

## The adaptation enhancement for flood mitigation due to climate change: A case study of a watershed after typhoon Morakot in Taiwan

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The typhoon Morakot struck Taiwan during August 8-10, 2009, and the government statistics analyzed that typhoon brought maximum 3,004mm in three days, and 21 rain stations is over 2,000mm. It claimed 673 casualties, 26 missing persons and 24,950 evacuees are evacuated by the Disaster Prevention and Response Act. The heavy and long period rainfall also triggered many debris flow and landslides, and the economic loss is 6.2 billion USD. The watershed of Kaoping River suffered those huge damages from the Typhoon Morakot in 2009 and Typhoon Fanapi in 2010. This kind damage is extreme weather, and we think that climate change will bring huge impacts to nations all over the world. Those impacts including the followings: change in biosphere, long-duration drought, large floods trigger by extreme torrential rain, spatial change in homelands, and food scarcity.

The extreme weather induced by climate change is the most direct factor influencing the floods, e.g. the extreme rainfall increases discharge and inundation area, sea level and estuary water level raising induce overbank floods, and land-use abuse and land-slides trigger high concentration of sediment discharge and river bed aggradations.

This study aims at the settings of hydrological scenarios due to climate change, evaluation of hydraulic structures (e.g. levees), vulnerability and risk analysis, and adaption strategy and practices. The study area is focused on Kaoping River basin watershed. First, the hydrological scenarios due to climate change are set. Secondly, based on those scenarios, the hydraulic structures are evaluated. Thirdly, the vulnerability and risk analysis are performed. Last, adaption strategy and action plans are proposed by referencing to actions taken by the Netherlands, Japan and USA for improving the capacity of the hydraulic structures of this basin watershed.

### Biography

Professor Harold Y.C. Tan has completed his PhD. from Cornell University and is teaching at National Taiwan University for over 30 years. He is the Director General of Center for Weather Climate and Disaster Research (WCDR) in the same university.

He has published more than 40 papers in reputed journals and serving as an editorial board for many journals.

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## Assessment of the impact of climate change on hydrological drought in lake Tana catchment, Blue Nile basin: Ethiopia

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This paper presents the assessment of projected impact of climate change on hydrological drought in the Lake Tana basin in Ethiopia, which is the headwater for the Blue Nile River. The rainfall-runoff HBV model was calibrated and validated against historical data to obtain a reference situation to the possible impact of climate change on hydrological drought for four sub-basins and the Lake Tana basin. Datasets obtained from the EU-WATCH project for three General Circulation Models (CNCM3, IPSL and ECHAM) were also used as an input to the HBV model, which was recalibrated for the same historic period to obtain an assessment to what local downscaled, bias-corrected GCM can be used as a forcing data for hydrological drought assessment. Next the GCM outputs with the recalibrated HBV model was used to derive future streamflow for two future time windows (2021-2050 and 2071-2100) and for one future emission scenario A2. The variable threshold level method combined with a 10-day moving average (MA) was used to detect hydrological drought characteristics. The climate change impact assessment revealed that, according to CNCM3, the number of droughts in the Lake Tana basin is expected to increase by 100 % and 68.8 % in the intermediate and far future respectively. IPSL projected a decrease in the number of stream flow drought by 35% for the intermediate and far future. ECHAM projected also projected a decrease in the number of stream flow drought by 16% and 28% for intermediate and far future respectively.

### Biography

Mr. Bantwale Diress Enyew has completed his BSc. in Physics at 'Debut University' in 2002 and his MSc. in meteorology science at 'Arbaminch University in 2010 both located in Ethiopia. He has been working as assistance lecturer of physics since 2005 at Arbaminch College. Currently he is studying MSc. climate studies at Wageningen University, the Netherlands, and he is going to complete his studies on August, 2012.

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