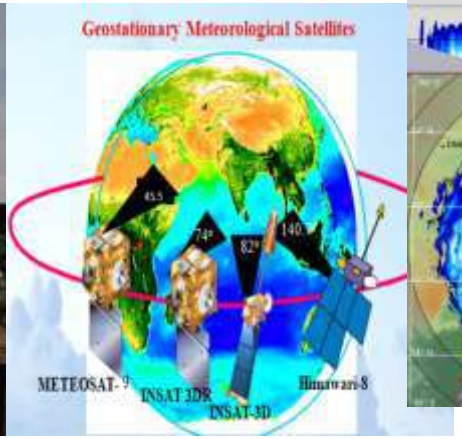
Weather monitoring and Observations Service

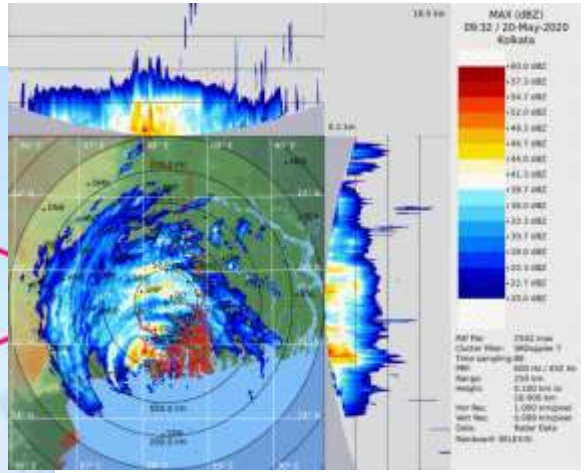


Observational Network in West Bengal

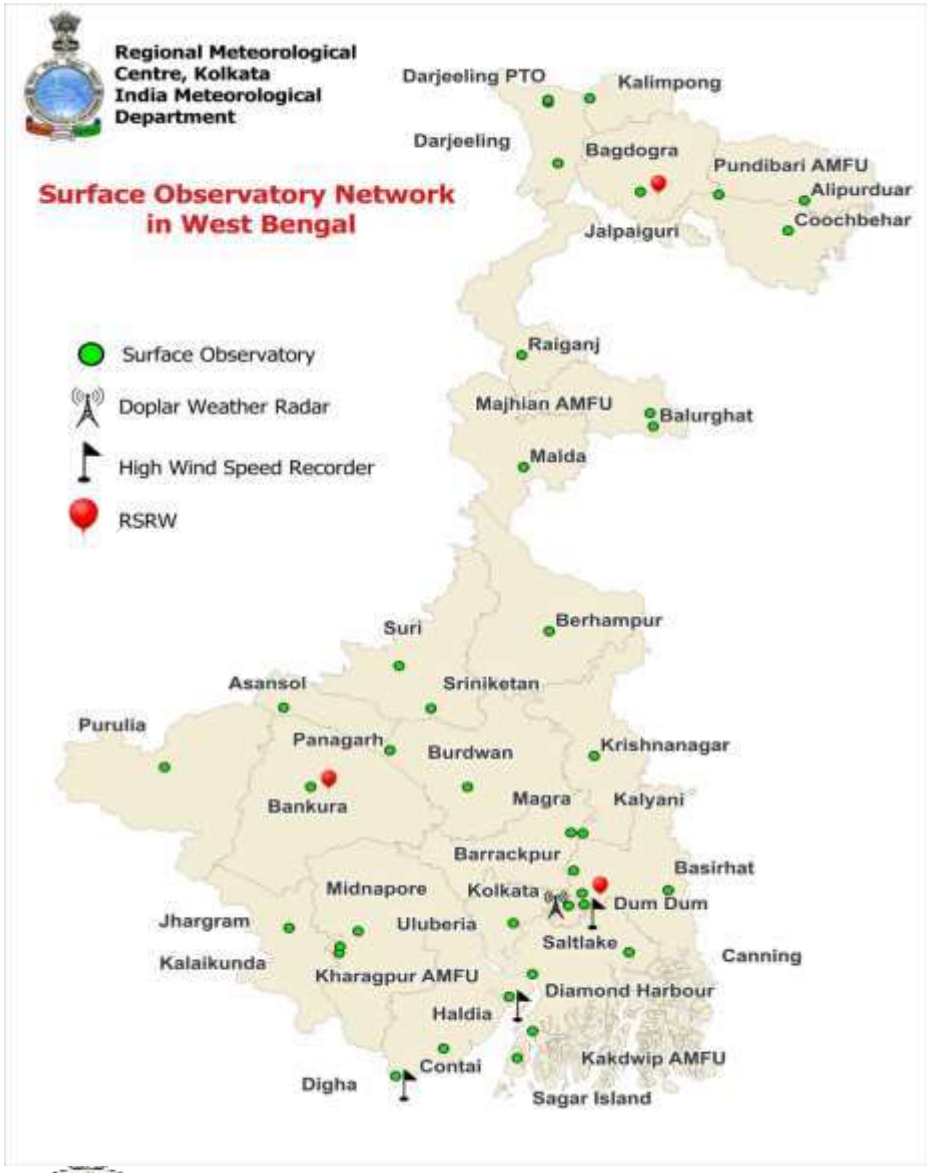
Departmental Observatories: 14
Part-time Observatories: 16
Raingauge Stations : 141
Automatic Weather station (AWS) : 34
AGRO-AWS : 6
Automatic Rain Gauge (ARG) : 39
High Wind Speed Recorder : 3 (Digha, Salt Take, Haldia)
DPT Anemograph : Kolkata, Dumdum
Upper Air Observational Stations : **Dumdum, Jalpaiguri, Bankura**

