

**Workshop on  
“Impacts to Human Settlement Due to  
Recent Landslides”**

**1<sup>st</sup> March 2011**

at

**Hotel Janaki, Colombo 5**

**Co- Organised by  
Sri Lanka Water Partnership  
(Lanka Jalani)**

**Organised by  
Human Settlements Division  
National Building Research Organization  
Ministry of Disaster Management**

**Report on the Workshop on**  
**“Impacts to Human Settlements Due to Recent Landslides”**

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## **Workshop on “Impact to Human Settlements Due to Recent Landslides”**

- 8.30 am - Registration
- 9.00 am - Lighting and Traditional oil Lamp and National Anthem
- 9.10 am - Welcome and Objectives of the Workshop – Director General, NBRO
- 9.20 am - Address by the Chairman ‘Sri Lanka Water Partnership’
- 9.30 am - Address by the Chief Guest - Secretary to Ministry of Disaster Management
- 9.45 am - Key Note Speech – ‘Integrated Human Settlement Development Guidelines in Landslide Mitigation’– Mr. Hemantha Jayasundara, Director, Tsunami Reconstruction Planning Project

### **10.45 am: Tea**

- 11.00 am - ‘Current Landslide Situation in the Country’ – Mr RMS Bandara, Head, Landslide Services Division, NBRO
- 11.45 am - Panel Discussion on Role of NBRO and other Stakeholders’ in Landslide Risk Reduction Dr. Rathnaweera, Mr.Hemantha Withnage, Mr. Hemantha Jayasundara, Mr SB Niyangoda, Dr. Jayatissa

### **12. 30 pm - Lunch**

- 1.15 pm - Introduction to the Workshop and Thematic Areas – Mr Clarence Perera, Head, Environmental Division, NBRO
  - Group Work on the Thematic Areas
    - Role of Different Stakeholders in Landslide Risk Reduction- Facilitated by Mr. RMS Bandara Head, LSSD, NBRO
    - Gaps in the Local and Regional level Planning Decision Making Process – Facilitator Mrs. Indu Weerasooriya, Deputy Director General, Urban Development Authority.
    - Landslide Mitigation as a Risk Reduction Method – Facilitated by Dr. Rathnaweera, , Civil Engineering, Open University
- 2.30 pm - Group Presentations – Facilitated by Kishan Sugathapala, Head Human Settlements Division, NBRO
- 3.15 pm - Concluding Remarks – Mr. Clarence Perera, Head, Environmental Division, NBRO

### **4.00 pm - Tea**

## **Report on the Workshop on “Impacts of Human Settlements Due to Recent Landslide”**

### **Introduction**

With the request of National Building Research Organisation ‘Lanka Jalani’ came forward to support a workshop to discuss the current landslide situation of the country and the inputs on human settlements. This was a good opportunity to NBRO and its stakeholders in landslide mitigation work. With this background Human Settlements Division of NBRO developed a proposal on the proposed workshop to submit to Lanka Jalani.

### **Workshop Proposal**

Historically landslides have occurred due to natural causes. But today more than 70% of the landslides occur due to unplanned land use practices & human interventions in fragile areas. Surveys revealed that lack of specific planning & technical guidelines along with planning and building regulations to guide the development of landslide prone areas are key to increasing number of landslide events. Due these reasons, that leading to disastrous situations, the government has been spending massive resources on relief in disaster situation which events the overall development of the country. This could be reduced if relevant mitigation measures are taken in identified areas. Considering of disaster aspect in development planning and decision making are therefore a necessity. One of the main mitigation measures that can be taken is creating awareness among the affected communities and training of local and regional level stakeholders. We have noticed with increase awareness and training the risk levels of stakeholders/ communities reduce considerably.

Hence by considering the above, the Human Settlements Division of NBRO would like to conduct National workshop which could lead to constructive cooperation from stakeholders to prepare future policy or to strength the existing planning practice considering the present magnitude of the landside issues.

### **Workshop Objectives**

1. Initiate the system to disseminate the information and knowledge that is available at NBRO to local level planning and decision makers.
2. To make aware the local level stakeholders on the current risk reduction trends and implementations in the country.
3. Identify the gaps in local, regional and national level planning and decision makers.

### **Workshop Presentations**

**Director General, National Building Research Organization** welcomed the participants and invited guests to the Workshop on “**Impact to Human Settlements Due to Recent Landslides**”. Introducing NBRO’s role as an R & D organization he explained that NBROs involvement in Landslide studies has been since 1987 and had developed its capacities in many related disciplines in geotechnical investigations, human settlements planning, environmental planning that can be integrate to perform effectively to achieve the tasks assigned to NBRO in respect of landslide mitigation.

