Funded Research Project - Summary/Final Report

"**The role of Green Blue and Grey Infrastructure (GBGI) in levelling up in Bristol"**

University of the West of England

As part of the application for this Urban Green Space and People call we asked that your proposal should aim to address one or more of the following key themes. Please explain below how your funded project met these themes (you may not have addressed all 3 themes so please detail just those themes that you were able to address) :-

- **Test new ideas for GBGI to demonstrate proof of concept and/or critically evaluate their potential for upscaling. For instance, scientific, social or cultural performance of: small scale prototypes: large scale replication of new GBGI approaches, designing and representing new GBGI ideas and evaluating their viability and desirability with users and stakeholders (Max 100 words)**

The idea of including grey infrastructure as a potentially restorative environment is a relatively new concept. We have demonstrated that the benefits of grey infrastructure in a city can be evaluated alongside green/blue infrastructure relatively quickly and economically using secondary data, where local survey data are available on the health and wellbeing of the population. We will be evaluating the usefulness of these findings with local partners. Future research should identify other areas with quality of life or wellbeing survey data, and replicate the analysis in other towns and cities.

- **Address knowledge gaps on the performance of existing interventions and assess the multi-functional benefits through a combination of scientific monitoring, modelling and qualitative and/or quantitative assessment of societal perspectives. These could include making use of established interventions constructed for a single purpose (e.g. flood risk, air quality improvements, accessible greenspace and where the co-benefits have not been assessed (Max 100 words)**

By using survey data with a wide range of societal outcomes and perspectives (e.g. self-reported health, social interaction, life satisfaction, satisfaction with neighbourhood, satisfaction with leisure facilities) we have taken a quantitative approach to assessing the multifunctional co-benefits of diverse and co-existing GBGI. Often studies focus on one GBGI feature at a time, which does not reflect the complexity of the built environment or people's behaviour, whereas we have used a combination of existing datasets to quantify exposures to GBGI and related these to the use of green space and health-related outcomes, employing GIS.

- **To better understand complexity, focusing on understanding how the service or benefit (including use by local communities) provided by GBGI varies with time of day, meteorology and season by assessing GBGI of different ages whether their function degrades or improves over time (Max 100 words)**

The repeated survey design allowed us to analyse trends in satisfaction with GBGI and health-related outcomes over a 10-year period. We do not have the data in this project to look at time of day or meteorology. When aggregated over the 10-year period, the size of the data set is sufficient for subgroup analyses by demographics (such as age group), although we are not yet at that stage of the analysis.

Did your project help address issues of community engagement and/or social inclusion?

The Bristol City Council Quality of Life (BCCC QoL) survey is representative of Bristol's population in terms of socio-demographic variables and geography (e.g. ward). Therefore, residents living in the most deprived areas at risk of social exclusion are included in the research. The data set we have constructed, by linking this survey data with data on GBGI, allows the impact of GBGI on individuals, communities and marginalised groups to be evaluated, although subgroup analyses have not yet been completed. The project was presented as part of the Festival of Nature in Bristol, a free event aimed at members of the general public.

Did your project advance equality, diversity and inclusion?

The BCC QoL survey includes a boosted sample for under-represented groups, ensuring ethnic and social diversity of respondents. Aggregating data across years, the sample size is sufficient to perform sub-group analyses across certain protected characteristics and social class, to explore the impact of GBGI on inequalities between these groups, although subgroup analyse have not yet been carried out.

The research team brings together researchers from different backgrounds and career stages, including an early career researcher.

Describe the impact of your project?

We have generated evidence about GBGI infrastructure which works to reduce rather than increase inequalities for more deprived communities. This can be used to identify priorities for funding within cities. Towards the end of the project we will present our findings to local stakeholders in Bristol City Council and seek their feedback on how the results can most usefully be presented to policy makers and decision makers in Local Authorities (e.g. maps, infographics) to inform local policy and practice. The national workshop with Local Authority stakeholders that we have received separate RECLAIM funding for will scale up the impact to national level.

What data/datasets have been produced?

