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URBAN GREENUP

1.5

DEVELOPING KPI AND DATA COLLECTION PROGRAM FOR THE NBS IMPLEMENTATION AND MONITORING

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URBAN GREEN UP

MONITORING LIVERPOOL DEMO (KPIS)

THE MERSEY FOREST
more from trees

Liverpool City Council

UNIVERSITY OF LIVERPOOL

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Background of KPI choice

All cities used the EKLIPSE framework to select shared core KPIs and individual KPIS specific to each city.

Most KPIs were chosen that have worked in other projects and have a grounding in empirical research, but are also able to isolate the links between change and the Nature-Based Solutions (NBS).

Intervention sites and subsequent interventions were either strategic or reactive to circumstance. Majority identified prior to the project starting, but intervention choices and sites changed. The focus was often on the NBS retrofitting rather than on the detail required for the KPIs.

Introduction

Useful or Successful KPIs defined as those which succeed in assessing the impact of the Urban GreenUP interventions, e.g. impact of each intervention (type) can be individually assessed, data collection straightforward, timely, reliable.

Challenging KPIs: defined as those which demonstrate difficulties in collecting data on and assessing if there is any impact of the interventions, e.g. scale, problems in data collection, etc.

Grouping of KPIs according to data focus

Data drawn from three main sources:

- Socio-economic data
- Modelled data
- Quantitative data

But often assessment of each KPI is by a variety of methods including survey data from non-technical interventions.

Focus on two useful and one challenging KPI from each group

Socio-economic based KPIs

Postal surveys and interview data, but surveys impacted by Covid.

A successful intervention is due to location, size and interactivity. The outcome of which is a direct change in behaviour, view or valuation.

St Johns green wall: visible, but not interactive

Parr Street green wall: direct contrast to the street, but low traffic volumes and low numbers of residents

LiverpoolOne green wall: direct connection of park to street and high traffic volumes, but installed too late for surveys and low numbers of residents

Socio-economic KPIs: Successful

KPI: NEW BUSINESSES

KPI NUMBER: CH1005 **KPI NAME:** NEW BUSINESSES

DATA METHODOLOGY:
SOCIO-ECONOMIC: See also other KPIs and combined report on KPI CH1005 New Business, CH1002 Job Creation, CH0602 Benefits of NBS Interventions and CH0703 Social Learning

DESCRIPTION
Effect of NBS on increasing desirability of the area to attract new businesses, bringing economic benefits.

UNIT: (business)

KPI: BENEFITS FROM INTERVENTIONS

KPI NUMBER: CH0602 **KPI NAME:** BENEFITS FROM INTERVENTIONS

DATA METHODOLOGY:
MODELLING: GI-VAL

SOCIO-ECONOMIC: See other KPIs and combined report on KPI CH1005 New Business, CH1002 Job Creation, CH0602 Benefits of NBS Interventions and CH0703 Social Learning

DESCRIPTION
Effect of NBS in investigating the variety of socio-cultural benefits, in terms of typology, functionality and sustainable benefits

UNIT: area, numeric

SUCCESSFUL: Clear links between NBS interventions and positive change.

Socio-economic KPIs: Challenging

KPI: CRIME REDUCTION

KPI NUMBER: CH0801 **KPI NAME:** CRIME REDUCTION

DATA METHODOLOGY:
SOCIO-ECONOMIC

DESCRIPTION
The effect of all interventions (technical and non-technical) on crime rates

UNIT: (nº crimes) + type

KPI: LAND AND PROPERTY PRICE CHANGE

KPI NUMBER: CH1004 **KPI NAME:** LAND AND PROPERTY PRICE CHANGE

DATA METHODOLOGY:
SOCIO-ECONOMIC: See also CH0510-Increase in Property value. Land values unable to be accessed in the same way as property value/ sales.

DESCRIPTION
Effect of NBS on increasing property values, in terms of mean house prices and rental markets

UNIT: £ (median)

CHALLENGING: Scale of the interventions are not big enough and examination over an extended time period needed, i.e. 10 years, to see if there has been any actual change caused by NBS.

