Development of glacial hazard and risk minimisation protocols in rural environments: a project summary

RGSL has undertaken a three year commercial research project to develop guidelines for glacial hazard assessment and management. The work was funded by the Department for International Development (DFID) under their Knowledge and Research (KaR) scheme for the engineering sector. The project finished in July 2003.

RATIONALE

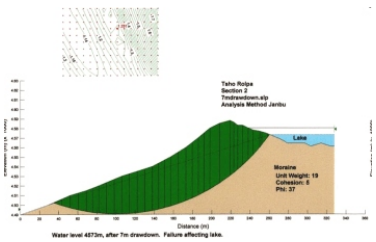
The rationale behind this project was the apparent increasing occurrence of glacier-related hazards in the world's great mountain chains. Based on projects undertaken by RGSL during the 1990s, it was clear that government agencies, NGOs, commercial organisations and individuals responsible for glacial hazard management lacked rigorous criteria by which to assess and reduce the risks.

PROJECT AIMS

- **To increase the understanding of glacial hazards, especially the growth and failure of glacial lakes**
- **To develop improved methods of inventory compilation**
- **To improve field methods of hazard and risk assessment**
- **To develop objective methods of hazard and risk assessment**
- **To review global methods of risk management**
- **To produce best practice guidelines for practitioners and managers**
- **To disseminate the outputs of the project to implementing agencies in affected countries**

WORK PROGRAMME

Technical procedures were developed from remote sensing data and field investigations in the Khumbu Himal, Nepal. These included studies of Imja glacial lake and its glacier, where detailed geophysics, glaciology, geomorphology and engineering geology surveys were undertaken to define the level of hazard. Vulnerability along potential flood routes was first considered empirically by studies of two past glacial lake outburst floods from Dig Tsho (lake) and Sabai Tsho. The relationships established between geology, morphology and flood processes were then incorporated into a methodology for vulnerability mapping and tested for a section of the valley below Imja glacial lake.



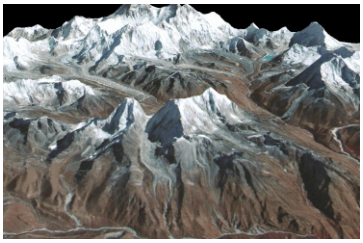
PROJECT OBJECTIVE

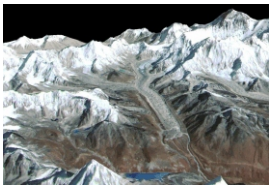
To develop cost-effective, socially acceptable and sustainable risk minimisation strategies through improved glacial hazard assessment and socio-economic vulnerability assessment.

REYNOLDS GEO-SCIENCES

DFID Department For International Development

INRENA





Methods of hazard and risk assessment were transferred to the Cordillera Blanca, Peru, for field testing in collaboration with the National Institute of Natural Resources (INRENA). Suitable management plans were then considered, building on the legacy of glacial hazard management within the Cordillera Blanca region. For the first time, the socio-economic aspects of glacial hazards were incorporated. Specialists were appointed to review the impact of glacier hazards, including the perception of hazard, upon the local population through workshops, focus groups and individual interviews. This information is proving vital to the development of socially acceptable management plans for the Cordillera Blanca region. INRENA are now looking to expand and apply the management model throughout the rest of Peru.

OUTPUTS AND DISSEMINATION

Progress updates and the findings of the project have been presented at three conferences in Nepal and Bhutan at various stages in the project. The final outputs were presented at a project seminar in Huaraz, Peru, in July 2003. These included:

- **Guidelines for glacial hazard assessment**
- **Guidelines for glacial risk assessment**
- **Guidelines for risk management for planners and policy developers**

Best practice guidelines have been made widely available, whilst implementing agencies supporting this research have also received copies of the data and analyses so that there is a tangible benefit to each country. Emphasis has been on the breadth of possible applications and awareness of the benefits of this research.

CONTACT DETAILS

For further information about this project, please contact:

Prof. John M. Reynolds
Reynolds Geo-Sciences Ltd
Unit 17, Mold Business Park,
Wrexham Road,
Mold, Flintshire,
CH7 1XP, UK

Tel: +44-(0)1352-756196
Fax: +44-(0)1352-759353
E-mail: rgsl@geologyuk.com
Web: www.geologyuk.com

REYNOLDS GEO-SCIENCES