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PROMOTING ACCESS TO PRODUCE SOURCED FROM URBAN AGRICULTURE: THE CASE OF METRO AND INFARM

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Florian Cointet, General Manager of Infarm,
in the METRO indoor farm - ©Maja Bialon

A graduate of the National Institute of Applied Sciences (INSA) and the ESCP European business school, Florian Cointet worked in strategy and operations teams at Givenchy, EFESO Consulting and EY-Parthenon before joining Infarm in September 2018 as General Manager (France).

Marie Garnier is a veterinary physician and has been Quality and Sustainability Director at METRO France since 2011, having previously been Quality Manager at the Monoprix supermarket chain for seven years.

A graduate of the Université des Eaux de Vie in Segonzac, Flavien Sollet joined METRO in 1997 and became manager of the Nanterre store in December 2016.

In November 2018, the METRO store in Nanterre opened Europe's largest indoor urban garden, operated by the startup Infarm. Incorporated directly into the wholesaler's store, the Infarm garden is based on a vertical hydroponic design using a closed water loop that allows production of several varieties of herbs throughout the year. Although yields are as high as 600-700 plants harvested per day, equivalent to 4 metric tons and 40% of the herbs on sale in the store, the environmental impact of this initiative is appreciably lower than with conventional farming.

Despite the inevitable differences in size and business culture – a startup working with France's leading supplier to the independent catering industry – the two organizations complement each other impressively well. Infarm grows the produce right inside the store with a full-time team of two people who deliver their herbs to METRO department managers literally just a few meters away, ensuring an ultra-local supply of super-fresh herbs.

METRO and Infarm signed a partnership agreement in 2018 to create Europe's largest indoor urban garden inside the METRO store in Nanterre. How did this come about?

Florian Cointet: To understand the origins of this collaboration between Infarm and METRO, we must go back to the creation of Infarm a few years ago. The project was started by Osnat Michaeli and the brothers Guy and Erez Galonska, who left Israel for Berlin in 2012. They wanted to make fresh fruits and vegetables accessible in winter without harming the environment and started to experiment with *indoor* growing methods. They began very simply by growing salad crops in their lounge.

They officially founded their startup Infarm in 2013 with support from investors and European Union funding. Their goal is to offer a new urban farming model that can provide high-quality, fresh, environmentally friendly plants, and their main business is building indoor vertical farms.

In 2015, with only a dozen employees on board, the startup gained the attention and trust of METRO Germany, with whom they signed their first partnership agreement. The wholesaler invested in an initial prototype, a small cube for growing herbs inside one of the largest stores in the Friedrichshain district of Berlin. The success of this first partnership enabled Infarm's expansion into other METRO branches.

A fresh injection of capital followed, which gave impetus to a strategy of expansion across Germany and Europe. In 2016, Infarm's French organization approached METRO France to enter a partnership to create a new indoor vertical farm dedicated to herbs, which opened in 2018.

Marie Garnier: The story of our partnership can basically be traced back to our visit to the METRO pilot in Berlin, which proved it was possible to make plants grow inside a retail space. After this meeting, we wanted to stay in touch with Infarm as they continued to develop their technologies and equipment. In the years following, we saw increasing demand from the community and from consumers for more responsible, and environmentally friendly production methods with a shorter supply chain. Our partnership with Infarm is in line with METRO's determination to meet these demands and new challenges.

We believe Infarm differs from other innovative urban farming initiatives because the real objective of their farms is to supply sales outlets, unlike other projects that have a primarily educational, entertainment or esthetic focus. These models are also interesting, but they address issues other than production. We are focused on Infarm and METRO's joint vision of harnessing urban farming to ensure sustainable and ultra-local provision that is also scalable. We also wanted to grow produce that meets our customers' demand for quality. This is now one of the key factors in the partnership's success – herbs grown on



Outside view of the Infarm indoor farm in METRO's Nanterre store - ©Maja Bialon

site, in the store itself, have real advantages in terms of both freshness and flavor compared with what you would usually find in supermarkets.

What are the advantages of the indoor farm model developed by Infarm inside the METRO store compared with other existing systems?

