



Proceedings of National Webinar with States/Union  
Territories for conducting a Hazard Vulnerability and  
Risk Assessment (HVRA) study

Conducted on: 7th April 2021

**National Disaster Management Authority**

New Delhi

June 2021

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**Proceedings of National Webinar with States/Union Territories for conducting a Hazard Vulnerability and Risk Assessment (HVRA) study**

**June 2021**

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National Disaster Management Authority  
Ministry of Home Affairs  
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## Acknowledgements

India, being a vast country, has a varied exposure to hazards and vulnerabilities. Various disasters cause huge loss of life and economic loss as well. In order to prepare better, we have to understand the probable hazards in an area, types of vulnerability prevailing and amount of risk posed by these hazards. Hazard Vulnerability and Risk Assessment (HVRA) is the study which assesses these components with the help of technical experts and provides risk mitigation strategy. In order to imbibe technical know-how and encourage States/UTs to conduct HVRA, NDMA has organised a national webinar.

Shri Sanjeeva Kumar, Member Secretary, NDMA, chaired the webinar and delivered the inaugural address. Shri. Rajendra Singh, Member-NDMA and Shri. Kamal Kishore, Member-NDMA had also graced the occasion. Joint Secretary (DM) of Ministry of Home Affairs, Shri. Sanjeev Jindal delivered a special address. Dr. Pavan Kumar Singh, Joint Advisor (Ops) delivered the welcome address.

Dr. V. Thiruppugazh, Additional Secretary (Policy and Plan), NDMA, has been making efforts to encourage the process of conducting HVRA at the national level. With the experience of the national HVRA study, which is under process, NDMA would like to take the States/UTs along in the process. Under the guidance of AS (PP), the National Webinar to enable the States/UTs was conducted. This webinar is the first of many more webinar/workshops to be conducted.

Coordination with various States was carried out by NDMA's Officers and Consultants alike. Shri. Bhupinder Singh Director (PR&AG); Shri. ML Sharma, Deputy Secretary (RR); Dr. Sushanta Jena, Joint Advisor (RR); Shri. Pankaj Kumar, Under Secretary (PP); Shri Manoj Kumar Jangir, Under Secretary (PR&AG); Dr. Brijender Mishra, Consultants (GIS); Shri. Jayant Raushan, Consultant (Chemical); Dr. Swati Sulagna (Sr. Consultant, Climate Change); Shri Anup Kumar Srivastava, Sr. Consultant (Drought); Shri. Dherya Saraswat, Sr. Consultant (EQ&T); Dr. Raja Chakraborty, Sr. Consultant (GIS); Shri Abhishek Shandilya, Sr. Consultant (IEC); Dr. Ravinder Singh, Sr. Consultant (LS); Dr. Sanjay Kaushal, Sr. Consultant (Medical); Shri. Anuj Tiwari, Sr. Consultant (Policy, Plan & Mainstreaming); Shri. D. Sundaram, Consultant (Nuclear & Radiological); Smt. Maitreyee Mukharjee, Sr. Consultant (Psychosocial); Kum. Aadita Saxena, Consultant (Social media); Shri. Mohd. Javed Iqbal, Jr. Consultant (EQ); Shri. Shishir Agarwal, Sr. Consultant (Disaster Risk Finance); Shri. Prasoon Singh, Consultant Gr-II (Flood); Shri. Abhishek Sarma, Senior Research officer (Mitigation) and Shri Ajay Katuri (Sr. Consultant- Vulnerability and Risk Assessment) had contacted all the States/UTs for encouraging them to participate in the webinar.

Writing of these proceedings was a collective effort as well. Shri Ajay Katuri, Sr. Consultant (Vulnerability and Risk Assessment) had coordinated the webinar and compiled the proceedings. Shri. Anuj Tiwari (Sr. Consultant, Policy, Plan & Mainstreaming) had anchored the webinar and conducted it successfully.

The technical experts who delivered presentations in the workshop include, Shri. Kamal Kishore, Member-NDMA; Prof. Dr. CVR Murty, Professor, IIT-Madras; Shri. Anup Karanth, the World bank; Shri. Ravinesh Kumar, Financial Advisor, NDMA; Shri. Ajay Katuri, Sr. Consultant (Vulnerability and Risk Assessment), NDMA had highlighted the importance of conducting a HVRA at the State/District level and encouraged the representatives to initiate the process in their own jurisdiction. Experiences from the States were shared by Shri. Victor

Mecwan, ACEO, Gujarat State Disaster Management Authority, Shri. Vivek Sharma, HPSDMA, Dr. Piyoosh Rautela, UKSDMA from their respective States, which have prepared the HVRA atlas earlier.

The response for the webinar was overwhelming. A total of 480 individual connections were made to the webinar link. This wouldn't have been possible without the support from the Chief Secretaries of States/UTs; Secretary-in-Charge of Revenue/Disaster Management departments; Heads of State Disaster Management Authorities; all departments and their heads who attended or nominated representatives to attend this National webinar.

NDMA would like to express its gratitude to all the individual participants and State/UT representatives for attending the webinar and taking part in the discussion.



**Webinar with States/UTs for training on conducting Hazards,  
Vulnerability and Risk Assessment (HVRA) studies**

**7<sup>th</sup> April 2021 from 10:30 to 13:30**

**Agenda**

<b>Time</b>	<b>Particulars</b>	<b>Guest/Speaker</b>	<b>Time allotted</b>
10:30 hrs.	<b>Signing-in and introduction of all participants</b>		<b>5 min</b>
<b>Inaugural Session</b>			
10:35 hrs.	Welcome address	Dr. Pavan Kumar Singh, JA (Ops), NDMA	05
10:40 hrs.	Special address	Shri. Sanjeev Kumar Jindal JS (DM), MHA	07
10:50 hrs.	Inaugural address	Shri. Sanjeeva Kumar, Member Secretary- NDMA	10
<b>Technical Sessions</b>			
11:00 hrs.	Concepts of Hazard, Vulnerability and Risk (HVRA) and climate change Legal framework for HVRA –DM Act, NDMP, SDMP, DDMP	Member (KK)	20
11:20 hrs.	Quality and Cost Based Selection (QCBS) and Least Cost System (LCS)	Shri. Anup Karanth, The World Bank	20
11:40 hrs.	Preparation of Terms of Reference (ToR) and Request for Proposal (RfP) for a HVRA	Shri. Ajay Katuri, Sr. Consultant, NDMA	20
12:00 hrs.	General Financial Rules, 2017, Estimation of expenditure and Budgeting for a project management	Shri. Ravinesh Kumar, FA, NDMA	20
12:20 hrs.	How to decide the resolution (scale) of the deliverables?	Prof. Dr. CVR Murty, IIT-Madras	20
12:40 hrs.	Finalising the Team Leader (TL) and Technical Team required	Prof. Dr. CVR Murty, IIT-Madras	20
13:00 hrs	Presentation by Gujarat on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Victor Mecwan, ACEO, Gujarat State Disaster Management Authority (GSDMA)	10
13:10 hrs	Presentation by Himachal Pradesh on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Vivek Sharma, Himachal Pradesh State Disaster Management Authority (HPSDMA)	10
13:20 hrs	Presentation by Uttarakhand on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Piyoosh Rautela, Uttarakhand Disaster Management Authority (USDMA)	10
13:30 hrs.	<b>Question and Answers / Discussion</b>		<b>30</b>
14:00 hrs.	<b>Vote of thanks and closure</b>		<b>05</b>

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## 1. Inaugural Session

### 1.1 Welcome address: Dr Pavan Kumar Singh, Joint Advisor (Operations), NDMA



Figure 1 Dr. Pavan K Singh, Joint Advisor (Ops), NDMA

Welcoming all the participants and dignitaries in the webinar, Dr Singh explained the importance and role of HVRA studies in disaster management. He emphasised on conducting the HVRA studies for all the States/UTs. He said that the webinar will be helpful in updating the existing knowledge, financial implications in the process of conducting HVRA, and will provide the insights for preparation of TOR and RFPs to conduct HVRA activities by the States. He outlined the structure of the webinar and said that

the presentation by the States and other speakers during the webinar will help in understanding the use of HVRA in planning of disaster management.

