On the Job Training on

Tsunami Inundation Modelling and Mapping and Development of Tsunami Hazards Maps for Implementation of UNESCO-IOC Tsunami Ready Pilot Sites in Madagascar, Maldives, Seychelles and Sri Lanka

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Tsunami Inundation Modelling and Mapping

TIMM #: 5.1 Guidelines for Tsunami Evacuation Mapping

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Tsunami Risk Reduction and Response

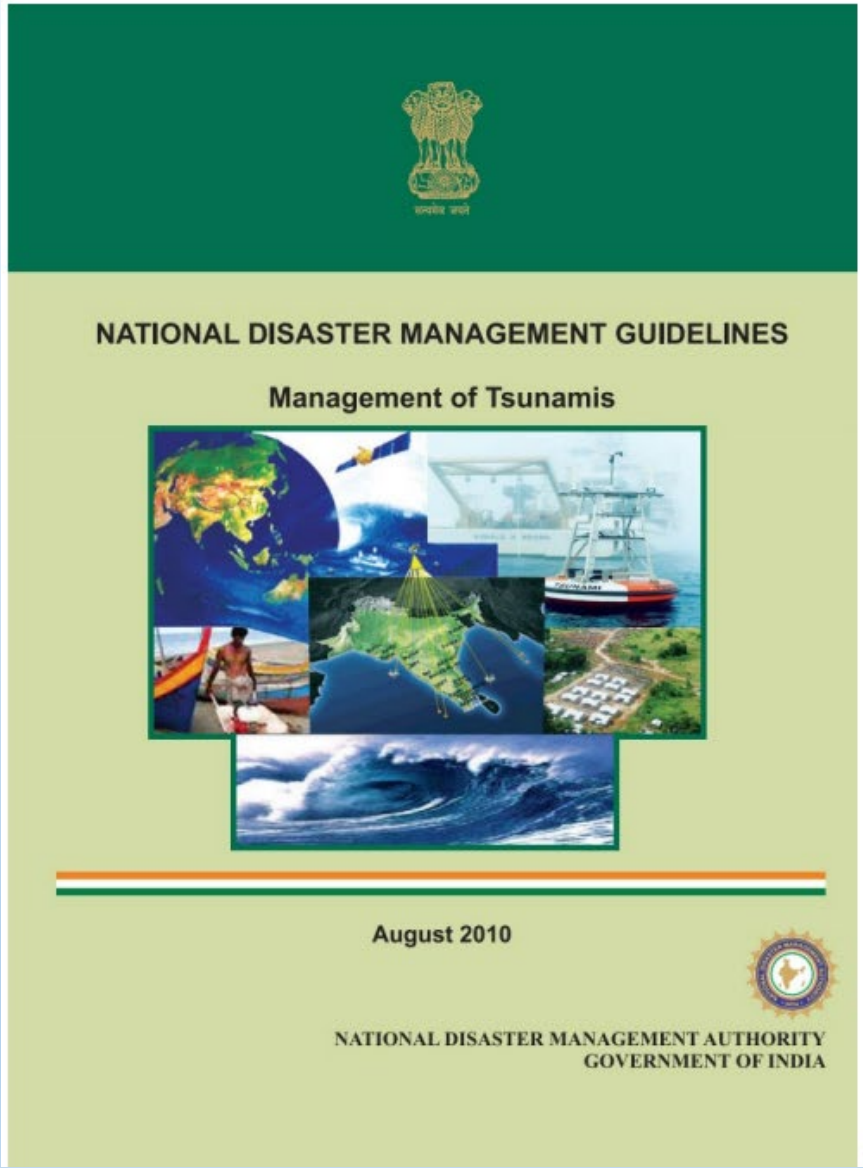
The risk reduction

- Constrain, or reduce exposure to, tsunami inundation (the hazard);
- Reduce a community's vulnerability in respect of tsunami inundation; and
- Improve a community's preparedness to anticipate, respond to, and recover from tsunami inundation.

Response measures

- Some measures may be implemented immediately, e.g. improving early warning and evacuation procedures, community education and drills.
- Other measures are longer-term, strategic in nature, e.g. structural protective methods and non-structural initiatives such as land-use planning and regulation.

