SUMMARY OF THE DGs' ROUND TABLE CONFERENCE

Strengthening Multi-agency Collaboration for Disaster Risk Reduction in Sri Lanka

Mount Lavinia Hotel, Mount Lavinia, Sri Lanka.

21st June 2018

Prepared by

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Acknowledgements

Our personal thanks go to all the participants from various government departments and to the colleagues from the University of Moratuwa who helped to make the DGs' Round Table Conference a successful event. We gratefully acknowledge the support of the Global Challenges Research Fund (GCRF) and the Engineering and Physical Sciences Research Council (EPSRC). Our special thanks go to Dr. Senaka Basnayake from the Asian Disaster Preparedness Center, Dr. Ananda Mallawatantri from the International Union for the Conservation of Nature (IUCN) and Mr. Srimal Samansiri from the Disaster Management Centre for helping us to organise this event.

MOBILISE Consortium Team

1. Introduction

A two day event was organised by the MOBILISE project consortium (http://www.mobilise-project .org.uk/) on the 20th and the 21st June 2018 involving Director Generals from various government departments to discuss a collective approach for implementing the Sendai Framework's priority one (Understanding Risks) and priority two (Risk Governance) in Sri Lanka. The first day of the event was organised as a team building exercise to present the MOBILISE project and gain support from the key senior officials. The second day was organised to discuss the way forward in creating a digital platform to support the implementation of the first two priorities of the Sendai Framework.

The agenda for the second day comprised three sessions wherein each session had a presentation and a panel discussion. The first session discussed an approach to creating a multi-agency platform for capturing and establishing a common understanding of disaster risks. The second session discussed how this platform can be tested taking Kaduwela as a case study. The third session discussed how the shared disaster risk platform can be used for collaborative risk assessment, mitigation, preparation and disaster response. The following sections present a brief summary of the discussions during these sessions.

Agenda

10.00 am: Arrival and Coffee

10.15am: Introduction to MOBILISE project and purpose of the day

10.30am Session 1 : Understanding Disaster Risks

The objective of this session is to define the nature of a multi-agency shared platform for capturing and establishing a common understanding of disaster risks.

- MOBILISE project ideas towards such a platform (Prof. Terrence Fernando, University of Salford)
- Panel Discussion (Representatives from DMC, Survey, NBRO, Irrigation, Meteorology, Agriculture)

11.45am : Tea Break

12.00am Session 2 : Possible Pilot Case Study (Kaduwela)

The objective of this session is to discuss how best to establish a pilot case study to demonstrate the feasibility of a multi-agency shared platform, taking Kaduwela as the area of study.

- MOBILISE Project ideas for the case study (Mr. Srimal Samansiri, DMC)
- Panel Discussion (UDA, National Policy Planning, DMC, SLRDC)

1.00pm : Lunch Break

2.00pm : Collaborative Approach to DRR

The objective of this session is to discuss how to establish a collaborative risk assessment, mitigation, preparation and response using the shared disaster risk platform.

- Initial ideas from the MOBILISE team (Prof. Terrence Fernando, University of Salford)
- Panel Session (Representatives from DMC, ADPC, UDA, Department of National Planning, ADPC and University of Colombo)

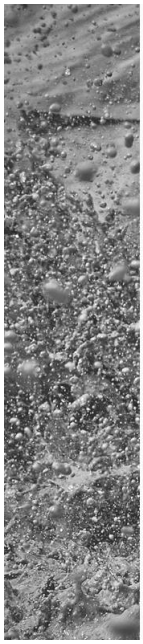
3.00pm : Tea Break

3.15pm: Final Discussions

4.00pm : Close

2. Introduction to the MOBILISE project and the purpose of the day

Prof. Fernando welcomed the participants and made a brief presentation to introduce the key objectives of the MOBILISE project and the purpose of the day using the following powerpoint slides.

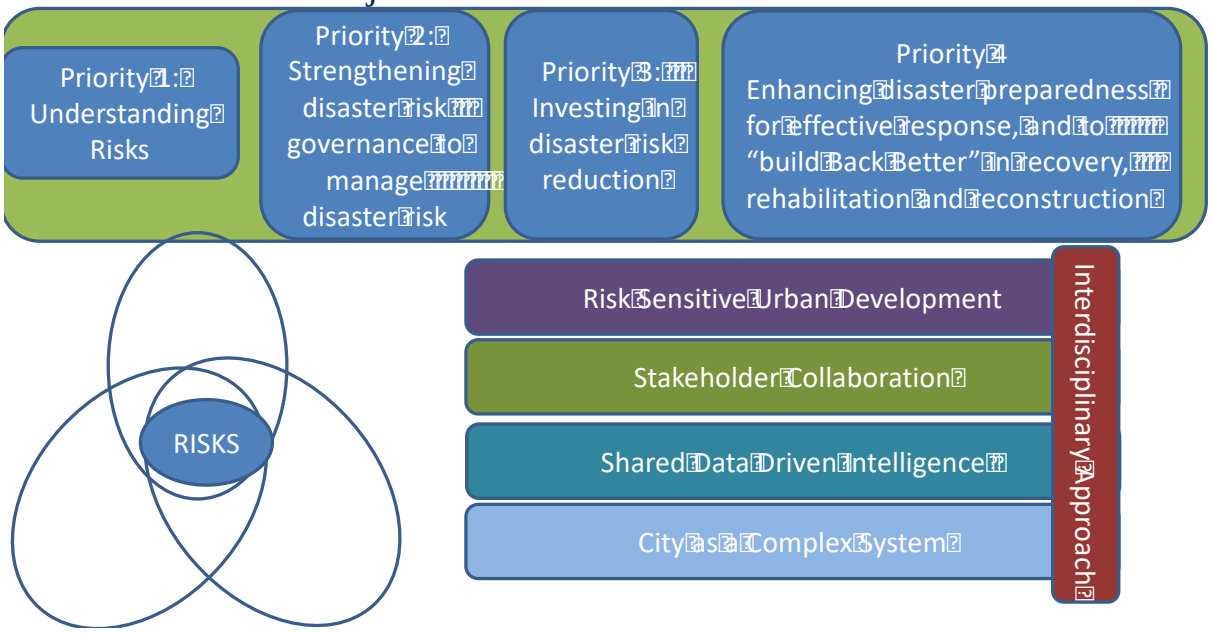


Project MOBILISE (£1.2M)

Tackling global development challenges through digital research

- Aim: to develop a digital infrastructure that can offer intelligence to a range of agencies to work together to reduce the impact of disasters such as floods and landslides on communities.
- Scientific Objectives
  - Digitally enhanced multi-agency collaboration models
  - Resilience frameworks that can measure resilience
  - Modelling community & infrastructure vulnerability
  - Model cascading effects of disasters
  - Social media and real-time intelligence gathered through Space technology for real-time monitoring
  - 3D visualisation of real-time satellite data for supporting disaster response

Context for the Project



Engagement with Sri Lanka So Far

- Held meeting with DMC
- Organised and conducted a two day conference on Disaster Risk Reduction
- Outcome of this event can be found at
  http://www.mobilise-project.org.uk/documents/SummaryMobiliseEventSriLanka.pdf

Purpose of the Day

- To discuss and agree an approach for establishing digital infrastructure and collaborative processes for strengthening a multi-agency approach to disaster risk reduction in Sri Lanka.
- Establish a foundation for creating a digital infrastructure for implementing the Sendai Framework priority one on "Understanding Disaster Risks" and priority two on "Strengthening Governance to Manage Disaster Risks".

