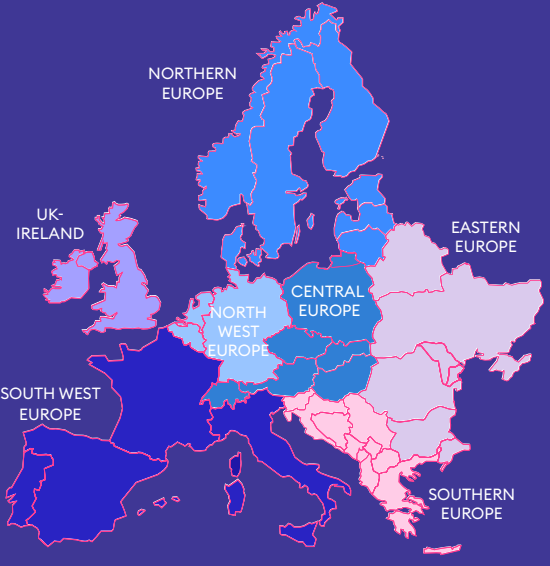
#Quest
EuroTour
2020-2021

OVERVIEW OF EUROPEAN AGRIFOOD INNOVATION

Accelerate the best startups for a more durable and resilient European AgriFood industry



AgTech

FoodTech

Climate

Retail

inVivo QUEST
NURTURE THE FUTURE

SUMMARY

3 EDITORIAL

4 INNOVATION IS AT THE CORE OF STRATEGIES IN FARMING TRANSITIONS

THE QUEST EUROTOUR 2020-2021

8 Northern Europe region
10 Central Europe region
12 Eastern Europe region
14 North West Europe region
16 South West Europe region
18 Southern Europe region
20 UK-Ireland region

22 QUEST LAUREATES

23 PARTNERS

24 CONCLUSION

26 BIBLIOGRAPHY

EDITORIAL

InVivo has made innovation one of its top priorities alongside CSR (corporate social responsibility). In fact we believe that these two pillars are genuinely linked to each other. When we launched InVivo Quest in 2017, our purpose was to identify the best ideas, the most interesting projects, the most promising startups in Agfood in order to promote them and create an ecosystem as **"an accelerator pedal" for improvement and innovation in the agri-food industry.**

2020 has been a difficult and challenging year for everyone. It has proved – if needed - that agriculture was essential and should be considered as a public good. To keep investing in it, to keep enhancing its performance, is an obvious choice to us. That's the reason why we decided to organise The Digital Quest Euro Tour 2020 – 2021, as we wanted to continue to support those who actively take part in the agricultural transition.

We explored 7 different European regions and met lots of committed people willing to find and offer innovative and sustainable solutions for agriculture. This publication gives you a sound overview of our European tour (agricultural and technological aspects; consequences of climate change; local crop) as well as a highlight of the 7 European startups selected by our juries. This year's edition of InVivo Quest revealed the high-tech potential of European countries and confirmed the true interest of cooperation.

Enjoy your reading!

THIERRY BLANDINIÈRES
CEO
InVivo

INNOVATION IS AT THE CORE OF STRATEGIES IN FARMING TRANSITIONS

Agriculture is currently facing several major challenges and must address them simultaneously. Climate change is already significantly impacting agriculture and this is expected to accelerate in the next decades, impacting plant and animal health, yields, production quality and biodiversity.

At the same time, consumer demands are changing and increasingly diverse. Transition is underway towards more healthy, sustainable and responsible food.

Finally, farming must be a profitable business and farmers need to make a living.

Therefore, agriculture is transitioning towards a more sustainable and responsible agriculture that values both production and services sourced from good practices to meet consumer and societal demands, address environmental imperatives, adapt to and mitigate climate change.

In this context, several strategies are being explored. Upstream, regenerative agriculture and precision agriculture are growing, often needing innovation hubs to boost innovation and several technologies including robotics. More downstream, value can be added to agriculture and food with augmented traceability and with a bioeconomy approach, while vine and wine is a specific case embracing most of these transitions.

Innovations that fuel these strategies are numerous and diverse. Some of them are still at an experimental stage while others are already commercialized. Expanding their adoption is certainly needed, but there is no one-size-fits-all solution for farmers and each situation is different and solutions must be tailored.

The Quest Tour 2020-2021 explored all these strategies and innovations and selected the most promising startups to help them test, develop and market their solutions. These small European companies will benefit from InVivo's innovation ecosystem to successfully help farmers and agribusiness stakeholders tackle the multiple challenges they are facing.

CHANGING FARMING PRACTICES: REGENERATIVE AND PRECISION AGRICULTURE STRATEGIES

Regenerative agriculture

The concept of regenerative agriculture is close to sustainable intensification, conservation agriculture, agroecology and agroforestry. Healthy soils are at the heart of "Regen Ag", as they enable the production of nutritious food for the benefit of human health, as part of the broader "One Health" concept. Regenerative agriculture is a type of farming intensification based on good environmental practices. It tackles climate change with carbon sequestration in soils and cover cropping; increases water storage in soils; maximises ecosystem functioning and photosynthesis; cultivates biodiversity (cultivated crops, integrating livestock for cyclical plant-animal valorisation); reduces the use of synthetic chemicals; and increases farmers income. Although still marginal, Regen Ag is becoming increasingly attractive. For example, **Agricultura regeneratio** is a non-profit organization promoting regenerative agriculture to groups of farmers, researchers and professors in Switzerland, while **Gut&Bösel** is a demonstration farm in Germany that leads education, information and extension services around Regen Ag.

Precision agriculture

Precision agriculture optimizes the use of resources to maximize performance and minimize waste, based on site-specific variability. It includes a wide range of knowledge, practices and technologies. Precision farming aims to boost farmers' economic and environmental performance while improving farm management.

Precision agriculture is based on digital solutions, including farm management softwares. Many farmers already embrace these tools. For example, **Smag** offers several softwares. The initial ones were designed to help farmers be in conformity with regulations regarding crop protection products and fertilizer plan, while Smag's most recent softwares value production practices through voluntary initiatives like the French specification "Haute Valeur Environnementale" (translating into "High Environmental Value").

Intra-plot modulation is a significant part of precision agriculture and is still marginally used across Europe. **BeApi** is a startup offering intra-plot modulation solutions for fertilizers, fungicides, seed density and irrigation. These are based on soil fertility and productivity heterogeneity diagnostics, calculated with satellite images and soil analyses. In the end, yields increase in more homogenous patterns thanks to upgraded soil fertility and practices adapted to the physical characteristics of soil.

Another dimension of precision agriculture is real-timing monitoring of plant health in order to accelerate decision-making to tackle diseases or pest infestation, and therefore reduce chemical uses. It leads to both reduced harvest losses and lower insecticide or fungicide uses. **FaunaPhotonics** is a startup specializing in insect identification and quantification, whether pests or beneficial insects. Their digital entomologists develop innovative technologies (sensors, imagery) for early identification, precision spraying on pests and protection of pollinators. For its part, **Telaqua** is a startup that offers water management systems based on precision irrigation and drop irrigation based on Internet of Things and Artificial Intelligence (AI). Again, real-time monitoring is key in this model, in order to optimize water management.

Robotics builds into regenerative and precision agriculture

Europe is the most advanced continent in terms of agricultural robotics, with weed control as the number one application (mechanical, electric or precision spraying, as an alternative to chemical herbicide spraying) with business models based on the sale of the robots or of robots as a service.

Agricultural robotics holds promise for making agriculture more environmentally friendly, by reducing greenhouse gas emissions and energy consumption (robots are usually autonomous electrical devices), enhancing soil health (reduced soil compaction) and diminishing inputs from synthetic chemistry. Agricultural robots are positioned as an alternative to intensive workforce that is increasingly difficult to hire and mobilize.

Although promising, robots are far from being widely adopted in agriculture. For example, there are only 10,000 robots used in farms in France, of which 8,000 milking robots. Their adoption is mainly limited by their currently high prices and low return on investment (high maintenance costs, skills and time).

The Odd.Bot (Netherlands) and **Vitirover** (France) robots illustrate innovation breakthroughs in agricultural robotics. They both provide mechanical weeding services, are self-sufficient in electricity and are lightweight to avoid soil compaction. Odd. Bot is still in development, selective (AI differentiates between cultivated plants and weeds) and intended for organic vegetable crops (carrots, onions). By contrast, Vitirover is already commercialized, not selective (being a mower), operates in "herds" in vineyards or along railway lines.

Innovation hubs: testing, demonstrations and education to stimulate adoption

Innovation transfer is a long and expensive process that consists of an invention meeting a market. In agriculture, innovations can only be successful if farmers are involved. Hence the importance of testing innovative solutions proposed by startups in farms, so that they meet “real-life” constraints and stakeholders, and hence become scalable. Innovation ecosystems including cooperatives, private groups and small companies, research organizations and farmers represent a favourable environment for innovations to become operational, scale-up and find a market.

In France, the InVivo Quest innovation challenge is a great example of this process. In order to test technological innovations in a real-scale format, InVivo created the **"Fermes Leader"** programme. It consists in a network of four hundred connected farms across France, aiming to test innovative technological solutions and adapt them to market and field realities. Thanks to this connected farms’ network, farmers and cooperative technicians are also educated about innovative technologies in digital and precision agriculture.

Interestingly, the vine and wine sector has specific innovation hubs in France. They include the cluster **Inno’Vin** and the Montpellier hub where the **Institute for Higher Education in Vine and Wine** is located, as part of the Montpellier SupAgro Higher Education Organization.

In Sweden, the large cooperative Lantmännen launched an accelerator program named “Greenhouse” to help innovators develop their projects in agriculture and find business opportunities. They need to be consistent with the cooperative’s “Farming for the Future” strategy to honour its commitment to climate neutrality by 2050. **In Austria,** the Agro Innovation Lab is a subsidiary of **RWA,** a cooperative that belongs to the German cooperative **BayWa**. The A**gro Innovation Lab** is a network of AgTech startups and tests new technologies, especially in ag robotics. **In Bulgaria, AgroHub.BG** is a digital innovation hub for farming that belongs to the European consortium in agri-food innovation: SmartAgriHubs. It mainly aims at organizing and developing a digital infrastructure.

