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Asia Water Forum 2022

8–11 August 2022 • Online

Focus Area: Water as a sustainable resource

Session Title: 1A: Decision support for efficient water utilization

Schedule: 9 August 2022 (Tue), 11:00 a.m. - 12:30 p.m. (GMT+08)



Integrated Modelling for Urban Water Security

Mukta Sapkota and Ashis Dey

The ADB logo consists of the letters 'ADB' in white, set against a dark blue square background. The background of the slide features a decorative blue wave pattern at the bottom and a stylized water drop icon in the top right corner.

ADB



Integrated Urban Water System

- Increasing water demand caused by population growth
- Supply variability due to climate change and increase in the frequency of extreme weather events



- Need to use a blend of traditional and alternative water supplies to provide water security
- Demand Management
 - Use of water-efficient fittings and appliances
 - Water Restrictions



Integrated Urban Water Modelling

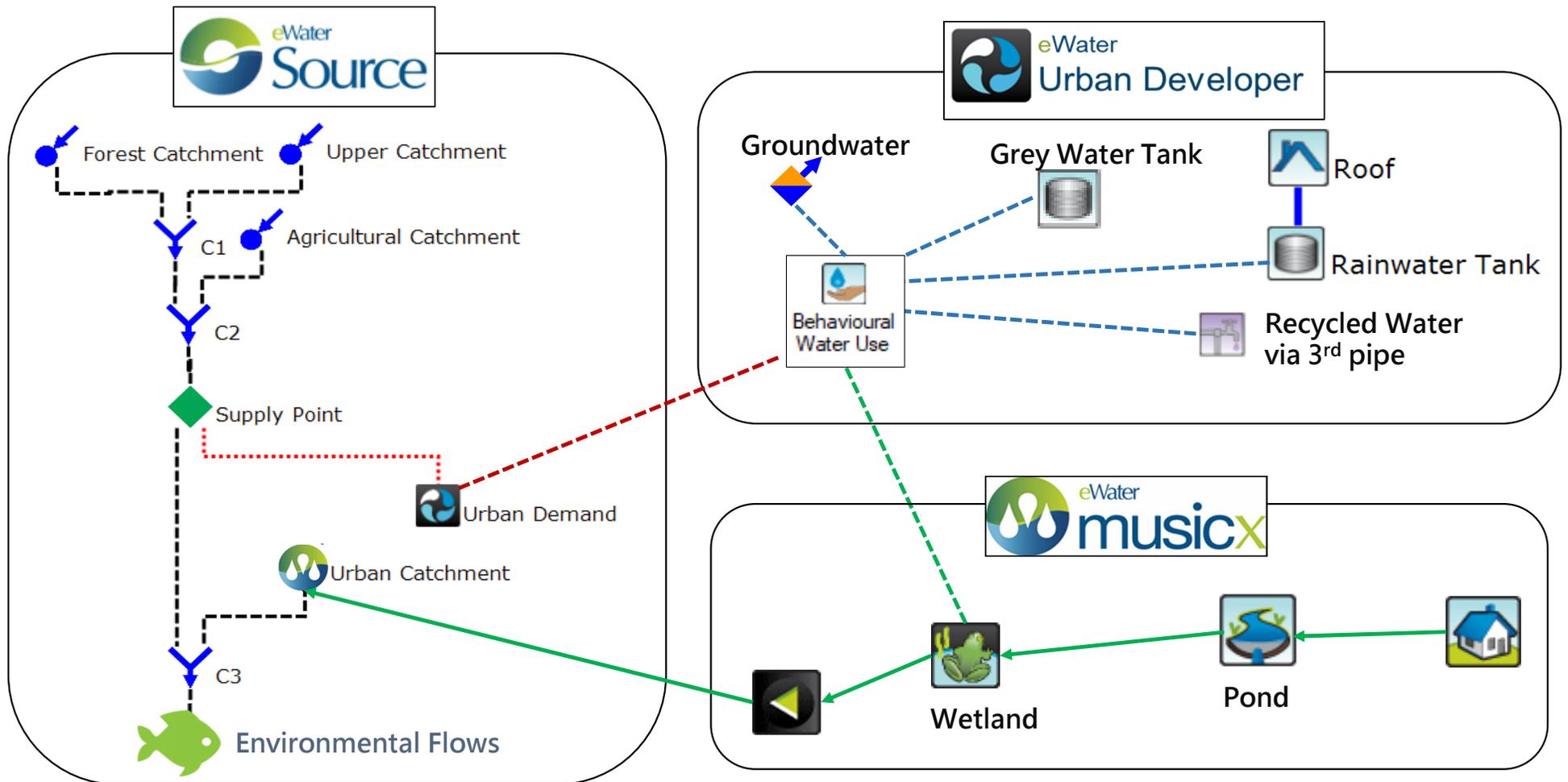
- Consideration of total water cycle modelling rather than component modelling
- Views urban areas as sub-catchments of a large catchment
- Representation of urban water system in an integrated model



