



CRC for
Water Sensitive Cities



Australian Government
Department of Industry and Science

Business
Cooperative Research
Centres Programme

Engaging Future Leaders

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Setting the scene

- Townsville situated in the dry tropics
- Pronounced dry and wet season
- Last few years experienced drought
- Excessive water use from dry conditions
 - 70% outdoor use; 30% indoor use
- Higher than average pan evaporation rates
 - Up to 2,880mm/year water lost to evaporation
- Ross River dam originally built for flood mitigation
 - Undergone upgrades to increase capacity

Key Drivers

- Identified a lack of awareness in water use behaviours
- Commitment to deliver water education paramount
- Aim to conserve water in drought and wet season
- Engage schools through Sustainability Cross-Curriculum Priorities



Townsville Schools and Water Conservation

CASE STUDY SUMMARY

- Schools proactively engaging students, teachers and parents
- Aim to reduce water consumption
- Encourage water conscious behaviours
- Opportunities for youth to be pioneers in water security
- Projects include:
 - Large 5 bed aquaponics system
 - Wicking beds harvesting air-conditioning water
 - Students using virtual platform



BELGIAN GARDENS STATE SCHOOL

- Ergon Energy's Envirofund grant
- Awarded \$7,100 in 2011 to construct aquaponics system
- 5 grow beds, 1000L fish tank, materials and electrical equipment
- Installed rainwater tank to refill fish tank
- Fish tank holds 40 Jade Perch
- Fish waste recirculated to grow beds (natural fertiliser for plants)
- Year 2 students manage system and plant produce
- Produce used in schools bird aviary, cooking classes, and sold to parents
- Profits go towards continued maintenance



BELGIAN GARDENS STATE SCHOOL

- System uses significantly less water to grow food
- Recycles water continuously
- 1000L fish tank to function
- Evaporation concerns were addressed
- School enclosed system inside greenhouse
 - Reduced exposure to extreme heat
 - Filtered sunlight for produce to grow
 - Lid fitted to the tank to keep sunlight out
- Successfully functioning since 2012!



ST CLARE'S CATHOLIC SCHOOL

- Collaboration with Townsville City Council
- Installed 3 wicking garden beds
- Harvest water from classroom a/c units
- Water efficient type of kitchen garden
- Water from the base up (stored reservoir)
- Plants uptake only what they need
- Reduces evaporation
- Encourages healthy root system that grows down
- Longer periods of time without watering
- Uses up to 30% less water



ST CLARE'S CATHOLIC SCHOOL

One of the most successful kitchen garden designs!

- Suit Townsville's dry conditions
- Traditional gardens use potable water
- Modifications made to harvest air-conditioning water
 - Depending on unit, A/C can drip 20-70L/per day!
- Harvested produce sold at schools market stall
- Profits used for maintenance
- Students learning to propagate seeds, cuttings and leftover produce
- Students gained a wealth of knowledge on sustainability
- All grades participate in some way
 - Harvesting, planting, composting, mulching etc.



THURINGOWA STATE HIGH SCHOOL

HYDRO INNOVATION (STEM)

- Program running since 2017
- 93 students across North QLD schools
- 10 week program, 70min session per week
- iSee Virtual Platform
- Local industry experts help mentor students
- Students posed question on water security
 - Directly relevant to Townsville's situation
 - Recent water shortage
- Students reflect on their own experiences
- Develop creative solutions to solving water shortage
- Create 3D prototype, pitch design and present to panel
- Solve real-world problems using Design Thinking pedagogical approach to learning



Rowes Bay Sustainability Centre

CASE STUDY SUMMARY

- Pre-1980 house “care takers cottage”
- Retro-fitted to showcase sustainability ideas around the home
 - Water, waste, energy and biodiversity
- Don't need to build from the ground up!
- Primary focus is water, showcased through various displays
 - Water Sensitive Urban Design
 - Water efficient kitchen gardens
 - Drought tolerant native gardens
 - Turf display
 - Water use behaviours



ROWES BAY SUSTAINABILITY CENTRE

- Aim to ensure community consciously conserves water
- Rowes Bay Centre designed to address water issues
- Involve community through experiential learning
- Exhibits show water conservation measures

Water Demonstration Gardens

- Drip irrigation
- Plants grouped by type and water needs (zoning)
- Shade provides cooling for house
- Lawn reduction alternative



THEMATIC EDUCATION

Thematic Signage

- Symbols represent water use and plant type
- Highly effective for self-guided tours
- Discussion point to reduce lawn
 - Replace with drought tolerant species
 - Reduce outdoor water use
 - Provide aesthetic value to property



Turf Display

- Drip irrigation on timer
- Narrow and broad leaf species common in Tsv
- Research to identify most water efficient option
- Zoysia proved most viable
 - Drought tolerant
 - Low water needs
 - Low biomass in clippings (recognised pollutant on the reef)
 - Addresses aesthetic value issues



WATER EFFICIENT KITCHEN GARDENS

- Alternative to reduce lawn
- Gain fresh produce
- Aquaponics system
- Raised garden beds with drip irrigation
- Wicking bed/Living Fence (linked to rain water tank)
- Provide options for different lifestyles and property types
- Water efficient designs
 - Recycles water
 - Stored water reservoir
 - Drip irrigation on timer
- Other features, WSUD throughout garden
- Successful asset to our community
- Sustainable way of living with multiple benefits



Concluding Remarks

- Positive community responses toward water conservation
 - Enhanced understanding in the role of water for Townsville
 - Empowered residents to make informed decisions
 - Transition from 'needs base' to 'value base' understanding
 - Achieving residents values of water
- Schools and students taking ownership of water conservation
 - Building a sense of pride and empowerment
 - Innovative and collective leadership displayed
 - Actively engaged students from a young age
 - Directly and indirectly influence community and schools
- Endeavour to develop and continue our work with the community and schools