F.C.: Infarm has designed a vertical garden that can accommodate herbs at various stages of maturity and allows regular harvesting. Infarm vertical farms have a cabinet structure with a standard width and depth (2 x 1 meters) to accommodate the machinery beneath, but with variable height, so they can be adapted to more limited spaces. Farms can be added as you like, accumulating and adapting them to the space available. The one condition is having access to water and electricity. In the farm at METRO, there are 18 gardens in total, adding up to an area of 80 square meters. The plants are distributed across 200 trays, and each tray contains different stages of one variety. Young seedlings are planted in the middle of the tray, where they have more space to grow; growing plants are placed outside these, with the most mature plants positioned at the edges of the tray. Once a week, the plants at the edges are harvested.

In addition to this design, Infarm developed its own hydroponic system. The principle of *hydro* (Latin for water) – *ponics* (Latin for grow) is simple: growing things in water. This ancient method can be traced back to the Gardens of Babylon and to the Maya, who planted crops in rivers. The organic plant seeds are placed in a neutral substrate that supports their roots, then germinated in a nursery. When the computer system tells us they have germinated, the plants are placed in the water in the middle of the tray.

The water is used as a nutrient medium. It's stored in each module's tank, enriched with nutrient solution – the recipe for which was developed and is regularly modified by Infarm – that provides the nutrients required for plants

to grow, such as calcium, potassium and magnesium. A robot constantly measures and balances the parameters (nutrients, pH, electrical conductivity, temperature, etc.) of the water used to irrigate each tray, which then flows back down into the tank. So, we reuse this water in a closed cycle, meaning very little is used – just enough to replace the water lost through evaporation.

To provide the light needed for photosynthesis, we use LEDs that reproduce white light. The intensity is less than with the red wavelengths, which can boost plant growth, but consumes less energy. We're currently working with a doctoral student from Paris Tech to lay down a more precise analysis of the life cycle of our plants and our resource consumption.

We also use many new technologies, such as the Internet of Things, robotization and artificial intelligence, to perfectly and continuously control the conditions in which the plants grow. Each farm has a robot and computer connected to the internet, which have 20 or so sensors to measure and adjust the various parameters (water, light intensity, ambient temperature, etc.), alter water levels by activating pumps, reproduce the day-night cycle, etc. All this information can be accessed through a computer or smartphone app that enables remote management of the parameters. Nothing's left to chance in this model!

You're only growing herbs at the moment. Why did you choose this type of plant?

F.C.: Infarm made a strategic choice to specialize in herbs because these plants are well suited to our *indoor* model, and also because there is real demand for quality herbs and original varieties.

Flavien Sollet: We started with really classic varieties, like chives, parsley, basil, etc. But we realized we could offer our customers more specific, more exotic varieties that are less commonly sold in France. These species were

previously rarely sold due to their high price and low quality, but the availability of Infarm herbs has allowed us to increase our sales volumes for herbs that have increased their market share. This includes, for example, kale, garden cress, confetti cilantro and Thai basil, of which we now sell around 15 packs daily. Wasabi rocket, previously unknown to French chefs, has also been highly successful and is now in great demand. Recently a chef asked for sesame seed sprouts, which we'll be developing with Infarm. We're offering something extra that attracts new customers and adds to the diversity of restaurant owners' purchases.

M.G.: We could describe that as research and development conducted directly with the customer. This creates a virtuous circle in which we respond to their requests in an almost bespoke manner.

METRO and Infarm are very different companies, in their business areas, their size and potentially their business culture. How are roles and responsibilities shared within your partnership?

M.G.: Our collaboration is actually based on how our structures complement each other. METRO made an initial investment to be able to benefit from having the garden in-store and established a partnership with Infarm for a complete service, with a dedicated team within the store who looks after the site day to day. METRO then takes over with everything involved in getting the herbs onto the shelves and marketing them.

F.C.: In this partnership, Infarm doesn't just provide the garden or limit its role to that of a supplier that would regularly deliver plants to the site. A two-person Infarm team works full time every day here at METRO Nanterre. They harvest the plants every afternoon, package them and then deliver them to the METRO department manager concerned. Everything is done in a space limited to around a hundred meters. This is pushing the short food supply chain concept to extremes!