Integrated Urban Water Modelling

- Accounts for interaction between
 - River and urban water system
 - Various components within the urban water cycle
- Capable of simulating
 - The trade-off between centralized and decentralized supply options
 - Demand Management
 - The implications of changes affecting various components of the water cycle
 - Water allocation management options

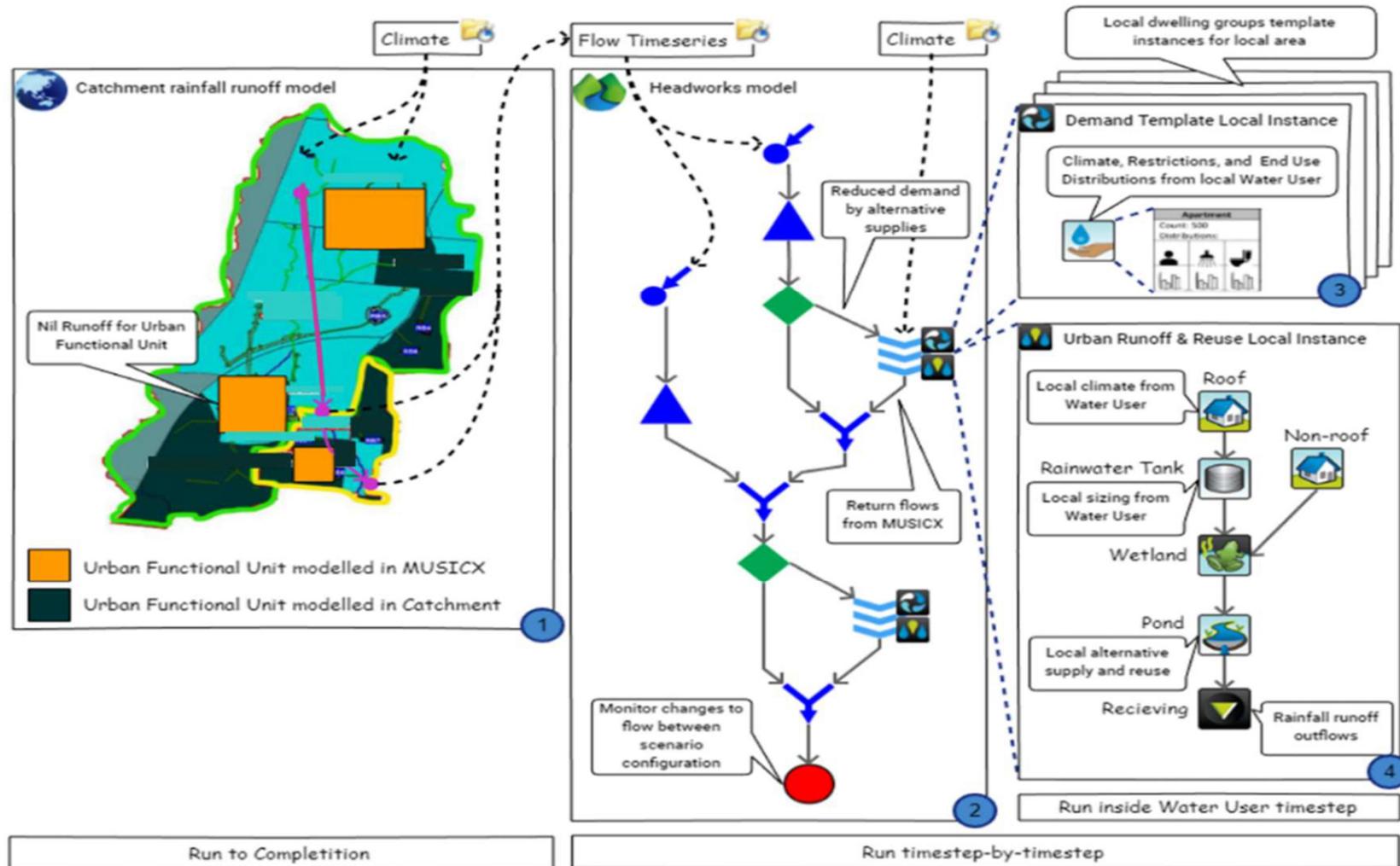
eWater Integrated Urban Water System Model





