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AGRICULTURE & INNOVATION

Shaping the digital (r)evolution in agriculture

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More information: www.eip-agri.eu

Supporting a digitised and data-empowered rural Europe

Digital technologies can support European farmers in providing safe, sustainable and quality food. Not only do they help farmers "produce more with less", but they can also contribute to fighting climate change. Existing and new technologies such as the internet of things (IoT), artificial intelligence, robotics and big data can contribute to making processes more efficient and can lead to the creation of new products and services.

Digitisation can also play a role in creating a better life in Europe's rural areas, as is highlighted in the Cork 2.0 Declaration. It states that the use of digital technologies will increasingly be vital for farmers and other rural businesses to enable them to deliver sustainable solutions to current and future challenges.

The European Commission (EC) aims to make the agricultural sector and rural areas in Europe digitised and data-empowered. Under the Digital Single Market strategy, the Communication "Digitising European Industry" sets out its objective to ensure that "any industry in Europe, big or small, wherever situated and in any sector can fully benefit from digital innovations to upgrade its products, improve its processes and adapt its business models to the digital change". In the Communication "Building a European Data Economy" the EC explores how data can potentially bring many opportunities for European industry, including the agri-food sector.

Although the digitisation of the farming sector comes with many benefits, and a number of actions and instruments have already been implemented, barriers to realise its full potential across Europe still exist. This brochure looks into what can be done to continue moving forward, highlighting inspiring examples and key areas for action.

Hungarian farmer and veterinarian Dr. Gabor Salyi is one of the many European innovators who see how a clever precision livestock farming (PLF) tool can help them address today's challenges. He has been using a PLF tool that gives continuous real-time insight into dairy and beef herds' rumen conditions via pH and temperature values. Gabor sees the benefits: "The PLF tool supports data-driven decisions and tells me on which rumen pH level our milk production, milk quality and herd health can be optimised."

More information: www.moonsyst.com

Richard Lloyd
from the thematic network 4D4F says:

"The explosion in the amount of data generated from dairy sensors opens up many new possibilities in improving the management and welfare of dairy animals, and this potential will be exploited best by bringing together farmers, advisers, researchers and industry."

More information: www.4d4f.eu

Digitisation for agricultural productivity and sustainability

Today, many farmers are already using digital technologies such as smartphones, tablets, in-field sensors, drones and satellites. These technologies provide a range of farming solutions such as remote measurement of soil conditions, better water management and livestock and crop monitoring. By analysing the data collected, farmers can gain insight into likely future crop patterns or animal health and welfare. This enables them to plan more effectively and be more efficient.

Potential benefits of the use of digital technologies may include improved crop yields and animal performance, optimisation of process inputs and labour reduction, all of which increase profitability. Digitisation can also improve working conditions for farmers and reduce the environmental impacts of agriculture.

Another gain relates to agricultural data flows. Improving information flows up and downstream in agri-food chains could result in a wide range of benefits for those involved, including farmers and stakeholders in distribution and retail. Also consumers, researchers, government and NGOs see benefits from improvements in transparency.

Encouraging the use of digital technologies

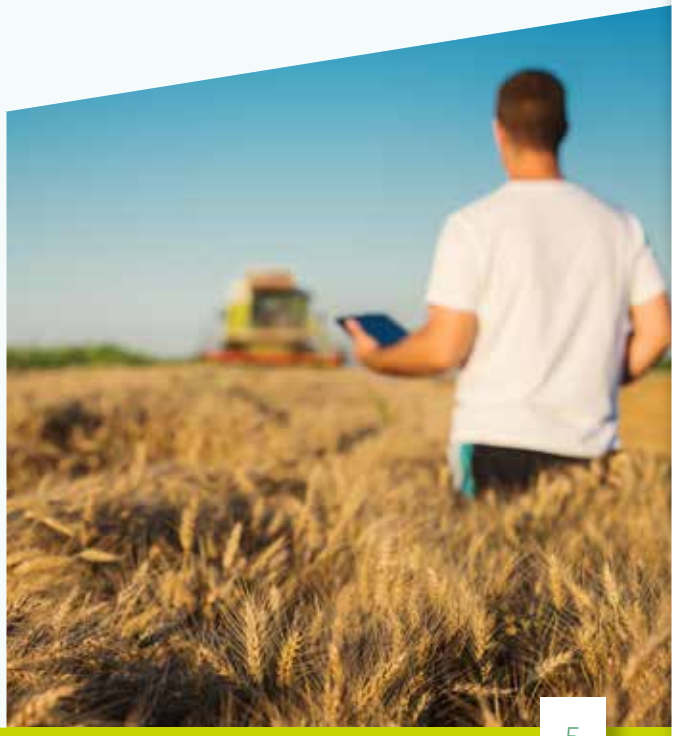
Digital technologies are widely available, but their use by farmers across Europe varies from one technology to another. This is perhaps due to the fact that many technologies require an initial investment, in some cases combined with little testing in specific real-life conditions or geographical locations. Also, these digital solutions are often seen as complex and this can discourage their uptake. The EIP-AGRI Focus Group on Precision Farming identified a range of measures that promote the use of technologies by farmers, including the following:

