Planning, Socio-Economic and Environmental Challenges in the Process of Urbanization in HCMC

Environment and Urbanization: Emerging Challenges and Opportunities for HCMC

By

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A Cooperative Program of the:
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The "Face" of Asian Urbanization

- Characteristics of Asian Urbanization
  - Functions of several demographic factors—Natural increase
    - Rural-urban migration
    - International migration
    - City boundary expansion
  - Distribution of urban growth—Major informal growth in the outer fringe of the cities and vulnerable areas, along the rivers, mountain slopes, coastal areas
  - Labor force trend—Urban growth is directly proportional to the growth of labor force
  - Emergence of megacities—Megacity size has changed from 8 million (1980s) to 10 million (1990s)
    - Megacity boundaries are rapidly expanding
  - Importance of small and medium sized cities—Rapidly emerging numbers of small and medium sized cities with high economic and political importance.
  - Consumption of previously agricultural lands, forests and other ecosystems.

Urbanization and Environment
– A Linked System

Key Environmental Definitions

- Environment — Global
  - The surrounding circumstances, objects, or conditions of an entity (person, place).

- Ecology — Global
  - The science of the relationships between organisms and their environments.

- Ecological Footprint — Global — regional — Local
  - Human demand on the earth’s ecosystems — originally known as "carrying capacity".

- Ecosystem — Sub-regional to local
  - A complete community of living organisms and the nonliving materials of their surroundings.
Main Findings: Millennium Assessment

1. Humans have radically altered ecosystems in the last 50 years
2. Changes have brought gains but with growing costs that threaten development goals
3. Degradation of ecosystems is growing worse but can be reversed
4. Workable solutions will require significant changes in policy and a commitment to change.

Ecosystem Services: Ocean to the Mountains

- Food
- Climate Control
- Hazard Mitigation
- Biodiversity Recreation Forest products
- Food Soil Formation
- Water Recreation Forest Products
- Water Climate Control

Fundamental Services
- Provisioning
- Regulating
- Supporting
- Cultural
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Urban Ecosystems

- An urban ecosystem is a composite of (a) the natural environment, (b) the built environment and (c) the socio-economic environment.
- Urban ecosystems are not separate entities as they have direct and indirect impacts on immediate and wider environments.
- Urban ecosystem management requires social, environmental, economic and decision making tools and institutions that are flexible and can adapt quickly to changes in one or more systems.
- Urban ecosystems require the alignment of cities to where resources, process and products are used more effectively, creating less waste.

Urban Resilience (UR)

- New area of focus in urbanizing Asia
  - VESR: Vulnerability, exposure, sensitivity, resilience (R = VES)
  - Resilience to unanticipated change such as disaster shocks caused by natural hazards and climate change
- Resilience is the proactive approach to risk
- Resilience is important for high vulnerability urban areas (infrastructure) and peri-urban areas (urban fringe zones).
- Resilience is important for areas of interaction with eco-system like coastline, mountain areas and unique habitats.
Urban Ecological Footprint (UEF)

- Urban Ecological Footprint - The land area and resources that must be used to sustain a population
- Incorporates use of water, energy, land, agriculture and forests, and land area required for waste.
- UEF analysis shows that many cities require a productive land and sea area several times the city's size.
- The UEF of a typical North American (population of 650,000) city requires 30,000 square km of land, in comparison, a similar size city in India would require 2,800 square km.
- The UEF of Tokyo is 2.14 times the land area of the whole of Japan

Urban areas - “sponges” of the earth's resources
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**Global Ecosystem Inequality**

