Modelling the Effect of Tree Planting on Mitigating Heat Exposure for Vulnerable Population in Australian Cities

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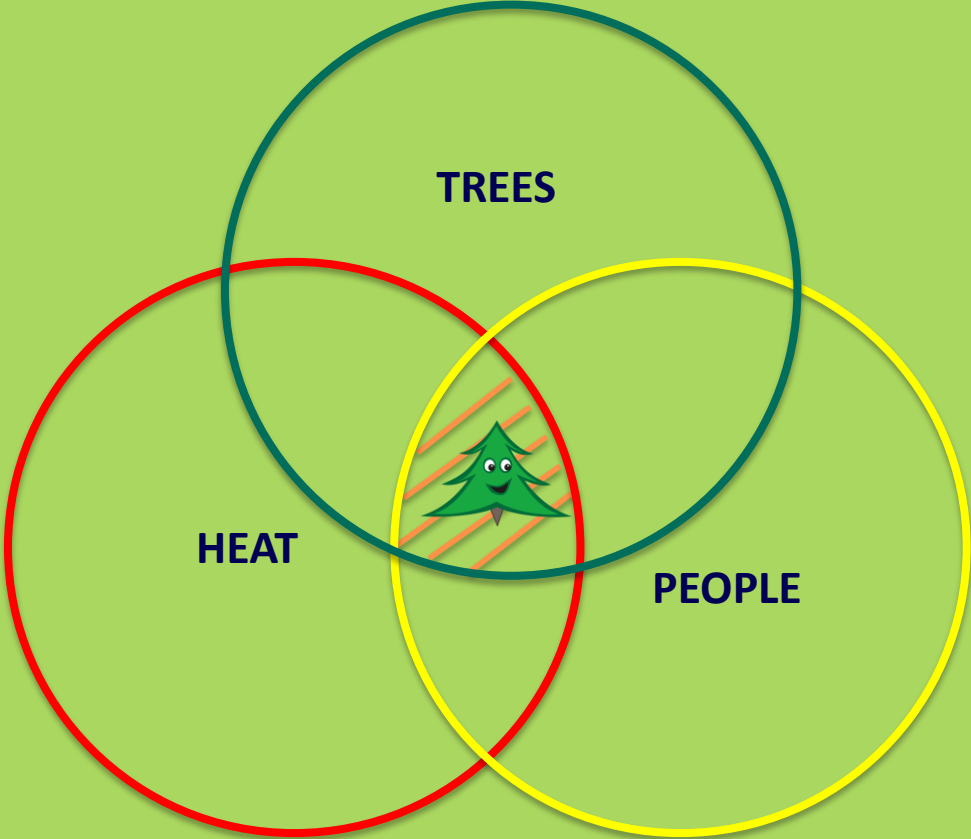# Outline

➢ Aim and Objectives

➢ Methods

    o   Study area

    o   Data

    o   Analysis and modelling

➢ Results

➢ Other ongoing urban forest related work

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Aim and Objectives

TREES

HEAT

PEOPLE

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Aim and Objectives

- Investigate the associations between land surface temperature (LST), tree canopy cover and community population profiles using satellite-derived temperature and census data in Sydney, Australia.

- Identify the spatial variations of heat exposure for vulnerable population.

- Prioritise the community areas for tree planting.

- Modelling the effects of tree planting on heat.