Talking about the provisions under DM Act 2005, he said that the Act pragmatically looks into all six components of disaster management. The merit of such an approach lies in the fact that “the pain we take in the first phase of disaster management i.e., preparedness, prevention and mitigation reduces our burden and has an inverse relationship during response, recovery and rehabilitation.” He also said that the HVRA Study has to be the integral part of the disaster Risk reduction planning as indicated in the NDMP and Guidelines issued by National Disaster Management Authority for preparation of Disaster Management Plans for States/UTs.

He said that NDMA is evolving a methodology to conduct HVRA studies in the State. The pilot intervention is going to be implemented in Kerala and Mizoram. The methodology developed through these pilot interventions will help other States to conduct their own HVRA studies. The resulting risk maps and Atlas will support in decision making and prioritising their resource utilisation in disaster risk management.

## 1.2 Special address: Shri. Sanjeev Kumar Jindal, JS (DM), MHA

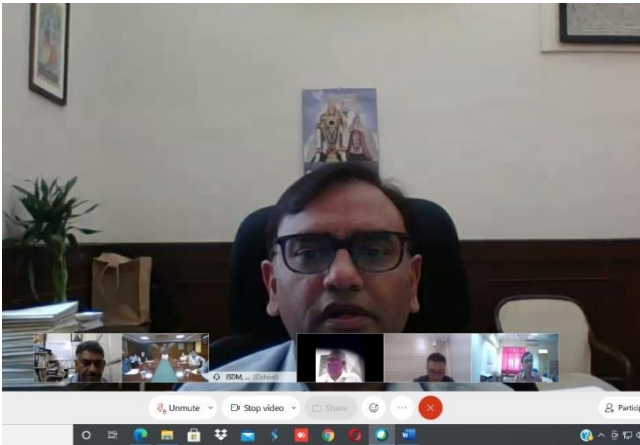


Figure 2 Shri. Sajeev Kumar Jindal, JS (DM), MHA

In his special remarks, Mr. Sanjeev Jindal welcomed all the participants and dignitaries for attending this webinar and appreciated NDMA for taking up this webinar on an important issue like HVRA. He emphasised the importance and role of HVRA studies in disaster management at the State and District level. He said that HVRA is a systematic approach and has practical implications, even for resource allocation, and it should be included in all our disaster management activities.

He emphasised on the use of available technologies and tools for hazard characterisation, data analysis and hazard mapping. These technologies have been used widely at national and international level in various disaster management activities and multi-hazard risk assessments.

Citing the example of use of space technology in disaster management, he said that the NRSC has undertaken work for Kerala, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Arunachal Pradesh and Jammu & Kashmir for creating aggregated flood maps which helps in risk assessment and overall disaster management initiatives at various levels.

At the end of his address he thanked NDMA for providing the opportunity to share his thoughts and hoped that the webinar will be useful in generating knowledge and understanding in conducting HVRA studies at State/UTs level.

## 1.3 Inaugural address: Shri. Sanjeeva Kumar, Member Secretary, NDMA



Figure 3 Shri. Sanjeeva Kumar, Member Secretary-NDMA

In his inaugural address, Member Secretary started off by complimenting the NDMA team for conceptualising and starting this new initiative of HVRA with the States and UTs. He said that the objective of this webinar is to demystify the idea of HVRA, as there is a lack of understanding about HVRA studies within the practitioners who are working in the area of disaster management. In this regard, this webinar will help in understanding the nitty-gritty of HVRA and add value in our existing knowledge. Talking about the disaster profile of India, he said that due to

geological and ecological climate conditions, India is one of the most disaster-prone countries of the world and there are many factors that could be affecting vulnerabilities and risks of a particular area. In order to address these issues, it is important to know the problem first, which is the foremost priority for understanding disaster risk. He emphasised that disaster risk management should be based on understanding the disaster risk with all its dimensions i.e., vulnerability, capacity, exposure of persons and assets, and the existing environmental conditions. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.

Talking about the ten-point agenda for disaster risk reduction initiated by the Hon. Prime Minister during Asian Ministerial Conference on DRR (Disaster Risk Reduction), he said that the ten-point agenda also emphasised on understanding the disaster risk, as one of the agenda points clearly mentioned that all development sector must imbibe the principles of disaster risk management. This can be possible only by understanding the disaster risk. He said that NDMA also assigns utmost importance to the aspect of understanding risks and in the National Disaster Management Plan (NDMP), this has been included as one of the thematic areas for risk reduction and mitigation of all disasters covered in it.

Talking about the importance of HVRA, he said that it is a pre-requisite for any development planning and investment exercise. There is a need to prioritise and optimise the available resources within the State and make their best use keeping in mind the aspect of disaster risk reduction in all developmental planning.

Talking about the work and collaborations of NDMA on DRR, he said that the NDMA is working closely with all concerned departments and agencies. NDMA has engaged CWC, NRSC and IMD for preparation of flood hazard atlas of flood-prone states and cumulative flood maps of less flood-prone States. Flood hazard atlases of Assam, Odisha and Bihar have been prepared while those of Andhra Pradesh, West Bengal and Uttar Pradesh are in process. Cumulative flood maps have been prepared for Kerala, Tamil Nadu, Karnataka, Maharashtra, Gujarat, J&K and Arunachal Pradesh.

Talking about the socio-economic vulnerabilities and associated risks, he emphasised on the inclusion of anthropogenic factors such as demographic conditions, deforestation, unscientific development for agricultural practices, construction of large dams, river channels, etc., beside natural factors while conducting HVRA Studies. He also elaborated upon climate change and its impacts and challenges in terms of changing weather patterns, changing of frequency and intensity of many natural hazards, which should also be looked at while conducting HVRA studies. He emphasised that the States which have not conducted the HVRA studies should learn from the experience of the States which have already conducted the HVRA such as Gujarat, Himachal Pradesh, Uttarakhand.

In his closing remarks he said that this webinar will help States/UTs in conducting HVRA and benefit in their risk assessment and disaster management planning and thanked all the participants for their active participation.

## 2. Technical Sessions

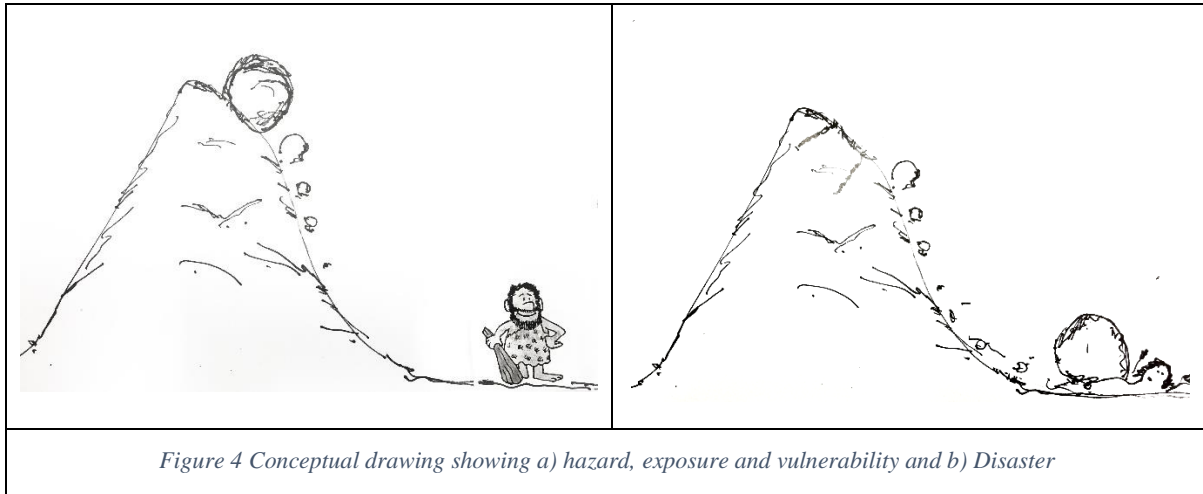
### 2.1 Concepts of Hazard, Vulnerability and Risk (HVRA) and climate change; Legal framework for HVRA –DM Act, NDMP, SDMP, DDMP: Shri. Kamal Kishore, Member, NDMA

Shri Kamal Kishore, Member, NDMA gave a brief overview of the concept of Hazard, Vulnerability and Risk Assessment. He explained basic terms such as hazard, exposure, vulnerability, capacity and disaster risk.

