Urban Greenblue Grids
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Urbanization

The urban and rural population of the world, 1950-2050

- Total Population
- Urban Population
- Rural Population

Population (thousands)

Thesis:
With urban greenblue grids we hit 7 flies in one stroke

- Climate adaptation
- Sustainable energy production
- More biodiversity
- Less heat stress
- Better air quality
- Food production
- Quality of life
Urban microclimate and biodiversity

Based on Krusche, 1982
Challenges for Dutch delta cities in times of climate change

Be prepared for:

• More heavy storm rains
• Longer dry periods
• Urban heating

and keep our cities safe and attractive!
Use of natural processes and location characteristics

- Visable water systems
- Re-use of wastewater
  - Use of rainwater
- Reduction of pavement
  - Infiltration

Reduction of groundwater extraction

Small water cycles
  - Fewer overflows
Heat stress

Temperature curve above an urban area

- surface temperature (day)
- air temperature (day)
- surface temperature (night)
- air temperature (night)

![Temperature curve graph]

- rural
- suburban
- pond
- industrial
- urban residential
- downtown
- urban residential
- park
- suburban
- rural

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Heat stress
Water balance in the city and in nature
Air quality
Particle matter
Air quality
Smog bubble and inverse flow
Smart grids
For sustainable energy production

- Wind
- Sun
- Ambient energy
  - Water
  - Soil
  - Air
- Biomass
  - Wooden pallets
  - Etc.
- Waste
  - Organic waste
  - Waste water
Participation
Active participation of citizens in designing and shaping the city
Food production
City farms and urban gardening
Synergy
Effects of more nature; green and blue in the city

More biodiversity
Better quality of life

Food production

Less heat stress
Increased sponge effect

Biomass for energy production
Better air quality

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Connectedness of measures

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Urban Greenblue Grids
History
Group of slumless smokeless cities and the fertile landscape

London Green Grid
London Green Grid

- Rainwater retention and purification
- Creating a healthy city
- Heat stress reduction
- Biodiversity
- Making the city more liveable
- Creating more leisure space
- Attractive walking and cycling networks
London Green Grid
Singapore
Transformation of the canals

Urban Greenblue Grids

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research, consulting and design
Singapore

Urban Greenblue Grids
Singapore
Hammarby Sjöstad, Stockholm, Sweden
Hammarby Sjöstad, Stockholm, Sweden

- Surface drainage
- 100% rainwater retention
- Ecological green management
Hammarby Sjöstad, Stockholm, Sweden
Hammarby Sjöstad, Stockholm, Sweden
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Hammarby Sjöstad, Stockholm, Sweden
Eva Lanxmeer, Culemborg
Eva Lanxmeer, Culemborg

**PERCEPTION**
- Green trafficless residential environment
- Safe for children

**MATERIALS**
- No PVC
- Natural based paint
- Modified wooden facades
- Natural (half) pavements

**WATER**
- 100% Rainwater storage
- Grey water treatment in constructed wetlands
- Surface rainwater run-off

**ENERGY**
- Heatpump (added to drinking water production)
- 50% reduce in energy consumption

**WASTE**
- Biogas from black water
- Composting of organic waste

**PARTICIPATION**
- Design and management of communal gardens

**ECOLOGY**
- Ecological green management
- Minimalization pavement
- Recovered old river (Lek)
Eva Lanxmeer, Culemborg
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Rijkswaterstaat office, Terneuzen
Rijkswaterstaat office, Terneuzen

**PERCEPTION**
- Natural ventilation
- Natural materials

**MATERIALS**
- Reused and recycled materials
- Reused more posts
- Cellulose insulation
- Renewable raw materials

**WATER**
- 100% Reuse filtered waste water
- 80% reduction in drink water consumption
- Rainwater buffering on the green roof

**ENERGY**
- Use of surface water for heating system
- PV panels
- 66% reduction in energy consumption

**WASTE**
- Reuse of waste materials
- 100% reuse of waste water

**PARTICIPATION**
- Involvement of the employees during the design process

**ECOLOGY**
- Use of existing green as wind buffer
- Green roof
- Minimized pavement

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Rijkswaterstaat office, Terneuzen
Measurable sustainability
Rijkswaterstaat office, Terneuzen
Rijkswaterstaatkantoor, Terneuzen
Waterfabriek, Dierenpark Emmen
Waterfabriek, Dierenpark Emmen

- 100% decentralized treatment and re-use of wastewater
- Visualization and public accessibility of purification plant
- Control of the provincial drinking water system from the water pavilion
Waterfabriek, Dierenpark Emmen
Waterfabriek, Dierenpark Emmen
Waterfabriek, Dierenpark Emmen
Erasmusgracht, Amsterdam
Erasmusgracht, Amsterdam

- Disconnect runoff water from the combined sewer system
- Decentralized treatment of rainwater
- Creating leisure space
- Wildlife habitat
Erasmusgracht, Amsterdam

regenwater

bezinkbassin

helofytenfilter

schoonwater

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Erasmusgracht, Amsterdam
Speeldernis, Rotterdam
Speeldernis, Rotterdam

- Water awareness
- Water storage
- Water experience
- Water retention
- Biodiversity
Speeldernis, Rotterdam
Speeldernis, Rotterdam
Waternet, Amsterdam
Waternet, Amsterdam

- Rainwater storage under the building
- Purification of rainwater
- Re-use of rainwater for toilets
Waternet, Amsterdam
Brasserhout, Den Haag
Brasserhout, Den Haag

- Rainwater storage
- Biodiversity
- Minimalized pavements
Brasserhout, Den Haag
Brasserhout, Den Haag
Brasserhout, Den Haag

Urban Greenblue Grids
Climate workshop

- Multidisciplinary
- Proactive
- Creative
- Integral
Building blocks for a greenblue city
Benefits of the process

• The climate challenge concerns us all
• Conflict transformed into creative solutions
• We developed integral and concrete ideas
• By solving the climate challenge, we also improve ecology, life quality and reduced urban heating
Eine andere Welt ist pflanzerbar!
Urban green-blue grids for sustainable and dynamic cities
Thank you!