# 4 CAPACITY BUILDING

Disaster Management Policy of India highlights the need for capacity building through research, education and innovation, with specific mentions of key stakeholders, including technical groups, concerned officials and Communities.

One of the major challenges in implementing and sustaining capacity building efforts for chemical/industrial disaster management, is in reaching out to a large number of diverse stakeholders across the country with varying levels of skills and capacity building needs.

The human resource requirements and subsequent capacity development programmes are very vital from the view of capacity building, in relation to Chemical/Industrial Disaster Management (CIDM).

NAP-CIDM has detailed all potential capacity building needs, through robust HRD (Human Resource Development) mechanism, including the identification of training groups, notifications of training institutions, and coordinated approach towards organizing training programmes.

The availability of existing resources and infrastructure, are also the major areas of concern, which need to be addressed from the capacity building point of view.

NAP-CIDM has addressed all relevant Information Network System components, and also captured the applicable infrastructure requirements, in line with capacity building.

## 4.1 Human Resource Development (HRD)

Human Resource Development (HRD) programme on CIDM is an important challenge for effective action plan. It begins with identification of target training institutions, targets groups, master training institutions, development of material, importance of evaluation criteria, system, along with training and infrastructure development, etc.

HRD comprises the following vital components:-

### 4.1.1 Identification and Notifications of Training Institutions

i) To have a quality human resource development through training and awareness programme the following three steps have been suggested:-

a. Identification and development of Nodal Training Institutions (NTIs). These NTIs further identify, develop and will recommend Satellite Training Institutions (STIs) at local levels to assist Nodal Training Institutions to strengthen the capacity of all stake holders. Local industrial associations and State Administrative Training Institutions (ATIs) may be the preferred Satellite Training Institutions.

   For example Lal Bhadhur Shastri National Academy of Administration (LBSNAA), Mussoorie is suggested as NTI for officers of Indian Administrative Services (IAS), the State Administrative Training Institutions will work as STIs ensuring the training at regional level for all administrative officers. Similarly, National Disaster Response Force (NDRF) battalions notified for Chemical Biological Radiological and Nuclear (CBRN) at Kolkatta, Arakkonam, Pune, Gazidabad will be the nodal training institutions for State Disaster Response Force (SDRF) of various states, the SDRF will act as a STI.

b. Identification of training institutions offering general and specialised training at different levels for different target groups at national and international levels.

c. Networking of training institutions.

To address the above points (a-c) following issues should also be considered:

- Formal college / institutions of engineering, medical and management should have specialised degree courses in CIDM in the respective areas / field.

- Development of distance training programmes by involving open universities

ii) Since Govt. of India has identified DMI to develop as National Institute of Industrial Safety (NIIS), this institute will be the National Focus Institution for CIDM. NIIS will coordinate and network with other NTIs engaged in training on chemical and industrial safety. The State Administrative Training Institutions (ATIs) will also act as notified training institutions for capacity development of the state officials especially of SDMAs and DDMAs. NIIS will have mandate for Training for Trainers (TOT) training of DDMAs and SDMAs of the whole country.

NDMA and MoEF will jointly support NIIS for overall training awareness related issues for NTIs and STIs. Suggested network mechanism is shown in Fig. 4.1.

A suggestive but not limited to, list of NTIs has been identified as below:-

- ESCI ï Engineering Staff College of India, Hyderabad

- ASCI ï Administrative Staff College of India, Hyderabad

- IICT ï Indian Institute of Chemical Technology, Hyderabad
- 
- ETI ï Environmental Training Institute, Chennai

- IGIAT ï Indo-German Institute of Advanced Training, Vishakhapatnam

- IIT ï Indian Institute of Technology, Bombay, Kharagpur, Madras, Roorkee etc.

- SVPNPA ï Sardar Vallabhbhai Patel National Police Academy, Hyderabad

- LBSNAA ï Lal Bhadhur Shastri National Academy of Administration, Mussoorie

- ISI ï India Statistical Institute, Delhi.

- NSC ï National Safety Council and its state chapters

- ITRC ï Industrial Toxicology Research Centre, Lucknow

- NEERI ï National Environmental Engineering Research Institute, Nagpur.

- NCDC ï National Civil Defence College, Nagpur.

- NIDM ï National Institute of Disaster Management, Delhi.

- NPC ï National Productivity Council, New Delhi.

- Indian Institute of Science, Bengaluru.

- SAIL ï Management Training Institute, Steel Authority of India, Ranchi.

- SPA - School of Planning and Architecture, New Delhi.

- TERI ï The Energy Research Institute, New Delhi.

- DGFASLI ï Director General of Factories Advice Services & Labour Institute, Mumbai

- CLI - Central Labour Institute, Mumbai and its Regional Labour Institutes (RLIs)

- IGNOU ï Indira Gandhi National Open University, New Delhi.

- IPSHEM ï Institute of Petroleum Safety, Health and Environment Management, Goa

- CLRI ï Central Leather Research Institute, Chennai

- MGLI ï Mahatma Gandhi Labour Institute, Ahmedabad

- KSPC - Kerla State Productivity Council

- Industrial Associations/Federations like FICCI , CII, ASSOCHAM, PhdCCI, etc.