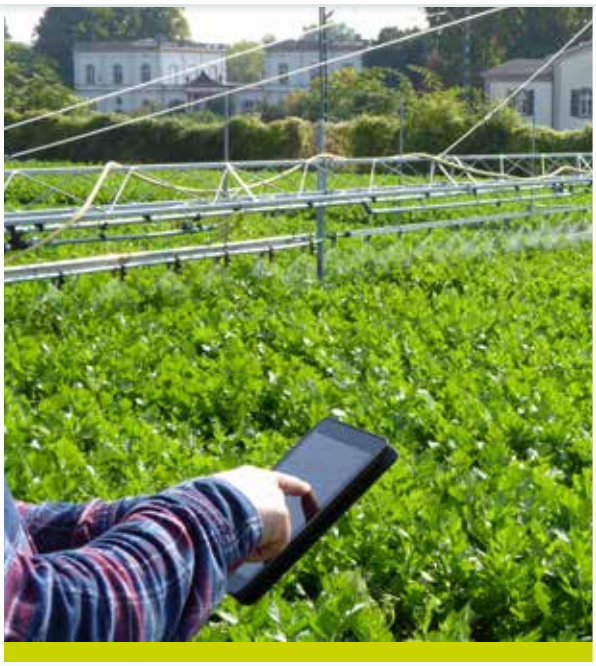
The introduction and uptake of technologies requires **new skills and knowledge for farmers and advisers.** Raising awareness and organising training on a regional/local level is essential, especially to reach small and medium-sized farms, where the use of digital technologies is not always thought of as profitable.

The **development of specific data analysis tools**, with a special focus on costs-benefits, can help farm advisers to play a critical role in informing farmers on digital technologies.

The Smart Farming Platform of the thematic network Smart AKIS allows farmers to identify and assess smart farming technologies through a quick assessment tool. The tool assists farmers in choosing the technologies that are best suited for their small and medium-sized farms.

More information: www.smart-akis.com





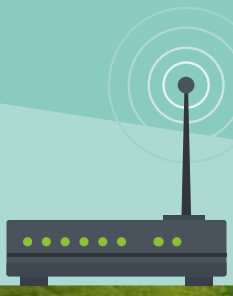
To make use of the full potential of digital technologies, **access to broadband internet** is essential. National and regional authorities can use EU funding to install high-speed broadband infrastructures and enhance the connectivity of rural areas.

There are still clear gaps between the applications created by business developers and the real needs of farmers. To develop user-friendly technologies, researchers and business developers should **work together and co-create appropriate solutions** with farmers, cooperatives, ICT experts etc. Properly testing new technologies could for example take place in living labs or on demonstration farms. This need for co-creation ties in with the "interactive innovation model", used in EIP-AGRI Operational Groups and Horizon 2020 multi-actor projects, bringing together complementary knowledge from science and practice. Find out more in the EIP-AGRI brochure on Operational Groups and the EIP-AGRI brochure on multi-actor projects.

Did you know that there are Broadband Competence Offices (BCOs)?

Broadband Competence Offices (BCOs) across Europe advise local and regional authorities on ways to invest effectively in broadband, and advise citizens and businesses on how to obtain support for better access to broadband services.