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Methods: Study area
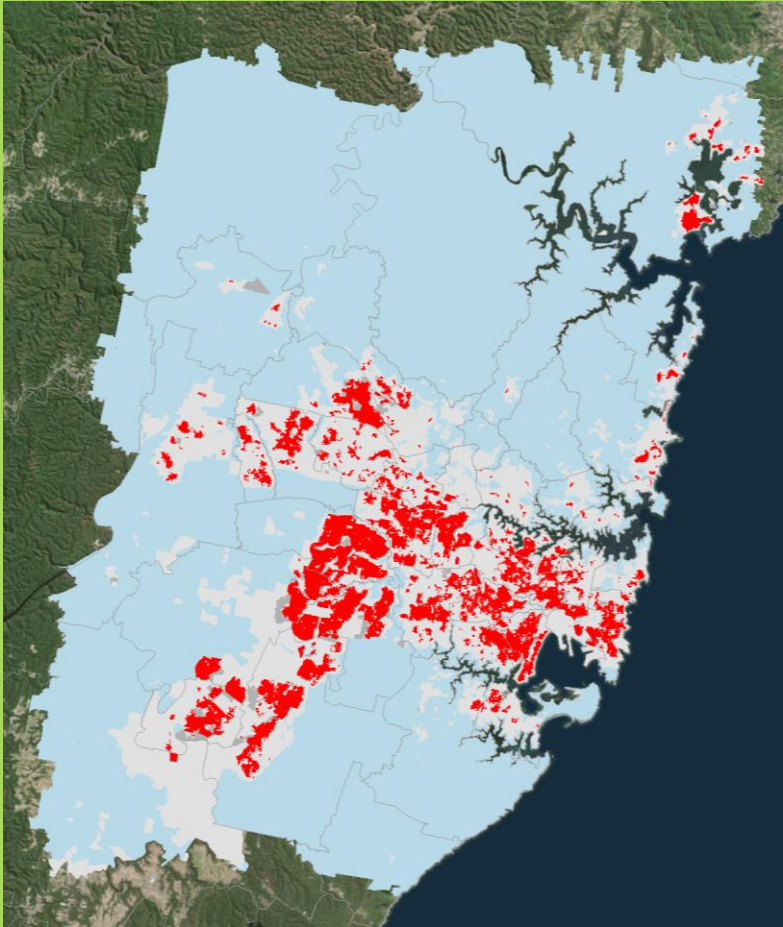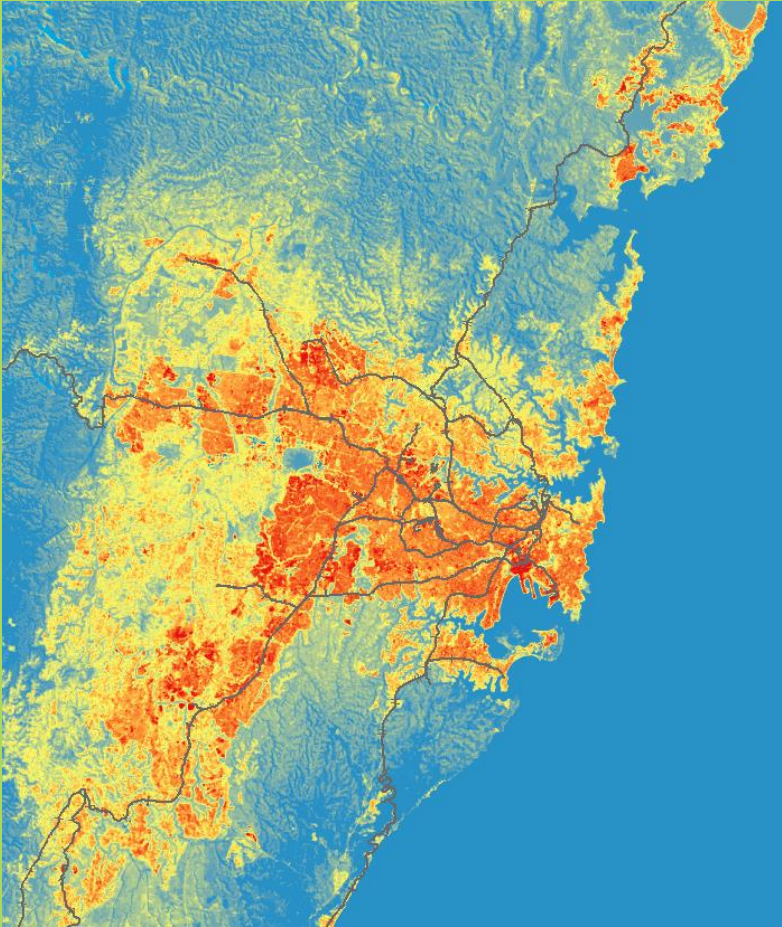

SA3: 47
SA1: 10,547
Meshblock: 54,777

Methods: Data

- Land surface temperature (LST) and Urban Heat Island: derived from 2016 landsat-8, 30m

- Urban vegetation types and distribution: derived from 2016 aerial photograph, 20cm

