

## Chemical Disaster Risk Management CAPACITY BUILDING & KNOWLEDGE NEEDS



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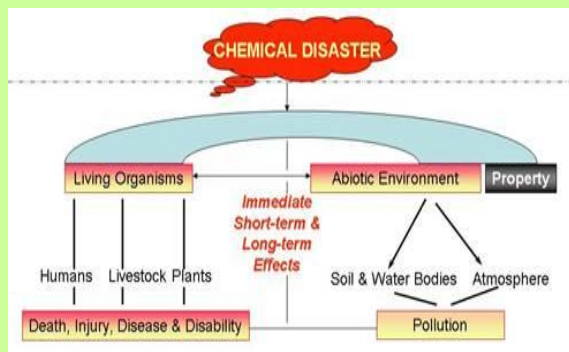
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## CHEMICAL ACCIDENT TRIGGERS

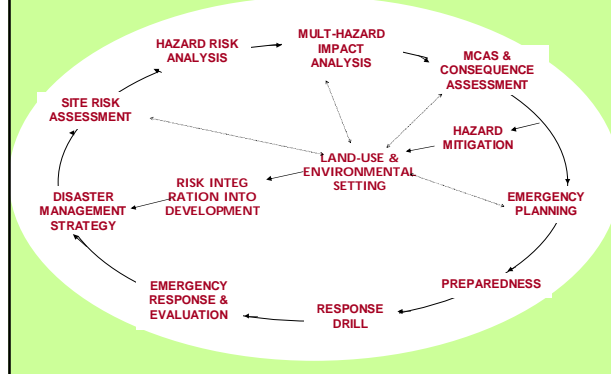
Few examples

- Process or storage system failures
- Instantaneous bulk release of pollutants/contaminant
- Mass release from natural source
- Spillage from hazardous waste
- Spillage / release during transport or shipping
- Natural calamities, e.g. earthquake, flooding, landslide, etc.
- Terrorist attacks/Sabotage
- Mass poisoning (intentional or unintentional)

## CHEMICAL DISASTER: IMPACTS



## FUNCTIONS- CHEMICAL DISASTER REDUCTION



## ENVIRONMENTAL SYSTEMS ANALYSIS, MODELING AND SCENARIO SIMULATION TOOLS

- Atmospheric release: Dispersion, plume and concentration models
- Ground release: Geo-hydrodynamic models, Liquid Flow models, Two-phase flow models
- Release in water: Steam-flow models, 1-D and 2-D models for diffusion and dilution
- Risk-contour development and Land-use models: GIS software
- Consequence modeling
- Risk Information system and communication tools
- GIS based emergency simulation, lay-out and land-use, emergency planning, response and resource management

## CAPACITY COMPONENTS

- **Resources**
  - Strategic and guiding
  - Non-structural and Intellectual
  - Structural and Material
  - Systemic and Functional
  - Human and Skill power
- **Motivational**
  - Insurance
  - Levees/taxes
  - Incentives/bonus
  - Awards/promotional
  - Facilitation
- **Deliveries/performance**
  - Knowledge
  - Skills
  - Attitude

## STRATEGIC RESOURCES

- **Laws:** Regulations/Acts
- **Plan:** National, State, District & Local Plans
- **Strategic Tools:** e.g. EIA, Environment Audit, LCA, Ecological Footprint, CIA, SEA, RA, Safety Audit, Medical Surveillance
- Environmental Information – database management
- Forecasting, Early Warning and dissemination systems
- Scientific and technological research and resource support system

## NON-STRUCTURAL

- Land-use codes/guidelines and enforcement
- Knowledge based decisions and awareness
- Building by-laws
- Codes/standards
- Region specific DRR strategies considering environmental risks
- DM integration into development
- HRV Atlas and Risk Indicator based categorization

## STRUCTURAL AND MATERIAL

- Environmental system analysis/ Modeling facility
- Research & Training Institute/Centre with equipment
- GIS Application facility
- Safety Museum and Demonstration Facility
- Control room facility
- HAZMAT facilities
- Mitigation (structural and non-structural) resources
- Response resources (create, mobilize, organize/pool)

## SYSTEMIC & FUNCTIONAL

- Designated responsible Dept./officers for specific jobs
- System for documentation and records
- Defined time frames for activities
- Defined and practicable SoPs for various tasks
- Knowledge sharing protocols
- Institutional mechanism and coordination framework

## HUMAN CAPACITY- SKILL POWER

- **Professionals** e.g. assessments, audits, planning, designs, monitoring, concept development, training, etc.
- **Execution/coordinate of the tasks:** planning, training, mock-drills, monitoring, etc.
- **Administrative support functions –** logistics, finance, ministerial, etc.

