

## NATIONAL DISASTER MANAGEMENT PLAN IN RESPECT OF LANDSLIDES

### STANDARD OPERATING PROCEDURE OF GSI AT A GLANCE

<b>HUMAN RESOURCE</b>		
<p>GSI has specialized Landslide Divisions, with geoscientists trained in landslide studies, in the all the Regions affected by landslide hazard. The workforce takes up pre and post-disaster studies apart from regular field season items of GSI on landslides. In cases of disastrous events, geoscientists from different Regions are mobilized for emergency response and studies as is being currently done in Uttarakhand.</p> <p>A directory of Resource Persons with contact details and expertise will be kept for emergency mobilization during disastrous events</p>		
<b>PRE-DISASTER ACTIVITIES</b>		
<b>Activities</b>	<b>Time Period</b>	<b>Objectives/Outcome</b>
<p><b>Landslide Susceptibility Zonation (LSZ) on Macro Scale</b> (1:25,000/50,000) as per BIS guidelines</p>	<p>Annually in Field Season Programs (FSP). Prioritization of areas for Susceptibility Zonation will be done by a committee of experts in GSI with inputs from various stakeholders.</p>	<p>Report with LSZ Map to facilitate the planners and settlers to understand the slope stability potential of the land parcels for a larger area in fragile hilly or mountainous terrains for use, development and deciding on protection measures to ameliorate the stability conditions.</p>
<p><b>Landslide Susceptibility Zonation on Meso Scale</b> (1:5000/10,000)</p>	<p>Annually in Field Season Programs. Prioritization of areas as above.</p>	<p>Report with LSZ Map depicting the stability status of the existing thickly populated townships/ important civil engineering structures, proposed expansion schemes for urban development, new construction sites of townships in the landslide prone hilly terrain etc through a much detailed stability investigations.</p>
<p><b>Monitoring of a few conspicuous landslides</b></p>	<p>Annually in Field Season Programs on the basis of assessment of GSI and specific request of stake holders.</p>	<p>Development of Forecast and Early Warning systems of specific hazardous landslides.</p>
<p><b>Development of Early Warning System</b></p>	<p>Activity in pilot studies scale taken up annually in FSP.</p>	<p>Development of early warning systems on local and regional scales.</p>

<b>POST- DISASTER ACTIVITIES (RESPONSE TO DISASTER)</b>		
<b>Immediate response - Reconnoitry (Level-1)</b>	Field-based ground appraisal will be taken up within 15 days of the event. Study is expected to be completed within 1 month and submission of preliminary report within 7 days after completion of fieldwork.	Study includes rapid assessment of damages, preliminary identification of landslides, its broad typology, identification of stretches of affected roads/ accessibility corridors and if possible, tentative identification of probable safer slopes for temporary rehabilitation. Another objective of this study is to delineate vulnerable tracts and the assess quantum of work to be taken up for the 2 <sup>nd</sup> level appraisal.
<b>Response study – Preliminary/ feasibility &amp; multi-thematic (Level-2)</b>	To be initiated within 1-2 months of the disaster. The total time period of this study is 6 months to 1 year including submission of reports to the stakeholders.	The main objectives of the first level of response are: <ul style="list-style-type: none"> <li>• To update the existing macro-scale landslide inventory database of the area, and preparation of a event-based landslide inventory (Landslide inventory mapping- the most fundamental tool to convert susceptibility maps into hazard and risk maps which are essential for any landslide management and mitigation planning).</li> <li>• To evaluate tentatively the geogenic causes of this geomorphic hazard.</li> <li>• To identify the susceptible locations for fresh mass wasting and failures,</li> <li>• Preliminary assessment on effective mitigation measures for restoration of roads/ accessibility tracks along NH and SH.</li> <li>• Preliminary evaluation of the proposal of re-alignment of NH and/or SH wherever essential for suggesting further more detailed site specific studies geological/ geotechnical studies.</li> <li>• To preliminarily identify safer and stable locations for rehabilitation/ relocation of settlement and for taking up detailed and site-specific geological/ geotechnical investigation in future.</li> </ul>
<b>Response study – Detailed site-specific (Level-3)</b>	Annually in Field Season Programs.  Prioritization of areas on the basis of level-1 and 2 studies and requests from State Governments.	Main aim is to identify activity, extent, causes and failure mechanisms of such landslides for effectively suggesting the slope protection measures; to suggest suitable and stable sites for housing buildings, suggesting realignment of roads and for preparing the foundation for constructing some critical infrastructures (e.g., bridges, rope ways, transmission tower etc.).