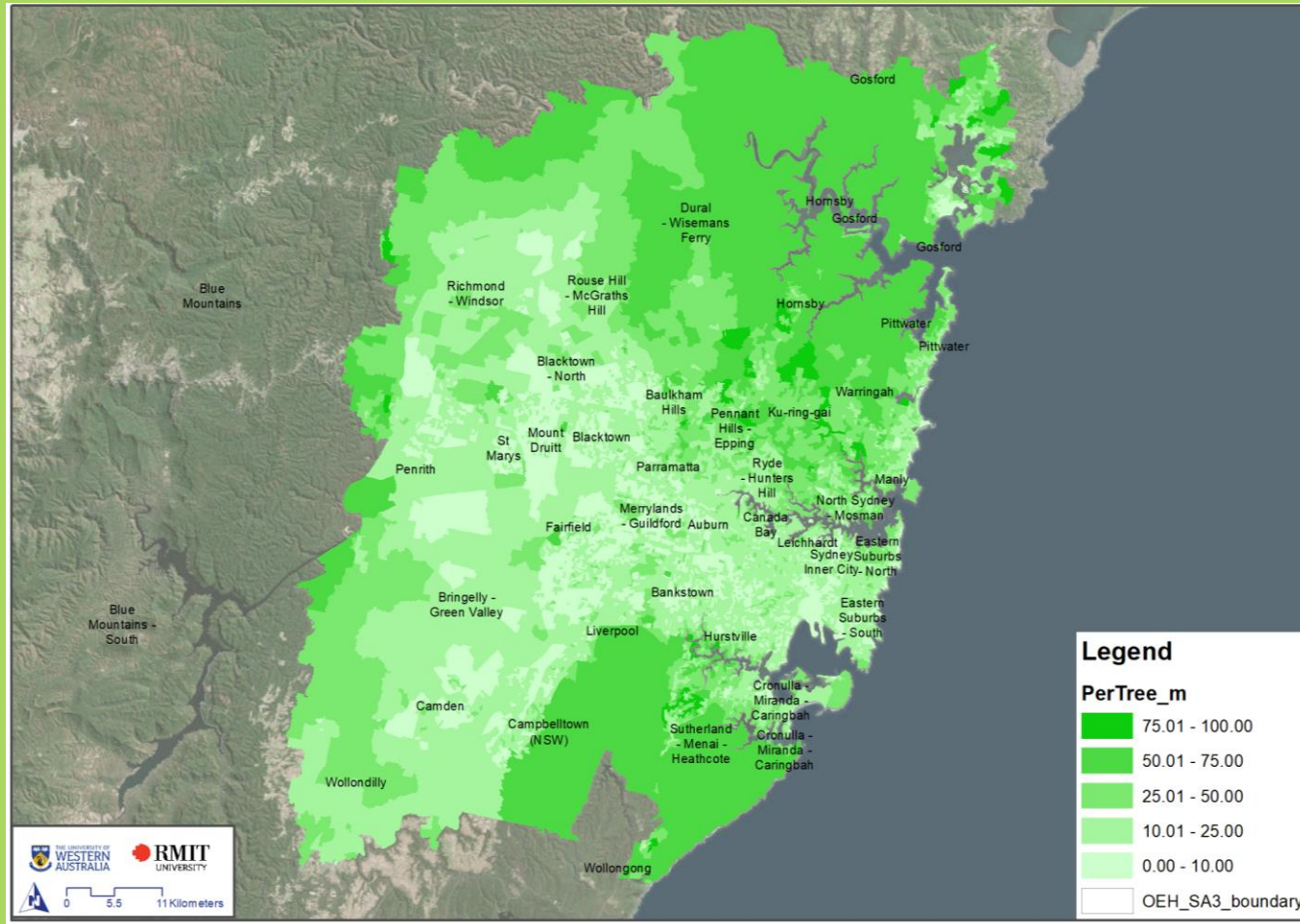- 2016 Census data of Sydney metropolitan area