- NITS ï National Institute of Training for Standarisation, Noida.

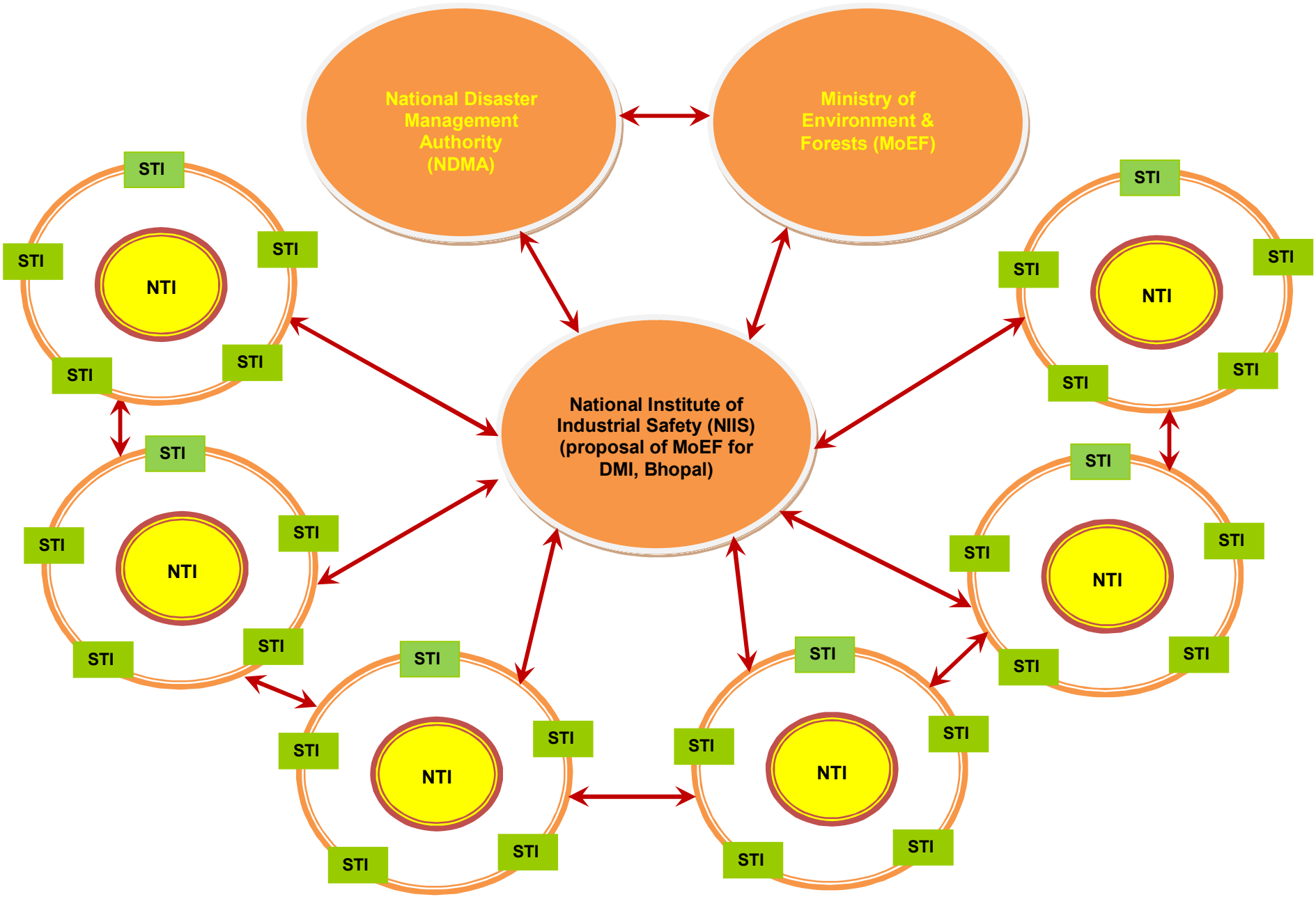


**Figure 4.1: Suggested Network Mechanism**

### 4.1.2 Identification of Target Groups to be Trained

i) NAP-CIDM advocates the Training Need Assessment (TNA) for following groups before starting any training programme:-

- SDMAs ï State Disaster Management Authorities
- DDMAs ï District Disaster Management Authorities
- SCGs ï State Crisis Groups
- DCGs ï District Crisis Groups
- LCGs ï Local Crisis Groups
- MAH industries ï Major Accident Hazard Industries
- First Responders ï Police, Medical, Fire departments, etc
- SIDCOs ï State Industrial Development Corporations
- CIFs ï Chief Inspector of Factories
- SPCBs ï State Pollution Control Boards
- PESO ï Petroleum & Explosive Safety Organisation
- PNGRB ï Petroleum and Natural Gas Regulatory Board
- Media ï Both Print and Electronics
- Transport ï Rail, Road, Pipeline
- Contractors ï Civil, Transport, Electrical, etc.