Finally, large private groups like **McCain Foods** are also developing networks of farms where innovations are tested. These include "Pilot Farms" (where new practices or management systems are tested) and "Farms of the Future" (farms owned by the company in three different regions of the globe, open to research on the long-term efficiency of innovative technologies).

FARMING AND FOOD TRANSITIONS: AUGMENTED TRACEABILITY, BIOECONOMY AND THE SPECIAL CASE OF WINE

Augmented traceability: building trust and value from farmer to consumer

Augmented traceability allows food companies to create value and base consumer-oriented allegations on evidence while farmers can be paid for their beneficial actions highlighted at the consumer level.

Agriprogress is a digital platform created by InVivo that connects upstream and downstream stakeholders to install a digital traceability. It aims at improving transparency to consumers through labels based on specifications, while allowing farmers to improve their environmental practices. Therefore, the system aims at strengthening consumer trust with evidence-based information, increase farmers’ income and fuel Corporate Social Responsibility (CSR) initiatives of the food industry. Carbon footprint specifications, in construction, and the French “High Environmental Value” specification (combining several environmental criteria like biodiversity, phytosanitary strategy, fertilisation and irrigation management) are currently explored by Agriprogress.

Bioeconomy: new value chains and circular economy for agriculture

The bioeconomy is a bio-based economy. It encompasses all industrial and economic activities that use biomass (a renewable carbon source) to produce products and services, based on innovative biological and technological principles and processes. It includes agriculture, forestry, the food industry as well as non-food uses of biomass. It is a transdisciplinary concept that overlaps with the circular economy.

The bioeconomy requires a broad range of innovations to substitute petroleum-based products with bio-based products using innovative processes and value chains, generate new products with new functions as well as new consumer behaviours, based on different business models. A bioeconomy approach of agriculture boosts its economic, environmental and societal value. Farming and food industry by-products are no longer wasted but can be valued in new chains with the help of various technologies (green chemistry, biotechnologies, engineering, synthetic biology) to produce a large range of products, such as cosmetics, dyes, surfactants, flavourings, antioxidants, polymers, or biocontrol solutions.

On the other hand, the development of the bioeconomy is limited by some strict regulations, the lack of market standards, unstable biomass availability to be processed and the lower price-competitiveness of biobased products compared to that of their petroleum-based counterparts.

Circular Carbon is a startup representing an iconic example of the bioeconomy for the benefit of agriculture and addressing climate change. This young company uses pyrolysis to process biochar from cocoa shells unused by a chocolate factory based in Hamburg. Biochar is a promising high value input in agriculture, notably improving soil fertility, water retention and carbon sequestration.

Wine Innovation

Tradition is at the heart of the wine industry and it is therefore difficult to reconcile wine with innovation. However, change is necessary in both upstream and downstream production. Climate change is strongly impacting grapevines across the globe, while a significant reduction in the use of chemicals is being imposed. At the same time, the world demand is changing, with new consumer expectations and habits. For example, the market share of no-alcohol and low-alcohol wines is increasing, as it that of sustainable wines (with reduced or no pesticide residues, embracing the circular economy) and "free from" wines.

The main innovations tackling these challenges include **robotics** (mechanical weeding), **plant breeding** (resistant grape varieties), **artificial intelligence** (predictive models to manage climatic and sanitary risks for grapevines, predictive oenology methods in “free from” wine production) and belong to the **circular economy** (upgrading by-products such as extractable derivatives to improve the flavour of no-alcohol wines).

MARIE-CÉCILE DAMAVE
Head of innovation and international affairs
agriDées
RÉFLÉCHIR · PARTAGER · AVANCER

NORTHERN EUROPE

September 2020

AGRICULTURAL LANDSCAPE

Scandinavian countries, except for Denmark, are covered in the majority by the boreal forest, making it more suitable for forestry than agriculture. Most of the crops are grown in the Southern regions. This is the case of Sweden where most of the cultivated area is located in the Southern part of the country with cereals and fodder crops being the major crops grown. Denmark is following the same model where half of the cultivated land is intended for cereals. Fodder crops are also highly represented as the country is a large producer of dairy and meat (mostly pigs). The country is a net exporter as it produces enough food to feed three times its population. Norwegian agriculture is dominated by forage to feed the dairy and meat cattle which represents almost 70% of its agricultural incomes. The country is a net importer.

Baltics' agricultural history on its side remains connected to USSR and its dismantling. Collective and state farms became history, giving way to small farms and associations. Lithuania, Estonia, Latvia agriculture remains dominated by wheat and other cereals while its dairy production makes the second revenue stream.

In Finland, like Scandinavian countries, the longest growing season lasts 185 days in the Southern part and only 100 in the Northern farms, the main production is turned towards dairy (roughly 40% of agricultural revenue, a share twice as important as its neighbor Sweden). However, Finland's crop farming specializes in barley and oats. These two crops are grown twice as much as wheat which is quite unique.

TECHNOLOGICAL LANDSCAPE

The region is a dynamic area when it comes to research & innovation. As an example, Sweden, Denmark, Finland & Estonia are often labelled as "Innovation Leaders" in the European Innovation Scoreboard (Norway isn't rank as a non-member state of the EU). According to the same scoreboard, Lithuania & Latvia are perceived as moderate innovators.

However, regarding AgriFood, both Scandinavia and the Baltics benefits from a very dynamic landscape in terms of hubs of innovation at the national, regional, or European level. This can be characterized by EU H2020 programs (Digital Innovation Hubs), public bodies (Rise Sweden), or private programs (Rockstart & Foodtrack by Maersk).

Finally, the recent launch of Food & Bio Cluster Denmark, a joint-cluster between Danish Food Cluster and Agro Business Park, enables Denmark to position itself as a central place for research & innovation on food production and processing.

CLIMATE CHANGE EFFECTS ON THE REGION

The countries of Northern Europe are set to be less sensitive to climate change effects in the years to come than their southern neighbors. However, an augmentation of the temperature would bring new pests and diseases to crops that will now face a lot of pressure. This change will require a lot of adaptation from Scandinavian and Baltic farmers. Biotechnologies and digital solutions will play a huge role in the selection of adapted crops and the elaboration of models to produce more in an evolving context.

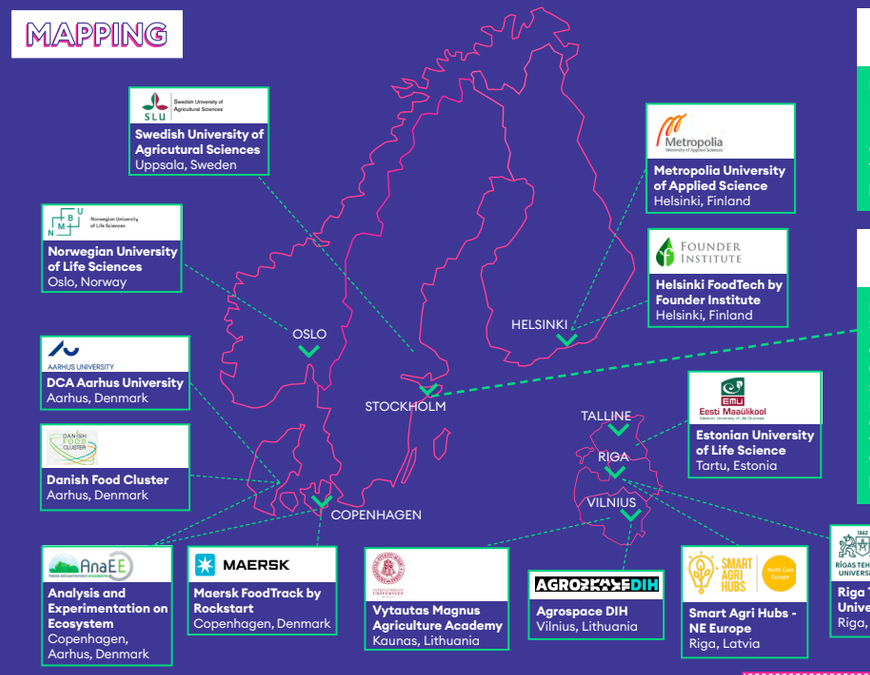
According to the report from NordGen on Nordic agriculture & climate change, key recommendations for the regions are to invest in crop breeding to provide new varieties that will provide predictable yields and adapt better to unpredictable weather patterns through biotech or seeds, investigate new farming practices such as no-till farming or the broader development of cover-crops both increasing the level of Co2 that can be stored in the soil, in addition to the need of increasing biodiversity while feeding a growing population.

FOCUS ON A LOCAL CROP: WHEAT

Wheat is one of the most farmed crops in the world, it is no surprise it is the most farmed in Northern Europe, suitable for arable cropping.

In the short term, Northern European wheat growers should even benefit from the effects of climate change with longer-lasting seasons. However, like other regions, unpredictable events should affect the region and will require innovations, especially in plant breeding and plant care.

MAPPING



Swedish University of Agricultural Sciences
Uppsala, Sweden

Norwegian University of Life Sciences
Oslo, Norway

DCA Aarhus University
Aarhus, Denmark

Danish Food Cluster
Aarhus, Denmark

Analysis and Experimentation on Ecosystem
Copenhagen, Aarhus, Denmark

Maersk FoodTrack by Rockstart
Copenhagen, Denmark

Vytautas Magnus Agriculture Academy
Kaunas, Lithuania

Agrospace DIH
Vilnius, Lithuania

Smart Agri Hubs - NE Europe
Riga, Latvia

Riga Technical University
Riga, Latvia

Estonian University of Life Science
Tartu, Estonia

Helsinki FoodTech by Founder Institute
Helsinki, Finland

Metropolia University of Applied Science
Helsinki, Finland

Food & Bio Cluster Denmark
Denmark

Denmark's national cluster organisation for the Danish food and bioresource industry.

https://foodbiocluster.dk/

Rise Sweden
Stockholm, Sweden

Owned dy the Swedish Government, Rise develops services, products, technologies, processes and materials that contribute to a sustainable future and a competitive economy.

https://www.ri.se/en

INTERVIEW

PETER ANNAS
Director Group R&D and Innovation
Lantmännen

Lantmännen

WHAT ARE THE PRESSING ISSUES THAT NORDIC AGRICULTURE CURRENTLY ENCOUNTERS OR WILL ENCOUNTER IN THE NEXT 10 YEARS?