The data set includes all Bristol residents who have responded to the BCC QoL survey between 2011/12 and 2021/22. Their demographic data (e.g. age, sex, ethnicity, residential area) and responses to relevant survey questions (e.g. wellbeing, self-reported health, life satisfaction, satisfaction with neighbourhood) have been matched on postcode to GBGI exposure (proximity) data based on routine data sources. No personal identifiers are held in the database.

Please list the outputs from your projects, as appropriate, under the following headings :-

**Presentation at conferences, workshops or other forums*

Conferences
RECLAIM Mini Conference, Festival of Nature, Bristol (June 2023)
European Urban Research Association Conference, Reykjavík, Iceland (June 2023)
Association of European Schools of Planning (AESOP) Annual Congress, Lodz, Poland (July 2023)
Royal Geographical Society Annual International Conference, London (August 2023)
RECLAIM Network Plus Conference, University of Surrey, Guildford (September 2023)

Seminars
Green space and health seminar series, UWE Bristol, February 2024

Blogs
https://reclaim-network.org/blog/bnhc-rp5r6

**Any other outputs*

Publications – Please list any here

Paper currently in draft

Further Funding - Please list here

RECLAIM Network Plus Workshop *'The role of GBGI and targeted interventions in levelling up in Bristol'* (Jan 2024, £2,500)

Key Findings

For four outcomes – general health, wellbeing, life satisfaction and neighbourhood satisfaction – we have developed models to assess the role of GBGI, controlling for income and educational level.

For self-reported general health (R^2=30%) GBGI variables were less important than socio-demographics in explaining the outcome. The exception was satisfaction with greenspace, which was an important predictor of general health. Conversely, for neighbourhood satisfaction (R^2=44%) sociodemographic variables were not significant in the model. GBGI variables were much more important in explaining neighbourhood satisfaction.

Our model for life satisfaction had lower explanatory power (R^2=13%), indicating that factors other than GBGI and socio-demographics predict life satisfaction (e.g. satisfaction with housing/neighbourhood/job/family/relationship). However, neighbourhood satisfaction was an important variable in predicting life satisfaction, which suggests that neighbourhood satisfaction mediates the relationship between GBGI and life satisfaction. There was also a counterintuitive finding that areas with smaller gardens were associated with higher life satisfaction, which can be explained by denser urban areas in Bristol being older terraced streets which compare favourably with less dense but more peripheral housing estates in terms of life satisfaction. However, in the model for general wellbeing (R^2=9%) we found the opposite effect, that less dense areas (with fewer road intersections) had higher wellbeing.

Narrative Impact

Has your project impacted the public, private or third/voluntary sectors? If so, please give detail

As the project is not due to finish until end May 2024, it is rather early to measure impact and benefits across different sectors, but the work has been presented to a wide range of academic and non-academic audiences, as described in the impact section below.

The project has been presented to a wide range of audiences including Local Authorities. Based on feedback at these events, the main impact has been to increase awareness of the value of health and wellbeing data from locally organised surveys in GBGI research.

Challenges overcome to achieve impact for your project?

An anticipated challenge is the lack of resources in local authorities to engage with the findings, both in terms of time and budgets. By planning to take our findings to stakeholders in Bristol City Council we will overcome these by not requiring time or money for travel on their part. The additional funding to hold a national workshop will be used to provide travel funds for stakeholders in local authorities around the country, going some way to overcoming the funding barriers to engagement and impact.

Has there been significant impact within academia from your project?

The project has been presented to a wide range of academic audiences, including public health, planning and geography, and interdisciplinary fields such as urban studies. Although papers have not yet been published, we will target interdisciplinary journals that reach a broad range of academics.

Recommendations for future research will include a greater focus on the quality (and safety) of GBGI and its use, as well as the provision of and residential proximity to GBGI. Our finding that subjective measures such as satisfaction with green space or neighbourhood are much stronger predictors of the outcomes than objective measures such as proximity to green space suggests that the objective measures are inadequate measures of exposure due to lack of data on the quality of the green space (or other GBGI).