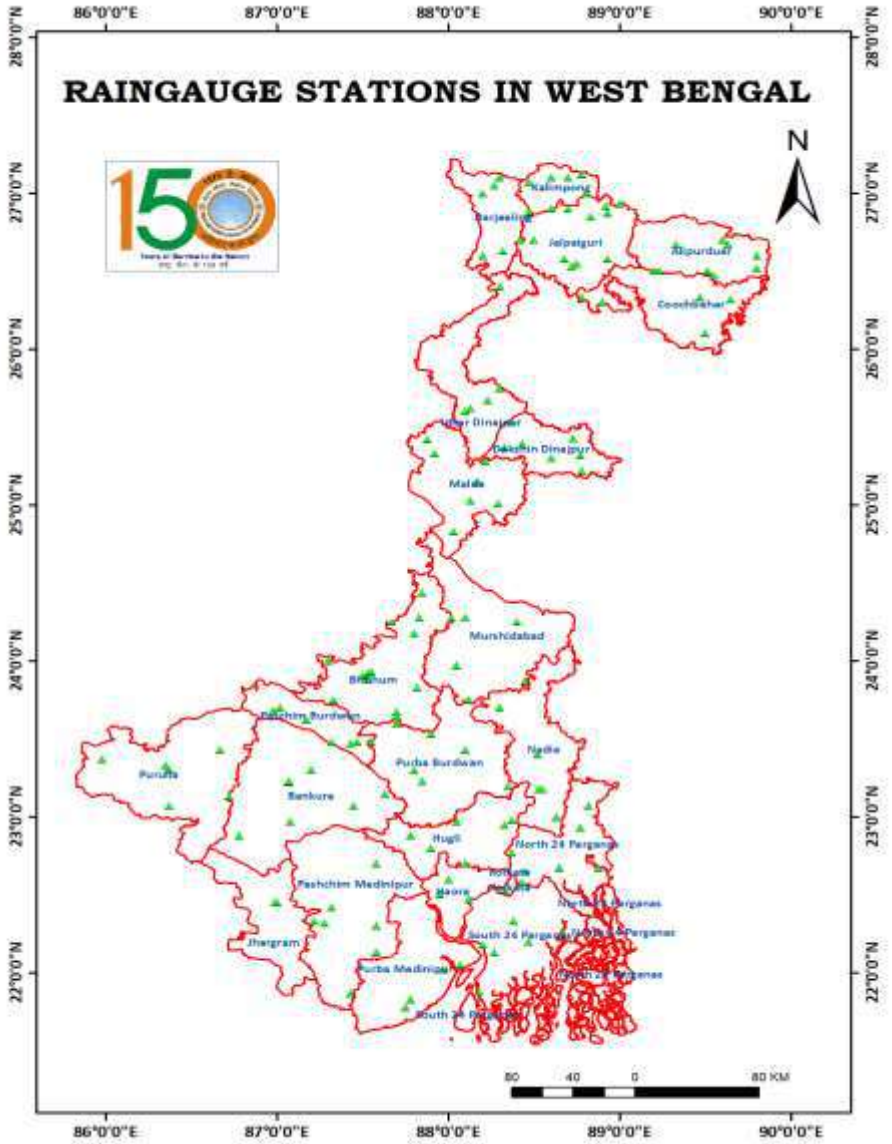
Weather Radar Stations



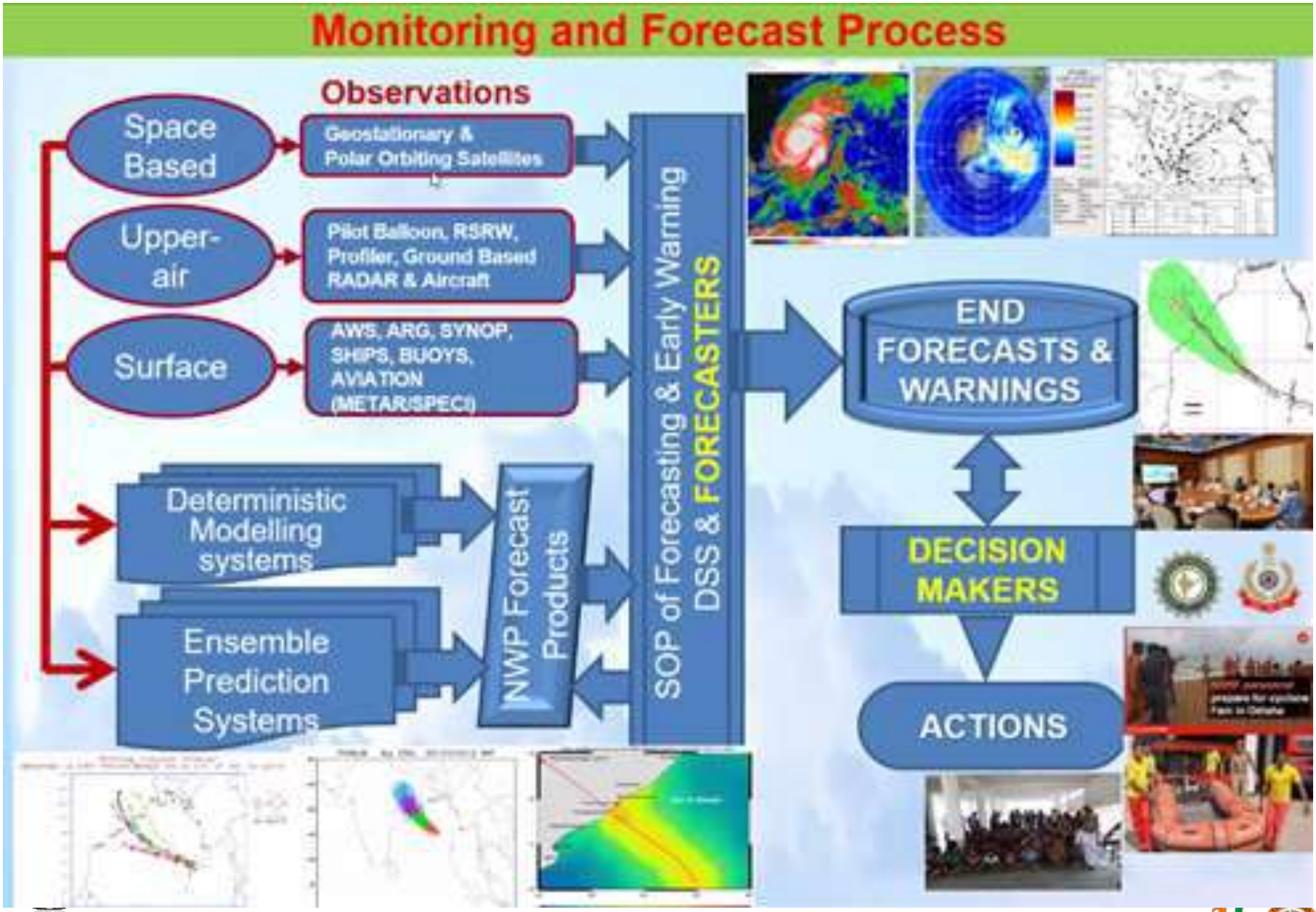


Kolkata : Site selected for Installation Of Radar at Diamond Harbour, Malda


Regional Meteorological Centre, Kolkata
India Meteorological Department
Surface Observatory Network in West Bengal
Surface Observatory
Doplar Weather Radar
High Wind Speed Recorder
RSRW
Darjeeling PTO
Kalimpong
Darjeeling
Bagdogra
Pundibari AMFU
Alipurduar
Jalpaiguri
Coochbehar
Raiganj
Majhian AMFU
Balurghat
Malda
Suri
Berhampur
Asansol
Sriniketan
Purulia
Panagarh
Burdwan
Krishnanagar
Bankura
Magra
Kalyani
Barrackpur
Basirhat
Midnapore
Kolkata
Dum Dum
Jhargram
Uluberia
Saltlake
Canning
Kalaikunda
Kharagpur AMFU
Diamond Harbour
Haldia
Kakdwip AMFU
Contai
Digha
Sagar Island


RAINGAUGE STATIONS IN WEST BENGAL
N
86°0'0"E
87°0'0"E
88°0'0"E
89°0'0"E
90°0'0"E
28°0'0"N
27°0'0"N
26°0'0"N
25°0'0"N
24°0'0"N
23°0'0"N
22°0'0"N
Kalimpong
Darjeeling
Jalpaiguri
Alipurduar
Coochbehar
Uttar Dinajpur
Dakshin Dinajpur
Malda
Murshidabad
Birbhum
Paschim Burdwan
Purba Burdwan
Nadia
Purulia
Bankura
Hugli
North 24 Parganas
Howrah
Paschim Medinipur
Kolkata
Haora
South 24 Parganas
Jhargram
Purba Medinipur
80 40 0 80 KM

Monitoring and Forecast Process



IMD Operational Models

Time scales	Numerical NWP/Climate Models	Resolutions/Update Frequency
Nowcasting Up to short range forecasting	• Weather Research Forecast (WRF) regional models • HRRR - EWRF- • HWRF - (Coupled) 5 days forecast	• 09 km and 03 km run for 3 days (Run 4 times a day)
Medium range forecast	• Global Forecast System (GFS) atmospheric model • Global Ensemble Forecast System (GEFS) atmospheric model (20 members) • MME Based products for short to medium range (City, district, river basin, met sub) • MME Based track; TIGGE MME Track	• 12 km (Run twice a day) for 10 days (06 and 18 UTC ; 3 days) • 12 km (Run once a day) for 10 days (12 UTC run experimentally)
Extended range forecast (ERF)	• Climate Forecast System (CFS) coupled models (16 members) • (State level, met-subdivision level and district level products). • Application products for various sectors (Agriculture, Water , health, DRR, Power, etc)	• 38 km (Run once in a week) for 32 days

- *Nowcasting (up to 3 to 6 hrs)*
- *Very short range forecasting (Up to 12 hrs)*
- *Short range forecasting (Uo to 3 days)*
- *Medium range forecast (Up to 10 days)*
- *Extended range forecast (up to 3 to 4 weeks to a month)*

TYPES OF POTENTIAL DAMAGES ACCOMPANYING TROPICAL CYCLONES

CYCLONE

LOCAL TIDES

LOCAL COASTAL CONFIGURATION

Dock.jpg

STORM SURGE

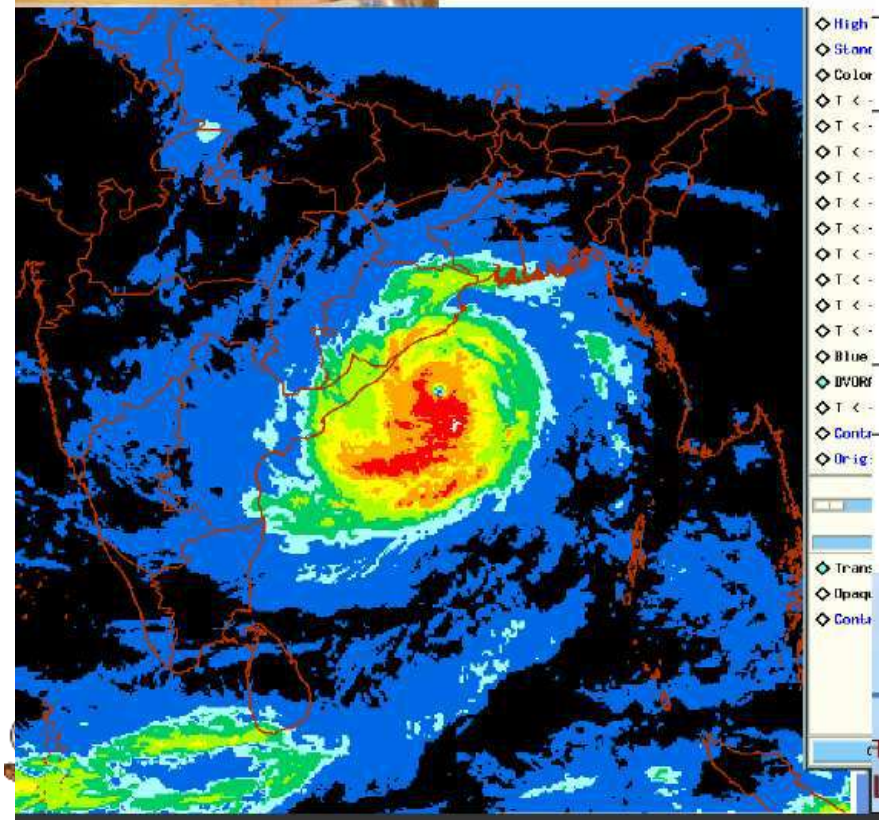
- FLOODING OF COASTAL AREAS
- EROSION OF BEACHES
- LOSS OF SOIL FERTILITY FROM SALINE INTRUSIONS