**Mrs. Kusum Athukorala, Chairperson of Sri Lanka Water Partnership** The affiliation of water partnership introduced the Lanka Jalani-Sri Lanka Water Partnership and stated that the “Lanka Jalani” is a organization with contribution of experts and professional who are voluntarily committed to improve the quality of life of people. Highlighting the objectives of Lanka Jalani, Mrs. Athukorala stated that facilitating a platform for stakeholder institutions to address the issues of water sector, environment and disaster is the key concerns. She further emphasized on the impact of road construction activities on landslide propagation and highlighted the need for intervention of a regulator. In her speech she stressed the importance of indigenous knowledge/ local know- how in problem solving in disaster risk reduction sector.

**Mrs. MS Mohomad, Secretary to the Ministry of Disaster Management** delivered an important speech stating that landslide disaster management has given a National Priority and highlighted the ministry’s commitment towards mitigation of disaster situations with

special response to landslide hazard, and announced the issues of circular that all construction/development activities in landslide prone districts should obtain the site suitability with respect to landslide vulnerability, and emphasized that no development could proceed without this clearance. She stated that 10 district sub offices have been already established. Expressing national and ministries commitment on landslide mitigation that landslide mitigation projects have been proposed for 10 landslide prone districts. The projects will be implemented in three stages covering all landslide prone districts. She further stated that awareness should be a key component in disaster management and the workshops in this nature are very important to full fill the need of awareness creation.

She continued her address by stressing following points,

- As land is a scarce resource need for land use policy for landslide disaster management was pointed
- Integrated stakeholder approach for landslide hazard mitigation was stated important

**Mr. Hemantha Jayasundara** – Key Note Speaker of the workshop under the theme **“integrated Human Settlements Development Guidelines Landslide Mitigation ”**. In his address on the theme he pointed out the topography of the country and the rainfall distribution have made very distinct climatological and morphological conditions to this island country.

Quoting “The unique topography of the island has made all 103 river basins of the country to originate from the central highlands. Well understanding the important role of central highlands in river management the ancient developments kept central highlands untouched, maintained its virgin forests. Accordingly the ancient kingdoms of Sri Lanka have been concentrated in the dry zone of the country which never touched the central hills. The water scarcity barrier of the dry zone has been overcome by well designed tank cascade system with privileged Sri Lanka to be the best ancient hydraulic civilization in the world. As a result the whole ecological system in the country was maintained ecologically sustainable manner. The coastal zone of country was never developed for human settlements but served as the countries commercial ports best utilizing naturally rewarded coastline and the ports. This has kept casualties from TSUNAMI hazard practical minimal. The infrastructure,

especially access roads were not provided in ecologically sensitive areas in order to keep development based interferences virtual zero in the central hills.

The western invasion specially, the British changed entire sustainability of the country by clearing fragile hills for mass scale coffee/tea plantations. This has been coupled with providing infrastructure; roads and railway. This resulted in population boom, erosion, and disasters such as landslides, floods, droughts and massive deterioration to ecosystem diversity. The development there onwards disregarded the natural ecological concepts and significance of role natural ecology in the system sustainability but focused on short –gain commercial benefits and to promote that network of roads running across the hill country were provided”.

By quoting above Mr. Jayasundara stated that the development cannot be stopped if the government provide infrastructure. Hence national development planning has now recognized the current situation and the National Physical Plan has considered the central highlands as fragile areas and considered the area for conservation by discouraging development and city expansion in hilly areas. Accordingly five anchor projects have been identified in Hambantota, North Central, Batticalo etc and UVA regional physical plan has been specially designed to protect Badulla (central highland fragile area ) while attracting development in to Monaragala which is less hazard prone. Concluding his address Mr. Jayasundara stated that guidelines should first focused on macro level planning focusing conservation of central fragile areas, maintaining protected area network, shifting employment types more towards service sector, promoting concentrated settlement strategy in focused locations which can bring in much on hazard prevention in sensitive areas. Quoting several example where modern engineering technology has failed to attain system sustainability, Mr. Jayasundara highlighted the need for focused approach on hazard mitigation enriched by way of technically sound scientifically proven methods as micro level planning.