National Guidelines on Tsunami: Example of NDMA India



NATIONAL DISASTER MANAGEMENT GUIDELINES

Management of Tsunamis

August 2010

NATIONAL DISASTER MANAGEMENT AUTHORITY
GOVERNMENT OF INDIA

raise, from within their armed police force, adequate strength of personnel for raising of State Disaster Response Force (SDRF) with appropriate disaster response capabilities.

(Para 6.8) (Action: State Governments)

41. Evacuation plans and Shelters

i. Inflatable motorised boats, helicopters and search & rescue equipments are required immediately after a tsunami to carry out search and rescue of people trapped in inundated areas, on tree tops and hanging on to structures. State Governments will compile a list of such equipment and identify suppliers of such specialised equipments and enter into Long Term Agreements for their mobilisation and deployment in the event of tsunami. India Disaster Resource Network (IDRN), which is a web-based resource inventory of information on emergency equipment and response personnel available at every district, will be revised and updated frequently. The IRS will also provide a web-based system for monitoring the emergency logistics requirements of disaster-affected villages as well as the flow of emergency relief supplies to the affected villages.

ii. The setting up of relief camps for the people whose houses have been damaged by tsunami or flooded by the storm surge and the provision of basic amenities in such camps involves complex logistics of mobilising relief supplies, tents, water supply and sanitation systems, transport and communication systems, and medical supplies. Immediate restoration of power supply would be essential to carry out relief operations. The DM Plans at the State and District levels will address this issue in detail. An information booth for victims would be established by the district authorities.

iii. In the event of mass casualties, States/UTs will develop systems for proper identification of dead bodies, recording the details of victims, and their DNA fingerprinting.

(Para 6.9) (Action: State Governments, UT Administrations, SDMAs, DDMAs)

42. Emergency Medical Response

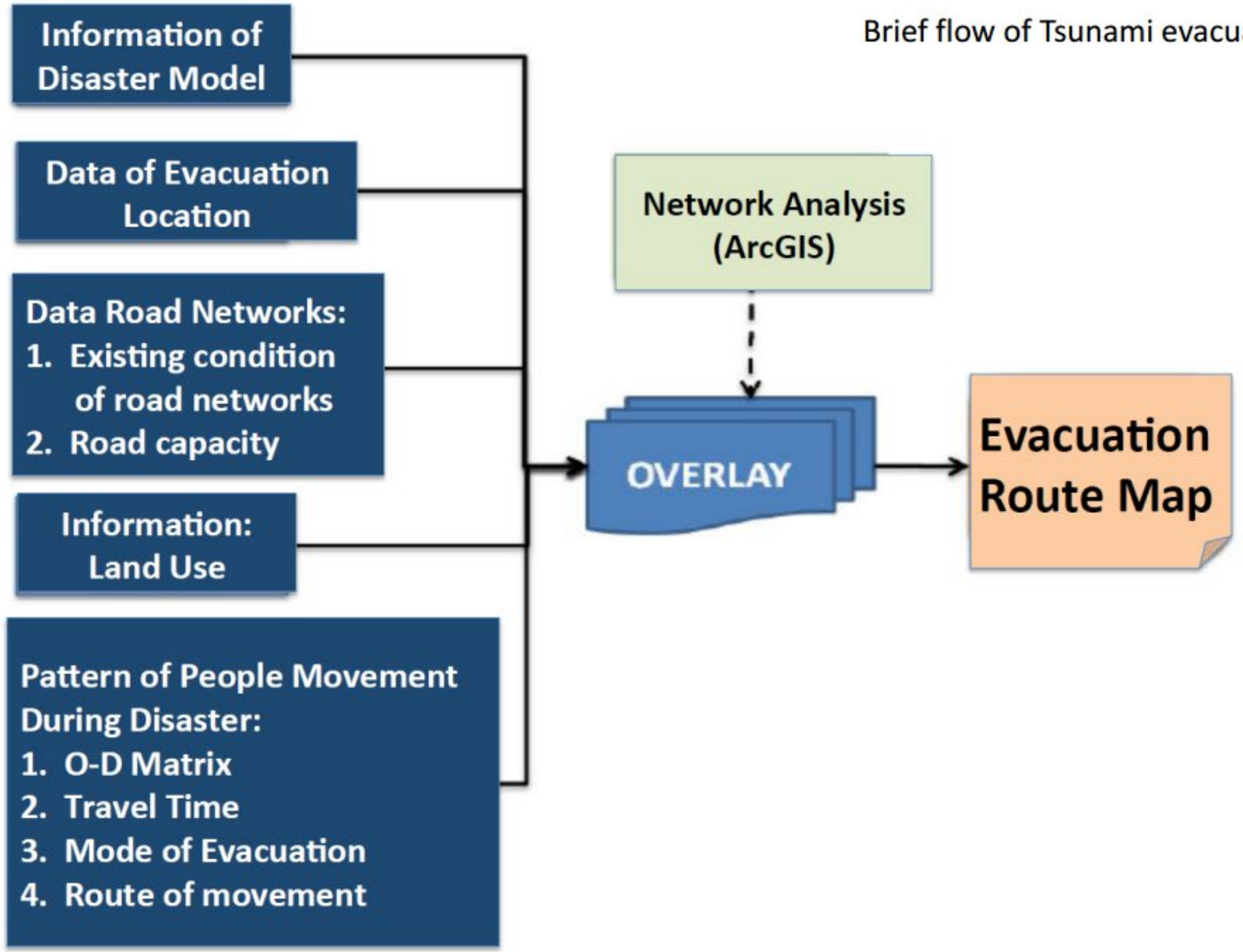
i. Prompt and efficient emergency medical response will be provided by Quick Reaction Medical Teams (QRMTs), Mobile Field Hospitals, Accident Relief Medical Vans (ARMVs) and Heli-ambulances. They will be activated to reach the tsunami-affected areas immediately, along with dressing material, splints, portable X-ray machines, mobile operation theatres, pulse oximeters, resuscitation equipment and life-saving drugs, etc. Resuscitation, triage and medical evacuation of victims who require hospitalisation will be done in accordance with SOPs. A large number of victims may suffer from psycho-social trauma, for which appropriate counselling will be provided.

