



FAQ

GENERAL

WHAT IS VERTICAL FARMING?

Vertical Farming is a method to grow crops either on vertical surfaces or by stacking acreage on top of each other, similar to a high camp/to shelves. It can be built with more than 20 layers. Vertical Farms are, therefore, highly space-efficient and can be placed in otherwise unused urban spaces like old factories, tunnels, bunkers, etc. Vertical Farms generally grow plants without soil, based on cultivation methods called hydroponic, or aeroponics.

HOW DOES VERTICAL FARMING WORK?

Vertical Farms are indoors, which gives the advantage of a completely shielded environment, highly controlled climate, and the possibility for precision agriculture.

As the plants are completely isolated from the outdoors, we replace sunlight with LED lights that adjust to our plant's needs. Vertical Farms are usually based on hydro (water)-, aero (air)- or aquaponics (combining a fishpond for fertilization with a hydroponic system). At YASAI, we use the "Deep-Water-Culture" cultivation method, which is one of the hydroponic cultivation methods. The plants sit in rafts that float in benches with their roots hanging in nutrient-enriched water. These benches are stacked on several acreage levels to maximize yield per square meter. Because we control the environment, we fully eliminated the use of pesticides.

DO YOU NEED A LOT OF ENERGY TO POWER YOUR FARM?

Even though our farm is very resource-efficient, we do use more electricity than outdoor farms. The energy our farm consumes comes from 100% renewable sources, mainly hydropower. As we designed the system from the ground up with efficiency in mind, we for example can use the waste heat of our LEDs to heat up other spaces. Ongoing research to increase efficiency and create synergies will enable us to improve constantly. As we are fully in control of our farm's environment, we are also able to grow much more efficiently than traditional farms regarding other resources.

IS VERTICAL FARMING MORE SUSTAINABLE?

Yes, by carefully deciding what crop to grow when, we believe we can deliver a more sustainable product. Our innovative farming method enables us to produce the best quality food all year round. Off-season, you will only find imported herbs on the shelves usually flown in from more than 2000 km. There is no other way of cultivation coming close to the 365-day-availability of our products in Switzerland. By growing locally, we significantly reduce transportation costs and greenhouse gas emissions. Through stacked cultivation, we can grow more with less and just around your corner. Future life cycle assessments will validate our claim to be more sustainable than traditional methods.

IS VERTICAL FARMING THE FUTURE?

By 2050, we'll need to feed 10 billion people using the same resources we currently have. Extensive agricultural practices and climate change have resulted in an alarming decline in biodiversity — and with dwindling supplies of arable land and clean water, food production is at risk. To ensure a sustainable future, we must rethink and reform our food systems. To feed today's 8 billion people, agriculture requires 40% of all ice-free land, 70% of all freshwaters, and emits 30% of all GHG emissions. Moreover, recent events have further exacerbated pressures on agricultural value chains, leading to a global rise in food prices.

We are on a mission to democratize access to local, high-quality food, produced sustainably with our soilless vertical farming model. Vertical Farming produces with far fewer resources than traditional agriculture. Additionally, it reduces food miles & food waste by growing crops in cities, eliminating carbon emissions associated with transportation and importation.

WHAT ARE THE BENEFITS OF GROWING VERTICALLY?

Our Vertical Farms are based on a circular system designed to maximize the use of freshwater, nutrients, and energy. We can grow up to 200x more per square meter by growing vertically, using 95% less freshwater, and limiting our use of fertilizers, due to our closed and controlled indoor environment. We use waste as a resource and adhere to a zero-waste policy. We don't use any pesticides, as we grow our plants indoors.

Our Vertical Farms produce healthy and tasty plants all year round – 24/7/365, right at your doorstep.

By creating a more local food system, we can achieve better quality & nutrient values and reduce food waste drastically, since almost 30% of food waste occurs during the transportation from the producer to the supermarket.

WHAT ARE THE CHALLENGES IN VERTICAL FARMING?