3. Session 1: Understanding Disaster Risks

The objective of this session was to define the nature of a multi-agency shared platform for capturing and establishing a common understanding of disaster risks. In this session, Prof. Fernando presented initial ideas from the MOBILISE team regarding establishing a digital platform for capturing risk information that can be then used by various organisations to establish a common understanding of risks and possible interventions for risk mitigation. His presentation was followed by a panel session comprising members from DMC, NBRO, Department of Irrigation, Department of Agriculture and Department of Meterology.

In his presentation, Prof. Fernando presented the business scenario for understanding risks and elaborated upon the challenge, possible technology solutions, its value, relevant stakeholders and the Key Performance Indicators (KPIs) that can be used to measure success. He also presented the initial set of data that is required to initiate the demonstration of the technology platform and how value can be extracted from these data sets. He then invited the panel to express their views on the following points:

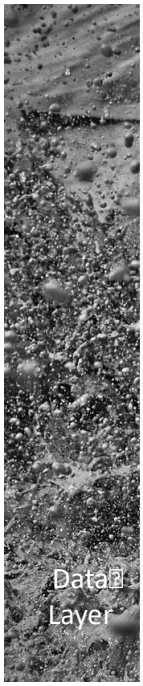
- What information is produced or collected by each department to assess disaster risks?
- How is risk information produced and communicated to relevant parties? What are the limitations of the current approaches?
- What is the value of sharing and integrating risk information (in real & non-real time)?
- What are the barriers to information sharing and how to overcome them? What are the concerns?
- What additional information is required for promoting risk-sensitive urban design?

A copy of the presentation and the key messages gained from the panel discussion are presented below.

3.1. Towards a Platform for Understanding Disaster Risks (powerpoint presentation)

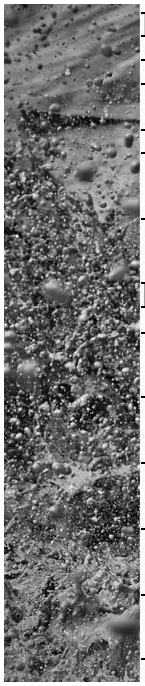
Business Scenario #1 – Understanding of Risks

Challenge	• Inadequate information on vulnerability, capacity, exposure, hazard characteristics • Disaster risk information produced by various agencies are not combined to establish a holistic nature of the local risks. • Unavailability of real-time data, satellite data for assessing slow onset and rapid onset disasters • insufficient understanding of the cascading effect of a disaster on social, economic, environmental and health dimensions. • No means to measure the resilience of a particular disaster prone area. • Current interfaces of risk information systems do not promote collective DRM activities involving relevant agencies • Do not allow local citizens to contribute and access non-sensitive risk information
Solution	• Provide an integrated risk information model that can support easy integration of risk data from various agencies,real-time sources (sensors, satellites, social media) within a given local context. • Provide easy to use visual interfaces for non-technical users from various agencies to collectively explore local risks • Provide an easy to use visual interface for local community groups or members to contribute as well as understand the local risks • Provide system dynamics models for understanding the cascading effect of disasters and their impacts • Provide a resilience framework that can be used to measure resilience of a local area.
Value	• Better collective understanding of the vulnerability, capacity, exposure, hazard characteristics of a local area • Informed debates and better collective decisions on DRR activities • Greater involvement of local citizens in DRR activities
Stakeholders	DMC, Department of Meteorology, Department of Surveying, National Building Research Organisation, Local Authority, District Disaster Management Committee, Village Disaster Management Committee, National Disaster Relief Services Centre (NDRSC) , National Emergency Operation Centre (EOC), Department of Census and Statistics Sri Lanka, Sri Lanka Red Cross Society, Community Leaders (NEED To REFINE)
KPIs	Measurable on the timescale of this project. • Improved understanding of risks (qualitative) • Ability to measure local resilience (quantitative).

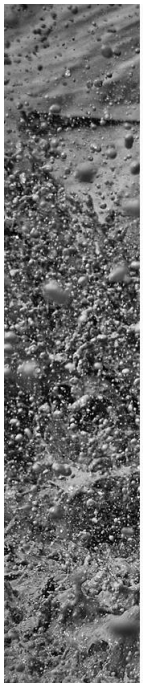


Data for Identifying Risks

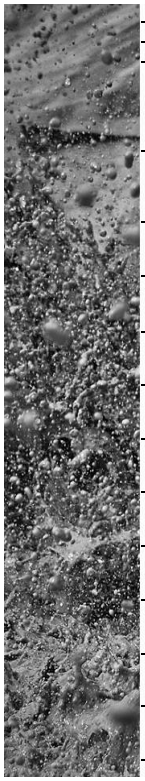
- Context & Vulnerability
  - Social
  - Infrastructure
  - Environment
- Hazard & Exposure for slow onset disasters
  - Simulation & Historical Data
  - Slow onset disaster data derived from satellite & sensor data
- Remote & Real-time Data for rapid onset disaster
  - Social Media
  - Weather Data
  - Sensor Data
  - Satellite data



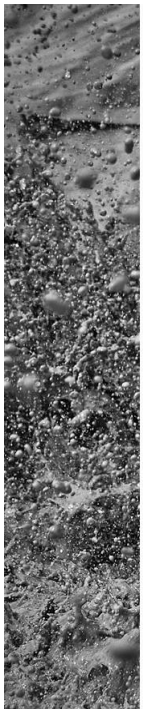
Data Layer	Data Attributes	Data Formats
Built Environment		
Digital Terrain Elevation Model	Digital Terrain Model (DTM) & Digital Surface Model (DSM)	Ascii (.asc)
Aerial Images	High resolution images	Geotiff
Roads	Road network	Shapefile (.shp), KML (.kml; .kmz), GeoJSON (.json; .geojson)
Land use	Zones (residential, industry, forest, cultural, paddy fields, recreational, etc)	Shapefile (.shp), KML (.kml; .kmz), GeoJSON (.json; .geojson)
Natural Environment		
Rivers	River networks	Shapefile (.shp), KML (.kml; .kmz), GeoJSON (.json; .geojson)
Reservoirs	Location, footprint, significance	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
National parks	Location, boundary, type, significance	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Forests	Location, boundary, type, significance	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Animal sanctuaries	Location, boundary, animal types, quantity, significance	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)



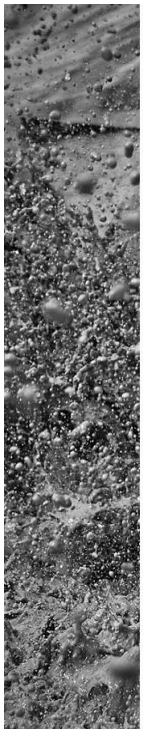
Buildings		
Residential buildings	Location, footprint, height, type, roof type, construction type, value, HH Income, family composition number, gender, age)	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Commercial buildings	Location, footprint, height, business type, construction, number of employees, value	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Industry buildings	Location, footprint, height, industry type, construction, number of employees, value	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Herritage buildings	Location, footprint, height, age, significance,	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Educational Establishments (Schools, Universities)	Location, footprint, height, type, construction, number of students & staff	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Religious establishments (churches, temples)	Location, footprint, height, type, construction, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Hospices	Location, footprint, height, type, construction, number of tenants & staff	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Shopping Centres	Location, footprint, height, business type, construction	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)