The overall goal will be to increase the productivity at the same time as we will have less available inputs (eg. pesticides and fertilizers) and that we will do that at the same time as we have the sustainability in mind. The challenge will be to do this and at the same time secure the profitability within the value chain.

One of the challenges concerns using the larger amount of data produced on farm level which is more and more accessible through new technologies and sensors in the agriculture. We have to secure that systems, platforms and services will communicate with each other with the farmer at centre. To aggregate, calculate, using AI and visualize all this data will be important for the future to be able to increase the sustainability, productivity and profitability.

ACCORDING TO YOU, HOW INNOVATION CAN HELP TO SOLVE THESE CHALLENGES?

Precision farming will be more and more important to be able to reach our goals within our national food strategy, but also more investments in RD and innovation such as for example plant breeding and water management.

WHAT ARE THE COMMITMENTS OF LANTMÄNNEN FOR THE NEXT DECADES?

Lantmännen are in the forefront and are annually investing a lot in R&D and innovation and are leading the change towards the "farming of the future". We have a goal to half the greenhouse emissions every decade fulfilling the Paris agreement.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●●○
DATA ANALYTICS	●●●○○
AGROBOTICS	●●●●○
AGBIOTECH	●●●○○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- Prediktor Instruments › Data Collection
- Vultus › Satellite Imagery
- sensonomic › Data Analytics
- GrainSense › Irrigation Systems
- Irriot › Irrigation Systems
- BoMill › Post-harvest
- sapco › Marketplace
- Biostimulants

FUNDRAISING IN 2020

26,6 M€ Raised (+368% vs 2019)

2,9 M€ Average ticket (+421% vs 2019)

TOP 3 FUNDRAISING

1. **9,5 M€** Saga Robotics - *Norway*
2. **7,5 M€** N2 Aplied - *Norway*
3. **3,3 M€** IFarm - *Finland*

AGRICULTURAL LANDSCAPE

Central Europe as we chose to define it in this Quest EuroTour is divided into the two countries Switzerland & Austria in the West and the Visegrad Group countries (Czech Republic, Hungary, Slovakia, and Poland) in the East.

On one side, Switzerland and Austria are mountainous countries with high levels of grassland, respectively 70% and 30% of cultivated areas. Livestock represents the first agricultural output followed by cereals and specialty crops. These two countries are also showing incredible rates of organic farming with respectively 16% and 25% of their total utilized area in 2019.

Visegrad Group countries, on their side, benefit from less steep landscapes and a climate more suitable for arable farming. Historically, the farm structure is also bigger in these Central Eastern European countries which benefited from cereals farmed in a conventional model. The organic farming rate in Poland and Hungary reflected that only 3.5% and 5.7% in 2019 were farmed organically.

In conclusion, Central Europe is a key place for European animal production, specialty crops, and arable farming.

TECHNOLOGICAL LANDSCAPE

Switzerland (despite being a non-member of the EU) and Austria are perceived as strong providers of innovations while their Central European neighbors are often ranked by European Commission as moderate innovators.

In Austria and Switzerland, the research and innovation are powered by public bodies such as Agroscope focusing on applied research in agronomy with various sites across Switzerland or world-class universities such as BOKU, the Vienna University of Natural Resources and Life Sciences.

Private entities or cooperatives are also working on supporting AgriTech innovators and foster technology adoption among farmers. RWA with its innovation platform in Vienna and the AgriTech campus Agropôle in Vaud County are two interesting examples of structures to support promising AgriFood startups. As a result, the region is strong in innovations related to Controlled Environment Agriculture, AgRobotics, and Arboriculture.

CLIMATE CHANGE EFFECTS ON THE REGION

According to a report from European Environment Agency, Central Europe will know a temperature rise expected to be higher than the European average. As a result, Switzerland has announced its intention to reduce greenhouse gas emissions of agriculture by one-third and food processing by two-thirds. (per the Swiss Federal Office for Agriculture). Additionally, the right combination of innovations, both digital and biotech, with new practices will be needed to adapt Central European farms to climate change effects.

FOCUS ON A LOCAL CROP: APPLES

As one of the most common specialty crops of the region, Apple farming is one of the strengths of the Central European region.

Poland is the first European and 4th world producer of apples with 4M tonnes in 2018. Hungary, 6th European producer (675,000 tonnes), Austria, 10th (385,000 tonnes), Switzerland, 16th (165,000 tonnes), and the Czech Republic, 17th (150,000 tonnes).

However, climate change effects such as early spring with severe frost (April 2021), summer droughts are already affecting the Central European orchards. We asked RWA/Agro Innovation Lab their views on the issue.

How are Central European orchards affected by climate change?

In Central Europe, agriculture is facing manifold challenges due to climate change. Extreme or changing weather situations and a lack of water, challenge farmers in managing their fields and orchards.

Can technology and new practices help to mitigate these risks?

Technology and new practices can support mitigating risks by generating, analysing and visualizing data for automated decisions or decision support. This will make it easier to manage changing environmental circumstances. It is very important to already focus on consumer friendliness and usability during the development.

MAPPING

Agroscope
Changins, Switzerland

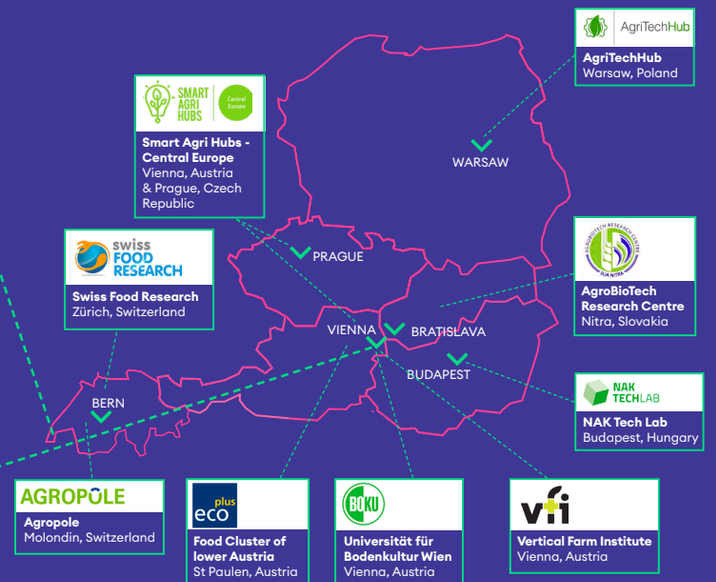
Agroscope focuses on research and development for the benefit of agriculture and the food industry, provides a basis for decision-making for the authorities' legislative activities, carries out executive tasks within the framework of legal provisions for the benefit of agriculture and the community, and contributes to the exchange of knowledge and technology transfer with practice, the extension service, the economy, scientific circles, education and the general public.

https://www.agroscope.admin.ch

Agro Innovation Lab
Vienna, Austria

The Agro Innovation Lab takes an active part in shaping the future of agriculture. Its mission is to foster new technologies or strategies, which increase efficiency, conserve resources or significantly improve the lives of farmers and thus the lives of consumers and customers.

https://www.agroinnovationlab.com/



INTERVIEW

LENA RANNEBERG
Innovation Manager
Agro Innovation Lab

WHAT ARE THE PRESSING ISSUES THAT CENTRAL EUROPE AGRICULTURE CURRENTLY ENCOUNTERS OR WILL ENCOUNTER IN THE NEXT 10 YEARS?

Agriculture will face different challenges in the coming years. Especially climate change, maintaining soil fertility, irrigation and environmental fit will be issues to solve in Central Europe.

Furthermore, changing consumer demand, lack of workforce, and digitization will demand farmers to continue improving their business activities.

WHAT ARE THE COMMITMENTS OF RWA / AGRO INNOVATION LAB FOR THE NEXT DECADES?

Our mission is to foster and implement new technologies that increase efficiency, conserve resources and improve the lives of farmers and consumers. Therefore, we want to bring startups and innovative companies into the spotlight, while providing an ecosystem for innovation to flourish.

WHAT IS YOUR VISION ABOUT THE AGRIFOOD ECOSYSTEM OF INNOVATION IN AUSTRIA AND CENTRAL EUROPE?

We want to help create an attractive environment to foster innovation and provide startups and innovative companies with ideal circumstances to invent new solutions.

Close cooperation of different entities along the entire value chain will enable the European AgriFood sector to maintain a viable, strong agricultural sector and vivid rural areas.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●●○
DATA ANALYTICS	●●●○○
AGROBOTICS	●●●●○
AGBIOTECH	●●●●○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- GAMAYA › Aerial Imagery
- Pixofarm › Arboriculture
- NITRO TERRA › Biostimulants
- evologic › Biostimulants
- vatorex › Biodiversity
- Varistar › Data Analytics
- WORLD FROM SPACE › Aerial Imagery
- CLEVER° FARM' › Data Analytics

FUNDRAISING IN 2020

13 M€ Raised (-2% vs 2019)

1,44 M€ Average ticket (-24% vs 2019)

TOP 3 FUNDRAISING

1. **1 M€** Vatorex - *Switzerland*
2. **0,77 M€** Moonsyst - *Hungary*
3. **0,12 M€** Gremon - *Hungary*

EASTERN EUROPE
October 2020

AGRICULTURAL LANDSCAPE

The agricultural landscape in Eastern European Countries is often divided between national or extra-national agro holdings and small-scale farming. As an illustration, Romania had in 2010 the largest number of farms in EU-27 with 3.8 million agricultural holdings. 71% of these holdings were less than 2 hectares representing small-scale farming. On the other side, 49% of utilized agriculture area was farmed by holdings with more than 100 hectares.

In Ukraine, the gap between peasant farming and agro holdings is even more pronounced with some of the largest holdings way above the 100,000 hectares under management, agro holdings represented 29% in 2017 of cultivated land against 8% in 2007. As the largest agro holding in Ukraine, Kernel manages close to 600,000 hectares of cereals and sunflower.

