Disaster Risk Reduction
16 to 19 October 2018

Introduction

In recent years, the nature and effects of disasters have changed. The December 2004 devastating tsunami event in South Asia showed that well-developed risk awareness could have saved many human lives. Recent catastrophes such as the Myanmar cyclone and Sichuan earthquake in 2008, the typhoons in Taiwan, Philippines and Vietnam, the earthquake in Sumatra in 2009, as well as the 2011 Thai floods and the triple events in the Japan Tohoku earthquake and nuclear plant melt down have brought huge strains to governments' budgets and resources. Disaster risk reduction and building resilience are thus imperative for any future development agenda.

Singapore is located in a low seismicity region within the Eurasian Plate. The magnitudes of earthquakes in scenario analysis are large, but they are located more than 450 km away from Singapore. Thus, the ground motions should have been attenuated significantly when they arrive the bedrock beneath Singapore. Singapore is taking a whole-of-government approach in formulating cost-effective and adaptation solutions and risk reduction measures to address climate change and natural hazards. An Inter-Ministerial Committee on Climate Change was formed in late 2007 to oversee the formulation of a national programme on climate change adaptation and mitigation, disaster risk reduction measures and the building of resilience in the community.

Course Objectives

The course will provide participants with an opportunity to:

- Understand the implications of coherence of the Sendai Framework, Paris Agreement and the 2030 Agenda for Sustainable Development, and integration of disaster risk reduction in development processes and investments
- Explore tools and cases that can help in the integration of disaster risk reduction into development policy and investment, development of strategies and plans for disaster risk reduction

This course shares Singapore's experiences in disaster risk reduction and the government approach in formulating adaptation measures and building resilience in the community.

The focus would not be just on theory but also on institutional development and capacity building to implement plans. The course would also cover Singapore's policies and implementation systems in sustainable urban planning and development. It will also discuss the principles, strategies and policies in the Masterplan 2014 and the government's commitment, plans, targets and projects in the Sustainable Singapore Blueprint 2015 and the government efforts in strengthening governance and building capacity.

Methodologies

The 4-day programme would comprise the delivery of a systematic curriculum and relevant course materials that would be used for interactive discussions in the classroom.

The methodology would include a mix of formal lectures, practical sessions, group work/exercises, experiential activities and other interactive components, as far as possible. Participants would also be

encouraged to share their experiences, learning points and challenges faced in plans and policy implementation in their respective countries.

To achieve the above course objectives more effectively, these course materials will be delivered by a team led by an expert along with several guest lecturers from government agencies and planning-relevant industry in Singapore.

To enhance the output of the program and to crystallize the knowledge gained by participants, there will be discussion with delegates on how they can incorporate the knowledge gained into their approaches and applications in disaster risk reduction plans and building resilience in their countries. In addition, relevant site visits would be arranged.

Coverage

The course will cover the following areas:

Disaster Preparedness

- Conducting vulnerability assessments through economic risk analysis, catastrophe assessment, and finance management
- Setting up early warning systems
- Building public health resilience through pandemic preparedness

Response

- Formulating emergency management plans
- Strengthening policy and decision-making processes
- Working with public and private stakeholders

Mitigation Measures

- Climate change adaptation and mitigation measures
- Sustainable urban planning and development
- Strengthening governance and building capacity

From the above subject areas, the topics to be covered include:

a. **Vulnerability assessment through economic risk analysis, catastrophe assessment, and finance management**
Vulnerability is characterised as the degree of damages or loss to elements at risk which occur as a result of any hazard. The vulnerability of objects is usually determined based on observations, modelling, experimentation or a combination. Vulnerability is usually represented by vulnerability functions or loss functions by capturing the interaction between exposure and susceptibility indicators.

b. **Linking DRR with Major Agreements.**
Understanding how disaster risk reduction links with the Sustainable Development Goals and the Paris Agreement, linking the Sendai Framework with the other two major agreements of 2015

c. **Setting up early warning systems**
Early warning systems describe the provision of information on an emerging dangerous circumstance through identified institutions where that information can enable action in advance to avoid or reduce the risks involved. An efficient early warning system comprises of 4 interrelated elements

characterised by knowledge of risk, monitoring of precursors and prediction of probable events, efficient dissemination of information and capacity to respond.

