Component 1 Political Commitment and Institutional Aspects

1.7 - Are the private sector, civil society, NGOs, academic and media participating in disaster risk reduction efforts? If yes, How? Indicating existing coordination or joint programming between government and civil society efforts in disaster risk reduction, or major difficulties or constraints for this to be effective.

Landslides often cause catastrophic disasters destroying houses in urban and urbanizing areas. They bring economic losses by destroying not only infrastructure such as roads, railways, bridges, dams, and ports, but also cultural and natural heritages and other properties, which are precious for mankind.

Since landslide risk mitigation and protection of cultural and natural heritages are very important, the International Consortium on Landslides "ICL" was established as a common international platform during the International Symposium "Landslide Risk Mitigation and Protection of Cultural and Natural Heritage" in Kyoto, jointly organized by UNESCO and Kyoto University. Because of the significance of establishing a core organization of landslide research, a new Research Centre on Landslides (RCL) was setup in Disaster Prevention Research Institute, Kyoto University in April 2003.

Until now, The RCL played a leading and coordinating role in the ICL activities From the 1st Board of Representative Meeting of ICL (1st BOR/ICL) held in the UNESCO Headquarters in Paris in November 2002 up to present. 50 research organizations of the world from 23 countries and areas have registered as ICL members. and UNESCO, the World Meteorological Organization (WMO), the Food and Agriculture Organization of the United Nations (FAO), International Strategy for Disaster Reduction (UN/ISDR) Secretariat, the Japan Ministry of Education, Culture, Sports, Science and Technology (MEXT), U.S. Geological Survey, etc. have become the Supporting Organizations

The international initiative of ICL is the International Program on Landslides (IPL), which aims to conduct international cooperative research and capacity building on landslide risk mitigation, notably in developing countries. Figure 1 is a structure diagram of the ICL. The activities of IPL will contribute to the International Strategy for Disaster Reduction (ISDR) directly.

The IPL projects cover topics of general interest with high priority and urgent societal needs.

Currently, there are three on-going coordinating projects, i.e., C100 for publishing an international Journal of International Consortium on Landslides, C101 for landslide risk evaluation and mitigation in cultural and natural heritage sites. including landslide investigation in Machu Picchu, Slovakia, Bamiyan valley (Central Afghanistan), Xi'an City and Changbai Mountains

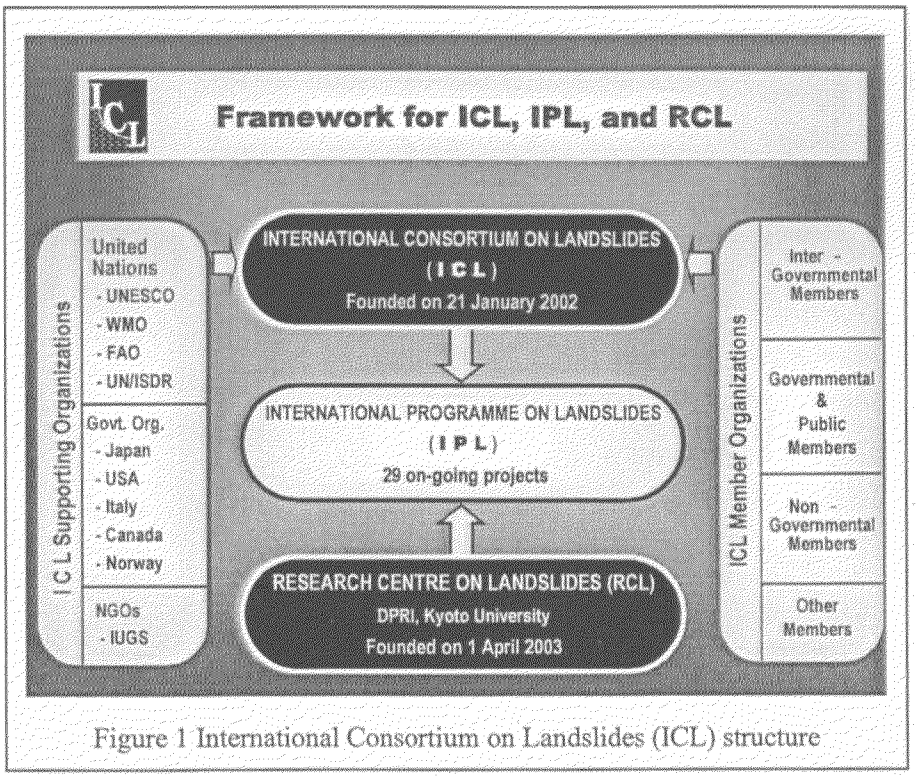

Figure 1 International Consortium on Landslides (ICL) structure

(China) and Masoulch Town (Iran), and C102 for assessment of global high risk landslide disaster hotspots, respectively Besides, there are twenty one member projects covering detailed landslide investigation in central America, Slovakia, Three-Gorge Dam reservoir area (China), Tien Shan (China-Russia), Thailand, Tehran-Caspian Seaside Corridors (Iran), Korinthos County of Greece, Garhwal of India, and methodology study such as application of GIS technology, best practices handbook for landslide hazard mitigation, standardization of terminology, integration of information and development of decision support software, establishment of regional network, capacity building in landslide hazard management

The framework of an international network for landslide risk assessment and mitigation is built up and is working well. The important initiative should be further developed in the next decade, and the capacity building for landslide disaster mitigation should be enhanced. Hence, more efforts such as establishment of international cores for cooperation and networking in disaster reduction research and capacity building are required.

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2.3 Does your country (ICL) have any mechanisms for risk monitoring and risk mapping ? If yes, who is responsible ?

