AGRITECH
An innovation domain of the canton of Vaud
FERTILE GROUND FOR AGRICULTURAL TECHNOLOGY

Farming technology continues to take huge strides, and the canton of Vaud offers a particularly supportive environment for innovation in the sector.

Agriculture and livestock farming have always been among the most inventive of human activities. Modern agriculture has embraced the digital era to such an extent that, in the space of just a few years, it has transformed itself into one of the most innovative economic sectors. Among other technologies, robotics, drones, crop monitoring and tracking, imaging, optimizing inputs, smart seeding, water and fertilizer management, are helping to improve yields and product quality. Pushed forward by digitization and the developments of technological solutions, the improved efficiency of agricultural activities allows farmers to adopt more profitable practices that are also sustainable and environmentally friendly.

Supported by the Government within the framework of its federal agricultural policies, this phenomenon is particularly noticeable in the canton of Vaud. This diverse region is home to farms of all sizes and varieties, groundbreaking companies, first-rate schools and laboratories, incubators and organizations like Agroscope (a center of excellence for agricultural research created by the Federal Office for Agriculture) or the Agropôle in Molondin – a center designed to welcome farmers, innovators and entrepreneurs looking to test their solutions.

This permanent dialogue between researchers, entrepreneurs, and cantonal and federal organizations has created an accommodating environment for businesses of all sizes, from startups like Gamaya, with its range of agronomic services based on hyperspectral imaging, to ecoRobotix’s autonomous robot weeder and companies like senseFly, which develops drones that provide high-resolution mapping.

As the planet will have to feed close to 10 billion inhabitants by 2050, the canton of Vaud has become a major European player in agritech and smart farming.

“Lausanne and the canton of Vaud provide a particularly favourable territory for innovation in the agricultural sector: high-level research, large agricultural areas, and a diverse range of soils and yields.”

Dr. Thomas Anken
Project Manager, Agroscope

Source: DTE, État de Vaud
INNOVATING THE FUTURE OF AGRICULTURE

From drones and robots to microchips and connected objects, technologies developed in the canton of Vaud are pushing agriculture into a new era.

Smart farming and agritech concepts refer to all of the technological innovations that benefit agriculture and improve yields, the working conditions of farmers and the quality of their produce.

Drones and imaging
Paired with GPS sensors and increasingly high-performance cameras, drones allow farmers to monitor vast expanses of land and detect the slightest anomaly from the sky, so they can react quickly in the event of a problem. The EPFL spinoff company senseFly dominates the market for agricultural drones with its autonomous eBee model, which is capable of mapping territories up to 40 km². To function, these drones use mapping and photogrammetry software, like that developed by Pix4D.

Another EPFL spinoff, Gamaya, which fits out drones with cutting-edge remote sensing cameras, offers priority services to big agricultural countries like Brazil, which have no shortage of large-scale industrial farms. A final example, Precision Vine, is active in the wine sector. This Lausanne-based startup provides wine growers and winemakers with remote sensing data that is useful for vine management as well as the winemaking process — two distinct parts of the same value chain.

Agricultural robots: pain-free and environmentally friendly work
By reducing the most physically difficult farmwork, agricultural robots are ushering in a new age in agriculture, following on from the era of mechanization. Offering the possibility of lowering chemical use in fields by 95%, the model developed by ecoRobotix is a striking example. Controlled by a smartphone and powered by solar energy, this weeding robot, developed in collaboration with farmers at the Y-Start incubator at the Y-PARC Swiss Technopole in Yverdon-les-Bains, frees farmers from backbreaking tasks and allows them to save on labour costs, all while promoting agriculture that is more environmentally friendly.

Soilless agriculture
Fruits, vegetables and plants grown far from fields require less water and fertilizer: the development of agricultural technology can help prevent soil degradation by producing crops away from farms, even in cities. CombaGroup, based at the Agropôle in Molondin, is an outstanding case. Supported by the Foundation for Technological Innovation (FIT), the company uses aeroponics to grow lettuce, a technique that eliminates the need for pesticides and reduces water needs by 95% compared to traditional growing methods. The lettuce grows on a series of shelves lined with sensors that are able to adjust the amounts of nitrogen, potassium and phosphorous and can adapt the quantities used by the sprays. Opportunities have also emerged for companies usually positioned in other sectors. This is the case with Lumartix, whose plasma lamps are capable of reproducing the solar spectrum, allowing for a considerable reduction in operating and maintenance costs for crops grown in greenhouses.