It is no surprise that Ukraine has developed to become such an agricultural super-power and Romania is seen as a country with very high potential as the region holds most of the world's black soil also called Chernozem (around 1/3 according to FAO), said to be the most fertile soil on Earth.

TECHNOLOGICAL LANDSCAPE

In addition to its thriving Agrobusiness, the region is known to be one of the strong places for computer science in Europe. As an example, Kiev and Bucharest, the two main outsourcing hubs of Europe are home to large American & European IT offices.

Following the launch of AgroHub & MHP Accelerator in 2017, the Ukrainian AgriTech scene is gaining momentum. Kiev is becoming a regional hub for AgriTech startups as they can find financial and support through partnerships from AgroHoldings willing to optimize every acre using aerial imagery (both drones and satellite) and Analytics.

CLIMATE CHANGE EFFECTS ON THE REGION

According to JRC's report "Analysis of climate change impacts on EU agriculture by 2050", cereal producers in Southern Europe will be in general more negatively affected. Barley, grain maize, and wheat are the crops most affected by climate change in Southern Europe, with a sizeable yield reduction (-10%, 6%, and -9%, respectively).

FOCUS ON A LOCAL CROP: CORN

Besides being the largest producer of sunflower in the world, Ukraine is also the world's fourth-largest producer of corn. The production has been increasing in the last decades to reach 35.8M tonnes in 2019.

However, the producing regions are hit by more and more droughts which affect the corn yields. According to a report from JRC on European Agriculture and climate change, grain maize is expected to be the most affected crop by climate change effects. The high need for water during summer that will be more subject to drought in the Southern parts of Europe should highly impact the yields (-4% to -22% according to JRC) and even put the crop at risk of replacement.

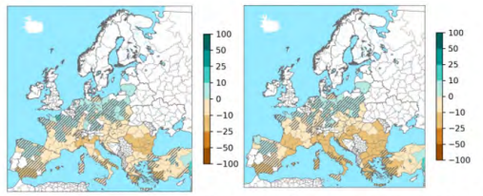


Figure 2. Ensemble mean changes of grain maize yield (% relative to the historical period) projected under the RCP8.5 for 1.5 oC (left panel) and 2 oC (right panel) warming conditions, and assuming irrigated conditions. Hatching denotes areas with low models' agreement (i.e. less than 66% of models agree in the sign of estimated changes).

Map from JRC: Ukraine is not included in these maps, but the impact on countries of the Black Sea is among the greatest in Europe.

MAPPING

MHP Acceletator
Kiev, Ukraine

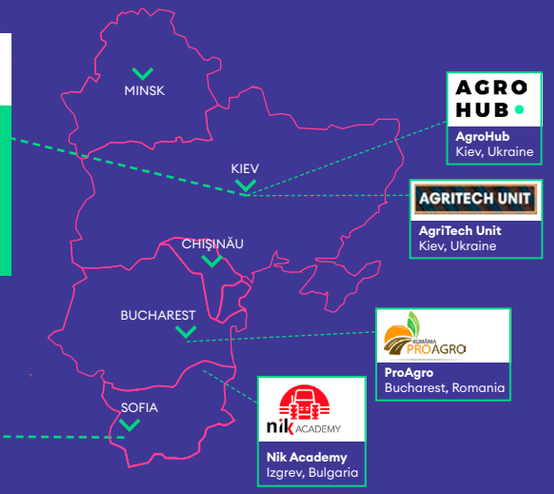
MHP accelerator 2.0 is a startup development program focused on the search, acceleration and integration of innovative technologies and developments in agribusiness.

https://radartech.com.ua/ua/mhp/

Agro Hub
Sofia, Bulgaria

AgroHub.BG - The Bulgarian Digital Innovation Hub (DIH) in the field of agriculture and food industry aims to unite and enable collaboration across the agro-industry.

https://agrohub.bg/?lang=en



INTERVIEW

SVETLANA BOYANOVA
Chairperson
Agrohub Bulgaria

Both the agricultural sector and food industry are equally important for the Bulgarian economy. Unfortunately, both have a number of serious issues to address, and innovation is the major driver for tackling the challenges in the agri-food sector.

In 2019, Bulgaria spent 0.84% of GDP on research and development which is much lower than the average of the intensity of EU average (2.19%).

The share of budget expenditures for R&D for "Rural and forestry development economy and fisheries" in the total budget expenditure for R&D development decreases, and the share of agricultural R&D funding from the state budget is quite variable over the years. This gives an idea of the reduced public importance of agricultural R&D and their unsustainable financing from the national budget.

Bulgaria agricultural sector is definitely lagging behind with modernization and innovations. Some of the most important aspects for agri-innovations include:

- Digitalization of agriculture, incl. implementation of precision farming, precision livestock (for example breeding books), precision irrigation, robotics, etc. in agricultural holdings, and improving the digital skills of farmers.
- Innovations for tackling luck of labour force, especially seasonal workers, but not only.
- Innovations related to environmental aspects of agricultural activity – climate change, energy efficiency, reduction of pesticide and veterinary medicines.
- Innovations for sustainable and effective management of soil and genetic resources and improvement of ecosystem services;
- Innovations in plant breeding for the selection and implementation of new vegetable varieties resistant to biotic and abiotic stresses, cultivars of vegetable crops with improved yield stability and nutritional, harvesting or processing qualities.
- Technical innovations (e.g., production equipment, process control, energy sources, traceability systems, circular economy - e.g., fruit and vegetable peels and pulp, keratin mass, etc.).

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●●○
DATA ANALYTICS	●●●●○
AGROBOTICS	●●○○○
AGBIOTECH	●●○○○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- Biomyc › Biopackaging
- › Marketplace
- BIOSENS › Post-Harvest
- ON·DO › Irrigation Systems
- AGRICLOUD › Data Analytics
- nextfarm › Data Analytics
- biosmarties.eu › Satellite Imagery

FUNDRAISING IN 2020

7,5 M€ Raised

SINGLE FUNDRAISING OPERATION

7,5 M€ OneSoil - *Belarus*

4

NORTH WEST EUROPE

December 2020

AGRICULTURAL LANDSCAPE

Benelux & Germany is arguably one of the most dynamic agricultural regions in Europe. Besides being an important dairy and meat producer, when it comes to crops, the region is particularly known for its productions of potatoes, cereals, and horticulture. It is also one of the key places for seed production. The Netherlands is a net exporter of AgriFood goods. It exports 9.1 billion € of flowers thanks to its dynamic horticulture industry and 6.7 billion € of vegetables. Germany, despite being one of the first agricultural countries in Europe is a net importer.

The two countries are among the highest TFP (Total Factor Productivity) in European Union meaning that the region is among the most productive. This can be explained by a large adoption of machinery and modern equipment, including new technologies, or education leading to better organization of production.

In addition to being one of the most efficient in its crop production, the region is also one of the most sustainable with One interesting example being the Netherlands often mentioned as the best player in sustainable large-scale production, through its High-Tech greenhouses raising productivity per acre by 10 times while lowering the need for chemical inputs or water. However, this intensive cropping system requires the significant addition of artificial light and considerable heating raising concerns about its true sustainability.

TECHNOLOGICAL LANDSCAPE

The ecosystem of innovation in northwest Europe is one of the most dynamic in the world when it comes to AgriTech. Netherlands & Germany as an example, are home to some of the best agronomic universities in the world with Wageningen (NL) & Göttingen (GER). The access to mentorship and industry connexions is facilitated by players such as StartLife or Startup Delta. Finally, access to capital is also enabled by Rabobank (NL), Anterra Capital (NL), or Munich Ventures (GER) that are among the largest AgriTech investors in Europe.

As a result, the region is a leading place for machinery, AgRobotics, Controlled Environment Agriculture, and biocontrol.

CLIMATE CHANGE EFFECTS ON THE REGION

According to JRC's report "Analysis of climate change impacts on EU agriculture by 2050": regarding wheat "Simulations (under the RCP8.5 scenario) show yield increases for Northern Europe around 2050, ranging from 5% to 16% for eight out of ten models". Positive impacts are also to be mentioned on corn with "5% yield gains around 2050 in the Netherlands".

In conclusion, positive impacts are expected on the region on arable farming, it is expected to be more nuanced on specialty crops.

FOCUS ON A LOCAL CROP: POTATO

The Northwest Europe region is a key place for potato production. Out of the 52 million tonnes of potatoes produced by the EU-28 in 2018, BeNeLux & Germany are responsible for close to 35%. Germany is the first European producer with 8.9 million tonnes while the Netherlands is the fourth largest with slightly more than 6 million tonnes.

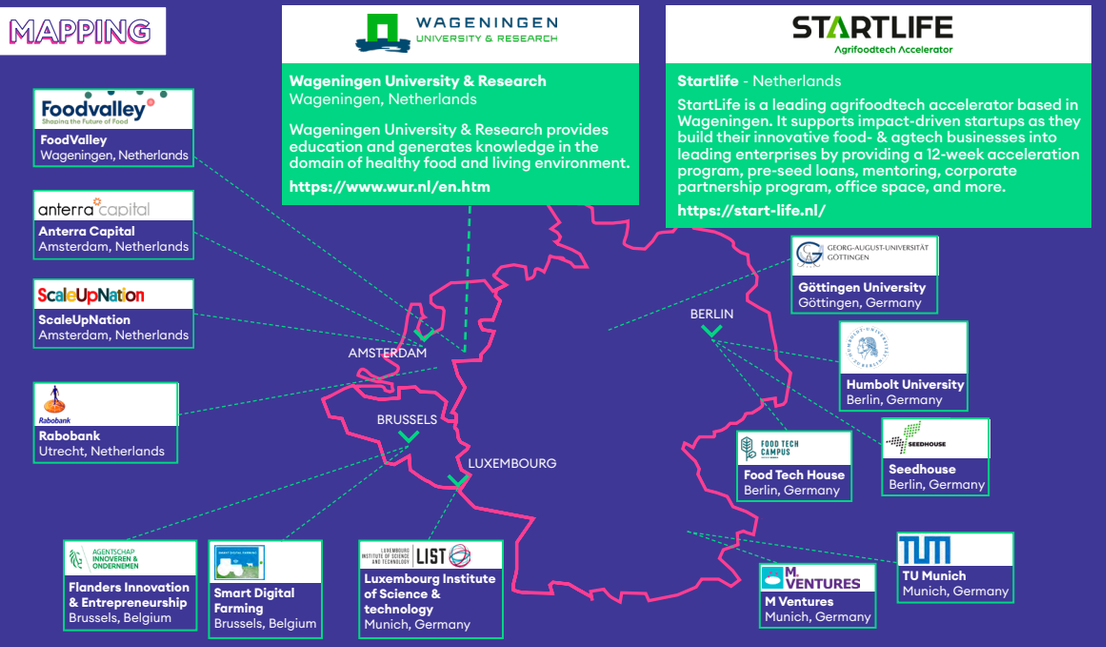
Are German potato fields affected by climate change?