NAP-CIDM also identifies the other groups working under different regulatory provisions:-

a. Response forces appointed under Disaster Management Act 2005
   - National Defence Response Force (NDRF)
   - State Defence Response Force (SDRF)

b. Officers appointed under Dock Workers (Safety, Health and Welfare) Act, 1986
   - Director General, Factory Advice Service and Labour Institute
   - Deputy Director General, Factory Advice Service and Labour Institute
   - Director (Dock Safety)
   - Joint Director (Dock Safety)
   - Deputy Director (Dock Safety)
   - Assistant Director (Dock Safety)

c. Officers appointed under the Factories Act, 1948
   - Chief Inspector of Factories
   - Additional Chief Inspector of Factories
   - Joint Chief Inspector of Factories
   - Deputy Chief Inspector of Factories
   - Inspector of Factories, etc.

d. Officers appointed under The Mines & Mineral (regulation and Development) Act, 1957
   - Controller General of Indian Bureau of Mines
   - Chief Controllers of Mines Controller of Mines
   - Regional Controller of Mines
   - Deputy Controller of Mines, etc.

e. Officers appointed under The Indian Dock Labours Act, 1934
   - Inspectors of Dock Safety

f. Officers appointed under The Indian Port Act, 1908
   - Conservator of Ports
   - Deputy Conservator of Ports
   - Harbour Master

g. Officers appointed under The Merchant Shipping Act, 1958
   - Director (Marine Department)
   - Manager (Marine Department)

h. Officers appointed under The Explosives Act, 1884 and the Explosives Rules, 1983
   - Chief Inspector of Explosives
   - Joint Chief of Explosives
   - Deputy Chief of Explosives
   - Controller of Explosives

i. Officers appointed under The Insecticides Act, 1968
   - Licensing Officer
   - Insecticides Inspector

j. Officers appointed under The Petroleum Act, 1934
   - Chief Controller of Explosives
   - Deputy Chief Controller of Explosives
   - Controller of Explosives
   - Deputy Controller of Explosives
   - Assistant Controller of Explosives
   - Inspector

k. Officers appointed under The India Boilers Act, 1923
   - Chief Inspector of Boilers
   - Deputy Chief Inspector of Boilers
   - Inspector of Boilers

### 4.1.3 Organisation of Training Programmes

i) The process of training organisation should have coordinated approach starting from development of the training programmes to implementation of the results, acceptance with understanding followed in practice. Skill development in CIDM is the ultimate objective of the programmes. The whole process to be followed is illustrated in Fig. 4.2.

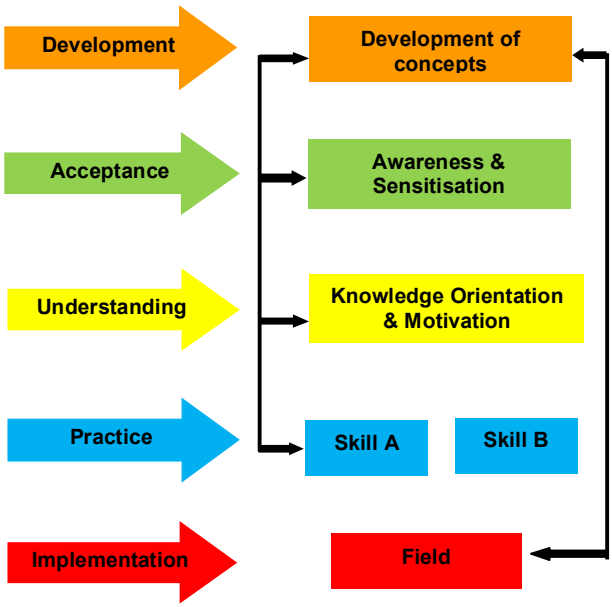


**Figure 4.2: Process of Training Organisation**

This is the general observation that training programmes are being conducted without proper Training Need Assessment (TNA) for various target groups. NAP-CIDM recommends that the TNA will be the essential and integral component for programme design to get best possible results. 9 steps of this process have been recommended and is as illustrated in Fig. 4.3.

ii) To have an effective training mechanism of development of master trainer action should be initiated jointly by NDMA and MoEF with the support of DMI so that a team of trainers can be developed in each state / UT and NTI in first phase. These master trainers will in turn take responsibility of development of STIs.

In the process of development of master trainers the best practices and experience of industries should be made mandatory.

iii) For above target groups as specified in 4.1.2. NAP-CIDM suggests immediate training on following topics for capacity development:-