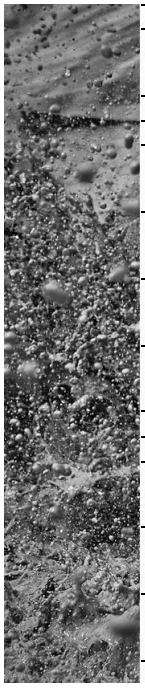
Critical Infrastructure		
Utility Services		
Electrical Power Distribution Network	Network structure + following data for each station (Location, footprint, height, type, capacity, geographical coverage.)	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Telecom network	Network structure + following data for each station (Location, footprint, height, geographical coverage)	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Water distribution system	Network structure with water purification points, distribution points, coverage	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Gas Infrastructure	Network structure and/or gas station locations and capacity.	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Road network	Road network structure, road types	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Railway network	Railway network, railway stations with height	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Coastal infrastructure (ports)	Location, footprint, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Dams	Location, footprint, height, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Bus stations	Location,	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Airports	Location, footprint, height, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Waste management systems	Location, footprint, height, capacity, geographical coverage)	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Bridges	Location, footprint, height	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)



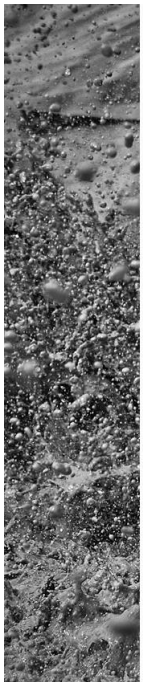
Critical Facilities		
Health Infrastructure (Hospitals, health cenrtes)	Location, footprint, height, type, construction, number of staff, number of patients / day	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Fire Stations	Location, footprint, height, type, construction, number of staff, number of fire engines.	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Police Stations	Location, footprint, height, type, construction, number of staff	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Council	Location, footprint, height, type, construction	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Other government facilities	Location, footprint, height, type, construction, service type	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)



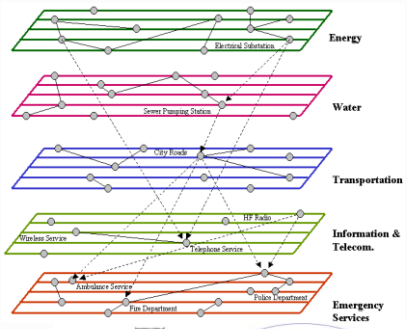
Hazard Sites		
Recycling plants	Location, footprint, height, hazard type, construction, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Waste disposal sites	Location, footprint, height, hazard type, construction, capacity	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Chemical sites (storage, factories, labs etc)	Location, footprint, height, hazard type, construction, volume	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
University labs (biological, radioactive)	Location, footprint, height, hazard type, construction, volume	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Petrol stations	Location, footprint, height, hazard type, construction, volume	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Sewage pipeline network	Network structure	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)

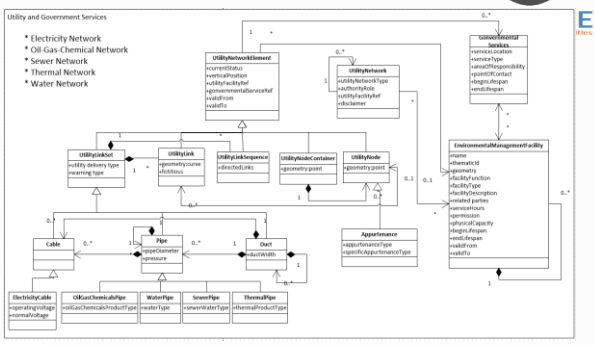


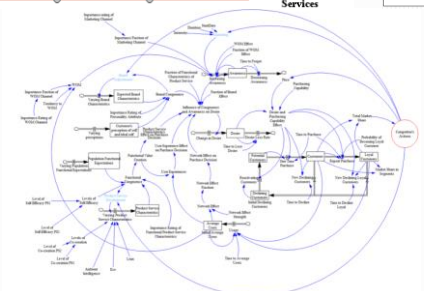
Social Information		
Population densities	Population against administrative boundaries	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Mobility Needs		
Elderly people	Location	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
People with disabilities	Location, type of disability	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Families with children	Location, number of children and their ages	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Pregnant ladies	Location	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
Healthcare Needs		
Serious medical needs (requiring special medical equipment to evacuate)	Type, location, gender, support required	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
People with specific type of illness (requiring special procedure for evacuation)	Type, location, gender, support required	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)
People with chronic health conditions	Type, location, gender, support required	Shapefile (.shp), CSV (.csv), KML (.kml; kmz), GeoJSON (.json; geojson)



Dependency Modelling for Simulating Cascading Effect

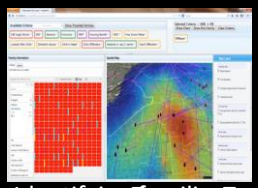




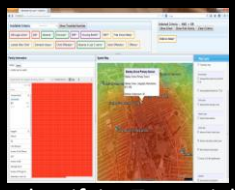


Extracting Value out of Data to Support DRR & Risk Sensitive Urban Development

Connecting various development agendas can help stakeholders to build common vision



Identifying families connected through crimes



Identifying Potential "Children In Need"