**Mr. RMS Bandara, Head, Landslide Studies and Services Division, NBRO - Current Landslide Situation in the Country**

He gave a pictorial presentation on current landslide situation in the country. According to him Landslide vulnerability is spread over in several districts namely Badulla, Nuwara Eliya, Ratnapura, Kegalla, Kandy, Matale, Kalutara, Galle , Matara and Hambantota. It covers 20% of Sri Lanka total land area. The present landslide density is estimated to be in the order 1-2 landslide per sq. km. Supporting his presentation and quoting large number of case studies he elaborated that most of the causative factors are anthropogenic stressing that ad hock cut slopes during construction of buildings and roads, blocking drainage, mini hydro power projects, deforestation, neglect of land, unplanned intensive cultivation, reservoir construction (Kotmale), aggregate quarrying, land blocking in resettlement without consideration natural drainage system and land use practices are the key man induced factors that trigger landslides. He further stated that Colombo and Gampaha districts have become landslide prone due to anthropogenic intervention such as soil removal, ad-hoc cut slopes etc. At present before construction roads, quarry mining need to be get EIA by Central Environmental Authority and Geological Survey and mining etc. They give the guidelines to operation of the work. However most of the cases the authorities issues guidelines or monitoring is not adequate. Most of the time resettlement sites of landslide victims are already land slide prone or become landslide prone due to drainage planning and inappropriate land use practices.

He stated that to mitigate impact of human settlements due to landslides one should be consider slope of the area, type of deposits, cutting height, upper slope angle/ lower slope angle, weight of the structure, distant between the structure and the cut slope, drainage system pattern etc.

Mr. Bandara concluded his presentation explaining the Landslide Hazard Mapping Project at NBRO and early warning projects that are currently being in operation in landslide prone areas. Any type of construction in hilly area required of land slide vulnerability report from the NBRO for approved.

## **Panel Discussions**

Panel discussions were held with the contribution of following resource personnel.

Dr. P Rathnaweera, Senior Lecturer, Open University of Sri Lanka

Mr. Niyangoda, Former Secretary to the Mahaweli Ministry, Lanka Jalani

Dr. Jayatissa, Scientist, Landslide Studies and Services Division, NBRO

Mr. Hemantha Jayasundara, Director, TSUNAMI Reconstruction Project

Mr. Hemantha Withanage, Centre for Environmental Justice

Mr Hemantha Withanage commenced the panel discussion by pointing following issues.

- Water is going to be the main issues that is influenced by the climate change and warn that it may bring serious implication to slope stability
- Cutting trees and removal of forest vegetation
- Bad agricultural practices
- Soil conservation act and the related issues in its implementation to bring soil conservation practices

He stated that Central highlands have been declared as conservation areas and Knuckles, Horton plains, Peak wilderness reserves are already declared under UNESCO world heritage list. However, he stated that the conservation practice do not happen in other sensitive areas in the highlands and continued that there are 400 development project in the country and to his understanding only 2 have gone through the EIA process. He also stressed on significance of awareness and need for a proper legislative mechanism in the management of landslide hazard.

Mr. Jayasundara contributed to the discussion highlighting the importance of following development based of the National Physical Plan. Dr Jayathissa pointed out the need for capacity development of NBRO to face current challenges in landslide mitigation.

Mr. Niyangoda of Lanka Jalani pointed number of concern areas that NBRO should consider when giving recommendations on development projects in hilly areas.

- Need of a proper resettlement planning policy for high vulnerable communities who will earmarked for resettlement without any options.
- As controversies may rise during the process close involvement of local agencies and implementation bodies were stated important
- At the same time multi stakeholder collaboration at national, regional and local levels was stated important
- As land allocation will be a major concern in landslide mitigation, importance of intervention with political delegations was highlighted

Dr. Ratnaweera highlighted following points with regard to landslide mitigation.

- Holistic approach beginning with of macro level planning and then approaching individual scenarios through micro level planning
- As landslide hazard management is a inter disciplinary issue, need for a multi-disciplinary approach was highlighted
- As the communities and local stakeholder groups intervention in the subject is very high importance of participatory approach was highlighted emphasizing local authorities and political groups as main stakeholders and public as the no 1 stakeholder
- As NBRO recommendation on landslide hazard has now been recognized under a legislative frame work there will be a possibility of challenging NBRO report on courts and stressed that the approach should be highly professional based on most appropriate scientific judgments
- And therefore capacity development to required level in number of disciplines such as geology, engineering, human settlements, ecology etc was stated very important
- Highlighted that the current mapping process should be continued and maps should be made available conveniently to those in need

Mr. Rohan Cooray from ADPC highlighted some issues that would result with NBROs licensing procedure and stated it should not be a red tape on already constrained community. He further pointed out about the UDA planning committee in the UDA regulated areas and questioned about the impact of NBRO license on existing planning committee process. He further questioned about the party who bear the cost of

investigation of NBRO's licensing process. In responding to him Dr Ratnaweera stated that NBRO will only give advisories and recommendations and local authorities will be the decision makers on giving project approvals based on NBROs report.

