

**GOVERNMENT OF HIMACHAL PRADESH
DEPARTMENT OF REVENUE
“DISASTER MANAGEMENT CELL”**

INVITES

**EXPRESSION OF INTEREST
FOR
SELECTION OF CONSULTANTS/SPECIALIZED
AGENCIES
FOR**

Conducting Hazard, Vulnerability and Risk Analysis (HVRA) for the State of Himachal Pradesh.

The State of H.P. is vulnerable to multiple natural and other hazards. From seismic hazard point of view the state falls in very high risk zones i.e. Zone IV & V. Geophysical specificities such as proximity to major tectonic lines, climate variability, fragile ecology, topography and socio-economic fabric further render the state highly vulnerable and risk prone to natural hazards. While knowledge about the extent, type & magnitude of various hazards at macro i.e. at State level exists, little systematic information exists about relative vulnerability (physical, social and economic) at district, block and village level.

In order to make effective policies and plans to minimize disaster impact and damages in hazard prone areas, information on the extent, nature and frequency of hazards and on the gravity of vulnerability of people, property, infrastructure and environment is required to be assessed and mapped through scientific techniques. In order to fill the analytical and information gaps, the Govt. of Himachal Pradesh has decided to conduct a Hazard Vulnerability & Risk Assessment (HVRA) for the entire State covering 12 districts by engaging the services of consultants and/or specialized agencies.

Objectives of the consultancy

- To map out and delineate all hazard prone areas within the districts down to the village level, covering all geological, hydro-meteorological, industrial and environmental hazards including the one anthropogenic in nature and to prepare GIS based Atlas at 1: 50,000 scale.
 - To assess and delineate the exposure of people, infrastructure and economic activities to these hazards.
 - To assess the full range of vulnerabilities of the exposed elements at risk such as houses, infrastructure, public places and utilities etc. with reference to all natural and man induced hazards.
 - To prepare block wise disaster probability matrix having details of probability of disaster occurrence and possible intensities.
 - To prepare a matrix on ranking & probability of disaster episodes for the state.
 - To develop composite Risk Atlas for the state of Himachal Pradesh.
- **Revenue & Disaster Management Department, Govt. of HP invites EOI from experienced and reputed Experts/ Consultants/ Organizations/ Institutions for conducting above study, so to**

reach the undersigned on or before 20th August, 2011. The qualification details can be obtained/downloaded from www.himachal.nic.in

**Special Secretary(Rev/DM) to the
Government of Himachal PradeshH.P.
Secretariat Shimla-2**

Fax. -

Tel. 0177-2621768

Email : splsecy-rev-hp@ nic.in

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**Qualifications
For
‘Expression of Interest’**

Qualification & Experience

- 1 Should have proven and verifiable experience of carrying out similar studies with organizations of repute.
- 2 Should have a minimum three years of professional experience in executing similar assignments.
- 3 Should have experienced and qualified staff with relevant experience for undertaking the study (CVs of the proposed team be submitted).

Consultancy Fees

Interested Consultants/Organizations/Institutes are advised to submit the details of their financial requirements for undertaking the proposed study as per TOR appended at **Annex-I**

Time Schedule

- The study is proposed to be completed within 24 months of award of work.
- Consultants/Organizations/Institutes should indicate the broader approach and schedule for the different components of proposed study.
- Consultants/ Organization/Institutions will be selected through transparent process as specified by the Revenue & Disaster Management Department.

EOI must be delivered on or before 20th August, 2011 at the following address

**Special secretary(Rev/DM) to the
Government of Himachal Pradesh
H.P. Secretariat Shimla-2
Fax. -
Tel. 0177-2621768
Email : splsecy-rev-hp@ nic.in**

Disaster management Cell

Revenue & Disaster Management Department Govt of H.P reserves the right to accept or reject any or all EOIs, without assigning any reason.