Use of visually enhanced spaces for stakeholder engagement in sustainable design

Local risk assessment by connecting multi-agency datasets

Data Fusion

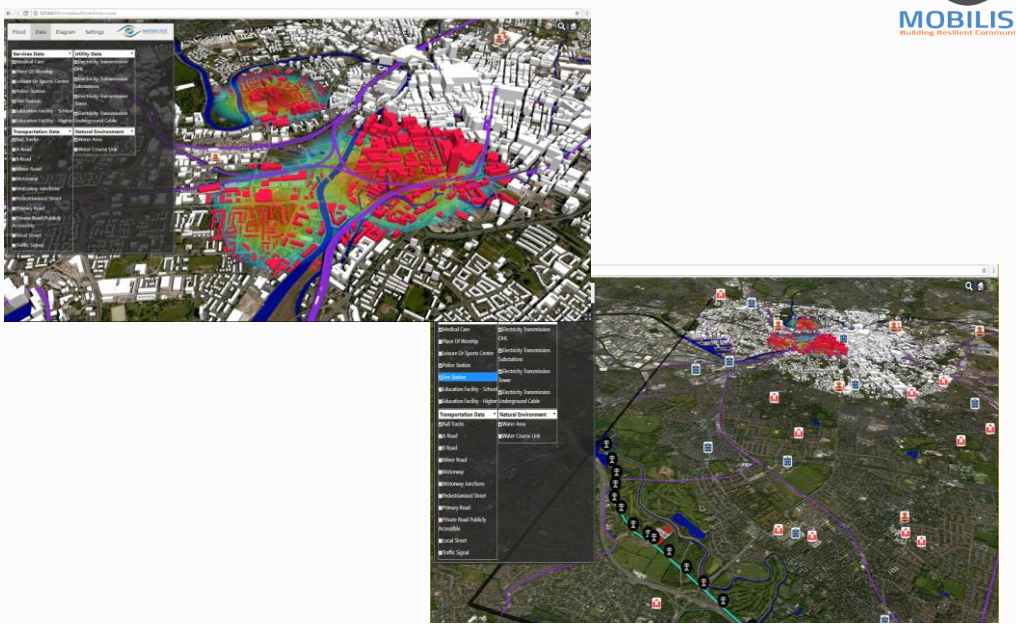
Data Analytics & Visual Analytics

Making Data Human Centric

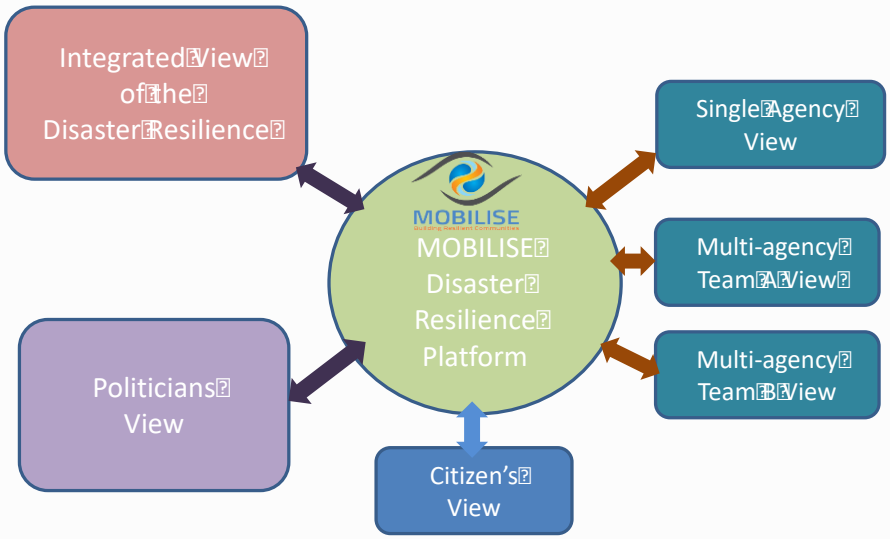
Data Governance Platform

Emergency response training through "role Play"

MOBILISE Platform for Contextualising Local Risks



User Concept of MOBILISE Platform



3.2. Key Points from the Panel Discussion on Understanding Disaster Risks

<table>
<tr><td colspan="2">Participants:
• Mr Rohan Samarakkody - Additional Director General, DMC
• Dr Gamini Jayatissa - Senior Geologist at the NBRO's Landslides Studies Unit
• Eng. G.P Gunawardane - Director of Irrigation (Drainage & Flood Systems/Disaster Management)
• Mr Hiran Peris - Additional Director, Agriculture Department
• Mr A L K Wijemanne - Deputy Director, Department of Meteorology</td></tr>
<tr><td colspan="2">Q1: What information is produced or collected by each department to assess disaster risks?
Q2: How is risk information produced and communicated to relevant parties? What are the limitations of the current approaches?
Q3: What is the value of sharing and integrating risk information (real & non-real time)?
Q4: What are the barriers to information sharing and how to overcome them? What are the concerns?
Q5: What additional information is required for promoting risk-sensitive urban design?</td></tr>
<tr><td>Rohan Samarakkody</td><td>Data is the key, when it comes to an understanding of disaster risks. This data could be technical or non-technical. According to the Sendai Framework, whether risks are large, medium, small or natural or man-made, having an understanding on these risks is vital. There should be an integrated mechanism and it should be multi-sectorial as well. There are 03 layers of stakeholders: national, provincial and local level. On top of that, the influence of regional and global level risks cannot be undervalued Specially, global warming. One hazard can trigger many more risks. Actually it is the local level which plays the important role when it comes to collecting information. There are 02 local level mechanisms. The Divisional Secretariat with the GNs are responsible for collecting data and Local Government is responsible for welfare activities. When you involve many stakeholders, you have to consider different perspectives. However, good participation from all responsible parties is vital.</td></tr>
<tr><td>Hiran Peris</td><td>Because of the climate change, the impacts on 04 seasons have to be assessed. The information concerning the impact on food and plantations due to disasters is the centre of focus. The Department of Agriculture is responsible for enforcing the "Soil Conservation Act" which helps to reduce disaster risks in the country, especially in the Up country, when it comes to landslides. The use of agro chemicals is a hidden disaster. However, these agro chemicals or pesticides have become an "Essential Evil", because we cannot cater for the food demand without the use of them in the production. Actually the disaster risks</td></tr>
</table>

	imposed by them are still in the soft corner of the disaster risk in the country, without a direct impact. Because of the malpractices adopted by the farmers, the use of agro chemicals can degrade water quality, when mixed with bodies of water.
A L K Wijemanne	Repetition of data collection is evident among NBRO, the Irrigation Department and the Met Department. But since now these 03 and the DMC are under a single Ministry these shortcomings will be resolved. Since 2009, we have operated an automated weather station. Simulation data is issued to any parties who request them. Based on the data received, a probabilistic rainfall forecast is undertaken.
Rohan Samarakkody	In replying to Mr Wijemanne, Mr Samarakkody explained that probabilistic models are valuable for DMC. Even though there exists a repetition of data collection, DMC knows from whom data should be captured and how reliable they are. He also highlighted issues associated with waste and water contamination. The lack of definition for waste itself is problematic because it is a potential hazard. He also pointed out the need for appointing a "Technical Advisory Committee" since most of the time disaster management is struggling with technical issues. The National Disaster Management Committee should bring together the Ministry and technical institutions.
Gamini Jayatissa	NBRO is the prominent organisation which works towards mitigating landslides. Currently 02 main measures have been undertaken: 1. Developing a landslide susceptible model to predict the locations of landslides; this is available in the scales 1: 50,000 and 1:10,000 2. Site specific data investigation from community specific data to identify which communities are at risk and the nature of these risks in landslide prone areas Because of number of increased landslides, we need an early warning system with real time rainfall data. For the early warning system, the triggering factor is the rainfall. Since the information we were getting from the Met Department was not enough, we have installed automated rain gauges. The cutting failures in hill country is one of the major risks in terms of landslides, because people create cuts when constructing houses and these unstable cuts lead to landslides eventually. We have developed building codes to incorporate resilience into building construction. Still we cannot prevent collapsing of buildings due to cutting failure.
G.P Gunawardane	As one of the oldest departments in the country, the Irrigation Department has its own mechanism to manage disasters. We have 113 rivers around the country. They have prioritized "Kelani", "Kalu" and "Nilwala" rivers which are the main sources of flooding in the country. Hence rain

	gauges have been installed at these critical locations. Since the Kelani river runs through the capital, the Irrigation Department has proposed a flood detention basin at Hanwella. However, due to political pressure, the proposal has been withdrawn. This flood detention basin could have provided protection against flooding from the Kelani river.
Rohan Samarakkody	Mr Samarakkody mentioned that most of the organisations are responding to disasters and their role is more relevant to post disaster scenarios. In fact, he added that NBRO has to play a major role in disaster management with the collective effort of its sub divisions. DMC's scope is getting wider and a holistic approach should be mandated. He also highlighted that a lack of research in the area of disaster management has subverted the focus on disaster prevention.
Opinions/comments from the audience:	
• Mr. P M P Udayakantha - Survey General, Sri Lanka Survey Department • Mr Srimal Samansiri - Assistant Director, Research and Development, DMC • Prof. Siri Hettige - University of Colombo • Prof. Ananda Jayawardane - Director General, National Science Foundation • Dr. Senaka Basnayake - Director, Climate Resilience Department, Asian Disaster Preparedness Centre	
P M P Udayakantha	The Survey Department has conducted a LIDAR survey in 05 districts and these include the flood prone districts; Colombo, Gampaha and Kalutara and landslide prone districts; Kegalle and Badulla. These data are shared with DMC on demand. For the Colombo area, 1000 building footprints and topographical maps have been developed. These are available in the 1:10,000 scale. The mapping of river basins, reservoirs and forest reserves is being undertaken. For the entire country, GN Division boundaries have been identified. Zoning maps are being developed as per the request of UDA. GIS data required by the DMC are provided on demand. But, currently, in order to enhance the effectiveness and efficiency of data sharing, the Survey Department is developing a portal, through which data access has been granted to the Agriculture Department, the Tourism Department and the Archeology Department. Currently the prime issue concerning data sharing is the Government's data policy. The standards and formats of data sharing should be regulated and enforced by the Government because some data cannot be disclosed free of charge. The Survey Department has collected flood simulation data from the 2017 flooding and a simulation model has been developed. Although the May 2018 flooding was not severe, data is being collected.
Srimal Samansiri	He acknowledged the support of National Institute of Geological Sciences (NIGS). With their support and with the help of Survey Department, flood inundation maps have