Case Studies

- Melbourne
- Geelong
- Colac
- Apollo Bay
- Lorne





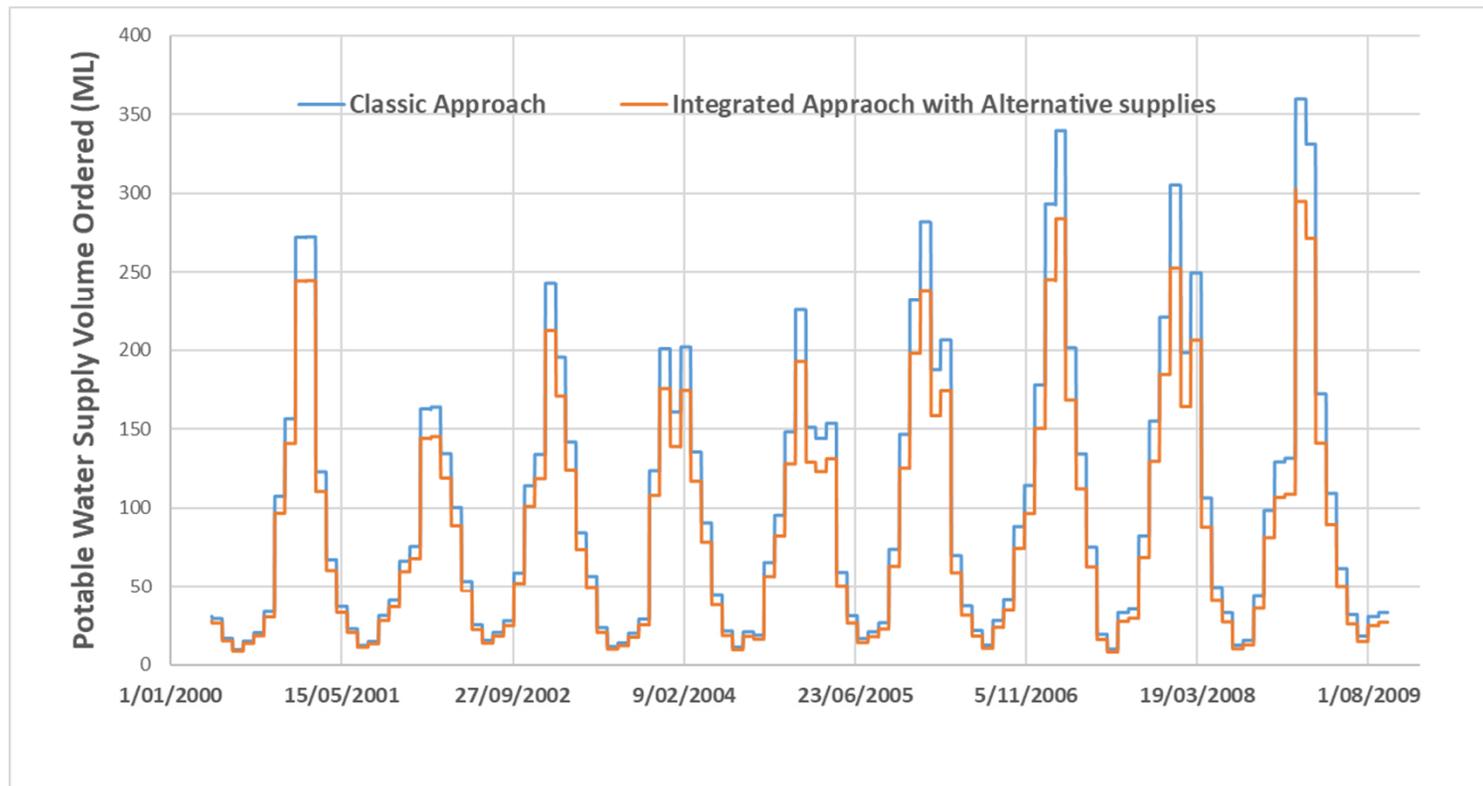
Methodology

- Various possible water supplies are assessed at each demand zone
- Water use aligned with available water supply sources based on fit-for-purpose use
- Where multiple sources are available to meet a specific demand, priority is given to local water at the smallest scale
- The remaining demand is then provided from the Bulk water system



