SMART FARMING

THE NEW APPROACH TO PRIMARY FOOD PRODUCTION AND DISTRIBUTION

FOOD 2030: CLIMATE, CIRCULARITY

Modern technology facilitates the potential to increase the quantity and quality of animal and plant production. Smart farming includes a variety of digital tools based on data collection, with the aim of producing more efficiently and sustainably. Some of those tools are worked into sensors, robots, and advanced machinery as well as through applications like the internet of things, data modelling, and artificial intelligence.

SPECIFIC R&I BREAKTHROUGH TOPICS

Precision farming: The management of animal and plant production using near real-time observations and measurements using digital tools is considered precision farming. Examples of these tools include, sensors to follow soil data, irrigation, foliar growth, weed development, and pest management. Overall, these technologies can improve yield output, animal performance, food safety, and reduce farm inputs like fertilisers and pesticides, bringing higher profitability and sustainability to farms.

Use of global data: The data obtained through precision farming can be made globally available through web platforms and forecasts. This data can come from local sensors at farm level, from mobile apps, drone services, and satellites. The data can provide information at a local level, giving smart access to farmers to critical information on farming.

Applied mechatronics: The use of robots and advanced mechanical tools belongs to the field of mechatronics. Examples are advanced drones for data acquisition, autonomous tractors using self-drive technology, and specific autonomous robots for jobs like fruit picking fruit or removing weeds.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088

Artificial intelligence applied to agriculture: The intelligence brought to machines is called artificial intelligence. Artificial intelligence allows machines to make decisions based on the acquired data -representing the highest level of crop and animal management in smart farming.

EXPECTED IMPACT

Smart farming has the capacity to provide higher quantity and quality of production, ensured food safety, better traceability, higher efficiency, less fraud, lower costs, improved use of chemicals, and more benefits to a new era of higher sustainability in agriculture.

MARKET OPPORTUNITIES / CHALLENGES

- There is already good availability of these technologies in the market, some of them showing promising technical results, including, higher efficiency and lower environmental footprint from the farm activity.
- These technologies could motivate and attract a specialised workforce, gaining the interest of a younger generation and progression into agriculture.
- Changes to farming practices requires risk management. To achieve success, further support is needed to boost the economic and knowledge transfer factors.
- Often, these technologies are expensive for farmers. Loan and grant mobilisation, public and private funding, co-operative renting, and other economic resources are still a challenge.
- The acquisition of skills for the use of many of these technologies requires the set-up of knowledge transfer, learning tools for adults, vocational skills training, and living labs to make them accessible for all.
- Smart Farming requires interconnection and exchange of data with all benefits and risks involved.
- There is a requirement for infrastructure to support technologies and kit like satellites, data exchange platforms, GPS technologies, etc.

EXAMPLE REFERENCES

Ivanov, S., Bhargava, K., & Donnelly, W. (2015). Precision Farming: Sensor Analytics. IEEE Intelligent Systems, 30(4), 76-80.
Negrete J.C. (2015). Mechatronics in Mexican Agriculture Current Status and Perspectives. SSRG international Journal of Agriculture and Environmental Science, Volume 2, Issue 3, 9-14.
Wolfert S., Ge L., Verdouw C., Bogaardt M.J. (2017). Big data in Smart Farming – A review. Agricultural Systems, Volume 153, 69-80.
Huang Y., Lan Y., Thomson S. J., Fang A., Hoffmann W. C., & Lacey R. E. (2010). Development of soft computing and applications in agricultural and biological engineering. Computers and Electronics in Agriculture, 71(2), 107–127.

ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

- Climate change
- Malnutrition
- Demographic change
- Scarcity of natural resources
- Engaged consumer
- New and Ggme-changing digital technologies in ggriculture
- Changes in farm structures
- Agricultural pollution

ASSOCIATED CASES IN FIT4FOOD2030 (URL)

- Novifarm
- eFooChain
- CtrlAQUA
- Fhytl Signs
- Flourish
- Prohealth
- Rootwave
- Ida by Connecterra
- AutomonPH by Waterice
- Iron Ox

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088