Mrs. Indu Weerasooriya, Chartered Town Planner highlighted the current situation in Divisional Secretaries offices stressing lack of staff and difficulty in finding suitable lands for relocation. Responding to that Mr. Jasyasundara said that similar situation has been faced in solving issues in mitigation of flood hazard and Vulnerability suggested first declaration of Landslide hazard prone areas as special project areas and supporting such areas with sub regional planning.

Mr. Jayasundara further stated that this circular on NBROS recommendation is only an initial step and available regulations on declaration of special project areas can be used for development of sub regional plans. Contributing to that Mr. Niyangoda suggested that the situation can be tackled with short-term plans and long term plans and further emphasized that NBROs role should be strictly limited to advisory level by guiding the Local authorities in decision making process.

Mrs Kumari Weerasinghe, Senior Scientist, NBRO queried further clarifications on declaration of central highlands as fragile areas by NPPD. And she questioned whether the declaration is already in place and she further questioned whether proposed tourism promotion projects specially in Badulla would result in tourism related land abduction. Responding to that Mr Hemantha Jayasundara stated that such tourism development will be restricted to high pay eco-tourism with stringent environmental conservation practices. Elaborating further on conservation strategies proposed for central highland fragile areas he stated that de -population will be a key planning aspect and said that it can be achieved by proposing anchor projects with all infrastructure in low hazard areas so that they naturally will become attractions for development. He quoted that there are five such anchor projects already proposed aiming de popularization of central hills and Mr. Niranjana added that the circular on NBRO recommendation will be an incentive to current NPPD process.

Mrs. Kumari Basnayake of UDA highlighted certain inadequacies and vagueness in reports issued by NBRO and emphasized that NBRO should give clear and specific recommendations with out jargon to guide the decision makers.

Mr. Senanayake, Former Director, NBRO revealed the historical background of Landslide Studies at NBRO and stated that the aim of the project was research and development to guide decision makers. And in that respect the project objectives were set specifically on research to study complex nature of landslide causative factors, identify suitable lands for development and development of guidelines. And he pointed out that earlier there were district landslide monitoring units to develop local level capacities in management of landslide hazard which is now missing and proposed that Landslide mitigation should be viewed as a concentrated national effort.

Mr. Jayananda of land use policy has been already approved in 2007. Currently, 275 land use are available in 3 DS offices. He stated that current land selection process is purely based on land suitability criteria and landslides zoantion is not emphasized in current process.

Mrs. Jeewa David, Assistant director, CEA stressed that recommendations only is not sufficient but compliance monitoring is equally important to see whether recommendations are implemented during development and operational phases.

By summarizing morning workshop activities Mr. MDC Perera, Deputy Director, NBRO raped up the Morning session.

## **Group Discussions**

### **1. Gaps in the Local and Regional Level Planning Decision Making Process**

#### Regional Issues

Following Regional plans are available.

Western, Uva, North Central, Sabaragamuwa balance expected early

Regional plans prepared in consultation with Local Authorities: however no monitoring to ensure that local plans are compatible with regional plans

#### Local Issues

Weak linkage between the District Secretary and Local Authorities which is harmful in disaster situations.

Although the planning committees of UDA has declared areas to enforce a plan, this is not the case in respect of non-declared areas. There is no effective linkage between the local authorities and divisional secretarial and a mechanism to monitor activities.

Non- availability of accurate data at local levels.

1. Inadequacy of detail maps from Survey Department
2. Non-availability of adequately qualified technical staff at regional and local levels
3. Officers at local levels do not have adequate legal power/knowledge/competence to make decisions: The decentralization of central government agencies has not been done in a meaningful manner.

#### Recommendation

1. Close relational ship with local authority and divisional secretaries and relevant agencies.
2. Establish a planning committee in non- declared areas under town and country planning ordinance.
3. Continuous awareness programmers for all stakeholders including politician.