Conclusions: Socio-Economic

- Lack of awareness of UGU and specific interventions was in part due to a lack of engagement in the design, a lack of size, and changes over an incremental timeframe. There wasn't really a Big Bang that could set the change apart from what was there before. As such, the socio-economic additionality wasn't as high as maybe some in UGU had wanted/hoped for.

- Lack of direct links made between UGU interventions and change highlight a need for engagement, size, function and location to be taken into account at the start.

- Metrification/quantification of KPIs - more the socio-economic ones rather than biophysical - that are problematic. NBS take time to settle and become important, and unless you're making a wholesale change in a location that visibility/activity/added-value is hard to calculate.

Modelling data KPIs

Wide variety of models successfully used:

- EcoServR: tool for mapping natural capital assets and assessing ecosystem services
- GI-Val: The Mersey Forest's green infrastructure valuation toolkit
- Star: to assess the potential of green infrastructure in aiding adaptation to climate change
- Condatis: tool to assess habitat networks

All models needed adjustments for values to assess interventions such as green walls and pollinator planting, particularly if using spatial data.

Modelling KPIs: Successful

KPI: GREEN SPACE ACCESSIBILITY

KPI NUMBER: CH0403 **KPI NAME:** GREEN SPACE ACCESSIBILITY

DATA METHODOLOGY:
MODELLING: GI-VAL, EcoServR

SOCIO-ECONOMIC: Data in CH0904. Also refer to report 'Analysis of NBS in Liverpool' which assesses CH0403-Green Space Accessibility, CH0702 Citizen Participation, CH0703 Social Learning, CH0705 Engagement with NBS and CH0904 Health Quality Perception.

DESCRIPTION
Effect of increasing public engagement with NBS through the use of green travel routes and urban green spaces

UNIT: (m) (min)

SUCCESSFUL: GI-Val could update the number of people and households that were within 300m and 1200m of the interventions. The benefit output shows an increase in the number of households with a view of green space and the economic value associated with it.

Modelling KPIs: Successful

KPI: CARBON SEQUESTRATION

KPI NUMBER: CH0104 **KPI NAME:** CARBON SEQUESTRATION

DATA METHODOLOGY:
MODELLING: GI-VAL, EcoServR

DESCRIPTION
Effect of trees and other green infrastructure for carbon sequestration

UNIT: tC

SUCCESSFUL: EcoServR looked at the annual uptake; GI-Val difference between trees and grassland;

CHALLENGES: In GI-Val no value assigned for wildflowers so assumption was made that it would be classed as 'improved grassland'.

Modelling KPIs: Challenging

KPI: ENGAGEMENT WITH NBS

KPI NUMBER: CH0705 **KPI NAME:** ENGAGEMENT WITH NBS

DATA METHODOLOGY:
MODELLING: GI-VAL

NON-TECHNICAL: BIOAPP-Lancashire Wildlife Report, Nature4Health: See CH0703-Social Learning

SOCIO-ECONOMIC: Data in CH0904 and CH0702. Also refer to report 'Analysis of NBS in Liverpool' which assesses CH0403-Green Space Accessibility, CH0702 Citizen Participation, CH0703 Social Learning, CH0705 Engagement with NBS and CH0904 Health Quality Perception.

DESCRIPTION
Effect of NBS on connecting the community to the NBS through activities such as community gardening and conservation

UNIT: N/A

CHALLENGING: In GI-Val assumption made that everyone who goes through Liverpool is looking at the interventions. It would be difficult to get a true number on the people who look/interact with the interventions every year.

Conclusions: Modelling

- Many intervention type codes had to be estimated due to lack of scientific evidence.
- Models depending on spatial data could not accurately account for the surface area of vertical green interventions, such as green walls.
- Many calculations were too coarse in detail to distinguish the interventions.

Quantitative data KPIs

Monthly data monitoring using a variety of sensors and methodologies.

