

The Benefits of Using Real-Time Control Technology in the Operation of Small Rainwater Harvesting Systems

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WATERWAY ECOSYSTEM
RESEARCH GROUP

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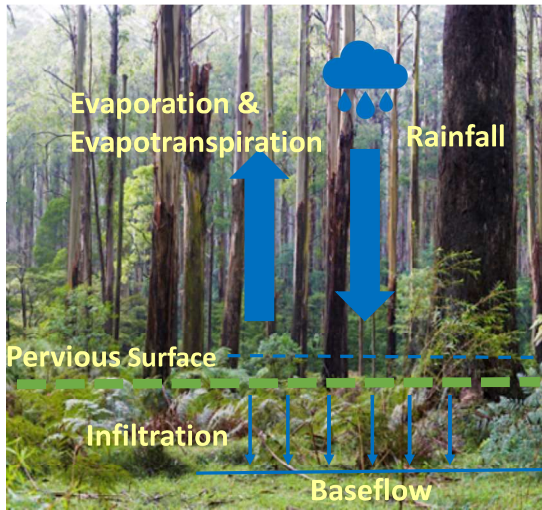
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Background and Rationale



Stormwater Issues

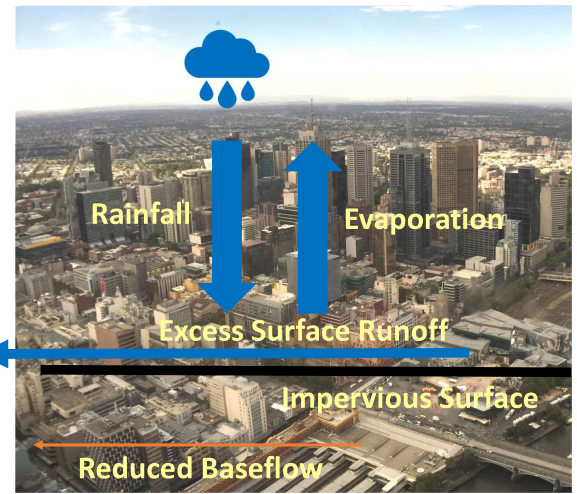
Pre-development (Rural)



