

## Internet of Food & Farm 2020



The Internet of Food and Farm 2020 (IoF2020) is a 30-million-euro initiative within the European Union which will implement a series of large-scale agri-food IoT pilots over the next five years. IoF2020 seeks to integrate the supply and demand side of IoT technologies in the agri-food sector.

... IoF2020 paves the way towards data-drive farming that is capable of providing higher production yields in a more sustainable and environmentally-responsible fashion, while also making the European farming sector more competitive in an increasingly globalized world.

In specific, IoF2020 aims to generate the following impacts:

- Validation of technological choices, sustainability and replicability, of architectures, standards, interoperability properties, and of key characteristics such as security and privacy;
- Exploration and validation of new industry and business processes and innovative business models validated in the context of the pilots;
- User acceptance validation addressing privacy, security, vulnerability, liability, identification of user needs, concerns and expectations of the IoT solutions;
- Significant and measurable contribution to standards or pre-normative activities in the pilots' areas of action via the implementation of open platforms;
- Improvement of citizens' quality of life in the public and private spheres in terms of autonomy, convenience and comfort, participatory approaches, health and lifestyle, and access to services.
- Creation of opportunities for entrepreneurs by promoting new market openings, providing access to valuable datasets and direct interactions with users, expanding local businesses to European scale, etc.
- Development of secure and sustainable European IoT ecosystems and contribution to IoT infrastructures viable beyond the duration of the pilot.<sup>1</sup>

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<sup>1</sup> <https://www.iof2020.eu/about/impact>

## Overview of IoF2020 – Trials

### The Internet of Arable Farming

Arable farming represents the largest agricultural sector in the EU in terms of acreage and primary production holdings. The IoF2020 arable trials are designed to address challenges concerning efficient use of pesticides, fertilizers and energy while enhancing food safety and data transparency across the food chain.

...In the use cases we link existing sensor networks, earth observations systems, crop growth models and yield gap analysis tools to a variety of databases. This combination of information creates effective, standardized actuation protocols ('task maps') for machines and robots. Focusing on the cultivation of three main crops (wheat, soybeans and potatoes), in different European regions and climate zones, the trial includes activities along the cropping cycle. With the help of IoT technologies, data on key variables such as the soil, climate conditions, growth of plants and weed, disease or pest prevalence can be combined in a meaningful way.<sup>2</sup>

### Dairy

The EU has experienced heavy fluctuations in milk prices at a time where there is global demand for high quality animal products due to the end of the EU milk quota regime in March of 2015. The IoF2020 dairy trials are designed to address the challenge of intensifying production while fulfilling consumer desires for sound environmental and animal welfare practices.

... In order to remain competitive on the world market, the European dairy sector needs to improve its production processes. The dairy trial addresses this challenge by combining real-time sensor data gathered from neck collars with GPS, machine learning technologies and cloud-based services to create more value in the dairy chain.<sup>3</sup>

### Fruits

Farmers are tasked with critical decisions regarding harvest time, selection, resource-use, logistics, and the control of disease and pests in the production of high quality fruits. The IoF2020 fruit trial is designed to improve production processes.

... Specifically focusing on the production of table grapes, wine and olives, the fruit trial will show how IoT technology can improve each step in the production process. Sensor data (e.g. weather stations, multispectral/thermal cameras, stem water potential, light micro-climate measures, fruitful indexes), cloud-based systems for monitoring and early warning systems to control pests/diseases (e.g. variable rate spraying, selective harvesting) can help to improve quality and increase yield.<sup>4</sup>

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<sup>22</sup> <https://www.iof2020.eu/trials/arable>

<sup>3</sup> <https://www.iof2020.eu/trials/dairy>

<sup>4</sup> <https://www.iof2020.eu/trials/fruits>

## **Vegetables**

Vegetables are one of the most important food groups in European supermarkets. In the EU, 10% of the total agricultural output is attributed to the vegetable sector. Vegetable farmers are concerned with the preservation of soil fertility while addressing the challenges of disease and pest control.

...In order to support the long-term growth of the sector, the vegetable trial aims to demonstrate how the cultivation process can be automated, using an intelligent combination of sensors and data analysis. These IoT technologies will be tested under different conditions, ranging from fully-controlled indoor greenhouses to semi-controlled greenhouses and open-air, non-regulated vegetable cultivation.<sup>5</sup>

## **Meat**

Meat production in the EU accounts for nearly one quarter of total agricultural output. The IoF2020 meat trials seek to address significant challenges to farmers concerning animal welfare, foreign competition, climate change, and antibiotic resistance.

...The meat trial aims to demonstrate how technology can help face these challenges. Early warning systems increase animal health and reduce antibiotic use. Advanced monitoring systems provide farmers with feedback on their decisions and help to optimize animal growth and wellbeing.<sup>6</sup>

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<sup>5</sup> <https://www.iof2020.eu/trials/vegetables>

<sup>6</sup> <https://www.iof2020.eu/trials/meat>