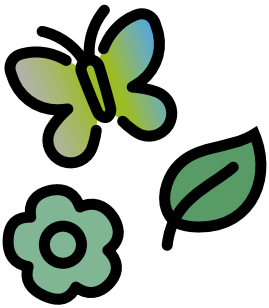

Urban Greening for Biodiversity Enhancement

Challenge

- Urbanisation threatens biodiversity through multiple interconnected mechanisms: habitat destruction and fragmentation, pollution (air, water, noise, and light), urban heat islands, altered water flows from impervious surfaces, introduction of invasive species, homogenisation of landscapes favouring adaptable species, disruption of ecosystem services like pollination, resource competition, and human-wildlife conflicts.
- The Living Planet Index (LPI) reveals a 73% decline in global wildlife populations since 1970, highlighting the severe and ongoing loss of biodiversity worldwide[1].
- Conserving biodiversity in urban settings is crucial for both ecological and human well-being, and cities can provide valuable habitat for many species. Ecologically, it maintains essential services like climate resilience, pollination and pest control. For humans, biodiverse urban environments improve physical and mental health, enhance quality of life, deliver economic benefits through reduced infrastructure costs, and create educational and public awareness opportunities. Urban conservation also preserves remnant habitats in biodiversity hotspots while fostering broader environmental awareness and stewardship.
- Urban greening restores and conserves biodiversity through developing urban nature recovery strategies that reduce the negative impacts of urbanisation.

How urban greening enhances biodiversity

Different urban greening types (see Figure 3) are recognised as a nature-based solution that enhances biodiversity through:

- **Habitat creation**
  Parks, gardens and lakes, amongst others, provide food and breeding habitat resources for birds, insects, small mammals, amphibians and different plant species.
- **Habitat connectivity**
  Green corridors (e.g. combinations of biodiverse parks, road verges, cycling and walking routes and engineered green infrastructure including rain gardens and green walls) allow species to move safely between habitats increasing diversity and reducing fragmentation and isolation.
- **Pollination**
  Green spaces offer safe habitats for bees and other pollinators to operate and boost ecosystems through pollination of different plant species and crops.

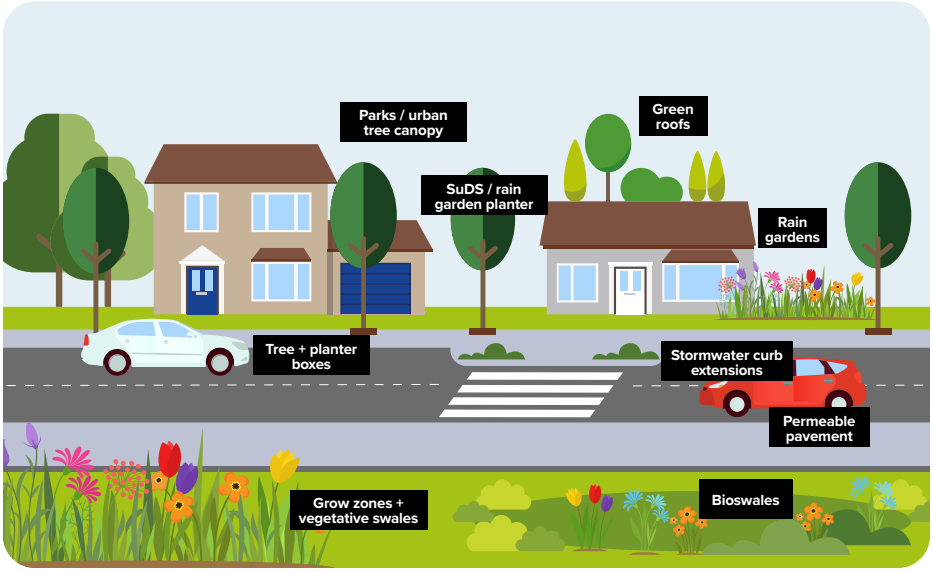

Figure 3: *Sustainable urban green solutions[2].*

- **Ecosystem protection**
  Reduced pollution and disturbance is achieved through low-traffic green zones that create buffers against noise, air and heat pollution, allowing ecosystems to develop.