He spoke on the importance of learning from previous events to understand disaster risk and to reduce those risks. He mentioned about the following twelve steps of Risk Assessment as given below:

- 1) **Target area for risk assessment:** Identification of target area and stakeholders such as Central Government, Local Government, Operators of Critical Facilities, businesses, social leaders, religious organisations.
- 2) **Stakeholders and transparency:** Establish steering committee, Peer review committee for credibility and transparency. Decide hazard types for risk assessment such as earthquake, flood, cyclone, fire etc.
- 3) **Hazard data collection:** Collect, compile and collate primary and secondary data of hazards. Identification of data gaps and to conduct primary investigations.
- 4) **Exposure:** Exposure of population, infrastructure, critical facilities and other assets. Map of exposure is based upon the secondary data mostly.
- 5) **Understand vulnerability and capacities:** Design standards, building codes and compliance, systems, social networks, religious and political cohesions, traits and existing legal and policy stipulations.
- 6) **Technical Analysis:** Intensity – Casualty Model (statistical and mathematical), Damage severity Model (Vulnerability/fragility Curve). Loss estimates: Death, Casualty, Damage/collapse of houses, facilities and preparation of loss maps and its distributions.
- 7) **Confirmation of Loss Estimation:** Visits/interviews with operators of critical facilities to discuss findings critically, and make corrections, modifications. Encourage to identify corrective measures.
- 8) **Translate Loss Estimates into Simple Language:** Simple maps, stories, cases, cartoons, reports to communicate the findings/outcomes.
- 9) **Scenario Workshop:** Collective confirmation of estimation, explore inter-sector linkage, synergy possibilities and possible action plans for mitigation.
- 10) **Risk Management Solutions:** International practices, good cases, long list of initiatives for risk management and priority criteria (interview structures).

- 11) **Action Planning for Earthquake Risk Management:** Action plan objectives, prioritisation criteria and workshop: Plan (who, what, when, costs, implementation strategy) for implementing risk reduction action on the basis of risk assessment.
- 12) **Write, distribute and educate Action Plan:** Document, advocate, promote plan implementation, support initiatives, remind and monitor plan implementation and update/ modify plan.



He mentioned that risk assessment is a rapidly expanding area of work. In India, risk assessment and comprehensive HVRA studies have been done in Gujarat, Himachal Pradesh, Uttarakhand. He emphasised that risk is not static. As the land-use changes and more people starting living in areas prone to hazards, the risk changes. Therefore, risk assessments need to be updated regularly.

Depending on the purpose of the risk assessment, available data, and available expertise, many different kinds of methodologies can be adopted for risk assessment. He illustrated this point with the examples of earthquake risk assessments. In case of earthquake, there are many methodologies for risk assessment that have different implications in terms of cost, kind of expertise needed, updates, software, training required, impact etc. Risk changes with time, therefore, it is required to update the risk assessment as per change in land-use pattern.



Which Methodology? Earthquake example

	RADIUS	ATC	HAZUS
Ease to use	1	5	25
Time for Assessment for a small city	1 week	1 month	3-6 months
Who can do?	Technical plus non-technical	Technical (engineer, geologist)	Specialist
Consultant need	1 person week	1 person month	3 person month
Software	Free	Free	Free (need to make request)
Training Required	Can be done in the week	On-the-job training	Special training (1-2 weeks)
Costs			
Impact	<ul style="list-style-type: none"> <li>Awareness of Decision Makers</li> <li>Educational Tool</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate multi-sector discussion/collaboration</li> </ul>	<ul style="list-style-type: none"> <li>most precise but not for awareness</li> <li>Not for engagement of decision-makers</li> </ul>

Figure 5 How to select a methodology

NDMA initiatives of multi-hazard HVRA studies of Kerala and Mizoram are important to institutionalise the methods within the country. In the end, he said that the field of risk assessment is advancing very rapidly to have the capacity to take actionable and doable steps. There are very few institutions having expertise in risk assessment; therefore, India requires institutionalising HVRA at every level of developmental planning.

**2.2 Quality and Cost Based Selection (QCBS) and Least Cost System (LCS):**

**Shri. Anup Karanth, The World Bank**

Shri Anup Karanth, made a brief presentation on QCBS and LCS. He mentioned various methods of consulting and hiring of consulting services and regional assessment with transboundary impacts of hazards. He also spoke about the national assessment as done for cyclone under National Cyclone Risk Mitigation Project (NCRMP) in NDMA for scientific assessment of cyclone as well as collation of all datasets related to cyclone hazards and risk assessment.

Further, he urged to assimilate all information available and create a Decision Support System (DSS). The purpose and use of this DSS is to determine which effort is done for risk assessment. There is also a need of DSS at the control-room for taking future actions. Scenario planning exercise is also required for execution of mock drills such as dam break analysis. He said, emergency response is required on the basis of scientific inputs. The DSS should be embedded in the hazard risk vulnerability assessment. He mentioned that the Government of Andhra Pradesh has done a good work to decipher risk through HVRA and collate data for decision making processes on GIS platform.

He emphasised upon the importance of data sharing for the consulting services with mining of data and MoUs to be done after the risk assessment for implementation of projects such as flood risk assessments. He mentioned that the only hindrance in any assessment is data sharing and experts spending a lot of time in data collection. Therefore, scientific data could be made available through a GIS portal so that risk assessment could be done in a proficient manner.

Advisory and project related consulting services include, feasibility studies, project management, engineering services, finance and accounting services, training and development. Further, he explained the methods of selecting consulting firms on the basis of quality and cost

of services. He also mentioned about the manual of procurement from the Ministry of Finance for selection of any firms on the basis of three methods i.e., Quality and Cost Based Selection methods and Direct Selection Source. Further, he mentioned that QCBS method is followed globally on the basis of weightage. He explained the selection methods, service providers and shortlisting of consulting agencies such as PSUs in detail as given below:

**The selection methods for consulting firms**

**A) Section 3.7 Systems of Selection of Service Providers: Manual for Procurement of Consultancy and Other Services (2017, Ministry of Finance)**

- i) Price based System – Least Cost Selection (LCS)
- ii) Quality and Cost Based Selection (QCBS)
- iii) Direct Selection: Single Source Selection (SSS)

**B). Section VII. Approved Selection Methods: Consulting Services | World Bank Procurement Regulations for IPF Borrowers (Fourth Edition, Nov 2020)**

- i) Quality Cost Based Selection (QCBS)
- ii) Fixed Budget Based Selection (FBS)
- iii) Least Cost Based Selection (LCS)
- iv) Quality Based Selection (QBS)
- v) Consultant’s Qualifications Based Selection (CQS)
- vi) Direct Selection

**Quality and Cost-Based:**

- QCBS is a competitive process among Shortlisted consulting firms under which the selection of the successful firm takes into account the quality of the Proposal and the cost of the services.
- The RfP document shall specify the minimum score for the Technical Proposals.
- The relative weight to be given to the quality and cost depends on the nature of the assignment.
- Among the Proposals that are responsive to the requirements of the request for proposals document and are technically qualified, the Proposal with the highest combined (quality and cost) score is considered the most advantageous proposal.

**Least Cost-Based:**

Similar to QCBS, LCS is a competitive process among Shortlisted consulting firms under which the selection of the successful firm takes into account the quality of the Proposal and the cost of the services. LCS is generally appropriate for assignments of a standard or routine nature (such as engineering designs of non-complex Works), for which well-established practices and standards exist. The RfP document specifies the minimum score for the Technical Proposals. Among the Proposals that score higher than the minimum technical score, the Proposal with the lowest evaluated cost is considered the Most Advantageous Proposal.

- Minimum qualifying marks for quality of the technical proposal are prescribed as benchmark (normally 75 out of maximum 100) and indicated in the RfP along with a scheme for allotting marks for various technical criteria/attributes.
- LCS is considered suitable for recruiting consultants/ service providers for most assignments that are of a standard or routine nature (such as audits and engineering design of non-complex works) where well established practices and standards exist.
- Any bidder that passes these benchmarks is declared as technically qualified for opening of their financial bids.
- **L-1** offer out of the responsive offers is selected on price criteria alone without giving any additional weightage to marks/ranking of technical proposal.

### **Direct Selection**

Proportional, fit-for-purpose, and Value for Money (VfM) considerations may require a direct selection (single-source or sole-source selection) approach, that is: approaching and negotiating with only one firm. This selection method may be appropriate when only one firm is qualified, a firm has experience of exceptional worth for the assignment, or there is justification to use a preferred firm.