Waterway

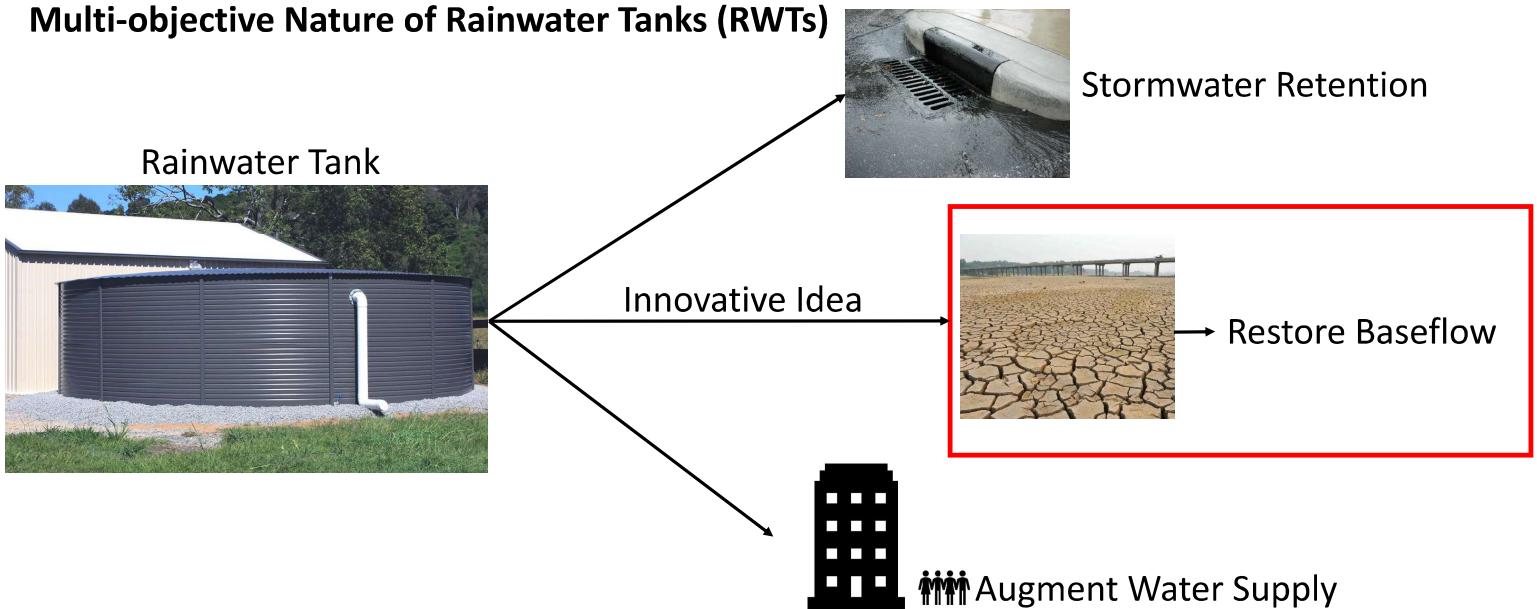


Post-development (Urban)



Solution: Rainwater Harvesting System

Multi-objective Nature of Rainwater Tanks (RWTs)





Aim and Research Questions

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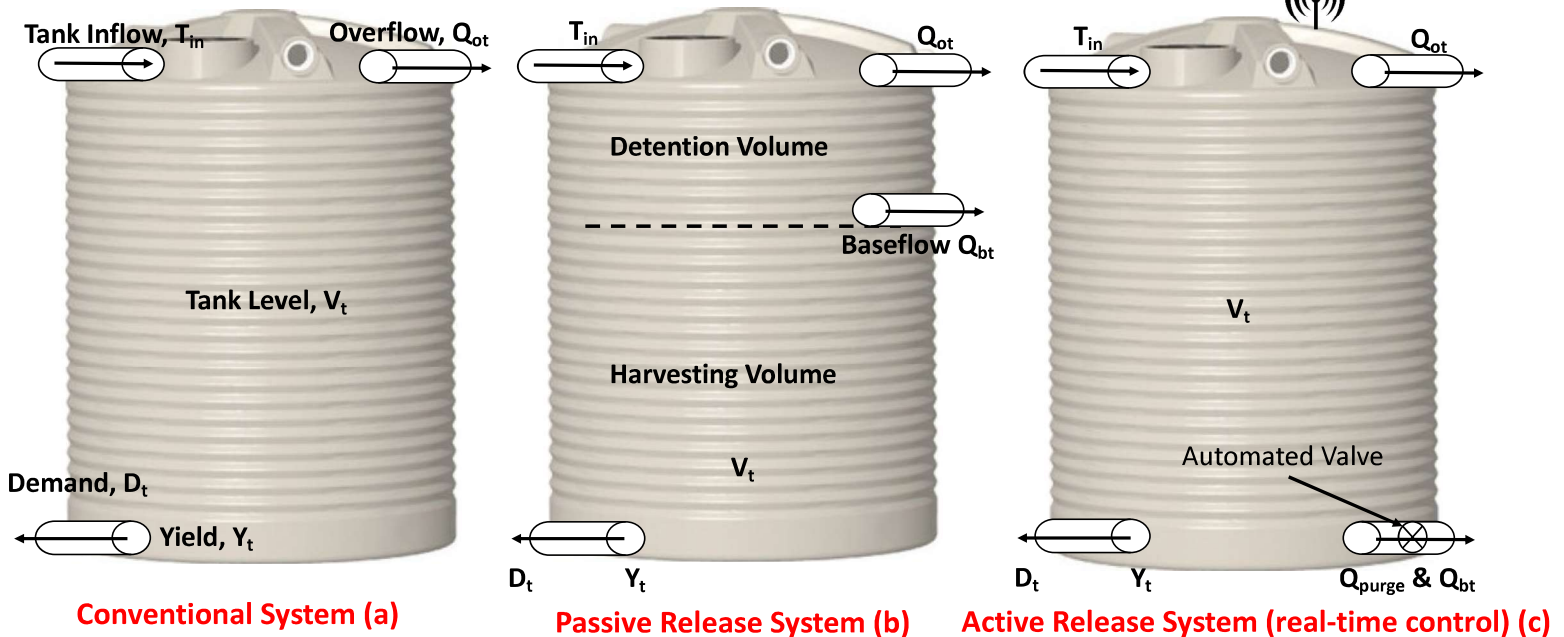
Research Questions



Can we design the Rainwater Harvesting System to simultaneously deliver water supply, stormwater retention and baseflow restoration outcomes?

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System Design



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Research Questions

Three Sub-Questions:

1. How does addition of a baseflow release affect water supply and stormwater retention?
2. How does addition of Real-Time Control (RTC) operation affect the water supply and stormwater retention?
3. How do RTC and passive release system compare in achieving multi-objectives?