- On-site Emergency Management, Planning, Making, Evaluation, Practicing, etc
- Off-site Emergency Management, Planning, Making, Evaluation, Practicing, etc
- Training for Safety in Road Transportation of Hazardous Chemicals
- Training for Safety in Rail Transportation of Hazardous Chemicals
- Disaster Management and Preparedness
- Hazards Identification and Risk Assessment (HIRA) techniques
- Accident Investigations
- Layer of Protection Analysis for Prevention and Mitigation
- Techniques of Safety Integrity Level
- Mock Drill as a Preparedness Measure
- Human Error & Organization Failure
- Business Continuity and IDRM Plans
- Training to various target groups like rail/ road / NDRF/ SDRF personnels
- First Aid
- Fire Fighting
- Medical Preparedness
- Reporting Procedures for Media
- Confined Space Safety
- Hazards Identification and Control Measures in Chemical (Industrial) Workplaces
- Personal Protective Equipment
- Accident Causation: Models and Theories
- Human Factors in Accidents and prevention
- Organisational Commitments in Reducing Accidents
- Job Safety Analysis
- What should I Know as District Collector and Why?
- Risk Assessment and Management
- Consequence analysis: application in emergency planning
- Industrial Disaster Response

iv) Development of Training Modules

Various institutions like NIDM, NSC, DMI, DGFASLI, CPCB, PESO, CIFs, SPCBs, IITs, and MAH industries are organising and conducting training programmes on various CIDM topics. The training materials have also been developed by these institutions. NAP-CIDM suggests that NDMA, MoEF jointly initiate the development of various training modules on various topics as discussed above for awareness, knowledge and skill development by compiling and researching the available literature in concise and attractive ways. These modules should be based on Indian and global best practices. The finding of industrial accident for reducing chemical risk should also be in the modules. In second phase these modules should be made available online with simulation.

v) Disaster Management Institute (DMI) under Indo-German bilateral programme have developed following training modules on 15 key topics of CIDM which are as follows:

Module No. 1 : Confined Space Safety.
Module No. 2 : Safety in Transportation Hazardous Substances by Road.
Module No. 3 : Hazards Identification and Control Measures in Chemical (Industrial Workplaces).
Module No. 4 : First Aid in Emergency.
Module No. 5 : Personal Protective Equipments.
Module No. 6 : Accident Cautions : Models and Theories.
Module No. 7 : Human Factor vs Accident Cautions.
Module No. 8 : Organisational Commitments in Reducing Accidents.
Module No. 9 : Job Safety Analysis.
Module No. 10 : Guide to be District Collector What I Must Know as District Collector ? and Why ?
Module No. 11 : Risk Assessment and Management.
Module No. 12 : Consequence Analysis : A Vital Need for Emergency Planning.
Module No. 13 : On-site Emergency Management Plan (OnSEMP).
Module No. 14 : Off-site Emergency Management Plan (OffSEMP).
Module No. 15 : Industrial Disaster Response

NDMA and MoEF should take responsibility of developing such modules.

NAP-CIDM recommends that the trainings on above modules should be started immediately involving DMI, NTI and ATI with the financial assistance from MoEF and NDMA jointly.

These modules have been appreciated across the country by all stakeholders and well drafted by applying training need assessment and programme development as a holistic HRD management design adopted worldwide (Fig. 4.3).

### 4.1.4 Development of Evaluation Criteria

An effective and unique evaluation criterion would be developed for each identified programs (awareness and skill based separately) and for identified training institutions with the involvement of MoEF, target institutions and groups. A model evaluation sheet to assess the quality for training courses is attached herewith (Annexure ï 4.1) for further follow up.

NAP-CIDM recommends necessary actions for implementation as suggested in Table 4.1.