“Instead of getting out the sprayer and spraying the entire field, our robot can move around by itself, detect undesirable plants and inject a microdose of herbicide exactly where it is required. This reduces the quantity of chemical products used by 95%.”

AURÉLIEN DEMAUREX
CEO of ecoRobotix
DOMAINE HIGHLIGHTS

By enabling professionals to refine their practices, smart farming and agritech companies offer a way of responding to the increasing demands of population growth, all while reducing the ecological footprint of the agricultural sector.

“Multinationals have no difficulty setting aside a substantial budget for innovation, but small companies need help. They are the ones we are interested in. We make infrastructures available to them that allow them to demonstrate the feasibility and effectiveness of their projects. There’s a lot of work that needs to be done to make an idea a reality. But you have to move fast, because the industry isn’t going to wait.”

STÉPHANE FANKHAUSER
CEO of Agropôle of Molondin

Smart agriculture uses data to better understand where to act and, by fine-tuning human interventions, makes it possible to react more effectively to the needs of plants or animals.

Far from eliminating the human element, agritech businesses offer farmers improved means of monitoring and planning, as well as new tools to get their job done. By automating certain repetitive tasks, connected agriculture allows farmers to focus on making the best decisions possible, saving them money on inputs and pesticides without sacrificing yields, all while preserving the quality and durability of soils.

RENOWNED FOR ITS PRODUCTION

A land of agriculture, the canton of Vaud enjoys great geographic and topographic diversity, which allows for varied and diversified agricultural production: from vineyards to fruit trees and field crops, from dairy farms to livestock, without forgetting the famous cheeses made in the high mountain pastures. Associated with a rich history and renowned expertise, the agricultural products from Vaud boast a reputation that goes well beyond Swiss borders. Many products are backed by emblematic brands and a number are from protected designations of origin, such as Gruyère and Vacherin.

Vaud’s agricultural surface accounts for 10% of the national total.

Source: État de Vaud
INCENTIVES AND SUPPORT

Whether long established or created only recently, those who choose to do business in the canton of Vaud find an extremely business-friendly climate, along with a political framework that supports innovation.

At the administrative level, aid is provided to lighten bureaucratic burdens, speed up procedures and secure business premises. Programs of support are also in place to help stimulate innovative projects in the region. SPEI offers grants to support the creation and establishment of businesses, as well as the development of industrial SMEs and startups in Vaud that want to innovate, expand or internationalize.

In the agricultural domain, there are a number of federal, cantonal and non-profit organizations that can offer companies support.

**Federal Office for Agriculture (FOAG)**
A part of the Federal Department of Economic Affairs, Education and Research (EAER), FOAG takes action so that farmers can sustainably produce high-quality foodstuffs and respond to the needs of the market, notably by means of Agroscope, the Swiss center of excellence for agricultural research. Agroscope also aims to increase the competitiveness of Swiss agriculture, carrying out research along the entire value chain of the food-processing sector. Its goals include creating a competitive and multifunctional agricultural sector, high-quality food for a healthy diet, and an intact environment.

FOAG’s Changins research station in Nyon is one of Agroscope’s three biggest sites. Agroscope employs almost 1,200 people throughout Switzerland and has developed a network of over 150 weather stations. The microclimate data these stations obtain are sent to farmers on the Agrometeo platform – which also supplies models that predict fungal diseases and the presence of pests – so that farmers can choose treatments based on the growth stage of the plant.

[blw.admin.ch/blw](http://blw.admin.ch/blw)

**Federal Office for the Environment (FOEN)**
The Federal Office for the Environment (FOEN) is responsible for ensuring that exploitation of natural resources, such as soil, water, air and forests, is carried out in line with the rules on sustainable development. FOEN has established a Technology Fund that provides loan guarantees of up to CHF 3 million to Swiss SMEs active in cleantech. These loan guarantees are for Swiss companies whose innovative products drive sustainable reductions in greenhouse gas emissions.

[bafu.admin.ch/bafu](http://bafu.admin.ch/bafu)

**Prométerre**
As a Vaud-based non-profit organization that promotes jobs linked to agriculture, Prométerre brings together farms in Vaud and has been defending their interests for over 20 years.