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Methodology

Scenarios



Roof Size



Tank Size



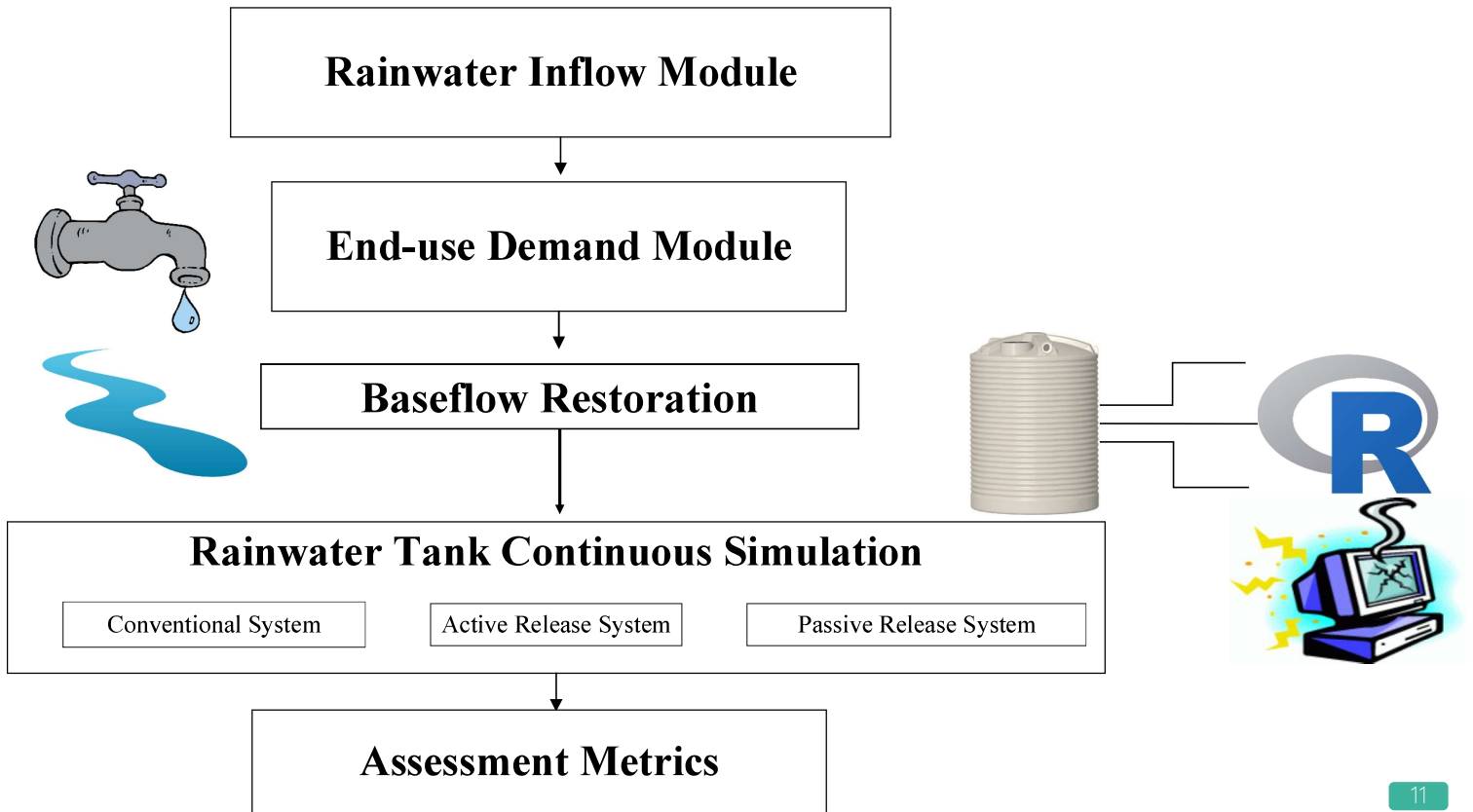
End-use Demand



Small



Big



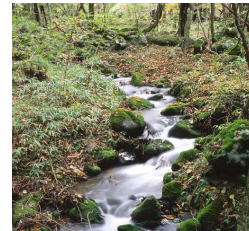
Performance Assessment



Water Supply



Stormwater Retention



Baseflow Restoration

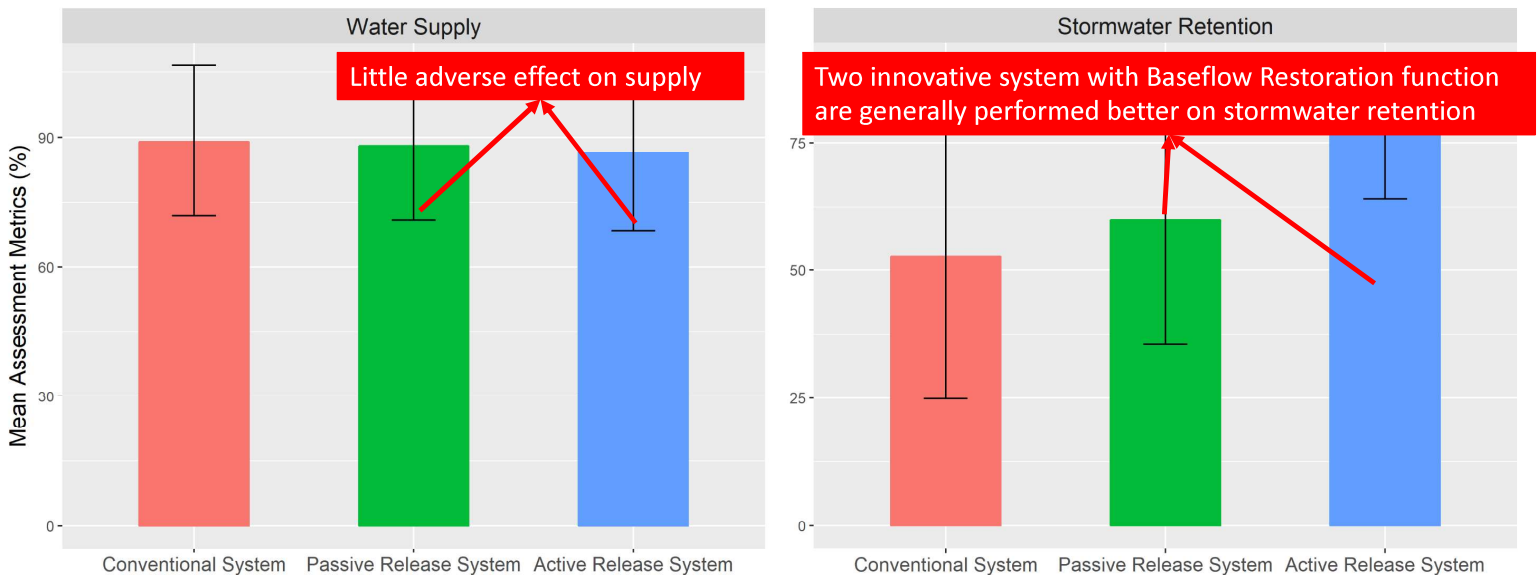