	been developed. Although multiple organisations have their own models, it is important to integrate them in order to bridge the technology gap
Siri Hettige	The 03 factors regarding DRR (in broad terms): 1. National level integration 2. Intervening variables 3. Building a common platform (integration of multiple nodal points)
Ananda Jayawardane	NSF is willing to provide grants to undertake research in this area. Integration and collaboration is the key when it comes to data sharing
Senaka Basnayake	Even though each and everybody have highlighted the necessity of data sharing, data is not the issue. We should have a purpose to which the data should be employed. Now that we have a purpose; which is to understand the disaster risks and develop models based on that data. We have to focus on technological advancements (such as remote sensing) which are already being applied at the regional level. Capturing transboundary data is also important.
Terrence Fernando	Wrapping up the panel discussion, the Professor highlighted 03 main aspects had emerged: 1. The type of data which is needed to understand disaster risk reduction. 2. The type of risk information that needs to be focused upon. 3. The means of application (Kaduwela case study).

4. Session 2: Possible Pilot Case Study (Kaduwela)

The objective of this session was to discuss how best to establish a pilot case study to demonstrate the feasibility of a multi-agency shared platform, taking Kaduwela as the area of study. This session commenced with a presentation from Mr. Srimal Samansiri from DMC who presented upon the nature of the Kaduwela case study. This was followed by a panel discussion involving key representatives from the Urban Development Authority, the Sri Lanka Land Reclamation and Development Corporation, the Department of National Planning and the Disaster Management Centre.

The panel members were asked to comment on the following points:

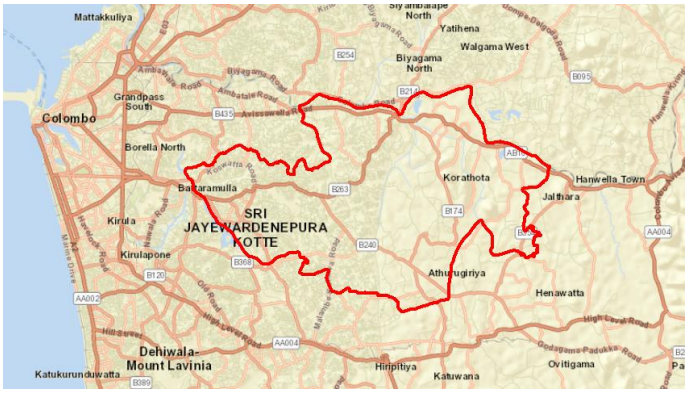
- What types of data (simulations, non-real-time data, real-time data) are important for creating a holistic view of risks in Sri Lanka?
- What type of data sets can be offered from the various departments?
- What questions do we want to ask from this shared digital platform to inform our DRR activities?

- What extra information do we need to promote risk-sensitive urban design?
- Who are the beneficiaries / stakeholders of this platform?
- How can we evaluate the usability of this platform?

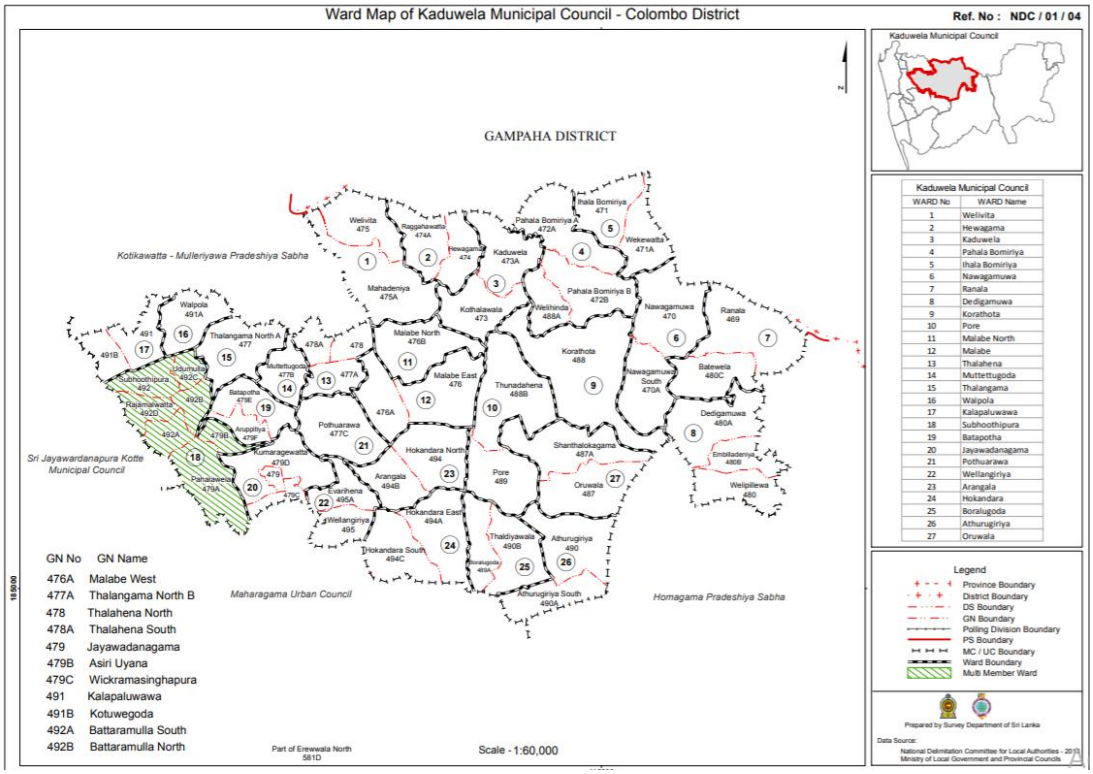
A copy of the presentation and a summary of the panel discussion are presented below.

4.1. Kaduwela Case Study (powerpoint presentation)

Kaduwela MC



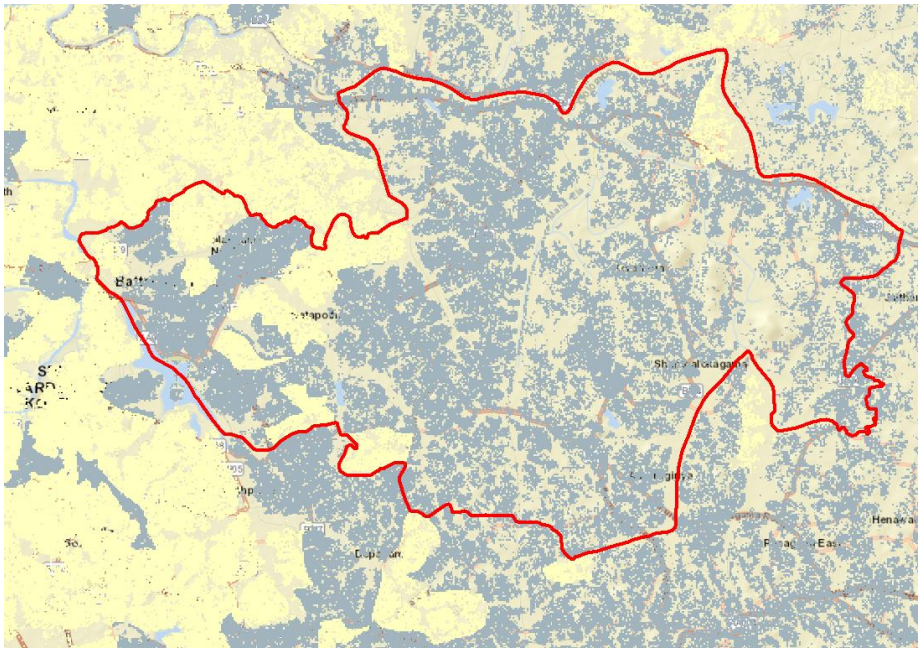
- Recently declared as Municipal Council
- Population more than 250,000
- Area – 87 sqkm
- Bounded by Kelani River
  - Highly residential are,
  - Major industries
  - An Educational hub