Like many other crops, potatoes are suffering the consequences of climate change. Increasing weather extremes such as heavy rain and hail damage the potato, or long-lasting drought impedes growth and leads to significantly lower yields, as happened in 2018 and 2019. In addition, weather-related diseases and increasing populations of pests (due to milder winters) occur more frequently.

How can technology and new practices help to mitigate these risks?

The potato needs a steady water supply during the growing season, so intelligent irrigation solutions are needed due to climate effects. Creative and sustainable solutions are also sought to protect the plants against pests or diseases. It will be particularly exciting when data-based recommendations are added to enable resource-efficient production. Especially effective against the risks of climate change, however, is a soil-centred way of working that leads to higher soil health and humus build-up. These technologies help not only the potato, of course, but also other crops that are cultivated here.

MAPPING



WAGENINGEN UNIVERSITY & RESEARCH

Wageningen University & Research
Wageningen, Netherlands

Wageningen University & Research provides education and generates knowledge in the domain of healthy food and living environment.

https://www.wur.nl/en.htm

STARTLIFE
Agrifoodtech Accelerator

Startlife - Netherlands

StartLife is a leading agrifoodtech accelerator based in Wageningen. It supports impact-driven startups as they build their innovative food- & agtech businesses into leading enterprises by providing a 12-week acceleration program, pre-seed loans, mentoring, corporate partnership program, office space, and more.

https://start-life.nl/

INTERVIEW

KATRIN HARTJES
Head of Corporate Development
RWZ

RWZ
Raiffeisen

WHAT ARE THE PRESSING ISSUES THAT GERMAN AGRICULTURE CURRENTLY ENCOUNTERS OR WILL ENCOUNTER IN THE NEXT 10 YEARS?

In addition to the currently challenging Corona pandemic, I consider global climate change and weather-related extremes as well as the rising world population to be the pressing issues. These aspects are affecting the supply and pricing of commodity markets and are causing increasing volatility; in addition, the concentration on supply and sales markets is exacerbating the situation for agriculture. On the farms themselves, structural change, the loss of proven technology and the need to manage limited resources carefully are becoming noticeable. Furthermore, we are already feeling the consequences of stronger political regulation on food production and the strong desire for more sustainability in all life situations from a society that is moving further and further away from agriculture.

ACCORDING TO YOU, HOW INNOVATION CAN HELP TO SOLVE THESE CHALLENGES?

I personally believe that technology alone cannot be the solution, because what is needed above all are people who are courageous, take risks, develop new things and try them out. The complex challenges will lead to more colourful, more diversified farms. New, smart concepts, technologies, cultivation and marketing methods can lead to farmers managing more resilient and sustainable farms, and this will also be recognised politically and socially.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●○○
DATA ANALYTICS	●●●●○
AGROBOTICS	●●●●●
AGBIOTECH	●●●●○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- CIRCUL AG CARBON › Biochar
- agrora › Marketplace
- SEED FORWARD › Biostimulants
- ecobot › AgRobotics
- Solynta › Seeds
- pats › Drone
- Agranimo › Data Collection
- agrocares › Soil Analysis
- Farm21 › Data Collection

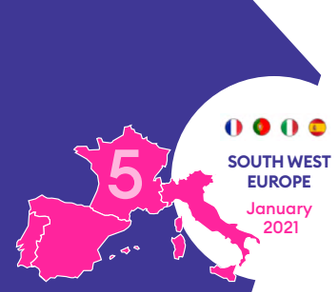
FUNDRAISING IN 2020

120 M€ Raised (-36% vs 2019)

9,24 M€ Average ticket (-36% vs 2019)

TOP 3 FUNDRAISING

1. **77 M€** Infarm - *Germany*
2. **14 M€** Aphea.Bio - *Belgium*
3. **10 M€** Biotalys - *Belgium*



SOUTH WEST EUROPE

January 2021

AGRICULTURAL LANDSCAPE

France is the largest agricultural power in Europe, Italy the second, and Spain the fourth. In terms of productivity, France and Italy have the highest TFP (Total Factor Productivity) in European Union alongside Netherlands, Germany, and Belgium.

The region is a large producer of cereals with a large part of its surface dedicated to arable cropping (more than a third of the utilized agricultural area in France) with a condensed production where a small number of producers' accounts for a large percentage of the total national production (per the French Ministry of Agriculture, 23% of arable farmers produce 65% of the total volume).

The region is also a great region for fruit and vegetable farming. According to Eurostat, Spain is the first European producer of fruits in Europe with close to 40% of the EU-28 hectares dedicated to fruit cultivation. Regarding vegetables, Italy, Spain, and France are the three first EU producers with up to 45% of the EU-28 hectares of vegetables in these three countries alone.

Finally, the region is the first wine-producing region in the world with Italy (48.5 million hectoliters), France (46.4 million hectoliters), and Spain (40.9 million hectoliters) being the three largest producers in the world in 2018.

TECHNOLOGICAL LANDSCAPE

The technological landscape in this region is led by public research bodies such as INRAE or Arvalis in the example of France.

Since 2004, more and more clusters (pôles de compétitivités in French) launched to enable more public-private partnerships and collaborations on applied research. Pôle IAR and AgriSud Ouest Innovation are two interesting examples of clusters generating collaborations in the AgriFood industry.

As a result, the region is among the most dynamic when it comes to AgriTech startups. France is an interesting example with players reaching interesting maturity (Sencrop, Naio) but Italy (Agricolus, Soonapse, xFarm) or Spain (Agroptima) also have similar examples.

CLIMATE CHANGE EFFECTS ON THE REGION

The countries of southwest Europe are expected to be hit differently by climate change effects. This is especially true in cereals production as some regions such as Italy and Spain are set to expect a reduction. "Six Member States show a decrease in cereals production, of which in absolute terms especially the reduction in Spain (-11%) is considerable" per JRC and "total soft wheat production declines in most regions in Southern Europe, whereas regions in Northern France, Central Europe North and Northern Europe show production increases" per JRC Climate Impacts in Europe, a report from 2018.

FOCUS ON A LOCAL CROP: GRAPES

As the first wine-producing region in the world, South West Europe has a long tradition and know-how. However, sometimes less known, it is also an industry that never stopped to innovate to adapt to climate and pressures. As a result, the vineyards from the past century looked very different from the ones we know (grape variety, mechanization...).

Today and tomorrow, winemakers will again need to adapt to fight the effects of climate change, answer to new consumer demands, and face the reduction of chemical inputs. Innovations in varietal selections, precision irrigation, more accurate yield prediction models, mechanical weeding, biocontrol are many solutions that need to be scaled to ensure the durability of the production regions.

MAPPING

INRAE - France

INRAE, the French National Research Institute for Agriculture, Food and the Environment, is a major player in research and innovation created on 1 January 2020 following the merger between INRA and Irstea. INRAE brings together a community of 12,000 people, with just over 200 research units and some 40 experimental units located in 18 centres throughout France.

https://www.wur.nl/en.htm

Andalucia AgroTech - Sevilla, Spain

Andalucía Agrotech Digital Innovation Hub is the largest European regional ecosystem for accelerating, accompanying and channelling innovation in the agri-food sector.

https://www.andaluciaagrotech.com/

INTERVIEW

OLIVIER DESCROIZETTE
Technical Innovation Director
Bioline by InVivo

WHAT ARE THE PRESSING ISSUES THAT FRENCH AGRICULTURE CURRENTLY ENCOUNTERS OR WILL ENCOUNTER IN THE NEXT 10 YEARS?

French agriculture faces a number of major challenges: meeting the expectations of its internal market (societal expectations, environmental pressure, farm maintenance) while preserving its leadership in international markets and responding to the growing global food need.

ACCORDING TO YOU, HOW INNOVATION CAN HELP TO SOLVE THESE CHALLENGES?

Science is at the heart of many innovations in our society in all fields, and agriculture is no exception. Whether we are talking about progress in Agtech or FoodTech, the possibilities for innovations are numerous and are sources of hope to meet the challenges of our planet. Whether we are talking about genetic progress, technology to reduce our environmental footprint such as precision ag, biocontrol, digital, etc... The future holds great promise.

WHAT ARE THE COMMITMENTS OF BIOLINE FOR THE NEXT DECADES?

Bioline is committed to the third way of agriculture and wants to provide answers to the agricultural world and consumers, by creating this unique and innovative link between agricultural upstream and downstream sectors. We're no longer talking about farm-to-fork solutions; we're talking about fork-to-farm solutions. Bioline can help meet the needs of the consumer while sharing the bike with farmers.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●●○
DATA ANALYTICS	●●●○○
AGROBOTICS	●●●●○
AGBIOTECH	●●●●○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- GREENBACK > Soil Health
- HD Rain > Weather Forecast
- AGRICOLUS > Data Analytics
- Rize > Carbon
- Meropy > AgRobotic
- AGROOP > Data Collection
- Weather Force > Weather Forecast
- CREALYST > Post-Harvest
- soonapse > Weather Forecast
- Cearitis > Biocontrol
- eFood Print > Weather Forecast

FUNDRAISING IN 2020

224 M€ Raised (+39% vs 2019)

11,8 M€ Average ticket (+90% vs 2019)

TOP 3 FUNDRAISING

1. 165 M€ Ynsect - *France*
2. 14 M€ Naïo Technologies - *France*
3. 11 M€ Vitibot - *France*

SOUTHERN EUROPE

February 2021

AGRICULTURAL LANDSCAPE

Southern Europe is a region with various topographies and the agricultural landscape of the region can be divided into two groups: Western Balkans countries on one side and Slovenia and Greece on the other.