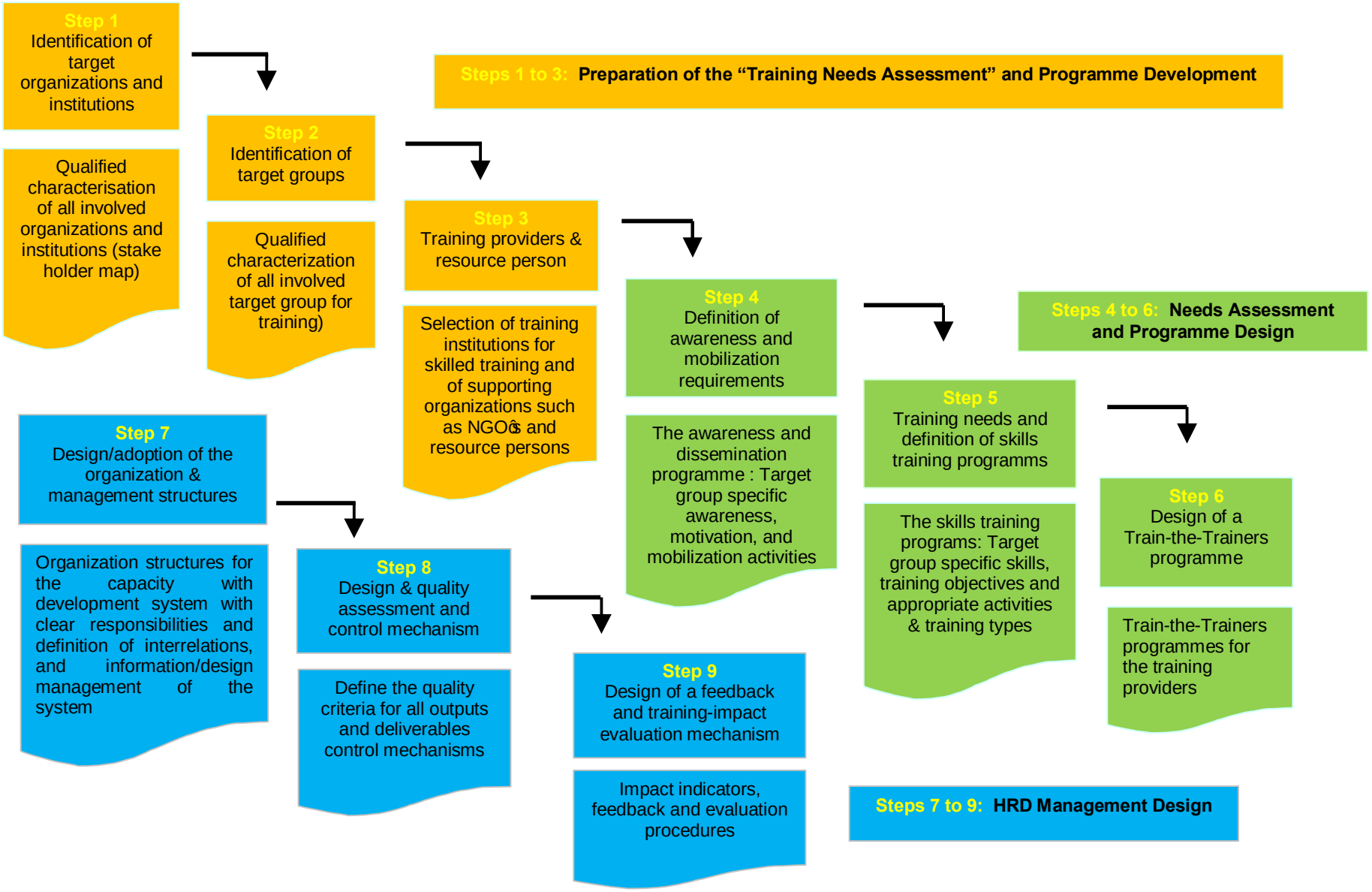


**Figure 4.3: Training Need Assessment Programme and Programme Development**

**Table 4.1: Recommendations for implementation with Time Frame for Training Institutions**

| S.no. | Items to be addressed | Recommendation for action | Ministries/ Authorities / Institutes for action | 0-2 Year | 2-5 Year | 5-8 Year |
|---|---|---|---|---|---|---|
| 1. | Identification and notification of<br>a) NTIs and STIs | Action as addressed in point no. 4.1.1 (i & ii) | NDMA & MoEF | √ | | |
| | b) Target groups | Action as addressed in point no. 4.1.2 (i) | NDMA & MoEF | √ | | |
| 2. | Development of training modules | Action as addressed in point no. 4.1.3 (iv) | NDMA & MoEF | √ | | |
| | a. Development of training programme for target group | -do- | NDMA & MoEF | √ | √ | |
| | b. Development of master trainers at NTIs | -do- | NDMA & MoEF | √ | √ | |
| | c. Development of master trainers at STIs | -do- | NDMA & MoEF | | √ | √ |

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## 4.2 Information Network System

Strong knowledge management will strengthen the process of informed decision making, therefore there is a need to create a network of knowledge to share the experiences and knowledge.

Knowledge creation will primarily be carried out in specialized domains by knowledge based institutions. The action plan has been suggested in Table 4.2.

### 4.2.1 Synergetic Application of Science and Technology

i) The MoEF and other line Ministries like Ministry of Petroleum and Natural Gas, Agriculture, Fertiliser, Ministry of Science & Technology, and the other concerned Departments of GoI, in consultation with NDMA, and with support from MoEF, Private and Public sector, Industrial Houses, will identify the specific needs and disciplines for research and application. The domain-specific institutions depending on their expertise and knowledge base will also have to identify.

ii) The following institutions have been recommended for the information networking:-

**A) National Institutions**

i) All CSIR laboratories for research and development
ii) All IITs for research and development
iii) All NITs (Earlier Regional Colleges of Engineering)
iv) All Central Universities
v) Specialized institutions like Indian Institute of Petroleum, Gandhi Nagar, Dehradun.
vi) Indian Institute of Science, Bangalore
vii) Petroleum and Explosives Safety Organization (PESO), Mumbai
viii) Directorate General of Factory Advice Service and Labour Institutes (DGFASLI), Mumbai
ix) Director General of Mines and Safety (DGMS), Ranchi
x) Central Power Research Institute (CPRI), Bengaluru
xi) Institute of Petroleum Safety, Health and Environment Management (IPSHEM), Goa
xii) Defence Research and Development Organisation (DRDO), New Delhi and Gwalior
xiii) All India Institute of Medical Science (AIIMS), New Delhi
xiv) Power Management Institute (PMI), Noida
xv) Specialized training institutions working on R&D on public and private industrial houses like Thapar, Reliance, Grasim, Ranbaxy, Cipla, Cadila, IOCL, HPCL, BPCL, etc.
xvi) Central Pollution Control Board (CPCB), New Delhi
xvii) Disaster Management Institute (DMI), Bhopal
xviii) National Safety Council (NSC), Mumbai
xix) Sardar Vallabhbhai Patel National Police Academy (SVPNPA), Hyderabad
xx) Lal Bhadhur Shastri National Academy of Administration (LBSNAA), Mussoorie
xxi) All India Industrial Association like CII, FICCI, ASOCHAM, etc.
xxii) Indian Space Research Organization (ISRO).