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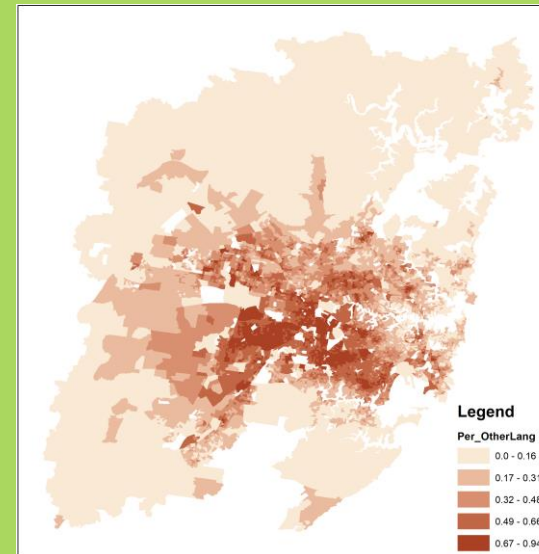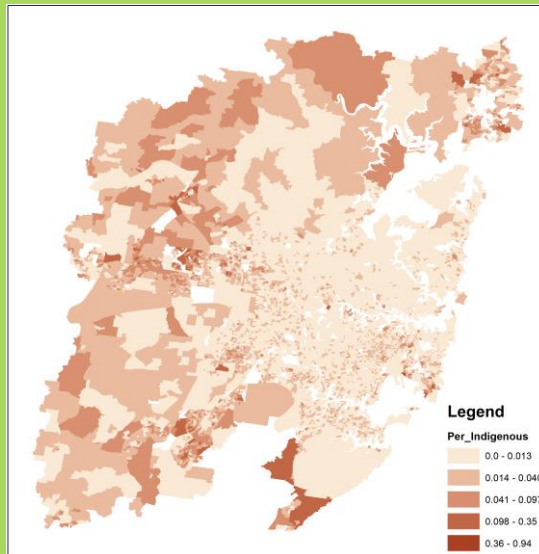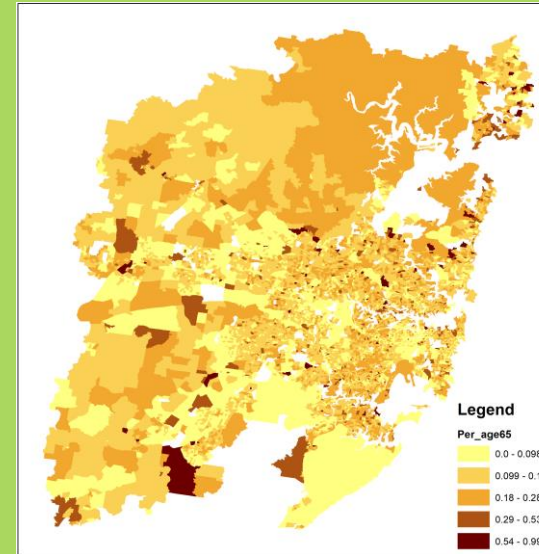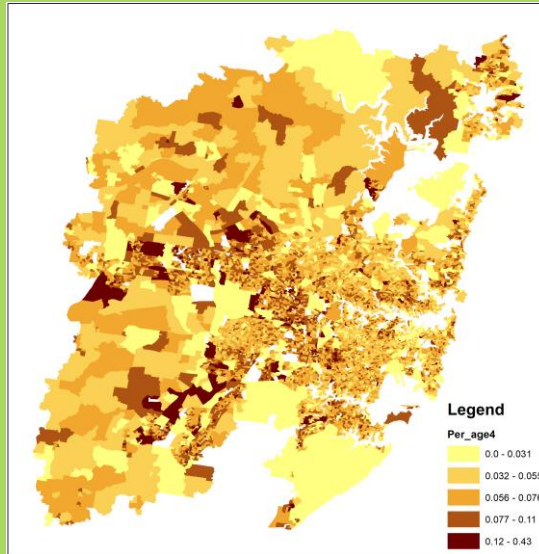# Methods: Data

LST and UHI

Methods: Data

Tree distribution

Methods: Data

Community profiles

Methods: Analysis and Modelling
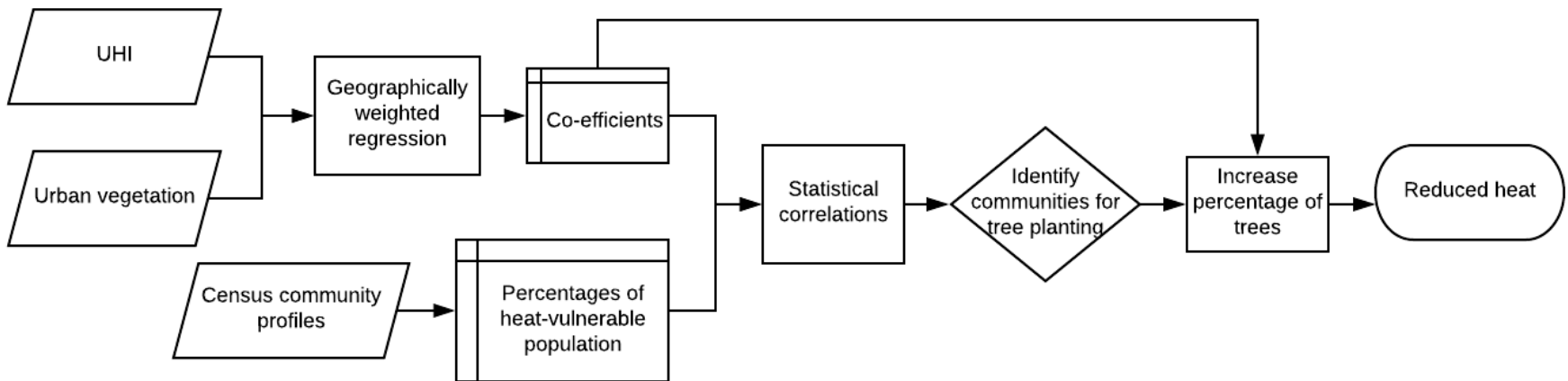
Results: GWR report

Neighbors	200	
ResidualSquares	3636.078414	
EffectiveNumber	868.170794	
Sigma	0.626061	
AICc	19768.549378	
R2	0.897999	
R2Adjusted	0.888464	
Dependent Field	0	UHI_MB_m
Explanatory Field	1	PerGrs_m
Explanatory Field	2	PerShrb_m
Explanatory Field	3	PerTree_m
Explanatory Field	4	PerRd_m

