Unlocking the Potential of Indoor Farming in Cities of the Future

Urban Future Global Conference
May 22-24, 2019, Oslo, Norway

Association for Vertical Farming
PREFACE by Christine Zimmermann-Loessl, Chairwoman, AVF

AVF, founded 2013, is a worldwide acting non-profit organization in the fields of indoor/vertical farming. We are a network of like-minded people, universities, companies, and experts—so we are based on something that new science discovered as the basic organizational form of life—every cell, human society, even companies, the global economy, and nations are organized according to the same principal patterns of a network.

We need to remember that nature is founded upon circular processes occurring over billions of years! How can we ever think that linear production, living styles, economic systems can work successfully? We do not have to reinvent the wheel of circular processes—we only have to observe and understand what and how nature is doing it. Vertical Farming can be such a technology—embedded in the resource and waste flows of a city it can and will be a primary pillar of a resilient sustainable city concept based on the circular economy concepts.

Cities play a critical role in global climate change and resource consumption. Food production and agriculture have a significant impact on the environment and climate, by adding significantly to greenhouse gas emissions. We need to transform this into healthy processes. Consumers have become increasingly aware of this negative role and beginning to change their behaviour to demand fresh, healthy produce locally grown. Vertical farming has the potential to contribute to sustainable urban food production and reduce environmental destruction.

AVF’s role at Urban Future

Indoor farming meets the requirements for all seventeen of the UN's Sustainable Development Goals. Accordingly, it also touches on all of the Urban Future programme's 10 tracks. Why then, do so many smart-city strategies leave out food completely? It is our belief that food production is among the most relevant topics for the future of cities. The right to food is a basic human right, and cities can either ease or disrupt access to healthy food.
The Association for Vertical Farming is an internationally active non-profit organization focusing on advancing Vertical Farming technologies, designs, and businesses. We foster the sustainable growth and development of Vertical Farming technologies around the world through educating, connecting, sharing, partnering, and promoting. We see our leading role in bringing together all forces in the field of Vertical Farming from research, business, and policy to create opportunities for the sustainable growth of Vertical Farming around the globe. Our mission is to facilitate the global implementation of Vertical Farming systems to ensure food security, food safety, green jobs, environmental protection and climate change resilience.

Urban Future Global Conference is Europe's largest event for sustainable cities. It's the place to meet the most passionate and inspiring City Changers from all over the world. This year's event is being held in Oslo, the European Green Capital 2019. Over 3000 participants, 400 cities and 300 speakers who discuss in 85 sessions mobility, circular economy, leadership, green buildings and food in the city of the future.
**Wed. May 22**

**9.00-10.30 Plenary Session: The Science of Food Production in the City.**
Science in food production plays a crucial role, especially in high tech CEA systems where we control all parameters. How is light influencing the growth of plants? How to configure a complete and complex indoor system to successfully implement indoor farms in cities of the future? This is the session’s core focus.

Session Chair: Joel Cuello, Professor of Biosystems Engineering, The University of Arizona

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**Wed. May 22**

**11.00-12.30 Plenary Session: Food and Future Cities.** An estimated 2.4 billion people, 56 percent of the world urban population live in cities and we need to feed them. This trend is rising till the end of the century. In the past decade we have developed revolutionary new technologies to produce food like 3D printing. Vertical Farms, cultured-meat production all of them can be done in cities at the doorstep of the majority of the consumers. We need to include all of this into urban planning and our understanding of how and what we want to eat in the future. Let’s discuss the challenges, options and promises.

Session Chair: Christine Zimmermann-Loessl, Chairwoman, AVF

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Workshop I: Upcoming Technologies and renewable energies in the next generation of indoor farms. All technologies in different industries are improving at an exponentially fast pace and indoor farming is no exception. On top of needed improvement in climate control systems, lighting solutions, circular nutrient delivery systems, automation and farm management, there are new developments in the fields of IT, Renewable Energy and Biotechnology that can be game changers for this industry. The Internet of Things, Artificial Intelligence, integration of energy production systems and specifically-bred species for indoor farming are just some examples of these developments. In this workshop we will delve into the potential of newly introduced technologies for the next generation of Indoor Farms.

