Urban Agriculture & Food Security

Auroville Green Practices 2013
Eco-Productive Cities
Urban Agriculture

Urban Agriculture is the practice of growing vegetables, fruits and other crops within city limits.
Food Security

“when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”

Source: World Food Summit 1996
Issues

POPULATION GROWTH  URBANIZATION
LOSS OF AGRICULTURAL LAND  WATER SHORTAGE
UNEQUAL DISTRIBUTION  RISING FOOD PRICES  FOOD WASTAGE
LOSS OF TOP SOIL
INFLATION  HEALTH AND DIETARY CHANGES
HUMAN HAPPINESS
Some Facts

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Global 2011</th>
<th>Global 2050</th>
<th>India 2013</th>
<th>India 2050*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>7 billion</td>
<td>9 billion</td>
<td>1.27 billion</td>
<td>1.8 billion</td>
</tr>
<tr>
<td>Urban Population</td>
<td>3.3 billion (50%)</td>
<td>6.3 billion (68%)</td>
<td>400 million (30%)</td>
<td>900 million (50%)</td>
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<tr>
<td>Slum Population</td>
<td>1 billion</td>
<td></td>
<td>94 million</td>
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</table>

(United Nations 2011)

* 15 million added per year
Cities as Eco-Predators

• From 1900 to 2000 resource consumption and urban populations went up sixteen fold.
• Cities, on 3-4% of the world’s land surface, use 80% of its resources, and discharge most wastes.
What cities produce?

Human habitats essentially are centers of waste generation
More facts

To feed 9 billion an increase of 70% in global food production is required.*

*If not radical change in the distribution and wastage in the food system occurs

* How to feed the existing population as well as the projected increase of 2 billion people in the coming decades?
Arable Land

Arable land in hectares/person

1980: 0.27 ha/person
2050: 0.09 ha/person

Source: World Bank 2010
Soil Erosion

Globally crop land is shrinking by 10 million hectares a year due to soil erosion.

<table>
<thead>
<tr>
<th>Region</th>
<th>tons/ha/yr.</th>
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<tbody>
<tr>
<td>Africa, Europe, Australia</td>
<td>5 - 10</td>
</tr>
<tr>
<td>North, Central, South America</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Asia</td>
<td>30</td>
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</table>

It takes (on average) about 100 years to generate a millimeter of soil.
Water

Per capita availability of renewable water in m/3 per person/year

Source: Aquastat Database Query 2011
Food Wastage

% of wasted fresh fruits and vegetables - from field to fork

India
- 50% of the food is lost during transportation
- 21 million tones of wheat annually due to inadequate storage and distribution.

Source: FAO 2011

Source: FAO 2012
Health

1 billion people do not have the required calorie intake (many of them are farmers) (OECD-FAO 2010)

Dietary shift: higher intake of meat, dairy and vegetable oil (high level of energy, cereal & water input)

1 kg of meat contains 3 kg of grains

If the cereal that was used to feed animals was instead used to feed the human population, the annual calorie need of more than 3.5 billion people could be provided for
Happiness

Source: Layard, R. (2005)
An Opportunity?
Green Bronx Machine – NY school

Education, business in setting up organic gardens, social integration
Kitchen gardens in schools, curriculum, preparing meals, food choices, diet related illnesses,
From Roof to table – Bell Book & Candle restaurant, Greenwich Village, NY

More than 70 varieties of herbs, vegetables, and fruit are grown in vertically planted towers. 60% of the restaurant’s food is from their roof top garden.
San Francisco legislation to facilitate UA

Allowed the selling of food, locate the sites, provide seeds tools and advice.
Food security, poverty alleviation, promoting community spirit, maintaining cleanliness in public spaces, preserving local food habits, education, therapeutic activities.

Governmental support: supplying land, instruction, tools and seeds, to financial support
Russia's Private Garden Plot Act, 

Entitles every Russian citizen to a private plot of land, free of charge, (2.2 acres to 6.8 acres). 35 million small family plots operated by 105 million people 50 percent of the milk supply, 60 percent of its meat supply, 87 percent of its berry and fruit supply, 77 percent of its vegetable supply, and 92 percent of its potato supply
Crop production takes up 34,000 hectares or 23 per cent of the city area and 90 % of the vegetables sold are grown within city limits.
Shenzhen, China

Perishable vegetables are cultivated in the city, grains and hardy produce in the periphery. 60% of vegetables, meat and seafood comes from urban farms.
Rooftop Farm Germany

‘Fresh from the Roof project; 7,000-square-meter roof garden with a fish farm, to provide Berliners with sustainable, locally-grown food.
Container Farm, Switzerland

ECF Container farm – aquaponic system
Gotham Green House, Brooklyn, NY

80 tons of produce per year on 2,800 m² - hydroponic system, solar system,
Rooftop Farm Japan

Sweet potatoes grow in roof-top environment
Rice Farm, Tokyo
Roofop Garden, Bangalore
# Urban Agriculture Benefits

<table>
<thead>
<tr>
<th>Environment</th>
<th>Individual</th>
<th>Community</th>
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<tbody>
<tr>
<td>• Reduce in transport and storage</td>
<td>• Freshly harvested crops are healthier</td>
<td>• Brings people together (community building)</td>
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<tr>
<td>• Greening Cities counters urban heat island effect</td>
<td>• Planting fruits and vegetables encourage a healthier diet</td>
<td>• Produce can be shared of given as a gift</td>
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<td>• Reduces building cooling costs</td>
<td>• Growing is cheaper and saves petrol</td>
<td>• Activity for otherwise unemployed people</td>
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<tr>
<td>• Improve urban air quality</td>
<td>• More variety (mainstream vegetables)</td>
<td>• The whole family or even neighborhood can get together</td>
</tr>
<tr>
<td>• Rooftop gardens reduce glare, noise and wind</td>
<td>• Stress buster, exercise</td>
<td>• Revitalizes neighborhoods</td>
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<tr>
<td>• Urban gardens provide wildlife habitat</td>
<td>• Provides you with food which origin you know</td>
<td></td>
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<tr>
<td>• Increase of biodiversity</td>
<td>• Access to or even view of green roofs can increase property value</td>
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<tr>
<td>• Retains storm water</td>
<td></td>
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<td>• Reduces landfill waste if composted at source (less methane emission)</td>
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What’s possibly missing?

Policy level
• UA incorporated into cities land use plan (legal framework)
• Building codes need to be adapted (rooftop farming)
• Public institutions to be encouraged to buy locally produces food
• A cooperative relationship with the municipal waste collection system for collecting and composting organic waste
What’s possibly missing?

Cultural level

- Make growing food a dignified profession
- Redefine what beauty means (landscaping)
- Value healthy and locally grown food
What’s possibly missing?

Technology level
• Make input materials for UA easily available (knowledge, containers, tools, seeds, soil etc.)
• Institutions for research and knowledge dissemination
What needs to shift?

Linear Economy

Take > Make > Dispose
Technical & Biological Nutrients all mixed up

Waste

Living Systems

Technical Nutrients

Biological Nutrients
What can I do?

- Can I produce myself? → Eg. vegetables, fruits
- How much do I need? → Shopping practices, avoid wastage
- Where does it come from? → Buying locally produced instead of imported food (food miles)
- How was it produced? → Organic over conventional
- What is the last option? → Conventional food as last option
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Contact:
Martin Scherfler
Auroville Consulting
Email: martin@aurolvilleconsulting.com