Results: GWR Local R2

Legend

Local R2

- ■ 0.11 - 0.30
- ■ 0.31 - 0.40
- ■ 0.41 - 0.47
- ■ 0.48 - 0.55
- ■ 0.56 - 0.65
- ■ 0.66 - 0.75
- ■ 0.76 - 0.93
- □ OEH_SA3_boundary

Clean Air and Urban Landscapes Hub

National Environmental Science Programme

WESTERN AUSTRALIA   RMIT UNIVERSITY

0   6   12 Kilometers

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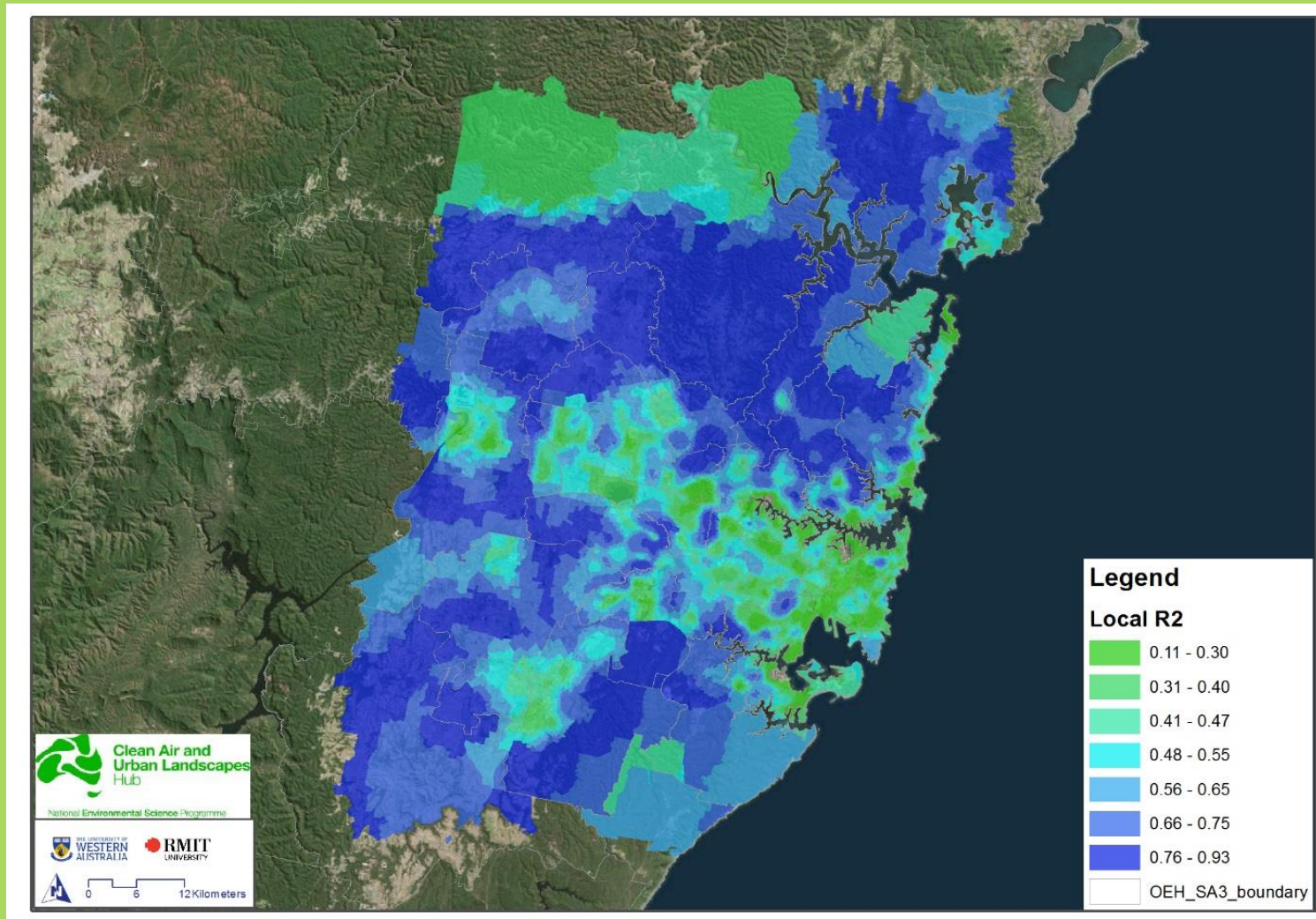
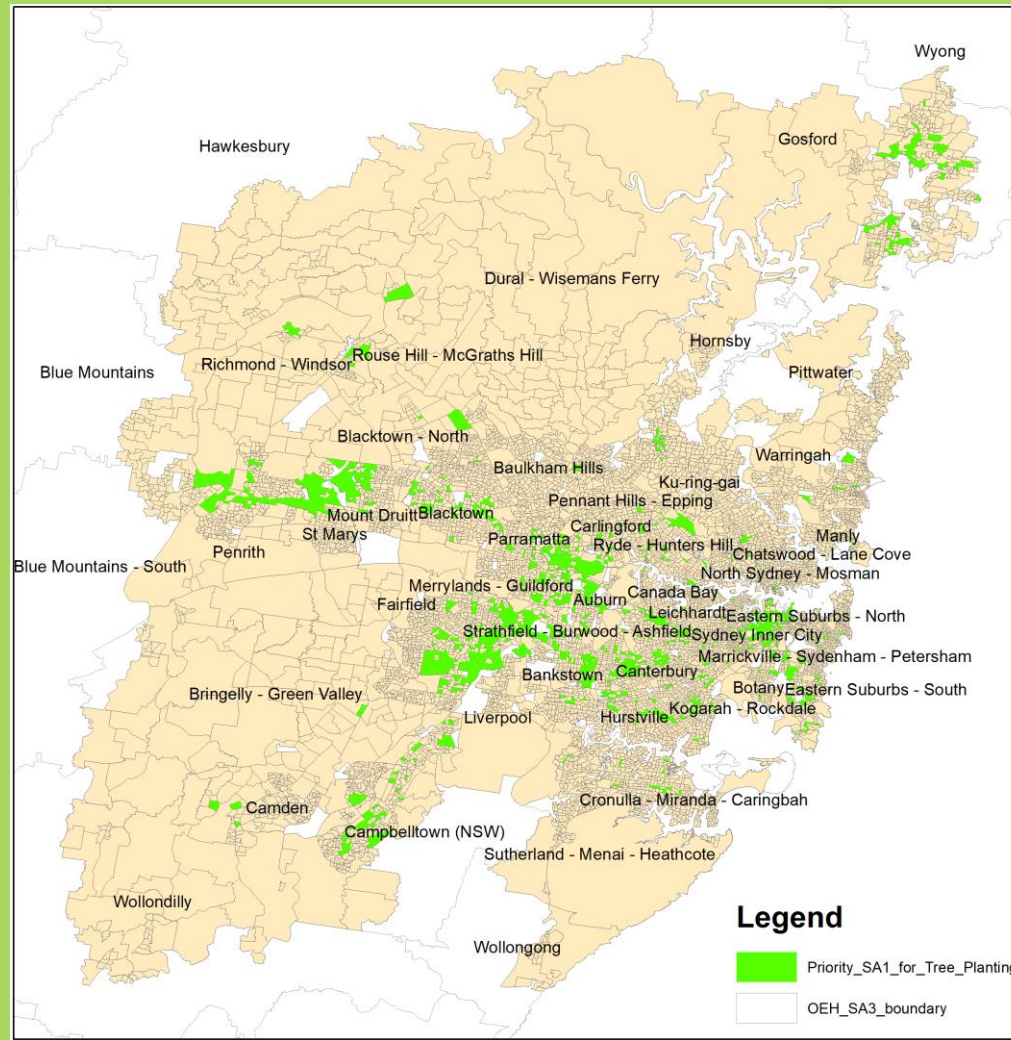# Results: GWR coefficients of trees
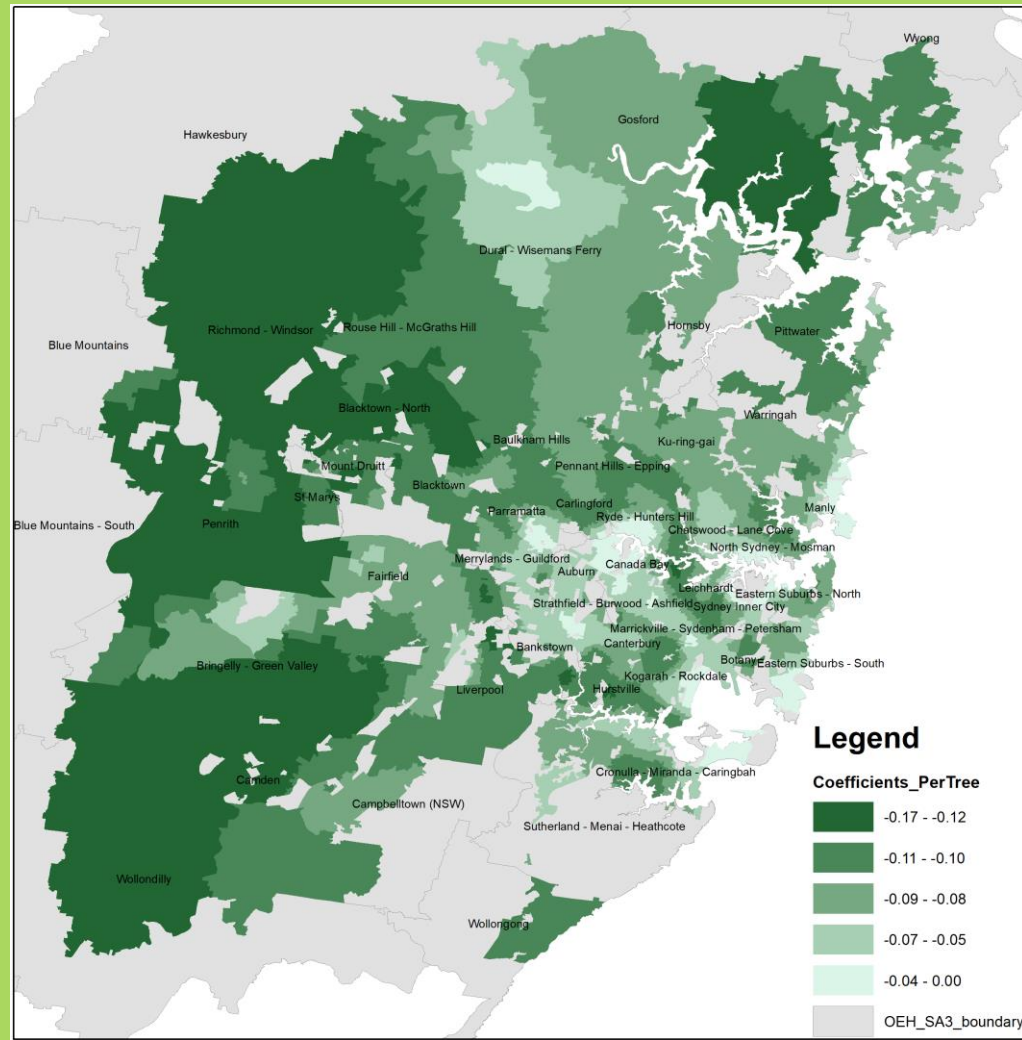
Results: Correlations between community profiles and tree-heat coefficients