[prometerre.ch](http://prometerre.ch)

**INNOSUISSE**
Innosuisse is a federal agency that can cover up to 50% of R&D projects carried out in collaboration with a Swiss university. Its Innovation council can grant subsidies or incentives. Innosuisse has a budget of CHF 950 million for the period 2017–2020. It can also support people who wish to set up or take over a company through awareness-raising, coaching and training. Finally, Innosuisse awards scholarships to graduates universities involved in original entrepreneurial projects.

[bafu.admin.ch/bafu](http://bafu.admin.ch/bafu)
TecOrbe
Located in Orbe, in the north of the canton of Vaud, the Technopôle de l’Environnement d’Orbe has over 7,000 m² of buildings adapted to the needs of SMEs involved in the environment, sustainable development and renewable energies, including office space, laboratories, and industrial facilities. With cantonal support, TecOrbe also has a startup incubator devoted to creating businesses and supporting them in their initial stages of growth, even testing new technological solutions on a small industrial scale. Companies based at TecOrbe – which is a member of the Innovaud ecosystem – can take advantage of scientific networks such as Alliance, CleantechAlps, Innosuisse and Econet.ch, as well as economic networks like the Northern Vaud Development Association (ADNV) and SPEI.
tecorbe.ch

FIT SUPPORTS INNOVATIVE STARTUPS IN FRENCH-SPEAKING SWITZERLAND
Created in 1994, the Foundation for Technological Innovation (FIT) provides financial support for innovative projects from French-speaking Swiss startups that are linked to a university of applied science in the canton of Vaud (HES, EPFL, UNIL, HEIG-VD, etc.). To meet all of the criteria, projects should also have potential to develop into a life sciences, ICT or cleantech company. CombaGroup and ecoRobotix have both benefited from the foundation’s financial support.
fondation-fit.ch

“Agritech interests financiers today the way IT did 15 years ago.”

DOMINIQUE KOHLI
Assistant Director (FOAG)
ACADEMIC ECOSYSTEM LINKED TO AGRITECH

Strong links between academic research and the economic world have laid the groundwork for the emergence of a number of successful startups. Many have emerged from EPFL, where smart farming is tackled within the framework of research carried out by TOPO, a laboratory dedicated to geodesy, surveying and cartography, sensor integration and calibration, and satellite positioning.

The success of senseFly and Pix4D, two EPFL spin-offs, illustrate the positive relationship between the academic world and business. EPFL Innovation Park welcomes companies focused on technology, providing them with access to cutting-edge research carried out by highly-specified laboratories, a vast network of dynamic entrepreneurs and established businesses.

At the heart of the HEIG-VD, ICT covers all aspects of IT and telecommunications, essential for smart farming technologies. As the largest research institute at HEIG-VD, ICT carries out around 50 research projects each year, including Agrovision, a monitoring tool based on high-resolution aerial imagery.

Designed to promote improved agronomic and environmental agriculture management, Agrovision lets users characterize, in both time and space, physical phenomena such as erosion at the level of individual plots of land and allows them to measure germination dynamics. This interdisciplinary project is financed by the University of Applied Sciences and Arts Western Switzerland (HES-SO) and coordinated by the Changins School of Viticulture and Enology.

AGROPÔLE OF MOLONDIN: RESEARCHING, INNOVATING, EXPERIMENTING

Based a few minutes away from Yverdon-les-Bains and entirely devoted to the food-processing industry, Agropôle of Molondin is the first of its kind in Switzerland. Its goal is to create a center for industrial excellence and innovation at the heart of an active and high-performing production complex. It is already home to nine companies, including CombaGroup, a specialist in growing soilless crops.

Created in 2009 in Molondin, in the north of the canton, Agropôle welcomes agritech companies on its two hectares of land. The site has been designed as an accelerator for new modes of high-quality production. Chosen for the relevance of their entrepreneurial projects, companies at the Agropôle site have all gone beyond the stage of applied research and are now at a pre-industrialization phase. By bringing together entrepreneurs, researchers and established businesses at a single site, Agropôle fosters healthy competition between people and companies that share the same goal: to quickly find sustainable and innovative solutions that will help feed a growing planet.

agropole.ch

“Our core technology came out of a series of collaborative scientific projects carried out at EPFL. We continue to take advantage of this relationship and our capacity to find ideas, talented people and networks at the heart of this school’s dynamic ecosystem. Investors and potential clients frequently come to EPFL to look for innovative solutions, which makes it an ideal platform where we can attempt to meet these needs.”

