



IIT Cloud Studio Abroad Fall 2014  
Hosted by The Why Factory/  
Delft University of Technology

# Farm Blocks

Studio Preview



## Urban farming beyond clichés

Food, next to energy and water, is one of the key resources driving our cities. The way we produce, distribute, consume and discard food plays a crucial role in how our cities prepare for the future. Business as usual is not enough. Today's global food system has to improve. This requires not only technological innovation but also spatial integration. There is certainly a role for architects and planners to work on this integration, to enable synergies by connecting food in a better way to the other flows of the city.

Is our profession prepared to give an effective contribution to the necessary changes of the global food system? The interest is undeniably there. Food related design proposals have popped up in architecture schools all over the globe. There is a photoshopped abundance of green rooftops, happy cows and lucky farmers. But all too often, these images are too uninformed, too small, too romantic and far too far away from the tight realities of food production. We need to get serious in our proposals, realistic in the surfaces and precise in the requirements of food production.

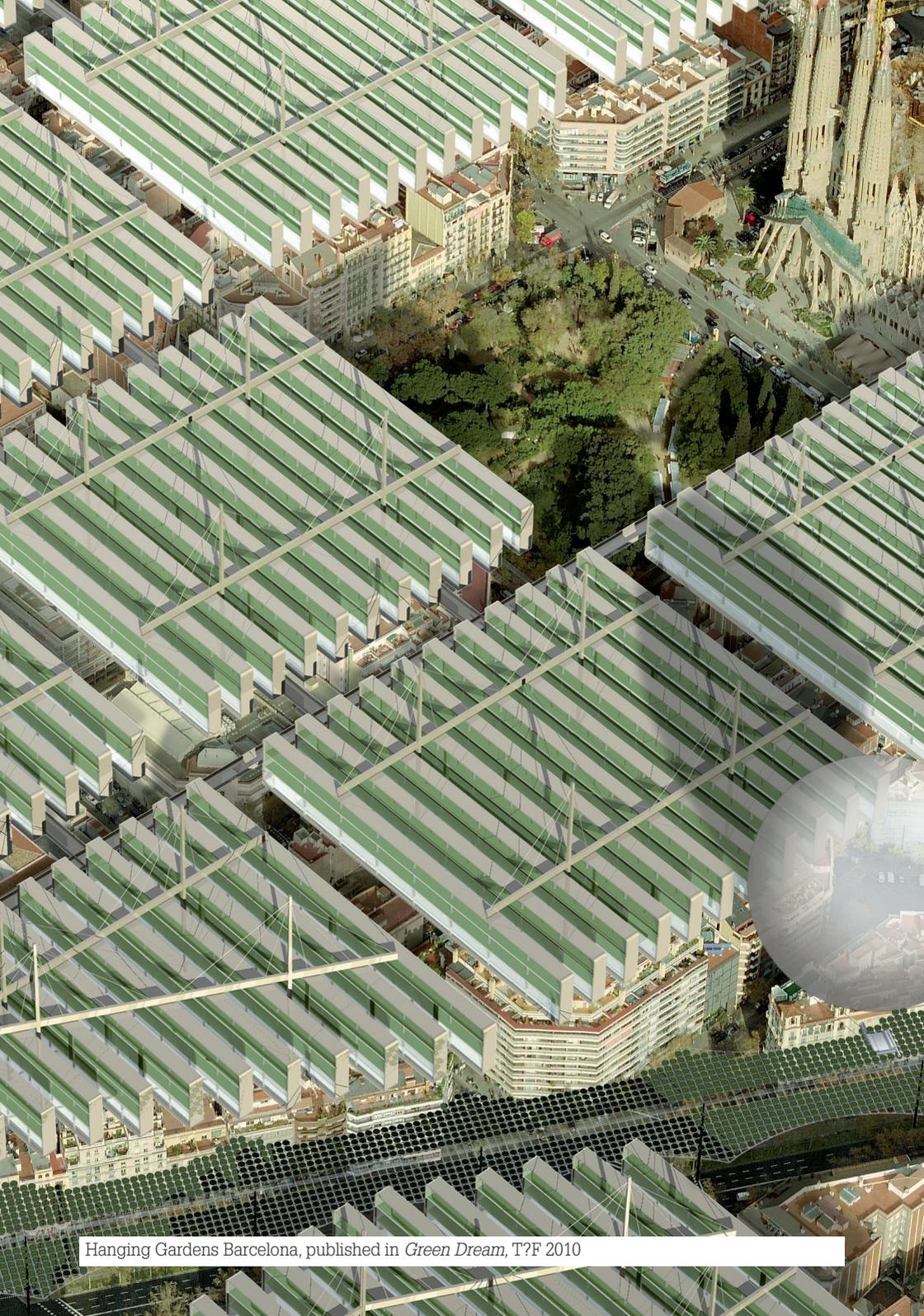
In this studio, we take the challenge.