**Special Secretary(Rev/DM) to the
Government of Himachal Pradesh**

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Terms of Reference
For
Selection of Consultants
For

Conducting Hazard, Vulnerability & Risk Assessment for the state of Himachal Pradesh

1. Scope of the Study:

The scope of this study would be to Conduct a Hazard, Risk & Vulnerability Analysis (HRVA) applicable at the lowest possible administrative unit. The methodology used should be all encompassing covering physical, social & economic dimensions of disaster management. Mapping of the entire state would be undertaken. The outcome of the study will be a Vulnerability Atlas containing information on areas prone to disasters such as earthquakes, floods, drought, environmental hazards, avalanches; Glacial lake Out burst Floods (GIOF), industrial, chemical and biological disasters. The study would also assess disaster probability and risk analysis. The systematic information and data base generated through this study would form the foundation for evolving effective policy and strategies for reducing disaster risk in the State of Himachal Pradesh.

2. Objective of the Study

The primary object of this study is to generate basic data, undertake in-depth analysis and to quantify disaster risk levels and associated causal factors and to produce a Vulnerability Atlas for the State.

2.1 Detailed objectives include:

- To map out all hazards prone Areas State/ District and Block wise, covering water and climate, geological, chemical & industrial, biological and accident related hazards in the State of Himachal Pradesh.
- To assess the exposure of people, infrastructure and economic activities to these hazards.

3. In order to achieve this, the Consultants/Institutions/Organizations shall:

3.1 Identify and access relevant data sources for conducting the assessment, which will include historical and scientific data related to hazards, government records, hazard maps, satellite imageries, aerial photographs, research documents and publications.

3.2 Assemble database for various hazards in order to assess their frequency, geographical distribution and magnitude, and present them statistically and analytically.

- 3.3 Provide adequate scientific analysis in respect of causation, frequency and magnitude for each of hazards while establishing their probabilistic estimates.
- 3.4 Conduct an assessment of physical vulnerability which includes housing, critical infrastructure and lifelines and essential facilities such as schools, hospitals etc.in structural terms, present their vulnerability to hazards.
- 3.5 Conduct a detailed assessment of social patterns of vulnerability, which include vulnerabilities associated with gender, weaker sections, disability, widowhood and other social handicaps
- 3.6 Present an economic analysis of the impact of past disasters and assess the impact of disasters in statistical and analytical terms.
- 3.7 Prepare GIS based hazard maps on 1:50,000 scale, showing their frequency impact, severity and the area likely to be affected.
- 3.8 Represent different types of vulnerabilities on GIS maps, and prepare a composite vulnerability and potential multi hazard map for the State/town/district/block.
- 3.9 Prepare an Atlas, showing both hazards and vulnerability together for State/District and block wise.
- 3.10 To provide recommendations for integrating hazard and vulnerability concerns in the developmental strategy

4.ANTICIPATED OUTPUTS FOR HAZARD VULNERABILITY AND RISK MAPPING INCLUDES:

- Hard & Soft copy of HVRA Atlas.
- Data (raw as well as output data) in GIS format
- Digitized maps for all blocks
- Progress reports at the end of first, second & third quarters.
- Project inception report within one month of the start of assignment which should clearly state the consultant's understanding & interpretation of TOR. Changes to TOR if required since the start of the assignment. Stock taking report approach & methodology proposed for the study.
- Technical report at the completion of project describing the structure and contents of the hazard/vulnerability maps, narrative on vulnerability analysis and methodology employed.
- Non-technical summary for common users
- Recommendations for future work.
- Technical guidelines for multiple development sectors based upon vulnerability analysis in order to make development safer and sustainable in hazard prone areas.

5.Detailed scope of Analysis:

5.1 Hazard Mapping

Hazard mapping will include hazard zoning covering the whole State with co-relational vulnerability analysis. It will define exposure levels of different blocks to key natural and man-made hazards. The hazards that will be covered include earthquakes, droughts, cloud bursts, avalanches, forest fires, floods, landslides, GIOF, industrial and environmental hazards. Exposure maps in terms of high, moderate and low hazard risk will be prepared based upon scientific and historical analysis. District and Block boundaries will be demarcated on these maps. Other hazard related information will be generated. The information will be produced in print and GIS formats.

5.2. In general hazard analysis should include information on the following:

- Surface location of sources of hazards; e.g. Thrusts/ faults/ major weak plains, flood plains, industries, glaciers, glaciallakes, etc.
- Frequency of occurrence of various levels of hazards based upon historical analysis and scientific analysis of future trends.
- Seasonality of hazards in different parts of the State;
- Demarcation of high, medium, low exposure areas based upon assessment of past severity/ intensity of hazards/disasters experienced, and hazard source location;
- Demarcation of State, District& Block boundaries with regard to exposure map;

In particular following information should be covered for each of the hazards.

