



THE NEW NEW THING IN INDOOR FRESH FOOD PRODUCTION IN MEGACITIES

MEETINGMOREMINDS & GRWNXT

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INTRODUCTION:

THE NEW NEW THING IN INDOOR FRESH FOOD PRODUCTION

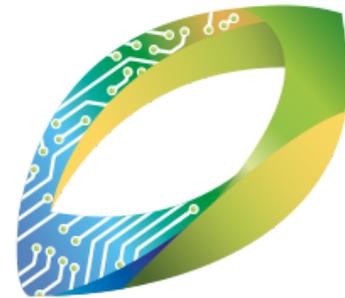
MEETINGMOREMINDS & GRWNXT



Envisioning the New New Thing in data-driven horticulture is one thing. Exploring the potential is a reality test of the concept of GrwNxt. In this reconnaissance study that is exactly what is done. Deep Dives made by an interdisciplinary team of MeetingMoreMinds and GrwNxt give a closer look at the multi-facets of GrwNxt

In essence GrwNxt is a care-free, scalable production concept for a remote controlled, cloud-based, data-driven infrastructure of modular growth systems to produce on-site, year-long, fresh produce based on digital recipes and focused on the B2B market in megacities.

The drivers of GrwNxt are providing practical solutions for the immense challenges of food safety, food security and food sustainability in megacities.



GrwNxt
FRESH FOOD INFRASTRUCTURE FOR MEGACITIES

THE NEW ELEMENTS IN THE GRWNXT CONCEPT

Care-Free for the B2B Market: hotels, hospitals or campuses want the fresh produce from seed to fork without the hassle of the ins- and outs of horticulture. The help of a freshineer on-site is enough to run the GrwNxt operation to deliver a variety of high-quality crops for demanding guests.

Scalable in Terms of On-Site: GrwNxt works with modular growth rooms (climate rooms) on-site. Depending the amount of fresh produce needed, more modules can be installed. The modules are like separate clean rooms.

Scalable in Terms of Markets: the focus on the B2B market makes it possible to have a rapidly growing demand, e.g. in hotel chains.

Remote Controlled: GrwNxt systems operate in the cloud. Having a central control unit in Amsterdam with experienced experts (data scientists, plant physiologist, Greentech, horticulture) is a solution to the scarcity of knowledge on growing in many places in the world.

On-Site Production of Fresh Produce: cutting the supply chains to an absolute minimum contributes to keeping the high quality in terms of nutrients, vitamins, minerals, fiber and taste. It also prevents distribution, traffic jams and CO2 emission. It enables B2B users to show their guests and clients their contribution to a healthy menu and well-being.

Year-Long Production: the GrwNxt modules guarantee a season-independent optimum climate to grow fresh produce. The controlled environment inside makes planning of growth and delivery of output a guarantee. No pests, no pesticides.

Digital Recipes: tailored for a range of crops in environmental controlled modules GrwNxt develops digital recipes. These recipes are far more precise in choosing the moments for intervention in the growth processes of crops to secure the right amounts of elements (nutrients, light, humidity, temperature etc.) necessary for an ideal growth of high quality fresh produce with excellent taste.

UNIQUE VALUE IN CARE-FREE MODULES & DATA INFRASTRUCTURE

Indoor growing modules

- World-leading Dutch greentech and horticulture knowledge
- Packaged and exported in modular climate rooms
- Suitable for B2B clients in megacities

Care-free output

- Complete unburdening
- Semi-autonomous growth in controlled rooms
- Locally trained 'freshineers' handling high quality crops



Global infrastructure

- Global network of connected climate rooms
- 24/7 remote monitoring in Amsterdam control room
- Supervision by leading horti- and data experts

Data-driven optimization

- Capture of growth process with AI, visual and other sensors
- Continuous improvement of digital growth recipes via machine learning

THE NEW ELEMENTS IN THE GRWNXT CONCEPT

Data-Driven Infrastructure: making use of the latest insights of Machine Learning, AI, recognition techniques and image control, sensors and cloud technology, GrwNxt can serve many B2B clients with modules all over the world at the same time. The infrastructure is the reliance for clients to receive optimal service. At the same time it is the data input that will make the GrwNxt system more and more robust.

