COOL STREETS PILOT PROJECT:
A PARTICIPATORY APPROCAH TO STREET TREE PLANTING

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Introduction:

Research undertaken in recent decades have established that urban tree canopy can significantly improve local temperatures, reduce urban heat, improve air quality and reduce air-conditioning costs (Simpson and McPherson 1996,1998; Hart & Sailor 2009, Stone 2012, Taha 1997 Rosenweig et al., 2006, Gallagher 2015). However urban development trends in Australia indicate that there is less space available for tree planting on private land due to reductions in lot sizes and private gardens and increased dwelling area. (ABS 2010, Ghosh and Head 2009). Within this context street reserves can provide capacity for urban tree canopy.

Community acceptance of street tree planting can be an obstacle to implementation. Negative perceptions related to urban tree maintenance such as leaf drop and damage to pavements can be concealed behind positive statements of "I love trees but...," (Schroeder *et al.* 2006, p.236). Furthermore, a small proportion of people can often dominate dialogue. Schroeder *et al.* (2006) found that *people who genuinely dislike living near trees are more likely to volunteer their opinions in the form of complaints to the local authority, whereas residents who hold less negative views may remain silent unless their opinions are actively sought out* (2006, p.237). Poor communication and inadequate explanations of the potential benefits can *increase dissatisfaction among residents* (Leonard et *al*., 2014, p.61,).

Counterbalancing individual views by improving awareness of the benefits has been shown to be effective. Research has found that consultation, information building and sharing alongside practical management issues can promote positive outcomes and foster uptake (Kirkpatrick *et al.* 2013, Leonard *et al.*2014, Schroeder *et al.* 2006,). Leonard *at al.* (2014) found that clear explanations of the positive benefits of street design strategies, through mechanisms such as formal and informal community groups, were highly effective in encouraging acceptance and shared ownership.

Participatory and 'mediated modelling' for design scenarios has been found to improve community engagement and support. Peterson & Franks found that a mediated modelling process, that aims for a collaborative team learning experience rather than experts' dispensing answers, raised the shared level of understanding and was effective in fostering a robust consensus (2005. p.441). Pataki *et al. (*2009) used participatory modelling to test mitigation strategies with a range of stakeholders from government, local community groups, and individual community members. The study found that as the knowledge base increased, so did the stakeholders' desire to not only integrate their needs but the needs of their fellow stakeholders.

The project objective was to test an alternative approach to implementation of effective street tree planting that combined detailed environmental and economic data with a participatory community engagement process. Specifically, the objectives were to

- test if detailed data on street tree layouts influenced acceptance;
- explore the capacity of using a participatory process in street tree implementation, and
- understand obstacles and barriers to acceptance of street trees.

Method

The pilot project was sponsored by Blacktown City Council was undertaken in two suburban neighbourhoods in western Sydney. A series of neighbourhoods were selected based on their vulnerability to increased heat, their representative characteristics of typical neighbourhoods in the Local Government Area (LGA) and their capacity to accommodate new street tree planting. A workshop was held with selected council staff to agree on locations. Two existing neighbourhoods, Woodcroft and Glenwood were identified as preferred locations for consultation.

A two-stage engagement process was developed. Stage one was focused on information gathering and sharing while stage two tested detailed street tree layouts and preferences. Site specific CO_2 simulation data was developed and used in both stages to allow residents to understand the benefits of various scenarios.

Stage 1 Engagement and results

Stage 1 engagement was undertaken in two neighbourhoods (Glenwood and Woodcroft) Street events were held in each neighbourhood (Figures 1 -3). Overall, 52 surveys were completed., with 35 people surveyed at Glenwood and 17 people surveyed at Woodcroft.

Participants were shown three street tree layouts – Option A Small evergreen tree, Option B: Medium scaled deciduous trees and Option C: evergreen and deciduous trees). Participants were asked at the outset to rank their preferred options, based on graphic representation only. Participants were then asked if they were aware of the benefits of street trees relative to reducing energy bills, increasing home value, and improving health and wellbeing. Detailed environmental benefits and average energy savings over 1 year based on a typical dwelling were displayed with each option. Option C provided 772 tonnes of avoided and sequestered CO^2 over a 40-year period, compared to Option B (499 tonnes) and Option A (149 tonnes). The shade benefits were most effective in Option B which reduced household energy bills by up to $164 over 1 year from established street trees. Following this, participants were asked if this information had changed their preferred option. Additional questions related to demographics and general concerns about street trees were also included.

A large portion of survey participants, (40%) were aged 35 to 49, with 17% aged over 60 and 8% were aged under 11 years of age. The participants were culturally diverse, and 58% spoke a language other than English at home, the most common being; Hindi (21%), Punjabi (15%), Filipino/Tagalog (10%), and Singhalese (8%). Most survey participants (92%) owned their home and almost half (48%) were new residents that had lived on their street for 1 to 3 years.

Residents did change their preference when information was provided on environmental and economic benefits. Initial preferences prior to respondents being made aware of street tree benefits ranked Option A (40%) as the preferred layout, then option B (38%) and Option C (19%). After data was provided, Option B: medium scaled deciduous trees were the preferred option by most people (52%), followed by Option A: Small evergreen trees (27%) and Option C: Mixed Species (19%), as illustrated in Figure 4.