## The global food system

There is every reason to be concerned about food today. The world population is expected to grow with 1 billion over the next 12 years and reach 9.6 billion by 2050. (UN, 2013). More food will be needed to feed this growing population. At the same time, there is a limit to the arable land, which is available globally. While climate change could raise productivity in some areas, it will make it much more difficult to grow food in others. Already today, the way food is produced, processed and distributed globally today comes with a number of unwanted 'side-effects' and increasing the production can increase the negative effects of the global food system. Food transportation contributes to the global emission of greenhouse gasses, as does the refrigeration, which much food requires during storage. Gaining new arable land can cause deforestation. Use of fertilizes and pesticides in agriculture can pollute the ground and ground water. Intense livestock farming can go with an unethical impact on animal welfare. The food system can cause health issues, when not enough fresh, unpolluted and diverse food is available. And eventually, a lack of transparency in how and where food is produced can affect food safety.

The challenge of today's food system is, how to produce more food for more people on the same or less land, while reducing or eliminating the negative effects listed above.



## Farming in cities

The initial reaction of architects, who want to engage with food production, is to bring it into their realm. Farming in cities, urban farming or urban agriculture seems the answer to all the negative effects of the global food system. Locally produced food travels less and therefore causes fewer emissions of greenhouse gasses (GHG). It makes the food system more transparent and therefore safer for the consumer. Being involved in a local farming project can improve your health through awareness, through physical activity and through easy access to healthy food. It can have an educational effect for the neighborhood and improve social coherence. It can improve urban heat effects and generally increase the attractiveness of the neighborhood. Eventually, urban farming can present an alternative to food monopolies and monocultures. It can raise biodiversity and agricultural diversity. It can stimulate local economies and stimulate consumer empowerment. With urban farming, architects and urban planners seem to have the silver bullet at their hands, which can solve all the problems of sustainable food productions.

But urban farming is not as obvious as these benefits suggest. There are many reasons not to produce food in cities.



The pollution of air and soil in cities can accumulate in locally produced food. Higher welfare but also higher costs of living in cities work against traditionally low skilled and low-income labor such as farming. The surfaces available between and on top of buildings are fragmented while crop and vegetable farming need large surfaces to operate feasibly. Still, the most crucial issue is space. You can grow could grow small amounts of vegetable on a reasonably sunny windowsill, but it will not be enough to feed you all year through. In the European Union, we currently need about 2.000 m<sup>2</sup> of agricultural surface to feed one citizen all year through, far more than the area available in a city of average density. Advanced farming technology involving artificial light can help to make farming more compact, but raises the energy consumption.

Some 10.000 years ago, it was the separation of spaces for farming from spaces for living, which made the first cities possible. Since then, food production has steadily moved away from the city. To change that is not an easy task.

# Farm Blocks

What are the requirements for an urban farming project to make it feasible and productive? How big does it need to be, what structure does it need and how should it connect to the city, its flows of resources and its inhabitants? Today, there are still little examples of productive urban farming.<sup>1</sup>

Urban farming in developed countries is still in its infancy and there is a lack of tested typologies, which can be applied in different urban conditions.

In this studio, we want to work towards such typologies. It would not make sense to squeeze traditional large-scale agriculture into the urban fabric. Therefore, the typologies are based on different farming strategies and technologies:

## 1: Farming strategies

In the first phase of the studio, different farming strategies will be explored in teams: Aquaponic farming, hydroponic farming, insect farming, live stock farming, organoponics, etc. The research will be based on literature study and where possible on interviews. For each strategy, the inherent requirements are explained. What are minimal feasible sizes, how much sun radiation is needed, how much water, etc.? Also the implications for the surrounding are part of this research. What are the potential benefits for the neighborhood? How accessible and transparent is the approach? What are the economic restrictions and possibilities?