But our collaboration goes further. The Infarm team is also on site to better understand the commercial dynamics of each of our plants, allow chefs and customers to taste and discover our produce, and offer new varieties depending on demand and what works best. We're in an ongoing dialog with METRO, their department heads and customers.

M.G.: These regular exchanges are one of the keys to the success of our partnership so far. I think the METRO and Infarm teams alike are learning a lot from this new experience and from this shared workspace that enables positive and constructive exchanges. For us, this is also a great source of motivation internally.



Daily harvesting of herbs by the Infarm team -
©Maja Bialon

What are the current results of your partnership?

F.C.: We're seeing a very productive yield: 600-700 plants (i.e., 200 sachets of plants) are harvested every day, which is equivalent to 4 metric tons per year. This accounts for around 40% of herbs on sale in the METRO store in Nanterre.

The environmental footprint and the return on resources are far better than in traditional agriculture. The closed water loop uses 95% less water than conventional farms, and delivery takes place on site by simply travelling the few meters between the farm and METRO's shelves. Now that's what you call ultra-local production! Even the packaging is made from maize starch and totally compostable.

F.S.: Our customers have also been noticeably impressed by this farm. The price of Infarm herbs is somewhat higher (around 20% more compared with other herbs), which elicits two types of reactions. "Pro-produce" restaurateurs, mostly from high-end or casual fine dining restaurants, were instantly smitten with the local and sustainable production method, absence of pesticides, plants sold with the roots still attached and more marked flavor.

Some customers' reticence over the price was overcome the moment they tasted the produce – that's the deciding factor. Restaurant owners often have very ingrained professional consumption habits, considering they have to keep dishes profitable. They are used to choosing the same kind of produce – the things they know. We are therefore undertaking a process of tasting, education and customer activation so they can discover the difference in taste between herbs from our garden and those from other sources, but also to help them discover new herbs and recipe ideas. At the opening, for example,

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we had the pleasure of welcoming Guillaume Gomez, head chef at the Elysée Palace, who placed an order. As the distributor, it's up to us to educate and raise awareness about new product types and production methods.

METRO supports several initiatives linked to new agricultural production methods. What role can distributors play in improving access to produce from urban farms over the next few years?

M.G.: As a major supplier to restaurants in France, METRO is indeed actively supporting several projects dedicated to new farming methods. Supporting projects like this is part of our role as a large company. We have to respond to new demands from our customers, but also to support the adaptation and transition from conventional agriculture to more ecologically and socially responsible production methods.

METRO continues to explore and support *outdoor* and *indoor* farming alike, including our partnership with Infarm, in a response to social responsibility challenges such as relocalization, transportation and energy consumption. Regarding *outdoor* farming, we began with a

partnership with *Fermes d'Avenir* (Farms of the Future), a nonprofit organisation working to accelerate agricultural transition that launched a pilot permaculture project. We currently also support *Vergers Écoresponsables* (Eco-friendly Orchards), a labelling program dedicated to environmentally friendly fruits growing in France. The approaches promoted by permaculture growers demonstrate a desire to develop a more sustainable way of farming, which we find extremely interesting and promising.

METRO continues to explore and follow these two types of farming, which appear to be different answers to the same question. This diversity is necessary because solutions are not always the same in different conditions. For example, *indoor* farming enables customers to buy herbs that are not readily available in France, in terms of quantity and quality. But for the moment, not everything can be grown using this technique, and not all METRO stores have the space needed to house indoor farms of this size. In these cases, the *outdoor* option seems a more likely solution.

Over the next few years, METRO hopes to continue with and improve its role as a platform for connecting producers and restaurateurs in the interest of transparency.

In January 2019, we also launched the METRO Foundation, which will focus on general interest measures in several areas: the meal itself, maintaining and appreciating French culinary heritage, and supporting initiatives reflecting on new models of production for the future.



Green shiso on the shelf - ©Maja Bialon