

NATURE INCLUSIVE DESIGN FROM A BUSINESS PERSPECTIVE



Makers of Sustainable Spaces (MOSS)

07 October 2019

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- Value Domains
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MOSS

for cities, for life,
for our future
we design and create
green oases
in and on top
of buildings.

Indoor Green

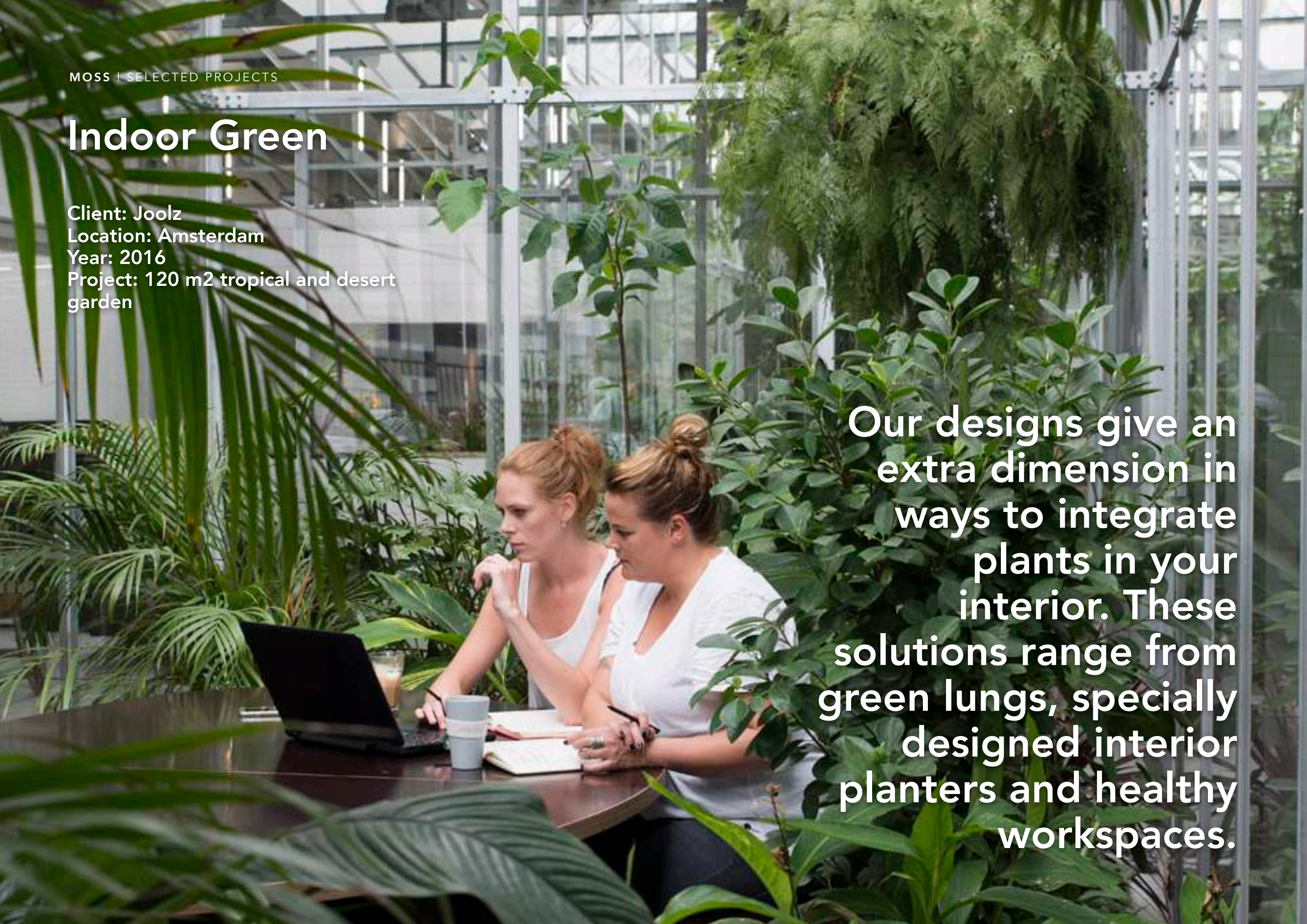
Client: Joolz

Location: Amsterdam

Year: 2016

Project: 120 m2 tropical and desert garden

Our designs give an extra dimension in ways to integrate plants in your interior. These solutions range from green lungs, specially designed interior planters and healthy workspaces.



Outdoor Green

Client: ZOKU

Location: Amsterdam

Architect: Concrete

Year: 2016

Project: Hrbs. garden, subtropical greenhouse and the 'Vegetable'

We create solutions on the facades or on top of buildings. Exteriors offer plenty of space for innovative solutions to make the city greener, healthier, more liveable, and even commercially interesting.



MOSS | SELECTED PROJECTS

Edible Green

Client: Albron

Location: Utrecht

Year: 2018

Project: The Green House

Locally produced food is the future. We integrate edible greens in the most convenient way for the user. We create solutions and innovations to make the produced food easier to maintain, grow and harvest.

How to Make a Green Development?

Guidelines

Costs Lighting

Diversity Hardscaping

Maintenance Installation

Functions Healthy Buildings

Innovation Creativity

Durability Low-tech

**1. Plants
are Heroes!**

**2. No plant
stands alone**

**5. Honor
Biodiversity**

Manifest

The mantra's of our design

**3. Do not add,
but integrate green!**

**4. WTF
(where's the food?)**

Manifest

1. Plants are heroes

An extraordinary range of plants can be grown in cities. From bizarre cacti, broad tropical leaves, sweet little succulents, iridescent plants, and tasty crops, the list is tremendous. We strive to honor and advocate plants in our designs. Our rule #1 is, "the plant comes first".

2. No plant stand alone

Plants communicate with each other. Through the soil and air, plants produce chemical signals and adjust their internal chemistry according to the message. By grouping plants together in small ecosystems, plants can harness their own protection network to reduce the spreading of any threats and establish harmony. In nature, you never find independent plants. When we mirror the natural environment's way of companion planting, we can create happier plants!

3. Do not add, but integrate green

Our landscapes affect human habitation and respond to everything involved with the building of urban spaces, including materials, finishes, electrical requirements, plumbing, lighting, ventilation, ergonomics, and intelligent use of space. When we integrate our plants into the built environment, we can balance art and science in our designs.

4. WTF (where's the food?)

Even if one quarter of all ornamental plants were replaced with edible varieties, imagine all of the healthy, hearty, and nutritious calories we could grow for our community. Local food production reduces transportation, packaging, and refrigeration, and not to mention, produces the freshest food in town! We are serious about creatively integrating food production with urban environment.

5. Honor biodiversity

The world is losing its biological diversity, or biodiversity, at an alarming rate. Moving away from the "concrete jungle", native plants are celebrities in supporting local biodiversity and the services it provides. To maximize the ecological function of urban spaces, we persist on designing green spaces which support heterogeneity.

Why Green?

- Connecting urbanites with nature satisfies **biophilic** affinity!
- Green infrastructure has a positive influence on the **micro climate** :
 - Cooling down the roof surface
 - Retaining stormwater
 - Creating habitats for biodiversity
 - Minimal impact on Urban Heat Island
- Taking a break in a green space has a positive impact on **productivity** and concentration
- Has a great influence on **relationships** between people

How?