The selection by SSS / nomination is permissible under exceptional circumstances such as:

- i) Tasks that represent a natural continuation of previous work carried out by the firm;
- ii) In case of an emergency situation, situations arising after natural disasters, situations where timely completion of the assignment is of utmost importance;
- iii) Situations where execution of the assignment may involve use of proprietary techniques or only one consultant has requisite expertise;
- iv) At times, other PSUs or Government Organisations are used to provide technical expertise. It is possible to use the expertise of such institutions on a SSS basis;
- v) Under some special circumstances, it may become necessary to select a particular consultant where adequate justification is available for such single-source selection in the context of the overall interest of the Ministry or Department.

Full justification for single source selection should be recorded in the file and approval of the competent authority obtained before resorting to such single source selection.

### **Systems of Selection of Service Providers**

- Since the quality and scope of a consultancy assignment are not tangibly identifiable and consistently measurable, the technical and financial capability of consultants becomes an important, though indirect determinant for quality and scope of performance.
- In such a situation **Value for Money (VfM)** is achieved by encouraging wide and open competition among equally competent consultants. Thus, selection of consultants, is normally done in a two-stage process.

- In the first stage, likely capable sources are shortlisted, if need be, through an ‘Expression of Interest’ (EoI), through advertisement. On the basis of responses received, consultants meeting the relevant qualification and experience requirements for the given assignment are shortlisted for further consideration. The shortlist should include a sufficient number, not fewer than three (3) and not more than eight (8) eligible firms.
- In the second stage, the shortlisted consultants are invited to submit their technical and financial proposals in separate sealed envelopes. Evaluation of the technical proposal is carried out by evaluators without access to the financial part of the proposal. Financial proposals are opened after evaluation of quality.

### **Shortlisting - Consulting Services**

- In a competitive procurement for Consulting Services, the Borrower is required to prepare a short list of firms. The Borrower attaches a Terms of Reference to a Request for Expressions of Interest document.
- The shortlist must only include firms that expressed interest and that have the relevant experience, managerial and organisational capabilities for the assignment. The shortlist must be no fewer than 5 and not more than 8 eligible firms.
- The Bank may agree to short list smaller number of firms when:
  1. There are not enough qualified firms having expressed interest for the specific assignment;
  2. When enough qualified firms could not be identified;
  3. When the size of the contract or the nature of the assignment does not justify wider competition.

### References:

- PROCUREMENT IN INVESTMENT PROJECT FINANCING (IPF) Goods, Works, Non-Consulting and Consulting Services (Fourth Edition, November 2020)  
<https://pubdocs.worldbank.org/en/178331533065871195/Procurement-Regulations.pdf>
- Procurement Guidance - A beginner’s guide for Borrowers Procurement under World Bank Investment Project Financing  
<https://pubdocs.worldbank.org/en/684421525277630551/Beginners-Guide-to-IPF-Procurement-for-borrowers.pdf>
- Manual for Procurement of Consultancy & Other Services (2017, Ministry of Finance)  
[https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20Consultancy%20and%20Other%20Services%202017\\_0.pdf](https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20Consultancy%20and%20Other%20Services%202017_0.pdf)
- VALUE FOR MONEY | GUIDANCE NOTE ON PROCUREMENT (JUNE 2018)  
<https://www.adb.org/sites/default/files/procurement-value-money.pdf>

### **2.3 Preparation of Terms of Reference (ToR) and Request for Proposal (RfP) for a HVRA: Shri. Ajay Katuri, Senior Consultant (HVRA), NDMA**

Shri. Ajay Katuri, Senior Consultant, NDMA had presented the process of preparing the Terms of Reference (ToR) and writing a Request for Proposal (RfP). He distinguished between the internal and external processes. While, Preparation of a concept note, identification of the hazards, vulnerabilities and risks to be covered; identification of the study area/jurisdiction and Securing the budget are internal processes; writing and announcing the Expression of Interest onwards, fall under external processes. He mentioned that once the EoI is announced, Consulting Agencies will apply and shortlisting based on the criteria given in ToR will be done. Then the shortlisted Agencies will be invited for submitting their Technical and Financial proposals as per the issued RfP.

He highlighted the importance of ToR, as it is the binding document for any dispute resolution at a later stage. ToR is a description of the technical work involved in a project, or part of a project. Specifically, it is used to specify the work required from an external consultant, contractor, or supplier. The Client/Proposer develops the Terms of Reference which is included within the bidding documents for the vendor, and subsequently becomes a part of the contract.

Shri. Katuri further explained the contents of Terms of Reference and Request for Proposal. He also explained the process and contents of the Technical as well as the Financial Proposals. In the process of explaining the process of RfP, he also explained the Criteria of evaluation, constitution of Technical Evaluation Committee and preparation of templates for submission of bids.

### **2.4 General Financial Rules, 2017, Estimation of expenditure and Budgeting for a project management: Shri. Ravinesh Kumar, Financial Advisor, NDMA**

Shri. Ravinesh Kumar, Financial Advisor, NDMA delivered a presentation on General Financial Rules (GFR) 2017. The purpose of the presentation was to empower participants with the knowledge for estimation of expenditure and budgeting for project management. The need for GFR was explained for effective project management along with GFR provisions and general principles related to expenditure. Shri. Ravinesh Kumar explained the Standards of Financial Propriety along with providing details on Quality and Cost Based Selection i.e., Consulting Service, identification of service required to be performed by consultants, preparation of scope of the required consultant, estimating reasonable expenditure, identification of likely resources, shortlisting etc.

Methods of QCBS were also explained in detail i.e., Least Cost System (LCS), Single Source Selection etc. Features of Project formulation and budget in project management were also highlighted in the presentation. Cost Analysis and Risk analysis of the projects were also explained at the end of the presentation.

He also explained the mechanism for budget estimation in the Government of India and as to how the funds flow for the ensuing year has been planned at least 6 months prior to the commencement of the FY, so that it can be incorporated in the budget estimates.

## **2.5 How to decide the resolution (scale) of the deliverables: Prof. CVR Murty, Professor, IIT-Madras**

The presentation started with the basic definitions. ‘Exposure’ refers to population likely to be affected by the negative fallout of a ‘Hazard.’ ‘Vulnerability’ refers to built environment not capable to resist the negative effects of hazards (this is the reason why collapsed built environment is a significant part of the post-disaster scenario in India). ‘Risk’ refers to a cumulative negative consequence of *Hazard*, *Exposure* and *Vulnerability*. There is a need to estimate *Risk* arising from damage or loss of the built environment before the event occurs. Hence, the three constituents of *Risk* require to be quantified accurately.

Competent subject specialists are required to assess Risk, who have 20 to 25 years of hands-on experience working in the field. Of the three constituents of Risk, the second and third alone are controllable before the disaster – the first one (*Hazard*) is in the hands of nature, the second one (*Exposure*) in the hands of municipal bodies, and the third one (*Vulnerability*) in the hands of architects and engineers. A number of subject specialists from different backgrounds are involved in assessing these three constituents of Risk. *Hazard* is estimated by a spectrum of specialists, including seismologists, climate scientists (wind, air, water), seismotectonists, pollution scientists, and forest rangers; structural engineers and geotechnical engineers also participate in estimating the hazard. Persons actually involved in the development of built environment help assess *Vulnerability*, including fire engineers, civil engineers, chemical engineers, electrical engineers, architects, structural engineers, construction engineers and geotechnical engineers. *Exposure* is understood best by architects, town planners, sociologists and municipal engineers. And, to integrate these three components to arrive at the Risk involved, there is a need for virtually everyone to be involved in the decision making and implementing the development of built environment – including lawmakers, managers, town planners, mathematicians, architects, economist, sociologists, modellers, statistician, financial and GIS specialists.

For effective Disaster Management (DM), Risk assessment is the starting point for planning effective actions along six aspects of the DM cycle – *Prevention*, *Mitigation*, *Preparedness*, *Response*, *Rehabilitation* and *Reconstruction*. The States along the Indo-Gangetic Plains (the large part of Northern part of India with soft soil sediment) will require putting in extra efforts, because of the presence of oceanic sediments, presence of water and potential earthquake shaking along the Himalayas, which together accentuate the geotechnical engineering issues and make it critical input to assessing the safety of the built environment.