According to the FAO, the countries of Western Balkans have a quite high potential for crop farming but remain uncompetitive due to a lack of mechanization. The WB countries are producing mostly cereals except for Montenegro which has a mountainous landscape not suited for arable farming.

Slovenia and Greece on their side are focusing on field crops and a large percentage of the utilized agricultural area (UAA) is dedicated to arboriculture (orchards, olive groves, and vineyards). In Greece, arboriculture is covering up to 65% of the country's UAA with the clear majority dedicated to olive groves.

TECHNOLOGICAL LANDSCAPE

The region, despite not being perceived as a strong place for innovation (Greece, Slovenia, and Croatia are ranked as moderate innovators by the EU innovation scoreboard) has some leading universities and research centers. At the forefront of the digitalization of farming in Southern Europe, BioSense Institute, in Serbia, a multidisciplinary research center in agriculture, or the Agricultural University of Athens are strong contributors to EU H2020 projects, sources of spin-offs.

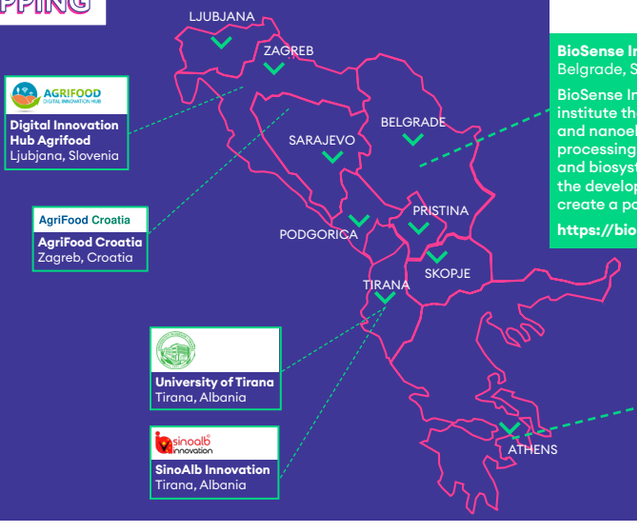
CLIMATE CHANGE EFFECTS ON THE REGION

Southern European countries are planned to be severely hit by climate change effects. According to JRC "Losses, especially in Southern Europe may be reduced by tailored adaptation strategies; e.g. changing varieties and crop types, increasing and improving irrigation practices for certain crops and when economically feasible."

FOCUS ON A LOCAL CROP: OLIVES

In terms of local crop, hard not to focus on arboriculture and the example of Greek olive groves. As the second world producer of olives and olive oil (16% of the world's production for a value of 1.4 billion euros), it will be key for Greece to invest in technical innovations and push for a change in farming practices to adapt its olive groves to climate change effects.

MAPPING



Digital Innovation Hub Agrifood
Ljubjana, Slovenia

AgriFood Croatia
Zagreb, Croatia

University of Tirana
Tirana, Albania

SinoAlb Innovation
Tirana, Albania

BioSense Institute
Belgrade, Serbia

BioSense Institute is a multidisciplinary research institute that perform in the fields of micro and nanoelectronics, communications, signal processing, remote sensing, big data, robotics and biosystems, with a common goal to support the development of sustainable agriculture and create a positive impact to the lives of people.

https://biosens.rs/?page_id=12564&lang=en

Agricultural University of Athens
Athens, Greece

The Agricultural University of Athens (formerly Highest Agricultural School of Athens) is the third oldest University in Greece. For over eighty years now, it has been serving agricultural sciences producing high quality graduates as well as scientific knowledge through basic and applied research.

https://www2.aua.gr//el

TESTIMONY

BUSINESS FRANCE OFFICES

WHAT ARE THE KEY CHALLENGES THAT AGRICULTURE IS FACING IN SOUTHERN EUROPE ?

Mediterranean countries in southern and south-eastern Europe, are expected to experience significant agricultural production losses due to climate change. Low precipitation and hottest temperatures are reducing crop yields and increasing crop failures and production declines. During the last few years, the region has suffered several diseases especially in orchards and olive growing sectors.

The governmental reforms, which aim is much more to reduce the policy gap compared to European standards than reducing environmental impacts, often reflect a poor understanding of the social and economic reality of the area.

ACCORDING TO YOU, HOW INNOVATION CAN HELP TO SOLVE THESE CHALLENGES?

In this context, water resource management is one of the key to face the climate variability's effects. Aerial imagery, weather stations and humidity sensors of the ground are especially useful for arable crops and wine or olive farms. Hyperspectral imaging also could help farmers for early stage disease recognition in order to improve the crop yields. These technologies can offer significant benefits on aspects of remote measurement of soil conditions, on provision of better water/irrigation management and crop monitoring in Precision Agriculture.

WHAT IS YOUR VISION ABOUT THE AGFOOD ECOSYSTEM OF INNOVATION HERE IN THE REGION?

However, there is a few initiative leaded by the main universities of the region which try to structure the AgriFoodTech ecosystem by helping the startups to improve their technologies and solutions. The number of candidates to the InVivo Quest Southern Europe Tour shows that, despite the lack of organizations and governmental framework, the regional Agri-sector's players are aware that digitalization of agricultural activities can improve the environmental impact of agricultural practices while improving welfare for farmers.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●●○
DATA ANALYTICS	●●●○○
AGROBOTICS	●●○○○
AGBIOTECH	●●○○○

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- Centaur › Post-Harvest
- agremo › Data Analytics
- EdenCore › AI
- KYTION › AgRobotics
- Fresh Agriculture Technologies › Arboriculture
- geabit › Data Collection

FUNDRAISING IN 2020

9,5 M€ Raised (2020)

8 M€ Raised (2021)

SINGLE FUNDRAISING OPERATION

9,5 M€ Trapview by EFOS *Slovenia*

8 M€ Augmenta *Greece*

UK - IRELAND

March 2021

AGRICULTURAL LANDSCAPE

Despite the mild climate making it an interesting region for crop farming, most of the farmland is used to support livestock. Utilized Agriculture Area (UAA) accounts for 72% of the land of the UK and Ireland but only 26% is dedicated to crops. The soil varies from rich and fertile soil in Ireland too low to medium in the United Kingdom. Regarding this last region, East Anglia (the Far East of the country) remains the most productive area as it is home to one-third of Grade 1 & 2 soil in the country.Both UK and Ireland dedicate most of their UAA aimed for crops to arable farming and root crops.

TECHNOLOGICAL LANDSCAPE

UK & Ireland are home to huge R&D investments led by excellent institutions, both on biotechnologies and digital, the two countries are set to increase their productivity in a significant way.
United Kingdom launched four centers for agricultural innovation at the end of 2015: Agrimetrics (agricultural data), CHAP (Crop Health & Protection), Centre for Innovation Excellence in Livestock, and Agri-EPI (Precision Agriculture).
The four centers are disseminated all over the country with a presence in Yorkshire, Hertfordshire, and Scotland.
Ireland is also a dynamic place for AgriFood innovation as the region is now home to a European Centre of Excellence for Precision Agriculture. In this country where agriculture is dominated by the livestock and dairy industry, crop farmers have understood the potential of technology to impulse a new model of development.

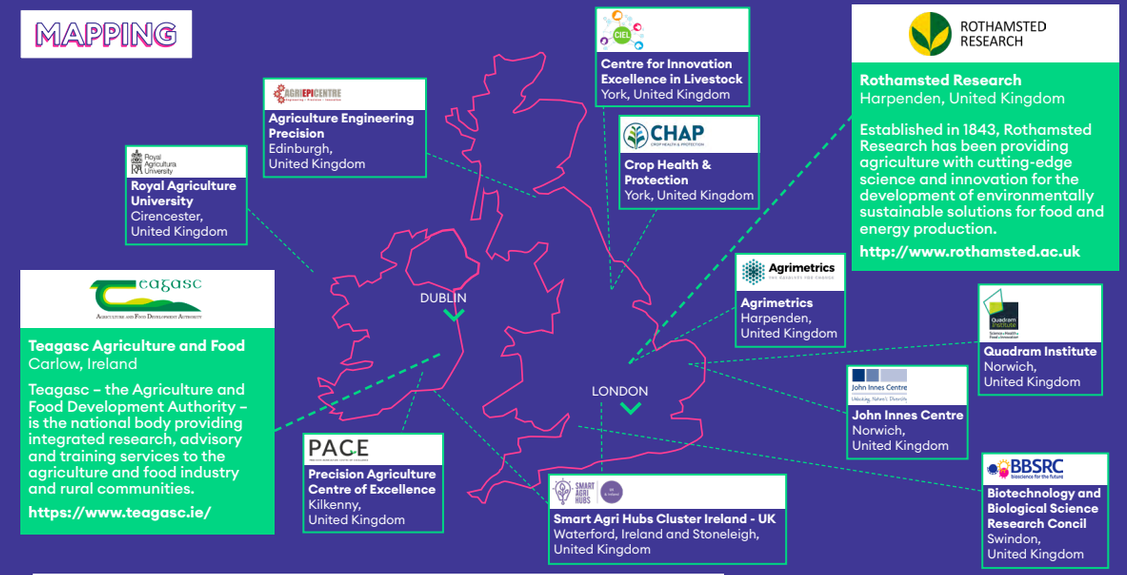
CLIMATE CHANGE EFFECTS ON THE REGION

On a historical note, the widespread use of hedges between arable fields has been contributing to storing carbon, increasing biodiversity, and mitigate floods for centuries.
According to a study ordered by the British parliament, the impact of climate change on the territory requires breeding new varieties of crops more resilient and adaptive to drought periods as well as developing Controlled-Environment Farming (CEF).
Regarding its current answers to climate change, the region is home to numerous research centers in plant breeding, biocontrol, and precision farming that are working on developing solutions to make agriculture more sustainable.

