

**Government of India  
Department of Science and Technology  
NRDMS Division**

## **Invitation for Submission of Research Proposals**

Research Project proposals are invited from academic and research institutions, universities, research teams, scientists, individual researchers and other stakeholders for R&D on landslides and tsunamis in the following thrust areas. This initiative of the Department of Science and Technology (DST), Ministry of Science and Technology, Government of India, is aimed at further strengthening the long ongoing effort to foster, promote and encourage research and development work, anchored to the bedrock of science. Besides above, the DST will continue to support brainstorming round table meetings, seminars/workshops and training for spreading awareness and for dissimilation of the fruits of research on Geohazards.

The scope of landslide and tsunami research in India is huge which is why thrust areas have been identified to respect national priorities, improve focus and the ultimate outcome of research, as also raise the quality of science and technology in problem solving. More specifically, there is an urgent need to promote spirit of scientific enquiry and add emphasis on the planned effort to bolster quality of engineering geological, geo-technical and hydro-geological investigations on landslides and other mass movements towards unfolding their fundamental mechanisms. Naturally the open-ended and piecemeal programmes of landslide hazard mapping, geotechnical investigation, *in situ* and laboratory testing, instrumentation, monitoring, data analyses, landslide remediation and early warning, etc., must give way to a science based holistic approach. Research will serve its intended purpose only when its outcome is scientifically vetted by the peers for its reliability and when the products of research are certified user-friendly and useful by the end users. We also have a great deal to learn from the landslide disasters of the past, as also from the existing and potential landslides and slope failures. It is therefore only appropriate that we encourage scientific documentation of case histories of major Indian landslides.

### **Thrust areas of Research and Development in Landslide and Tsunami**

1. Fundamental Research and Development work supported by high quality scientific investigations towards unfolding the mechanisms of the Indian landslides and other mass movements; Development of innovative approaches to account for factors such as climate change, urbanization, deforestation, mining historic neglect of slopes and mountain systems and poor slope management practices.
2. Landslide instrumentation and monitoring aimed at (a) adding to the quality of landslide investigation including elucidation of landslide boundaries; (b) unfolding the mechanisms of different types of landslides; (c) understanding of slope behavior and for early warning; (d) evaluation of the efficacy of landslide remediation practices. Projects aiming at applications of satellite based technologies and development of simple, economical and reliable community-centred early warning systems will be encouraged. Development of scientific thresholds and criteria for early warning constitute an important area of research.

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3. Scientific investigations of specific landslides affecting human settlements, strategic road network, heritage and other lifeline structures aimed at creating replicable best practice examples.
4. Refinement of approaches to GIS based landslide hazard mapping, vulnerability, risk, impact and damage assessments, and validation of maps for enduse. Integration of landslide hazards into user-friendly multi-hazard mapping. Projection of multi-hazard risk scenarios in situation where landslides constitute a major threat.
5. Scientific documentation of case histories of major landslide disasters in India and writing of well researched monographs through revisiting of actual sites and study of available literature, published papers and records, and through scientific consultative and interactive discussion meetings. Lessons from major landslide disasters in India.
6. Fundamental Mechanisms of earthquake-induced and earthquake-triggered landslides.
7. Landslide modeling. Back analyses of slopes and landslides in terms of total and effective stress. Probabilistic stability analyses of complex natural and manmade slopes and landslides.
8. Development of Innovative technologies for landslide control fashioned to support scientific design of surface and subsurface drainage systems and cost-effective restraining structures. Development of approaches to field evaluation of the efficacy of control measures. Mechanized construction of complex subsurface drainage networks and their critical evaluation.
9. Retrofitting of problematic slopes and protection of heritage buildings in landslide prone areas.
10. Climate change and landslides. Study of landslide dams and management of consequent threats.
11. Reservoir induced seismicity
12. Coastal landslides.
13. Submarine slumping and tsunami induced landslides.

Proposals can be submitted round the year. Every proposal should provide pointed information on the (a) classification of the thrust area, (b) title of the project, (c) objectives, (d) expected outcome including deliverables, (e) current status of R&D on the subject, (f) outline of the approach to be followed, (g) major activities envisioned, (h) available infrastructure to support the proposed research, (i) project team and other affiliations, (j) timeframe, (k) resource requirement and budgetary details, (l) possible beneficiaries of research, and (m) contact addresses of possible experts for project review. The prescribed format can be downloaded from website [www.dst.gov.in](http://www.dst.gov.in). Added submission of other relevant information and papers is welcome. All proposals will be peer reviewed, and evaluated by a team of sub-specific experts, as per the DST mechanism.

Five hard copies and a soft copy of the proposal duly supported and forwarded by the Head of Institute may be submitted to **Dr Bhoop Singh**, Scientist 'F', NRDMS Division, Department of Science and Technology, Technology Bhawan, New Mehrauli Road, New Delhi 110 016, e-mail: [bhoopsingh@nic.in](mailto:bhoopsingh@nic.in).