

## **A simulation study on modifying reservoir operation rules: tradeoffs between flood mitigation and water supply**

**CHERRY MAY R. MATEO<sup>1</sup>, NAOTA HANASAKI<sup>2</sup>, DAISUKE KOMORI<sup>1</sup>, KEI YOSHIMURA<sup>1</sup>, MASASHI KIGUCHI<sup>1</sup>, ADISORN CHAMPATHONG<sup>3</sup>, DAI YAMAZAKI<sup>4</sup>, THADA SUKHAPUNNAPHAN<sup>3</sup> & TAIKAN OKI<sup>1</sup>**

*1 Institute of Industrial Science, the University of Tokyo, 4-6-1 Komaba, Meguro-ku, 153-8505 Tokyo, Japan  
cherry.m@rainbow.iis.u-tokyo.ac.jp*

*2 National Institute for Environmental Studies, 16-2, Onogawa, Tsukuba, Ibaraki 305-8506, Japan*

*3 Office of Water Management & Hydrol., Royal Irrigation Department, 811 Samsen Rd, Dusit, Bangkok 10300, Thailand*

*4 School of Geographical Sciences, University of Bristol, University Road, Clifton, Bristol BS8, UK*

**Abstract** A simulation model was used to evaluate two proposed reservoir operation rules in Bhumibol and Sirikit reservoirs in the Chao Phraya River Basin. H08, an integrated hydrology and water resources model, was combined with CaMa-Flood, a river routing model considering inundation dynamics, to simulate the impacts of reservoir operation on the river basin. Simulated reservoir inflows were used as input to the reservoir operation module coupled with H08. The inclusion of CaMa-Flood in the system allows the assessment of impacts of reservoir operation on inundation within the entire river basin. It was found that hedging significantly reduces the occurrence of the reservoir emptying during dry seasons. A low linear storage constraint, set three months before the onset of the rainy season, significantly reduces the reservoir overflows. The simulation framework developed would be useful in designing optimal reservoir operation rules that are effective for mitigating both flood and drought damages.

**Key words** integrated hydrology and water resources model; H08; CaMa-Flood; balancing flood mitigation and water supply provision; Bhumibol and Sirikit Reservoir; Chao Phraya River Basin