Session Five: Issues and Priorities for Training

Session Five was chaired by Professor T. ITO. Three papers were presented on the theme of the session.

Landslide Hazard Mapping For Sustainable Development -- N. Rengers

Dr. N. Rengers from ITC (The Netherlands) firstly described the relevant work being carried out by ITC, which is supported by the Dutch Government as a part of its contribution to international development. At ITC, geo-information management, which includes collection and use of integrated data generated through GIS and remote-sensing (such as maps and reports) to assist various development and research programmes, is an important part. At present the institution has over 12,000 alumni worldwide and 300 fellowships are given to developing countries under the Netherlands' Fellowship Programme every year.

Landslide hazard mapping using remote-sensing aerial photography -- one of several research thrusts at ITC which has been supported by several other agencies, including the World Bank, the European Economic Commission, the Asian Development Bank, and UNESCO among others. In South America, a course in landslide hazard mapping was conducted by ITC; and also a course at ICIMOD, recently. Many other special courses were planned for later in the year, such as one on Glacial Lake Outburst Floods in Nepal; this will be held partly in Nepal and in the Netherlands in collaboration with ICIMOD and Tribhuvan University.

Dr. Rengers described the various scale maps, the methods used to compile and their usage.

Commenting on the proposed training programme curricula, he suggested that, as well as emphasising increased geo-technical knowhow, it is also vital to create awareness about the issues among policy-makers and the general public. A legal framework for hazard management was also of great importance. Preparation of appropriate decision support documents (such as landslide hazard zonation maps) is of utmost importance for this.

Dr. Rengers emphasised the use of GIS and remote-sensing as tools to support work on landslide hazard management. He reminded the participants that this decade had been designated the 'International Decade for Natural Disaster Reduction' (IDNDR) and that the Dutch Government had been asked to play a major role in this. He mentioned that certain countries, e.g., the Philippines had already asked the Dutch Government for assistance in natural disaster management.

Landslide Hazard Mapping : Scale and Objectives -- H. Yagi

Dr. Yagi mentioned that aerial photographs on scales of 1 : 20,000 to 1:40,000 were sufficient to detect landslide topography and to prepare a landslide distribution map over a large area. It had become possible to detect a disastrous zone prone to landslides in a country by overlapping a landslide distribution map on geomorphological (relative relief) and geological maps.

Aerial photographs of at least 1 : 10,000 are required in order to create hazard maps of 1 : 5,000 or more when development schemes were to be implemented on a civil works site. After classification of a slope into facet units, quantitative evaluation of the stability of each facet should be carried out by superimposing other thematic maps, such as a detailed geological map showing structure and lithology , conditions of slope surface layers and topographic conditions in and around the facet.

Evaluation of Landslides under the Effect of Stochastic Factors -- Mr. Lou Xiangdong

In his presentation, **Mr. Lou** described the effects of rainfall, earthquakes and their combined effects in calculating the probability of landslides occurring on a particularly vulnerable site.

The presentation was based on a case study of a site near a proposed dam site of the Three Gorges' Project. The area in which the dam is being built is also prone to landslides, and a study to identify the risk sites had already been conducted.

In the past, with correct predictions of landslides, evacuation of a town near the river had taken place, and the town was later buried under a landslide.

The study looked into Huanglashi landslide, where cracks had appeared on a site in 1989, arousing fears that a landslide would occur. To evaluate the probability of landslide hazards due to earthquakes, the study used SARMA NON-VERTICAL SLICE ANALYSIS, a statistical method. Analysis of extreme rainfall events was undertaken and a threshold value for rainfall for the landslide calculated.

After the presentations, the partcipants held discussions on three different interlinked themes. To facilitate the discussions, Dr. Banskota posed some questions to the participants to be considered in the working groups. The three working groups were on the themes: Group I: Inventory Database including, Socioeconomic Aspects and Institutional Collaboration, Group II: Processes, Tools, and Techniques (both diagnostic and remedial conventional/modern) and Group III: Curricula and Training Materials.

Box 3: Points for Consideration for Group Discussions

1. Definition of a `Landslide': How narrow, how wide? (only Landslide or also other mass wasting/erosion processes)

2. Inventory/Database: Minimum Needs/Priorities (Socioeconomic ?) Uniformity (Acquisition) Exchange : National/Regional Focal Points, Data Management/Computerisation
   Who should collect, monitor ?
   Data needs of different target groups - general and specific purposes ?

3. Processes, Tools and Techniques
   Key Processes:
   Conventional/Modern Tools and Techniques: Diagnostic (e.g., Remote Sensing and GIS) including role of indigenous knowledge
   Prevention/Remedial/Control Methods/Techniques

4. Curricula/Training Material
   - Ongoing/Available/New Needs/Priorities
   - Target Groups: Middle-level professionals
     Others ?
   - Focal Institutions: National/Regional
   - Extent of Integration in Teaching Institution
   - Institutional Collaboration: National/Regional/International