

Urban food from vertical farming

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Credit: diephotodesigner.de

Your local supermarket and favourite restaurant could soon be growing their own food, thanks to an EU-funded project that has completely redesigned the food supply chain to develop the concept of in-store farming.

Our busy, modern lives demand that fresh produce be available 365 days a year, even though some varieties may only be seasonal and/or produced on the other side of the world. The result is a [food](#) system centred on quantity, low prices and efficiency rather than on quality, sustainability and traceability.

The EU-funded INFARM (The vertical farming revolution, urban Farming as a Service) project reflects a growing desire for highly nutritious locally grown food, which is free of herbicides and pesticides

and addresses the lack of accountability in the current food system. "By growing produce directly where people eat and live, we can cut out the lengthy supply chain, significantly reduce food waste, offer nutrient-dense food without any chemical pesticides and improve the environmental 'foodprint' of our [plants](#)," says the INFARM's Chief Technical Officer and co-founder, Guy Galonska.

The answer lies in vertical farming, which grows food in vertically stacked layers under carefully controlled conditions, using hydroponics and light-emitting diodes (LEDs) that mimic sunlight. INFARM takes the concept a step further by employing its smart modular farming units throughout the city "Rather than asking ourselves how to fix the deficiencies in the current supply chain, we wanted to redesign the entire chain from start to finish; Instead of building large-scale farms outside of the city, optimising on a specific yield, and then distributing the produce, we decided it would be more effective to distribute the farms themselves and farm directly where people live and eat," Galonska explains.

Use of technology

Each farming unit is its own individual ecosystem, creating the exact environment for plants to flourish. By developing the optimal light spectrum, temperature, pH, and nutrients researchers can ensure the best possible flavour, colour and nutritional quality for each plant, whether it be rocket from Provence, Mexican tarragon or Moroccan mint.

The distributed farms are connected by INFARM's central farming platform, creating a first of its kind farming network: "Each [farm](#) acts as a data pipeline, sending information on plant growth to our platform 24/7 allowing it to learn, adjust and optimise." A matrix of sensors collects and record data, enabling researchers to remotely optimise the growth of the plants in real-time. This information is also fed into the

central farming platform, ensuring its continual development and improvement.

The design of the growing trays mimics the petal pattern of the sunflower, which represents the most efficient arrangement of space in nature. The tray moves plants from the centre to the outer perimeter according to their size and growth. Young seedlings are placed in the centre of the spiral and are harvested from the outside when matured. This design allows fresh produce to be harvested each day at a significantly higher output than comparable technologies.

Supply chain reduced

INFARM is now operating more than 50 farms across Berlin in supermarket aisles, restaurant kitchens and distribution warehouses. In addition to the in-store farms, INFARM has successfully installed and activated a large-scale seedling plant and logistical support system that allows the continued, successful operation of all farming units.

These results are the first step towards creating an [urban farming](#) network in Berlin that will ultimately make the city more self-sufficient in its food production. According to Galonska: "With our system, we have completely reduced the food [supply chain](#), as our produce is grown in the heart of the city, often directly at points-of-sale. Thus, customers can purchase [fresh produce](#), minutes after being picked, thereby retaining all its original nutritional qualities, which are lost when the produce is transported and refrigerated."

Those benefiting from the work of INFARM range from small grocers to global retail conglomerates and governments interested in water conservation, food security and reducing greenhouse gas emissions. Galonska concludes, "INFARM's innovative business model has attracted major interest and I believe that our success will serve as proof,

to both aspiring entrepreneurs and established companies, that going 'green' can be profitable and sustainable."

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