The biggest challenges of today's vertical farming industry are energy efficiency, initial investments to build farms, and consumer awareness. While common in Asian countries, the US and the Netherlands, vertical farming is still new to most consumers in Switzerland. Therefore, it is crucial to educate and inform consumers about the potential and positive impacts vertical farming holds.

We operate our farms with 100% renewable energy and continuously invest in research to improve the effectiveness of our energy consumption. Automation and an efficient growth cycle are important to keep the costs at the market level.

FARMING

WHAT IS THE JOURNEY OF THE HERBS FROM SEED TO FORK?

We begin with placing seeds in 100% bio-degradable plugs and leaving them to germinate for about 10 days, depending on the plant, in our Seedling Chamber. In the next step, the plants growing in the plugs will be transplanted into rafts and enter the Grow Chamber. Those rafts then swim in the system with their roots dangling in the nutrient-enriched water until the crops are ready to be harvested. This can take about 2.5 weeks. Therefore, the whole growing process from seed to harvest will take about one month on average. Most of our herbs are cut on top, will regrow, and can be harvested several times. After harvest, the herbs are packaged right at the farm and will be ready for happy consumers on the shelves within 24 hours.

WHICH PLANTS CAN YOU GROW IN VERTICAL FARMS?

Until now, most Vertical Farms grow leafy greens, microgreens, and herbs. It is also possible to grow mushrooms, medicinal plants, flowers, berries, and various kinds of vegetables like tomatoes and cucumbers. For the moment, YASAI focuses on the cultivation of aromatic herbs, but plans to produce leafy greens and berries in the future.

ARE YOU COMPETITION FOR LOCAL TRADITIONAL FARMERS?

Our goal is to replace unnecessary imports with a more robust local production. Vertical Farming offers conventional farmers the opportunity to complement their traditional cultivation with a new component. Associations of local farmers can combine forces and invest in Vertical Farming to increase the resilience of local production, by becoming independent of environmental conditions. In the future traditional green house producers could for example use vertical farms to produce seedlings.

WHAT IS YOUR YIELD COMPARED TO TRADITIONAL OUTDOOR FARMING?

Measuring yield depends strongly on the choice of cultivated plants and farm size. At our pilot farm, we have six levels of acreage. If we grow basil on all levels, we can grow a lot more per square meter compared to traditional cultivation.

WHY VERTICAL INDOOR FARMING?

YASAI creates circular food production systems in cities and regions where agricultural resources, such as freshwater and fertile arable land, are scarce. With Vertical Farming, we can actively shape the future of food production, whether in deserts, cities, remote islands or outer space. Our model boosts biodiversity by combining food production with resource-saving technologies and eliminating pesticide use. By focusing on locality and premium quality, YASAI replaces food imports and secures a reliable supply chain.

TECHNOLOGY

WHY DO YOU NEED A.I. TO GROW PLANTS?

A.I. and technological breakthroughs in agriculture have boosted production efficiency and sustainability. Thanks to new technologies we can grow more with less. With A.I. we can monitor our plants and collect data on all kinds of levels to constantly improve our growing methods. This permanently optimizes our operations and always ensures efficient use of resources.

WHICH CULTIVATION SYSTEM DO YOU USE?

At YASAI, we use the "Deep-Water-Culture" cultivation method, which is one of the hydroponic cultivation methods. With the hydroponic growing method, the roots of the plants permanently float in nutrient-enriched water and thrive without soil.

COMPANY

WHO ARE YOU AND WHY ARE YOU DOING THIS?

YASAI AG is a spin-off from ETH Zurich and a Vertical Farming startup, founded in 2020 by Mark E. Zahran, Stefano Augstburger, and Philipp Bosshard in Zurich. Our mission is to transform food systems, by building and managing vertical farms based on a circular economy. Our technology is independent of local circumstances and can therefore be used worldwide for sustainable, future-oriented precision agriculture. In the beginning, YASAI is mainly growing herbs – leafy greens and even berries will follow at a later stage. In January 2022, we launched our first product in Coop retail stores in north-western Switzerland.