Workshop II: Indoor/Vertical Farming Designs and Strategies. The long-term success of indoor/VF depends, not only on its sustained optimal crop productivity, but also on its sustainability: economically, environmentally and socially. Indeed, as an aspiration for the industry, Cuello's Law provides that crop productivity per unit resource use in a tech-dense vertical farm must double every four to five years. Thus, novel and innovative designs and strategies for indoor/vertical farms are needed to ensure threefold sustainability. This workshop will examine and discuss up-to-date designs and strategies for indoor/vertical farms.

Workshop III: Can Blockchain Technology advance the Vertical Farming industry? In the middle of the jungle of hype and buzzwords surrounding Blockchain, we approach the topic hands-on with Bernhard Hecker from Value.Digital. We will take a look at the Blockchain technology itself and gain insights into actual success models. We will first take a look at the technologies and their implications, but also learn where they are not useful. We will learn about actual blockchain models in practice, with legal references and implications for vertical farming. We will discuss in groups which ideas can be used to facilitate the working environments of the participants through blockchain. Results of the workshop will be presented to the group at the end.

Roundtable Discussion: Food and Future cities— growing food where people live: what why and how? Join us in the afternoon of May 23rd to sum up all that we have learned. Food production meets all of the UN's 17 Sustainable Development Goals; accordingly, it also touches on all of Urban Future's thematic areas. Why then is food production so often left out of city planning? This roundtable discussion will cover the importance of placing food at the centre of city planning, and the best ways to go about doing so. Hear unique industry perspectives on what is working and what needs to change, and then take the opportunity to ask questions in a 20-minute public Q&A session.
Ynsect farms insects to make high-quality, premium natural ingredients for aquaculture and pet nutrition. With growing global demand for premium proteins, we produce YnMeal, a premium protein, as well as other quality insect ingredients such as YnOil and YnFrass fertilizer. Our mission is to be a leading global provider of sustainable, premium nutrition for all by tapping the natural goodness of insects at large scale. https://www.ynsect.com/en/

Crop One is transforming the agriculture industry, using advanced hydroponic technology and proprietary data analytics to provide pure, safe, and consistent produce year-round. This is the company behind the successful container-farming group FreshBox Farms, who grow top-quality produce in controlled environments for retail in the state of Massachusetts This is the company building the biggest vertical farm in Dubai to feed the Middle East high fliers. https://cropone.ag/
Founded more than 10 years ago by plant scientists and biologists with a vision to make commercial crop production more connected and resource-efficient, Heliospectra has become the industry’s most proven intelligent lighting solution for greenhouse and controlled plant growth environments. https://www.heliospectra.com/

Intravision Group is a photobiology and systems integration company working with new technologies for the production of foods and plant-made pharmaceuticals. Their focus is on multi-band and spectrum variable LED lights enabling biological control and optimization of plant responses to specific wavelengths between UVA and IR light. Their headquarter is in Oslo, Norway, with offices in Shanghai, China (production and sales, Asia), and Toronto, Ontario, Canada (R&D and sales, Americas). www.intravisisongroup.com
Ali Ahmadian  
CEO  
Heliospectra AB

Speech: Vertical Farming 2.0: How Light Influences the Future of Food

As CEO, Ali Ahmadian works with growers and cultivation teams across the globe to ensure that their businesses scale and increase profitability using Heliospectra lighting solutions and technology. Ali previously served in executive leadership roles with Tetra Pak in both global and regional positions after starting the company Abban Co. in Iran. Ali has also driven the management consultant company EXPEED AB with a focus on advising international companies in their business development, organizational development and sustainability issues.