Per_age4	Per_age65	Income	Education	Per_Indigenous	Per_NonEng
-0.16	-0.03	-0.26	-0.29	-0.22	0.21

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Results: Priority SA1s for tree planting

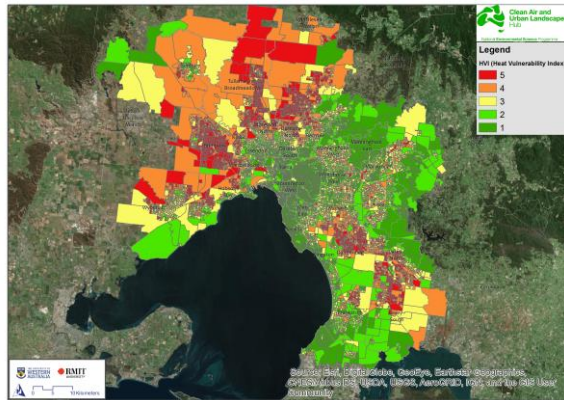# Results: Effects of tree planting on vulnerable populations
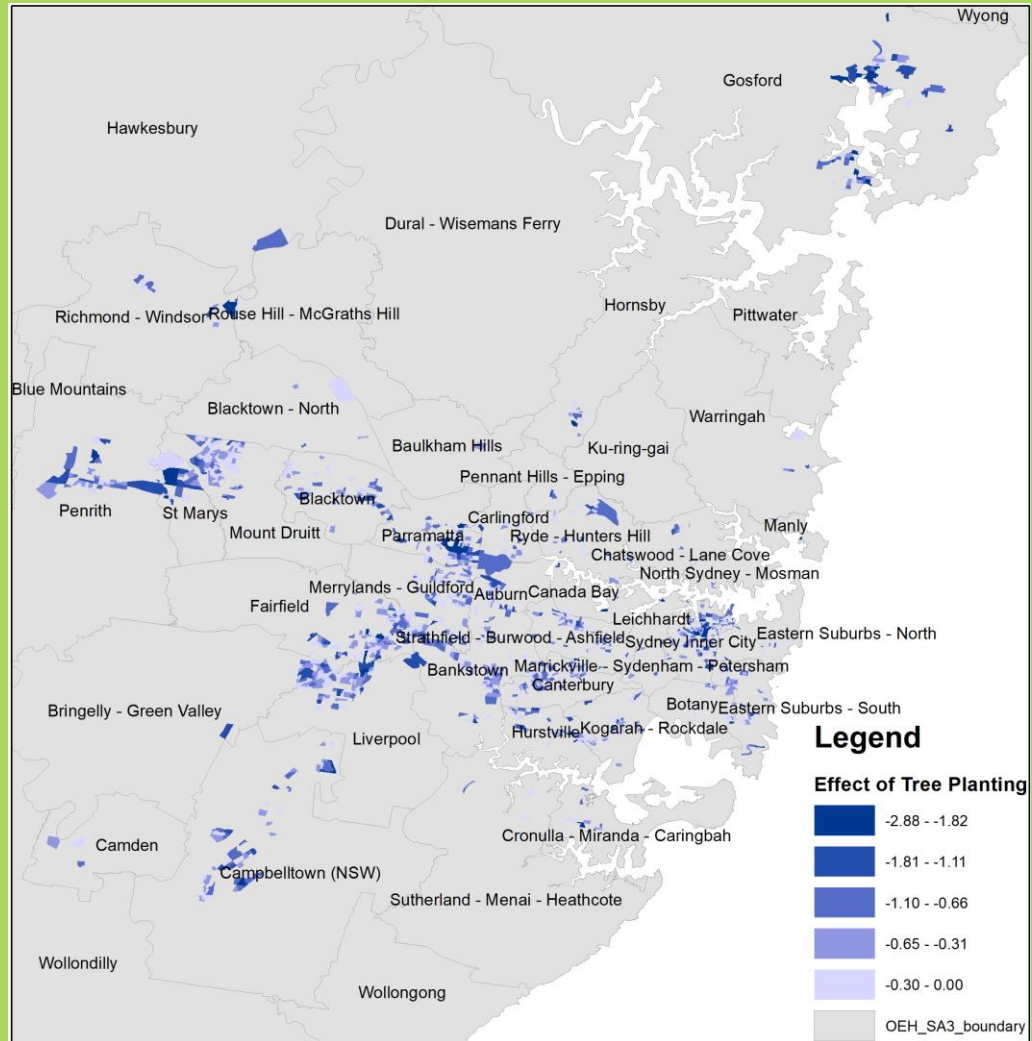
Coping with Climate Change – Indicators and Indices for mitigation and adaptation

