Air pollution reduction potentials of multiple GBGI

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UNIVERSITY OF SURREY

Guildford Living Lab

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Research questions

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- Which GBGI types are the most effective in reducing air pollution in urban areas?
- What factors influence the effectiveness of GBGI, and their impact on reducing different air pollutants at micro and urban scales?
- Which GBGI category(ies) has(have) the highest average performance in reducing air pollution?

Scope

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Included

- Quantifiable evidence of air pollution reduction potentials of GBGI
- Assessment of physical, environmental or other factors influencing the effectiveness of GBGI in reducing various air pollutants
- Monitoring, modelling and remote sensing methods used for assessing air pollution reduction efficacy of GBGI

Beyond the Scope

- No literature found on 31 GBGI sub-categories (out of 50);
- Detailed design and implementation principles of GBGI;
- Other co-benefits and disbenefits of GBGIs
- Health and economical impact assessment

Search analysis

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50 sub-categories divided under **10** main GBGI category

Identified papers 18378 → **Screened papers 719** → **Included papers 207**

- No literature found for air pollution reduction for 31/51 (~60%) GBGI sub-categories;
- 80% (165 papers) were for 6 GBGI types:
  - Street trees, green walls, Hedges, Parks, Green roofs, and Grass (other)

57%

- Remaining 20% were for 13 other GBGI types.