Dr. Joel Cuello  
Professor of Biosystems Engineering  
University of Arizona

Presentation: The Mobile Vertical Farm  
Workshop Session chair: Indoor/Vertical Farming Designs and Strategies

Joel Cuello is Professor of Biosystems Engineering and Director of the Global Initiative for Strategic Agriculture in Dry Lands (GISAD) at the University of Arizona. His technical expertise in both engineering and biology provides the platform for engineering designs in various agricultural and biological systems with an emphasis on optimizing productivities while fostering resource sustainability and environmental protection. He has over 100 publications, 200 global presentations, and 10 pending patents for vertical farming growing systems and photobioreactors.
Andreas Gerhardt
CEO
Kairos Group / Kairos Green Indoor Farming GmbH

Speech: New Old City Blocks: Prototypes for the City of Tomorrow

Andreas Gerhardt is a real estate developer with an inspiring vision for an urban future. “Our buildings are not islands in the city, they are locally networked, they influence and change their urban environment. I see my main task in developing buildings that give the places new, lasting impulses. Dissolve the spatial separation between work and life and contribute to the development of buildings for urban production. I am interested in the city of tomorrow, socially, technically, structurally. Economic success is important, but not determinative.”

Per Aage Lysaa
CEO
Intravision Group

Presentation: Introducing the GravityFlow automated controlled environment plant production system

Per Lysaa invented the GravityFlow system in 2015 intended for automated production of Plant Made Pharmaceuticals via transgenic tobacco and vacuum infiltration of agrobacterium. Tuning this system towards food production, a pilot leafy-green facility became operational in Toronto during spring of 2018. Currently two large scale facilities are under construction, one in New Jersey vis a vi Manhattan, and the second in St Catherine’s outside Toronto. The commercial aim for these facilities is to demonstrate ability to compete with superior quality produce on commodity-scale and -price level. The technology is co-developed by Oslo based Intravision Group, with a Canadian space research institute; the Controlled Environment Systems Research Facility, at the University of Guelph, and with Canadian and American partners on process automation and air-dehumidification.
Dr. Leo Marcelis  
Head of Chair Group, Horticulture and Product Physiology, Wageningen University

Speech: Vertical Farming: The Sky is the Limit?

Professor Leo Marcelis researches and teaches plant production in vertical farms and greenhouses. He has a deep knowledge on how plants respond to environmental conditions and how this knowledge can be used to control crop production and quality. His research contributes to sustainable horticultural production while improving crop production and quality. He has (co-) authored about 170 scientific articles and 275 articles for growers or general public, and 30 radio/TV interviews.

Gertjan and Lianne Meeuws  
Co-Founders  
Seven Steps to Heaven

Speech: Hungry Cities

In the world of indoor farming, you would be hard pressed to find a company with more expertise than Seven Steps To Heaven, co-founded by vertical farming pioneers Gertjan & Lianne Meeuws. With decades of experience collecting horticultural data, consulting on best practices, and running successful indoor farms, they have been involved in the evolution of this industry from an early stage. As Gertjan says: “The mission of agriculture must be: feeding the world in a smart way.”
Josef Schmidhuber is the Deputy Director, Trade and Markets Division at the FAO, which is a specialised agency of the United Nations that leads international efforts to defeat hunger. Their goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. Josef thinks that there is a growing recognition for urban agriculture, which can make an important contribution to better diets at lower resource footprints, enhanced micro-climates (ambient cooling) and even reduced import dependencies.

Pitichoke Chulapamornsri is the Vice President of International Business Development and Strategic Project at Crop One Holdings, Inc. The company is transforming the agriculture industry, using advanced hydroponic technology and proprietary data analytics to provide pure, safe, and consistent produce year-round. Crop One is building the world’s largest vertical farm in Dubai, following a joint venture with Emirates Flight Catering. At the core of the company is creating a food system that can sustainably provide nutritious, fresh produce in and for communities, regardless of the geographical location.
For further details please contact us:

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