Aim: To create healthy and resilient Smart Urban Forests wherein trees interact with urban residents and managers via digital media platforms that are informed by real-time wateruse and water-stress data



Why do we need Smart Urban Forests?

Population Growth

- Global urban populations are rapidly expanding
- More than 70% of people will live in cities by 2050
- Urban densification is causing a rapid loss of vegetation cover on private land

This is making cities hotter and putting the pressure of enhancing or maintaining vegetation cover on the owners and managers of public land

Health

- Heat kills more people every year than all other natural disasters combined
- In Melbourne, Australia temperatures above 30°C for one or two days result in significant increases in emergency room visits, ambulance call outs, and mortality
 - People need the cooling benefits provided by trees

Climate Change

- Global temperatures are expected to increase by more than 2°C by 2100
- Cities will get hotter, resulting in heat health thresholds being exceeded more often
- The condition of existing urban forests will also decline in association with these changes
 ⇒To maximise their cooling benefits, cities need healthy trees of the right species

The solution: increasing and maintaining tree cover to offset temperature rises



Water and trees: The importance of water for urban trees cannot be understated. Most urban trees suffer from ongoing impairment because they often experience water stress. This reduces their longevity and the benefits they provide.



How water affects the health and longevity of urban trees



Current urban tree watering practices and likely outcomes

Ways of maintaining trees commonly used by urban forest managers:

- 1) never water (will always under water);
- 2) water on a regular pattern, e.g., once a week (will sometimes over water and sometimes under water);
- 3) water when it has been hot or dry (will almost always under water);
- 4) water when it looks like the trees are struggling (will almost always under water);
- 5) water based on soil moisture sensors (will sometimes over water and sometimes under water).

Over watering consequences—spending more time and money than is needed to ensure the health and longevity of the trees; can stunt tree growth.

Under watering consequences—trees are regularly in stress, reducing their benefits, health and longevity, driving up replacement and legal costs.

Categorising trees: By categorising trees based on their suitability for a given environment, we can maximise vegetation health, resilience and longevity and minimise the costs of maintenance, liability and replacement.



Category A (the foundation of healthy, resilient, low-maintenance urban forests)

- Species that require very little ongoing maintenance once established
- Only need to be watered a couple times per year during extended (greater than 5 days in duration) hot, dry and/or windy periods
- Includes Category B species planted in ideal conditions with good quality soils and best practice water sensitive urban design principles applied

Category B (helpful to enhance diversity in healthy, resilient, low-maintenance urban forests)

- Species that require some ongoing maintenance once established
- Need to be watered sometimes, especially during hot, dry and/or windy periods (greater than 3 days in duration)
- Includes Category C species planted in ideal conditions with good quality soils and best practice water sensitive urban design principles applied
- Also includes category A species planted in poor conditions with low quality soils and minimal access to rainfall

Category C (should be avoided and phased out of healthy, resilient, low-maintenance urban forests)

• Species that require regular ongoing maintenance even once established

stress

- Need to be watered regularly even under average conditions (at least once or twice per fortnight in cooler/wetter periods up to every second or third day during hotter/drier periods)
- Includes Category B species planted in poor conditions with low quality soils and minimal access to rainfall

Real-time water-use and water-stress data are the solution

The Smart Urban Forests technology driven approach to real-time urban forest management and enhancing community education outcomes.