The level of Risk in a State will determine the extent of disaster and to what extent it will affect neighbouring States. Risks of the neighbouring States also can affect a State. ‘Risk’ considers this aspect, and helps in planning accordingly the post and pre-disaster actions. Risk should be analysed *before* implementing the risk reduction measures and re-analysed after implementing risk measures; thus, it is work in progress. There is final answer, but there is an urgent need to start the process and put in place a system for analysing risk and integrating with the long-term risk reduction methodologies.

### How to decide the resolution (scale) of the deliverables

In a drawing of 1:A scale, ‘A’ refers to the actual size and 1 to drawing size. If A is more than 1 (e.g., 1:2, 1:5, and 1:1000), the items in the drawing are reduced in size. The reduced scale drawings are used by city planners, architects, etc. This scale is used in preparing drawings of Houses, Cities and geological features on earth. Scales like 1:5,00,00,000 show countries, 1:1,00,00,000 a couple of States together and 1:2,00,000 a State distinctly from their adjoining States. On a Survey of India maps of 1:2,50,000 scale, 1 cm on the drawing represents 2.5 km at the real site. 1:50,000 represents a township, 1:10,000 buildings with roads, 1:5000 a building with adjoining houses (but each building is still not clear), 1:2,000 a building identified distinctly and separately. This is the most effective scale for HVRA, asset mapping, etc.

Satellite images are available at different scales of resolution, like 1:2,00,000 (1 cm = 2 km), 1:20,000 (1 cm = 200 m), 1:5000 (1 cm = 50 m), 1:2000 (1 cm = 20 m), 1:1000 (1 cm = 10 m) and 1:500 (1 cm = 5 m). Different scale levels can help identify the objects in terms of different applications. For example, 1:300 identifies a 1-room house, 1:600 a 2-room house, 1:1,200 a 2-lane road, 1:5,000 a building, 1:10,000 a railway station, 1:25,000 a stadium, 1:50,000 a dam, and 1:2,50,000 a Town. To map a Town or city, a 1:1000 scale map (10 m resolution satellite map) is required, and to map a village, a 1:500 scale map (5 m satellite resolution map). A map of 1:2,000 scale or higher is required to undertake detailed HVRA.

Thus, the 3 challenges in deciding the scales of different maps are: (i) Knowing the use, (ii) Deciding the scale, and (iii) Getting the data.

### 2.6 Finalising the Team Leader (TL) and Technical Team required: Prof. CVR Murty, Professor, IIT-Madras

As stated earlier, Risk analysis involves three aspects, namely: (a) Hazard, (b) Vulnerability, and (c) Exposure. Risk assessments can be done at various levels of granularity. *Science* is the basis of assessing the first, *Engineering* of the second, and *Bye-laws* of the third. Risk Assessment can be by procedures positioned at 4 levels, namely:

- (1) *Rapid Qualitative Risk Assessment*,
- (2) *Detailed Qualitative Risk Assessment*,
- (3) *Simple Quantitative Risk Assessment*, and
- (4) *Detailed Quantitative Risk Assessment*.

In risk assessment, the *likelihood* is one aspect and the *impact* is another, and on the basis of this, weights will be given as *low*, *moderate*, *high* and *extremely high*. This weight will be developed as an outcome of probabilistic studies done by a mathematicians, statisticians and modellers. The impacts are calculated by the engineers, architects and hazard assessors.

The team of specialists should be built to undertake HVRA with persons who are have *positive attitude* (*passionate & completed the tasks in the past*) and who are *capable* to complete the task. The former ones will be *Team Leaders (TL)* and the latter *Team Members (TM)*. The TL needs to control the whole process of Risk Assessment, even though she/he may be the subject specialists in just one area. The risk assessment procedure deals with different subjects and no one person can have the full knowledge of all the issues. The TL needs to have clear knowledge in one specific area so that he/she understands the system properly. And once that is in place, the TL can include additional key resource persons for verticals for which additional hands are needed. The most crucial part is the *experience* of the TL; the person

should have led a team at the national level previously. While positive attitude constitutes the first half of the *Competence*, the *experience*, *knowledge* and *skills* constitute the other half of the competence. While recruiting the Team Leader, it should be ensured that the TL should have *financial experience* and *analytical skills* – these aspects should be given as the highest priority during selection. The TL should be able to identify *items* as well as *implement all of them* into the whole scheme of risk assessment and management. The TL should have industrial and market knowledge, ability to endure & work under stress, technical skills, negotiation skills, ability to influence people, good communication and presentation skills, holding academic credentials in finance & risk, strategic thinking capability, understanding of regulations, and networking with different offices.

The TM should have demonstrated expertise in a single area. It could be one of the items mentioned, like *Development & Planning*, *Hazard Assessment*, *Vulnerability Assessment*, *GIS Tools*, *Risk Governance or Management*, and *Regulator Risk*. The TM should have experience of working and completing a task at the state or national level. By completing the task, the TM will have clarity on one's role in a risk assessment team. Also, TM should have *Competences* (i.e., capability to complete the Task, which is largely technical focussed) and *Competencies* (i.e., the way of completing the Task resulting in outcomes, which is largely behaviour focussed).

Assessing the RfPs or the application received is crucial; they should be checked thoroughly regarding the past history and background of the bidders. The 'better mapping and data' is one of the most important key elements in terms of resolution, and the people who are working with these, must be strong individually, as well as collectively. There will be a number of features that the team should have, and while the individuals may not have all the aspects, but the TL and TMs together as a *single team* should be capable of completing the whole procedure. To succeed in picking up a successful team, there is need of both *Competences* and *Competencies*, and not just one. The focus is not just on *knowledge* and *skill*, but also on *positive attitude*, because *attitude* is a way of thinking of someone or something, *skill* is an individual capacity to perform sustain effort, and *knowledge* is the capability to interpret the available information.

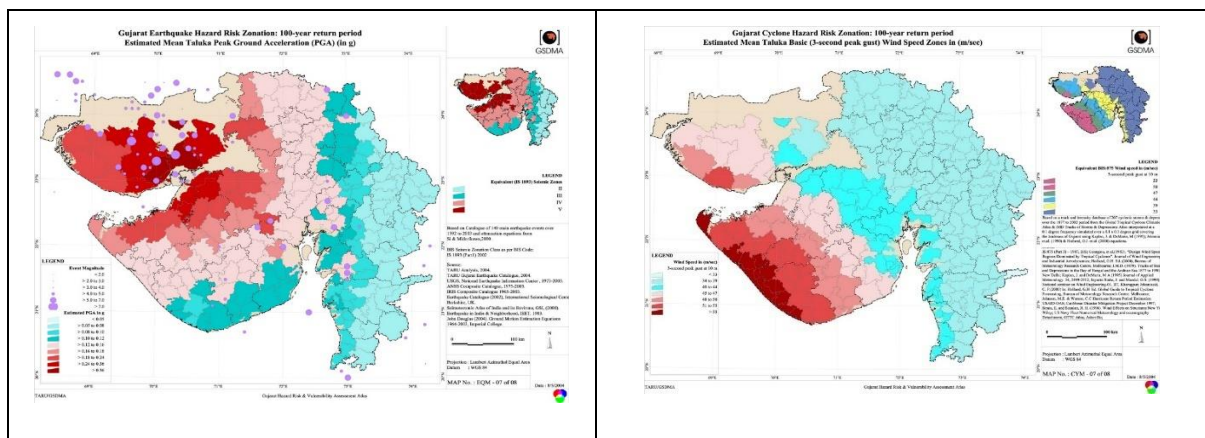


### 3. Presentation by States on how the State is using hazard atlas prepared by them for developmental and other activities

#### 3.1 Gujarat

Shri. Victor Mecwan, ACEO, GSDMA had represented the State of Gujarat and presented how the State is using the HRV Atlas prepared by GSDMA. He explained the HRV Atlas and its details. He informed that this is one of the first comprehensive, scientific sub-regional (Taluka-level) probabilistic risk assessments in the world. It covers six hazards, namely- drought, earthquake, cyclone, storm surge, flood and chemical accidents. This Atlas looks at four-time horizons-10, 50, 100 and 200 year return periods. He said that separate Taluka-level risk assessments were carried out for: Probable Loss of Life, Risk to Economic Output, Risk to Capital stock. Under the Elements at Risk, this Atlas covered buildings, roads & bridges, power systems, ports and airports; Socio-economic vulnerability of populations and vulnerable communities; and Economic vulnerability (all of primary & secondary, much of services sectors). Shri. Mecwan mentioned that this Atlas enables systematic risk prioritisation by sector, element and hazard type for each Taluka and District, depending on resource availability and helps in the integration with the State Five-Year and District Planning process via key Departments of the Government of Gujarat.