More information:
ec.europa.eu/digital-single-market/



In EIP-AGRI Operational Groups, researchers and farmers cooperate to translate innovative ideas into practical solutions that are relevant and useful in the field. In the German Operational Group GS-Netz, web developers, researchers and farmers are working together to develop an app on irrigation scheduling for vegetable crops, by providing data and by testing the technology in real time.

More information: www.hs-geisenheim.de

Luis Pérez-Freire is executive director of Gradiant (the Galician R&D Center in Advanced Telecommunications that co-founded the Galician Digital Innovation Hub for the agri-food sector). He says:

"We want to make it easier for all to adopt digital innovations. More importantly, we want to help the creation of new technology solutions for the Galician farming sector. We will enable a close collaboration with regional government and other key Galician actors, like cooperatives, producers, ICT companies, universities."

More information:
http://polodeinnovaciondixital.org/en

Digital Innovation Hubs (DIHs) help the uptake of digital technologies in agriculture

By bringing together IT suppliers, the farming sector, technology experts, investors and other relevant actors, DIHs will ensure the connection between the ICT and the farming communities. This will lead to new applications that are adapted to the real needs of farmers.

National and regional authorities can play a key role in encouraging the setting up of DIHs and the creation of a regional innovation ecosystem. They can, for instance, ensure that regional infrastructures such as testing facilities, pilot plants, data centres and fab labs are shared by all relevant people.

The Horizon 2020 project SmartAgriHubs will consolidate, activate and extend the current ecosystem by building a network of Digital Innovation Hubs (DIHs) that will boost the uptake of digital solutions by the farming sector.

More information on Digital Innovation Hubs, their role in agriculture, and the EIP-AGRI Seminar on DIHs on the EIP-AGRI website.

H2020 calls 2018-2020

The Horizon 2020 Work Programme 2018-2020 will encourage the uptake of technologies through the following funding activities:

- RUR-13-2018 - Enabling the farm advisor community to prepare farmers for the digital age. The project selected for this topic: Fairshare
- DT-RUR-12-2018 - ICT Innovation for agriculture: Digital Innovation Hubs for agriculture. The project selected for this topic: SmartAgriHubs.

More information: EIP-AGRI brochure on Horizon 2020 calls 2019

Developing new technologies and business models

New technologies such as the internet of things (IoT), artificial intelligence, robotics and big data have the potential to lead to unprecedented innovations in agriculture. Also, the appearance and adoption of technologies can boost the creation of new business models based on data produced by different technologies.

To ensure that the farming sector can take full advantage of these technologies, it will be crucial to build an innovation ecosystem through which start-ups, entrepreneurs and SMEs can develop technology applications which are adapted to real needs. Balancing all of these groups' different needs may be challenging, but it is necessary for new business models to work.

'Internet of Food & Farm' (IoF2020) is the largest-scale pilot that has been implemented at European level. Its goal is to strengthen Europe's leading position in the internet of things technology, applied to the agri-food sector. Based on the multi-actor approach, IoF2020 is developing an ecosystem that consists of farmers, food companies, policy makers, technology providers, research institutes and end-users. The project is organised around five agricultural sectors: arable crops, dairy, fruit, vegetables and meat. Within each trial, several case studies (19 in total) demonstrate the value of IoT solutions for the European food and farming sectors.

More information: www.iof2020.eu

Did you know that Digital Innovation Hubs (DIHs) have a role in developing new applications?

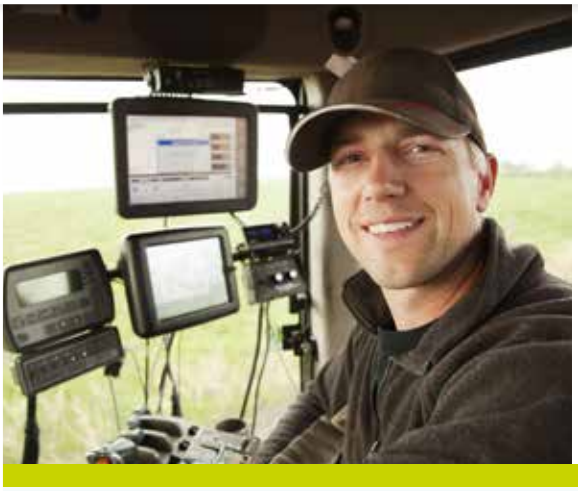
As 'one-stop-shops', DIHs serve companies, start-ups and entrepreneurs in their region and beyond to improve their businesses. This support can take different forms, such as testing and experimentation of new and disruptive technologies, and it is available at different stages from product conception to development production.