FOCUS ON A LOCAL CROP: SUGAR BEETS

Wheat is the most commonly farmed crop in the United Kingdom, but we chose to focus on sugar beets for which the UK is the 10th world's largest producer.
Sugar beet is a key root crop as it is the main source of sucrose of the Northern Hemisphere in opposition to sugar cane that can be found in the tropics and the Southern Hemisphere.

MAPPING



INTERVIEW

DR AURÉLIE BOVI
Knowledge Exchange and Innovation
Crop Health and Protection Ltd

WHAT ARE THE KEY CHALLENGES THAT AGRICULTURE IS FACING IN UNITED KINGDOM?
In the UK, the changes and challenges of the past year have further exposed the need for greater domestic food supply resilience, adding pressure on the Agricultural sector to increase its productivity, use resources more efficiently whilst reducing its carbon emissions and impact on the environment. In many ways, 2021 is marking a 'new era' for British agriculture. Yet, looking ahead, one of the biggest challenges farmers will continue to face is climate change.

ACCORDING TO YOU, HOW INNOVATION CAN HELP TO SOLVE THESE CHALLENGES?
Innovation can help the AgFood sector meet these challenges in different ways and support its transition to a more sustainably productive, low-carbon, prosper and resilient system, one that will provide food security for all whilst protecting the environment and biodiversity. For instance, use of data in decision-support systems and modelling of early pest/disease detection can drive precision interventions and reduce inputs on farm. Controlled environment agriculture could play an important role in increasing the availability of healthy, diverse, locally-grown fresh produce with reduce waste and high-efficient use of resources. Networks and ecosystems bringing together innovators, experts and end-users to collectively design and implement cross-sector solutions are also crucial to tackle those challenges in new ways, and accelerate their translation and adoption.

WHAT IS YOUR VISION ABOUT THE AGFOOD ECOSYSTEM OF INNOVATION HERE IN THE REGION?
The UK innovation ecosystem is very strong and benefit from interactions between different actors from industry to research to government. For many years, the UK have encouraged and fostered cross-sector, multi-disciplinary approaches through different interventions such as Industry/Research clubs and funding, in particular industry-led projects. In 2016, four Agri-Tech Centres, including Crop Health and Protection (CHAP), were established to harness R&D excellence and support and accelerate the identification, development and adoption of Agri-Tech solutions by creating networks and collaboration opportunities.

OUR ECOSYSTEM GRADING

DATA COLLECTION	●●●○○
DATA ANALYTICS	●●●●○
AGROBOTICS	●●●●○
AGBIOTECH	●●●●●

2020/2021 REGIONAL FINALISTS INVIVO QUEST

- Crop Intellect › AgBiotech
- agribot › Data Analytics
- Small Robot Company › AgRobotics
- FungiAlert › Data Collection
- FOTENIX › Data Analytics
- deepplanet › Satellite Imagery
- HayBeeSee › Satellite Imagery

FUNDRAISING IN 2020

125 M€ Raised (+86% vs 2019)

8,95 M€ Average ticket (+205% vs 2019)

TOP 3 FUNDRAISING

1. **60 M€** Roslin Technologies - *UK*
2. **26 M€** Tropic Biosciences - *UK*
3. **9 M€** Dendra Systems - *UK*

#Quest EuroTour 2020-2021

QUEST LAUREATES

Winner of the Central Europe region, Gamaya (Switzerland) develops hyperspectral imaging systems coupled with a data visualization platform to enable augmented decision making.

GAMAYA

www.gamaya.com

Prediktor INSTRUMENTS

www.prediktorinstruments.com

Winner from the Northern Europe region, Prediktor Instruments (Norway) is developing ultra-compact near infrared sensors for post-harvest grain or biomass analysis.

GREENBACK www.greenback.green

Winner of the South-West Europe region, Greenback (France) is launching the first soil rating agency considering carbon and organic matter levels, integrity and biodiversity at the plot level. Greenback plans to deploy its platform worldwide to have a complete vision of the health of agricultural soils and to imagine actions to be implemented to regenerate them.

CIRCULARCARBON

www.circular-carbon.com

Winner of the North-West Europe region, Circular Carbon (Germany) is developing a biochar for European crops from co-products of the chocolate industry (cocoa pods). In addition to feeding plants by acting as a biological fertiliser, the biochar enables carbon to be stored in agricultural soils.

Circular Carbon finances the construction of agricultural and agri-food waste recovery plants through companies wishing to offset and cancel their carbon dioxide and other GHG emissions.

Crop Intellect

https://cropintellect.co.uk/

Winner of the UK-Ireland region, Crop Intellect (UK) proposes R-Leaf, a NOx conversion solution to reduce fine particle air pollution while increasing nitrate fixation by plants.

Centaur

https://centaur.ag/

Winner of the South West Europe region, Centaur Analytics, (Greece) provides technologies that power an end-to-end post-harvest quality chain, deploying wireless smart sensors that enable real-time monitoring of stored crops and artificial intelligence to make forecasts for the coming weeks.

biomyc https://biomyc.eu/

Winner of the Eastern Europe region, Biomyc (Bulgaria) is developing an alternative bio-packaging to polystyrene, fully compostable and biodegradable, made from mushroom stems and crop residues. The Biomyc solution is therefore of great interest in meeting the need for new packaging with a low environmental impact, while at the same time valorising agricultural by-products and providing new sources of income for farmers.

SPECIAL THANKS TO OUR PARTNERS

bpifrance

Bpifrance, the French public bank, provides a continuum of solutions adapted to every key step in a business' growth such as: business creation, financing, guarantees or equity investment. It is also the French agency for innovation, delivering programs to innovative entrepreneurs.

Lantmännen

Lantmännen is an agricultural cooperative and Northern Europe's leader in agriculture, machinery, bioenergy and food products. Lantmännen is owned by 20 000 farmers and with grain at the heart of its operations, it refines arable land resources to make farming thrive.

RWZ Raiffeisen

Raiffeisen Waren-Zentrale Rhein-Main eG is the third largest agricultural cooperative in Germany. They trade in agricultural products (grain, oilseeds, potatoes), inputs for agriculture, viticulture and professional horticulture, agricultural technology, animal feed and wood.

With approximately 2,600 employees at almost 150 locations, they are active in wholesale for their member cooperatives as well as locally for many thousands of farmers, winegrowers and horticulturists - and have been for around 130 years.

BUSINESSFRANCE

Business France is responsible for fostering export growth by French businesses, facilitating international investment in France. It promotes France's companies, business image and nationwide attractiveness as an investment location.

royal agrifirm group better together

With almost 3.000 dedicated employees driven to excel every day, **Royal Agrifirm Group** contributes to a responsible food chain for future generations. We deliver measurable, relevant and sustainable value at farm, field and industry. Founded over 120 years ago in the Netherlands, we now are a leading agricultural cooperative with an international network of subsidiaries within Europe, South America, United States of America, Asia and a worldwide distribution network. Royal Agrifirm Group strives to be the preferred knowledge and solution-driven partner for our customers in animal nutrition, crop cultivation and animal, plant and soil health.

WAI by BNP PARIBAS

WAI (We Are Innovation) was created to support all companies that wish to innovate: Start-ups but also Intermediate Size Companies and Large Companies. To effectively support start-ups, BNP Paribas has deployed a network of specialised bankers throughout France since 2012.

Microsoft

Microsoft's mission and values are to help people and businesses throughout the world realize their full potential. With Azure FarmBeats, Microsoft is making data-driven agriculture simple and affordable.

FarmBeats enables partners to make farmers more efficient by providing visibility into how much water is in the soil, what the soil conditions are, how plants are growing, and more.

Tereos

Tereos is a Cooperative and leading player in sugar, starch and alcohol markets. Its mission is to respond to the needs of a changing world with plant-based solutions.

In Extenso Innovation Croissance

In Extenso Innovation Croissance advises innovative organizations on the major challenges of tomorrow by providing companies and public actors with the strategic vision of a partner capable of proposing and implementing scientific, technical, strategic, financial and fiscal recommendations in the field of sustainable innovation.

CAPAGRO

Capagro is the first European Independent Venture Capital fund dedicated to AgTech and FoodTech.

LA POSTE SOLUTIONS BUSINESS

La Poste Business Solutions is the B2B entity of the French Postal Services.

agro innovation lab

Founded in 2016 as the innovation platform of RWA and the Lagerhaus cooperatives, **Agro Innovation Lab** is one of Europe's biggest players in Agriculture. It operates as a trend scout, accelerator, networker, mentor, unconventional think tank, knowledge carrier, partner, and facilitator – in a goal to play an active part in shaping the future of agriculture through innovation.

McCain

McCain is the world's largest manufacturer of frozen potato products, supplies French fries, potato specialties and appetizers to retail and foodservices.

BayWa

BayWa is a globally active group with the Energy, Agriculture/Technology and Building Materials Segments as well as Innovation & Digitalisation. We develop innovative solutions, value-creating projects and trade in products that are close to the basic human needs of food, heat and living.

T1 GLOBAL EUROPE PRESENTATION

Venture capitalists confirm that the signs are green for the beginning of 2021. The increase in the total amount of investments in Europe (+96%) combined with the generalized increase in the average ticket size (+103%) are strong signs of a return to pre-crisis investment levels. The record performance of March 2021 - almost half of the amounts raised over the quarter - reflects the climate of confidence and optimism revealed by the funds during the interviews conducted over the period. However, the sustained decline in the number of deals on the European markets (-14%) reveals the concentration of investments in mature companies.

EUROPE : 517 MILLON EUROS RAISED IN 2020

FOCUS ON THE AGRITECH SECTOR

The agritech sector is following the same trend with a significant increase in amounts raised (+216%) in Q1 2021 compared to Q1 2020. The increase in the amounts raised by "Agritech" companies is a long-term trend with an average growth of 15% per year since 2018 to reach €517 million raised in 2020. This increase is characterized by a concentration of investments in companies that have already raised funds, with the three largest deals in 2020 accounting for nearly 60% of total amounts in 2020 and being positioned in the food sectors (Food&Feed): Ynsect 160M€, Infarm 77M€ and Roslin Technologies 60M€.

