Climate Science and Technology for Disaster Prevention – the Inaugural Symposium of ANCST

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The Asian Network on Climate Science and Technology (ANCST), coordinated by the Southeast Asia Disaster Prevention Research Initiative of Universiti Kebangsaan Malaysia (SEADPRI-UKM), with support from the Cambridge Malaysian Education and Development Trust (CEMDT) in Association with the Malaysian Commonwealth Studies Centre (MCSC) of Trinity College, Cambridge, organised its inaugural technical meeting on "Climate Science and Technology for Disaster Prevention" on 20 November 2013 at Pullman Hotel, Putrajaya, Malaysia to commemorate its official launch. The ANCST Symposium was a special invited session, held in conjunction with the International Conference on "Extended Mega Urban Regions: The Changing Face of Southeast Asia and the World", organised by the Institute for Environment and Development (LESTARI) of UKM and partners, from 19-21 November 2013.

The ANCST Symposium was co-organised by University of Cambridge, City University of Hong Kong, Indian Institute of Science Bangalore, Advisory Committee on Protection of the Sea (ACOPS), Academy of Sciences Malaysia and SEADPRI–UKM. The programme comprised a key note address delivered by Emeritus Professor Lord Julian Hunt and seven oral presentations from local and international experts (Table 1). The presentations provided insights on science and technology needs for dealing with new challenges of risk management and climate adaptation for the extended mega urban region. Selected highlights are briefly described below.

Major modes of climate variability such as El Nino – Southern Oscillation (ENSO), Indian Ocean Dipole (IOD) and Madden-Julian Oscillation (MJO) is expected to affect anthropogenic warming and thus impact Southeast Asia, compared to East and South Asia. The rapid growth of cities in conjunction with the increase in land temperature has exacerbated the urban heat island effect. Small green spaces have been found to be more effective in ameliorating the heat effect compared to large tracts of green areas. Over the past two decades, warmer urban heat islands have been reported in Hong Kong, Shenzhen and Macau (Figure 1). There is urgent need to address the downstream impacts of the urban heat island effect.

More intense rain associated with typhoon is expected with climate change and at landfall such heavy rain will lead to more disasters associated with flooding. Flooding is likely to be exacerbated since storm surge will be higher due to sea-level rise. Extreme sea-level rise is more relevant than mean sea-level rise in this respect. The shrinking periods of extreme rainfall have the potential to create more hazards such as floods in low-lying areas. Intense rainfall also triggers landslides in the highlands. Short-term forecasts are getting more important to address climate extremes. There is need to understand and be aware of the variation and return periods associated with climate extremes. However, limitations in

climate data have resulted in inaccurate models and this is a challenge that should be immediately addressed.

The prognosis does not bode well for extended mega urban regions in Asia. Communities need to know if they are exposed to extreme events. For this purpose, hazards and risk maps are useful to delineate areas that require special attention to build resilience. There are cases where the property prices have dropped or insurers have pulled out or increased the premium tremendously in areas that have been identified as high risk. Such actions normally burden the low income groups. The role of government and civil society becomes important in such cases, to negotiate options based on inherent values. New approaches need to be identified in the insurance sector to help society cope with the risk of disasters. There is also need to build local level resilience. Community based disaster prevention actions have brought about positive outcomes in many areas such as Bangladesh and India. These actions can be replicated in other parts of Asia.

The urban heat island effect and extreme precipitation leading to flash floods and landslides are not uncommon in Malaysia, particularly in the extended mega urban area of Greater Kuala Lumpur. Flash floods and landslides are the most common disasters in the country (Figure 2). There are many challenges associated with these disasters, ranging from science to governance. It was noted that flash flood mitigation has had limited success in urban areas that are cemented and impermeable. New multidisciplinary approaches are required to address this issue. For example, subsurface geology and soil characteristics greatly influences rainwater runoff and this input can be useful for addressing the urban floods. Subsurface geology and soil characteristics also influence seepage in exposed areas which then promote the development of slip zones that lead to slope failures. Such aspects need to be carefully investigated to bring about holistic solutions.

Other issues mentioned include the need to enhance enforcement, audit drainage systems, inspect slopes and monitor groundwater resources particularly in coastal areas due to imminent water stress conditions. All the issues are also relevant to other extended mega urban regions in Asia. The role of the community as well as information and communication technology was highlighted in this respect. Crowd sourcing is an unexplored area and has great potential to organise communities that are more resilient. It can also provide information to enhance enforcement and effectiveness of technical agencies. A neutral and respected platform is required to bring together all the relevant stakeholders including the community, to mobilise science and technology for preventing disasters in a world where climate extremes become more common. The role of ANCST in providing information and facilitating research coordination in conjunction with national and regional platforms is crucial in this context. The quote Albert Einstein - "*Those who are in the know have the duty to act*".

Figure 1: The annual mean temperature anomaly of Hong Kong has been higher than the global level since the 1990s. Source: Hong Kong Observatory Headquarters.

Figure 2: Frequency of flash floods, floods, landslides and storms in Malaysia as reported in major newspapers from 2008 to January 2014. Compiled by Mohd Faizol Markom, SEADPRI-UKM.

Table 1: Presentations at the Inaugural ANCST Symposium held on 20 November 2013.

Keynote Address
Climatic and Urban Effects on Hazards and Impacts *Emeritus Prof. Lord Julian Hunt, Malaysian Commonwealth Studies Centre Cambridge* & University College London
Invited Papers
Research Needs for the Asian Region to Address Climate Change *Prof. Johnny C. L. Chan, City University of Hong Kong* **Tackling the Impact of Climate Change in South Asia** *Prof. J. Srinivasan, Indian Institute of Science, Bangalore* **Predictability of the Northeast Monsoon Cold Surges over the Malaysian region** *Kumarenthiran Subramaniam, Malaysian Meteorological Department* **Tropical Soils and Flood Management – New Applications for Old Science?** *Dr. S. Paramanathan, Param Agricultural Soil Services* **Geohazard Mapping and Assessment – Tools to Reduce Risks of Climate Extremes?** *Dato' Zakaria Mohamad, Minerals and Geoscience Department Malaysia* **Groundwater Salinization – An Emerging Slow Onset Risk?** *Dr. Saim Suratman, National Hydraulic Research Institute of Malaysia (NAHRIM)* **Building Climate and Disaster Resilience – A Budding ICT Market?** *Tengku Mohd Azzman Shariffadeen, Academy of Sciences Malaysia*