On-going analysis

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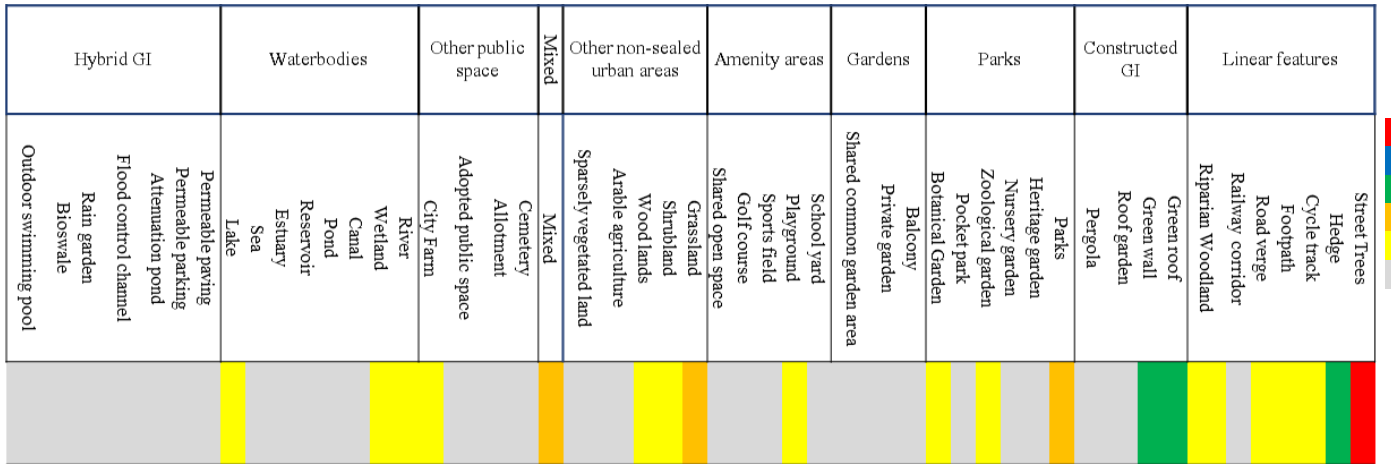
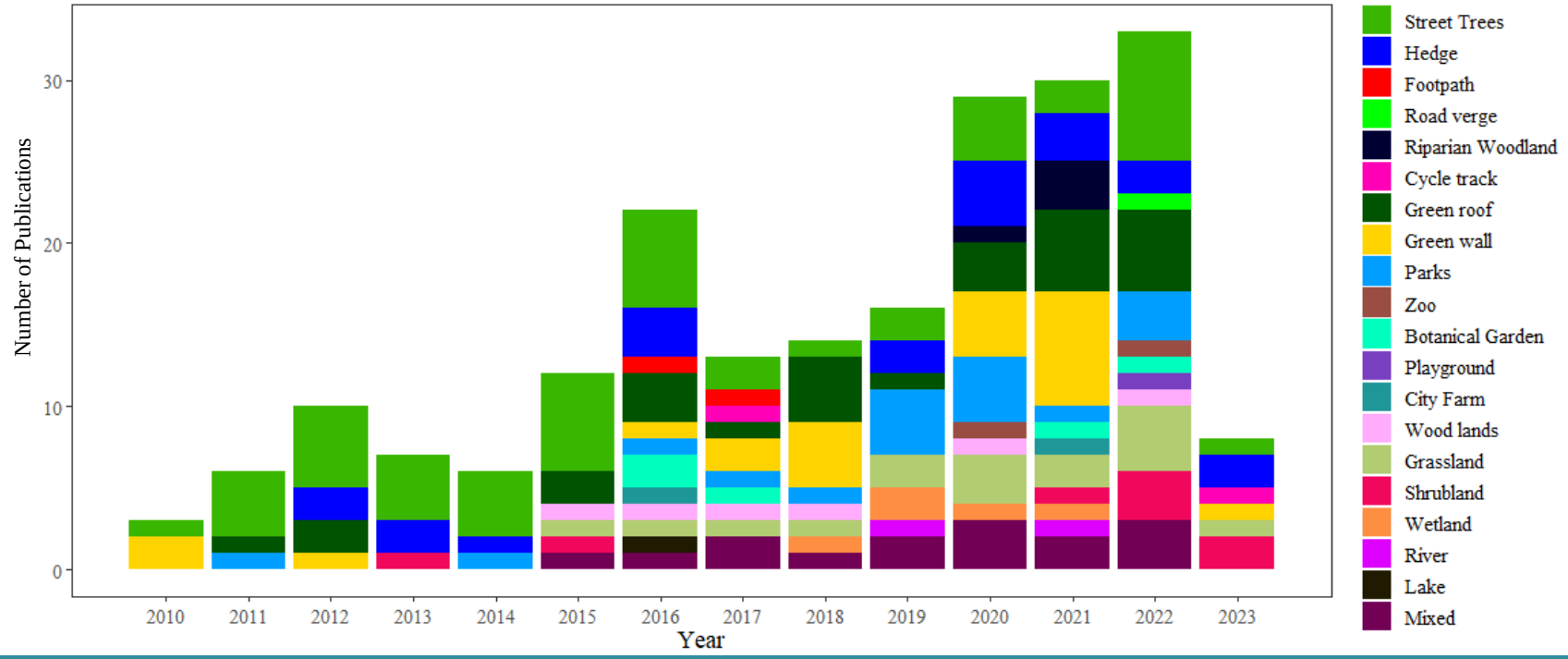
A six-point-scale number of studies Available



