

1. Integrated and Multidisciplinary on Flood Hazard Assessment in Johor, Malaysia (2009 – On-going)

Flood disasters in the humid tropics region and their impact to human and environment have continued to increase despite improved ability to monitor phenomenon (White et al, 2001; Dutta & Herath 2005). As such managing of flood disasters is now essential in many Asian countries such as China, India, Indonesia, etc. According to Manuta & Lebel (2005), climate change exacerbates the challenges of managing floods.

Severe floods occurred in Johor State in Malaysia in December 2006 and January 2007 and effected more than families in many district mainly in Batu Pahat, Kota Tinggi and Kluang.

Initial post flood survey conducted by UKM and DID found that the floods were not only caused by unusually heavy rainfall and a host of other factors, which include geographic, hydrology, land use changes and unprecedented urbanization, river geometry, awareness and preparedness of residents and socio-economic conditions. There is a need for more integrated flood mitigation (IFM) plan to be put in place, in view of the impending effects of global climatic variability and change which certainly affect local rainfall patterns and intensity.

Objectives of Study:

- To identify the major causes of the recent floods in the states of Johor.
- To investigate the impact of climate variability and change at the river basin scale.
- To assess the socio-economic impact of the floods.
- The produce vulnerability and risk maps based on hydrologic, ecological, hydraulic and socio-economic studies.
- To produce flood hazard maps for flood preparedness and emergency responses.
- To propose an IFM that can be used for other areas in the region

2. R & D on Application of water Sensitive Urban Design for Integrated Storm water management at Local Scale (2008 – On-going)

The most important component of the urban water cycle with respect to drainage and flood protection is storm water runoff. A significant fraction of precipitation is returned to the atmosphere while the remaining will infiltrate. In general, it can be said that natural ground cover about 50% of rainfall infiltrates into the ground, 40% evaporates or is transpired through plants, and only about 10% actually runs off the surface. As we develop the land, we put structures on the surface, which make it impervious to various extents. In turn, the portion of impervious surface within a drainage basin determines the changes in partitioning the precipitation into surface runoff, evapo-transpiration and infiltration.

The objectives of the research aims at producing accurate estimates of quantitative changes in the hydrological cycle of the humid tropics especially in developed areas in urban Kuala Lumpur depending on the sorts of surface pavements, roof solutions (including green roofs) parks as recharge areas of groundwater, infiltration ponds. Pollution loads over different time and space scales will also be measured, particularly the heavy storm wash-off loads and pollutant concentration during storms.

The concept of WSUD covers all aspect of integrated urban water cycle management, including the harvesting and treatment of storm water and wastewater to supplement non-potable water supplies. It intends to minimize the impact of urbanization of the natural water cycle.

There are six (6) components of the studies :

Component 1 : Bio-Retentions System

Component 2 : Constructed Wetland System

Component 3 : Rainwater Harvesting System

Component 4 : Grey-water Reuse System

Component 5 : Porous Pavement System

Component 6 : Green Roof System

3. Integrated Flood Forecasting and Warning System (FFWS) management at Local Scale

The Study River Basins of this Flood Forecasting and Warning System (FFWS) described the river basin network, topography, climate and weather regimes and other hydrological and eomorphologic features. Also, the existing or planned flood control issues and problems as well as flood control infrastructures, monitoring and forecasting (if it exist) procedures where presented.

The study river basins for each participating country that will be assessed for its FFWS are as follows:

- Ciliwung River of the Greater Jakarta Basin in Indonesia
- Klang River Basin of Kuala Lumpur in Malaysia
- Marikina-Pasig River Basin of Metro Manila in the Philippines
- Thu Bon River of Vietnam



The above river basins will be the subject of the assessment and investigation for their flood forecasting and warning system of this project according to the final output and report in this project.