  Healthy ecosystems help resist invasive species allowing for native species to flourish, while allowing beneficial microhabitats to develop supporting niche species[3].

- **Awareness**
  Community engagement in urban greening through citizen-science projects and initiatives improves awareness and a sense of belonging to communities and in turn improves protection of green spaces.

Recommended Actions

Opt for the most effective GI types, when possible.

- **Ground-level GIs** such as allotments, gardens and parks should be prioritised as they attract more insects than green roofs, which could limit insect accessibility, have typically smaller surface areas and shallow substrate depth which in turn places limitations on planting diversity.
- **Green walls**, despite being costly, are recommended when possible in urban spaces where horizontal area is limited[4].
- **Wildflower meadows** provide exceptional value for insects, even in small areas like roadside verges. Studies show they support higher arthropod biomass and species richness compared to traditional lawns, making them significantly more beneficial for urban biodiversity[5].
- **Spontaneous vegetation** plant species that naturally colonise urban spaces have been proven to better support local insect communities.
- **Beneficial GI** types can offer additional benefits for wildlife diversity through providing a more varied and complex habitat structure. For example, street-side rain gardens and drainage channels designed to manage stormwater and prevent flooding were found to support more insect species than ordinary lawns.

Consider factors that enhance biodiversity when designing and managing green spaces.

- **Diversity** of plant species combined with varied vegetation structure across different GI types, enhances overall biodiversity in urban environments[6].
- **Connectivity** of urban green islands facilitates species movement and colonisation, thereby enhancing insect abundance and richness by reducing isolation and minimising distances between green-blue spaces.
- **Heterogeneity** of habitats and resources GI, particularly gardens, demands deliberate planning to maximise the diverse microclimates that support robust insect communities through varied vegetation structure and rich plant species composition.
- **Invasive species**[7] must be avoided due their detrimental effects on other biodiversity, which requires careful selection of seeds and plants, alongside cautious design of water bodies—considering factors such as depth, size, and vegetation coverage—as these features may allow alien species to persist or spread.
- **Nature-friendly maintenance** practices – including avoiding excessive mowing and eliminating the use of pesticides and fertilisers – significantly protect diversity, as research shows reduced mowing frequency directly correlates with greater abundance and richness of arthropod communities.

Integrate urban greening in city-wide plans and strategies.

- **Land area** devoted to larger green-blue infrastructure islands within urban settlements demonstrates a positive correlation with insect abundance and richness, which is why the Green Infrastructure Framework's Urban Nature Recovery Standard recommends establishing specific targets for increasing wildlife rich habitats and urban greening across cities[8].
- **Local conditions** – including locally defined baselines, vegetation cover, site management, specific community needs, opportunities and constraints – must be thoroughly assessed when designing, planning and installing urban greenery to ensure optimal ecological outcomes and sustainability.
- **Strategies** encompassing urban greening targets, mandatory or recommended requirements for new developments, roadmaps and comprehensive implementation plans enable cities to allocate budgets effectively, make informed decisions and successfully install impactful urban greenery where it is most needed.
- **Nature recovery** strategies should include specific quantifiable targets, such as the recommended provision of one hectare of Local Nature Reserve (LNR) per 1,000 population[8], which serves the dual purpose of enhancing biodiversity conservation while creating spaces for public quiet enjoyment and connection with natural environments.
- **Nature conservation** should be established as a priority of urban planning, requiring both the enhancement of existing ecological sites and the strategic identification of new areas that meet the criteria for designation as Local Wildlife Sites, thereby creating a more comprehensive and resilient network of protected habitats.

Further Insight

Support local research efforts to address current knowledge gaps.

- Despite their importance for supporting biodiversity, blue infrastructures, including ponds, streams, wetlands and other small water bodies, remain understudied compared to their green counterparts, creating a substantial knowledge gap in urban ecological research. Moreover, climate change is expected to increase the risk of vector-borne diseases in the coming years, highlighting the need to fully assess the associated costs and benefits of mitigation and adaptation strategies.

Public engagement through citizen science programs have proven successful.

- Mobile phone applications such as eBird and iNaturalist have transformed citizen science by enabling community members to actively participate in biodiversity monitoring, allowing them to document and report species observations from their local neighbourhoods and broader environments, thereby contributing valuable data to ecological research.

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