ii. The medical response plan will integrate all aspects of emergency medical management at the incident site, medical care facilities during

Good Evacuation Planning:
Key Component of Preparedness

1. Tsunami Risk Assessment - in the Context of Tsunami Evacuation Planning
2. Evacuation Route – Planning and Design
3. Tsunami Evacuation Signage – Planning and Design
4. Evacuation Shelter – Planning and Design
5. Reliable downstream warning chain devices - Community Tsunami Alert System: siren, speaker etc
6. Responsive Stakeholders
7. Community readiness/preparedness

Brief flow of Tsunami evacuation map preparation

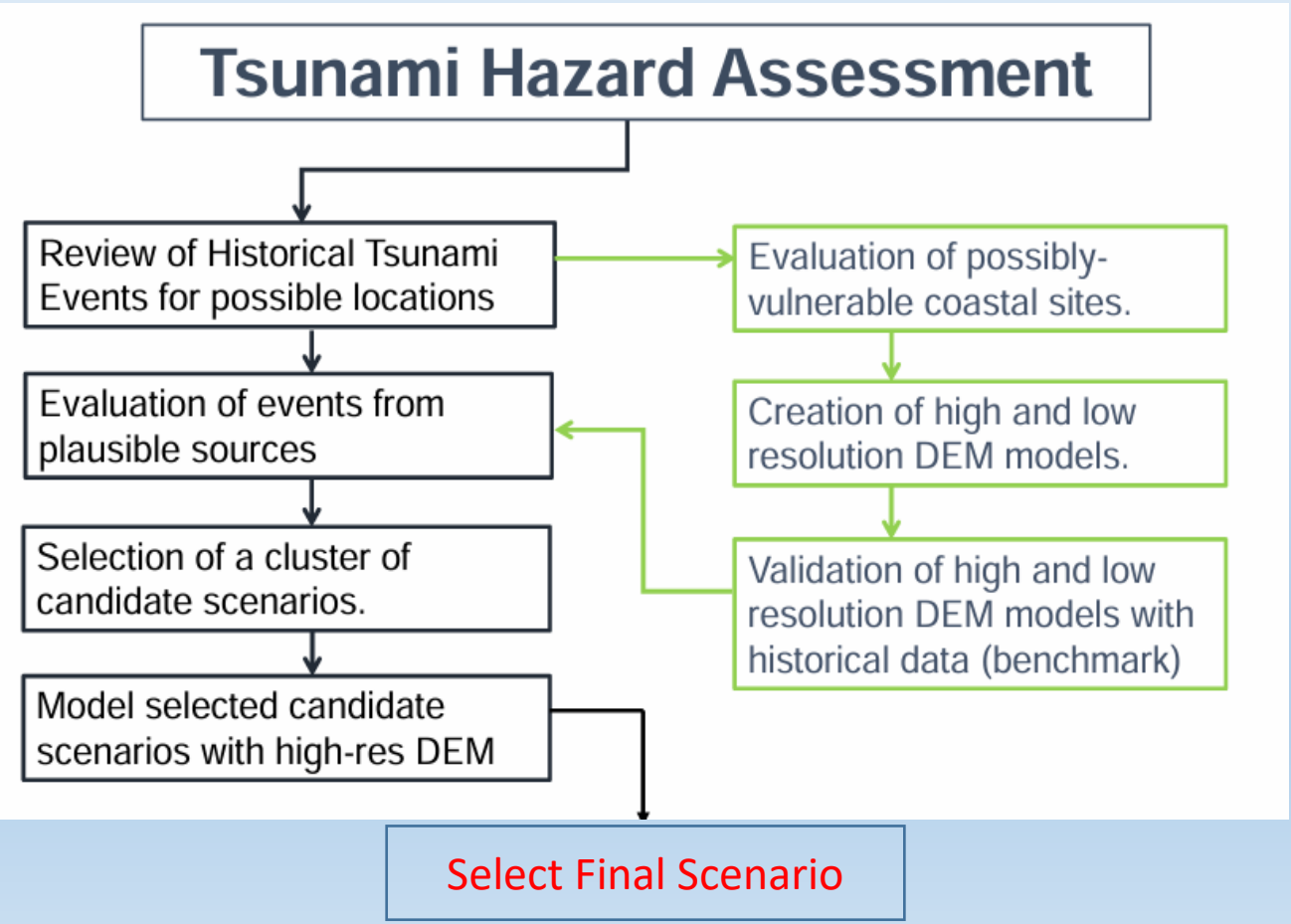


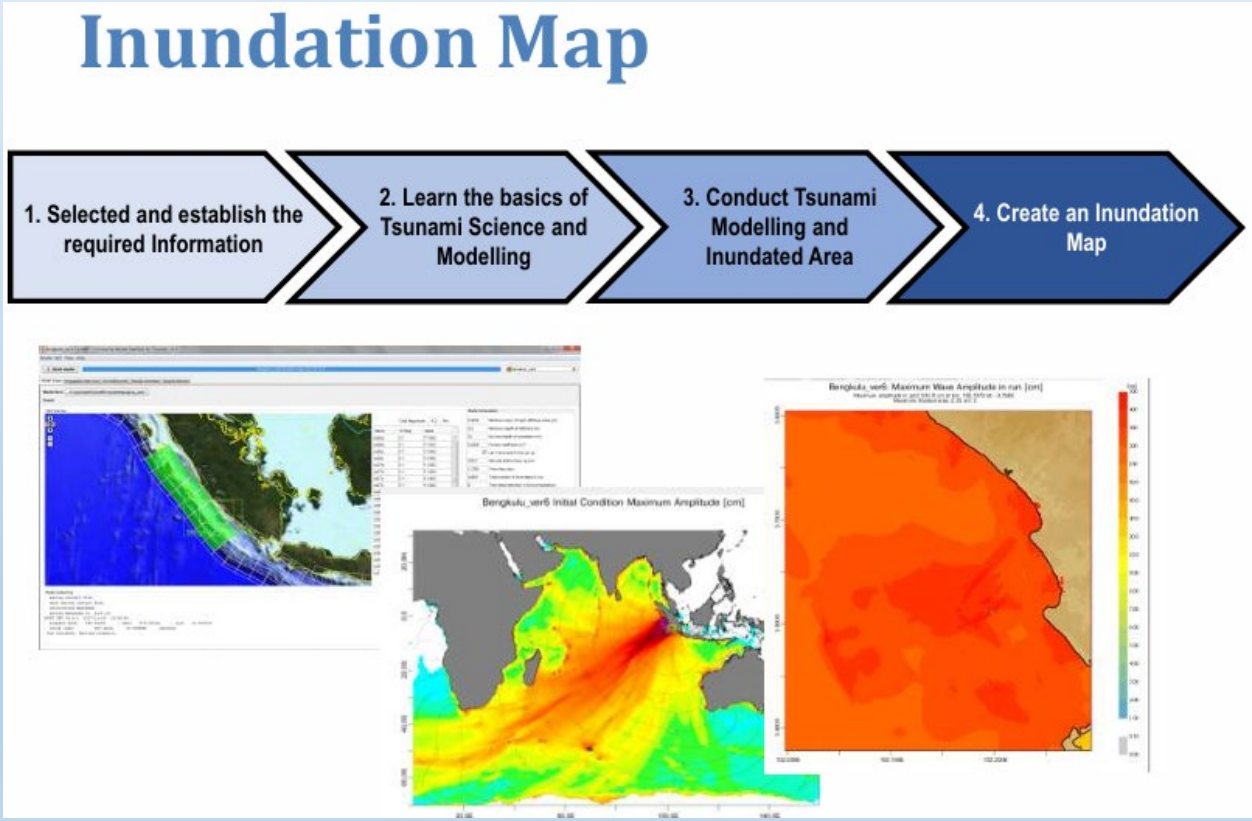
Tsunami Evacuation Route: Planning & Design

