

## **REPORT**

**on**

### **Knowledge Sharing Meeting about Landslide Risk and Early Warning System for Chittagong City**



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## Knowledge Sharing Meeting on Landslide Risk and Early Warning System for Chittagong City

A knowledge sharing meeting about landslide risk and early warning system for Chittagong City was held on 3<sup>rd</sup> March, 2015 at CUET Resource Center in Institute of Engineers Bangladesh (IEB), Chittagong. BUET-Japan Institute of Disaster Prevention and Urban Safety (BUET-JIDPUS) and the Department of Disaster and Environmental Engineering (DEE), CUET jointly organized this roundtable meeting. Dr. Ikuo Towhata, renowned Professor of The University of Tokyo, Japan was the main speaker. In addition, an Assistant Professor of BUET-JIDPUS Md. Shahinoor Rahman, Chief Architect and Planner of Chittagong City Corporation Rezaul Karim also gave a brief presentation on disaster management and risk reduction of landslide prone areas in Chittagong. The Honorable Vice Chancellor of Chittagong University of Engineering and Technology (CUET), Professor Dr. Jahangir Alam was the chief guest and the Director of BUET-JIDPUS, Professor Dr. Tahmeed M. Al-Hussaini attended as a special guest. Head of the Department of Disaster and Environmental Engineering (DEE), CUET, Dr. Sudip Kumar Pal moderated this meeting.

Figure 01: Knowledge sharing meeting on landslide risk and early warning system for Chittagong City at CUET Resource Center in Institute of Engineers Bangladesh (IEB), Chittagong.



Md. Shahinoor Rahman, Assistant Professor of BUET-JIDPUS gave a brief presentation on the project named Developing Dynamic Web-GIS Based Early Warning System for the Communities at Landslide Risks in Chittagong Metropolitan Area, Bangladesh. He said “Chittagong Metropolitan Area (CMA) is highly vulnerable to landslide hazard, with an increasing trend of frequency and damage. The major recent landslide events were related to extreme rainfall intensities having short period of time. All the major landslide events occurred as a much higher rainfall amount compared to the monthly average. Moreover, rapid urbanization, increased population density, improper land use, alterations in the hilly regions by illegally cutting the hills, indiscriminate deforestation and agricultural practices are aggravating the landslide vulnerability in CMA”.

Figure 02: Speech delivering of Md. Shahinoor Rahman, Assistant Professor, BUET-JIDPUS



Mr. Md. Shahinoor Rahman gave a brief description of the characteristics of Chittagong Hill Tracts (CHT) to understand the causes and geological reasons of landslides in CMA. He showed Landslide Inventory Map, Precipitation Map, Elevation and Slope Map, NDVI Map which were prepared using Arc-GIS 10.1. In addition, he said previous landslide occurred locations were identified in this project through field visit where the latitude and longitude values were collected using a Global Positioning System (GPS) device. Moreover, the Digital Elevation Model (DEM) data were collected from the ASTER GDEM portal. He described some Geotechnical causes that are responsible for landslide occurrence. He mentioned the

aim of the research project as to develop a Web-GIS based dynamic model to warn the people in landslide vulnerable zones. After knowing how people are living with landslide risks, the mechanisms of landslides and producing the predictive vulnerability maps; it is possible to create a Web-GIS based Early Warning System. Mr. Shahinoor Rahman exclaimed the dynamic advantages of this model. He said “vulnerable zones of a certain area will be changed based on the intensity of rainfall. It is known that the bearing capacity of different types of soil changes due to different amount of rainfall. It is possible to know the climatic condition of the coming days through different weather stations. Moreover, the vulnerable zones are changed due to the change in precipitation level, soil characteristics and geomorphological issues related to landslide. Therefore, by considering the future climatic conditions this model will automatically generate future landslide vulnerable zones through graphical representation (e.g. dynamic susceptibility maps) in Web-GIS based website”. Mr. Shahinoor also replied the questions asked by the audiences.

Then renowned Professor Dr. Ikuo Towhata shared his valuable work experience of landslide risk and discussed what should be done in Chittagong.

Figure 03: Speech delivering of Professor Dr. Ikuo Towhata, The University of Tokyo, Japan.



Dr. Ikuo Towhata described two types of early warning methodology relative to annual rainfall distribution. He said average annual rainfall was around 2800 mm and typical heavy rainfall was greater than 820 mm per day before sunrise, October 16, 2013.

Then the Chief Architect and Town Planner of Chittagong City Corporation (CCC) Mr. Rezaul Karim gave a brief presentation on landslide risk reduction in the landslide prone areas of Chittagong. He overviewed the landslide disaster of CCC area and emphasized to mitigate through “Slum Apartment” construction. He added that Chittagong City Corporation (CCC) has taken some housing projects for low income people in Batali hill and Tiger pass area.

Figure 04: Speech delivering of Mr. Rezaul Karim, Chief Architect and Town Planner of Chittagong City Corporation.