1. Most people feel **happier** in a green environment.
2. **Improved** performance by 20 to 40%.
3. Clean air and better humidity reduces **allergy** and **absenteeism**.
4. Plants actively break down **toxins** and produce **oxygen** from CO₂.

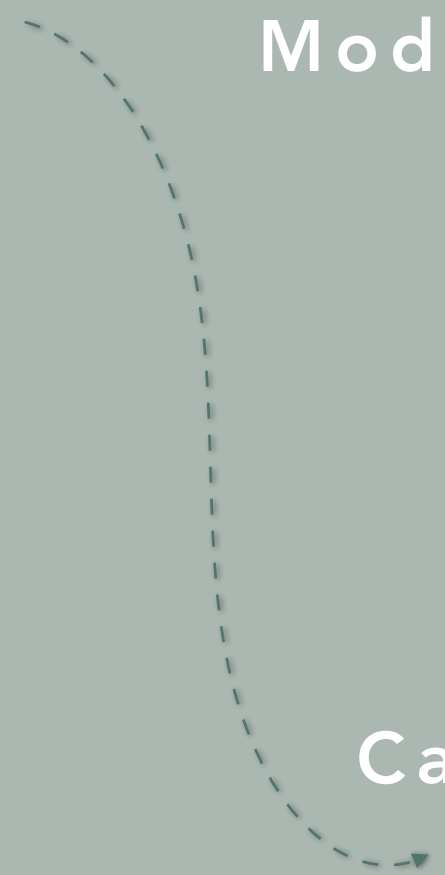
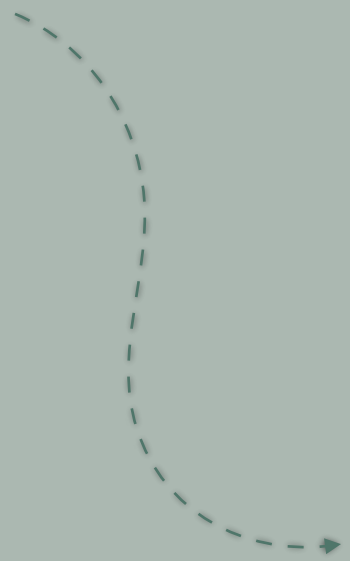
ROOFTOP TYPES

Value Domains

Possible
Locations

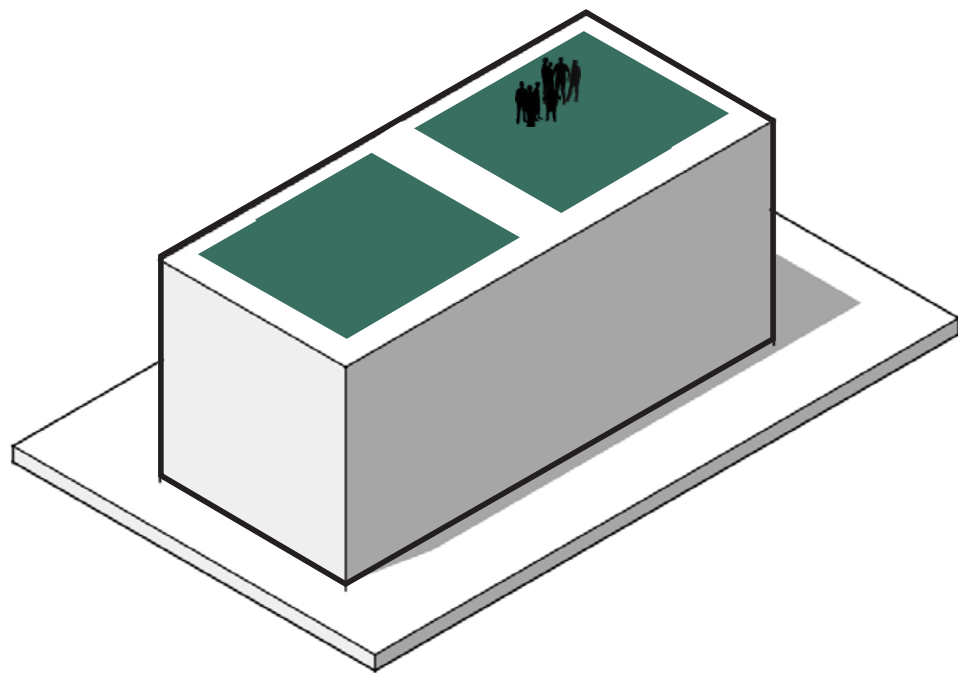
Revenue
Models

Case Studies

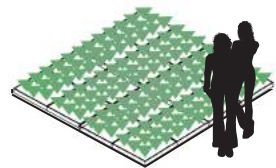


Hotel & Horeca Rooftops

Incorporating an accessible roof garden into hospitality design can add value, not just to the user's experience, but also to the property.



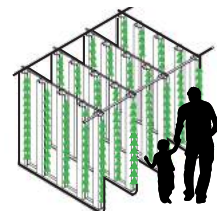
System Types & Techniques



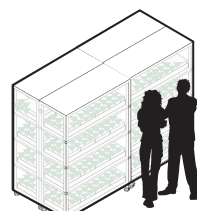
Extensive Green Roof



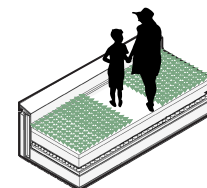
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ Exhibition
- ▶ Community Center
- ▶ University Cafeteria
- ▶ Supermarket
- ▶ Parking garage
- ▶ Restaurant; Bar