YOSEK AKTHMAN
CEO of Gamaya
# Main Actors of the Agritech Ecosystem

## Industry Drivers
- R&D, applied R&D

## Key Factors
- Smart farming
- Geodetic Engineering Laboratory TOPO
- Urban and regional planning community CEAT
- INSIT
- IICT

## Key Actors
- Agropôle of Molondin
- EPFL
- HEIG-VD

## Companies
- Aero41
- AgroSustain
- BCI Environment
- CombaGroup
- ecoRobotix
- Gamaya
- GRT Group (formerly Granit)
- Lumartix
- Pix4D
- Precision Vine
- senseFly

## Governing Entities
- Agroscope Changins
- FOAG
- FOEN
- Prométerre
- TecOrbe

“Our campus is unique in that it brings together firms, startups and inventors who can test their pre-industrial prototypes with companies that are active in the food-processing sector.”

*STÉPHANE FANKHAUSER*
Founder of Agropôle of Molondin
RESEARCH AND DEVELOPMENT

Agroscope
Through its research programmes, Agroscope is focused on identifying future challenges in the Swiss agricultural and food-processing industries and meeting those challenges by means of well-adapted smart farming solutions, capable of increasing Swiss competitiveness without forgetting the human element in the agricultural world.
agroscope.admin.ch/agroscope/en/home

EPFL – CEAT
CEAT is a cutting-edge research institution on questions of territorial planning.
ceat.epfl.ch

EPFL – Geodetic Engineering Laboratory TOPO
The research carried out at the TOPO lab is focused on geodesy, surveying and cartography, including the development of algorithms, the integration and calibration of sensors, and satellite positioning.
topo.epfl.ch

HEIG-VD – Institute for Information and Communication Technologies (IICT)
The Institute designs and develops low-cost communication solutions which make use of a number of technologies to lower energy consumption: applied electromagnetics, RF communications, and technologies linked to IoT.
iict.heig-vd.ch
ESTABLISHED BUSINESSES AND STARTUPS

Aero41
Aero41 has developed drones dedicated to crop protection. They allow the spreading as well as the organic and conventional treatments of the vines.
aero41.ch

AgroSustain
AgroSustain develops and markets natural solutions to stop and prevent the growth of molds linked to harvesting on large agricultural crops.
agrosustain.ch

BCI Environment
BCI Environment develops innovative technologies, concepts and services in the sectors involved in environmental protection.
bci-environment.com

Caulys
Caulys develops customizable urban greenhouses that allow different GMO-free and pesticide-free edible plants to be grown from seeds selected for their nutritional quality.
caulys.com

Cerealia
Cerealia is a secure market platform, specializing in cross-border transactions and the trading of agri-food products.
cerealia.ch

CombaGroup
CombaGroup is developing automated soilless lettuce growing installations – an aeroponic technique which has its origins in research carried out by NASA for growing vegetables on space stations.
combagroup.com
ecoRobotix
The weeding robot developed by ecoRobotix can deliver the right amount of herbicide at just the right place, thereby cutting costs and reducing the environmental impact of the farm.
ecorobotix.com

Embion Technologies
Embion is an EPFL spinoff and develops natural and sustainable prebiotic products for human and animal nutrition. Plant biomass is used as a resource for the extraction of ingredients using innovative patented technology.
embiontech.com

Gamaya
Created on the EPFL campus, Gamaya specializes in drone-mounted remote sensing cameras that can provide large-scale diagnoses of crops.
gamaya.com

Greenastic
Greenastic is a smart online garden center that sells plants specifically adapted to the soils and constraints of its clients.
greenastic.com

GRT Group
For 45 years, GRT Group has been developing innovative technologies in all sectors concerned by environmental protection.
grtgroup.swiss

Lumartix
A source of next-generation lighting, Lumartix’s plasma lamps reproduce the solar spectrum, which makes it possible to substantially reduce the operation and maintenance costs of crops.
lumartix.com