Shri. Mecwan suggested that the Atlas provides a comprehensive understanding of Hazards in terms of Frequency – Return Periods, Intensity / Magnitude – Peak Ground Acceleration (PGA) in earthquake, Gust Speed in cyclones. Through mapping ‘Elements at Risk’, it provides the exposure of Buildings, Critical Infrastructure – Roads, Bridges, Airport, Ports, Transmission Networks. The Atlas shows Risk in terms of ‘loss’ - Damages & losses to buildings, infrastructure, Capital & Revenue Loss due to different hazards and estimation of possible life loss.



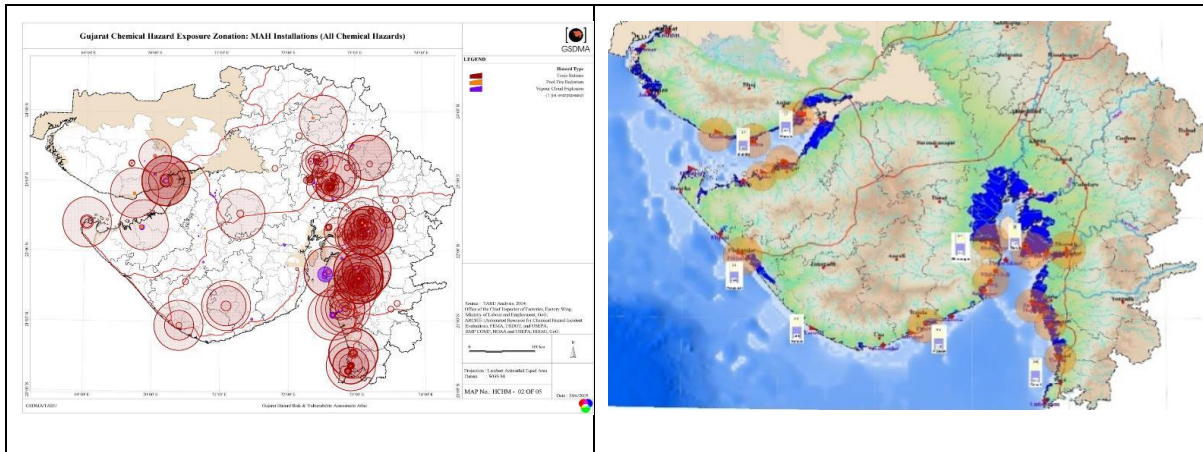


Figure 6 Hazard Assessment for various hazards for Gujarat

He informed that the Atlas is useful in understanding hazard-specific, risk-informed sustainable development, design context-specific strategies for vulnerability, Design long-term sustainable development plans and DRR roadmaps / strategies, Enhanced preparedness based on hazard-specific risk & composite risk. He highlighted that this Atlas was used in Industrial Zoning, Atlas of Gujarat Pollution Control Board has been prepared by using HVRA Atlas of GSDMA which has avoided the conflict of development & natural resources. Allocation of land for the Special Investment Region (SIR) has been carried out using the HVRA atlas, the port & other Coastal development has been regulated based on the storm- surge and Tsunami models in the HVRA Atlas. Land allocation for various development activities like new cities, industries, universities etc. has been done using the HVRA Atlas.

### 3.2 Himachal Pradesh

Shri. Vivek Sharma presented how the HVR Atlas of Himachal Pradesh is being used for various purposes. Himachal Pradesh is the second State of the country to carry out State level Hazard Risk and Vulnerability Assessment. The primary objective of the study is to generate basic data, undertake in-depth analysis, to quantify disaster risk levels and associated causal factors and to produce a Vulnerability Atlas for the State. This atlas is available on the official website of the HPSDMA [www.hpsdma.nic.in](http://www.hpsdma.nic.in). Main objectives of the Atlas are: To map out all hazard prone areas at State, district and block level, covering water and climate, geological, environmental, chemical & industrial, biological and accident-related hazards in the State of Himachal Pradesh (with projections for at least next 20 years); To assess the extent of vulnerability, the exposure of people, infrastructure and economic activities to these hazards in consideration of the potential growth for next 20 years; To identify and propose location specific detailed solutions to avoid disaster risks by implementing both structural and non-structural mitigation and prevention measures.

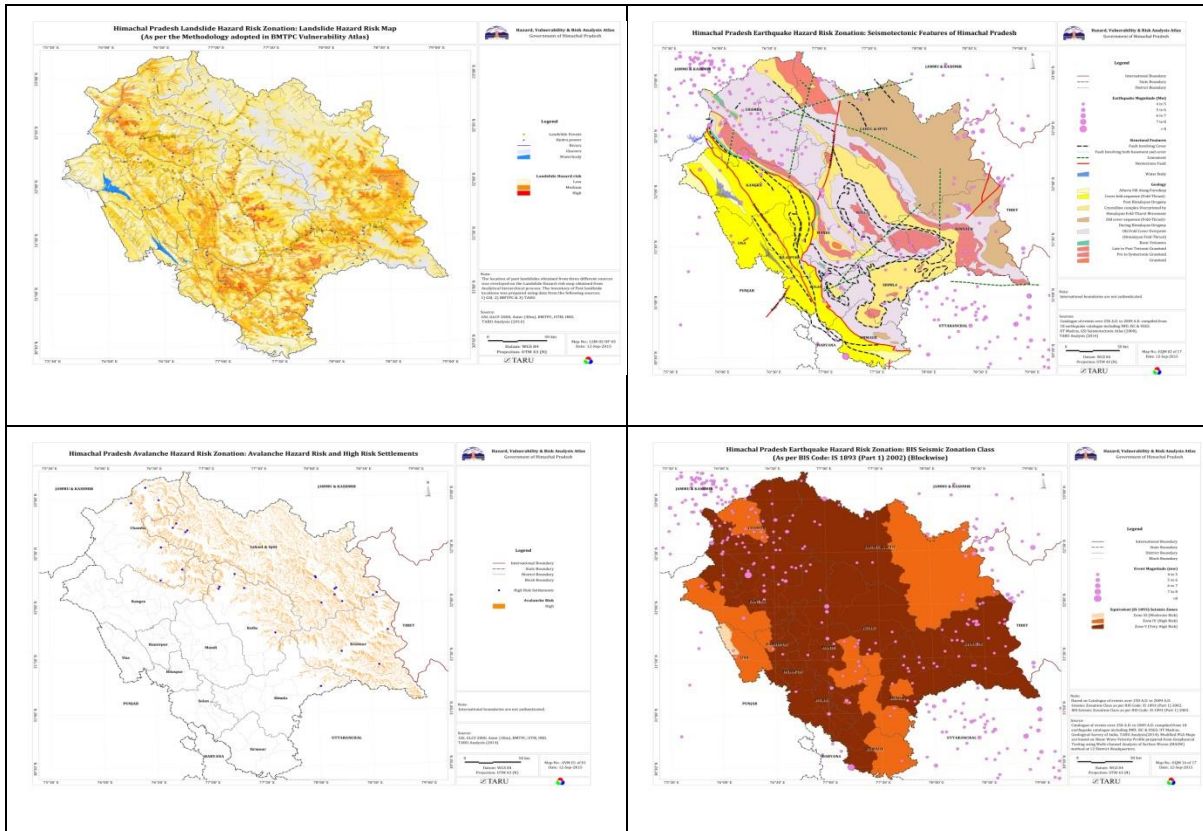


Figure 7 Some sample maps from the HRV Atlas - Himachal Pradesh

He further mentioned that composite risk of each hazard and major economic sectors were assessed and presented in maps. It also depicts the Differently Abled Population (DAP) at Risk and livestock at risk as well.

