The food producing city of tomorrow

Food production versus city living

De StadsKas

By Lisa Marije de Groene
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Examples of urban farming

The Urban Farmers in Den Haag
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Examples of urban farming

Mediametic in Amsterdam
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Different project, different intention

Social
The project creates or strengthens communities and social ties

Environmental
The activities are sustainable or beneficial to the environment

Economics
The project creates jobs and supports local economic activity

Health
The project provides affordable, nutritious, fresh and healthy food

Education
The project teaches food skills and promotes awareness about food

Livability
The projects increases the quality of living and life surrounding the project

Key dynamics by Farming the city (Book)
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P5 Presentation

Content:

Introduction assignment

1. Why did I chose this topic?

Research

2. What are my intentions with the project?

Project Design

3. How can I achieve these goals by design?
Introduction assignment

1. Why did I chose this topic?
Introduction assignment

“The task in the Dutch Housing Graduation Studio is to design a housing project that fits in a scenario of your own making for the future of Amsterdam.

Behind the brief for an apartment building lie the bigger questions of ‘how do we want to live in the future?’ and ‘what do our cities need?’”

What kind of challenges will cities, in particular Amsterdam, face?
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Challenges facing cities

- Growing population
- Diminished resources
- Water management
- Food supply
- Energy transition
- Climate change
I want to focus on the food issue

Food supply

- Energy transition
- Water management
- Diminished resources
- Climate change
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What does the food supply challenge mean in the Netherlands?

The Netherlands farms food in one the most efficient ways of the world.
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Agriculture today in the Netherlands has the following problems:

Land use

The countryside is getting full of industrialized farms, It’s no longer a place for nature and leisure but endless agriculture with huge farms.
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Agriculture today in the Netherlands has the following problems:

Awareness

People are completely separated from the food production which has serious consequences like food waste.
Research

2. What are my intentions with the project?
I want to bring this productive green to the city.

The big farms will be in a smaller scale distributed over the city.

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Research question

Combining the production of food with living in the city

How can food production be used as a tool to design a sustainable, lively and dense city?
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The goals of the project

Combining the production of food with living in the city

- high density apartment building
- food production to sustain everybody who lives in the building

In order to make it possible that the city of tomorrow will be able to feed it's own citizens
World land use

- Inland water: 6.7 Billion (20%)
- Crops (Humans): 20%
- Crops (Livestock): 10%
- Grassland (Livestock): 70%

Surface of cities: 714,140 m² --> 0.5%

Land area: 50,250,000 m² --> 35%

Agriculture area: 105,000,000 m²
6.7 Billion Crops | 20% (Humans) Crops | 10% (Livestock) Grassland | 70% (Livestock)

Agriculture area:
0 17.500.000 35.000.000 52.500.000 70.000.000 87.500.000 105.000.000 122.500.000 140.000.000

Surface of cities: 714.140 m² --> 0.5%
50.250.000 m² --> 35%

This number must go down!
2 ways:
- Diet change
- Efficient growing methods

World land use
Diet change

Different types, different characteristics

Urbanitarianism

Big hitters:

Meat

Dairy products

Cereal
Diet change

Different types, different characteristics

**Urbanitarianism**

**Big hitters:**

- Meat
- Fish from sustainable sources like aquaponics
- Eggs
- Cereal
- Potato and other starchy root vegetables
- Dairy products

We should eat a lot less of:

- Chicken
- Fish
- Eggs
- Cereal
- Potatoes
- Dairy products
Growing methods

Different types, different characteristics

**City garden**
It’s one of the most common forms of urban agriculture projects you see around Amsterdam.

- Social: ++
- Environmental: +
- Economic: -
- Efficiency: -

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**Roof garden**
This is open air, soil based garden on roofs or balconies.

- Social: ++
- Environmental: +
- Economic: +
- Efficiency: -

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**Greenhouse**
Food is most efficiently grown in a greenhouse. The Netherlands have become the forerunner in this innovative technique.

- Social: -
- Environmental: +
- Economic: +
- Efficiency: ++

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**Vertical farming**
It’s the most recent development in urban farming. It is the stacking of food production in a highly technical environment.

- Social: -
- Environmental: -
- Economic: -
- Efficiency: ++
Growing methods
Different types, different characteristics
Case studies: Social or Efficient

Forest garden
Roof garden allotments
Seasonal garden
Greenhouse; o.a Aquaponics
Vertical farming

Inclusive
Exclusive
Social
Not very
Very much

Efficiency
Growing methods

Different types, different characteristics

Case studies: Social or Efficient

Social vs. Exclusive

Inclusive vs. Not very

Forest garden

Roof garden allotments
Seasonal garden

Greenhouse; o.a Aquaponics

Vertical farming

Efficiency

Not very

Very much
Growing methods

Different types, different characteristics

Case studies: Social or Efficient

Social

Exclusive

Inclusive

Forest garden

Roof garden allotments
Seasonal garden

Greenhouse; o.a Aquaponics

Vertical farming

Efficiency

Not very

Very much
For urban food production to become a part of the solution to the global food crisis it is necessary to combine efficiency with integration in the urban environment.