**B) State Institutions**

i) ATIs of states / UTs
ii) CIFs
iii) SPCBs
iv) State Technical & Medical Science Universities
v) Medical & Engineering Colleges
vi) State Chapter of NSCs

**C) International Institutions**

i) United Nation International Strategy for Disaster Reduction (UN-ISDR)
ii) United Nations Environment Program (UNEP)
iii) United Nations Institute for Training and Research (UNITAR)
iv) United Nations Environmental Protection Agency (USEPA)

v) International Labour Organization (ILO)

vi) European Process Safety Centre (EPSC)

NIIS, NIDM and other institutions will collaborate and bring together academic and training institutions at the National, Regional and International levels. These institutions will form the knowledge repository in CIDM, and also strive to enhance the knowledge base on planning, preparedness and response mechanism. These institutions will also try to rope the civil administration for their knowledge by organizing mock drill and compiling the finding of mock drills for overall capacity development.

### 4.2.2 Knowledge Dissemination through Information and Communication Technologies (ICT) Indigenous Technical Knowledge (ITK)

i) A rich legacy of technical knowledge and experience has been handed down right from enactment of MS&IHC rules in 1989. The best practices are available at the state level with the directorates of industrial health and safety and with DGFASLI on CIDM by way of training and awareness campaign. Good practices of on-site and off-site emergency management plans have also been observed by the state of Punjab, Uttar Pradesh, Gujarat, Maharashtra, Karnataka, etc and these best practices should be placed on indigenous technical knowledge platform in control access. In the recent years, NDMA has created an excellent wealth of knowledge on mock drills on CIDM in technical collaboration with DMI. This wealth of knowledge should be made available to all stakeholders of CIDM. We have also tested practices in facing disasters in different parts of India since ancient time. A concerted effort is recommended to catalogue this precious heritage, validated the knowledge through contemporary systems and disseminate the results to appropriate destinations and affected communities with a view to adding value to their CIDM effort.

ii) For knowledge dissemination by applying information and communication technology, the involvement of print and electronic media is very important. The media should be regulated by making necessary amendment in DM Act, 2005 for their responsibility for the community welfare. The welfare majors can be by making mandatory provisions to telecast and or print the feature items on CIDM at regular intervals. We are of the view that two print features per month at intervals of 15 days and 5 hrs. per months for electronic media to telecast through either feature film or and by making live debate with regulators, community, process industries, subject experts, administrators, etc. It should be on priority. Appropriate instructions should be issued Ministry of Information and Broadcasting (MoI&B).

iii) Various National and State industrial associations had been conducting conferences and seminars on Chemical/Industrial Disaster Management for decades. Hence it is advised that these associations should be continued to organise national & regional trainings for focus on:-

- Organizing National & International conferences on Chemical (Industrial) Disaster Management (CIDM) in the proximity of hub of Major Accident Hazard (MAH) Units.
- Organizing training programmes of Disaster Risk Reduction for various industrial sectors.
- Working jointly with National Disaster Management Authority (NDMA), Ministry of Home Affairs (MoHA) in publishing and circulating their comprehensive guidelines on Chemical (Industrial) Disaster Management (CIDM), Medical Preparedness & Mass Casualty Management and also other Guidelines on Natural Disaster which could trigger chemical disaster or vice versa.
- Promoting and Advocating Public Private Partnership (PPP) based models of Disaster Management especially during Off-site emergency where PPP can play a very supportive role.

### 4.2.3 India Disaster Resource Network (IDRN)

i) The existing framework of IDRN (www.idrn.gov.in) is required to be further expanded to include the resources of various agencies, domains and disciplines at the National level. The relevant information will be placed in the public domain for easy retrieval, usage and online updation. Another knowledge platform www.hrdp-idrm.in has been developed and was launched by Ex-member Lt. Gen (Dr.) J R Bhardwaj in 2009 in an International Conference at New Delhi for the knowledge up-gradation of the stakeholders.

ii) The knowledge network platform must have year wise repository of training programmes on various modules of CIDM at different places of the country with training materials for the benefit of the stakeholders. The network should have also comprehensive information on key concept of CIDM related regulations and also about the institutions and organizations providing knowledge information on CIDM. The platform should provide information on latest calendar of events along with the participating institutions. The platform should also provide information about the individual experts working in govt. / private sectors. The network will also explore the possibility of capacity development for school and college students by way of online learning and scoring.

iii) In acknowledgment of the need for a knowledge sharing platform on CIDM, and to facilitate interaction and dialogue with related areas of expertise, the CIDM Portal need to be set up immediately on top priority. The portal will serve as a tool to collect, collate and disseminate information related to CIDM. It will connect all Government Departments, statutory agencies, research organisations/institutions and humanitarian organisations to share collectively and individually their knowledge and technical expertise. The information platform recently developed by MoEF will be merged to have a uniform knowledge platform. The knowledge platform will act as single window for getting information on following :

a) MSDS of hazardous chemicals with their antidotes as per schedule 9 of MS&IHC rules industry wise of each state and others (as suggested in Chapter 3).
b) Information on vulnerability due to explosion, fire and toxicity by hazardous industries (as suggested in Chapter 3)
c) On-site and off-site emergency management plans on GIS domain nation wide
d) All relevant Acts and Rules
e) Guidelines and Manuals on CIDM
f) Best Practices on CIDM
g) Accident Investigation Reports, etc.,
h) Videos and films
i) Report of Mock drills conducted by NDMA and others.
j) Availability of District and State wise response equipments with detail contact numbers and approximate time to transport the equipment to industrial vulnerable places.