WIND

- DAMAGE TO STRUCTURES
- LOSS OF POWER/COMMUNICATION
- INJURIES & LOSS OF LIFE

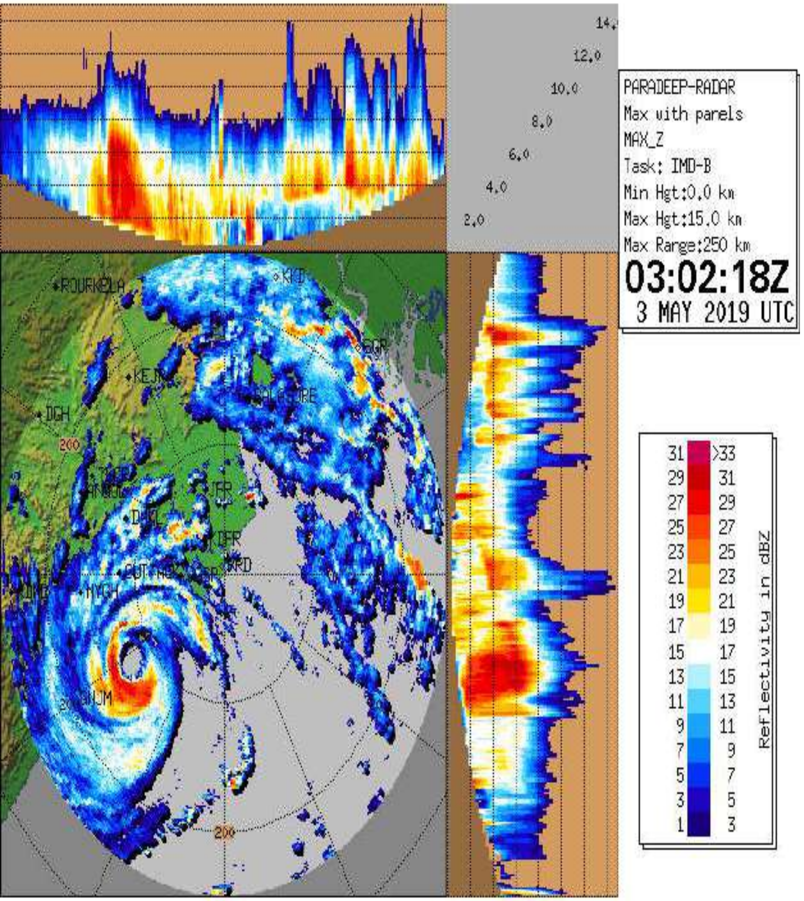
RAIN

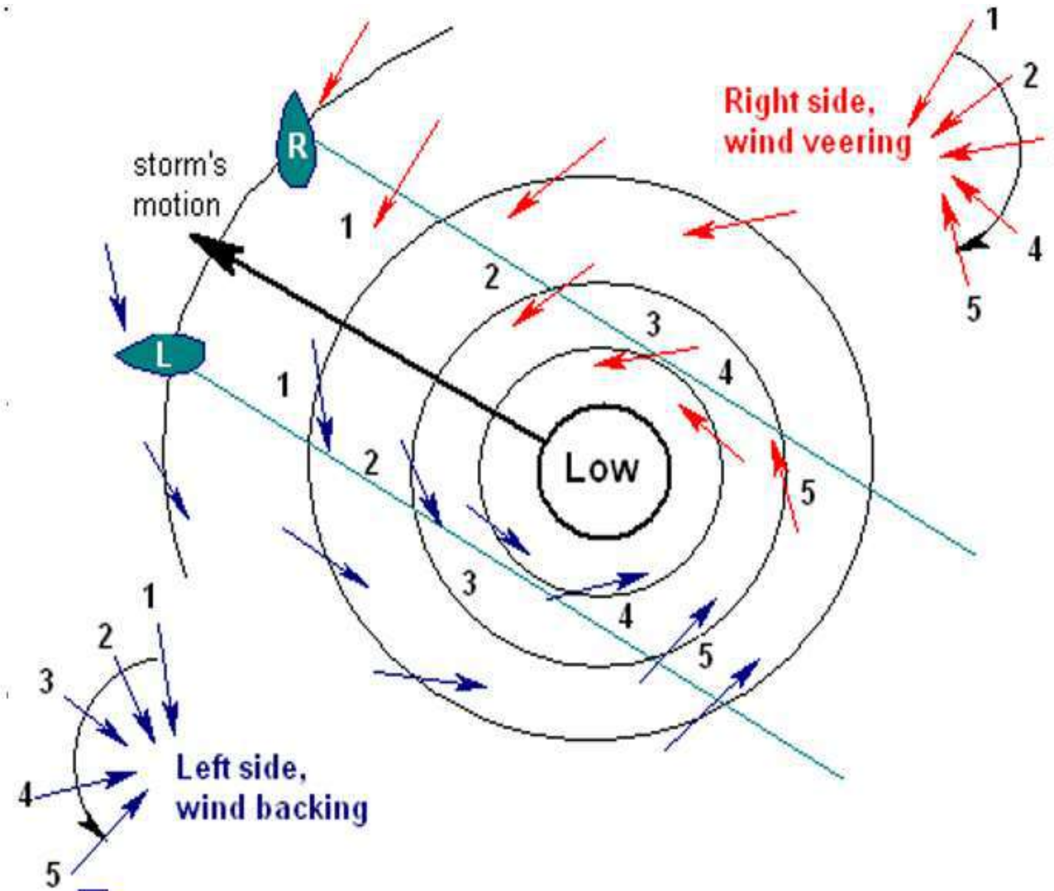
- DESTRUCTION OF CROPS, VEGETATION, LIVE-STOCK
- CONTAMINATION OF WATER SUPPLY SYSTEM
- LAND SUBSIDENCE
- FLOODING OF INLAND AREA



विज्ञान विभाग

LOGICAL DEPARTMENT


PARADEEP-RADAR
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
03:02:18Z
3 MAY 2019 UTC
Reflectivity in dBZ


storm's motion
Right side, wind veering
Left side, wind backing
Low
R
L

Storm Intensity, Expected Damage and Suggested Actions

Intensity	Damage expected	Action Suggested
Deep Depression	Minor damage to loose and unsecured structures	Fishermen advised not to venture into the open seas.
Cyclonic Storm	Damage to thatched huts. Breaking of tree branches causing minor damage to power and communication lines	Total suspension of fishing operations
Severe Cyclonic Storm	Extensive damage to thatched roofs and huts. Minor damage to power and communication lines due to uprooting of large avenue trees. Flooding of escape routes.	Total suspension of fishing operations. Coastal hutment dwellers to be moved to safer places. People in affected areas to remain indoors.
Very Severe Cyclonic Storm	Extensive damage to kutcha houses. Partial disruption of power and communication line. Minor disruption of rail and road traffic. Potential threat from flying debris. Flooding of escape routes.	Total suspension of fishing operations. Mobilise evacuation from coastal areas. Judicious regulation of rail and road traffic. People in affected areas to remain indoors.
Extremely Severe Cyclonic Storm	Extensive damage to kutcha houses. Some damage to old buildings. Large-scale disruption of power and communication lines. Disruption of rail and road traffic due to extensive flooding. Potential threat from flying debris.	Total suspension of fishing operations. Extensive evacuation from coastal areas. Diversion or suspension of rail and road traffic. People in affected areas to remain indoors.
Super Cyclone	Extensive structural damage to residential and industrial buildings. Total disruption of communication and power supply. Extensive damage to bridges causing large-scale disruption of rail and road traffic. Large-scale flooding and inundation of sea water. Air full of flying debris.	Total suspension of fishing operations. Large-scale evacuation of coastal population. Total suspension of rail and road traffic in vulnerable areas. People in affected areas to remain indoors.

Port Warning Signals (General System) used in India

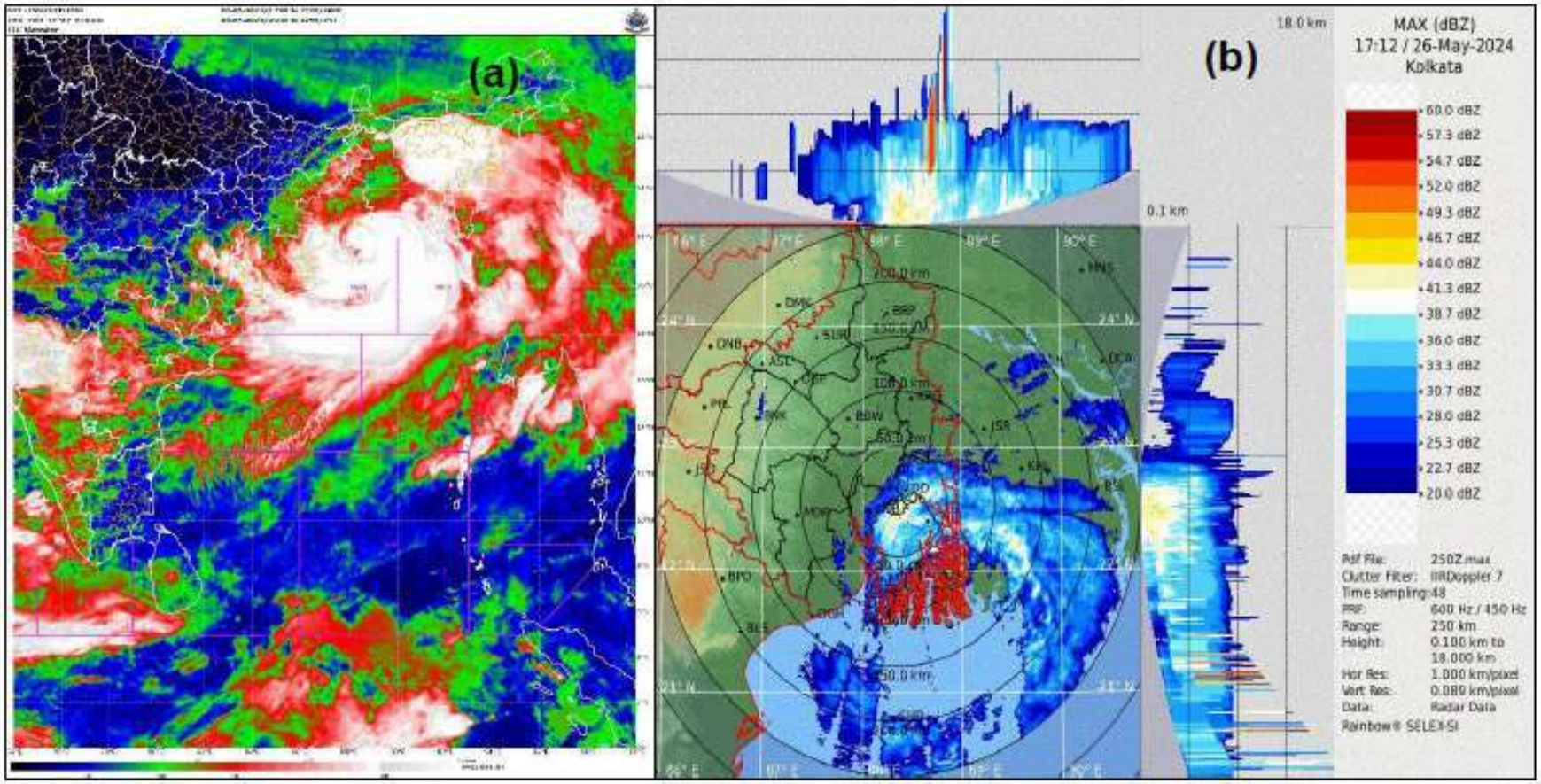
Signal/ Flag No.		NAME	Symbols		Description
			Day	Night	
1	DISTANT BAD WEATHER	DC1			Depression far at sea. Port NOT affected.
2		DW2			Cyclone far at sea. Warning for vessels leaving port.
3	LOCAL BAD WEATHER	LC3			Port Threatened by local bad weather like squally winds.
4		LW4			Cyclone at sea. Likely to affect the port later.
5	DANGER	D5			Cyclone likely to cross coast keeping port to its left.
6.		D6			Cyclone likely to cross coast keeping port to its right.
7.		D7			Cyclone likely to cross coast over/ near to the port.
8.		GD8			Severe cyclone to cross coast keeping port to its left.
9.		GD9			Severe cyclone to cross coast keeping port to its right.
10.	GREAT DANGER	GD10			Severe cyclone to cross coast over or very near to the port.
11.		XI			Communication failed with cyclone warning office.

Code word	Type of bulletin	Chart on which based (UTC)
ELECTRON	Storm-One	0000
AURORA	Daily-One	0300
FORMULA	Storm-Two	0900
BALLOON	Daily-Two	1200
GASBAG	Storm-Three	1500
DEW DROP	Extra	1800
HEXAGON	Special	Anytime

BULLETINS AND WARNINGS ISSUED BY ACWCS AND CWCS

- **Four stage cyclone warning**
- Sea area bulletin
- Coastal weather bulletin
- Bulletins for Indian navy
- Fisheries warnings
- Port warnings
- Aviation warning
- Bulletins for departmental exchanges
- Bulletins for AIR/ Doordarshan/ press
- CWDS bulletins
- Warnings for registered/ designated users.

- 1. Pre-cyclone watch – Issued to Cabinet Secretary and Senior Officials indicating formation of a cyclonic disturbance – potential to intensify into a Tropical Cyclone and the coastal belt likely to be affected.
- 2. Cyclone Alert- Issued at least 48 hrs in advance indicating expected adverse weather conditions.
- 3. Cyclone warning – Issued at least 24 hrs in advance indicating latest position of Tropical Cyclone, intensity, time and point of landfall, storm surge height, type of damages expected and actions suggested.
- 4. Post-Landfall Outlook- Issued about 12 hrs before landfall & till cyclone force winds prevail; District Collectors of interior districts besides the coastal areas are also informed.
- ** Finally a 'De-Warning' message is issued when the Tropical Cyclone weakens into Depression stage.



: Typical (a) enhanced color imagery from INSAT 3D(R) at 2230 hrs IST/ 1700 UTC and (b) reflectivity imagery from Doppler Weather Radar, Kolkata at 1840 hrs IST/1712 UTC of 26th May, 2024 in connection with Severe cyclonic storm "REMAL"

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
प्रमुख - पूर्व क्षेत्र
प्रादेशिक मौसम केन्द्र
4, डूयेल एवेन्यू, अलीपुर,
कोलकाता - 700 027

Government of India
Ministry of Earth Sciences
India Meteorological Department
Head - Eastern Region
Regional Meteorological Centre
4, Duel Avenue, Alipore,
Kolkata-700 027

No. W-00102 / IX /

Dated – 26-05-2024

Special Bulletin No-17

Sub: Severe Cyclonic Storm "Remal" (pronounced as "Re-Mal") over North Bay of Bengal *(Cyclone Warning for West Bengal Coast: Red Message)*

The **Severe Cyclonic Storm "Remal" (pronounced as "Re-Mal")** over the North Bay of Bengal moved nearly northwards, with a speed of 13 kmph during past 06 hours and lay centered at 1130 hrs IST of today, the 26th May, 2024 over the same region near latitude 20.2°N and longitude 89.2°E about 220 km south-southwest of Khepupara (Bangladesh), 260 km south of Mongla (Bangladesh), 210 km southeast of Sagar Islands (West Bengal) and 230 km south-southeast of Canning (West Bengal). Currently maximum sustained wind speed of 95-105 kmph gusting to 115 kmph prevails around the cyclone centre.