EUROPE : TOP 10 FOUNDRAISING (2020)

1. **165 M€** Ynsect - *France*
2. **77 M€** Infarm - *Germany*
3. **60 M€** Roslin Technologies - *UK*
4. **26 M€** Tropic Biosciences - *UK*
5. **9 M€** Alphea.Bio - *Belgium*
6. **14 M€** Naïo Technologies - *France*
7. **11 M€** Vitibot - *France*
8. **10 M€** Biotalys - *Belgium*
9. **9,5 M€** Saga Robotics - *Norway*
10. **9,09 M€** Dendra Systems - *UK*

Southwest Europe (225M€ raised), the UK & Ireland (125M€ raised) and northwest Europe (120M€) represent the three most active regions in terms of amounts raised (90% of Europe) and the number of fundraisings in 2020 (67% of the number of fundraisings).

AFTERWORD

by InVivo Quest Team

Not a trivial tour of Europe in digital innovation! And yet, given the context we all share, this is what we proposed to do over the last few months to continue our quest for innovative solutions in agriculture. **For us, it was not only a question of exploring the European AgriFood innovation landscape but also of growing our community of experts committed to proposing alternative models in the face of climate and environmental challenges.**

And it is with great satisfaction that we conclude this exciting Quest EuroTour 2020-2021, after having met many talents in the four corners of Europe, discovered some sixty projects, and been auditioned by more than a hundred jurors, who agreed to challenge them while giving some recommendations.

We have learned a lot about the different initiatives that feed the transition trajectories for a more efficient and resilient Agrifood and we hope that you will have found it interesting to go through this booklet, which is intended to be **a synthesis of these few months spent deciphering the dynamics of European AgriFood innovation.**

As this Quest EuroTour is only the beginning of connecting promising projects and the actors who can help them grow, we hope to be able to share some great success stories in the coming months!

Finally, we would like to thank all the participants, startups, cooperatives, investment funds, corporations, institutions, and research centers who helped us make this edition of InVivo Quest different from the previous ones, but just as exciting and hopeful for the future of AgriFood!

JÉRÔME BRICKERT
Innovation Project Manager
InVivo Quest

FABRICE DA CANAL
Innovation Project Manager
InVivo Quest

ABOUT INVIVO QUEST

Launched in 2017, InVivo Quest InVivo' s open innovation platform aims to federate and structure an agri-food ecosystem of innovation, to ensure connections with its partners, to bring out global champions that will help shape the agri-food of tomorrow. Over the past 4 years, InVivo Quest has challenged 600 startups and brought together more than a hundred partners, including BPI France, Microsoft, Business France, La Poste and Wai BNP Paribas.

BIBLIOGRAPHY

NORTHERN EUROPE

Lantmännen Farming of the future, the road to climate neutral farming 2050
Available at: https://www.lantmannen.com/farming-of-the-future/

Nordic Agriculture and Climate Change - Mitigation and Adaptation: Recommendations from leading researchers and private companies within the Nordic plant breeding.
Available at: http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A1314281&dswid=7529

Crop production in a Northern climate on FAO website
Available at: http://www.fao.org/3/i3084e/i3084e15.pdf

Agricultural land use in Sweden, Eurostat
Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Table_4_Utilised_Agricultural_Area_by_land_use_Sweden_2000_and_2010.PNG

Denmark – a Food & Farm country
Available at: https://agricultureandfood.dk/prices-and-statistics/annual-statistics

Finland Agriculture & Forestry
Available at: https://www.mtk.fi/web/en/agiculture-and-forestry-in-finland#:-:text=Finland%20has%2048%2C000%20farms%20with,which%20milk%20accounts%20for%2040%20%25

Climate change adaptation in the agriculture sector in Europe
Available at: https://www.eea.europa.eu/publications/cc-adaptation-agriculture

Productivity in EU agriculture, EU agricultural markets briefs
Available at: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/trade/documents/agri-market-brief-04_en.pdf

Lithuania's agriculture profile on FAO website
Available at: http://www.fao.org/3/y2722e/y2722e0v.htm#:-:text=Arable%20land%20and%20permanent%20crops,horticultural%20crops%20and%20linen%20fibre

2018 report on Latvia agricluture
Available at: https://www.csb.gov.lv/sites/default/files/publication/2018-07/Nr_17_Latvijas_Lauksaimnieciba_2018_%2818_00%29_LV_EN_0.pdf

Agriculture and forestry in Estonia
Available at: http://www.estonica.org/en/Economy/General_overview_of_Estonian_economy/Agriculture_and_forestry/#:-:text=Milk%20cattle%2C%20also%20pigs%20and,amount%20of%20meat%20is%20imported

CENTRAL EUROPE

Swiss Agriculture & Food, Pocket statistics 2020
Available at: https://www.bfs.admin.ch/bfs/en/home/statistics/agriculture-forestry/farming.assetdetail.13127969.html

Eurostat, organic farming area 2019
Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Organic_farming_area_2019_map.jpg

Europa archive: Agriculture census in Austria, 2018
Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agricultural_census_in_Austria&oldid=379531

FAO: The Czech Republic
Available at: http://www.fao.org/3/y2722e/y2722e0o.htm#:-:text=Major%20crops%20include%20winter%20wheat,%2C%20maize%2C%20hops%20and%20fruit.&text=Economic%20reform%20in%20the%20Czech,is%20a%20member%20of%20OECD

FAO: Hungary
Available at: http://www.fao.org/3/y2722e/y2722e0r.htm

Poland, statistical yearbook of agriculture 2020
Available at: https://stat.gov.pl/en/topics/statistical-yearbooks/statistical-yearbooks/statistical-yearbook-of-agriculture-2020,6,15.html

The Swiss climate strategy for agriculture at a glance
Available at: http://www.fao.org/3/i3084e/i3084e24.pdf

Assessing climate policy impacts in Poland's agriculture
Available at: http://climatecake.pl/wp-content/uploads/2020/07/CAKE_climate_policy_impacts_in_agriculture_June_2020_s.pdf

Apple production in Switzerland, 2013
Available at: http://www.agribenchmark.org/fileadmin/Dateiablage/B-Horticulture/CountryInformation_Apple/Apple_Switzerland.pdf

Volume of apple production in Europe in 2018, Statista
Available at: https://www.statista.com/statistics/578339/apple-production-volume-europe/

EEA Report No 4/2019, Climate change adaptation in the agriculture sector in Europe
Available at: https://www.eea.europa.eu/publications/cc-adaptation-agriculture

EASTERN EUROPE

FAO country profile: Belarus, 2015
Available at: http://www.fao.org/3/ca0325en/CA0325EN.pdf

Credit Agricole, Ukrainian agribusiness, 2018
Available at: https://www.credit-agricole.com/en/pdfPreview/171758

Top 10 Agroholdings in Ukraine, 2018
Available at: https://www.agroberichtenbuitenland.nl/documenten/publicaties/2018/07/12/top-10-agroholdings-in-ukraine

NORTH WEST EUROPE

Europe largest potato producers, 2019, Statista
Available at: https://www.statista.com/chart/17636/harvested-potato-production-and-share-of-eu-total/

Europa : The EU potato sector - statistics on production, prices and trade, 2019
Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/The_EU_potato_sector_-_statistics_on_production,_prices_and_trade

FAO : The Netherlands
Available at: http://www.fao.org/3/i1500e/Netherlands.pdf

Europa statistical factsheet: Germany
Available at: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agri-statistical-factsheet-de_en.pdf

SOUTH WEST EUROPE

Eurostat : Area of fruit and vegetable by main producing EU member state, 2017
Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Figure_2_Area_of_fruit_and_vegetable_by_main_producing_EU_Member_State,_2017_(%25_of_EU-28)_.png

Overview of French agricultural diversity
Available at: https://agriculture.gouv.fr/overview-french-agricultural-diversity

Volume of wine produced in European wine producing countries in 2018, Statista
Available at: https://www.statista.com/statistics/445651/leading-countries-wine-production-europe/

JRC, Analysis of climate change impacts on EU agriculture by 2050
Available at: https://ec.europa.eu/jrc/en/publication/analysis-climate-change-impacts-eu-agriculture-2050#:-:text=As%20large%20negative%20climate%20change,resulting%20in%20higher%20producer%20prices

SOUTHERN EUROPE

Technical efficiency of agriculture in Western Balkan countries undergoing the process of EU integration
Available at: https://www.agriculturejournals.cz/publicFiles/224_2019-AGRICECON.pdf

Agriculture in the Western Balkan Countries
Available at: http://www.iamo.de/fileadmin/documents/sr_vol57.pdf

Slovenian Agriculture in Numbers
Available at: https://www.kis.si/f/docs/Slovenian_Agriculture_in_Numbers/KIS_Slovensko_kmetijstvo_v_stevilkah_2016_ANG_splet.pdf

Annual agricultural statistical survey: 2018
Available at: https://www.statistics.gr/en/statistics?p_p_id=documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4IN&p_p_lifecycle=2&p_p_state=normal&p_p_mode=view&p_p_cacheability=cacheLevelPage&p_p_col_id=column-2&p_p_col_count=4&p_p_col_pos=1&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4IN_javax.faces.resource=document&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4IN_ln=downloadResources&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4IN_documentID=418041&_documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4IN_locale=en

Adaptation of Mediterranean Olive Groves to Climate Change through Sustainable Cultivation Practices
Available at: https://www.mdpi.com/2225-1154/8/4/54/html

UK-IRELAND

Agriculture in the UK, 2019
Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950618/AUK-2019-07jan21.pdf

Agriculture in United Kingdom and climate change
Available at: https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/agriculture/#:-:text=Changes%20in%20the%20UK's%20climate,on%20agricultural%20and%20forestry%20production.&text=Warmer%20temperatures%20will%20increase%20the,sugar%20beet%20and%20leafy%20vegetables

Impact of food
Our World in data: Environmental impacts of food production
Available at: https://ourworldindata.org/environmental-impacts-of-food

Nature.com, Calculation of external climate costs for food highlights inadequate pricing of animal products
Available at: https://www.nature.com/articles/s41467-020-19474-6

To revisit the Quest EuroTour :
https://www.youtube.com/channel/UCUKclbexC7Y8TdGfgReWBIA

@InVivoQuest InVivo Quest

Powered by INVIVO