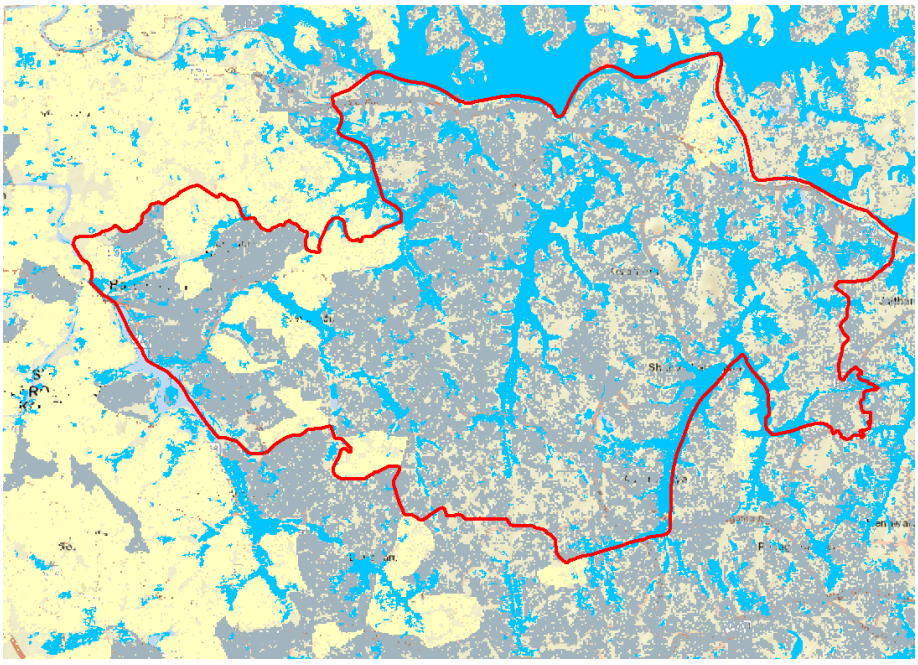
Source: Kaduwela MC

Kaduwela Flood 2016

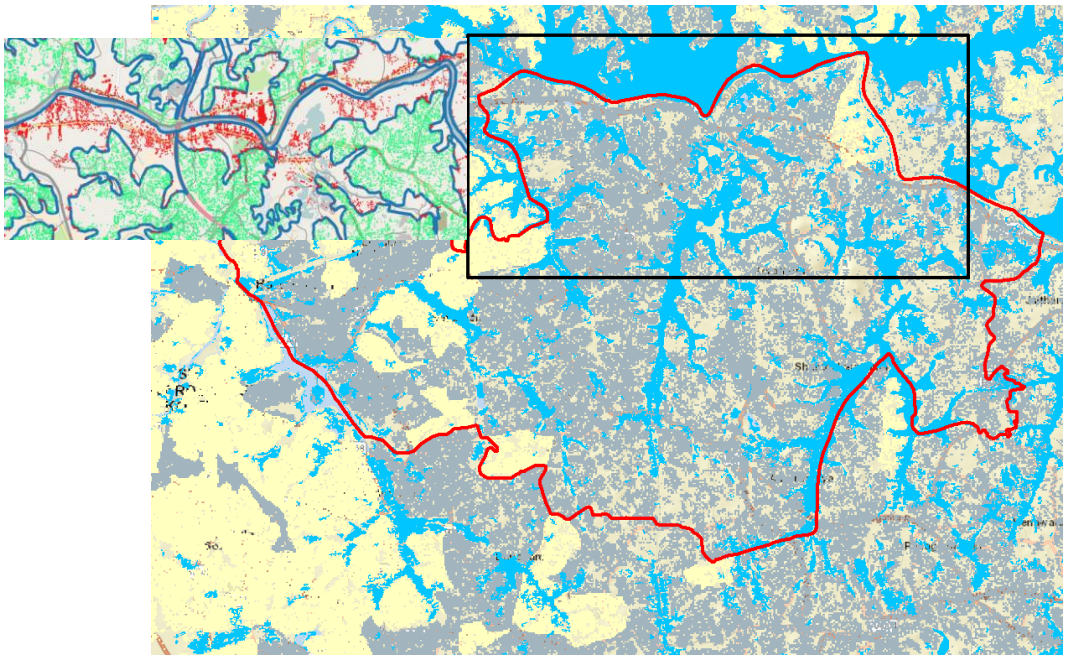
Population Density Map



Population vs Floods



Proposed Study Area



4.2. Key Points from the Panel Discussion on the Kaduwela Case Study

Participants: • Ms Chethika Gunasiri - SLRDC • Mrs Nishamini Abeyratne - UDA • Mrs Rajitha Jagoda - Department of National Planning • Mr Srimal Samansiri - DMC	
Q1: What types of data (simulations, non-real-time data, real-time data) are important for creating a holistic view of risks in Sri Lanka? Q2: What type of data sets can be offered from the various departments? Q3: What questions do we want to ask from this shared digital platform to inform our DRR activities? Q4: What extra information do we need to promote risk-sensitive urban design? Q5: Who are the beneficiaries / stakeholders of this platform? Q5: How can we evaluate the usability of this platform?	
Srimal Samansiri	The briefing on the Kaduwela case study was undertaken by explaining about the selected area. He pointed out that although data are available, it is still challenging to understand when and how data should be employed.
Rajitha Jagoda	Since climate change has become the major challenge across the globe, a focus on human rights has also to be raised. It has been found that women are the most vulnerable to disasters. Hence gender-based budgeting

	should be enabled. Initially, the implementation of cost reliable options is encouraged for countries like Sri Lanka. However, a repetition of proposals should be avoided. At all department levels, the issue of “under-staff” is a continuing concern which hinders the progression of any practical implication of these proposals.
Chethika Gunasiri	Environmental sustainability should be integrated with urban planning, given the fact that cities are expanding vertically (Colombo, Jayawardanepura Kotte). Eco system services, waste management and urban health and sanitation are some of the concerns that need to be addressed through the digital platform.
Nishamini Abeyratne	Urban planning has to be undertaken by integrating DRR measures. For conventional zoning, basic patterns have been identified. Special attention on the protection of wetlands has been a key area. Currently, there is no pre-defined method to determine population and it is calculated by the carrying capacity of spaces. This is challenging when it comes to identifying the vulnerable parties of a disaster prone area.
Srimal Samansiri	The main idea behind selecting Kaduwela as the pilot case is to emphasis the role of technology in DRR. The quality of data which we already have is questionable. At DMC 03 concerns have been raised regarding the data: 1. Data should be available 2. Data should be at a machine-readable level 3. Available data should be integrated with more data sets For pre-disaster preparation, DMC should have an understanding regarding: 1. The hazards beforehand. 2. The mechanisms to capture them. 3. The amount to be spent. 4. Vulnerability levels. It is important to carry out a census after every disaster, with the collaboration of the Census department, at least within every 2 years.