It is very likely to continue to move nearly northwards, intensify further and ***cross Bangladesh and adjoining West Bengal coasts between Sagar Island and Khepupara, close to southwest of Mongla (Bangladesh) by midnight of today, the 26th May 2024 as a Severe Cyclonic Storm with maximum sustained wind speed of 110-120 kmph gusting to 135 kmph.***

Forecast track and intensity are given in the following table:

Date/Time (IST)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
26.05.24/1130	20.2/89.2	95-105 gusting to 115	Severe Cyclonic Storm
26.05.24/1730	21.0/89.1	110-120 gusting to 135	Severe Cyclonic Storm
26.05.24/2330	21.8/89.2	110-120 gusting to 135	Severe Cyclonic Storm
27.05.24/0530	22.7/89.5	70-80 gusting to 90	Cyclonic Storm
27.05.24/1130	23.5/89.8	50-60 gusting to 70	Deep Depression
27.05.24/2330	24.8/90.5	30-40 gusting to 50	Depression

Forecast: (South Bengal)

Moderate rainfall at most places over the districts during 26th to 27th May 2024.

Warning: (South Bengal)

Rainfall Warning

26-05-2024:

1. (Red warning: take action)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) at a few places over North and South 24 Parganas, East Midnapore Kolkata, Howrah and Hooghly districts with extremely heavy rain (> 20 cm) at one or two places is very likely over North and South 24 Parganas and East Midnapore districts.
2. (Orange warning: be prepared)
   Heavy to very heavy rain (7 - 20 cm) is likely at one or two places over West Midnapore, Nadia and East Bardhhaman districts.
3. (Yellow warning: be updated)
   Heavy rain (7-11 cm) at one or two places is likely over rest districts.

27-05-2024:

1. (Red warning: take action)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) at a few places with extremely heavy rain (> 20 cm) at one or two places is very likely over Nadia and Murshidabad districts.
2. (Orange warning: be prepared)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) is likely at one or two places over Birbhum, East Bardhhaman, Hooghly, North and South 24 Parganas, Kolkata and Howrah districts.
3. (Yellow warning: be updated)
   Heavy rain (7-11 cm) at one or two places is likely over rest districts.

Wind Warning

26-05-2024 :
Surface wind with speed reaching 100 to 110 kmph gusting to 120 kmph likely over North and South 24 Parganas; reaching 70 to 80 kmph gusting to 90 kmph likely over Kolkata, Howrah, Hooghly, East Midnapore; reaching 60 to 70 kmph gusting to 80 kmph likely over Nadia East Bardhaman; reaching 40-50 kmph gusting to 60 kmph likely over rest of the districts.

27-05-2024 :
Surface wind with speed reaching 60 to 70 kmph gusting to 80 kmph likely over Nadia and Murshidabad; reaching 50 to 60 kmph gusting to 70 kmph likely over North and Sourth 24 Parganas, Kolkata, Howrah, Hooghly, Birbhum, East Bardhhaman; reaching 40 to 50 kmph gusting to 60 kmph likely over rest of the districts.

Forecast: (North Bengal)

Light to moderate rainfall very likely at most places over the districts during 27th to 29th May 2024.

Warning: (North Bengal)

Rainfall Warning

27-05-2024:

1. (Orange warning: be prepared)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) is likely at one or two places over Malda and South Dinajpur districts.
2. (Yellow warning: be updated)
   Heavy rain (7-11 cm) is likely at one or two places over Cooch Behar, North Dinajpur and Jalpaiguri districts.

28-05-2024:

1. (Red warning: take action)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) at a few places with extremely heavy rain (> 20 cm) at one or two places is very likely over Cooch Behar, Jalpaiguri and Aliporeduar districts.
2. (Orange warning: be prepared)
   Heavy (07–11 cm) to very heavy rain (12 - 20 cm) is likely at one or two places over Darjeeling, Kalimpong, North and South Dinajpur districts.

29-05-2024:

(Yellow warning: be updated)
Heavy rain (7-11 cm) at one or two places is likely over Cooch Behar, Alipurduar and Jalpaiguri districts.

Wind Warning

27-05-2024 :
Surface wind with speed reaching 35 to 45 kmph gusting to 55 kmph likely over Malda, North and South Dinajpur districts.

28-05-2024 :
Surface wind with speed reaching 35 to 45 kmph gusting to 55 kmph likely over all the districts.

Wind Warning Over Sea Area: -

(a) Bay of Bengal:

- **Gale wind speed reaching 80-90 kmph gusting to 100 kmph** is likely to prevail over central Bay of Bengal till noon and decrease becoming Squally wind speed reaching 50-60 kmph gusting to 70 kmph till morning of 27th May.
- **Gale wind speed reaching 95-105 kmph gusting to 115 kmph** prevailing over North Bay of Bengal is likely to increase becoming **100-120 kmph gusting to 135 kmph** from noon till midnight of 26th May. It is likely decrease thereafter becoming 70-80 kmph gusting to 90 kmph by morning on 27th May and squally wind speed reaching 45-55 kmph gusting to 65 kmph by evening of 27th May.

(b) Along West Bengal coasts:

- **Squally wind speed reaching 50-60 kmph gusting to 70 kmph** is prevailing along & off West Bengal & coast. It is likely to increase becoming **gale wind speed reaching 70-80 kmph gusting to 90 kmph** from afternoon of 26th May and **100-120 kmph gusting to 135 kmph** along & off West Bengal coast from evening of 26th May till early morning of 27th May. It is likely decrease thereafter to become 60-70 kmph gusting to 80 kmph by afternoon and squally wind 50-60 kmph gusting to 70 kmph by night of 27th May.

Sea condition :

(a) Central and North Bay of Bengal:

Very rough to high sea condition is likely to prevail over central Bay of Bengal on 26th May and High to Very High over North Bay of Bengal till 27th May morning.

(b) Along & off West Bengal coasts:

Very rough sea condition is prevailing along & off West Bengal coast. It would become high to very high along & off West Bengal coasts from 26th noon onwards till 27th May morning.

Storm surge warning:

Storm surge of about 1 meter above astronomical tide is likely to inundate low lying areas of coastal West Bengal and around the time of landfall.

Fishermen Warning RED WARNING: TAKE ACTION!

Fishermen are advised not to venture into Sea along and off West Bengal coast and deep sea area Bay of Bengal till 27th May 2024.

Port Warning: -

Keep hoisted GD8 at Hooghly Port and Sectional Signal-I at Sagar Island.

Damage Expected over South & North 24 Parganas, Howrah, Hooghly, Kolkata & adjoining East Medinipur districts of west Bengal:

- Major damage to thatched houses/ huts. Possibilities of damage to vulnerable structure.
- Unattached metal sheets may fly.
- Breaking of tree branches, uprooting of trees. Major damage to banana and papaya trees. Dead limbs may blow off from trees.
- Damage to power and communication lines due to breaking of branches and uprooting of trees.
- Damage to Kutcha and minor damage to Pucca roads due to heavy rain.
- Damage to paddy crops, horticultural crops and orchards.
- Inundation of low-lying areas and localized flooding
- Occasional reduction in visibility due to heavy rainfall.
- Disruption of traffic due to water logging and strong winds

Action Suggested for South & North 24 Parganas, Howrah, Hooghly, Kolkata & adjoining East Medinipur districts of West Bengal:

- Total suspension of fishing operations.
- Surface transport and shipping operations need to be regulated
- Onshore & Offshore operation need to be regulated as per guidelines
- Coastal hutment dwellers to be in safer places.
- People in affected areas to remain indoors.
- Avoid going to areas that face the water logging problems often.
- Avoid staying in vulnerable structure.
- Ferry services may be suspended.
-

Impact and suggested action in other districts of South Bengal: -

1. Temporarily water logging in low-lying areas and traffic disruptions in urban areas.
2. Some damages of standing and horticulture crops.
3. Keep arrangement for drainage of excess water.
4. Traffic may be regulated judiciously.

Damage Expected over North Bengal:

Possible Impact

1. Damage to loose/unsecured structure.
2. Water lodging in low-lying areas.
3. Communication / Traffic disruption in urban areas.
4. Damage to standing crops and horticulture, Reduction of visibility.

Action suggested:

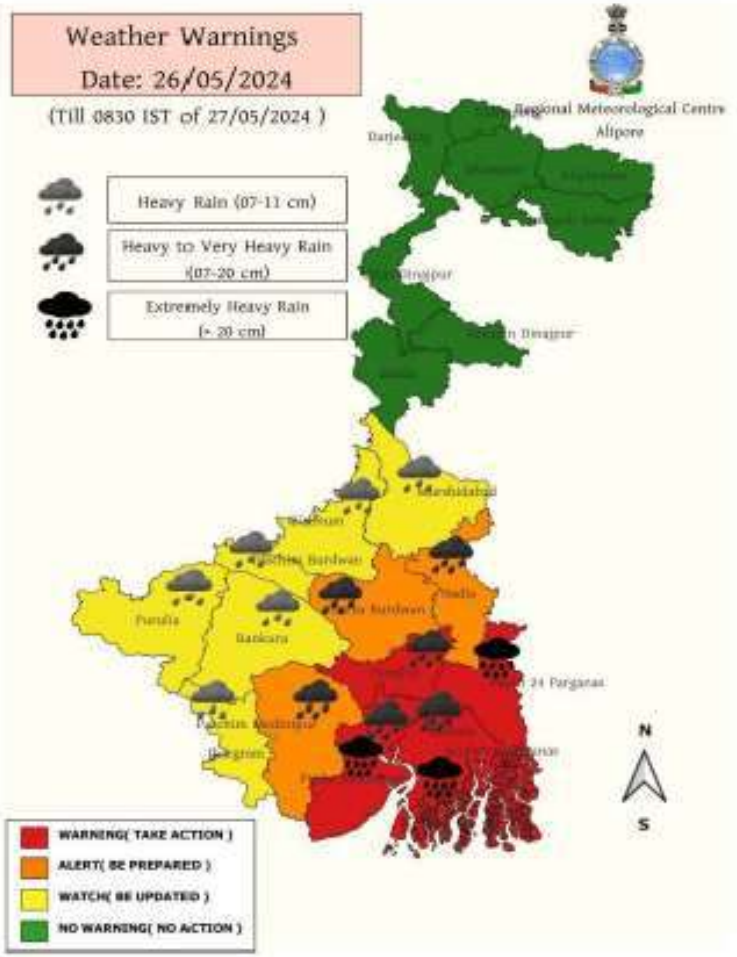
1. Take shelter in safe place.
2. Movement of traffic may be regulated judiciously.
3. Avoid taking shelter under tree/electric pole and avoid contact with water bodies.
4. Use Mausam/Damini app for real time weather alert.