Suitable Revenue Models

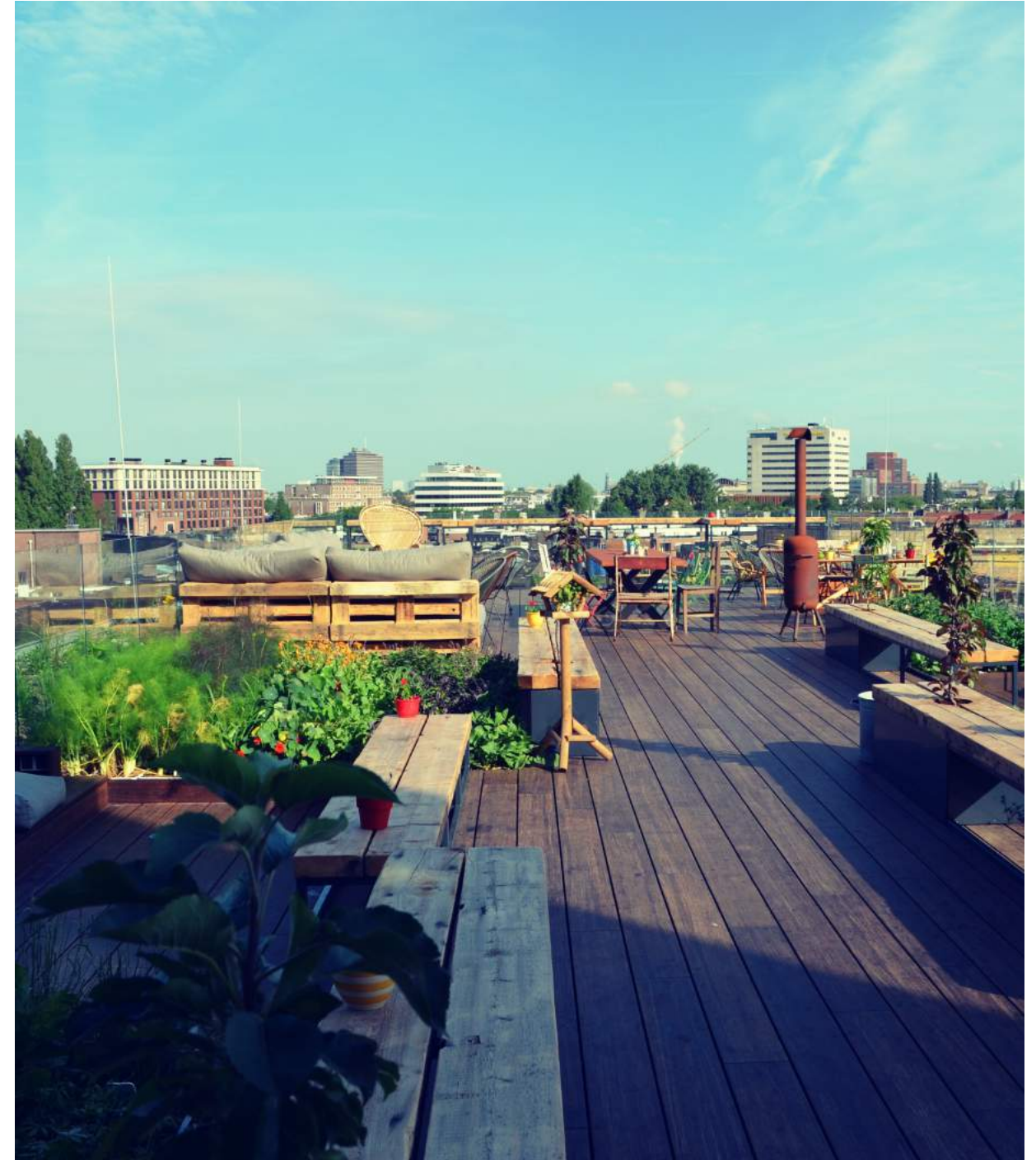
- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)
- ▶ Food & Drink Service (Horeca)

Case Studies

- ▶ Hopp, Amsterdam
- ▶ ZOKU, Amsterdam
- ▶ Soho House, Amsterdam
- ▶ QO Hotel, Amsterdam
- ▶ Restaurant Vermeer, Amsterdam
- ▶ Waterhouse hotel, Shanghai

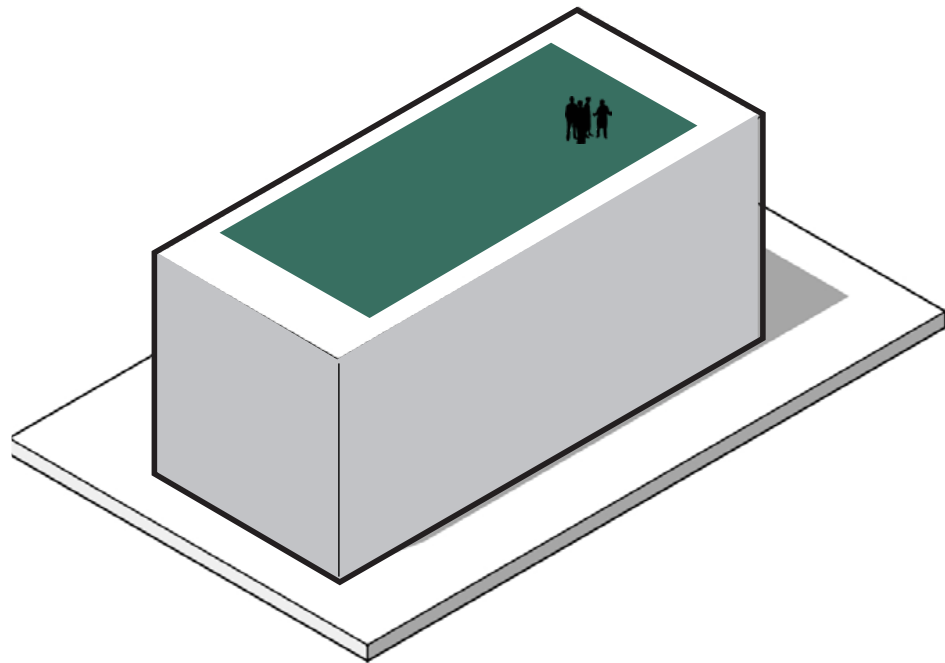
Case Study : HOPP @ Hotel Casa, Amsterdam

Year - 2016; Design - MOSS; Key Point - only 2 seasons until ROI

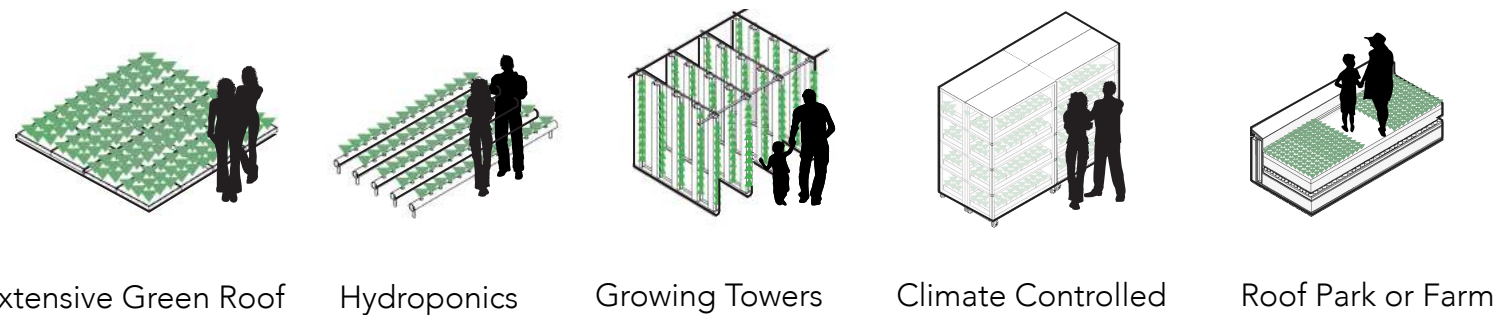


Shopping Center Rooftops

Leisure gardens in and around shopping and commercial centers can be integrated to building functions like restaurants, markets, and kid's activities.



