Assessing benefits of urban green and blue space in cities from four continents: Asia, Latin America, Africa, Europe.

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NERC SCIENCE OF THE ENVIRONMENT

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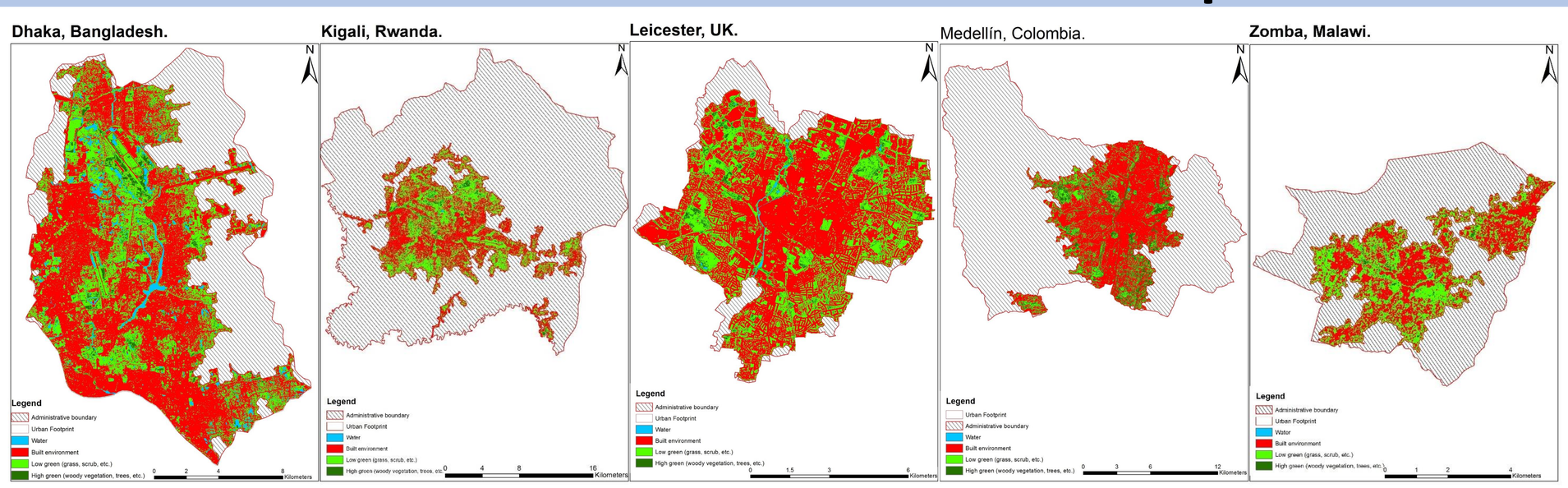
Introduction

- Calculating the benefits of urban green and blue space rarely takes into account local conditions or context. Where assessments consider the demand for services, they often only map the pressure, and do not consider where the beneficiaries are located and who will benefit most.
- We conduct an assessment of urban natural capital in selected cities from four continents with contrasting climate, political and social context, and size.
- The assessment takes into account spatial patterns in the socio-economic demand for ecosystem services and develops metrics which reflect that local context.

Objectives

- Identify, quantify and map urban green and blue space.
- Estimate cooling and air pollution removal benefits.
- Quantify access to urban green space.
- Incorporate socio-economic data to quantify and map relative demand.

Urban Green & Blue Space



- Administrative boundaries are poor representations of "Urban" area.
- We use a semi-supervised classification method to classify from Sentinel-2a data:
  - Built environment
  - Water
  - High green (trees)
  - Low green (grass, scrub)
- We use a data-driven approach to derive "Urban Footprint", based on 'built environment' class.