The knowledge platform will be in Hindi and English initially which will later on be in all Indian regional languages.

iv) MoEF with NIC is working on the Environmental Information System (ENVIS). This system is basically an information dissemination system of various environmental components State / UT wise. ENVIS headquarter at Delhi at MoEF is coordinating with various State / UT governments by their state ENVIS centers.
A working group should be constituted under leadership of MoEF and NIC to suggest a framework of such system along with required recurring financial expenses to support state government.

v) Emergency Operation Centre (EOC) of each state in first phase and EOC located in industrial hubs / estates will be linked in second phase with proposed uniform knowledge platform to know the available resources and infrastructure to combat the CIDM. The information on EOC has been discussed in separate chapter on Response.

### 4.2.4 Self Evaluation and Simulation

i) Knowledge portal should also have space for industry and civil administration for checking and evaluating their overall CIDM preparedness by filling on line information to evaluate themselves. Self evaluation will suggest some mechanism for their improvement for fix intervals. Self evaluation process and formulation of check list need to be developed by a group of experts following institutions.

   a. NDMA
   b. MoEF
   c. ICC
   d. DMI
   e. NSC
   f. DGFASLI

**ii)** Training should also be online with simulation to educate better in the area of CIDM.

### 4.2.5 National Priorities for information network system

i) In the field of capacity development, priority will be given to training of DM officials, functionaries, trainers, elected representatives and communities.

   DM training and orientation of professionals like doctors, engineers, and architects should be given due importance.

Further, expansion of DM training in educational institutions at all levels including schools, with orientation towards practical requirements should be given due weightage.

NIIS with support from NIDM, will play an important role in developing and facilitating the implementation of networking of the National training schedule for CIDM with various knowledge sharing partners. There are a number of renowned institutes in various States, which are imparting training in CIDM. These will be strengthened with financial assistance and such efforts will be replicated by States/UTs. Also, the CIDM cells in all Administrative Training Institutes, Police Academies, State Institutes of Rural Development, the Paramilitary Training Centres, NDRF and the National Training Academy will contribute most significantly in developing CIDM related skills with the support of NIIS and NIDM.

The capacity of existing institutes needs to be upgraded in accordance with Regional and Local requirements through NTIs and STIs.

**Table 4.2: Recommendations on information network system for Action with Time Frame**

| S.no. | Items to be addressed | Recommendation for action | Ministries/ Authorities / Institutes for action | 0-2 Year | 2-5 Year | 5-8 Year |
|---|---|---|---|---|---|---|
| 1. | Synergetic Application of Science and Technology | Action as addressed in point no. 4.2.1 | NDMA | | √ | |
| 2. | Knowledge Dissemination through Information and Communication Technologies (ICT) Indigenous Technical Knowledge (ITK) | Action as addressed in point no. 4.2.2 (i) | NDMA with the support of MoI&B | √ | √ | √ |
| 3. | Involvement of Media | Action as addressed in point no. 4.2.2 (ii) | NDMA with the support of MoI&B | √ | √ | √ |
| 4. | India Disaster Resource Network (IDRN) | Action as addressed in point no. 4.2.3 | NDMA | | | |
| | a. Creation of web platform for by Amalgamating of www.idrn.gov.in & www.hrdp-idrm.in in Hindi and English. | Action as addressed in point no. 4.2.3 (iii) | NDMA | √ | | |
| | b. Creation of similar system like ENVIS | Action as addressed in point no. 4.2.3 (iv) | MoEF | √ | | |
| 5. | Self Evaluation and Simulation | Action as addressed in point no. 4.2.4 | NDMA & MoEF | √ | | |
| 6. | National priority for information network system | All stakeholders action as address in 4.2.5 | NDMA | | √ | |

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## 4.3 Infrastructure Development

The following types of important stake holders have been identified for capacity building in relation to chemical disaster prevention, mitigation and preparedness:

- ✓ Regulators and Administrators.
- ✓ First Responders
- ✓ Community

### 4.3.1 Regulators and Administrators

#### 4.3.1.1 Regulators

It has been observed that the regulators need capacity development, with adequate infrastructure. Hence it is recommended that the following points should be institutionalized in schedule manner:-

- Graduate Engineer:- Chemical and Fire Engineers to contribute in CIDM. Besides, Doctorate in Chemistry will also be required
- Support Staff:- Diploma Engineer, Computer Operators in place of simple clerks
- Office Building with internet and Library:- At each revenue divisional commissioner level and large industrial estate latest office building on Green environment concept.
- Monitoring Equipments:- Toxic gasses monitoring equipment ($CS_2$, CO, $CO_2$, $NO_x$, $SO_2$, $SO_3$, Acid fumes, lead fumes), Noise monitoring, Respirable dust monitoring equipments with mobile van
- Vehicles:- Necessary vehicles at each industrial estate level office to work independently and effectively.