System Types & Techniques



Extensive Green Roof

Hydroponics

Growing Towers

Climate Controlled

Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Horticultural Therapy
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ Commercial centers
- ▶ Movie theaters
- ▶ Supermarkets
- ▶ Parking garage

Suitable Revenue Models

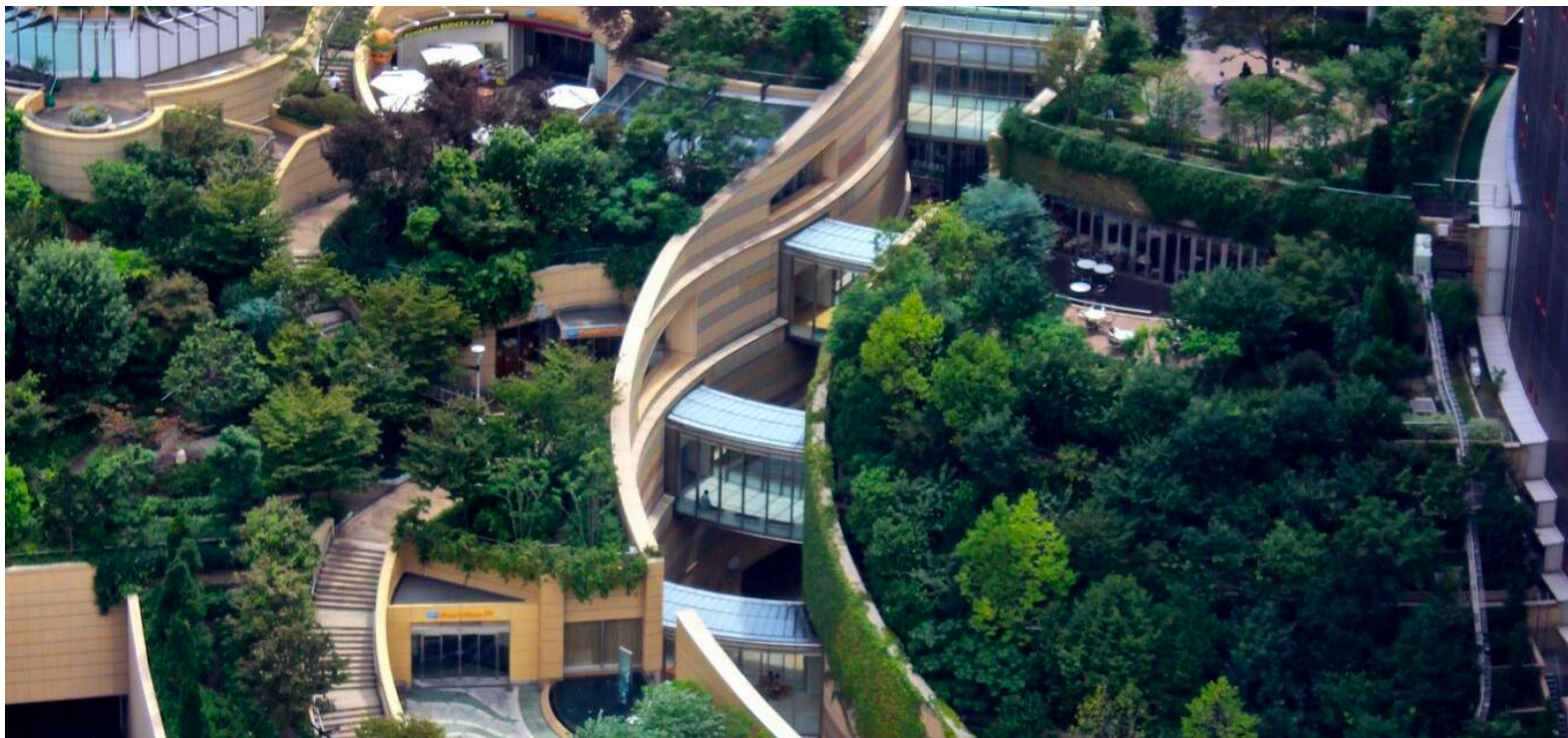
- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)
- ▶ Food and drink service (Horeca)

Case Studies

- ▶ Namba Parks, Osaka
- ▶ Beaugrenelle, Paris
- ▶ Emporia Malmö Shopping Centre
- ▶ Le Jardins de Beaugrenelle, Paris
- ▶ Jin Qiao Mall, Shanghai
- ▶ Nový Smíchov Shopping Centre, Prague

Case Study : Namba Parks, Osaka

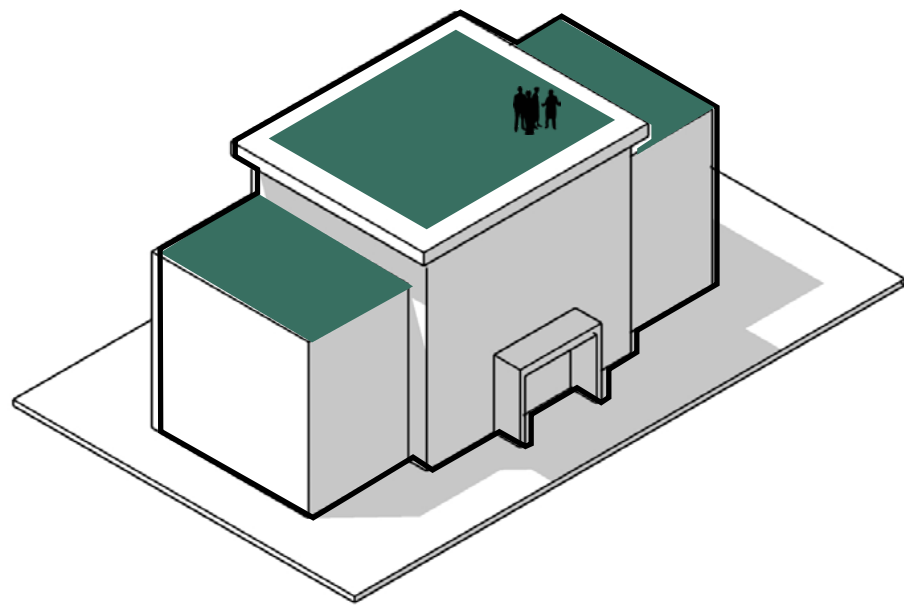
Year - 2003; Design - Jerde Partnership; Key Point - Urban park through all levels of the mall



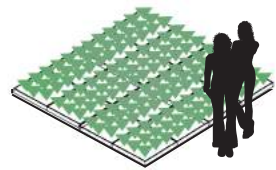
Photos: Jerde Partnership

School Rooftops

School gardening engages the senses, encourages healthy eating, aids the development of fine motor skills, and teaches responsibility.



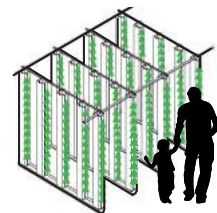
System Types & Techniques



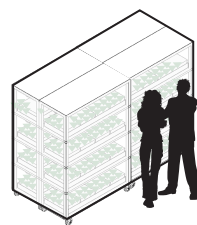
Extensive Green Roof



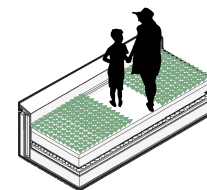
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Research & Experimentation
- ▶ Children's Education
- ▶ Horticultural Therapy
- ▶ Leisure