d. **Building public health resilience through pandemic preparedness**
The threat from infectious pathogens is greater today than ever. Singapore has established a systematic framework in response to the threat. A comprehensive preparedness and response plan comprising of alert phases, pharmaceutical and non-pharmaceuticals response measures has been proposed.

e. **Formulating emergency management plans, Evacuation planning & training and implantation**
Emergency management is a continuous process through which communities prepare, respond, and recover from crises and disasters. It serves to help residents better understand the threat and expands understanding of the potential risk reduction measures such as policies, building codes etc. Evacuation procedures combined with early warning measures and physical measures can save many lives. So it is necessary to make sure the affecting community is informed and are prepared in the event of any disaster. Advocating hazard specific evacuation training measures is necessary to have positive effects.

f. **Essential and emergency operations**
In the event of a disaster it is necessary to ensure continued operation of essential and emergency services. A continuity of operations plan, which is an overarching plan that has to be developed independent of the event so as to ensure the functioning of the identified essential processes and functions.

g. **Working with public and private stakeholders and strengthening policy and decision-making processes**
Natural hazards present significant risks to people and property, as well as large-scale economic costs. For disaster risk reduction it is imperative to build partnership with diverse stakeholders to leverage data and resources in reducing workloads, as well as achieving shared community objectives.

h. **Climate change adaptation and mitigation measures**
There is an overwhelming scientific consensus that the climate is changing and Climate change scenarios will have a significant impact on all aspects of human life; including our buildings. Climate change adaptation and mitigation measures are vital in land use planning and building decisions as they have long term implications due to their permanency nature. The proposed measures based on risk assessment provide an opportunity to change course from likely outcome to manageable outcome.

i. **Sustainable urban planning and development**
The section shares a comprehensive understanding on the Singapore's policies in urban and town planning and systems and the mechanisms on how to successfully develop a comprehensive modern city state.

j. **Strengthening governance and building capacity**
In disaster risk reduction, there has been a shift from a management approach to one focusing on governance and institutions. Disaster risk governance while risks are increasing globally, aims to reduce risk to an accepted and manageable level by ensuring risk reduction as a national and a local priority with a strong institutional basis for implementation. Capacity development thus is the central strategy for reducing disaster risk.

k. Integration of DRR and climate change adaptation to development policy. Key sectors covered will include infrastructure, housing, land use planning, environmental protection, gender issues, psychosocial issues, health, livelihoods, to name a few.

Training Dates/Time
16 to 19 Oct 2018 (4 days -weekdays)/ 9am to 5pm

Training Venue
Nanyang Technological University- NTU@one-north campus

Class Size
25 - 30

Teaching Faculty
The programme will be taught by a team of senior practitioners and led by Dr Robert Tiong as the Lead Trainer. Dr Tiong is currently an Associate Professor in School of Civil & Environmental Engineering. He served as Deputy Director of Centre for Infrastructure Systems (2006-2011, 2013-2015) and Institute of Catastrophe Risk Management (2011-2013) at Nanyang Technological University, Singapore. Dr Tiong was the lead trainer, together with UNISDR Mr Sanjaya Bhatia, for the 2015 , 2016 and 2017 Disaster Risk Reduction course held in Singapore, sponsored by MFA and UNISDR.

To obtain wide-ranging perspectives on Singapore urban development, town planning and housing, the course would have the involvement of senior staff from the government agencies, practitioners and experts on urban development and town planning. They include, subject to confirmation, senior people from agencies and research centre such as the SCDF, Building Construction Authority (BCA), the Jurong Consultants, the Earth Observatory of Singapore (EOS) at NTU, and the Public Utilities Board (PUB).

NTU will also work with experts from the UN International Strategy for Disaster Risk Reduction (UNISDR) office to customise the programme.