Publications on GBGI in last years



On-going analysis

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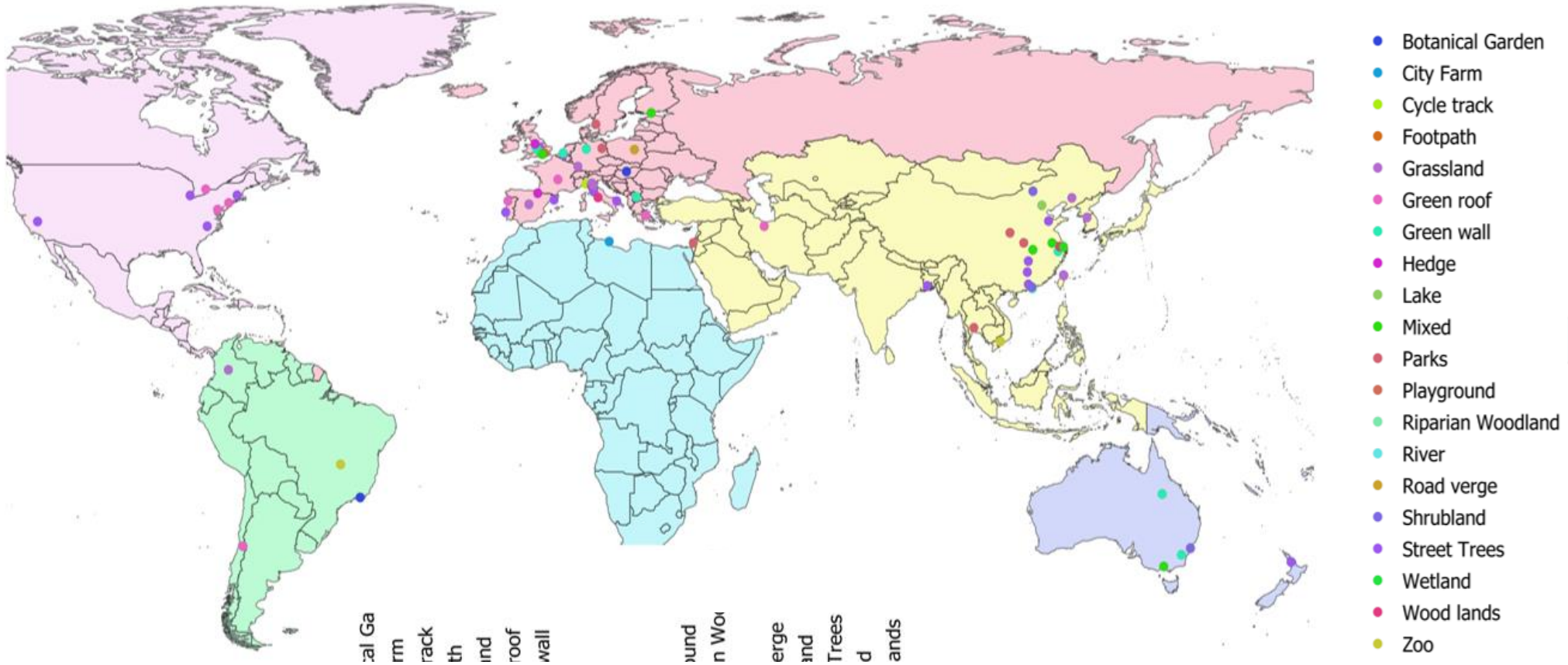
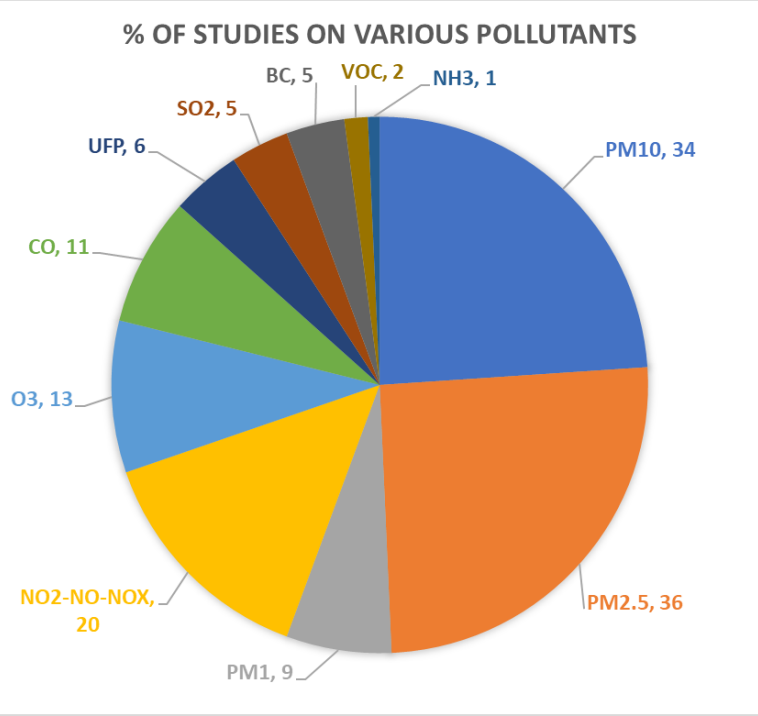
Geographical distribution of reviewed papers