## **2. Landslide Mitigation as a Risk Mitigation Methods**

1. Structural methods
2. Non- Structural methods

### Structural Methods

1. Construal guidelines and regulation of Local Authorities
2. Direct consultancy services
3. Advice to clients
  - Reject proposal with reasons
  - Accept proposal with reason
  - Conditional acceptance
    - Ex: special decision requirement
  - Authorised person(s) to perform design
  - Designer certification NBRO feedback

### Non-structural Methods

1. Monitoring developments with LAS/UDA/ DS
2. Capacity building of LA officials (their role in mitigation)
3. Awareness to general public
4. Early warning
5. Insurance and compensation
6. Land use recommendations
7. Awareness among stakeholders

## **3. Different Stakeholders in Landslide Risk Reduction**

### Sectors

1. Public
2. Housing Developers
3. Regulators
4. Technical Bodies

### Housing Developers

- National Housing Development Authority
- Building Department
- Estate management Trust
- Ranaviru Sewa Authority
- M/Public Administration
- Private Developers
- Banks(public/ private)
- Insurance
- INGO'S/ NGO's

### Regulators Authorities

- Urban Development Authorities
- National physical planning department
- Local Authorizes
- Central Environment Authorities
- Natural Resources Management Commission
- Agrarian Service Department
- Irrigation Department
- Road Development Authorities
- Mahaweli Authority of Sri Lanka
- Coast Conservation Department
- District Secretary / Divisional Secretary
- Sri Lanka Land Reclamation Development Cooperation
- Stakeholders

## List of Participants

Organization	Designation	Name
Ministry of Disaster Management	Secretary	Mrs. M.S. Mohamad
	Senior Assistant Secretary	Mrs. T. W. Wickramasinghe
		Mr. C.S.H. Vitharaachi
Disaster Management Centre	Director General	Major General Gamini Hettiarachi
	District Coordinator- Kandy	Mr. H.R.K.P. Hearth
	District Coordinator- Matale	Mr. I. A.K. Ranaweera
	District Coordinator- Hambantota	Mr. M.G.A. Nandana
Asian Disaster Preparedness Centre	Coordinator	Mr. Rohana Cooray
Land Use Policy Planning Department	Deputy Director	Mr. B. A. Jayanandana
Open University	Senior Lecture	Dr. H.G.R.A. Ratnaweera
Moratuwa University	Senior Lecture	Dr. U.P. Nawagamuwa
National Physical Planning Department	Director	Mr. Veranjan Kulakulasuriya
	Planning Officer	Ms. M.M. H. G. Nawarathne
Urban Development Authority	Deputy Director General	Mrs. Indu Weerasuriya
	Director Sabaragamuwa	Mrs. D.D.R.K. Gunatilaka
	Director- Southern Province	Mrs. C.K.S. Basnayake
	Director UDA	Mr. D. Hettiarachi
	Director – Southern Province	
	Assistant Director –Central Province	Mr. K.H.M.W.K. Abeyrathna
	Planning Assistant	Mr. N.G. Senaka Amarasiri
SLLAS	Chairman, Former Director NBRO	Mr. Kirithi Senanayake
Central Environment Authority	Assistant Director	Mrs. Jeewa David
Ministry of Environment		Mrs. T.M.A.G. Tennakoon
District Secretary	Additional District Secretary	Mrs. S.A. Dilruk
	District Landuse Planner	Mss. K. Daraniyagala
		Mr. W.A.S.K. Weerasekara
Provincial Council	Uva Province	Mr. M.P. N.M. Wickramasingha
	Sabaragamuwa Province	Ms. Pushpalatha
	Sabaragamuwa Province	Mr. U.P.S.Pathirana
		Mr. A.S. Keerthgala
Sri Lanka Local Government	Consultant	Mr. R.M.A.K. Ratnayake
Mahaweli Authority	Engineer	Mr. I.G. Bandula
Environmental Foundation Limited	Project Officer	Mr. Rumin
Environmental Justices	Director	Mr. Hemantha Withanage
Tsunami Reconstruction project	Director	Mr. Hemantha Jayasundara
Sri Lanka Water Partner	Chair	Mrs. Kusum Athukorala
	Senior Advisor	Mr. S.B.Niyangoda

<b>Organization</b>	<b>Designation</b>	<b>Name</b>
National Building Research Organization	Director General	Dr. Asiri Karunawardena
	Director / Environment Division	Mr. C. Perera
	Head/ LSSD	Mr. RMS Bandara
	Head/ HSD	Mr. K.C. Sugathapala
	Senior Scientist/LSSD	Dr. Jayatissa
	Senior Scientist/HSD	Mr. Sunil Jayaweera
	Senior scientist/ EMV	Mrs. S.V. Dias
	Senior scientist/LSSD	Mrs. K.M. Weerasinghe
	Senior Scientist/HSD	Ms. H.M.R. Menike
	Scientist/HSD	Mr. Manjula Pradeep
	Scientist/HSD	Mr. L.J. Prasanna
	Scientist/ HSD	Mr. Dayan Munasinghe