Bio-data of Proposed Speakers (Tentative. Names of other speakers will be included when confirmed)

Er. Louis Tay Heng Hoc, former Managing Director, Building Technology & City Management, Surbana International Consultants Pte Ltd; Er Tay has a B Eng- Civil (Hons) as well as a MSc (Civil Engr) from the National University of Singapore (NUS). To date, he has over 28 years of accrued experience in the building consultancy business. Er. Tay had dedicated his career to promoting high engineering standards in design and construction for the built environment both in Singapore and internationally. He is also a Professional Practicing Engineer in Singapore.
He joined Housing & Development Board (HDB) in 1983 as an engineer immediately after graduation from NUS with his 1st degree. He spent the next 20 years in HDB in various capacities, working on formulation and implementation of building technology for public housing in Singapore. He was one of the key officers responsible for precast technology development and implementation in high-rise public housing. For his significant contributions in spearheading the industrialisation of Singapore's Public Housing Upgrading Construction Programme, he was in 1997 awarded the Public Administration Medal (Bronze) by the Singapore Government.

In his current appointment as Managing Director (Building Technology & City Management Division), he is rebranding Surbana's service offerings by building up capabilities in the area related to the development of strategies to sustain the proper execution of the management of the built environment. To date, SIC is able to leverage off Sustainable City Management consultancy augmented by ICT based Enterprise Resource Planning and Green Consultancy / Technology to support the demands of its International Clientele for the management of the build environment.. This has helped Surbana position itself as a true one stop consultancy providing both in-house design and management of the built environment services.

He had also authored / co-authored & presented several technical papers related to industrialised building / precast technology and sustainable housing at both local and international building seminars and conferences.
His presentation will focus on discussing the Singapore Success Story for Sustainable Housing Developments in the context of the rampant growth of new cities globally. The UN has already estimated that from now up till 2025, some 500 new cities with populations more than 1 million people will come into being. The presentation will highlight several key factors that have contributed to Singapore's success with its world class housing estates and how they can be modified and adapted for use globally.

Dr. Robert Tiong, Associate Professor, School of Civil and Environmental Engineering, Deputy Director, Centre for Infrastructure Systems (2006-2011), and the Institute of Catastrophe Risk Management (2011- 2013) Nanyang Technological University, Singapore.

Dr Tiong received degrees of BSc (First Class Hons) in Civil Engineering with specialization in Management in 1981, from University of Glasgow, UK, M Eng in Construction Management in 1987 from University of California, Berkeley, USA (with dissertation on International Project Financing) and PhD in 1994 from Nanyang Technological University, Singapore (with dissertation on Evaluation and Competitive Tendering of BOT Projects. He is a registered Professional Engineer in Singapore since 1990. Before joining NTU, he worked in HDB, Ove Arup Consulting Engineers and McDermott Engineering Ltd. He is Council Member of the UK-based International Project Finance Association (IPFA), Singapore branch. He is also on the Academic Working Group of UNEP's Sustainable Insurance Initiative.
Dr. Tiong has published extensively including a monograph on "The Structuring of Build-Operate-Transfer (BOT) Projects", a research report on "Evaluation of risks in BOT projects", and a book chapter on "Public-Private Partnership for Infrastructure Projects: An Asian Dimension". He was also a reviewer for the UNIDO Guidelines for the Development, Negotiation, and Contracting of BOT Projects. He has worked with the Asian Development Bank and the World Bank on risk analysis and management of infrastructure projects and has in-depth knowledge and updated information on PPP projects in the region. In September 2010, he was invited to present a paper on Financing of Affordable Housing at the Affordable Housing Conference in Singapore.

Dr. Tiong has been Lead Trainer for a series of training programmes on sustainable urban planning and housing management, and public-private-partnership in infrastructure projects sponsored by the Ministry of Foreign Affairs, Singapore, and the Commonwealth Secretariat for senior level planners, engineers and architects from many developing countries.

Professor Willie Tan (B Land Surveying Hons, MSc(Estate Management), PhD(Architecture)) is former Vice Dean (Academic), School of Design and Environment, and the Program Director of the MSc(Project Management) program at the Department of Building, National University of Singapore. Dr Tan is the First Rotational Chairman of the International Project Management Education Union and has chaired visiting teams to accreditate master level and doctoral project management programs for the Global Accreditation Center of the Project Management Institute (PMI). He is an editor of the Journal of Spatial Science, a member of the Editorial Board of the International Journal of Project Management, and author of Principles of Project and Infrastructure Finance (Taylor and Francis, 2007) and Practical Research Methods (Prentice-Hall, 2008). He has consulted widely for large organizations in construction, real estate, education, health, oil and gas, and marine industries, and in training programs (such as World Bank Institute) for senior officials from LDCs.

