AIPH Green City conference

Urban Greening for Clean, Healthy Cities

Dr Audrey Gerber

Technical Advisor to AIPH

Beijing, China

11th September, 2019

audrey.gerber@aiph.org

www.aiph.org

AIPH

Terminology

Green infrastructure

Sustainable cities

Nature-based solutions

Urban forest

Urban forests can be defined as networks or systems comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas; they include, therefore, forests, street trees, trees in parks and gardens, and trees in derelict corners. Urban forests are the backbone of the green infrastructure, bridging rural and urban areas and ameliorating a city's environmental footprint.

FAO. 2016. Guidelines on urban and peri-urban forestry, by F. Salbitano, S. Borelli, M. Conigliaro and Y. Chen. FAO Forestry Paper No. 178. Rome, Food and Agriculture Organization of the United Nations.

AIPH

Urban forest initiatives

'The urban forest comprises all the trees in the urban realm – in public and private spaces, along linear routes and waterways and in amenity areas. It contributes to green infrastructure and the wider urban ecosystem.' Institute of Chartered Foresters, UK

Green Infrastructure

Grass

Linear forests

Street trees

Shrubs

The Urban Forest

Trees in parks and public greenspaces [1]

Soil

Trees in gardens and private greenspaces [2]

Water

Trees along waterways

Woodland

Non – agricultural crops

Agricultural crops

1. Examples of public greenspaces:
Civic and amenity spaces
Green corridors
Outdoor sports facilities
Parks and gardens
Urban orchards

2. Examples of private greenspaces:
Agricultural land
Derelict lands
Green roofs
Institutional grounds
Residential gardens
Water management spaces

AIPH

Urban forest initiatives

London:

More than 8 million trees

21% Canopy cover

£126.1 million value in pollution removal

Most common species: Birch, Lime, Apple, Sycamore, Oak, Hawthorn

£132.7 million value of total benefits

Replacement value of £6.12 billion

.

Beijing:

Green cover increased from 3.4% in 1949 to 26%.

55% are of four genera (*Populus, Sabina, Sophora* and *Robinia*)

16% are fruit trees

Ambition to initiate urban forests in all 16 precincts.

.

AIPH

Urban forest initiatives

City of Melbourne:

Increase canopy cover from 22% to 40% by 2040

Rebalance diversity of species and age

Developed a database of all 70,000 trees – interactive

http://melbourneurbanforestvisual.com.au/#mapexplore

i-Tree assessment

.

Vancouver:

40% tree cover over city area of 1,206km^2

2.1% evergreen cover

125,854 trees planted since 2010

Removes 1.740 t of air pollution per annum

.

AIPH

Forests are complex systems

The **Urban forest** is the **ecosystem containing**
all the **trees, plants** and **associated animals** in the **urban environment, both** in
and **around** the **city** – **Sands 2005**.

AIPH

Hedges
Green roofs
Green walls
Pockets and patches
Corridors

AIPH

Hedges

Hedges define boundaries, provide privacy, and contribute to noise screening.

AIPH

Hedges
Capacity to reduce air pollution

Urban hedges: A review of plant species and cultivars for ecosystem services delivery in north-west Europe. Blanusa et al, 2019

"Due to common management approaches, there is a degree of valid comparison between species"

Direct	Implied
Euonymus japonicus	*Berberis thunbergii*
Ilex aquifolium	*Buxus sempervirens*
Laurus nobilis	*Camellia sasanqua*
Ligustrum ovalifolium	*Carpinus betulus*
Photinia fraseri	*Eleagnus x ebbingei*
Taxus baccata	*Fagus sylvatica*
Viburnum tinus	*Phyllostachys aurea*
	Skimmia japonica
	Weigela florida

AIPH

Green Roofs

Limited space in built environments
Roof area is vast

Melbourne: Potential for 236 ha intensive green roofs, 328 ha for lightweight green roofs
Central London has 1.5 million square metres
Chicago has 5.5 million square feet
New York: new bill passed requiring green roof installations (and solar)

AIPH

Green Roofs

Green walls

Dedicated green walls

Interface of art and science

Musee Quai Branly, Paris

Patrick Blanc

Green walls/ Green facades

Creepers on walls: local scale effect

One study by King's College London that found levels of NO_2 reduced by 23 % when a green wall was placed between a busy road and a school playground.

Ivy growing along 12m railing and 2.4 m high

AIPH

Green walls

AIPH

Pockets and patches

Pots provide greenery in difficult zones

AIPH

Pockets and patches

Pots provide temporary measures.

AIPH

Pockets and patches

Pots provide greenery in heritage zones

AIPH

Pockets and patches

Pots provide greenery in unusual spaces

London: Retro-fitted lampposts with green columns incorporating a range of vegetation able to promote biodiversity, purify the air and provide an attractive focal point on the street.