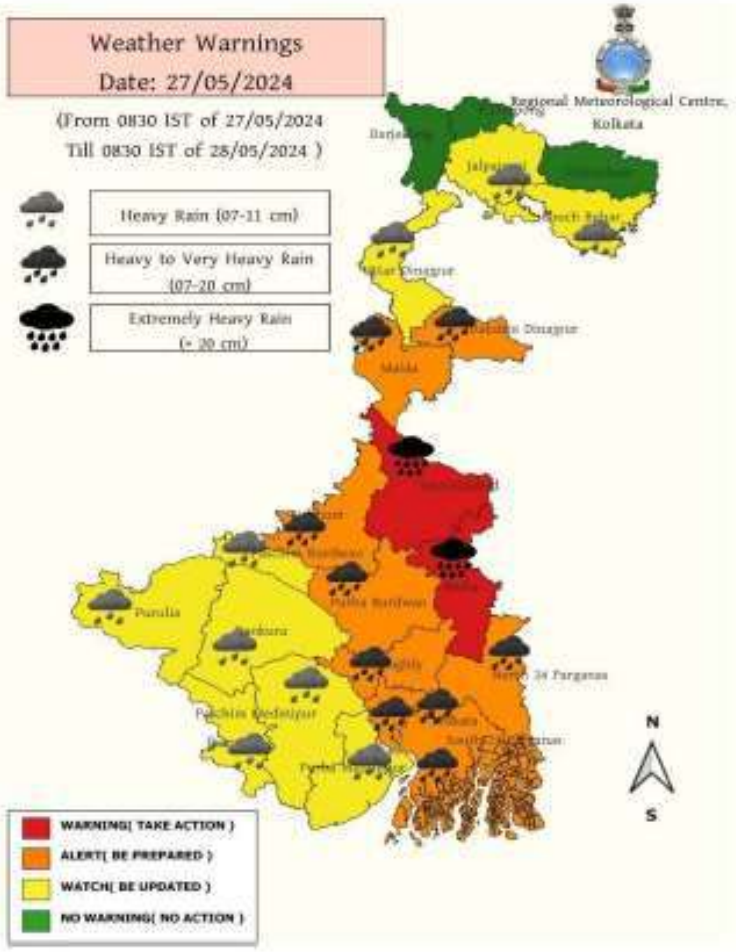
Next bulletin will be issued on 1800 hours IST of today, the 26th May, 2024.

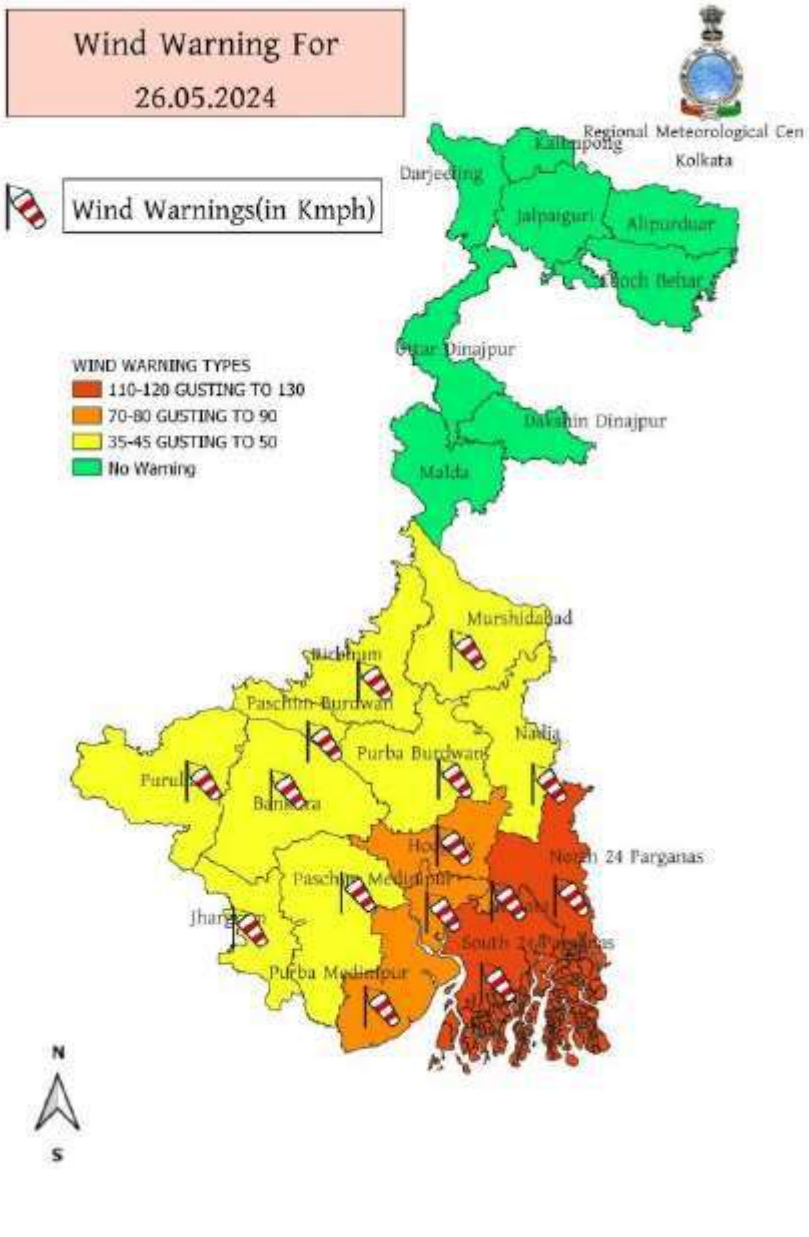
Sd/-
(Dr. H.R.Biswas)
Scientist -F
For Head, RMC, Kolkata

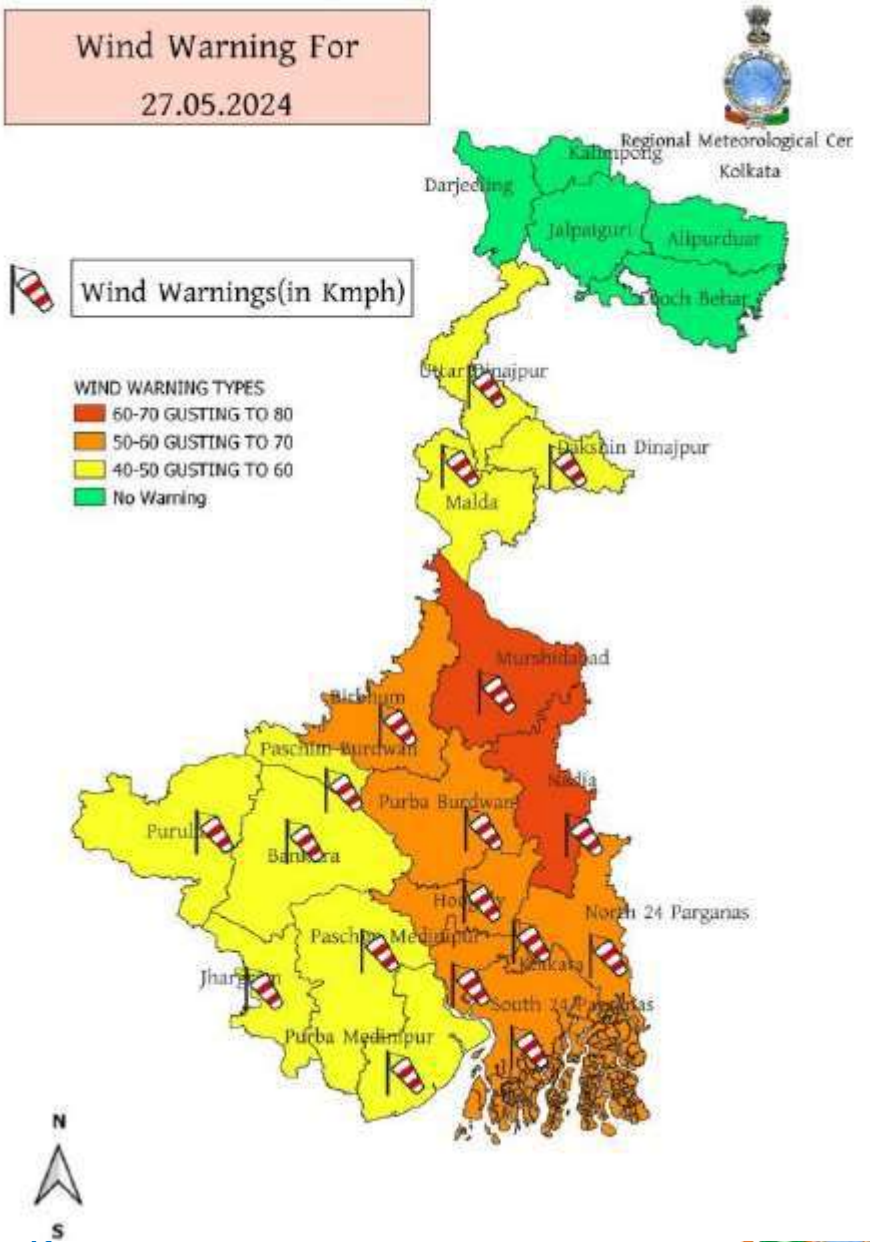
Note: For detail information please visit our
Website: https://mausam.imd.gov.in/kolkata/
Facebook page: https://www.facebook.com/WeatherOffice.Kolkata
Twitter: https://twitter.com/ImdKolkata
WhatsApp channel: https://whatsapp.com/channel/0029VaD6VGS3QxS9vKh3e13C
Mausam App: https://play.google.com/store/apps/details?id=com.imd.masuam

Rainfall Warning Maps: -



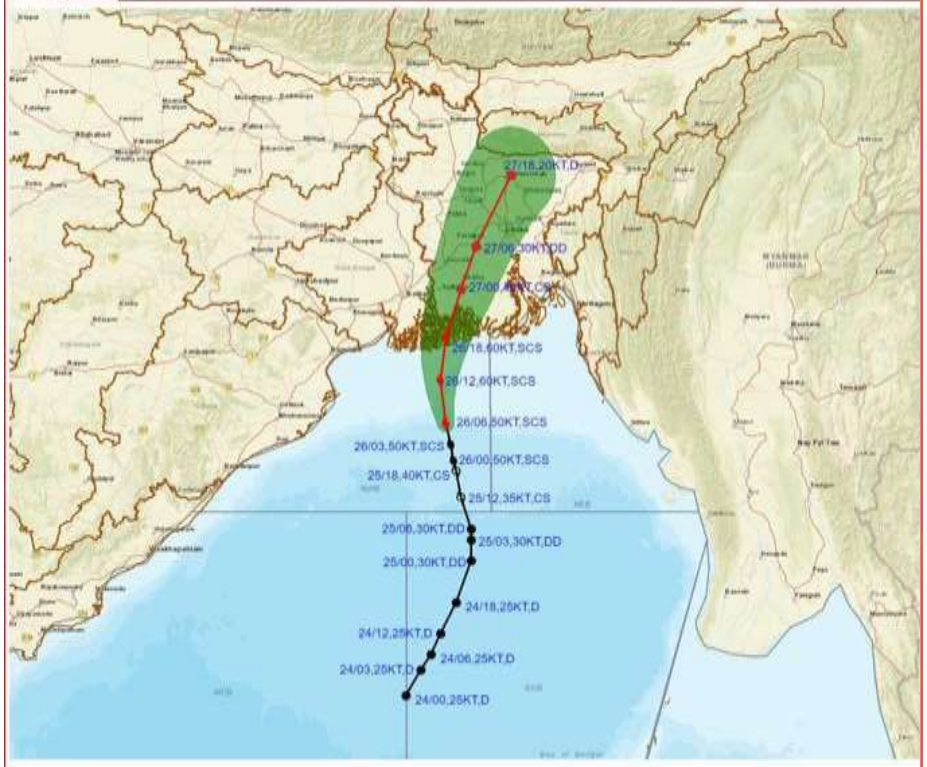






भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

FORECAST TRACK ALONGWITH CONE OF UNCERTAINITY IN ASSOCIATION WI
SEVERE CYCLONIC STORM 'REMAL' OVER NORTH BAY OF BENGAL BASED ON 0
UTC (1130 IST) OF 26TH MAY 2024.