S.Sreenath, has 29 years of construction experience working in India, UAE and Singapore. He is presently working as Deputy Project Director in the Singapore construction industry and also presently researching on part-time basis on Public Private Partnership models; and also reviewer of various construction management international journals. He received degrees of BSc (First Class) in Civil Engineering in 1981 from Kerala University; MBA in 1993 from Kerala

University; MSc International Construction Management in 1999 from Nanyang Technological University and MSc Geotechnical Engineering in 2006 from Nanyang Technological University.
He was involved in the construction Bukit Panjang Light Rapid Transit for Land Transport Authority; Bishan underground MRT interchange station for Land Transport Authority and Woodsville Interchange for Land Transport Authority.

Mr Emmanuel Leung, Senior VP**,** CPG Facilities Management**,** CPG International
Prior to joining CPG Facilities Management, Singapore, Emmanuel gained professional experience through providing technical and FM services in private sector such as hotels, office buildings, residential building, airport, power plants, industry buildings in Singapore, Hong Kong & China.
He has been with CPG FM for 16 years and has taken charge of numerous projects and facilities management (FM) consultancy works in Singapore and overseas. Emmanuel has managed and provided FM services including technical audits and building assessor to different types of buildings and ministries in Singapore. These include Township Management, Healthcare developments, libraries, community clubs, ICA checkpoints, commercial buildings, Industry and Factories, Exhibition & MICE venues, properties belonging to Singapore Tourist Board ((including the Merlion, Haw Par Villa, Sir Stamford Raffles statue, Changi Chapel Museum, etc.), National Arts Council properties (Kallang Theatre, Victoria Concert Hall & Telok Ayer Performing Arts Center, etc.), Infrastructure (including the first Common Services Tunnel in South East Asia for the past 12 years & provide consultancy to Seletar Aerospace Park – Seletar Airport), FM Consultancy support for the three town councils managed by the company, building assessor for MCYS (now MSF) and NCSS for properties of approx. 400 volunteer welfare organisations (VWO), dormitory for Singapore National University (Prince George Park Residence), and due diligence audits as well as other consultancies in Abu Dhabi and various parts of Asia.

Emmanuel is currently the Senior Vice President of Facilities Management Division 2 and his team provide a full suite of Smart and Sustainable Facilities Management Services for many government and private properties / infrastructures in local or overseas market that would give the clients the competitive edge in the global economy: from forming part of the Integrative Design team to inject Maintainability / Sustainability / Smart FM Technology (including BIM FM, Internet of Things and Data Analytics) elements into Project / Development's various stages including Master Planning /Design stages/ Construction / Operation stages. His team also use the 24/7 call centre for more than a decade to support the client and site / contractors management.
Emmanuel is CPG FM's in-house trainer and obtained train-the-trainers certificates from ITE, Singapore. He has helped conducted in-house trainings as wells training courses for foreign delegates for Singapore International Management Academy, Lee Kuan Yew School of Public Policy (NUS), National Technology University (NTU). He also trains the clients for FM Technology for overseas clients and helps BCA Academy to draft training materials.

He holds a Bachelor of Science Degree and professional diploma in management. He is a certified Fire Safety manager, Singapore Certified Energy Manager and water efficiency manager.

Dr. Durairaju Kumaran Raju
Director , Geoscience Pte Ltd, Singapore.
Dr. Durairaju Kumaran Raju was the former Head of Ecological Monitoring, Informatics and Dynamics Lab, Tropical Marine Science Institute, National University of Singapore. He has a doctoral degree in Earth Sciences. His research interests are Climate Change and Sea Level Rise impacts, vulnerability and risk assessment, adaptation and management studies. He played a key role in the first Singapore Vulnerability study commissioned by National Environment Agency in order to address the Climate Change issues. Presently, he is developing coastal zone risk map for Singapore due to climate change and sea level rise - A national level initiative. Dr Raju is actively involved in land subsidence study using GNSS, remote-sensing studies. He also plays a significant role in data management, and custom GIS application development for coastal and marine environment management. Dr Raju is an Adjunct Faculty at Asian Institute of Technology, Bangkok, Thailand.