Quantitative KPIs: Successful

KPI: NUTRIENT ABATEMENT

KPI NUMBER: CH0207 **KPI NAME:** NUTRIENT ABATEMENT (Chemical Oxygen Demand, COD)

DATA METHODOLOGY:
QUANTITATIVE: DSS YSI Water Probe, Nutrient analyses, Metal analyses
Water quality assessments of Wapping Dock
Also refer to soilmania sensor data in CH0211

DESCRIPTION
Effect of interventions on abatement of soluble pollutants

UNIT: COD (mg/l), ppm

USEFUL: Straightforward to collect monthly samples with a wide variety of abiotic, nutrient and metal data collected. A wide range of nutrient and metal pollutants could be investigated throughout each site.

CHALLENGES: Strand tree SuDs had sediment ingress from nearby works leading to blocked gullies and a lack of water reservoirs in boreholes making water collection difficult. Lab analyses were also impacted by Covid restrictions.

Quantitative KPIs: Successful

KPI NUMBER: CH0410 **KPI NAME:** POLLINATOR SPECIES INCREASE

DATA METHODOLOGY:
MODELS: EcoServR

QUANTITATIVE: Observational Flower-Insect Timed counts

DESCRIPTION
Effect of NBS GI to create habitats and food for pollinators

UNIT: (nº) (%)

KPI: POLLINATOR SPECIES INCREASE

USEFUL: Straightforward, objective methodology (established by Centre of Ecology and Hydrology) to collect observations. Seasonal changes and interactions with each pollinator type and specific flower type choices could also be determined.

CHALLENGE: To stay within standardised climatic conditions for data collection;

Models (EcoServR) just looked at pollination habitats and proved too coarse a measure for the size of the interventions

Quantitative KPIs: Challenging

KPI: PM2.5 PARTICULES

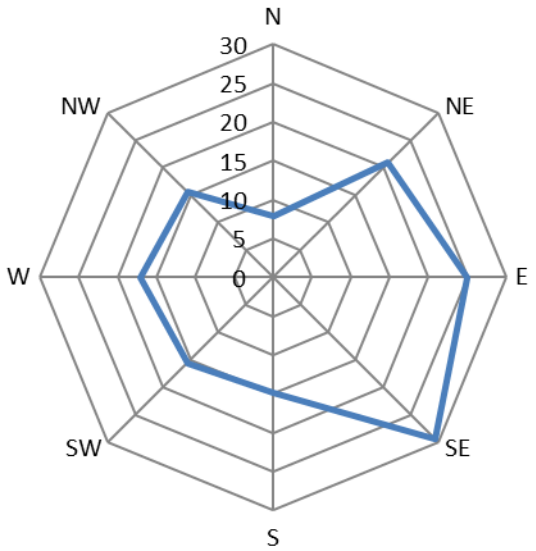
KPI NUMBER: CH0502 **KPI NAME:** ANNUAL MEAN LEVELS OF FINE PM2.5 PARTICULES

DATA METHODOLOGY:
QUANTITATIVE: Portable photometric sampler

MODELLING: GI-Val

DESCRIPTION
Effect of NBS on reducing the levels of particulate matter PM2.5 air pollution, to increase air quality and benefit the population's respiratory health

UNIT: µg/m3



USEFUL: Regular monthly sample collection close to interventions; Backed up by Aeternum 24/7 data;

BUT

CHALLENGING: Only 2 minute mobile sensor sample heavily influenced by climatic conditions; Aeternum sensors not always close to interventions; GI-Val output data were too coarse for the interventions.

Conclusions: Quantitative

- Data highly weather dependent, e.g. wind direction for Air pollution (particulate matter) or wind speed for pollinator species. Flexibility for data collection dates and access to interventions crucial.

- Good design of interventions crucial to enable monitoring to take place.

Perspective on KPI choice

All the KPIs in theory were useful and offer insights into how NBS can influence local socio-economic and ecological composition, function and value.

With hindsight, ideally we would have:

- Engaged with a more community-led/co-production process to embed UGU into the consciousness of all people in Liverpool.

- Opted for alternative NBS interventions that were (a) bigger, (b) located in different places and (c) more connected in space.

- Designed in the methodology for the assessment of the KPIs with each intervention to determine the potential change/benefits more effectively.