Suitable Locations

- ▶ Community Center
- ▶ University
- ▶ Parking garage

Suitable Revenue Models

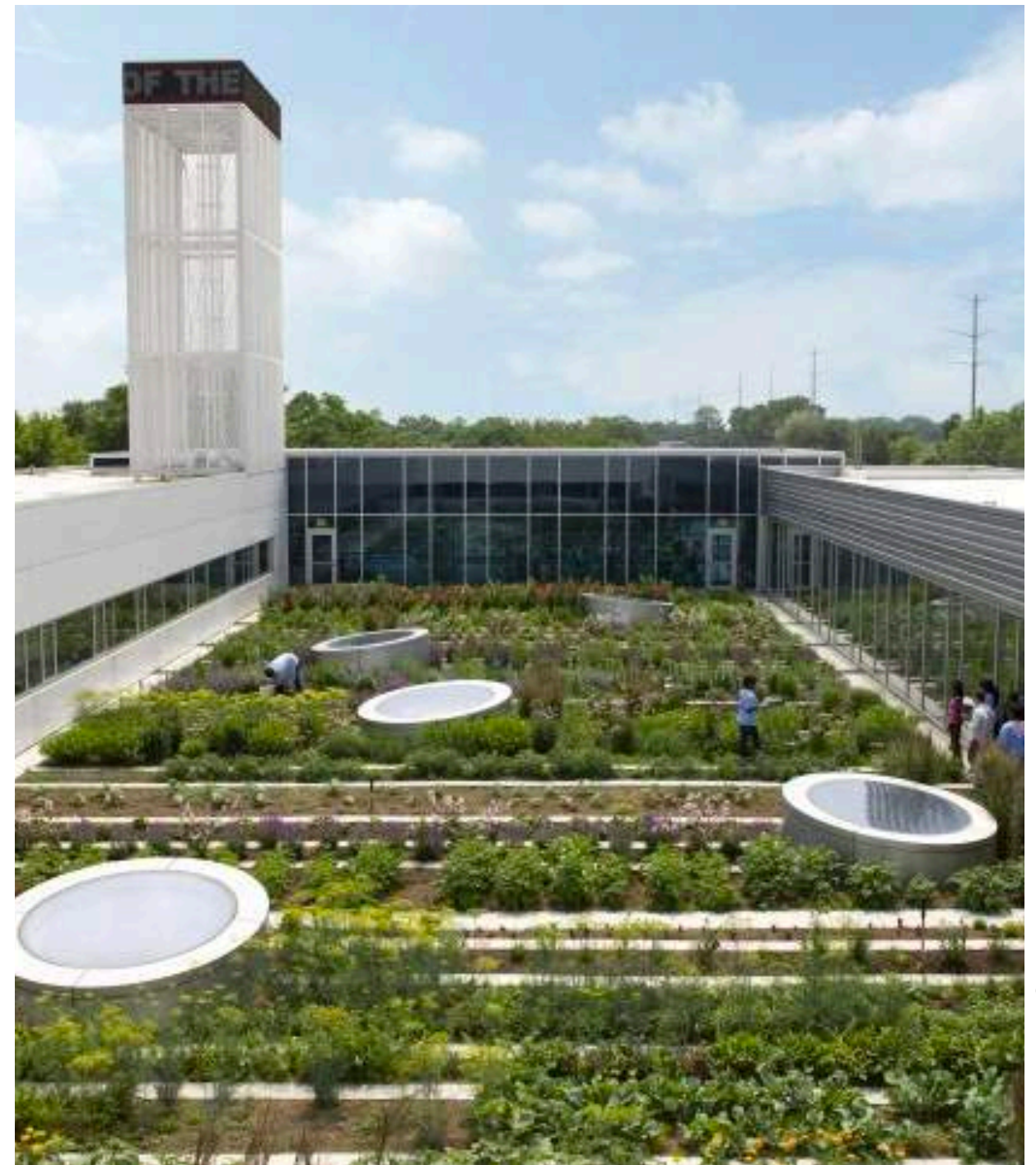
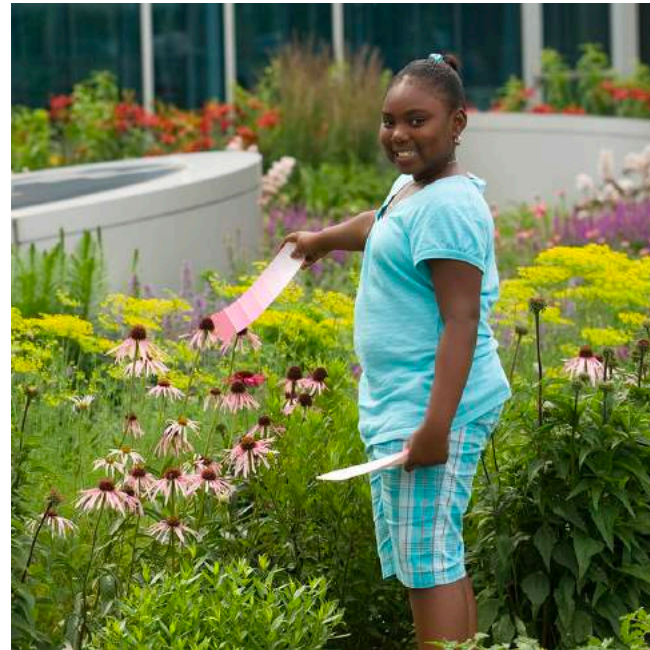
- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)

Case Studies

- ▶ Dyrk, Copenhagen
- ▶ Tomatenfish, Berlin
- ▶ Gary Comer Youth Center, Chicago
- ▶ AgroparisTech, Paris
- ▶ Spectra Secondary School, Singapore
- ▶ Ascension School, New York
- ▶ Nanyang Technological University, Singapore
- ▶ Hong Kong University, Hong Kong

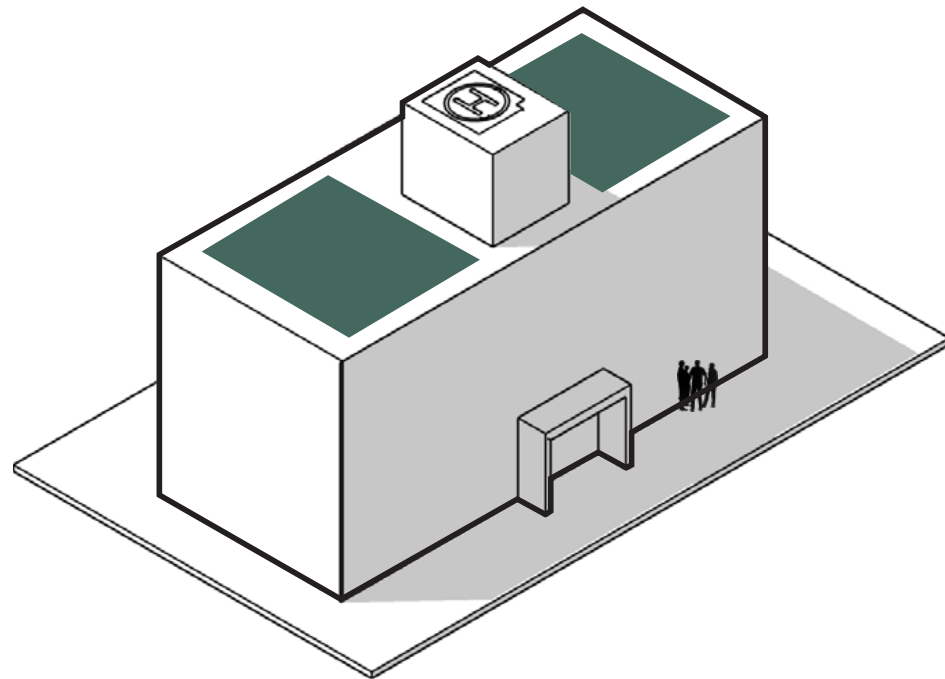
Case Study : Gary Comer Youth Center, Chicago

Year - 2006; Design - John Ronan Architects; Key Point - Promoting Youth Success

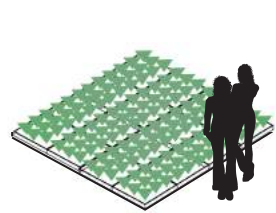


Hospital Center Rooftops

Access to nature has positive influences on health .During physical rehabilitation while horticultural therapy can help strengthen muscles and improve coordination, balance and endurance.