The outcome is presented and discussed in the group. The result is a manual for each of the different, relevant farming strategies.

## 2: Farming models

In the second phase, the farming strategies are translated into functional schemes. The basic requirements are included in the scheme: minimum size, sun orientation and exposure, amount of required water, amount of required fertilizer, output in food, output in waste, etc.

We will work with Rhino and Grasshopper to make the schemes three-dimensional, spatial. These scripted schemes are the DNA of each farming strategy. No buildings yet, but dynamic scale models of the requirements of each farming approach.

## 3: Farm Blocks

Eventually, the spatial models are translated into buildings. In the first step, these are context less prototypes. Unbiased by a specific urban context, they form modular prototypes. Later, these prototypes can be placed on different locations. Pig Blocks, Aquaponic Blocks, Digester Blocks, Grain Blocks, Veggie Blocks, Wild (game) Blocks and more, changing the way we live with food...

1) There is the concept of Vertical Farms from Columbia University, and there is Cuba, two concepts, which we will discuss during the studio.



Urban livestock farming as re-use. *The Office* from the project *City Pig*, T?F 2009



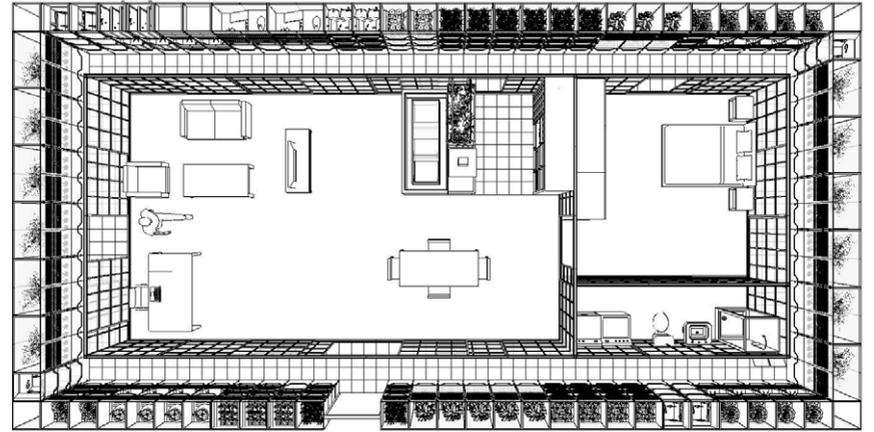
From diagram to building. *Stacked farm* from the project *City Pig*, T?F 2009



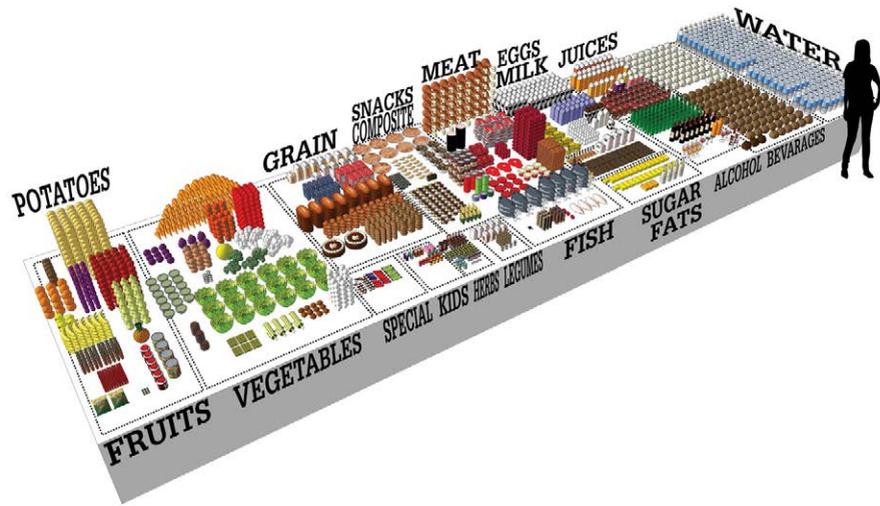
Integration in urban context. *Neighbourhood farm* from the project *City Pig*, T?F 2009