<table>
<thead>
<tr>
<th>Percentage of World's Population</th>
<th>Distribution</th>
<th>Use and Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>10%</td>
<td>Lack of access to</td>
</tr>
<tr>
<td>Population growth</td>
<td>0.1%</td>
<td>Adequate sanitation facilities</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>77 years</td>
<td>2.6 billion (39%)</td>
</tr>
<tr>
<td>Wealth and income</td>
<td>15%</td>
<td>Enough fuel for heating and cooking</td>
</tr>
<tr>
<td>Resource use</td>
<td>12%</td>
<td>Electricity</td>
</tr>
<tr>
<td>Pollution and waste</td>
<td>25%</td>
<td>2 billion (30%)</td>
</tr>
<tr>
<td></td>
<td>82%</td>
<td>Clean drinking water</td>
</tr>
<tr>
<td></td>
<td>1.5%</td>
<td>1.1 billion (16%)</td>
</tr>
<tr>
<td></td>
<td>88%</td>
<td>Adequate health care</td>
</tr>
<tr>
<td></td>
<td>75%</td>
<td>1 billion (15%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enough food for good health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.84 billion (13%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Developed countries</th>
<th>Developing countries</th>
</tr>
</thead>
</table>

**Ecological Urban Footprints**
Ecosystems, a “value added” Service to All

**Supporting**
- Soil formation
- Nutrient cycling
- Primary production

**Provisioning**
- Food
- Fresh water
- Fuel wood
- Genetic resources

**Regulating**
- Climate regulation
- Disease regulation
- Flood regulation
- Water purification

**Cultural**
- Spiritual/Aesthetic
- Recreational
- Educational

**Ecological Values**

<table>
<thead>
<tr>
<th>Use Values</th>
<th>Non-Use Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct values</td>
<td>Outputs that can be consumed or processed directly, such as timber, fodder, fuel, non-timber forest products, meat, medicines, wild foods, etc.</td>
</tr>
<tr>
<td>Indirect values</td>
<td>Ecological services, such as flood control, regulation of water flows and supplies, nutrient retention, climate regulation, etc.</td>
</tr>
<tr>
<td>Option values</td>
<td>Premium placed on maintaining resources and landscapes for future possible direct and indirect uses, some of which may not be known now.</td>
</tr>
<tr>
<td>Existence values</td>
<td>Intrinsic value of resources and landscapes, irrespective of its use such as cultural, aesthetic, bequest significance, etc.</td>
</tr>
</tbody>
</table>
Watershed Services: Supply and Demand

Provisioning:
Upstream land uses affect the Quantity, Quality, and Timing of water flows

Demand for services:
Possible downstream beneficiaries:
- Domestic water use
- Irrigated agriculture
- Aquaculture
- Hydroelectric power
- Fisheries
- Recreation
- Downstream ecosystems

Ecosystems: The Worlds Largest Undervalued Assets

The value of The Catskill Forest Watershed Forest to New York City

Water purification is one ecosystem service provided by this forest:

Benefit/cost:
- Watershed Restoration = US$1B
- Build a water purification plant: US$8-10B
- Savings: US$ 7-9B
Converting an Ecosystem – Losses and Gains of Mangrove Utilization

**Losses:** Nursery and adult fishery habitat; forest products (fuelwood/timber); sediment trapping; detoxification of pollutants; coastline protection from erosion & natural disasters (Tsunami, storm surge).

**Gains:** Land for agricultural, commercial and urban development; infrastructure; aquaculture.

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### Ecosystem Payments

**Public Payments**

- **Costa Rica:** $20-44/ha/yr for forest conservation (Payment based on an old subsidy devised from an assessment of the opportunity cost of land use change)

- **USA** (Conservation Reserve Program): $50/ha/yr (Opportunity cost of alternative use and cost of conservation measures).

- **Ecuador:** Municipal water and electrical utility companies « donate 1% of total revenues for watershed protection (originally 5% had been proposed by Government.).

- **Brazil** – Water utility in Sao Paulo pays 1% of total revenues ($2,500 per month) for the restoration and conservation of the Corumbatai watershed. Funds are used to establish tree nurseries and for reforestation along riverbanks. Payment is outcome of political negotiation.
Private Payments

- **France**: US$320/ha/year for 7 years, equivalent to 75% of farm income, based on the opportunity cost and actual cost of switching agricultural technologies.