Results

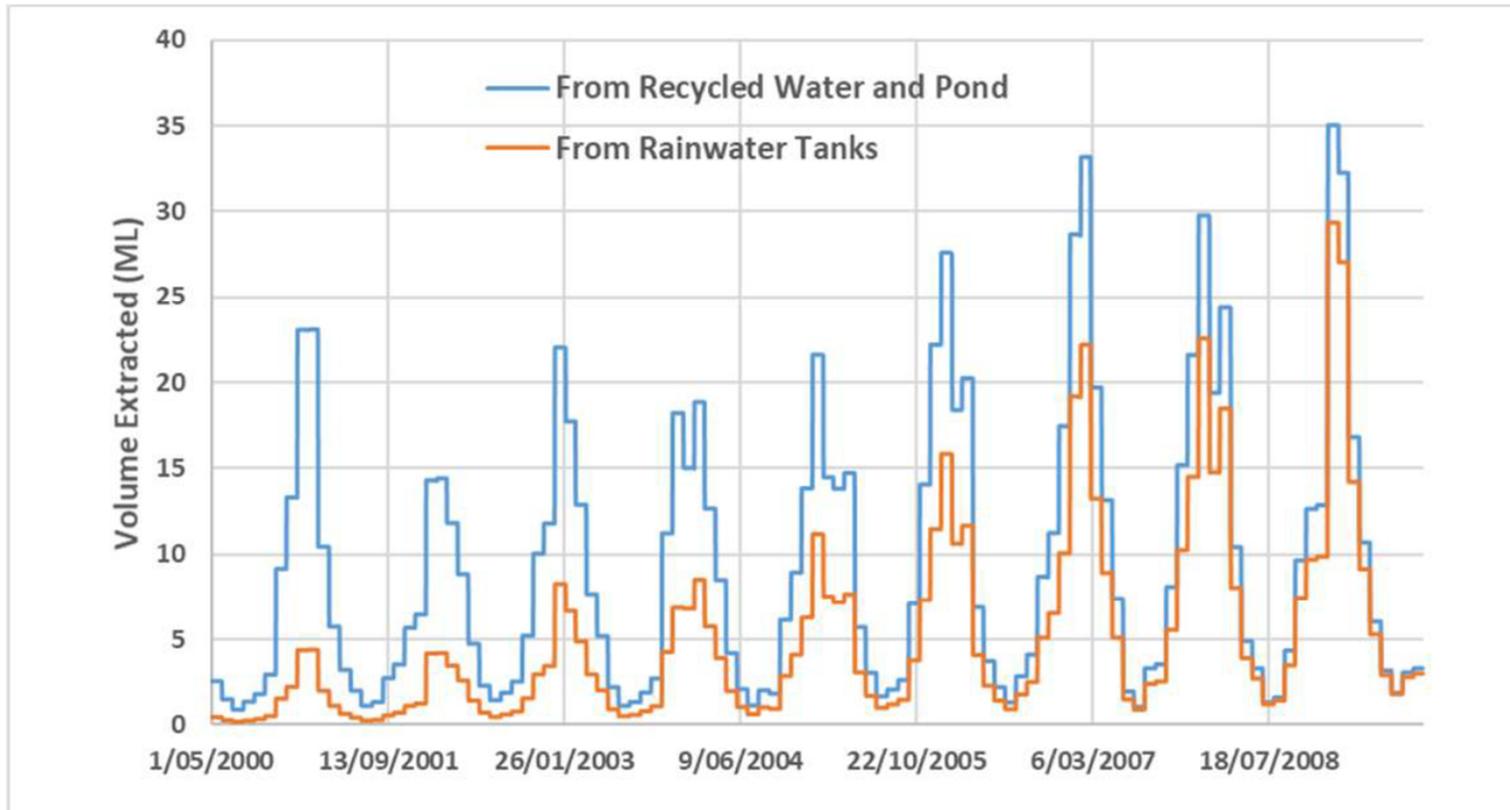
Potable Water Volume for Outdoor use Ordered with and without Alternative Supplies





Results

The volumes of water extracted from various supply group





Conclusion

Case studies demonstrate that the integrated tool

- Able to model alternative water supply options to reduce demands on traditional water resources
- Can represent projected changes in individual systems



Model Applicability

- Integration of MUSIC and Urban Developer tools with Source provides a new platform for investigating fully integrated water resource management options
- Helps to identify the rainfall dependent and non-rainfall dependent supplies effectively and provides the opportunities that are not apparent when separate strategies are developed
- Very useful for water planners approaching towards integrated water management

Thank You!

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