1. Characterize both the “Quantity”(amount) and “Quality”(frequency)
2. Standardize as proportion of totals (e.g. Tank Yield/Total Demand)
3. Calculate mean value



Result

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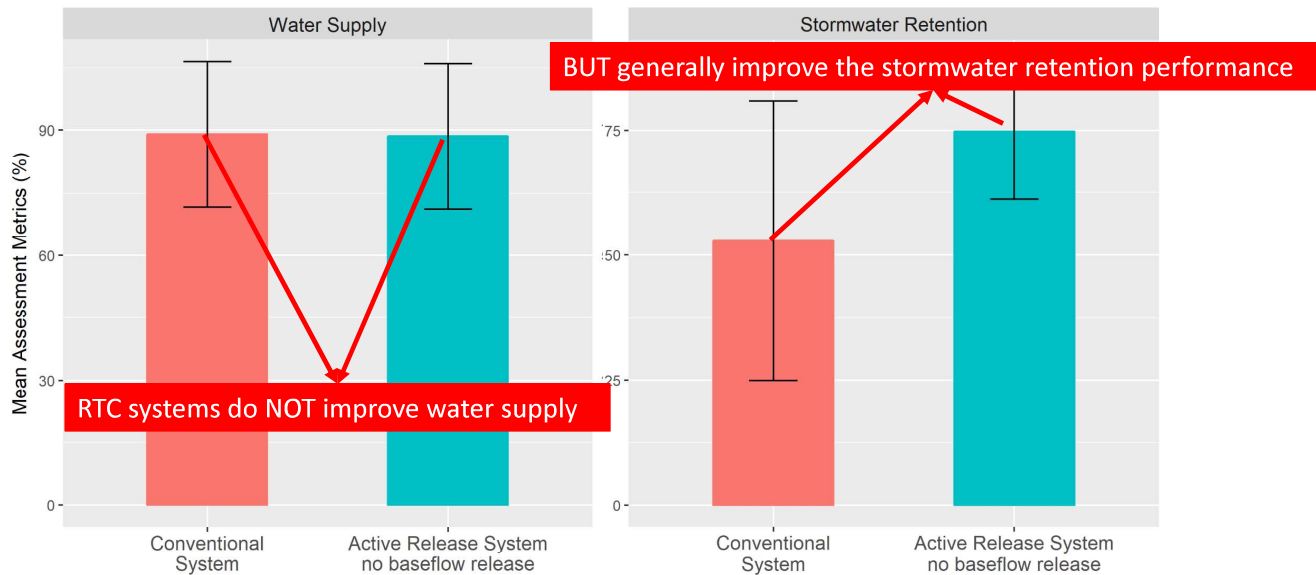
1. How does addition of baseflow release affect water supply and stormwater retention?