Herbal Kampung development from the project *Superkampung*, T?F 2010



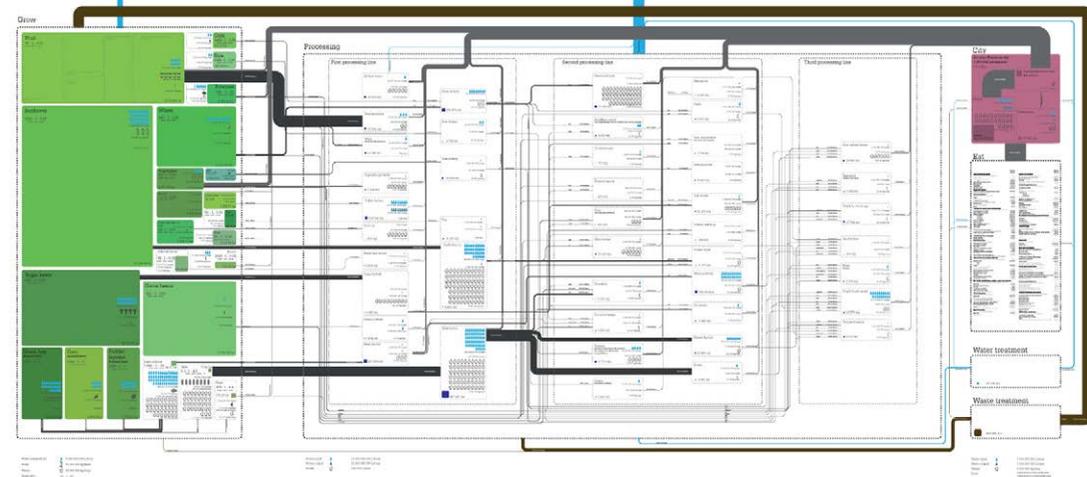
Farm facade, graduation project A. Symvoulidou, T?F 2012



Visualisation from the average annual food consumption from the project *Food City*, T?F 2011