Research Centre on Landslides, Kyoto University, the Core member organization of ICL, has been promoting following risk monitoring projects.

(1) Zentoku landslide, Tokushima Prefecture, Japan (1972-)

Monitoring of landslide movement is very important for landslide disaster reduction because catastrophic landslide may indicate precursory creeping before their final failure. In order to avoid destruction of historical buildings and other cultural heritages located near the landslide slope, precise and integrated monitoring is indispensable. Prof. Sassa and Research Centre on Landslides (RCL) of Kyoto University has been engaged in the risk monitoring at the Zentoku landslide site since 1972

Prof. Sassa developed Long-span Extensometers, Three Dimensional Shear Displacement Meters (3D-SDM) and other instruments for landslide movement and hydrogeological monitoring. They started installation of long-span extensometer since 1972, 3D-SDM monitoring since 1991, and GPS monitoring since 1989 in the Zentoku landslide, Tokushima Prefecture, Japan. This landslide is one of the largest scale active crystalline-schist landslide in Japan. There is a historical settlement of the samurai survivors of the Heike clan of about 1,000 years history. Nowadays this site attracts half million of tourists every year. However, this site is suffering from the risk of small to huge size of landslides triggered by future earthquakes and/or heavy rainfalls. They need a practical and precise warning system using reliable landslide monitoring system

This research and develop project has been recognized as a sub-project of UNESCO-IUGS IGCP-425 "Landslide Hazard Assessment and Cultural Heritage" since 1998. This project succeeded to reveal (1) the long-term creeping characteristics of the whole mountain slope along the line from the summit to the river side, (2) three dimensional creeping characteristics along the transverse line of the slope, (especially larger subsidence comparable to sliding distance estimated to be resulting from crushing of rocks in the sliding surface and underground erosion), as well as develop (3) integrated and intelligent landslide monitoring and data acquisition/processing system in order to realize precise and reliable monitoring.

(2) Lishan Landslide, Xian city, China (1990-)

Prof. Sassa and other 18 Japanese landslide researchers investigated the slope behind Huaqing Palace together with 50 Chinese landslide researchers at a joint field workshop in 1987. This was to organized to discuss the slope deformation of the Lishan mountain slope just above Hua-qin Imperial Resort Palace which was constructed in Tang Dynasty (618-907 A D.) and attracts three millions of tourist every year. Opinions of researchers were divided into (1) shallow and small superficial soil creep and (2) deep and large slides and the present risk of this slope. Prof. Sassa of DPRI obtained budgets for the Japan-China Joint Research on the Assessment of Landslide Hazards in Lishan, Xian since 1991 to 1999. In 1999, this project became to the first sub-project of the UNESCO/USGS joint project IGCP-425 In this joint project, DPRI provided long-span extensometers of pen-recoding and electronic recording types, GPS receivers, Total Station with prism targets, a borehole inclinometer, 3D-SDMs, seismometers, a groundwater level monitoring instrument, a rain-gauge, and a system for data analysis. Chinese side drilled bore holes to take core sample and two 40-m-long investigation tunnels, and are keeping carrying out level monitoring, and laser EDM monitoring as well as maintaining and monitoring the instruments provided by the Japanese side. Geotechnical testing

by newly developed ring shear apparatuses and numerical simulation of landslide runout area based on the obtained geotechncial parameters were also carried out to assess the landslide risk area.

The obtained monitoring records, especially the long-span extensometer record proved that the Lishan slope shows creeping which corresponds to precipitation. Combined with other obtained monitoring and calculation results, the joint research team concluded that the slope is in the precursor stage of huge catastrophic landslide and the major background cause is active pimping up of ground water for tourism-related activities. When the landslide will be triggered, it will cause catastrophic disaster in the most populated area at the foot of the slope.

Based upon above mentioned results, the Chinese national government, Municipal government of Shiaanxi Province and Xian city decided to fund jointly about three million US dollars to install prevention works of Lishan potential landslide consisting of ground anchor works and ground surface drainage. This was the great success that joint academic effort of two nations on landslide risk assessment lead to policy-making of preventive measures for risk mitigation of future catastrophic landslide.

(3) Landslide Risk Evaluation at Machu Picchu, Peru (2000-)

The Inca citadel of Machu Picchu in Peru is one of the most famous UNESCO World Heritage and the most important tourist resort of Peru. It is located on a mountain site of stupendous beauty, overlooking the deep canyon of the Urubamba River. It is known as "the city in the air." However, our recent researches revealed that the entire ruins of this citadel are at landslide risk.

Based on the investigation of air-photos, topography and the citadel buildings by RCL, several small landslides occurred in the past, and many recently distorted or collapsed parts of buildings are recognized, and it is also inferred that the ground itself of the citadel on the summit had been probably flattened by landslides.

RCL started preliminary monitoring of deformation of the ground surface by 12 extensometers jointly with Peruvian ministries and national institutes, such as INC (Cultural Agency), INRENA (Agency for Natural Resources), INGEMMET (Agency for Geology and Metallurgy), and IGP (National Geophysical Institute) since the year 2000. Obtained results show that not only the access road (Hiram Bingham Road) block, the block of the citadel on the summit are creeping and the movements correlate with precipitation. This results presented that the both blocks of Machu Picchu area are at clear risk of landslide. Those results attracted wider attention of landslide researchers of the world and the importance of further investigation was recognized. The International Consortium on Landslides (ICL) approved the international joint effort as the IPL project C101-1 "Landslide Investigation in Machu Picchu" in 2002. This project is coordinated by Prof. Sassa of RCL/Kyoto Unviersity.

(Photos attached in separate sheet)

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