- **Costa Rica**: a hydropower company pays US$10 per ha/year to a local conservation NGO for hydrological services in the Peñas Blancas watershed.

- **Australia**: Since 1999, farmers in the Murray Darling watershed pay $AUD 85/ha/yr for forest conservation for 10 years or $AUD 17 per million liters of water used. Assessment based on the increase in marginal benefits due to reduced soil salinity resulting of 100 ha of reforested area.

Reality of Ecosystem Valuation

- Economic valuation highlights costs and benefits, and cost-bearers and beneficiaries, that in the past have been ignored.

- But for policy makers it may not, and probably will not be, the most important factor. Ecosystem valuation only provides a set of tools with which to make better and more informed decisions and is not a stand alone exercise.

- Valuation is out of necessity partial. Case studies underestimate ecosystem values at larger scale because the larger scale the more difficult it is to replace the ecosystem goods and services and interactions are too complex to understand impacts of alternatives.

- Some ecosystems will never be measurable or quantifiable because we do not have the necessary scientific, technical or economic data.

- Regardless of the above, the reality is that the value of ecosystems must ultimately be taken into account in terms of “sustainable urban development”.
Reality of Ecosystem Valuations (Cont.)

- When ecosystem benefits that relate to attributes such as human life, cultural or religious significance, economic valuation raises serious ethical questions. Ecosystem valuation may be dangerous when it focuses only on financial or cash benefits at the expense of other types of values that cannot-or should not-be valued.

- Results of ecosystem valuation studies are not definitive, and transferable between groups and locations. They are generally based on the perception of a particular group at one point in time and is not universally valid.

- There is no guarantee that the findings of economic valuation will support the wise use and management of ecosystems and their services. In fact the use of valuation studies to identify and promote new ways of capturing ecosystem values through markets or PES, can be a double-edged sword.

Ecosystem Valuation - Key Steps

- 1st. step: ask yourself what is the purpose of the analysis, who should take its results into account
  - Clearly define the geographic extent, composition and function of the ecosystem being evaluated.

- 2nd. step: what is your budget, can it be adjusted, what capacity is available, which time frame?
  - It is possible to spend a lot of money and not get an "actionable" or "cost-effective" solution.

- 3rd. step: which process? Process may be as important as the result.
  - Consider stakeholders, including policy makers, participation into the study.

- 4th. Step: Time and sequence. The time frame of development and the associated costs of ecosystem preservation/utilization will be time dependent: Process must be structured to these considerations.
  - Evaluation and monitoring of the process should be ongoing and results integrated into planning.
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Current Emphasis | Sustainability Emphasis
---|---
Pollution cleanup | Pollution prevention
Waste disposal (bury or burn) | Waste prevention
Protecting species | Protecting habitat
Environmental degradation | Environmental restoration
Increasing resource use | Less resource waste
Population growth | Population stabilization
Depleting and degrading natural capital | Protecting natural capital

Urban Resilience

10 Key Points of Sustainable Urban Management

- Provide a long-term vision for cities based on: sustainability; intergenerational, social, economic and political equity; and their individuality
- Achieve long-term economic and social security
- Recognize the intrinsic value of biodiversity and natural ecosystems, and protect and restore them
- Enable communities to minimize their ecological footprint
- Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities
- Recognize and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems
- Empower people and foster participation
- Expand and enable cooperative networks to work towards a common sustainable future
- Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management
- Enable continual improvement, based on accountability, transparency and good governance

After Shaw, 2008
Urban Ecosystem Analysis and Planning

Key Issues to Consider

- Scale (Macro/global to Micro/family groups)
- Priorities (Global versus national versus local)
- Linkages (Water, Food, Energy, Health)
- Land (use and change)
- Time (Planning versus events)
- Economics (Ecosystem valuation)
- Development (Ecosystem carrying capacity)
- Infrastructure (Multi-functionality)
- Ecosystem preservation and incorporation

The reason why what we do with the World's Ecosystems is Important!