URBAN CROP SOLUTIONS

Envisioning the future of urban landscapes: The rise of high-tech farming

By Cath Isabedra

Imagine strolling through the busy streets, where amidst the concrete jungle, lush greenery thrives above, below, and all around you. Rooftops, abandoned lots, and even underground bunkers are transformed into vibrant farms teeming with fresh produce. But this is no longer a distant dream. With urban farming technologies, it has become a tangible reality.

Feeding the swelling populations sustainably becomes an ideal and urgent necessity. Urban farming and its innovations can turn urban spaces into bastions of food production.

The shift towards urban agriculture is propelled by the imperatives of environmental sustainability and food security. Urban farms offer a promising alternative in a world where traditional farming is strained by climate change and urban sprawl. These green oases utilize vertical spaces, recycle water, and minimize transport distances, slashing carbon footprints and bringing food production back to the heart of urban communities.

I first met **Frederic Bulcaen**, Founder of Urban Crop Solutions, during the 2022 Agri-Food Summit in Singapore. I already saw his eagerness to showcase Urban Crop Solutions and how they can help make sustainability even more accessible to all.

Once again, Frederic indulges us in an interview to talk about Urban Crop Solutions and how cities can harness technology to survive and thrive, transforming rooftops and empty buildings into sources of life and vitality.

Why integrate technology with urban farming?

Integrating technology with urban farming significantly boosts efficiency and productivity. Smart irrigation systems, for instance, use sensors to monitor soil moisture levels, ensuring that plants receive the optimal amount of water. This conserves water and promotes healthier plant growth. Automated systems can manage tasks such as planting, harvesting, and pest control, reducing the need for manual labor and allowing urban farms to operate more smoothly and consistently.

Urban Crop Solutions understands that no two urban farms are alike. Each installation must be tailor-made to fit a city's specific environmental and economic contexts. Frederic explains the necessity of customization, saying, "Our customers often want a customized installation tailored to the building or space they have available and the specific purposes of their business."

The integration of technology like ModuleX not only enhances operational efficiency but also maximizes crop yield, proving essential for commercial growers. "The flexibility of growing crops that have different growing days is important for most of our customers," Frederic points out. This adaptability enables growers to respond dynamically to market demands and prices. ModuleX's low energy consumption also marks it as one of the most sustainable systems available, aligning with the global push towards energy efficiency.

"We have developed several standard products that are scalable such as our ModuleX and our Farmflex product range.

This bespoke approach allows Urban Crop Solutions to not only meet but exceed the expectations of urban farmers, ensuring that each system is as productive as possible.

Technology integration is critical to achieving this high level of customization and efficiency. Frederic details the process, "The machine controls, sensors, and even the software of an indoor farming installation are usually adapted to meet the requirements of the customer." This customization extends to ensuring seamless integration with other operating systems the clients might use, enhancing both usability and functionality.

"We find that there are still many customers looking for the right market segment. Unlike greenhouses or other indoor farming systems, our ModuleX is very flexible, and apart from possibly investing in custom trays, nothing is needed to switch to other crops. We have already successfully grown many crops in our systems. Besides the specialty crops that you hear and see everywhere, we found the tests with "cactus-like plants" the most surprising."

Addressing urban farming's maturity

Urban farming has reached a critical juncture in its development, evolving from a niche concept to a significant component of modern agriculture. As urban farming technology advances, it faces the challenge of ensuring market adaptation and acceptance, particularly within traditional farming communities. Integrating these new methods with established practices and within food processing companies remains a significant hurdle.

Frederic explains, "We note that it is not easy to integrate urban farming technology into traditional farming techniques or into food processing companies. However, we believe that these are the actors who will use the technology in the future. They either have experience in farming or in running a (food processing) factory."

Despite the potential of urban farming technology, its adoption is not yet widespread.

> **We underestimate how many people do not yet know the indoor farming technology or believe how operationally secure or stable it already is to date, Frederic notes.**

He emphasizes the importance of larger indoor farming companies, which are currently making significant strides in local markets, in raising awareness and proving the viability of these technologies. While retail industries are unlikely to produce their food immediately, existing factories and major indoor farming entities are expected to drive the transition.

Navigating regulatory challenges

Urban farming's growth is also complicated by regulatory challenges that vary significantly across regions. There is often a lack of understanding about the capabilities and practices of indoor farming facilities, resulting in inconsistent legal frameworks.

Frederic points out, "A big issue is whether a crop from an indoor farming facility is allowed to use the organic label or not. Personally, I would prefer that people create a separate label for indoor farmed crops instead of trying to have the organic label."