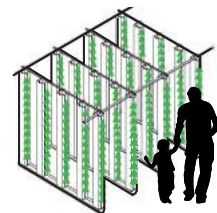
System Types & Techniques



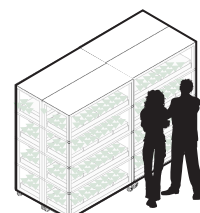
Extensive Green Roof



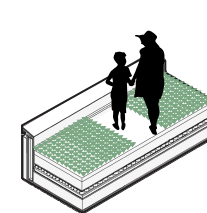
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Research & Experimentation
- ▶ Horticultural Therapy
- ▶ Children’s education
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ Hospital
- ▶ Rehabilitation Centers
- ▶ Elderly homes

Suitable Revenue Models

- ▶ Restaurant Supported Agriculture (RSA)

Case Studies

- ▶ Khoo Teck Puat Hospital (KTPH), Singapore
- ▶ Boston Medical Center (BMC), Boston
- ▶ St. Louis Children’s Hospital, Missouri
- ▶ Rush University Medical Center, Chicago
- ▶ Children’s National Health System, D.C.
- ▶ Danbury Hospital, Connecticut
- ▶ Wiegmannklinik, Berlin
- ▶ Farm at One Farrer, Singapore

Case Study : Robert Doisneau, Paris

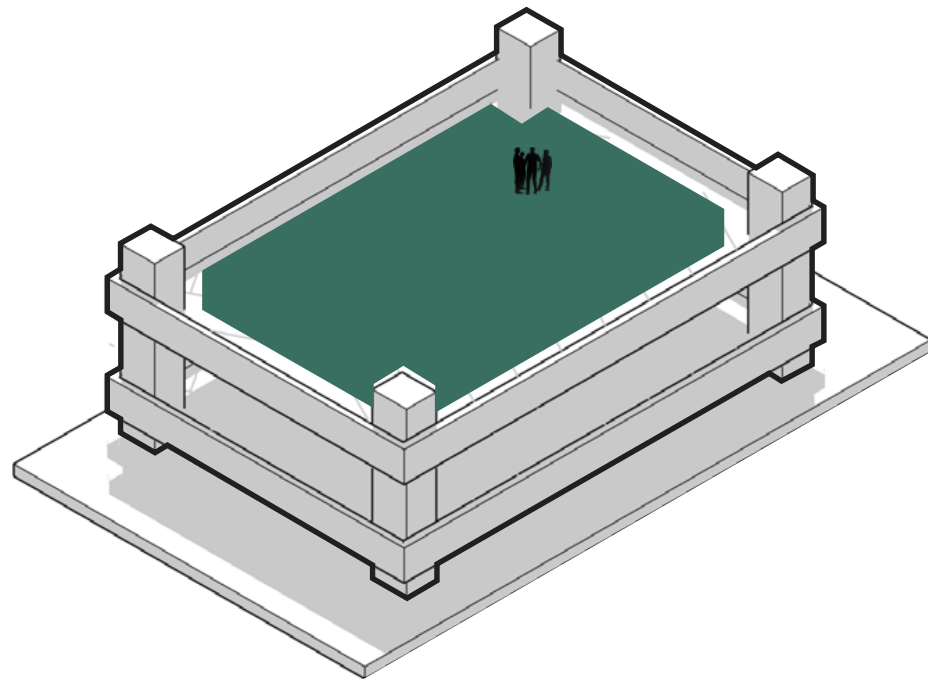
Year - 2014; Design - Topager - Horticultural Therapy



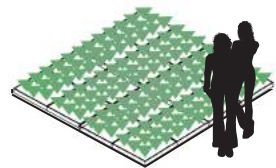
Photos: Topager

Parking Garage Rooftops

The upper areas of these substantial and increasingly less-used structures are ideal for roof gardens and farms.



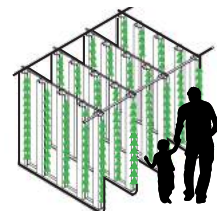
System Types & Techniques



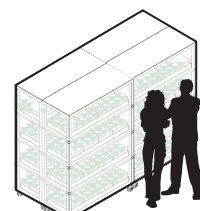
Extensive Green Roof



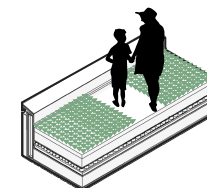
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Research & Experimentation
- ▶ Children's Education
- ▶ Horticultural Therapy
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ University
- ▶ Supermarket
- ▶ Commercial center
- ▶ Hotel
- ▶ Hospital

Suitable Revenue Models

- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)
- ▶ Food & Drink Service (Horeca)

Case Studies

- ▶ Citiponics, Singapore
- ▶ Østergro, Copenhagen
- ▶ Garten Deck, Hamburg
- ▶ Klunkerkranch, Berlin
- ▶ Food Roof Farm, St. Louis

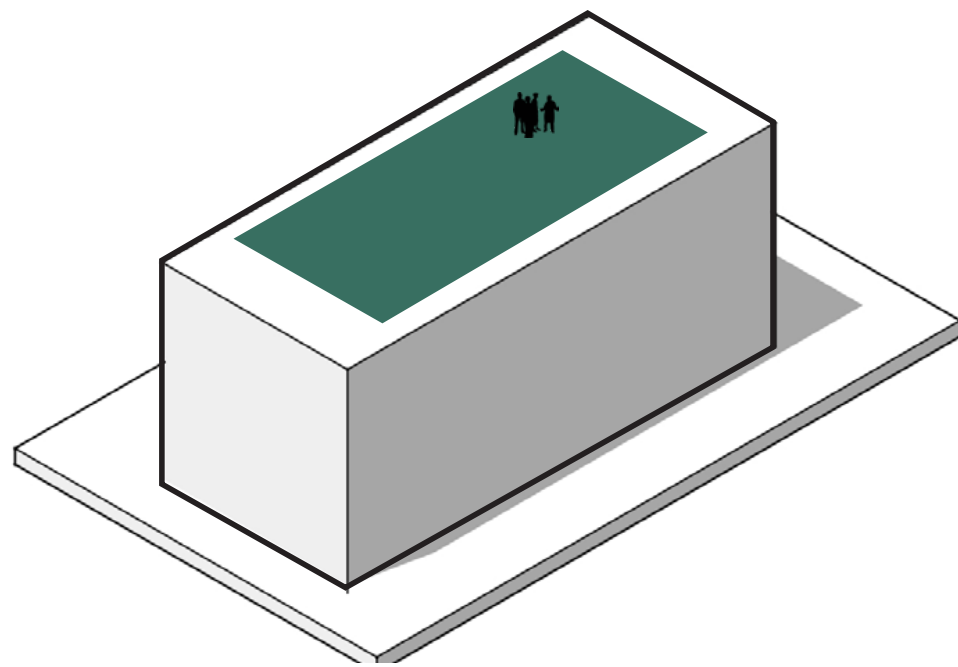
Case Study : Østergro, Copenhagen

Year - 2014; Design - Livia Urban Swart Haaland, Kristian Skaarup, and Sofie Brincker; Key Point - CSA + Horeca

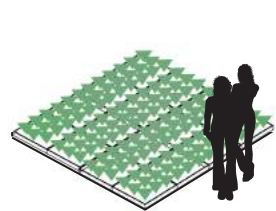


Institutional Rooftops

Vegetated workspaces provide a place for relaxation & are shown to increase job satisfaction, productivity, & reduce stress.