Heat Vulnerability Index
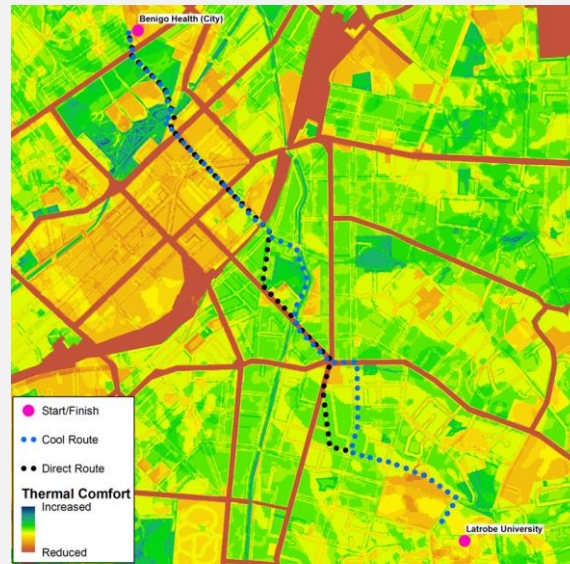
Exposure + Sensitivity – Adaptability

-> Identify areas where we

DELWP
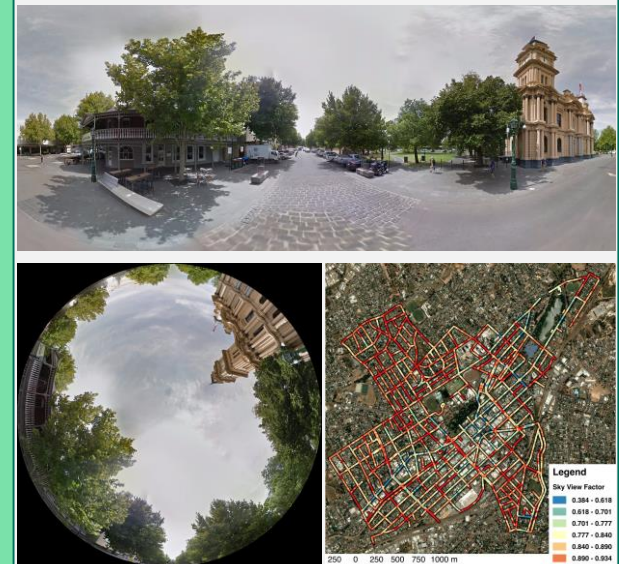
Thermal Comfort Index

-> Finding cooler travel routes

Smart Cities and Suburbs
https://www.shadeways.net/

Greenery view Index

-> Benchmarking for tree shade

City of Greater Bendigo

Thank you!

World Forum on
Urban Forests
Mantova 2018

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