FOOD CITY THE HIDDEN STRUCTURE

FOOD CITY FOR 1,000,000 INHABITANTS



Hidden structure of food flows from the project *Food City*, T?F 2011



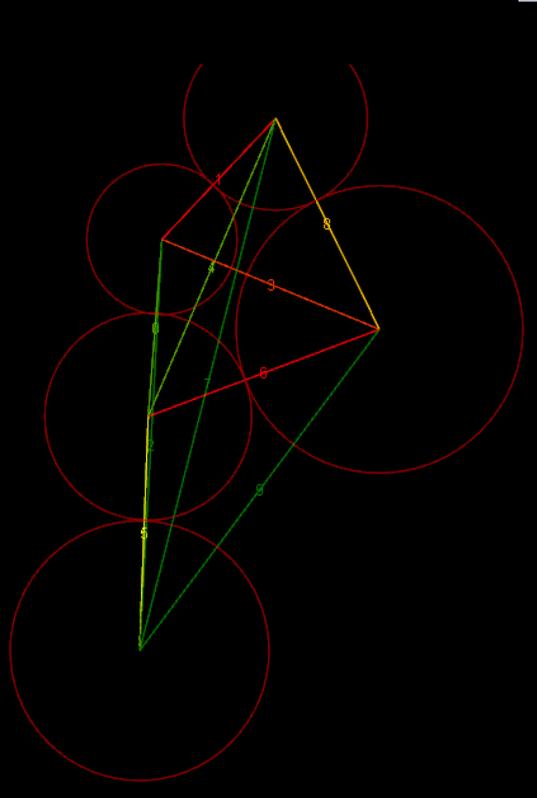


## The Why Factory

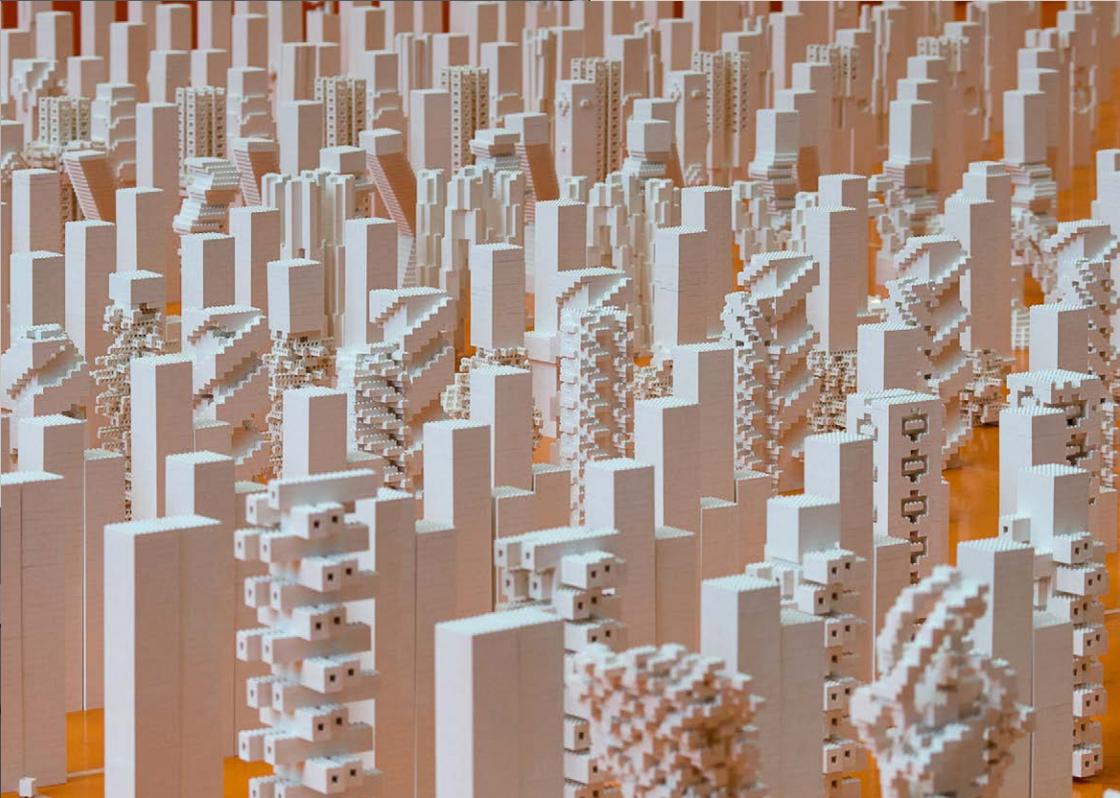
The Why Factory is think tank on urban futures and is led by Prof. Winy Maas. It is located at the faculty of architecture of the Delft University of Technology, where it offers design and research studios and graduation projects in the Master of Science program of the faculty. Research and education are closely related in this chair. The work of the students forms an integral part of the ongoing research of the Why Factory: The Future Cities project. In this project, the Why Factory explores the possibilities of future urban development through production of scenarios, models and visualizations. Master students enrolled in the program are challenged to creatively explore the potentials of urban life in the future. They design visionary cities and fantastic architecture.

The range of topics addressed in the studio varies per semester and is always announced a week prior to the enrollment period through our website and information posters at the faculty. The subjects addressed so far include: Green Dream, World Wonders, The Death of Leisure City, Robotic City, Austeria, BiodiverCity, AnarCity, Transformer, Food City, Eurohigh, Sensor City, Copy/Paste and more.

The Why Factory's findings are communicated to a broad public in a variety of ways, including exhibitions, publications, workshops, and panel discussions.



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5		88.74
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8		132.10
9	0.00	



The Farm Block studio is a collaboration between the Illinois Institute of Technology, School of Architecture and The Why Factory, Delft University of Technology in the framework of the Cloud Studio Abroad.

The studio will be hosted by Prof. Winy Maas and Ulf Hackauf with Adrien Ravon (scripting seminar)

Please visit our website for more information:  
[www.thewhyfactory.com](http://www.thewhyfactory.com)

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Texts by Ulf Hackauf  
The Why Factory, June 2014



Hanging Gardens Barcelona, published in *Green Dream*, T?F 2010