Urban green spaces

Challenge: Too much water/Too little water **Adaptation response:** Urban storm water management /Water augmentation

Description

Green spaces are areas covered by vegetation (e.g. grass, bushes or trees), where water can permeate through the soil and vegetation, filtrating part of the sediment and pollutants before reaching the underlying groundwater. Green spaces and permeable surfaces are particularly relevant in urban settings, where they help to uptake and infiltrate water, decreasing runoff rates. The water also often contains excessive amounts of pollutants. This subsequently reduces pressure on water drainage systems and treatment facilities. The high retention capacity of vegetation makes it important for mitigating floods and managing urban storm water.

Managing rainwater infiltration rates has become increasingly important to meet the challenge of increased frequency and severity of cloudbursts resulting from the changing climate. Apart from storm water management's applicable value, green spaces also contribute to improved living environments by creating recreational areas for urban populations, contributing to air quality and creating habitats for urban biodiversity. Examples of urban green spaces include: forests, wetlands, parks, sports fields, agricultural land, gardens and green roofs. Public green spaces are protected, designed (if necessary), managed and maintained by local municipalities.

Implementation

The initial step for green spaces involves general planning, including site choice, size and type. Since green spaces influence a wide range of societal sectors and aspects, such as health, education, environment, heritage, transport, utilities, the private sector and community, stakeholders from these sectors should be involved in the planning process. The planning process should identify urgent societal needs, and how green spaces can address them. The next step is implementation. This may include changing existing legislation to legally protect environmentally important areas, or the design and planting of a new green space, for example a park, sports fields, or small urban forest. Planted vegetation should be local species and be able to tolerate the high stress factors of urban settings. Operational management includes landscape maintenance, removal of non-native species and assessment of socioeconomic and environmental effects.

Environmental Benefits

- Provides water quality benefits. Water is infiltrated and purified by chemical, biological and physical processes as it passes through the surface, soil and/or dense vegetation.
- Controls air pollution control and contributes to carbon sequestration.
- Decreases the likelihood of soil erosion, improves water retention and increases the groundwater recharge rate.
- Reduces habitat fragmentation and enhances biodiversity in urban areas.

Socioeconomic Benefits

- Absorbs less heat than solid industrial constructions, and vegetated areas promote evaporation,

reducing the urban heat island effect[1] in cities.
- Provides high water retention capacity, which is important for preventing flood events and minimizing peak discharges.
- Shades and cools (vegetation, particularly trees) surrounding houses in very hot climates, thus reducing energy costs. Increases property value.
- Reduces water reaching drainage and sewer systems, minimizing water transportation and treatment costs and energy.
- Provides aesthetic and recreational value to the local populations.
- Reduces noise levels in urban areas. Green spaces and other permeable surfaces reflect sound less than buildings, paved roads and other urban structures.

Opportunities and Barriers

Opportunities:

- Green spaces offer a wide range of environmental and socio-economic benefits from a single investment
- Low cost technology
- Climate change adaptation and mitigation benefits
- Relatively quick and simple implementation
- Can create income from increased property values

Barriers:

- Usually has limited capacities for reducing runoff, thus may not be the only solution for severe urban flooding problems
- Requires space - may be difficult to make space in densely populated cities
- Increases in population and urbanization add extra pressures on urban green spaces

Implementation considerations*

Technological maturity:	4-5
Initial investment:	1-3
Operational costs:	1-3
Implementation timeframe:	2-3

* This adaptation technology brief includes a general assessment of four dimensions relating to implementation of the technology. It represents an indicative assessment scale of 1-5 as follows:
Technological maturity: 1 - in early stages of research and development, to 5 – fully mature and widely used
Initial investment: 1 – very low cost, to 5 – very high cost investment needed to implement technology
Operational costs: 1 – very low/no cost, to 5 – very high costs of operation and maintenance
Implementation timeframe: 1 – very quick to implement and reach desired capacity, to 5 – significant time investments needed to establish and/or reach full capacity
This assessment is to be used as an indication only and is to be seen as relative to the other technologies included in this guide. More specific costs and timelines are to be identified as relevant for the specific technology and geography.

[1] Urban heat island effect is when cities are significantly warmer than their surroundings due to heat produced from human activity and technologies (cars, factories, appliances etc.), and the high concentration of buildings, which absorb heat much more than e.g. vegetation.

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