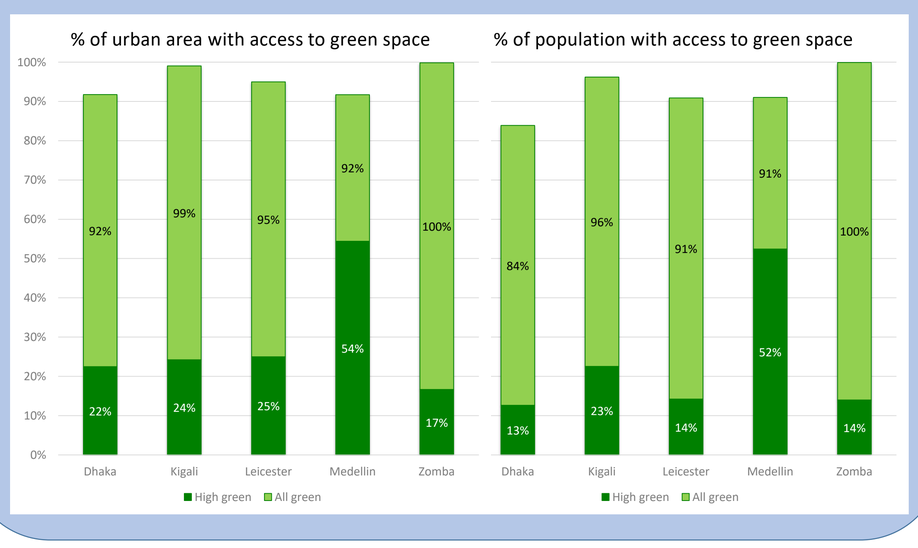
Benefits

City	Total area (km²)	High green area (%)	Low green area (%)	Water area (%)	Built area (%)	PM2.5 (ug/m³)	Calculated PM2.5 removed by woodland (kg/yr)	Estimated change in PM2.5 due to trees (ug/m³)	Estimated mean cooling effect (°C)
Dhaka	209.18	3.1	32.8	4.5	59.3	63.58	8,530	*-4.12*	*-0.63*
Kigali	156.77	2.5	47.7	0.1	49.7	24.73	4,009	*-1.49*	*-0.60*
Leicester	64.52	3.5	33.5	0.5	62.0	12.53	2,148	*-0.83*	*-0.44*
Medellin	117.74	13.1	21.6	0.1	64.9	7.30	8,228	*-0.73*	*-0.98*
Zomba	16.17	2.4	45.0	<0.1	52.1	10.60	1,080	*-0.62*	*-0.65*

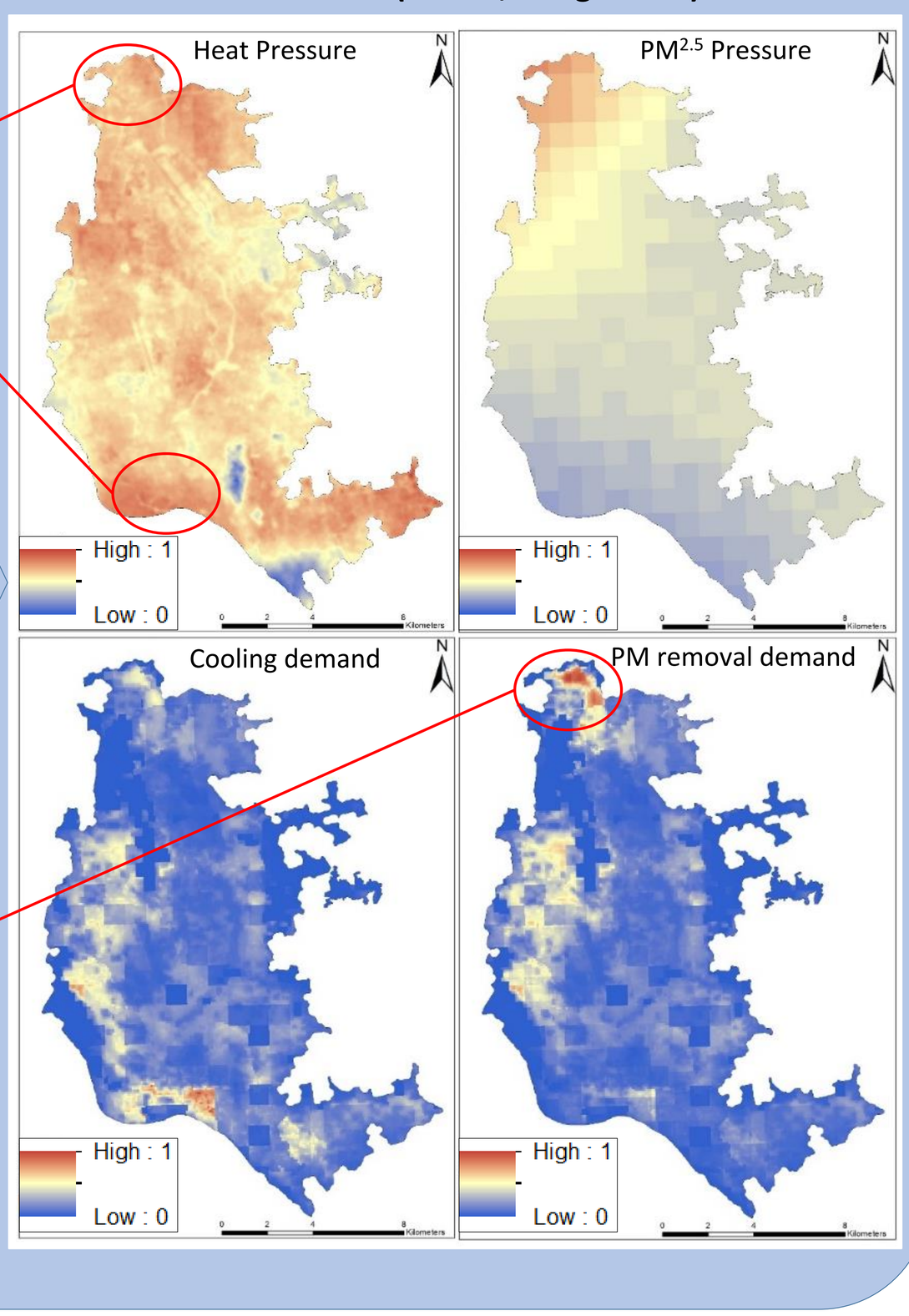
- LC classes quantified
- PM2.5 removal estimated
- Cooling effect, adjusted for climate (Morakinyo et al., 2017).

Accessibility

- UN Sustainable Development Goals (SDGs) emphasise importance of accessible, urban green spaces.
- Urban green space benefits are typically greatest at source, diminishing with distance from green space.



Demand (Dhaka, Bangladesh)



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