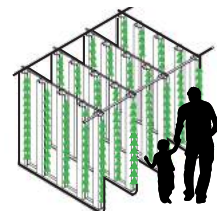
System Types & Techniques



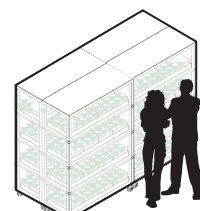
Extensive Green Roof



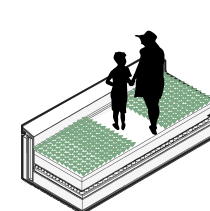
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Research & Experimentation
- ▶ Children's Education
- ▶ Horticultural Therapy
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ Offices
- ▶ Convention Centers
- ▶ Community Center

Suitable Revenue Models

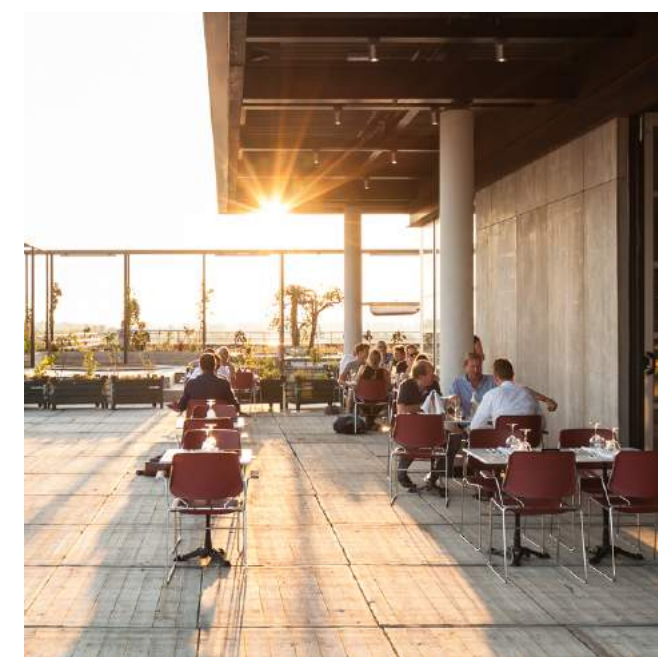
- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)

Case Studies

- ▶ Anken Green, Shanghai
- ▶ B.Bylon, Amsterdam
- ▶ Dakakker, Rotterdam
- ▶ Pasona, Tokyo
- ▶ UF002 De Schilde, The Hague
- ▶ Zuidpark, Amsterdam

Case Study : B.Bylon @ B.1, Amsterdam

Year - 2015; Design - MOSS; Key Point - Startup Hub's Social Platform



Meeting Challenges

plusshus/Zero emission building standards
Water retention + vegetation + solar



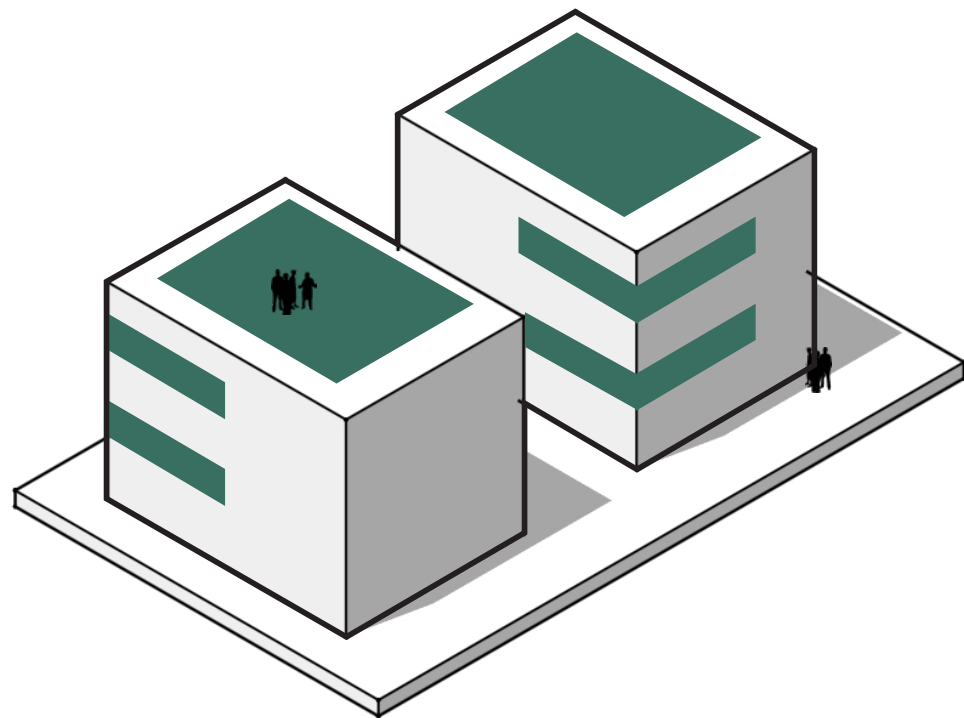
"Snap in" system for PV pergola

Hrbs tray for seasonal, edible, green

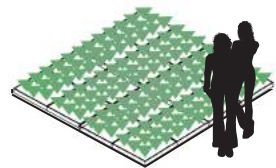
Water retention Box 71L/m²

High-density Residential

Shared gardens foster community involvement and provide neighbors with a shared interest while contributing to well-being.



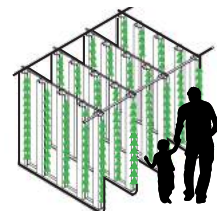
System Types & Techniques



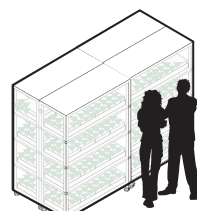
Extensive Green Roof



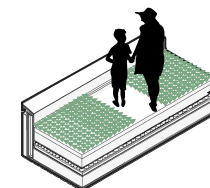
Hydroponics



Growing Towers



Climate Controlled



Roof Park or Farm

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Children's Education
- ▶ Horticultural Therapy
- ▶ Added Real Estate Value
- ▶ Leisure

Suitable Locations

- ▶ Residential
- ▶ Parking garage

Suitable Revenue Models

- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)

Case Studies

- ▶ Skyfarm, Shanghai
- ▶ Chai Wan City Farm, Hong Kong
- ▶ Kun Tong, Hong Kong
- ▶ The Greenhouse, Malmo