- Define tsunami safe zone, transition zone and hazard zone
- Designate tsunami safe area for permanent shelter → high and safe place
- Design evacuation route ← design criteria, number of people at risk, evacuation capacity
- Need assessment for vertical evacuation shelter ← design criteria

Tsunami Inundation Mapping Overview

- Definition: Delineation of areas that may be flooded due to tsunami waves.
- Input data: Bathymetric/topographic data, tsunami modeling, historical records.
- Output: Maps for emergency planning and public awareness.





Finalizing the Map – Key Considerations

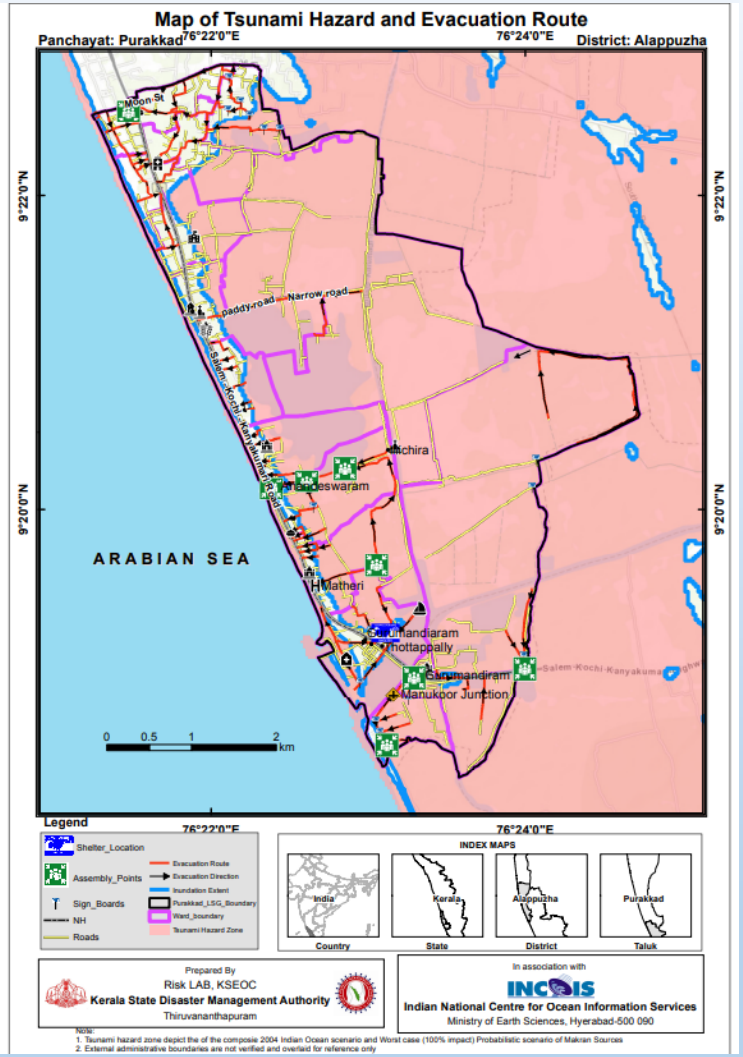
- Accuracy of elevation and bathymetric data
- Resolution and scale (usually 1:10,000 to 1:25,000)
- Map overlays: critical infrastructure, population centers
- Scenario selection: worst-case, historical, or probabilistic models

Map Elements to Include

- Inundation extent and depth
- Landmarks and infrastructure
- Evacuation zones and routes
- Legend, scale bar, north arrow
- Source and metadata
- Index maps, Logos, etc.