5.3 Geological hazards:

The hazards under this theme will include earthquakes and landslides and land subsidence. The hazard maps should include following information.

- Surface fault rupture/fault lines.
- Probabilistic Ground seismic Hazard maps.
- Seismic zoning maps
- Lateral spread
- PGA Maps
- Historical landslide hazard maps.
- Potential landslide source maps (based upon analysis of the geological/surface conditions)

5.4 Hydro-Meteorological hazards:

This theme will include mapping of floods, droughts, forest-fires, avalanches, GLOF. The hazard maps should include following information.

- Flood plain maps.
- Flood inundation maps based upon past flood analysis.
- Low lying areas along the main river system.
- Hydro- geomorphologic maps
- Important towns/villages, located within flood inundation zone
- Location of glacial lakes in the catchments areas of major drainage basins with indication of impact areas.
- Drought zoning maps based upon analysis of meteorological, hydrological and agricultural droughts for the past 30 years.
- Potential avalanche prone areas.

5.5 Environmental & Industrial hazards:

This theme includes mapping of industrial facilities, industrial zones, waste dumping including hazardous waste sites, debris dumping sites , effluent releasing sites etc.

- Inventory of sources and type of major industrial and environmental hazards including the one associated with hydro powerprojects.

- Location of sources of major industrial and environmental hazards etc.
- Location of past disaster sites.
- Demarcation of exposure areas (potential impact boundaries)

6.Exposure and Vulnerability Analysis

Exposure and vulnerability analysis will form an important component of the mapping for each hazard. This will include assessment of social, economic, physical and environmental vulnerabilities. Co-relational analysis will be produced for the selected variables for the entire State. While information in mapping format will be produced for all blocks in order to use it for overlaying purpose to conduct modeling. The variables of analysis will include following:

6.1 Shelter:

Analysis of exposure of housing stock, and determination of vulnerabilities of various construction types in hazard prone regions.

6.2Critical facilities:

Determination of vulnerabilities of various kinds of facilities such as hospitals, clinics, telecommunication facilities, water and electricity network etc

6.3 Infrastructure:

Determination of various kind of infrastructure such as roads, bridges, dams, power projects, airports/airstrips, educational institutions, commercial centers, high rise buildings, heritage buildings.

6.5Livestock:

Assessment of livestock exposed to drought, flood and snow storms/avalanche hazards including estimation of vulnerability of different livestock types to experience disease or death from the above hazards.

6.6 Crops:

Scale of exposure of agriculture&horticultures crops to drought, pest attacks, hailstorms, landslides and flood hazards. Vulnerability of various crops varieties to the above hazards, in terms of suffering losses.

6.7Industry & Power Projects:

Extent of industry's and power projects exposure to hazards; e.g. number of units, location etc.

6.8 Social:

Vulnerabilities of different social groups in hazard prone areas based upon factors like age, sex, income, ethnicity (caste, religion, language etc.), occupation, education and settlement type (rural or urban).

6.9 Risk Analysis:

Mortality and injury scenarios for cities, towns & villages located in high risk zones including projection onpotential livestock losses in identified hazard prone areas.

6.10 Response scenarios:

To identify and delineatepopulation needing food, shelter, rescue/evacuation and first aid etc.

6.11 Economic projections:

Block/ panchayatwise projections of financial losses and damages against different disasters; e.g. scenarios for loss to crops, industry, houses/shelter, infrastructure or facilities.

6.12 High risk areas/villages:

Based upon their location and analysis of above aspects, delineation of most vulnerable Blocks and village in the State.

7. Team Composition (Estimated)

It is expected that the team engaged in consultancy work for mapping and analysis will be a multi disciplinary team broadly comprise upon:

- Seismologists
- Hydrologist/flood engineers & experts
- Geologist/landslide expert.
- Drought experts/meteorologists
- Medical doctors
- Structural engineers
- Socio-economic experts
- Agriculture/horticulture and livestock expert
- Snow avalanche expert.

8. Timeframe (estimated)

It is anticipated that the mapping including data review, field work, scenario building should be completed in 24 months.