



Biodiversity in Urban Landscapes

Method in the Madness

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Urbanisation

Global Trends and Prospects

- Year 2010, the urbanized proportion of the world's population overtook the rural population (rising from 49% in 2005 to 51% in 2010).
- Among industrialized nations, city dwellers already account for nearly three-quarters of the population. (UN, 2008).
- By 2030, five billion people (60 % of the global population) will live in cities and 4/5 of these will be in the developing world.
- **The most rapid growth will occur in cities with fewer than half a million residents, which collectively account for over half of the world's urban dwellers.**
- Cities of the developing world will absorb roughly 95 percent of the total population growth expected worldwide in the next two decades.
- Over 1.5 billion residents will be added to developing country cities by 2030, many of whom will be poor. Already, one of every three city dwellers lives in slum conditions (UN-Habitat, 2006)

Urbanisation

Asian Picture

Asia and the Pacific:

Second least urbanized region of the world (43%)

Second fastest urban population growth rate (2.0% p.a.- 2005-2010).

Urban proportion/ urban population growth rates vary dramatically.

12 of the world's 21 mega-cities (2010), are in Asia, including 7 of the largest 10 cities.

Most of Asia's urban population lives in secondary cities/ small towns.

China became "Urban" in 2011 when more than 50% of its population lived in cities

Urbanisation

Indian Scenario

- By 2030, 40.76 per cent of India's population will be living in urban areas compared to about 28.4 per cent now. (UN 2007)
- over 90 per cent of slum-dwellers live in developing countries with China and India accounting for 37 per cent of them.
- 43% of the country's wealth is generated by top 100 cities.
- India spends barely 0.1% of its GDP on urban development, minimum requirement is 0.25% of GDP per year (Deepak Parekh).

URBAN GREEN SPACES

Critical for Urban (??) Sustainability

As India urbanises, more and more people will interface with nature through Urban Green Spaces.

- Livelihoods and Poverty Alleviation- Commerce, Recreation
- Pollution and Flood Control-Wind Breaks, Noise Barriers, SPM Traps,
- Disaster Management and Control- Earthquakes, Floods
- Education and Awareness- Outdoor Classrooms
- Climate Change Mitigation – Thermal Relief, Heat Island Effect, Food Miles
- Water Supply-Shimla Example
- Human Health-Physical as well as Psychological
- *Property Valuations* – PLC for Park Facing Apartment, Central Park in NYC



Biodiversity

- Biodiversity is the variety of all forms of life, from genes to species, through to the broad scale of ecosystems.
- Fundamental part of the Earth's life support system regulating natural processes such as the growth cycles of plants, the mating seasons of animals, and even weather systems.

Biodiversity

Human Perspective

- **Food and drink: About 80 per cent of our food supply comes from just 20 kinds of plants.**
- **Medicines: A significant proportion of drugs are derived, directly or indirectly, from biological sources.**
- **Industrial materials: Fibers, Dyes, Resins, Gums, Adhesives, Rubber and Oils. There is enormous potential for further research into sustainably utilising materials from a wider diversity of organisms.**
- **Ecological services Regulating the chemistry of our atmosphere and water supply. Recycling nutrients and providing fertile soils.**
- **Leisure, cultural and aesthetic value s: Many people derive value from biodiversity through leisure activities such as enjoying a walk in the countryside, bird watching or natural history programs on television**
- **Art and Culture Biodiversity has inspired musicians, painters, sculptors, writers and other artists.**

Urban Biodiversity

What?

Urban biodiversity is the variety and richness of living things, including genetic, species and habitat diversity found in and on the edge of cities. At the landscape level it can include all 3 types of nature:

- Remnants of pristine natural landscapes (e.g. primeval forests, rock faces)
- Agricultural landscapes (e.g. arable land, grasslands, forest land, vineyards, paddy)
- Urban-industrial landscapes (e.g. residential areas, parks and gardens, brown fields)



Urban Biodiversity

Why?