In addition, along with the organizers approximately 20 of the researchers, teachers and senior officials from different institutions of Chittagong attended the Landslide Risk and Early Warning System Knowledge Sharing Meeting who provided valuable feedback. Some were Muhammad Nurul Islam (Honorary Consul General of Japan, Chittagong), Professor Rafiqul Islam (Pro-Vice-Chancellor, CUET), Professor Dr. Md. Hazrat Ali (Dean, Faculty of

Architecture and Planning, CUET), Professor Dr. Abdur Rahman bhuiyan (Director, Institute of Earthquake and Engineering Research-IEER, CUET), Engineer Manzarey Khorshed Alam (Chairman, IEB, Chittagong), Prof. Engineer M. Ali Ashraf (Head, Department of Civil Engineering, Southern University, Chittagong), Md. Habibur Rahman (Supervising Engineer, Bangladesh Water Development Board, Chittagong), Md. Shahinul Islam Khan (Chief Town Planner, Chittagong Development Authority), Dr. Md. Moinul Islam (Head Department of Architecture, CUET), Mr. Debasish Roy Raja (Assistant Professor, Department of Urban and Regional Planning, CUET), Naznin Nahar Sultana (Assistant Professor, Department of Geography and Environmental Studies, Chittagong University), Md. Abul Hasan (Lecturer, Department of DEE, CUET), A.T.M. Shahjahan (Lecturer, Department of Urban and Regional Planning, CUET), Dr. Maruful Hasan Mazumder (Lecturer, Department of DEE, CUET), Ram Krishna Mazumder (Lecturer, Department of IEER, CUET), Md. Ashrafuzzaman (Assistant Town Planner, CDA), Sayed Fuadul Khalil Al Faha (Assistant Town Planner, CDA), Kutub Uddin Chisty and Md. Kamrul Islam (Students of Urban and Regional Planning, CUET).

Figure 05: Valuable feedback provided by researchers, teachers and senior officials from different institutions.



Muhammad Nurul Islam (Honorary Consul General of Japan, Chittagong) said about supporting emergency decisions and upholding the efforts on the mitigation of future landslide hazards in CMA. He emphasizes on regular attention of concerned organizations or institutions about landslide disaster.

Figure 06: Speech delivering of Muhammad Nurul Islam.



Then Prof. Engineer M. Ali Ashraf (Head, Department of Civil Engineering, Southern University, Chittagong) said “Hills and hilly regions are ecologically and environmentally sensitive areas needing special attention at the planning stage of development. Ensuring appropriate drainage is essential in the hilly areas for maintaining stability of constructions like roads and human settlements”. He added that, settlement in the hills generally start from a relatively flat area available along the ridge line and gradually expands towards the valley and cutting of hills is to be avoided as much as possible to reduce surface erosion which affects the downstream drainage. He also said “Hills are an important element of our heritage, cultural and physical landscape. Any future management decision on the development of hilly areas should be based on the principle of sustainable development. Resources should be used in a way which does not jeopardize its future use. It is our responsibility to maintain our hills cape. All development in the hills must be professionally planned, engineered and

implemented. The planning should be guided by natural environmental setting, the development site itself will dictate the plan”.

Figure 07: Speech delivering of Prof. Engineer M. Ali Ashraf.



He proposed a high-level inter agency working group is to be formed with representatives from all the development agencies working in Chittagong. The working group will be responsible for monitoring development activities in the hills and integrating all available resources and setting priorities. Moreover, local, national and international level collaboration on development activities in hilly areas is to be encouraged. He condoled that CDA authority is not being able to implement the master plan properly. The master plan will be outdated within 2 years but still there is no sign of revising it. It proves that there is lacking in integrating urban planning policies within the city boundary. This issue needs to be solved and the implementation of the master plan is mandatory.

Professor Dr. Md. Hazrat Ali (Dean, Faculty of Architecture and Planning, CUET) also said all variables such as climate, soil conditions, vegetation, physiography, geology, slope, Digital Elevation Model (DEM) and topography should consider as dynamic variables for landslide vulnerability.



At last, Honorable Vice Chancellor of Chittagong University of Engineering and Technology (CUET) Professor Dr. Jahangir Alam provided his valuable speech. He said that CUET also conduct a study based on its susceptibility to landslide hazard from the existing vulnerable hills in Chittagong Metropolitan Area. For This study soil data is collected from study hills and geotechnical reports were prepared performing required laboratory test to analyze slope stability for failure, following specific method and to assess the vulnerability of the target hills considering different parameters. He added that this study will help to predict the loss of lives and structures due to landslide hazard.

Figure 08: Speech delivering of Prof. Dr. Jahangir Alam.



Professor Dr. Jahangir Alam also said “From the present study of six hills in Chittagong Metropolitan Area, it is found that Batali hill, Intraco CNG hill, Kushumbag hill, VIP R/A hill are risky among the other hills, as the factor of safety for slope stability analysis of these hills are less than 1.5. It was also obvious that Intraco CNG hill (Top) is the most hazardous and then Batali hill. Remedial measures should be taken as early as possible at these hills”.

Finally Professor Dr. Jahangir Alam thanked BUET-Japan Institute of Disaster Prevention and Urban Safety (BUET-JIDPUS) for jointly organizing this roundtable meeting with the Department of Disaster and Environmental Engineering (DEE), CUET.

Figure 09: Dr. Ikuo Towhata renowned Prof. of University of Tokyo received gift from of Prof. Dr. Jahangir Alam (Vice Chancellor of CUET).



Figure 11: BUET- JIDPUS director Prof. Dr. Tahmid M. Al-Hussaini received gift from of Prof. Dr. Jahangir Alam (Vice Chancellor of CUET)



Figure 12: All researcher, teacher and senior official from different institutions who attended the Landslide Risk and Early Warning System Knowledge Sharing Meeting.