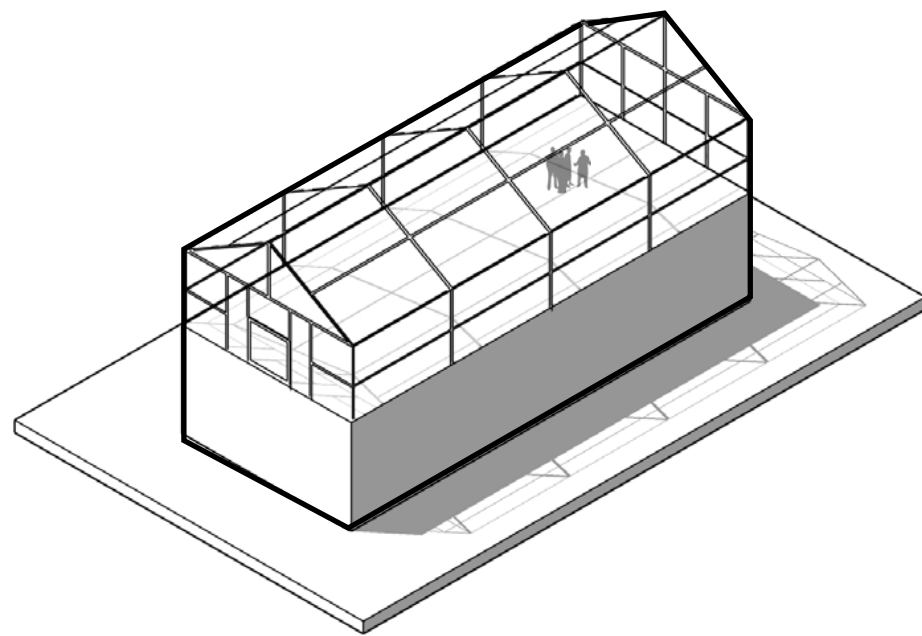
Case Study : Greenhouse Augustenborg, Malmö

Year - 2016; Design - MKB + NCC Key Point - Eco Residence

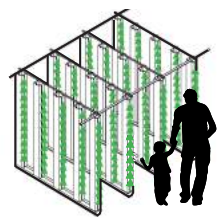


Rooftop Greenhouse

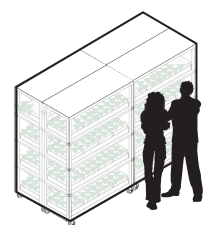
Greenhouses enable local produce and year round production. To reduce heating costs, heat waste from the structure below can be harvested.



System Types & Techniques



Growing Towers



Climate Controlled

Value Domains

- ▶ Environmental Amelioration
- ▶ Food Security
- ▶ Research & Experimentation
- ▶ Children's Education
- ▶ Horticultural Therapy
- ▶ Added Real Estate Value

Suitable Locations

- ▶ Residential
- ▶ Exhibition
- ▶ Community Center
- ▶ University
- ▶ Supermarket
- ▶ Commercial center
- ▶ Parking garage
- ▶ Hotel
- ▶ Hospital
- ▶ Restaurant; Bar

Suitable Revenue Models

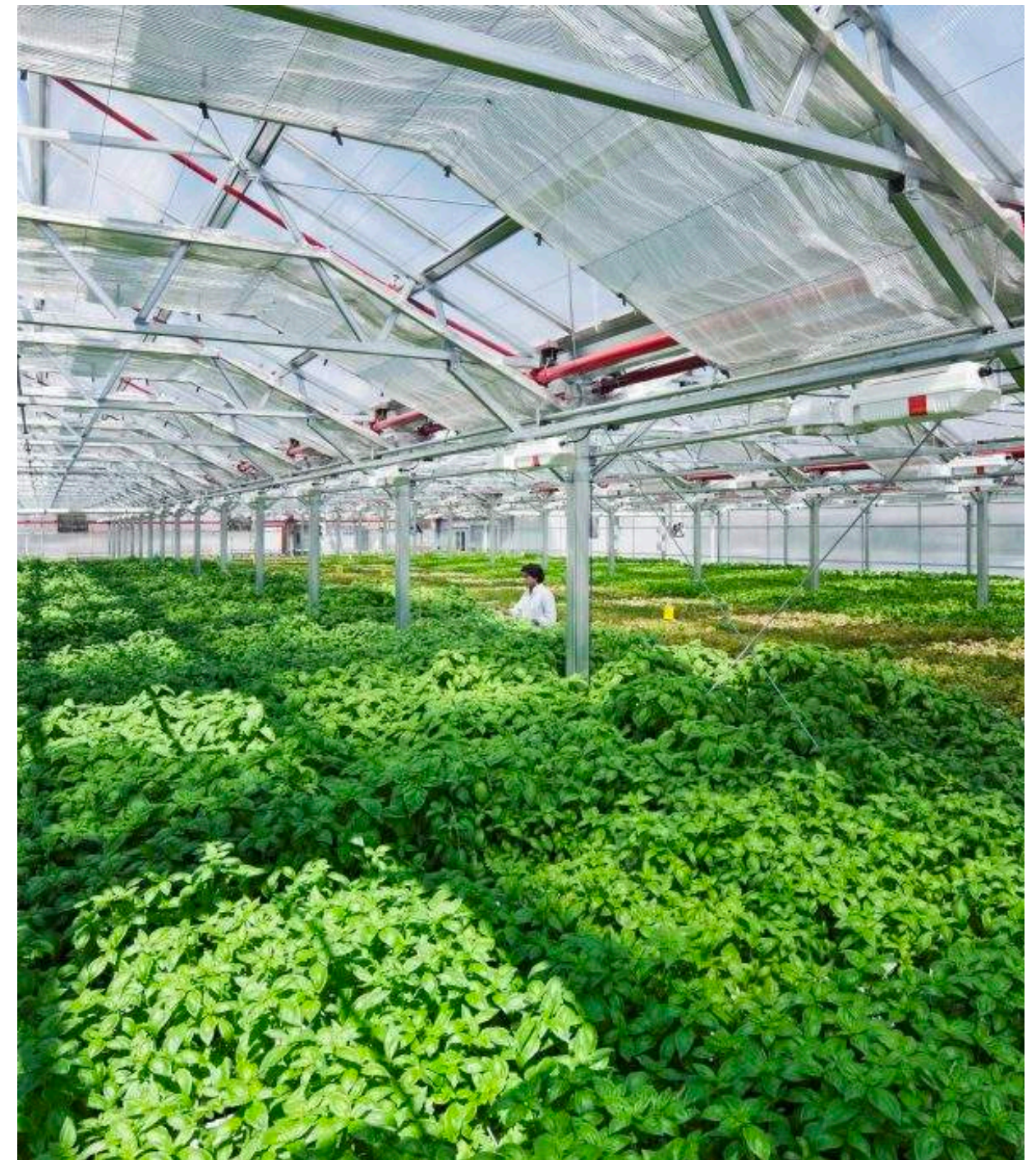
- ▶ Community Supported Agriculture (CSA)
- ▶ Restaurant Supported Agriculture (RSA)
- ▶ Market Supported Agriculture (MSA)

Case Studies

- ▶ Gottam Greens, New York
- ▶ DGWH Humboldt University Haus 12, Berlin
- ▶ QO Hotel Amsterdam

Case Study : Gotham Greens, NYC

Year - 2009; Design - Gotham Greens; Key Point - provides year-round, local supply of produce



Photos: Gotham Greens

KEY POINTS

Rooftops and Revenue

Key Points

1. It is evident how roof gardens, which add property value, are more economical than non-green roofs
2. Featuring food production as a rooftop function opens further financial opportunity
3. Factors of structure, climate and access are to be scrutinized
4. Successful rooftop projects do not exist without maintenance (+/- 10% project costs per year)
5. There is no one-size-fits-all, and overlap is ideal for broadening potential