- Cities are ecosystems with a high biodiversity
complex hotspots & melting pots for biodiversity
- Include relics of natural/semi-natural habitats
forests, rivers, meadows, arable fields
- Variety and distinctness of urban habitats-
residential areas, gardens, parks, industrial areas, railway areas, brownfields..
- Centers of import, naturalization and spread of exotic species
- Centers of evolution and adaptation
Ornamental plants- result from cultivation & selection of native and exotic plants
Spontaneous plants - new taxa are appearing in urban areas- adapted to the special ecological conditions in urban habitats (e. g. air pollution, soil contamination...)
- Simulating the effects of climate change on biodiversity
Cities are “heat islands” (annual temp. 2° C higher)

Urban Green Space Biodiversity

Functionally Efficient Green Spaces

- **Social Benefits:**
 - Recreational opportunities,
 - improvement of home/work environment,
 - impact on physical/mental health.
 - Cultural and historical values
- **Aesthetic and Architectural Benefits:**
 - Landscape variation through different colors, textures, forms and densities of plants.
 - Growth of trees, seasonal dynamics and experiencing nature.
 - Defining open space, framing and screening views, landscaping buildings
- **Climatic and Physical Benefits**
 - Cooling, Wind, humidity, and temperature control.
 - Air pollution reduction, sound control, glare and reflection reduction,
 - flood prevention and erosion control.
- **Ecological Benefits**
 - Biotopes for flora and fauna in Urban Environment
- **Economic Benefits**
 - Value of Market Priced Benefits (timber, berries...etc.
 - Increased Property Values
 - Tourism

Urban Green Space Biodiversity

Threats

- Overwhelming Urbanisation
- Selection of Species in Urban Planting
(standardized landscaping against nature)
- Inadequate Societal Connect
- Shortsighted Urban Planning
- Enforcement Issues in Municipal Governance
- Poor quantification and evaluation of values

Urban Green Space Biodiversity Opportunities

- Judicial Outreach.
- Institutional Campuses within Cities.
- Enhanced appreciation of closeness with nature.
- Convergence of interest between commercial and environmental considerations.
- Renewed emphasis on urban renewal (JNURM).

Enhancing Urban Biodiversity

Efforts Around the World?

- **Singapore : Green Mark, CUGE**
- **Hong Kong : Inventory, Rent a Kitchen Garden, Volunteering Opportunities for school/college students**
- **Malaysia : Live Assets Audit**
- **SriLanka : Agricultural Enclaves in Cities**
- **Thailand/China: National Awards**
- **India : Delhi : Tree Protection Act, CITY PLANTS A MILLION TREES CAMPAIGN**

Urban Biodiversity

In a “nutshell”

- Cities occupy just 2 per cent of the Earth’s surface, their inhabitants use 75 per cent of the planet’s natural resources.
- Cities draw on their surrounding ecosystems for goods and services, and their products and emissions can affect regional and even global ecosystems.
- Healthy ecosystems and biological diversity are vital for cities to function properly. Ecosystems provide three main kinds of services to the city: provisioning, regulating and enriching.
- While some of these services are easily measured, such as the provision of food and fresh water, others are harder to quantify, such as the contribution an ecosystem makes to quality of life in aesthetic or spiritual terms.
- Biodiversity – the diversity among living organisms – plays an essential role in ensuring the survival of life on earth. Clean water, foodstuffs, medicines and quality of life are just a few of the services which biodiversity offers to cities.
- Recognizing the importance of biodiversity and healthy ecosystems for their survival, cities today undertake many initiatives to utilize and conserve their surroundings efficiently.
- These actions can reach far beyond the boundaries of the city, affecting biodiversity on a global scale.

Urban Biodiversity

Motivations Behind Conservation

- **Preserve Important Local Biodiversity in an Urbanizing Environment**
- **Create Stepping Stones or Corridors for Natural Populations**
- **Understand and Facilitate Species' Responses to Environmental Change**
- **Connect People with Nature and Provide Environmental Education**
- **Provide Ecosystem Services**
- **Fulfill Ethical Responsibilities**
- **Improve Human Well-Being**