Preferences for options were related to visual uniformity and tidiness rather than tree scale. Evergreen trees were nominated as most significant cited reason for selection preference (17 comments), followed then by medium scaled trees (11 comments), neat trees (10 comments). The most significant influences appeared to be related to tidiness and leaf litter (45%), followed by tree scale (25%), tree colour (10%) location (10%), tree shade (10%). Many respondents listed Option A: small evergreen trees as their most preferred option due to the reduced leaf drop rather than concerns related to tree scale.

Visual amenity was the most valued aspect of street trees. 50% of respondents cited visual amenity as important and over a third (35%) valued the benefits to human health and wellbeing. Other values included bringing nature in to the city (27 %), cooling my home and reducing electricity bills (25%), increasing home value (17 %) and general shading (10%).

Approximately 63% of survey respondents had concerns about street trees generally related to leaf litter and root damage. The three primary issues were root damage to footpaths, driveways and pipes (27% of respondents) and leaves dropping (27% of respondents). Other concerns included installation and maintenance of street trees (12% of respondents), visual uniformity (9% of respondents) and safety (6% respectively).

Figure 1, 2, 3: Residents using participatory panel at the Cool streets© Blacktown.engagement events (S. Reilly 2015).

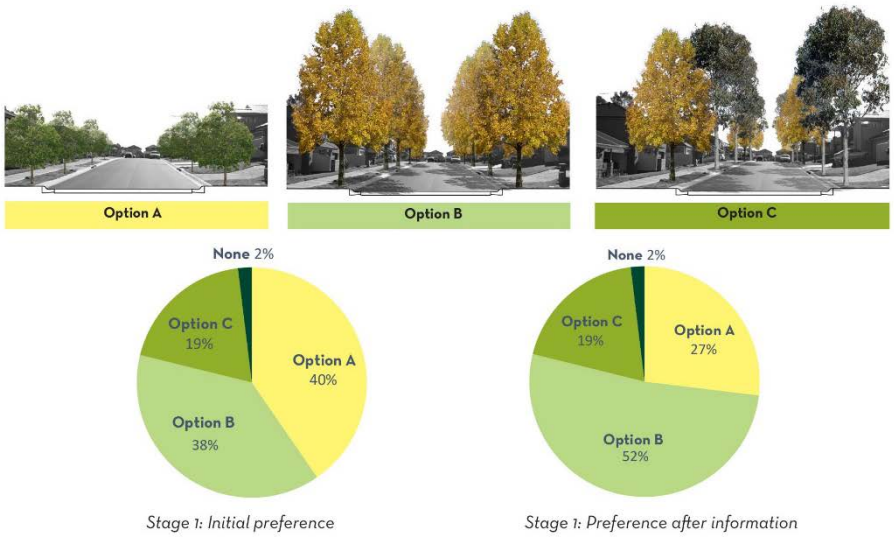

Figure 4: Results Cool streets © Blacktown Stage 1 (Gallagher 2018).

Stage 2 Engagement and results

Due to budget limitations, only one street was selected for stage 2 events. Glenwood was selected due to high levels of participation from residents in stage 1 events. The selected street had a 14-metre-wide reserve with a 7-metre carriageway. Twenty-five people were surveyed.

Based on data regarding preferences, 4 layouts were developed, 2 layouts related to tree numbers (46 trees vs 36 trees) and 2 related to tree species, a single species (*Lophostemon confertus)* and mix of trees *(Lophostemon confertus and Fraxinus 'Raywood'*).

Species were selected based on preferences for visual uniformity and tidiness as nominated in stage 1. Detailed environmental benefits and average energy savings over 1 year based on a typical dwelling were displayed with each option. Layout 4: Mixed species/46 trees was most effective in climate abatement, (517 Tonnes avoided CO^2 over 40 year period), followed by Option 3 mixed species/ 36 trees (482 tonnes), Layout 2: single species/ 46 trees (481 tonnes) and single species/ fewer trees (437 tonnes).Average bill savings over 1 year at maturity were also illustrated; these were generally very similar for all layouts, ($232 - $237). Participants were asked to select their preferred layouts.

Figure 5: Initial preference to final preference: Cool Streets© Blacktown. stage 1 (Gallagher 2018).

Most participants (83%) preferred the mixed species *(Lophostemon confertus and Fraxinus 'Raywood'*) however there was an almost even split between layout with fewer trees - 13 participants (52%) and more trees - 12 participants (48%). Most participants (75%) didn't change their preference after information was shared in this stage; of the 25% who did, all stated their change was to improve the environmental benefits. A finalised layout was then developed based on feedback and planting day was undertaken.

Conclusion

A significant shift in participants preferences on street trees was evident across the project. At the outset of engagement, most participants preferred the least environmentally effective design of small evergreen street trees. By the end of the project most participants preferred a more environmentally beneficial of larger trees and a mix of deciduous and evergreen species. Aesthetic preferences also shifted considerably through the two stages of engagement. Initial preferences for single species of trees in stage 1 based on perceived preferences for visual order initially appeared to be a significant factor. However further testing of this assumption in stage 2 indicated that participants overwhelmingly accepted a more diverse, less ordered, that was more effective in climate abatement.

Altruistic choices based on a broader range of criteria such as general environmental and wider economic benefits, were enhanced through the two-stage process. While participants stated that they had changed their preferences in stage 1 primarily based on these benefits, the preferred option in stage 1 was not the most effective layout for climate abatement. By stage two, most participants selected the layouts with highest environmental benefits.

In general consultation created a positive experience for community members and many people commented on the how positive it was to be engaged with at an early stage. The project demonstrates that adopting engagement processes can improve street tree acceptance, improve environmental outcomes and build social capital.

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