This distinction is crucial as indoor farming offers distinct, easily verifiable benefits compared to traditional organic farming.

Another regulatory challenge is defining the status of indoor farms—whether they are purely agricultural or also considered food processing units. This classification affects how land can be used and the applicable regulations.

"Here in Belgium, land is available for agriculture, industry, retail, or residential use. But under which statute does an indoor farm fall?" Frederic asks.

He highlights that local legislation is often adequate for smaller, local operations, but larger mega farms aiming to export their produce face more complex regulatory landscapes. The focus on local production for local consumption simplifies many regulatory concerns, aligning well with urban farming's strengths.

Investment and operational costs

For new entrants, the high initial investment and operational costs of urban farming can be prohibitive.

Frederic acknowledges, "It is not easy for startups that want to get into the urban farming sector because the market is certainly not yet mature enough to immediately choose the right business segment."

Despite the uncertainties, he believes in the long-term potential of urban farming technology. His advice to startups is to address specific market problems actively.

> **The advice I have for start-up companies in the urban farming sector is to build your business from the solution to a concrete problem you see in the market at an active company.**

Frederic recounts Urban Crop Solutions' journey, highlighting their strategic decision to become technology providers rather than commercial plant producers. This approach allowed them to remain competitive as the technology evolves.

He observes that experienced industrial players are beginning to experiment with advanced urban farming technologies, seeking practical and commercially viable applications. This trend indicates a promising future for urban farming as these technologies become more refined and integrated into mainstream agricultural practices.

Collaboration — the key to innovation

At the heart of Urban Crop Solutions' transformative approach to urban farming is a strategic pivot from traditional, isolated research methodologies to a collaborative, open-innovation model. This transition reflects a deep understanding that the future of urban agriculture depends not only on technological advancement but on the synergy between technology providers, end-users, and academic researchers.

This market-driven approach to innovation is about creating theoretically sound, practically viable solutions, and immediately integrated into existing urban farming operations.

This collaborative framework facilitates a rapid iteration cycle, allowing Urban Crop Solutions to refine their technologies in real-time based on direct feedback from the field. This dynamic accelerates the development process significantly. The benefits of such an approach are manifold, such as enhanced adaptability to market demands, quicker troubleshooting, and the development of customized solutions that cater specifically to the nuanced needs of urban farmers.

Moreover, this collaborative ethos extends beyond mere product development. It fosters a community of innovation where knowledge, challenges, and successes are shared openly. This enhances the products and solutions and contributes to the broader knowledge base of urban farming technologies, propelling the entire industry forward.

Shaping the future of urban farming

Looking ahead, the most promising innovations in urban farming revolve around the refinement and customization of existing technologies rather than major hardware breakthroughs. Frederic highlights, "We believe that in terms of hardware, there are no major breakthroughs to be made in our market in the short term. Customized installations score better than the standard solutions that especially American companies are promoting."

Focusing on smart engineering and tailored solutions allows significant improvements and efficiencies over standardized approaches.

Another anticipated breakthrough is the development of particular seed varieties tailored for indoor farming applications. However, progress in this area has been slower than expected, with new companies struggling to deliver on their promises. Frederic notes, "We believe that it will be the old traditional seed companies that will eventually provide the step forward here." This suggests that established players in the seed industry are better positioned to make meaningful advancements.

Consequently, the growth of indoor vertical farming will be more gradual, conquering niche markets one at a time, akin to the steady progress seen in the 3D printing industry.

Urban Crop Solutions is poised to play a crucial role in this evolving landscape. By continuing to innovate through customized solutions and leveraging their expertise as technology providers, they will help drive the sustainable growth of urban farming.

With insights from Frederic Bulcaen, Founder of Urban Crop Solutions

Frederic Bulcaen is an innovative entrepreneur and the founder of Urban Crop Solutions. He is dedicated to transforming agriculture with new technologies, focusing on vertical farming to make urban agriculture more sustainable.

Frederic started Urban Crop Solutions in 2014 to help farmers grow fresh produce in any environment, regardless of space or climate. His company is now a global leader in vertical farming, providing advanced technologies to clients worldwide. His innovative work has earned him recognition in the industry.

Before founding Urban Crop Solutions, Frederic worked at Deloitte, gaining experience in business strategy. He then led Typhoon NV, an engineering and production technology company, where he honed his leadership and innovation skills.

Frederic's commitment to sustainability and innovation drives Urban Crop Solutions, making it a key player in the future of sustainable food production.