#### 4.3.1.2 Administrators

District collectors and their team as identified in CA(EPPR) rules of environment protection act to monitor the progress of overall CIDM preparedness should have regular training for skill and knowledge development. The suggested constitutions for IRS and IRTs have also been published by NDMA in their guidelines on Incident Response System. For effective administration of these teams immediate need of EOC establishment has been highlighted in Response chapter.

### 4.3.2 First Responders

Capacity development is recommended for CIDM, through equipping the following first responders immediately:

- ✓ Fire Department
- ✓ Police Department for maintaining law and order during crisis.
- ✓ Medical Department for handling medical issues during and after disasters.

#### 4.3.2.1 Fire Department

Capacity of the Fire department will be strengthened to respond all types of fires by addressing/ providing the following:

- Latest Fire tenders.
- Trained man power.
- Latest foam, DCP fire extinguishers.
- Recruitment of the trained man power through robust policy of recruitment.
- New area proper planning will be addressed with proper signage and hydrants points for emergency.
- Survey will be carried out for high rise platform for high altitude fire fighting in many fire stations

#### 4.3.2.2 Police Department

Capacity of the Police Department for maintaining law and order during crisis will be strengthened, hence it is suggested that:-

- Proper training and awareness in CIDM.
- Training should be imparted on how to maintain law and order in case of emergency which involves mass casualties surrounded by their relatives and family members due to fire, toxic releases or explosion in chemicals.
- Constitution of special task force for handling such emergency situations. It can be achieved by creating CBRN battalions in States.

#### 4.3.2.3 Medical Department

Medical Department will be strengthened for handling medical issues during and after chemical disasters, should have the following.

- Proper infrastructure need to be created for numbers of beds.
- Burns wards to be created in those areas where there are possibilities of frequent fire hazards.
- Proper training is mandated for doctors and paramedical staff.
- Creation of provisions of reception of relatives of the casualties in case of any chemical/ industrial disasters to avoid chaotic situation. Infrastructure can be created after proper survey by State Govts.
- National Guidelines prepared by NDMA should be used for the development of mass causalities.
- Adequate number of ambulances has to be procured to deal the emergency. Developing a mechanism so that the ambulance can be maintained in good conditions and emergency can be handled effectively.

**Poison and toxic**

To treat victims of poisonous chemicals the poison centres need to be established at national, state and regional level. These centres shall have competency to treat the victims by appropriate antidotes. MoEF will coordinate with Ministry of Family Welfare in long term.

### 4.3.3 Community

MoEF and NDMA will have to jointly launch a long term programme for the community awareness. The focus should also include do's and don'ts in local languages based on advance finding of on-site, off-site, safety reports, safety audits and mock drills etc. District administration should be directed through SDMA to make awareness hoardings at common places along with the regular publication of do's and don'ts in popular local newspapers / e-media.

Corporate driven initiatives such as the Corporate Social Responsibility (CSR) and Responsible Care (RC), have very high potential to address the pertinent issue of Chemical/Industrial disaster management. The corporate/ chemical industries need to capacitate the communities surrounding the Chemical/Industrial plants.

Local/regional NGOs also have important role to play, in order to sensitize the communities residing in the vicinity of hazardous industrial unit. Therefore the NGOs and volunteers also need to be trained prior to or along with community. Afterwards NGOs can further sensitize the communities and local residents.

### 4.3.4 Request for development of State Action Plan

NDMA will advocate all the SDMAs to draft the action plan in time phase manner for capacity development of all above stake holders as discussed to elevate the capability at state level. All SDMAs will have to submit their plan to NDMA. The detail recommended actions have been tabulated in Table 4.3

**Table 4.3: Recommendations for Action on Capacity Building with Time Frame**

| S.no. | Items to be addressed | Recommendation for action | Ministries for action | 0-2 Year | 2-5 Year | 5-8 Year |
|---|---|---|---|---|---|---|
| 1. | Regulators and Administrators | | | | | |
| | 1. Regulators | Action as addressed in point no. 4.3.1.1 | NDMA and SDMAs | √ | | |
| | 2. Administrators | Action as addressed in point no. 4.3.1.2 | NDMA and SDMAs | √ | | |
| 2. | First Responders | | | √ | | |
| | 1. Fire Department | Action as addressed in point no. 4.3.2.1 | NDMA and SDMAs | √ | | |
| | 2. Police Department | Action as addressed in point no. 4.3.2.2 | NDMA and SDMAs | √ | | |
| | 3. Medical Department | Action as addressed in point no. 4.3.2.3 | NDMA and SDMAs | √ | | |
| 3. | Request for development of State Action Plan | Action as addressed in point no. 4.3. 4 | NDMA and SDMAs | √ | | |

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