5. Session 3: Risk Governance

The objective of this session was to establish a collaborative risk assessment, mitigation, preparation and response using the shared disaster risk platform. In this session, Prof. Fernando presented a business scenario template which elaborated challenges, possible solutions, value of the solutions and key stakeholders that could be involved in implementing the business scenario and the KPIs for measuring the success of the novel approach. He then presented a six step risk assessment

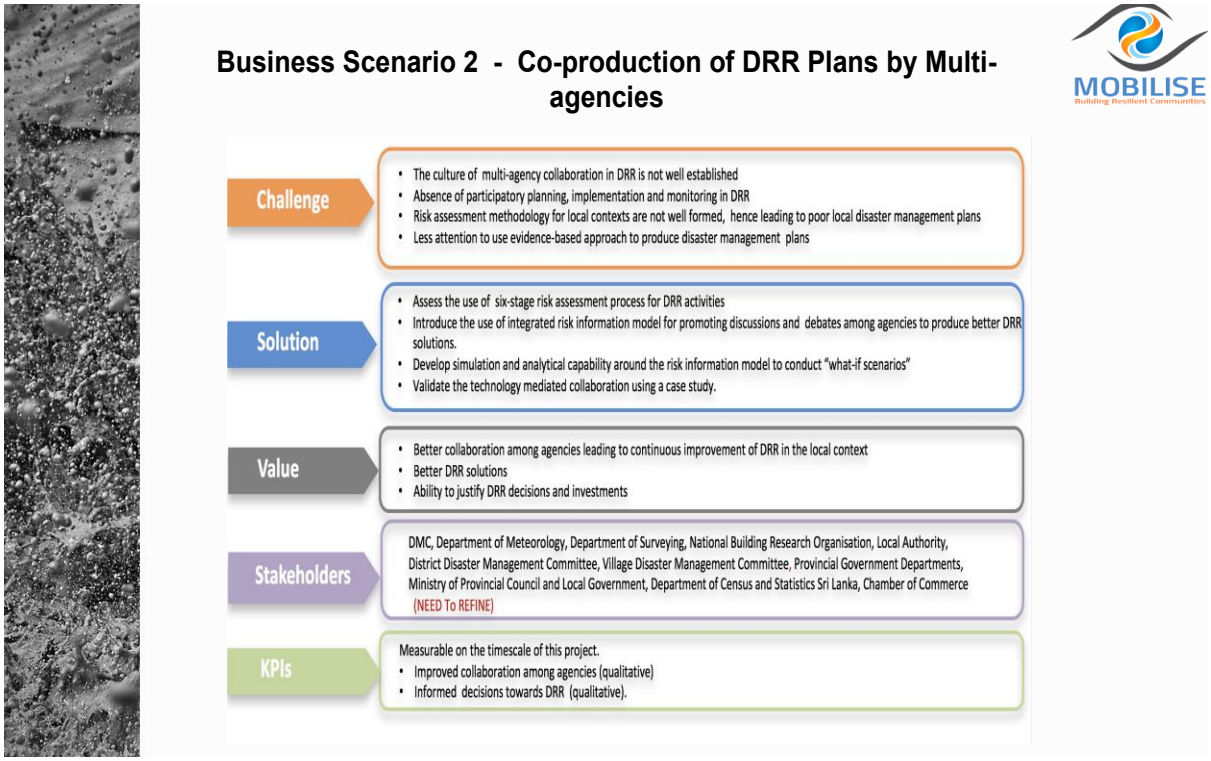
process used in countries such as New Zealand, Australia and governance structures used in UK to perform continuous risk assessment and treatment.

His presentation was followed by a panel session comprising representatives from the Disaster Management Centre, the Asian Disaster Preparedness Center, the Urban Development Authority, the Department of National Planning and the University of Colombo. He invited the panel to express their views on the following points:

- What is the current collaborative approach to DRR in Sri Lanka? What are its limitations?
- What is the mechanism to introduce a digitally supported collaborative approach to DRR in Sri Lanka?
- What barriers do we need to overcome in implementing a digitally supported collaborative approach to DRR?
- How can we establish an approach for developing and evaluating a collaborative DRR approach?

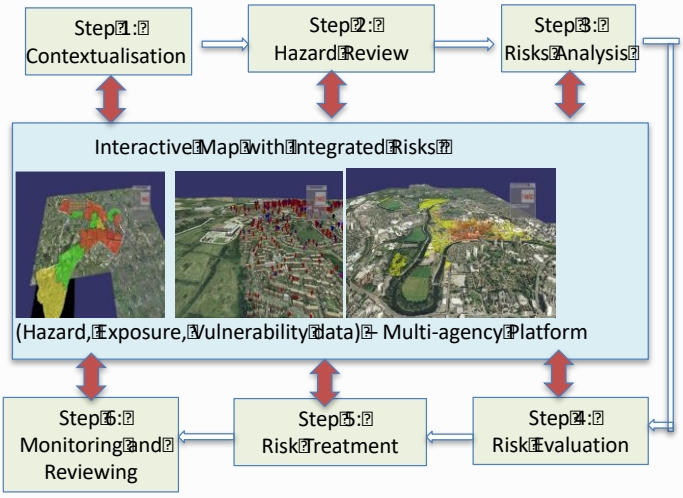
A copy of the presentation and the key messages from the panel discussion are presented below.