As farmers are increasingly working with digital technologies at different levels, collecting large amounts of data now becomes possible. Collecting and combining data from different sources can lead to value creation, as the appearance of new and sometimes very disruptive business models shows. Therefore, facilitating data sharing and data reuse will highly contribute to the digital revolution.

In the EIP-AGRI Seminar on Data revolution, participants acknowledged that data sharing and open-data sources should be developed to bring digital technologies to the next level. Having common standards would improve the exchange of data, and the interoperability and overall development of new data-driven business models. In agriculture, new services could be set up by innovative ICT companies and others, with the use of open data provided by governments. Also, data exchange platforms can lead to the creation of new applications, as the benchmarking application Farmbench shows:

"Farmbench collects and shares data from across the UK, providing farmers with useful indications on potential changes to their farm management practices, which can eventually help them to manage risks and to cope with price volatility."
Derek Carless, Head of Farm Economics, from the Agriculture & Horticulture Development Board (AHDB)

More information:
https://farmbench.ahdb.org.uk



Creating an environment of trust can stimulate data sharing, and can thereby support the further development of digitisation. Transparency, clarity and customised terms of use and licensing, as well as an appropriate division of added value can allow more people to take up these technologies. Aside from sector initiatives, a clear legal framework for data ownership is important for further development in this area. Discussions on these issues took a central place at the EIP-AGRI Workshop on Data sharing.

H2020 calls 2018-2020

The Horizon 2020 Work Programme 2018-2020 will support the development of applications and business models through the following funding activities:

- RUR-20-2018 - Digital solutions and e-tools to modernise the CAP
- DT-ICT-08-2019 - Agricultural digital integration platforms
- DT-ICT-09-2020: Digital service platforms for rural economies

More information: EIP-AGRI brochure on Horizon 2020 calls 2019

Dealing with impact on society and the economy

Not only does digitisation change the way farms are operated and managed, it impacts the agricultural system as a whole. It can contribute to reducing problems of remoteness of rural areas and enhance their capacity for social inclusion. Digital technologies bring opportunities to develop new businesses and they are likely to increase rural attractiveness, in particular for younger generations. In short, societal and economic impacts range from employment and quality of life, markets and value chains, competitiveness and scalable opportunities for agricultural and rural businesses to (re)deployment of public services.

This raises a number of questions for the future: What if digitisation of the agri-food sector leads to an increase in scale of industrial agriculture? Could it leave the concentration of power and influence over the agri-food value chain in the hands of a small number of very large-scale businesses? What if mobile broadband is part of the future in rural Europe? Could this empower rural youth to realise their full potential and lead to the digital delivery of public services?

H2020 calls 2018-2020

The Horizon 2020 Work Programme 2018-2020 will help to deal with societal and economic effects through the following funding activity:

- RUR-02-2018 - Socio-economic impacts of digitisation of agriculture and rural areas.

More information: EIP-AGRI brochure on Horizon 2020 calls 2019

More funding opportunities

- The Rural Development Programmes' Managing Authorities regularly launch calls for setting up and running Operational Groups during the 2014-2020 period. Check out the 'Operational Groups' dedicated section on the EIP-AGRI website, for more information from your country or region.
- The European Space Agency Business Applications programme offers funding opportunities for space-based services on the theme of 'Food & Agriculture'. Partners can propose demonstration projects and feasibility studies. More information on https://business.esa.int.
- On the topic of digitisation the ICT-AGRI ERA-NET offers funding opportunities on a yearly basis. More information on http://ict-agri.eu/node/13786/projects.

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Today farmers and foresters face many challenges and strive to make their work more effective and efficient.

Digital technologies can support farmers to produce "more with less" and find sustainable solutions to today's and tomorrow's challenges.

Working together to develop digital solutions adapted to the farmers' real needs and enhancing internet access will foster the uptake of digital technologies.

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