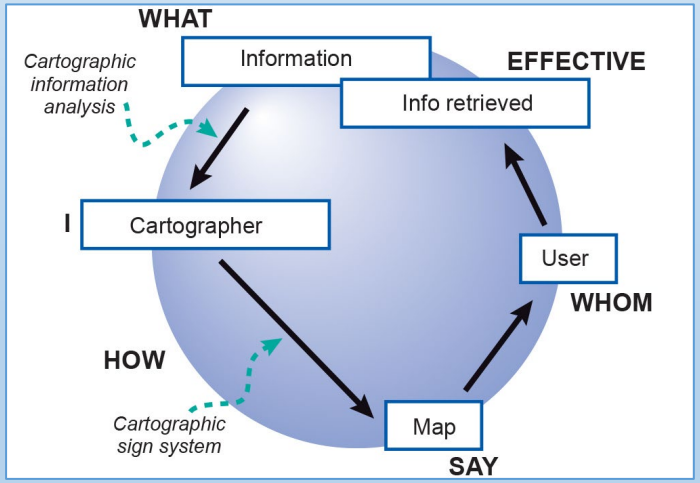
Quality Assurance & Validation

- Cross-check with historical data and field verification peer reviews by technical experts
- Stakeholder consultation (local authorities, emergency services)



Cartographic Refinements

- Consistent color schemes (e.g., blue shades for inundation)
- Clarity and readability: avoid clutter
- Labeling of high-risk areas
- Use of standard symbology (ISO/TC 211 where applicable)