5.1. Approach for Risk Governance (powerpoint presentation)

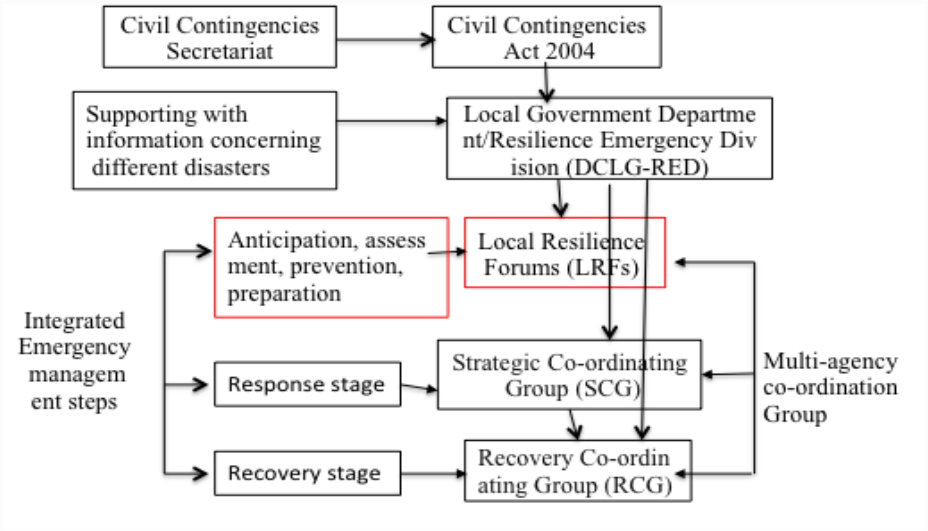


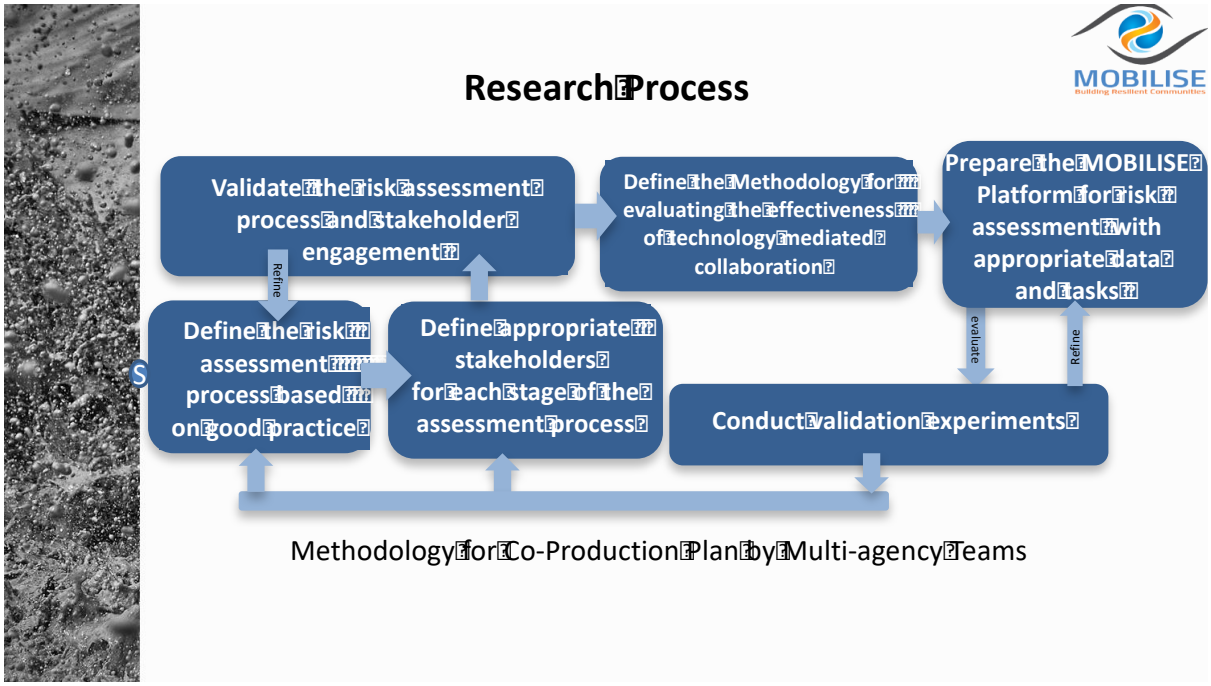
Local Intelligence Platform for Supporting Disaster Risk Reduction

- Possible Approach
  - Six-step risk assessment process proposed in the Australian/New Zealand Emergency Preparedness
  - widely recognized as being of good practice (Guidance on Part 1 of the Civil Contingency Act, 2004).



UK Model for Disaster Management





5.2. Key Points from the Panel Discussion on the Risk Governance

Participants • Mr Rohan Samarakkody - Additional Director General, DMC • Dr. Senaka Basnayake - Director, Climate Resilience Department, Asian Disaster Preparedness Centre • Mrs Nishamini Abeyratne - UDA • Mrs Rajitha Jagoda - Department of National Planning • Prof. Siri Hettige - University of Colombo	
Q1: What is the current collaborative approach to DRR in Sri Lanka? What are its limitations? Q2: What is the mechanism to introduce a digitally supported collaborative approach to DRR in Sri Lanka? Q3: What barriers do we need to overcome in implementing a digitally supported collaborative approach to DRR? Q4: How can we establish an approach for developing and evaluating a collaborative DRR approach?	
Senaka Basnayake	Currently there is no collaboration. Although there is the Sendai Framework, it has to be refined to suit the national level. Information needs to flow from the bottom up. We lack resources, even though policies are being formulated.
Nishamini Abeyratne	It should be a bottom up approach with DMC. Although the "National Physical Plan" has been formulated, none of the relevant stakeholders are commenting on it for further improvement. This is a good example to show the lack of a collaborative approach in our country.
Rohan Samarakkody	Prof. Terrence showed the UK's way of disaster management with its hierarchical levels and structure of

	information flow. He asked Mr Samarakkody, whether the same can be mapped within the Sri Lankan context. According to him, DMC is the coordinating body and there is still a need to come up with a proper structure. According to him, delegating authority and assigning more responsibilities to local administrative bodies will be effective.
Siri Hettige	Bringing other stakeholders into a functional team should be done by the DMC. Currently, they are mostly undertaking the fire fighting. The hierarchical arrangement at the Ministry level is also poor and it hinders the collaborative approach. Private and public sectors should be brought together. He further proposed to develop a provincial and local setup for disaster preparedness and risk mitigation.
Rajitha Jagoda	The collaborative approach is mostly visible at the post disaster stage. The Natural Disaster Insurance Scheme (NDIS) implemented through the National Insurance Trust Fund since 2016 and the Drought Assistance programme for the agriculture sector are some of the outcomes from the collaborative approaches undertaken to provide relief services for flood victims. Still, cross sector prioritization is needed.
Opinions/ Comments from the audience	
• Mr A L K Wijemanne - Deputy Director, Department of Meteorology • Dr Gamini Jayatissa - Senior Geologist at the NBRO's Landslides Studies Unit	
A L K Wijemanne	He suggested the development of KPIs to address disasters. Bringing together police and other forces is also important, even at the pre-disaster stage.
Gamini Jayatissa	He raised concerns as to whether the national physical planning and future settlement is implemented with short, medium and long term strategies, to which Mrs Abeyratne responded that resettlement is not the issue, but that the redevelopment is done poorly. Dr Jayatissa pointed out that DRR should be thorough within the future development taking place in the country and subsequently should be integrated with the overall national policy planning.

6. Summary

The event was useful in having an open debate about a collaborative approach to risk reduction as well as obtaining support from various government agencies for implementing such an approach. This event also laid the foundation for having detailed discussionswith several government agencies. The section below summarises the key messages from the panel discussions.

Data Issues:

- Integrated mechanisms for capturing risk information is important.
- Different perspectives from various stakeholders should be considered.
- A repetition of data collection is evident among many departments; hence a coordinated approach could be beneficial. The MOBILISE platform could be used to connect information from various weather stations, rain gauges, river sensors etc.
- Hazards such as waste and agro pollution should also considered.
- NBRO is collecting site specific data to identify which communities are at risk due to landslides. This data could be brought into the MOBILISE project.
- Real-time rainfall data is required to issue early warnings of possible landslides.
- The Surveying Department has Lidar data for Colombo, Gampaha and Kalutara, Kegalle and Badulla; for Colombo building footprints and topographical maps have been developed; mapping of river basins, reservoirs and forest reserves are being undertaken; zoning maps are being developed as per the request of UDA. This data could be made available for the Kaduwela case study.
- For conventional zoning, basic patterns have been identified. Special attention on the protection of wetlands has been a key area.
- Currently, there is no pre-defined method to determine population and it is calculated by the carrying capacity of spaces. This is challenging when it comes to identifying vulnerable parties in a disaster prone area.
- There is a need to understand hazards beforehand, the mechanisms to capture them and vulnerability levels.

Simulation:

- Many departments are simulating floods. It would be useful to evaluate the accuracy of various simulation systems.
- NBRO is developing a landslide susceptible model to predict the locations of landslides.

Risk Sensitive Urban Development Issues:

- Unstable cuts created during construction can lead to landslides.
- The introduction of flood basins could reduce the impact of floods but sometimes it is difficult to implement without political support.
- Environmental sustainability should be integrated with urban planning, given the fact that cities are expanding vertically (eg. Colombo, Jayawardanepura)
- Urban planning has to consider DRR measures.

Collaboration in Risk Governance:

- Current collaboration is weak.
- Stakeholders from the national, provincial and local level should be involved.
- The “National Physical Plan” has been formulated but requires stronger buy-in from other government agencies.
- There is a need to involve stakeholders from the current structures involved in disaster management