AIPH

Corridors

Systems approach recognises urban ecology and interactions between plantings
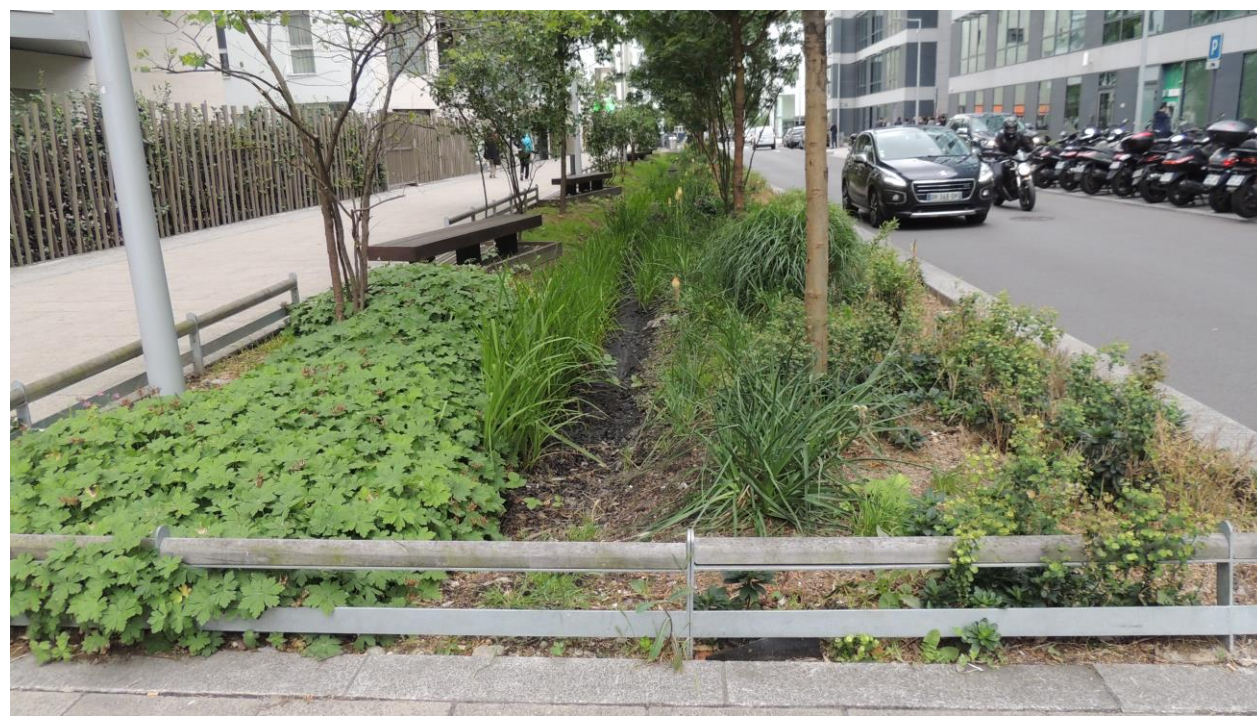

AIPH

Mechanisms of pollutant removal

Process of removing air pollutants:

– metabolic incorporation, or physical capture.

AIPH

Sustainable Urban Drainage Systems

Lysimachia nummularia, Sagittaria sagittifolia, Phragmites australis, Carex, Menyanthes trifoliata, Pontederia cordata, Sparganium emersum

AIPH

Indoor plants

Indoor air can be polluted up to 12x more than outside air.

Formaldehyde

Trichloroethylene

Benzene

Toluene

Octane

Alpha-pinene

Carbon monoxide

AIPH

Indoor plants

Plant species that have a proven capacity to improve air quality

Gerbera daisy – benzene, trichloroethylene, O_2

Spathyphylum – benzene, ammonia, formaldehyde, acetone, xylene, ethyl acetate, and trichloroethylene.

Chlorophytum – xylene, formaldehyde, CO

Epipremnum/Scindapsus – formaldehyde, toluene, benzene, CO, xylene.

Aglaonema

Dracaena marginata

Hemigraphis alternata (purple waffle plant)

Hedera helix (English ivy)

Hoya carnosa (variegated wax plant)

Asparagus densiflorus (Asparagus fern)

Tradescantia pallida (Purple heart plant)

AIPH

Indoor plants

AIPH Green City conference,
Padua, Italy, September, 2018

![AIPH logo]

AIPH Green City initiative

http://aiph.org/wp-content/uploads/2015/04/Green%20City%20-%20Guidelines.pdf

Policy

Define governance as any effort to coordinate human action towards goals.

Planning should be a visionary, creative and inclusive process,

Metrics to define and quantify inclusion of living green

Urban Greening Factor

Green View Index

FAR/GAR

AIPH

Policy
Challenge of terminology

Living green is suggestive: encourage, promote, where appropriate, to have regard to, should incorporate….

Built infrastructure is prescriptive: requires, demands, must demonstrate, must comply, will provide

AIPH

To conclude……..

- Evidence base exists to show how living green improves life in the city

- This information can drive greater inclusion of living green into policy for planning and development

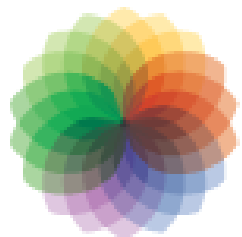- The horticultural industry must be part of the conversation

AIPH

AIPH – the world's champion for the power of plants

AIPH

audrey.gerber@aiph.org

www.aiph.org

Thank you

AIPH

audrey.gerber@aiph.org

www.aiph.org