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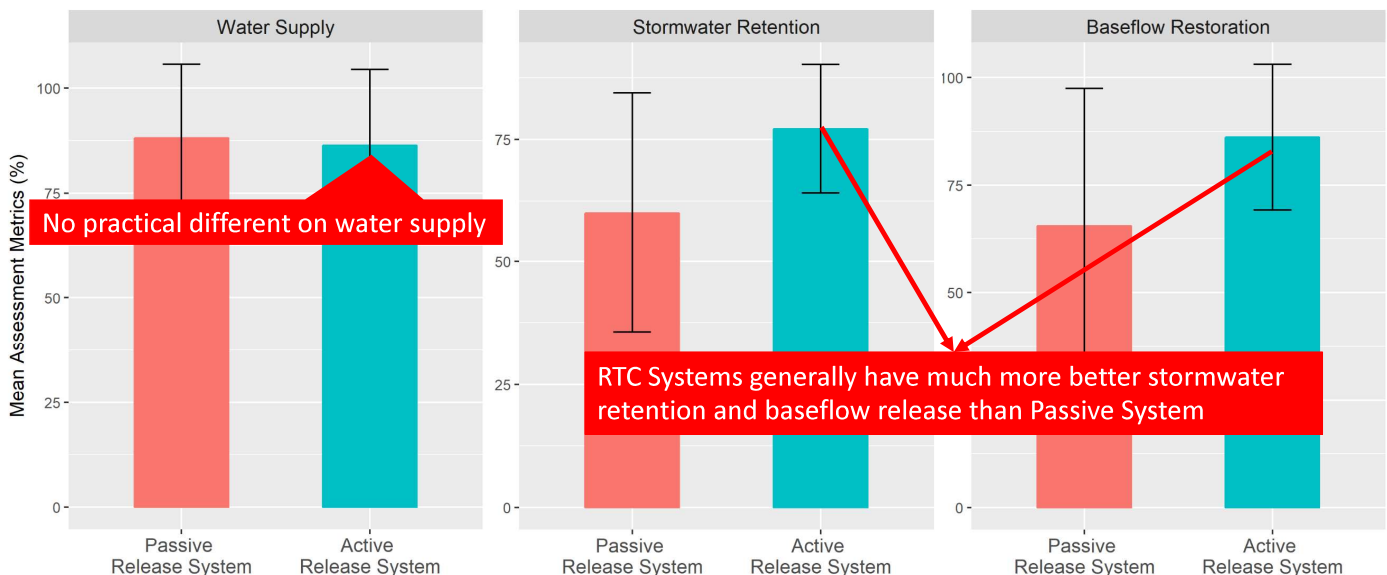


2. How does addition of Real-Time Control (RTC) operation affect the water supply and stormwater retention?



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3. How do RTC and passive release system compare in achieving multiple objectives?



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Conclusion



Active or passive RWH -> simultaneous water supply, stormwater retention, baseflow restoration

Active (RTC) moderately better than passive

1. The addition of a baseflow release generally not affect water supply and increase stormwater retention performance
2. The addition of RTC operation generally do not improve the water supply, **BUT** generally improve stormwater retention performance of RWH Systems
3. RTC systems can generally better deliver baseflow than passive configuration with less adverse impact on water supply.

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Future Work



1. Cost Benefit Analysis

2. Deployment

3. Scale Up – Network Control

4. Business Model

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QUESTIONS?