- Raise awareness so people change their diets
- Grow more efficiently so we need less space and pollute less

In my project I want to do both

Growing methods
Different types, different characteristics

Forest garden
Roof garden allotments
Seasonal garden
Greenhouse; o.a Aquaponics
Vertical farming

Efficiency
Not very
Very much

Inclusive
Exclusive

Social

Inclusive
Prototype

Different types, different characteristics

https://www.arcam.nl/winterlezing-1-stedenbouwkundig-patroon/lezing-1-luchtfoto-amsterdam/
Project Design

3. How can I achieve these goals by design?
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Location

Pilot project

https://www.arcam.nl/winterlezing-1-stedenbouwkundig-patroon/lezing-1-luchtfoto-amsterdam/
Pilot project
The belt; Border between the city centre and the outskirts

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Location

https://www.arcam.nl/winterlezing-1-stedenbouwkundig-patroon/lezing-1-luchtfoto-amsterdam/
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Location

The Groenmarktkade buurt

Pilot project
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De Appeltjesmarkt

PRIVATE HOUSING (Rental 49%, Owner Occupied 28%) | SOCIAL HOUSING 23%

GroenmarktkaDeBuurt

Density 5.477 people/km²

http://www.tussentaalenbeeld.nl/A60fb.htm
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Site analysis

The plot
- The function doesn't fit the sustainable future this project envisions
- The project is going to be an example project, therefore its better if the design can be reproduced.
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Site analysis

History
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Site analysis

Citypark
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Site analysis

Citypark
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Site analysis
Commercial plinth
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Site analysis

Building volume.
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Urban ensemblé

Plan
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Urban ensamble

Plan
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Functions of the building

- Greenhouse
- Dwellings
- Public groundfloor
- Conservatory
- Citypark
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City vs Green
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City facade
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Park facade
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Park facade
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Section
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Section
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Building structure;
Groundfloor
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Building structure;
First floor
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Building structure;
Second floor
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Building structure;
Third floor
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Building structure;
Fourth & fifth floor
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Building structure;
Greenhouse
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Building structure;
Vertical circulation
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Section;
Different types of green

Greenhouse
Technical & Efficiency

Dwellings
Livability

Groundfloor
Education, health & economics

Conservatory
Livability

Citypark
Social & environmental
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The greenhouse

Circular food consumption
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The greenhouse

Circular food consumption

150 households
owner & user

Fixed expenses when buying/renting a home:
- Monthly mortgage/rent
- Monthly fee for food

Initial investment for the greenhouse

Union: ‘de Appeltjes markt’

Food for residents:
They have a monthly subscription for 3-5 days worth of food

Employed professionals

Retail in ‘Green centre’
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The greenhouse

Based on the New Urban
Foodprint Calculation
Model

Program for 1 person:

| 25 m² | Greenhouse | --> | Fruit, vegetables, legumes & potato's |
| 2 m²  | Fish Production |
| 3 m²  | Orchard        | --> | Fruit                           |
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Floorplan; Groundfloor

Education; Information centre
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Floorplan;
Groundfloor

Greenhouse;
Conservatory
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Floorplan;
Square
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Floorplan;
First floor
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Perspective;
First floor
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Floorplan;
Appartment 85m²
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Floorplan;
Studio 50m²
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Perspective;
Studio 50m2
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Floorplan;
Maisonnette 2nd 145m2
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Floorplan;
Third floor
De StadsKas

Floorplan;
Fourth floor
De StadsKas

Perspective;
Fourth floor
De  StadsKas

Floorplan;
Maisonnette 4th 90 m²
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Floorplan;
Maisonnette 5th 90 m2
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Floorplan;
Fifth floor
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Floorplan;
sixth floor Greenhouse
Climate; Climate Cascade

Warme lucht wordt afgekoeld door de waterdruppels

Water wordt naar boven gepompt

Gekoelde lucht

Water temperatuur:
+- 12 graden in de zomer
+- 15 graden in de winter

Verwarmings element

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Climate
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Climate;
Water

Drink water
Grijs water
Zwart water
Hemel water

Een gesloten systeem:
Schoon grijs water

Filter
Huishoud water

Grijs water systeem
Zwart water systeem
Vergister

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Climate;
Shafts
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Structure;
1.5 Details

- Schuco ASS FD 70
- Schuif vouwwand
- Aanslag
- Houten balk
- Rails
- Ventilatie rooster

Clima-Level vloer

- Holte voor ventilatie
- CLT vloer

Plantenbak:
- Aarde
- Membraan
- Fijn grind
- Grof grind
- Drainage pijp
- Afwatering naar het grijs water systeem

Holle CLT vloer

- Aanvoer frisse lucht

Holle ruimte dubbele CLT vloer, ruimte voor leidingwerk:
- Rooster ventilatie lucht
- Aanvoer verse lucht voor woningen
- Leidingwerk drainage plantenbakken

- Multiplex beplating
- Houten balken
- Waterbestendige folie

Waterbestendige folie

Plantenbak:
- Aarde
- Membraan
- Fijn grind
- Grof grind
- Drainage pijp
- Afwatering naar het grijs water systeem
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Zoom-in's Facades; Park Facade
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Zoom-in's Facades; City Facade
Thank you!
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Thank you!
De StadsKas

Thank you!
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Thank you!