

# Institute of Engineering, Tribhuvan University

Pulchowk, Lalitpur, Nepal

[www.ioe.edu.np](http://www.ioe.edu.np)



## Outline

[The Institute of Engineering (IOE) founded in 1930 is the first technical school of Nepal. It was reformed in the present shape in 1972 as an organ of Tribhuvan University. Besides producing low and tertiary level technicians, IOE runs professional diplomas, under graduate studies in 9 different engineering fields, postgraduate studies in 17 different engineering fields and Ph.D. programs. The institute has four constituent and ten affiliated campuses in the country.

The main objectives of the Institute are:

- To produce Engineering manpower needed to meet national aspirations and goals.
- To conduct various research and development works.
- To offer various types of training, research works, sponsored courses, conduct problem oriented research and provide engineering consultancy services
- To mobilize the human and physical resources of IOE for the technical advancement of the nation

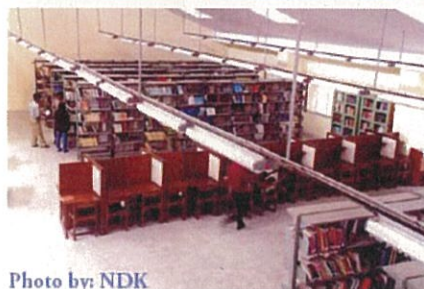


Photo by: NDK



## Research Achievements and Challenges

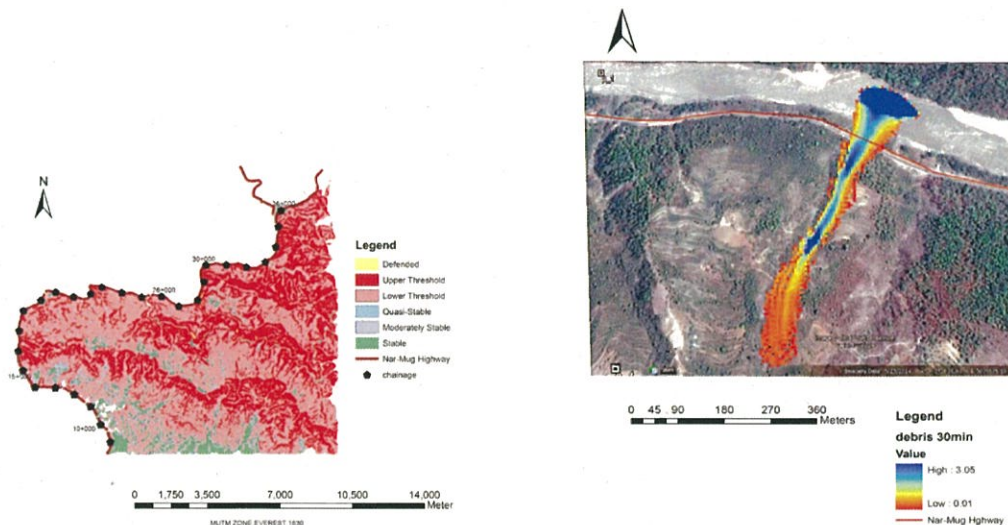
[Some of the research activities of IoE related to disaster risk reductions

are: hydrological modeling, modeling of debris flows, research on bio-engineering measures for slope stabilization, flood forecasting and evacuation, glacial Lake Outburst flood and landslides.

### Features of Researches:

#### **Rain storm induced hazard Assessment: Landslides susceptibility using SINMAP and debris flow simulation using DEBRIS2D**

The high intensity rainfall for longer duration during the monsoon season is one of the major prompting and stimulating factor for landslides and debris flows in Nepal. In this study, the deterministic Stability Index Mapping (SINMAP), which is the integration of a mechanistic infinite slope stability model and hydrological model, was applied for the susceptibility assessment of shallow landslides along Narayanghat-Mugling (N-M) Highway. Similarly, DEBRIS2D numerical model, was used for debris flow simulation along N-M Highway. It was concluded that the results obtained from this study would aid in making any decisions along the watershed for attenuating any type of losses either human or economic.

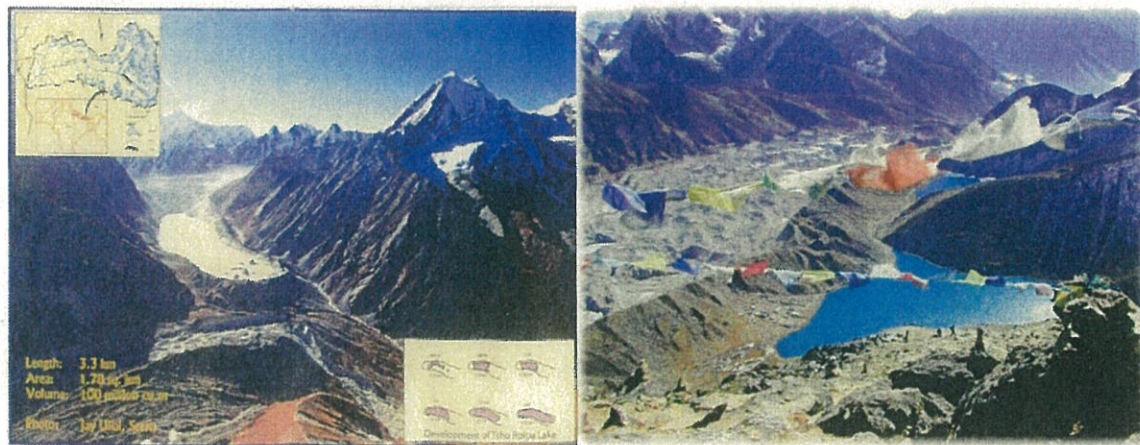


### **Assessing Vulnerability of Everest National Park Area**

The series of five high altitude lakes in the ablation valley of Nguzompa glacier and Imja Lake is located in the most popular tourist destination of Nepal: the Khumbu/Everest region. They carry high significance in the sustenance of the surrounding ecosystem as well as the socio-economic activities of people living in the vicinity. These lakes are fed by melt water from snow cover melt and glacier melt mainly in the form of subsurface flow. The five lakes are interconnected by sub surface as well as surface flow. The flow from these lake ultimately discharge into the Dudh Kosi river originating form Nguzompa glacier. While a GLOF from Imja Lake can have devastating effects on the local settlement, infrastructure and agriculture, the damage on the tourist industry can have a national impact. It is therefore important to study the magnitude of possible GLOF from Imja Lake and its likely impact on the downstream areas.



A glacier hydrology model such as the HYCYMODEL was used to estimate the melt water generated from the catchment of Nguzompa glacier. Appropriate separation techniques were applied to separate the contribution of Nguzompa glacier and contribution of snow covers in the catchment to the high altitude lakes. BREACH model was used to simulate the breaching of the moraine dam. The breach discharge was routed through the river valley downstream up to Ghat area using dam break model. The temporal and spatial variations of routed hydrograph were used to delineate hazard map and to plan appropriate mitigation measures.



The main research challenges in our context are to conduct result based research on disaster risk reduction which is compounded by the sparse database, instrumentation and funds.]