Programme Schedule
Disaster Risk Reduction
(16 – 19 Oct 2018)

	AM	PM
Day 1 **16 Oct,** **Tuesday**	**9.00am – 9.15am** **Programme Briefing** **9.15am – 9.50am** **Overview of Singapore's Experiences in Disaster Risk Management** **10.00am – 10.30am** **Opening Ceremony** *By: MFA, UNISDR, PaCE College & Assoc Prof Tiong, NTU* **10.45am – 11.15am** **Overview of Vulnerability and Risk assessment in the face of CC & SLR for Singapore** **11.15am – 12.30pm** **Introduction to Sendai Framework on Disaster Risk Reduction (DRR) and steps for developing an action plan for DRR and Climate Change Adaptation** - Understanding how disaster risk reduction links with the Sustainable Development Goals and the Paris Agreement, linking the Sendai Framework with the other two major agreements of 2015	**2.00pm – 3.15pm** **Lecture on Sustainable urban planning and development , governance and building capacity – The Singapore Experience** **3.30pm – 5.00pm** **Applying Tool for Review, and analysis of existing national DRR Strategies and longer term Action Plans** -Report Presentations by participants within groups & group work.
Day 2 **17 Oct,** **Wednesday**	**9.00am – 11.30am** **Applying Tool for Review, and analysis of existing national DRR Strategies and longer term Action Plans** (Report Presentations by participants within groups & group work*)* **11.30am – 12.30pm** - **Mainstreaming DRR into National Sectoral Programmes for Socio-Economic Development with Case Studies on SFDRR Priority for Action # 1: Understanding Disaster Risk, and SFDRR Priority for Action** **# 2: Strengthening Disaster Risk Governance to Manage Disaster Risk** **(Part 1) (Finance, Governance)**	**2.00pm – 3.30pm** **i) Building public health resilience through pandemic preparedness with visit to Singapore General Hospital (SGH)** **ii) Acute Phase of Disaster management: Healthcare sector preparation on standard disasters, natural and technological, chemical and infectious disease outbreaks** **3.30pm – 5.00pm** **- Mainstreaming DRR into National Sectoral Programmes for Socio-Economic Development with Case Studies on Health sector, followed by 60 minutes group work to draft action plan**

	AM	PM
Day 3 **18 Oct,** **Thursday**	**9.00am – 10.00am** **Disaster risk financing and insurance** **10.30am – 12.00pm** **Catastrophe Risk Management** **12.00pm – 12.30pm** **Disaster Management and Vulnerability/Economic Assessment**	**2.00pm – 3.30pm** **Visit to Marina Barrage or NEWater plant with tour on Singapore's resilience in climate change adaptation, water supply management, flood control** **4.00pm – 5.30pm** **Visit to and tour of URA (Urban Redevelopment Authority)'s Singapore City Gallery to understand the urban management and planning, Familiarising with new downtown Singapore, Marina Bay new financial centre and residential developments & discussion on policy and decision making processes in urban planning**
Day 4 **19 Oct,** **Friday**	**9.00am – 11.00am** **- Mainstreaming DRR into National Sectoral Programmes for Socio-Economic Development with Case Studies on SFDRR Priority for Action # 3: Investing in Disaster Risk Reduction and Resilience, and SFDRR Priority for Action # 4: Enhancing Disaster Preparedness for Effective Response, and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction (Part 2) (Environment, Climate Change Adaptation)** **11.00am – 12.30pm** **Cases on Infrastructure, Housing** followed by 60 minutes group work to draft action plan	**1.30pm – 3.30pm** **i) Discussion with delegates on Sendai Framework for Disaster Risk Reduction, 2030 Agenda for Sustainable Development Goals and possible applications to their State's existing and future plans** **ii) Working Group Discussion to develop Indicators for Monitoring, Evaluation and Follow Up for Draft version National DRR Action Plan** *Facilitated by: UNISDR & NTU* **Group work followed by presentations (by groups to the plenary)** *Facilitated by: UNISDR & NTU* **3.30pm – 3.45pm** **Programme Evaluation by Delegates** **3.45pm – 4.15pm** **Closing Ceremony** *By: MFA, UNISDR, PaCE College NTU*

** The above programme schedule may subject to change.*