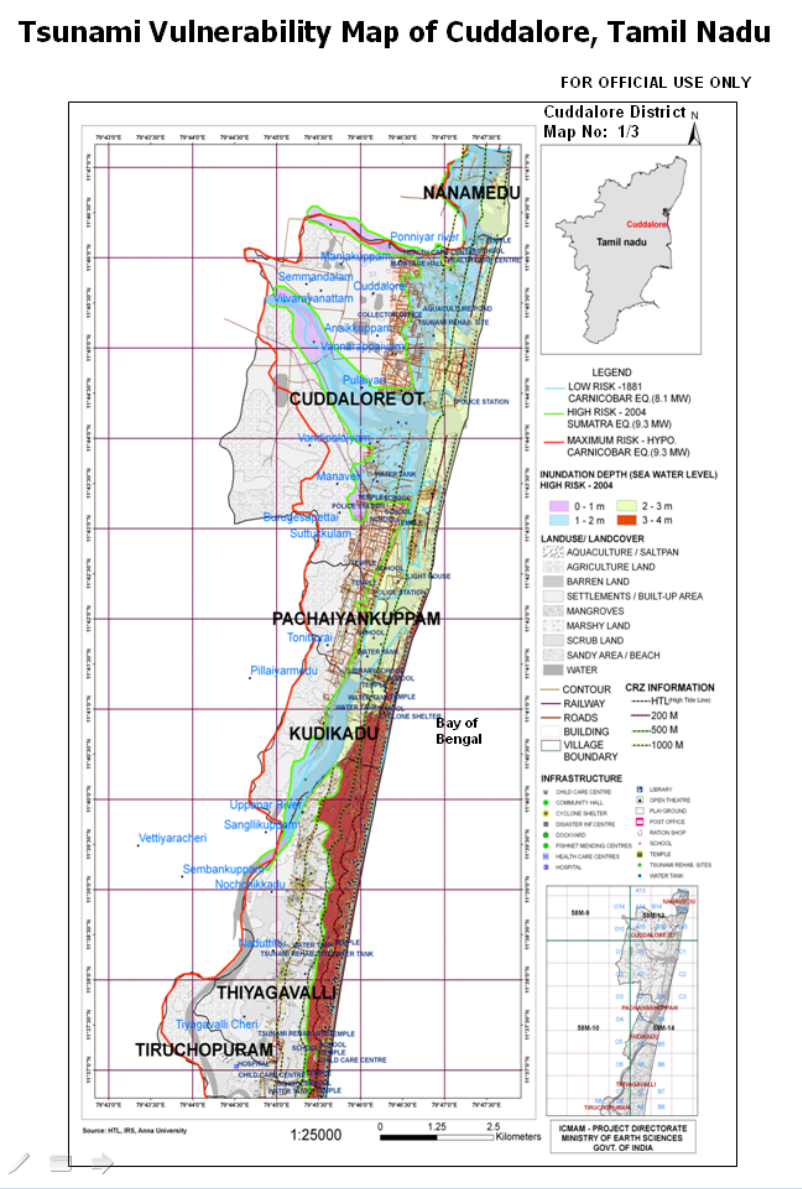


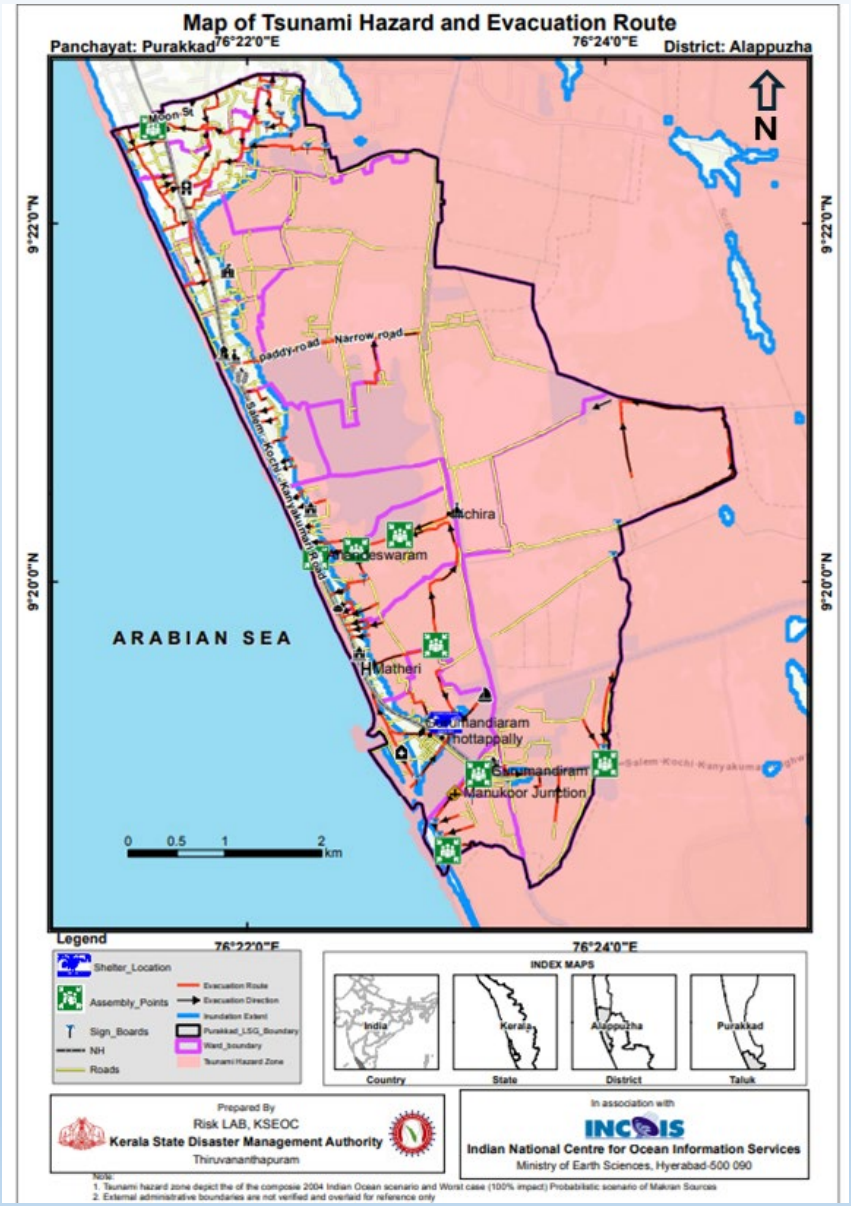
Map Publication

- **Format:** Digital (PDF, GIS layers), Print (Posters, Brochures)
- **Accessibility:** Multilingual, large print for visibility, colorblind-friendly options
- **Distribution:** Government portals (Web GIS, Mobile Applications, APIs), public awareness campaigns, community centers

Version control: Include map version, date of publication

Examples of Final Maps





Thank you