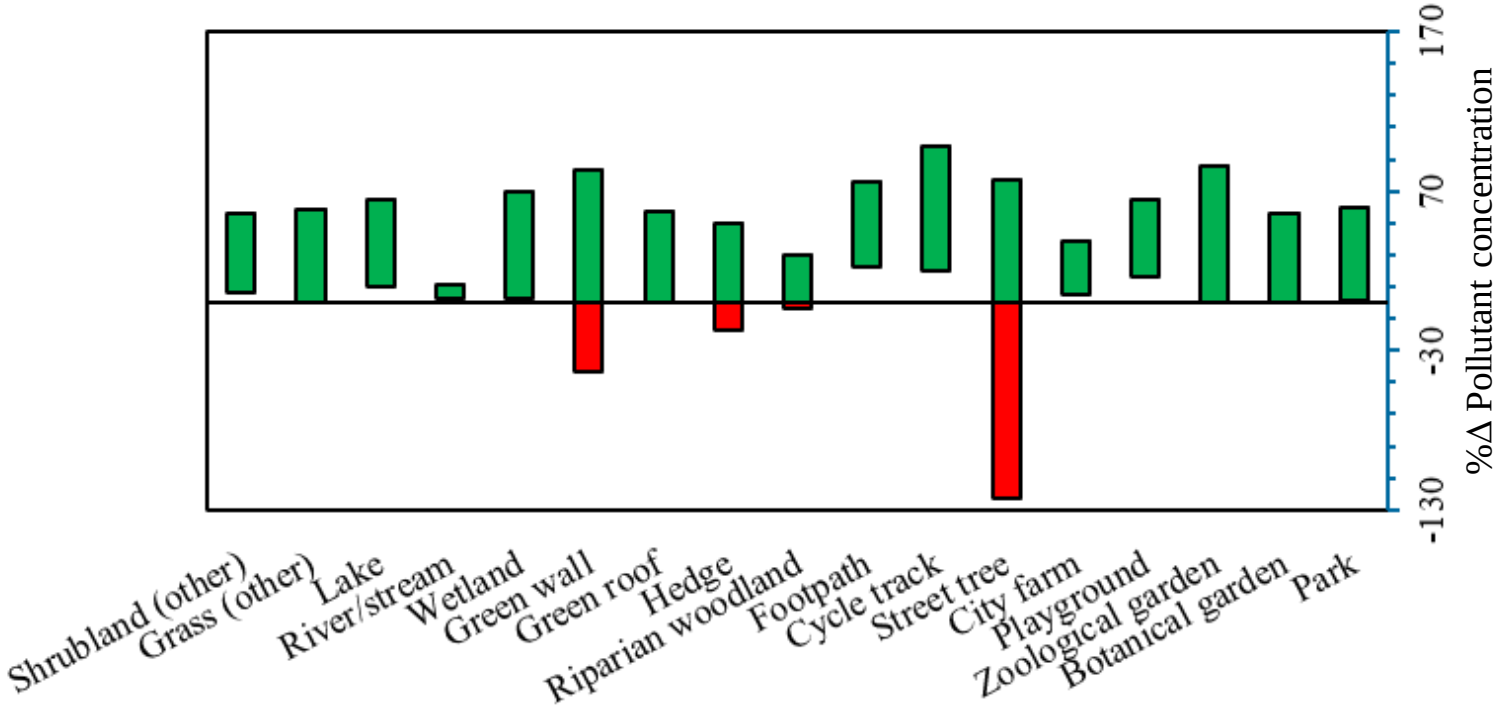
North America 7% South America 6% Europe 36% Asia 41% Oceania &Australia 8%



On-going analysis

- Majority of the GBGIs showed significant pollutant reduction (average ~55%, highest up to 78%).
- Linear & constructed GBGI (e.g. trees, hedges) in street canyons showed increased air pollution.
- Majority of the studies investigated changes in PM concentration.
- Different forms of GI and their physical characteristics influence air pollution reduction.





Thank you

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