Shri. Sharma mentioned that considering hazards alone may lead to a skewed set of priorities for action. Hence, it is equally important to consider the severity of possible impacts from the hazard as well as the frequency or likelihood of a hazard event occurring. The combination of severity and likelihood is termed as the ‘level of risk’. In determining the severity of a hazardous event, a community’s vulnerability must be examined. A Hazard Risk and Vulnerability Assessment examines the hazards that may impact a community and the risk that each hazard event poses to the community as a whole and to vulnerable elements of the community. Using an Atlas, a community can make risk-based choices to address vulnerabilities, mitigate hazards and prepare for response to and recovery from hazard events. It also helps the Government to make effective disaster management plans for disaster mitigation and management activities.

He informed that some applications of the HVR Atlas are:

- Identifying and understanding the risks;
- Developing Risk Reduction & Disaster Mitigation Strategies;
- Preparedness and planning for disasters – DM Plans of the State and Districts;
- Forecasting and early warning with Decision Support System (Proposed);

- For relief management & rescue operations;
- Integration in NDEM Portal;
- Sectoral planning and implementation for climate/disaster risk mitigation;
- The Atlas can not only be used for hazard risk identification but also for risk reduction and activities related to future development planning in the State;
- Various DRR Schemes have been launched by HPSDMA based on this HVRA study.

In Himachal Pradesh,

- The HVRA study became the base for updation of the State Disaster Management Plan 2017 and all 12 District Disaster Management Plans.
- The HVRA also inspired the SDMA for preparation of the Departmental DM Plans for 39 departments.
- The Building Vulnerability Assessment in the HVRA gave focus to strengthening of Techno-Legal Regime in the State.
- The Model Building Bye Laws are under revision and process of adoption by the ULBs.
- State Level Scheme on Training of Masons, Bar-Binders, artisans etc. in association with CBRI Roorkee is under implementation.
- Scheme for Structural Safety Audit of Lifeline Structures and Hospital Safety scheme has also been conceptualised and implemented on the basis of this HVRA Study.
- Resource mapping and inventory mobilisation for disaster response.
- GLOF monitoring and basin wise mapping of Moraine Dam & Supra Glacial Lakes using high resolution satellite data in Himachal as well as Tibet Himalayan Region.

Shri. Sharma suggested that the State is looking forward to enhance this study by getting more comprehensive data and layers from various departments for micro-planning, mitigation and prevention, better utilisation of the Mitigation Funds and reducing the disaster risk. He said, the response mechanism will be strengthened by integration of this HVRA study with the Decision Support System in coming years. As a way forward, real time monitoring of the potential threats and strengthening of Early Warning System is also planned for last mile connectivity. The State has also planned to get village boundaries imposed on the HVRA for preparation of the Village Disaster Management Plans, however there is limitation of availability of maps on desired scale for better DM planning.

### 3.3 Uttarakhand

Shri. Piyoosh Rautela represented the State of Uttarakhand and presented the uses of the State HVR Atlas. He informed that the State HVR Atlas used multi-hazard approach with earthquake and fluvial floods as probabilistic; and flash floods, landslides and industrial hazards as deterministic risk assessment. This Atlas is being used for risk communication, State and District DM plans, District/ Tehsil specific mock exercises, Post-disaster damage and impact assessment, Information sharing with districts and line departments and for Floodplain

Zonation. Shri. Rautela said that it is being used for preparing DPRs for retrofitting of more than 100 identified hospital buildings. He said that HVRA is an input for a decision support system, which helped in allocating resources during various disasters in the State. He concluded by saying a disaster database is being prepared for updating the HVRA for the times to come.

#### 4. Question and answers

Dr. Amir Ali from JKSDMA informed that Jammu and Kashmir is conducting HVRA study with WB funding and some deliverables have been submitted.

Shri. Girish Ch. Joshi enquired, if a 5000-year return period is required to estimate as part of the HVRA, as presented by Shri. Ajay Katuri. He asked if as per the National Building Code, if this type of return period needs to be calculated to understand the seismic hazard assessment. Shri. Katuri replied that this 5000-year return period was given as an example and based on the study area, this high return period may be needed. Prof. Murty informed that based on the structures within a State, Bureau of Indian Standards (BIS) is mulling on proposing a return period on higher side, i.e., 2500 year and 5000 year. That is the reason why 5000-year return period is mentioned in the earlier presentation.

Additional Secretary, Dr. Thiruppugazh mentioned that the return period is a direct function of the level of preparedness and as an example, he gave the case of the Netherlands, where flood events of 10,000 years and more are being taken into consideration while preparing a risk assessment. He also cautioned that the cost of conducting such a study may be exorbitant in terms of financial resources needed.

Shri. Aman Pal Singh enquired what measures are being taken by the predecessor States (Gujarat, Himachal Pradesh and Uttarakhand) to keep the HVRA up-to-date, since HVRA is a continuous process. Shri. Victor Mecwan informed that the HVRA is entrusted with each District Collector and they are using the Atlas at the ground level and they are going to update the Atlas.

#### 5. Vote of thanks and conclusion

**Dr. Thiruppugazh, Additional Secretary, NDMA** said that this is a technical webinar targeted at the States/UTs to prepare a HVRA. This is the first of many workshops to impart knowledge and know-how of the HVRA. He also mentioned that lack of technical expertise in the country to conduct the HVRA is worrying. Hence, conducting these types of workshops to increase the technical know-how of HVRA at the district level and community level is important.

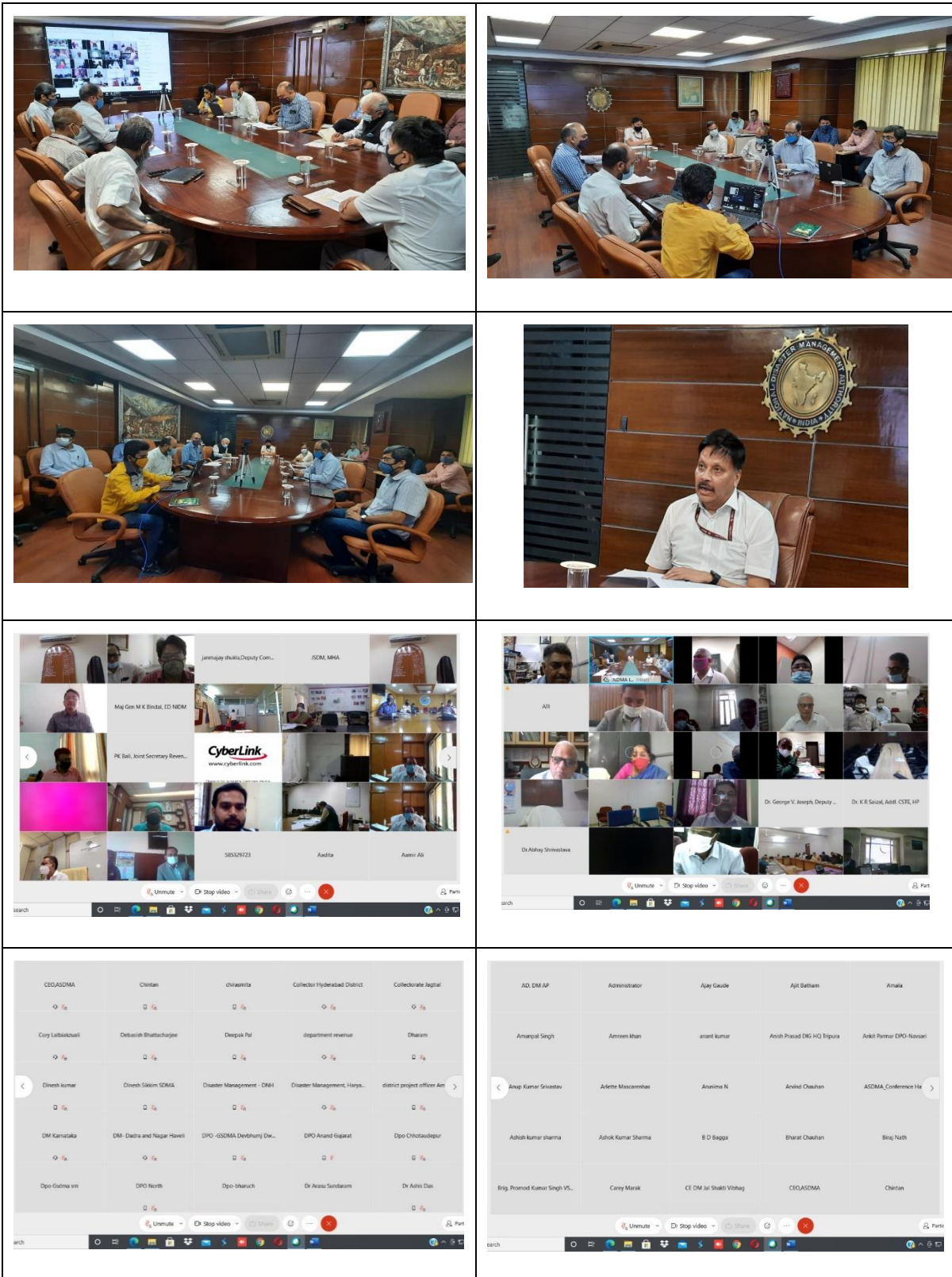
Dr. Thiruppugazh said that the response from the States/UTs has been overwhelming and he thanked all the States/UTs; Chief Secretaries of States/UTs; Secretary-in-Charge of Revenue/Disaster Management departments; Heads of State Disaster Management Authorities; all departments and their heads who attended or nominated representatives to attend this

