Urban Harvest approach
A resource based tool for urban design

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Problem definition

- Growing urbanization
  - increasing pressure on available resources
  - Waste production

- Lack of integration between urban planning & resources management
Research questions

How to Identify harvesting potential of urban resources towards sustainable cities?

Is urban resources management a key consideration for urban planning?
Concepts: urban metabolism

Linear Metabolism

Circular Metabolism
Urban Harvest approach

- Focuses on improving resources management within urban system
- No waste, only resources in different qualities
- Unified methodology to manage urban flows
- Bridge the gap between technology and planning
- Urban resources management as key consideration of urban planning
Urban Harvesting strategies

0. Baseline – Initial demand

1. Demand minimization

2. Output minimization

3. Multisourcing

→ Saving technologies

{ Cascading
Recycling
Recovering

→ Local and renewable sources
UHA at household level

Water balance:
Total inputs = Total outputs + storage
Urban Harvest applied to water cycles

Quality

I - Clean
II - Slightly polluted
III - Polluted
IV - Heavily polluted

2 types of losses:

- **Qs** = quality surplus supplied
- **Qr** = unused quality of the remaining flow
Evaluation of potential for reuse of the different flows for the NL

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<thead>
<tr>
<th></th>
<th>Rain water</th>
<th>Bathroom</th>
<th>Laundry</th>
<th>Kitchen</th>
<th>Mixed</th>
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</thead>
<tbody>
<tr>
<td><strong>Quality</strong></td>
<td>+++</td>
<td>++</td>
<td>+</td>
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<tr>
<td><strong>Quantity</strong></td>
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</tbody>
</table>

+++ very good, ++ good, + satisfactory, - bad,
Results – Metabolic profiles

0. Baseline – Initial demand

1. Demand minimization

2. Output minimization

3. Multisourcing

Demand | Self production | Output
--- | --- | ---

CLASS [A-C]

SSI = SP/D

OI = O/D

50% reduction in demand - 100% of the remaining demand can be supplied by recycling and multisource – Output can be reduced 75%
Conclusions

• Single measurement implementation is not enough. Strategies should be combined to achieve less impacting urban areas
  • minimization demand,
  • minimization output
  • multi-sourcing urban

• Urban areas are reservoirs of resources, therefore urban resources management is a key element of future city design

• Urban planners and managers must be aware of potential linkages of flows, to facilitate exchange among different urban functions
Metabolic profiles (%)

- A+: 33%
- B+: 66%
- C+: 100%
- A-: -33%
- B-: -66%
- C-: -100%

Production

Total Input

Self-sufficient

1 Minimization
2 Cascade & recycling
3 Multisourcing

Customize solutions for the built environment
Questions?

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