Mootral
Mootral develops innovative solutions for companies and governments to reduce greenhouse gas emissions from the agricultural sector.
mootral.com

Pix4D
Founded in 2011, Pix4D develops drone-based imaging and mapping solutions. Devoted to precision agriculture, these solutions make it possible to monitor crops in real-time.
pix4d.com

Precision Vine
With a focus on improving wine quality, Precision Vine helps growers and winemakers thanks to the collection of high-resolution aerial imaging data (hyper/multispectral, thermal, and visual).
precisionvine.com

SenseFly
The drone solutions for the collecting and analysis of large-scale geospatial data developed by senseFly provide farmers with decision-making tools. SenseFly was sold to Parrot in 2012.
sensefly.com
**NETWORK OF SUPPORTING PARTNERS**

**Agropôle of Molondin**
Agropôle of Molondin is the first Swiss center of excellence entirely dedicated to the food-processing industry.

[agropole.ch](http://agropole.ch)

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**CLUSTER: CleantechAlps**
CleantechAlps is a networking initiative led by the cantons of French-speaking Switzerland and Bern and supported by the State Secretariat for Economic Affairs (SECO). Its mission is to promote Western Switzerland as a European center for clean technologies. The cluster works with research institutes, PME and start-ups to provide them with visibility, support and networking. CleantechAlps has chosen to concentrate its activities on strengthening the sectors with high added value for the Swiss economic fabric, such as photovoltaics, hydraulics, waste recycling, industrial ecology, energy efficiency and eco-mobility.

[cleantech-alps.com](http://cleantech-alps.com)

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**Economic Development – Canton of Vaud (DEV)**
The DEV is the main contact for foreign companies looking to set up in the region. To fulfill its role, the DEV works with both private (banks, notaries, lawyers, etc.) and public partners (various government departments). It provides advice on administrative procedures and financing, and allows newly established companies to benefit from its vast network.

[dev.ch](http://dev.ch)

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**Federal Office for Agriculture (FOAG)**
A part of the Federal Department of Economic Affairs, Education and Research (EAER), FOAG takes action so that farmers can sustainably produce high-quality foodstuffs and respond to the needs of the market. Agroscope, the Swiss center of excellence for agricultural research, is a part of FOAG.

[blw.admin.ch](http://blw.admin.ch)
**Federal Office for the Environment (FOEN)**
The Federal Office for the Environment (FOEN) is responsible for ensuring that exploitation of natural resources, such as soil, water, air and forests, is carried out in line with the rules on sustainable development. It is responsible for the protection against natural hazards, safeguarding the environment and human health against excessive impacts, and conserving biodiversity and landscape quality.
bafu.admin.ch

**Innovaud**
As a gateway to innovation in the canton of Vaud, Innovaud supports and provides networking opportunities for start-ups and SMEs, particularly those in life sciences, to develop solutions with them in the area of hosting, promotion, funding and/or coaching. Innovaud is firmly established in a vast network of partners, enabling it to redirect requests to the organizations most suited to the needs of each party.
innoaud.ch

**Office for Economic Affairs and Innovation (SPEI)**
The SPEI supports companies established in the canton of Vaud, and more specifically those active in the sectors of industry and advanced technologies. SPEI advises and informs entrepreneurs, particularly by putting them in touch with the appropriate organizations according to their specific needs. SPEI can also provide direct financial support.
invest-vaud.swiss

**Prométerre**
A Vaud-based non profit association that promotes jobs linked to agriculture, Prométerre brings together farms in Vaud and has been defending their interests for over 20 years.
prometerre.ch

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**TecOrbe**
With over 7,000 m², the buildings of TecOrbe feature offices, laboratories and industrial facilities that meet the needs of SMEs involved in the cleantech and agritech sectors.
tecorbe.ch

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“**There is an incredible amount of world-class research being done at Swiss academic institutions, especially in the canton of Vaud. We are working with a number of organizations, like EPFL, UNIL and Agroscope, but also ETH Zurich and the University of Zurich. When combined with the presence of major industrial players like Nestlé, Syngenta and Bühler, this creates the perfect conditions for innovation.”**

YOSEK AKTHMAN
CEO of Gamaya

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Source: Statistique Vaud

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**3,618**
the number of farms in the canton. They employ 12,540 people.