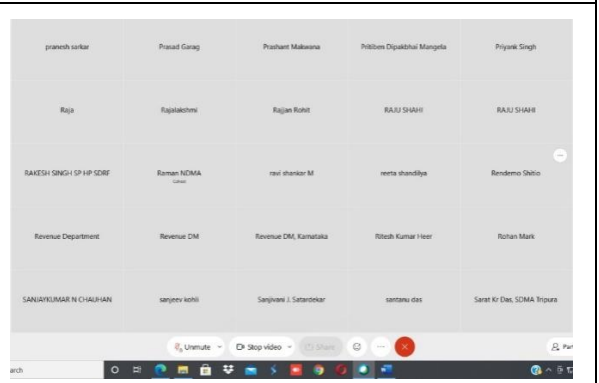
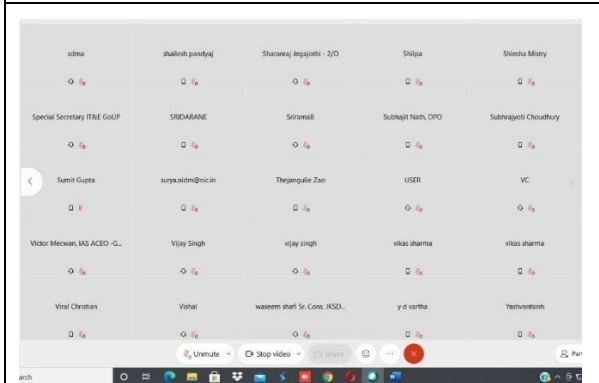
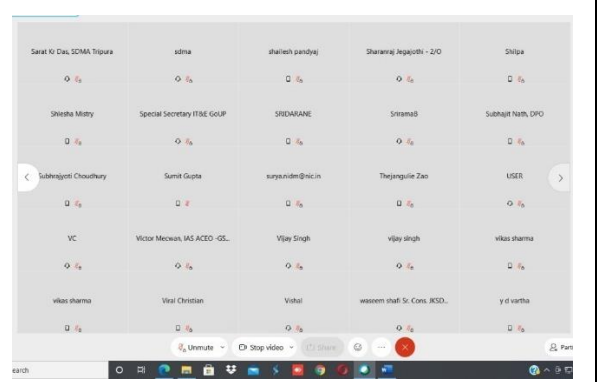
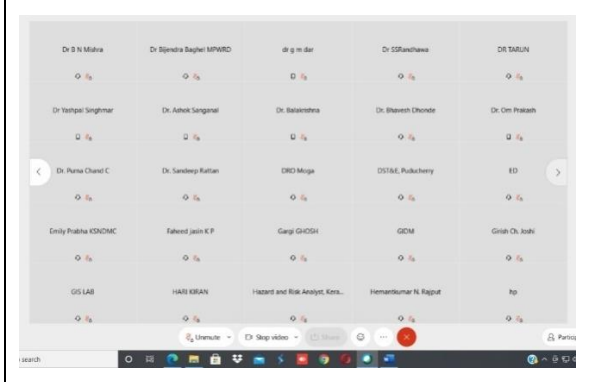
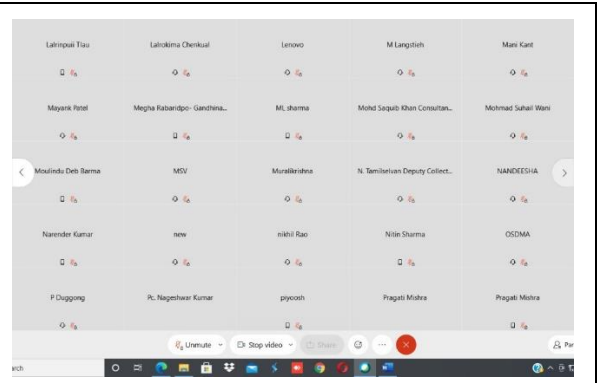
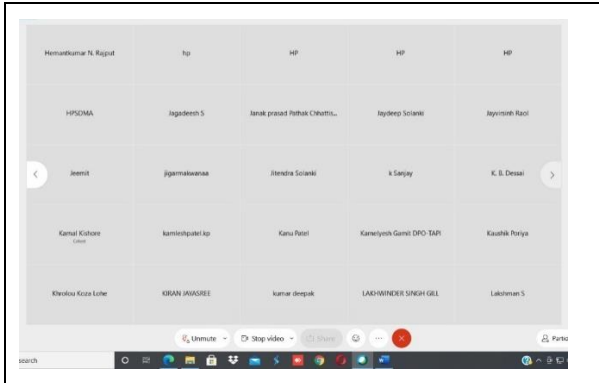
National webinar. He also thanked the experts who delivered the technical sessions, especially, Prof. Dr. CVR Murty, Shri. Anup Karanth for their commitment.

The webinar ended by thanking the Chair.

## 6. Annexure

### 6.1. Some glimpses of the webinar







## 6.2. Annexure 2

### National Webinar with States/Union Territories for conducting a hazard Vulnerability and Risk Assessment (HVRA) study

#### Responsibilities allotted for documenting the proceedings

	Subject/topic	Delivered by	Responsibilities
1	Welcome address	Dr. Pavan Kumar Singh, JA (Ops), NDMA	Sh. Prasoon Singh, Consultant Gr-2 (Flood) and Sh. Brinjinder Mishra, Consultant (GIS)
2	Special address	Shri. Sanjeev Kumar Jindal JS (DM), MHA	
3	Inaugural address	Shri. Sanjeeva Kumar, Member Secretary- NDMA	
4	Concepts of Hazard, Vulnerability and Risk (HVRA) and climate change Legal framework for HVRA –DM Act, NDMP, SDMP, DDMP	Shri. Kamal Kishore, Member- NDMA	Dr. Ravinder Singh Bora, Sr. Consult (LA&A)
5	Quality and Cost Based Selection (QCBS) and Least Cost System (LCS)	Shri. Anup Karanth, The World Bank	
6	Preparation of Terms of Reference (ToR) and Request for Proposal (RfP) for a HVRA	Shri. Ajay Katuri, Sr. Consultant, NDMA	Shri. Ajay Katuri, Sr. Consult (HVRA)
7	General Financial Rules, 2017, Estimation of expenditure and Budgeting for a project management	Shri. Ravinesh Kumar, FA, NDMA	Sh. Shishir Agarwal, Sr. Consult (DRF)
8	How to decide the resolution (scale) of the deliverables?	Prof. Dr. CVR Murty, IIT-Madras	Dr. Raja Chakravarty, Sr. Consult (GIS)
9	Finalising the Team Leader (TL) and Technical Team required	Prof. Dr. CVR Murty, IIT-Madras	
10	Presentation by Gujarat on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Victor, Mecwan, ACEO, GSDMA	Shri. Ajay Katuri, Sr. Consult (HVRA)
11	Presentation by Himachal Pradesh on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Vivek Sharma, HPSDMA	
12	Presentation by Uttarakhand on how the State is using hazard atlas prepared by them for developmental and other activities	Shri. Piyoosh Rautela, USDMA	
13	Question and Answers	Dr. Thiruppugazh, AS (PP), NDMA	
14	Vote of Thanks and Conclusion	Dr. Thiruppugazh, AS (PP), NDMA	

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