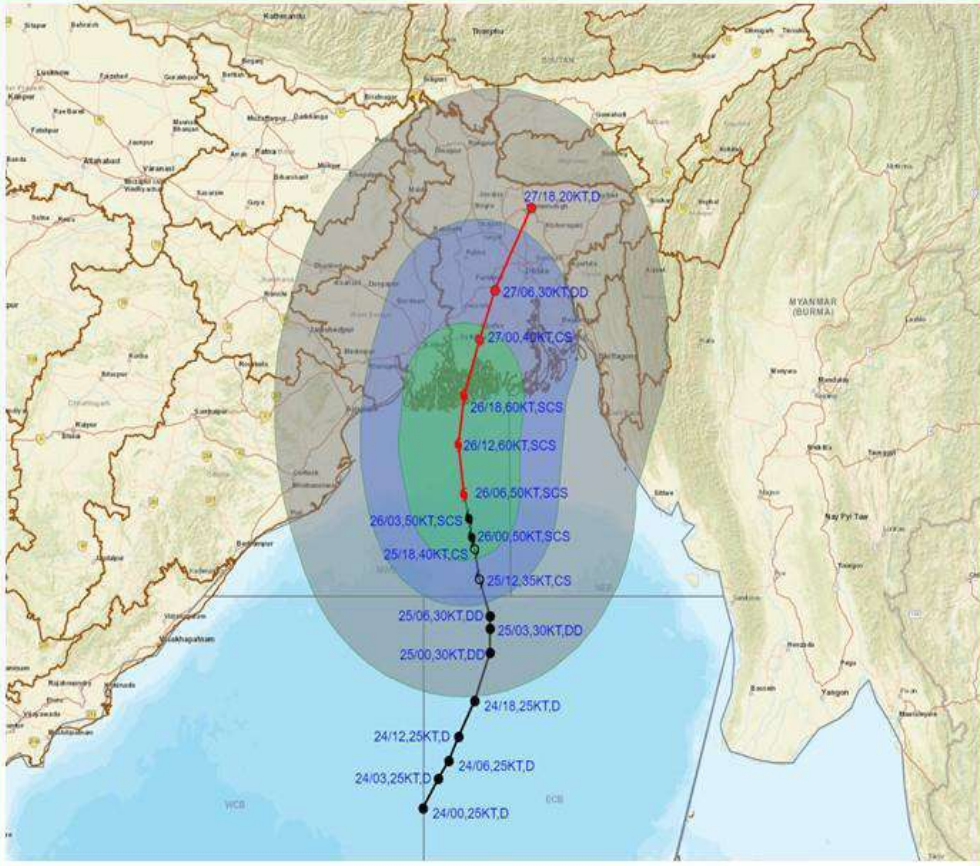


DATE/TIME IN UTC
IST=UTC + 0530
L: LOW PRESSURE AREA
WML: WELL MARKED LOW PRESSURE AREA
D: DEPRESSION (17-27 KT)
DD: DEEP DEPRESSION (28-33 KT)
CS: CYCLONIC STORM (34-47 KT)
SCS: SEVERE CYCLONIC STORM (48-63KT)
VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)
SuCS: SUPER CYCLONIC STORM (≥ 120 KT)

LESS THAN 34 KT
34-47 KT
≥ 48 KT
OBSERVED TRACK
FORECAST TRACK
CONE OF UNCERTAINTY

Forecast	DISTANCE (KM) AND DIRECTION FROM STATIONS			
Date and Time (UTC)	Canning	Sagar Island	Khepupara	Mongla
26.05.24/0600	230, SSE	220, SSE	210, SSW	260, S
26.05.24/1200	150, SSE	140, ESE	150, SW	180, SSW
26.05.24/1800	80, SE	110, E	100, WSW	90, SSW

FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION IN ASSOCIATION WITH SEVERE CYCLONIC STORM 'REMAL' OVER NORTH BAY OF BENGAL BASED ON 0600 UTC (1130 IST) OF 26TH MAY 2024.



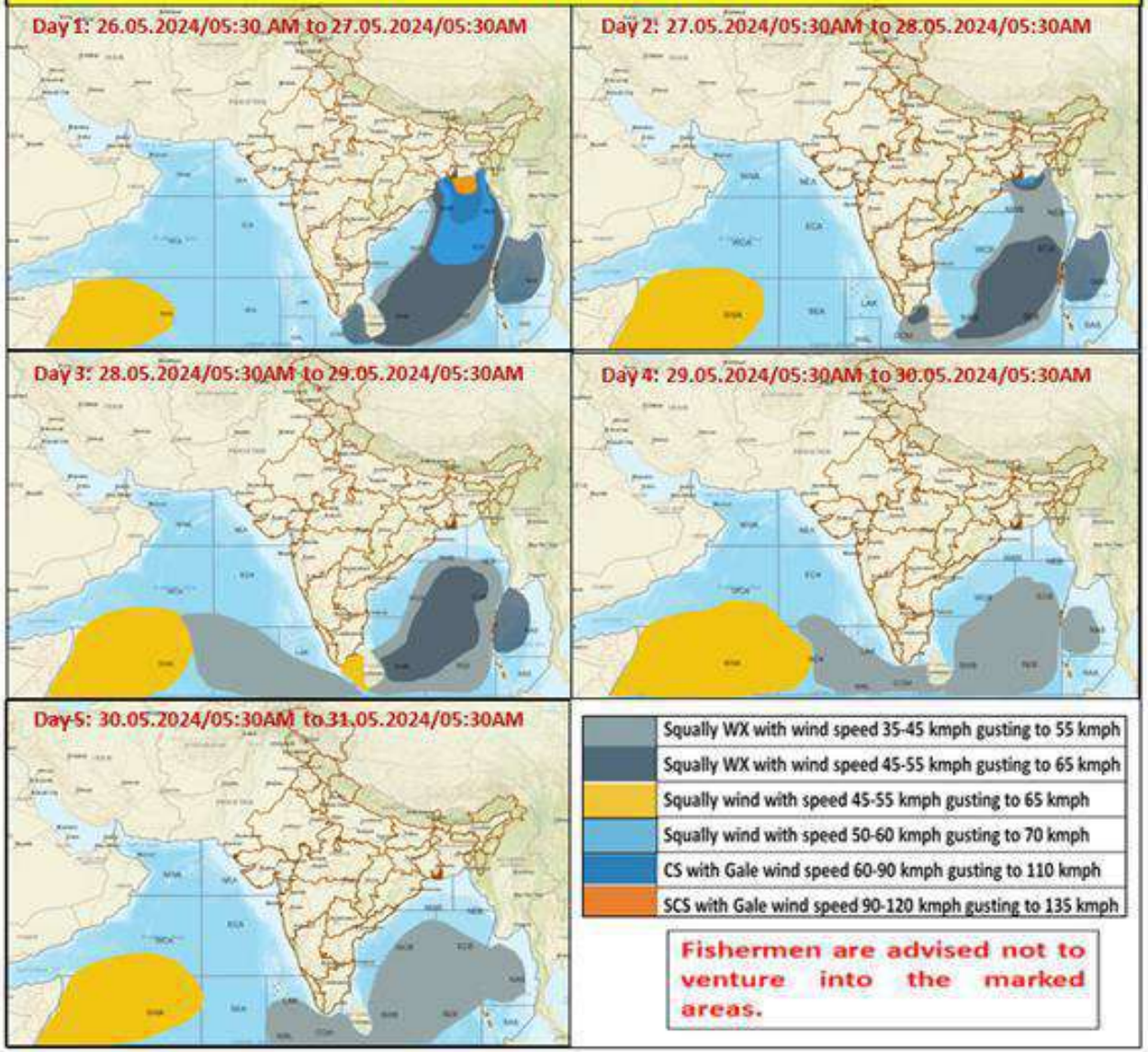
DATE/TIME IN UTC
IST=UTC + 0530
L: LOW PRESSURE AREA
WML: WELL MARKED LOW PRESSURE AREA
D: DEPRESSION (17-27 KT)
DD: DEEP DEPRESSION (28-33 KT)
CS: CYCLONIC STORM (34-47 KT)
SCS: SEVERE CYCLONIC STORM (48-63KT)
VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)
SuCS: SUPER CYCLONIC STORM (≥ 120 KT)

LESS THAN 34 KT
34-47 KT
≥ 48 KT
OBSERVED TRACK
FORECAST TRACK
CONE OF UNCERTAINTY
AREA OF MAXIMUM SUSTAINED WIND SPEED:
28-33 KT (52-61 KMPH)
34-49 KT (62-91 KMPH)
50-63 KT (92-117 KMPH)
≥ 64 KT (≥118 KMPH)