Megacities: this production concept for fresh produce on-site is particularly geared toward metropolitan areas with multi-million inhabitants. The arable land around has become scarce. The amount of traditional farming is rapidly diminishing. The distance from food production to food consumption is getting longer and longer. Congestion of roads is leading to food waste even before it arrives at destiny. Low quality of fresh produce combined with limited supply is the result. Fresh food is scarce and prices are high. This leads to inequality, malnutrition, life-style diseases, high costs for healthcare and lower productivity and quality of life. Municipalities in megacities, and also the FAO of the United Nations, are more than aware of these food-related problems. They made food safety and food security key items to address. To secure safe food, B2B users, such as hotels, import large parts of daily needs from overseas, contributing to a high CO2 emission per piece of food or fruit. This is untenable in the long run taking into account climate change and the new CO2 related regulation.

Increasing urbanization: megacities are the places where increasing urbanization is most visible. Notwithstanding the many challenges megacities face, the positive element is also the increase in middleclass population. Better educated, better jobs in the service industry, higher salaries and more demanding in terms of hygiene, housing and diets, this group is looking for a healthy lifestyle. Less fat, salt and sugar than in fast food and more exercise to stay fit, is the what a growing middle class of (younger) people want. Although the GrwNxt concept is focused now on the B2B market, we foresee the embedment of on-site production in residential areas as one of the growing markets in the decades to come. It is for this reason this exploration made use of studies done by city planners, architects and project developers to get an impression of the changing landscape of cities with food production inside.

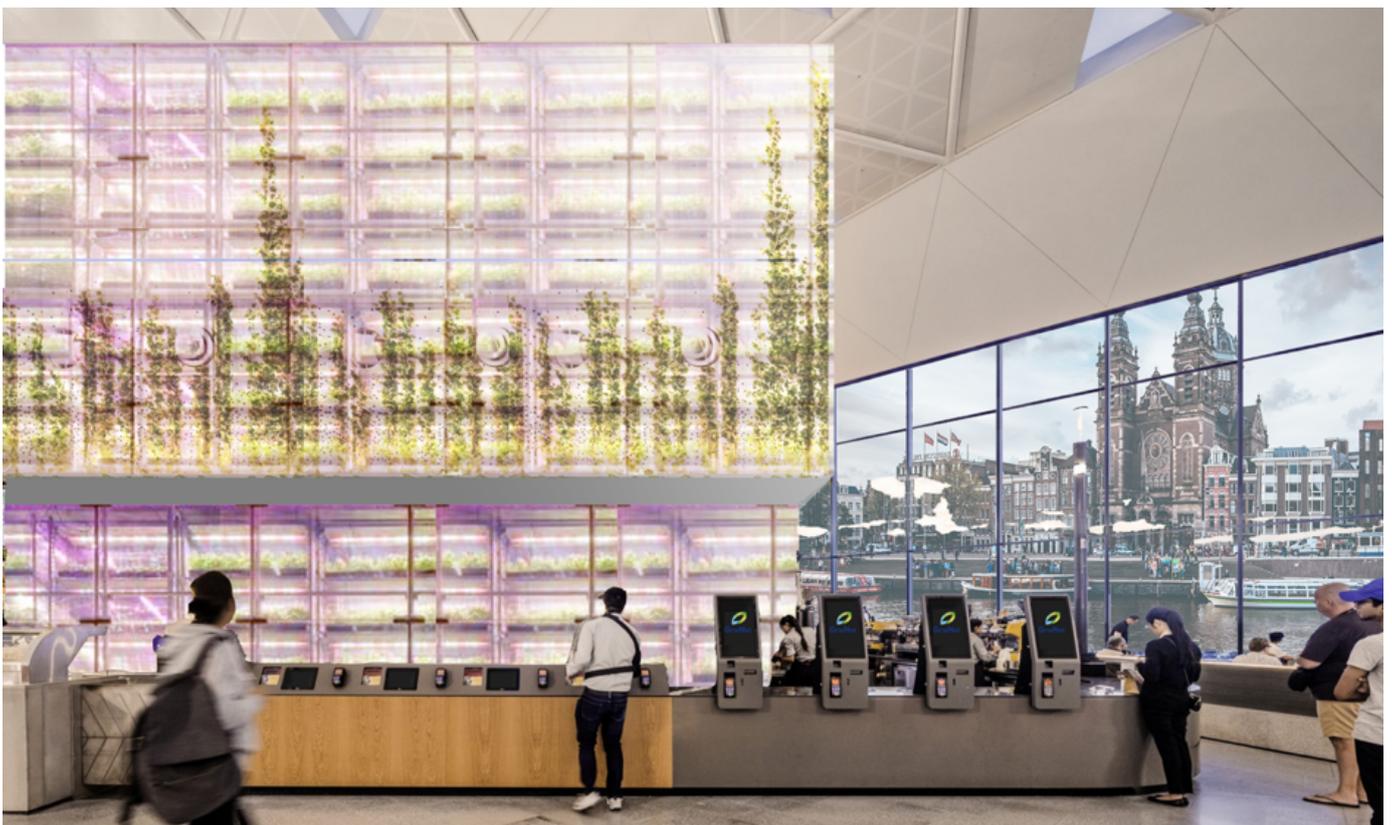
In this exploration we studied a range of questions related to specific fields, from a technology related feasibility study on integrated systems to insights in a range of megacities around the world. We worked on international mapping of operating indoor farms in megacities, making a distinction between vertical farms (plant factories) and climate rooms.