## DEPARTMENTAL CASES

### Dept. of Factories/Health & Safety –

- Shortage of staff
- Lack of infrastructure
- Lack of coordination with environment & other departments, e.g. industry, medical, education, Revenue, etc.
- Lack of familiarity on recent developments, e.g. GIS application, DDMP, District level ICS, Web-enabled system
- Less knowledge about environmental risks and natural factors leading to industrial disasters
- Poor/no training facility at District/Division level

## DEPARTMENT OF ENVIRONMENT

- Job definitions not adequately addressing safety / disaster risks
- Less focus on prevention through land-use plans and proper siting of industries: post-operation compliance main priority
- Safety a non-routine issue/ out of direct mandate
- Lack of coordination with factories/H&S, & other departments, e.g. industry, medical, education, Revenue, etc.
- Less familiarity on recent developments, e.g. GIS application, DDMP, District level ICS, Web-enabled system
- Less knowledge about disasters leading to environmental damages and pollution, and vice-versa: e.g. floods leading to pollution, etc.
- No designated "Disaster Management Cell" in State Deptt./ Boards (except in few, e.g. MP) even at CPCB, although all disasters originating in the environmental and affecting environmental resources, values, properties
- Poor/no training facility at State/District/Division level
- Poor economic valuation of environmental losses

## STATE/DISTRICT ADMINISTRATION

- Lack of physically existing & functional DMA with integration of CCG (especially at district/local)
- Lack of central functional point of safety, environment, health and industry department on regular basis
- Poor-involvement of scientific/line departments in formulation of DMPs
- Poor exposure/understanding and lack of interest of revenue department (which deals the subject of disasters) on issues related to environmental risks, chemical disasters and likely impacts/losses due to technicality of the subject

## OTHER- POLICE/MEDICAL

- Involvement of Police, Transport, Medical Departments at strategic and planning level
- Strengthening of forensic laboratories for assessment of hazardous materials incidents
- Integration of forensic laboratories and experts with Environmental Department/ Disaster Management for post-incident cause analysis
- Poor training of Police on Hazmat identification and emergency requirements
- Medical departments rarely addressing pre-disaster medical surveillance and/or disaster preparedness at local levels

## TRAINING -TARGET GROUPS

### (A) Expertise/academic

- Professionals on various functions/tasks
- Knowledge development & research
- Concept building and testing
- Training/education planning, design & delivery

## PROFESSIONALS

- Site Assessment
- Environmental/Land-use Planning
- Environmental Impact Assessment (EIA, LCA, CIA, SEA)
- Risk Assessment
- Disaster Management
- Safety/SHE Audit
- Emergency Planning
- Damage & Loss Assessment
- Environmental Law
- Emergency Response
- Medical Management
- Psycho-social & Special Needs
- Information Management
- Media and Public Relations
- Economic Analysis

## TARGET GROUP....CONTD

### (B) Governance

- Policy – Legislators, Advisors, Secretaries,
- Systemic: State Department chiefs, District Collectors,
- Functional: Line departments
- Ground/Community

### (C) Governance (Industry)

- Policy – Top Management
- Systemic: Department Heads, Unit Managers
- Functional: Line departments
- Supervisors/operators

## TARGET GROUP....CONTD

### (D) Corporate Sector:

- Policy – Corporate business planners
- Systemic: Sector Heads, State Unit Chairs
- Functional: Member Industries Directors/Heads
- Environment & Safety Heads in Industries

### (E) Awareness functions:

- Teaching community
- NGOs
- Trade Unions
- Community at large

## SECTORS

- Environment & Health and Safety (EHS)
- Industry
- Police & Home guards
- Medical
- Transport
- Land-use
- Urban Governance
- General administration
- Finance

## INFORMATION FACILITIES

- Data generation
- Reporting system
- Databank
- Data processing/interpretation
- GIS integrated system
- Convert data into knowledge
- Web-enabled system
- Communication system
- Dissemination system

## CAPACITY BUILDING RESOURCES

- NDMA
- MoEF
- MHA
- NIDM
- ATIs/DMI/DMCs
- CONSULTANTS
- Corporate/FICCI/CII/ASSOC HAM/PSUs
- UGC
- CSIR/ICAR/ICMR/MoES/DST /DBT/ICSSR
- NEERI/ITRC/NCL
- LUB/ULB/
- CPCB
- NIC/ISRO/NRSA/GSI/MoES / IMD / Survey of India
- Universities/Colleges/ IIMs/IITs
- Professional Organizations/
- ISCA/IMA/Red-Cross/ SoES/INSA/NAS
- UNDP-DRM/UNEP/WHO
- WWF/UNESCO/ILO/WB
- SDMC

## NIDM

**Apex National Institute** on DRR under DM Act 2005, for training, research, capacity building, documentation, policy advocacy, etc

- A consortium at NIDM - for exchange of knowledge and views
- NIDM as national focal point for education and training development
- Environmental systems facility at NIDM
- Information pool and knowledge facilitator
- Organizer for strategic tools development and integration mechanism, and policy advocacy

## Ministry/Department

- Transport & Shipping
- Railways
- Coal & Mines
- Power
- Oil & Petroleum
- Defense
- Labour & Employment
- Home
- Agriculture
- Water Resources
- Earth Sciences
- Science & Technology- DST / DBT
- Urban Development
- Human Resource Development
- Women & Child Welfare
- Statistics & Programme Implementation
- Law & Justice
- Finance
- Ministry of Power
- Nuclear Energy

THANK YOU

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