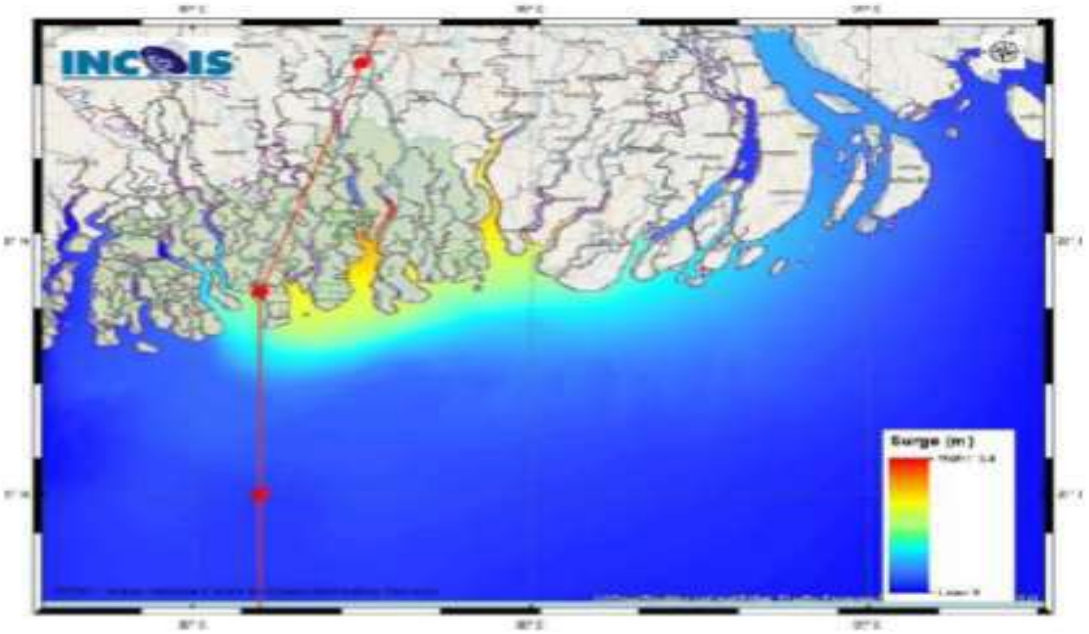
IMPACT OVER THE SEA

MSW (knot/kmph)	Impact	Action
28-33 (52-61)	Very rough seas	Total suspension of fishing operations
34-49 (62-91)	High to very high seas	Total suspension of fishing operations
50-63 (92-117)	Very high seas	Total suspension of fishing operations
≥ 64 (≥118)	Phenomenal	Total suspension of fishing operations

Fishermen Warning Graphics



Storm Surge Warning Graphics

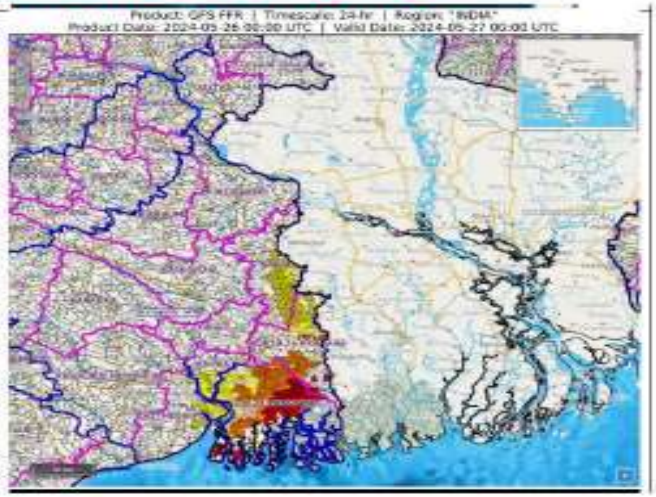


Flash Flood Guidance for West Bengal

24 hours Outlook for the Flash Flood Risk (FFR) till 0530 IST of 27-05-2024 :

Moderate flash flood risk likely over few watersheds & neighbourhoods of **southern districts of Gangetic West Bengal** Met Sub-divisions (as indicated in adjacent map) during next 24 hours.

Surface runoff/ Inundation may occur at some fully saturated soils & low-lying areas over AoC as shown in map due to expected cyclonic system Remal in next 24 hours.



भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
प्रमुख - पूर्व क्षेत्र
प्रादेशिक मौसम केन्द्र
4, ड्यूएल एवेन्यू, अलीपुर,
कोलकाता - 700 027

Government of India
Ministry of Earth Sciences
India Meteorological Department
Head - Eastern Region
Regional Meteorological Centre
4, Duel Avenue, Alipore,
Kolkata-700 027

Dated – 25-05-2024
Issue Time: 1700 IST

Capital City Weather Warnings & Advisory

Deep Depression lies over eastcentral & adjoining north Bay of Bengal and centered at 0530 hrs IST of 25th May, 2024 near latitude 17.6°N and longitude 89.7°E, about 490 km south of Khepupara (Bangladesh), about 380 km south-southeast of Sagar Islands (West Bengal) and 530 km south-southeast of Canning (West Bengal).

It is very likely to continue to move north-northeastwards and intensify into a Cyclonic Storm over eastcentral Bay of Bengal during next 12 hours. Subsequently, it would move nearly northwards, intensify into a Severe Cyclonic Storm by 26th May morning. Continuing to move nearly northwards, thereafter it is very likely to cross Bangladesh and adjoining West Bengal coasts between Sagar Island and Khepupara by 26th May midnight as a Severe Cyclonic Storm with wind speed of 110-120 gusting to 135 kmph.

Forecast & Warnings for Kolkata

Date	Forecast & Warning	Impact & Suggested Action
26-05-2024	Light to Moderate rain/thundershower with heavy spells (2-3cm/hour) of rain very likely. Heavy (07–11 cm) to very heavy rain (12 - 20 cm) is very likely in 24 hours period (0830 IST of 26.05.2024 to 0830 IST of 27.05.2024) Surface wind with speed reaching 70 to 80 kmph gusting to 90 kmph likely.	Waterlogging in low lying areas and underpass road, occasional reduction in visibility due to heavy rainfall. Disruption of traffic. Breaking of tree branches, uprooting of trees. Disruption to power and communication facilities and water supply. Avoid staying in vulnerable structure. Stay indoors in a safe environment during heavy rain and high winds. Make arrangements for drainage of excess water.
27-05-2024	Light to Moderate rain/thundershower with heavy spells (2-3cm/hour) of rain very likely. Heavy (07–11 cm) rain is very likely in 24 hours period .(0830 IST of 27.05.2024 to 0830 IST of 28.05.2024) Surface wind with speed reaching 50 to 60 kmph gusting to 70 kmph likely.	

Next update will be provided on 1000 hours IST tomorrow, i.e 26th May, 2024.

Sd/-
(Dr. H.R.Biswas)
Scientist -F
For Head, RMC, Kolkata

Example : CAP Message

Warning Details — View Warning Status

Sender Name : IMD Kolkata
Event Description: Extremely Heavy Rain
Entry Date & Time : 25 May 2024, 5:57 PM
Dissemination Status : Warning Dissemination Finished
Warning Type : Current Day Warning
Sender Contact No : 8335880801

Warnings :

Severity: WARNING
Certainity: Very Likely
Effective Date & Time: 25 May 2024, 6:00 PM
Expiry Date & Time: 26 May 2024, 6:00 PM
Area Description: Haora, Hugli, Kolkata, Murshidabad, Nadia, North 24 Parganas, Purba Medinipur, South 24 Parganas districts of West BengalNaN
Area covered: 34489.95975837037 Sq. Km (approx.)

Message for SDMA (English): In anticipation of formation of severe cyclone and movement, Very heavy(12-20 cm) to extremely heavy(>20 cm) rainfall accompanied with very strong wind is very likely to affect North and South 24 Parganas, Kolkata,East Midnapore, Howrah, Hooghly,Nadia and Murshidabad districts during 26-27th May,2024.

Forwarding Status: Notified to West Bengal SDMA

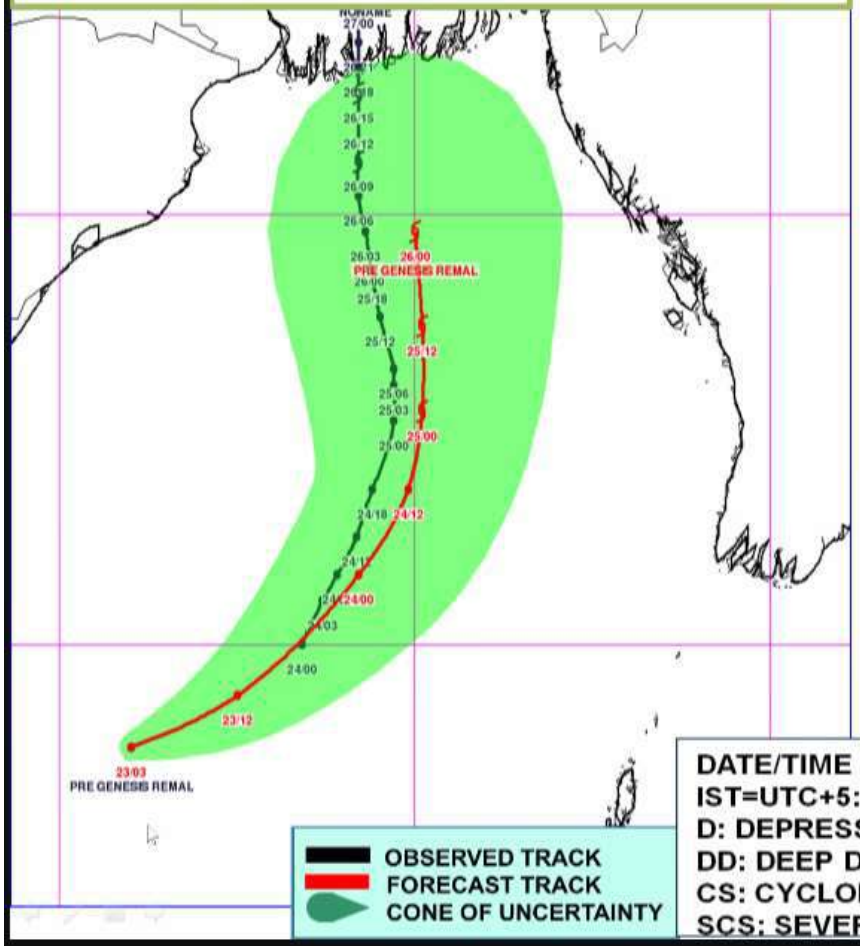
Dissemination Status: Public Dissemination Completed

Instruction: Avoid staying in vulnerable structure.