The B2B market for GrwNxt is totally different than the market of farmers or growers, the traditional horticulture and Greentech industry is focusing on. A considerable amount of time we spent on a range of deep dives on the high-end hotel chains operating in megacities, often with more than one brand. A laborious study has been done on the dataset of hotels and the visualization. It was never done before, as we noticed during roundtables with experts and CEO's from the hospitality industry. The outcome of this unique study is included in this reconnaissance study. Since the overview of the data is difficult to present in an excel table in this report, we make reference to the dataset we created on-line.



Artist impression visual developed by Bloc for MeetingMoreMinds/GrwNxt, March 2020

Some vertical farming companies see the supermarket and e-delivery as great markets. For us a reason to dig deeper in the potential. We saw particularly the differences in the concept of supermarket, grocery store and e-delivery in Asian countries compared to Europe and North America. It reassured us not to jump immediately into that highly fragmented market with a complex and non-sustainable distribution challenge in megacities.



Artist impression visual developed by Bloc for MeetingMoreMinds/GrwNxt, March 2020

We work on the New New Thing where advanced technology and building up intellectual property rights is crucial. Therefore, we gave a closer look at the item of legal protection and intellectual property in China. The Chinese market will be by far the largest market for GrwNxt-type of concepts. During a working visit in 2019 we noticed sincere interest. The number of megacities is high and rising rapidly. The demand for safe food is high as was underlined by the delegates of the municipality of Beijing (22 million inhabitants). Recent incidents with SARS, pigs-virus related disease and the pandemic Covid-19 speak for itself. By law the legal protection is secured in China, however, protection of intellectual property can be different in practice. We were grateful for the insights offered by Buren Legal Office in Beijing, and at an earlier occasion by their office in Shanghai.

The New New Thing must be validated with figures in terms of a business model. To conclude we did a Deep Dive on the financial feasibility of GrwNxt. Together with financial business modelling experts we run several models (best, medium and worse case) for a range of 10 years. Figures in excel are no predictions with guarantees. At most they give a range of the potential based on certain assumptions and parameters. The outcome is highly promising. After the development and piloting phase, the scalability of the data-driven concept can bring GrwNxt in a steep curve with fast growth and high revenues. Much will depend on the test results of the pilots and the foresight of the first launching customers in the hospitality industry.

This reconnaissance study has been executed by an international and interdisciplinary team of MeetingMoreMinds and GrwNxt under supervision of Prof. dr. Annemieke Roobeek. The Deep Dives have been discussed in a collaborative spirit with stakeholders, supporting companies from the Greentech industry (Certhon, Alumat-Zeeman, Hogendoorn, Koppert-Cress, Cultilene, Sygnify, 30Mhz) to the hospitality industry, experts from universities and institutes of knowledge (WUR, TU Delft, Erasmus University Rotterdam, Free University, University of Amsterdam). A special thank you for the Province of North-Holland for making this study on High Tech Sustainable Solutions for Feeding Megacities possible in the framework of the Research Agenda.

In this study we used many illustrations from different sources. We have tried to limit us to publicly free available material or material offered to us. We would like to thank all who provided us with pictures that illustrate the findings of our research.

Amsterdam, The Netherlands, March 2020