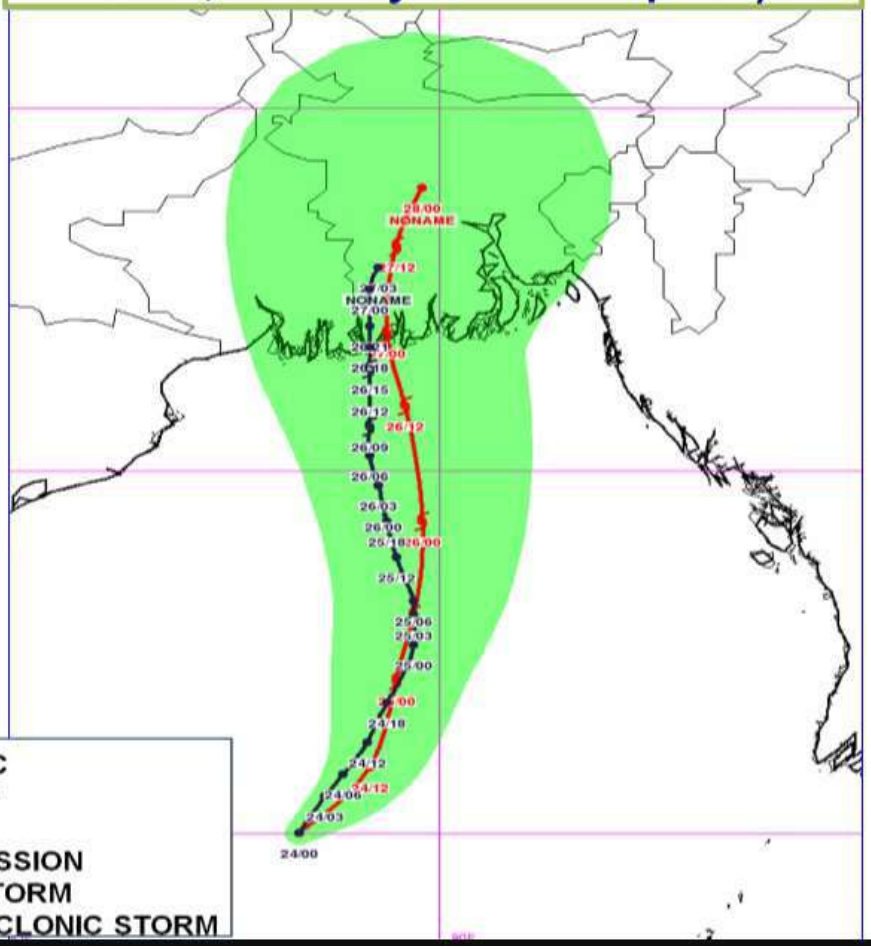
TABLE 4: CYCLONIC DISTURBANCE FORECAST FOR PORTS BASED ON 2330 hrs IST of 25th May,2024														
SI	DESCRIPTION OF PORT NAME(LAT°N /LON°E)	LOCATION		CURRENT LOCATION FROM CENTRE OF CYCLONIC DISTURABANCE		FORECAST PARAMETERS WHEN THE CYCLONIC DISTURBANCE WOULD BE NEAREST TO THE PORT								
		LAT (°N)	LON (°E)	DISTANCE (KM)	DIRECTION	DATE/ TIME(IST) OF OCCURRENCE	DISTANCE OF CD FROM PORT	DIRECTION OF CD FROM PORT	MSW OVER PORT(KTS)	UNCERTAINTY IN		STORM SURGE	SIGNIFICANT WAVE HEIGHT (M)	STATE OF SEA
										DISTANCE (KM)	MSW (KTS)			
ACWC Kolkata														
12.	Port Blair (11.67,92.5)	19.3	89.4	912	NNW	25.05.24/2330	912	SSE	<27	5	5		<4	Rough
13.	Sagar Island (21.72,88.1)	19.3	89.4	302	SSE	26.05.24/2030	124	W	49	20	10		6-10	High
14.	Haldia (22.02,88.06)	19.3	89.4	333	SSE	26.05.24/2330	128	W	49	25	10		6-10	High
15.	Kolkata Port (22.32,88.18)	19.3	89.4	359	SSE	26.05.24/2330	121	WNW	49	25	10		6-10	High
CWC Bhubaneswar														
16.	Checked out Gopalpur (19.27,84.92)	19.3	89.4	471	E	25.05.24/2330	471	W	<27	5	5		<4	Rough
17.	Puri (19.81,85.83)	19.3	89.4	379	E	26.05.24/0830	373	W	<27	10	5		<4	Rough
18.	Paradip (20.27,86.67)	19.3	89.4	306	ESE	26.05.24/1130	278	W	33	15	5		4-6	Very Rough
19.	Dhamra (20.78,86.97)	19.3	89.4	303	ESE	26.05.24/1130	243	W	33	15	5		4-6	Very Rough

Customised Location specific bulletin for Ports

Pre-Genesis Track and Intensity Forecast issued on 23rd May (84 hours ahead of landfall)



Track and Intensity Forecast issued on 24th May (60 hours ahead of landfall) demonstrating accuracy in track, intensity at landfall point)



OBSERVED TRACK
FORECAST TRACK
CONE OF UNCERTAINTY

DATE/TIME IN UTC
IST=UTC+5:30 IST
D: DEPRESSION
DD: DEEP DEPRESSION
CS: CYCLONIC STORM
SCS: SEVERE CYCLONIC STORM

Realised wind (kmph) in Bangladesh

Name	Date	TIME	Wind (Kmph)
Khepupara	27-05-2024	01:30-02:00 AM	111
Khepupara	26-05-2024	11:30-11:59 PM	91
Patuakhali	27-05-2024	01:30-02:00 AM	111
Patuakhali	26-05-2024	11:30-11:59 PM	102
Patuakhali	26-05-2024	2:30 PM	89
Satkhira	26-05-2024	11:30-11:59 PM	70
Mongla	27-05-2024	12:30 PM	80
Mongla	27-05-2024	3:00 AM	79
Khulna	27-05-2024	11:30-11:59 PM	72
Dhaka	27-05-2024	6:20 AM	59
Chandpur	27-05-2024	3:30 AM	65
Patenga	27-05-2024	6:05 AM	74
Patenga	27-05-2024	11:45 AM	92

Realised wind over West Bengal during landfall

Station	Highest Wind Speed (kmph)
Dum Dum	91
Canning	78
RKM College	78
Kolkata	74
Uluberia	73
Diamond Harbour	69
Baruipur	69
Ramsaday College	67
Kzi Airport	65
Kalyani	65
Howrah	65
Sagar Deep	63

Statistics of Bulletins Issued in association with Cyclone " REMAL".

S.No.	Type of Bulletin	No. of Bulletins Issued
1	Sea Area Bulletins	17
2	Coastal Weather Bulletins	17
3	Fisherman Warnings issued	26
4	Port Warnings	17
5	Heavy Rainfall Warnings	27
6	Gale Wind Warnings	21
7	Storm Surge Warnings	14
8	Information & Warning issued to State Government and other agencies.	28 – Special Bulletins 13 – Hourly Bulletins
9	SMS	22,30,13,945 (Through cap)
10	No. of Press Releases	5 Press Releases / 3 Bengali Bulletins
11	No. of Impact Based Warnings for a. District b. City	 28 4
12	No. of whatsapp messages	48,000
13	No. of updates on facebook	41
14	No. of updates on X(Twitter), Instagram	41

Cyclone Warning Dissemination Mechanism

- Telephone, Mobile Phones(SMS/Whatsapp), e-mails
- Websites https://mausam.imd.gov.in/ , https://mausam.imd.gov.in/kolkata/ http://www.rsmcnewdelhi.imd.gov.in/index.php
- Radio/TV News Paper network (FM, Community Radio, Private TV): Prasar Bharati and private broadcasters
- Briefing by Senior Officer (Director/scientist) to State disaster management authority and others.
- Briefing to electronic media and print media
- Web DCRA System
- Common Alert Protocol System
- API (Application Programming Interface) Service.

Facebook page: https://www.facebook.com/WeatherOffice.Kolkata
Twitter: https://twitter.com/ImdKolkata
WhatsApp channel: https://whatsapp.com/channel/0029VaD6VGS3QxS9vKh3e13C
Mausam App: https://play.google.com/store/apps/details?id=com.imd.masuam

Thunderstorm

Sudden electrical discharges manifested by a flash of light (Lightning) and a sharp rumbling sound (thunder)

Dust/Sand Storm

An ensemble of particles of dust or sand energetically lifted to great heights by a strong and turbulent wind.

Frost

Ice deposits on ground

Air temperature ≤4°C (over Plains)

Squall

A strong wind that rises suddenly, lasts for atleast 1 minute.

Moderate: Wind speed 52-61 kmph
Severe: Wind speed 62-87 kmph
Very Severe: Wind speed >87 kmph

Rain/ Snow *

Heavy: 64.5 to 115.5 mm/cm *
Very Heavy: 115.6 to 204.4 mm/cm*
Extremely Heavy: > 204.4 mm/cm *

Heat Wave

When maximum temperature of a station reaches ≥40° C for plains and ≥30° C for hilly regions

(a) Based on Departure from normal

Heat Wave: Maximum Temperature Departure from normal 4.5° C to 6.4° C.
Severe Heat Wave: Maximum Temperature Departure from normal ≥6.5° C

(b). Based on Actual maximum temperature

Heat Wave: When actual maximum temperature ≥45°C.
Severe Heat Wave: When actual maximum temperature ≥47°C

(c). Criteria for heat wave for coastal stations

When maximum temperature departure is >4.5°C from normal. Heat Wave may be described provided maximum temperature ≥37°C

Warm Night

When maximum temperature remains 40°C

Warm Night: When minimum temperature departure 4.5 °C to 6.4 °C.
Severe Warm Night: When minimum temperature departure >6.4 °C.

Cold Wave

When minimum temperature of a station ≤10°C for plains and ≤0°C for hilly regions.

(a). Based on departure

Cold Wave: Minimum Temperature Departure from normal -4.5 °C to -6.4 °C.
Severe Cold Wave: Minimum Temperature Departure from normal ≥ -6.5 °C

(b) Based on actual Minimum Temperature (for Plains only)

Cold Wave : When Minimum Temperature is ≤ 4.0 °C
Severe Cold Wave: When Minimum Temperature is ≤ 2.0 °C

(c) For Coastal Stations

When Minimum Temperature departure is ≤-4.5 °C or actual Minimum Temperature is ≤ 15 °C

Cold Day

When minimum temperature of a station ≤10°C for plains and ≤0°C for hilly regions

Based on departure

Cold Day: Maximum Temperature Departure from normal -4.5 °C to -6.4 °C.
Severe Cold Day: Maximum Temperature Departure from normal ≤ -6.5 °C

Fog

Phenomenon of small droplets suspended in air and the horizontal visibility < 1km

Moderate Fog: When the visibility between 500-200 metres
Dense Fog: when the visibility between 50- 200 metres
Very Dense Fog: when the visibility < 50 metres

Descriptive term used	Rainfall amount in mm
No rain	0.0
Very light rainfall	Trace - 2.4
Light rainfall	2.5 – 15.5
Moderate rainfall	15.6 – 64.4
Heavy rainfall	64.5 – 115.5
Very heavy rainfall	115.6 – 204.4
Extremely heavy rainfall	>204.5
Exceptionally heavy rainfall	When the amount is a value near about highest recorded rainfall at or near the station for the month or season. However, this term will be used only when the actual rainfall amount exceeds 12 cm.

SPATIAL DISTRIBUTION (% of Stations reporting)

% Stations	Category
76-100	Widespread (WS/Most Places)
51-75	Fairly Widespred (FWS/ Many Places)
	Dry (No station reported Rainfall)

% Stations	Category
26-50	Scattered (SCT/ A Few Places)
1-25	Isolated (ISOL)

WARNING

WARNING (TAKE ACTION)
ALERT (BE PREPARED)
WATCH (BE UPDATED)
NO WARNING (NO ACTION)

Probabilistic Forecast

Terms	Probability of Occurrence (%)
Unlikely	< 25
Likely	25 - 50
Very Likely	50 - 75
Most Likely	> 75


Heavy Rain


Heavy Snow


Thunderstorm


Dust Storm


Strong Winds


Visibility


Cyclone


Squall/ Hail


Frost


Cold Wave


Heat Wave


Sea State

Thanks for kind attention