ICT-AGRI-FOOD ERA-Net Cofund on ICT-enabled agri-food systems - Mid-term seminar of cofunded projects

28 – 30 September 2022

The ICT-AGRI-FOOD Cofund mid-term Research Seminar was held on 28-30 September 2022 in Aachen (DE) at the Technologiezentrum (TZA). The seminar was hosted by ICT-AGRI-FOOD consortium partner Forschungszentrum Jülich. About 50 participants, ranging from researchers and processors to funding agencies, came from all over Europe to take part in this event and a number of participants followed this event online. All those who gathered in Aachen were happy to meet for the first time. The coordinator, Johannes Pfeifer (BLE, DE) noted that physical meetings have "a different feel" and are "an important opportunity for networking". All those present agreed and welcomed this opportunity.

On the first day of the Research Seminar, seven projects were invited to present an interim poster of their project to give participants insight into the preliminary results, potential impact and future research activities.

1. **ANTONIO** (Multimodal sensing for individual plant phenotyping in agriculture robotics). The project has set the goal of simplifying and optimizing the use of crop protection products and other input products thanks to precision agriculture and automation. This is achieved using sensors as well as their fusion and implementation in a novel interoperability network in combination with artificial intelligence.

ANTONIO was presented by Charalampos Paraskevas from the Aristotle University Thessaloniki in Greece.

2. **BeeConnected** (Understanding and anticipating mechanisms of honeybee colony mortality with connected beehives). BeeConnected aims at using ICT to monitor beehives during winter and to understand mechanisms underlying winter mortality risk of honeybee colonies and to identify early-warning indicators that could help beekeepers limiting colony losses and related economic deficits. BeeConnected developed a new ICT device based on 3D multiple sensors monitoring system, called connected frames, that aims at monitoring the inside temperature of the beehives in multiples location of the swarm. BeeConnected was presented by the coordinator Fabrice Requier from UMR EGCE in France.

3. **FINDR** (Fast and Intuitive Data Retrieval). The project aims at Fast and Intuitive Data Retrieval for Earth Observation. Spectral and spatial homogenization for Landsat and Sentinel has been implemented as well as the data archive access together with Onedata. All services are deployed in a Kubernetes cluster in Google Cloud that made the platform highly scalable. The spectral homogenization is based on machine learning methods and makes the use of different data sources with the same algorithms possible. FINDR was presented by Frank Schäfer from the Fraunhofer Institute for High-Speed Dynamics in Germany.

4. **GOhydro** (A smart-sensing AI-driven platform for scalable, low-cost hydroponic units). With a clear and concrete target at its core, GOhydro's innovation and achievements revolve around the provision of a fully featured and ready-to-use smart hydroponic platform. The extensive analysis towards observable growth optimisation, the adoption of flexible data infrastructures and the incorporation of AI architectures fit to the intended usage settings and are key components that enable the development of the GOhydro solution. GOhydro was presented by the coordinator Panagiotis Zervas from SCiO BIG DATA ANALYTICS in FOOD SYSTEMS in Greece.

5. **HALY.ID** (Innovative ICT tools for targeted monitoring and sustainable management of the brown marmorated stink bug and other pests). HALYomorpha halys IDentification: Innovative ICT tools for targeted monitoring and sustainable management of the brown marmorated stink bug and other pests. The project aims to lead to a new way to monitor orchards, and can be easily extended to vineyards. In particular it aims to create the tool that helps to measure the advantages of using technology in (remote) monitoring. The novelty is in the integrations of many new technological aspects: the backbone infrastructure, the UAV with a pondered camera, the intelligence to detect the bug, the smart trap for remote monitoring, the remote communications to archive microclimate data, images, which all together form the core of the decision making process. HALY.ID was presented by the coordinator Cristina M Pinotti from the University of Perugia in Italy.

6. **MUSHNOMICS** (Unlocking Data-Driven Innovation for Improving Productivity and Data Sharing in Mushroom Value Chain). Significant progress has been made in the research of the usable substrates for mushroom growing, as well as green disposal of the spent substrate. For the IT platform, a novel approach for information centralization and model generation is being developed, as data privacy is a core value of the project. The results of MUSHNOMICS will help HS to develop to expand the HS solution portfolio for farms and farmers. MUSHNOMICS was presented by Oliviu Matei from the Holisun SRL in Romania.

7. **TailBiteAdvice** (An ICT-based real-time advisory tool to minimise tail biting in fattening pigs). The first project to combine computer vision and other technologies for real-time estimation of tail-biting. The project aims to develop and demonstrate a data-driven decision support tool that will actively advise farmers on how to reduce tail biting occurrences based on mainly behaviour-based variables collected remotely during production. TailBiteAdvice was presented by Tomás Norton from the Katholieke Universiteit Leuven in Belgium.

After the presentations, the coordinators and project representatives were invited to interviews to talk to the national funders and exchange on salient points from the funders' and also from the coordinators' perspectives. The interview session was organised in parallel with a poster networking session.

In the subsequent Knowledge Incubator workshop, Livia Ortolani (MIPAAF) presented the advantages of joining the Knowledge Incubator by uploading the innovative solutions in progress and/or already developed by the partners of the 2017, 2018, 2019, 2021 and 2022 Calls (ICT-AGRI and ICT-AGRI-FOOD). Livia also described the type of contents needed for uploading innovations in the defined action-oriented sections (e.g., presentation of the innovation from a practical perspective) with a creative way whenever possible (e.g., creation of

multimedia contents using storytelling). Marijke Hunninck (ILVO) presented the online platform step-by-step.

In the second part of the KI workshop participants had the opportunity for networking, commenting on and building synergies among innovations currently available on the Knowledge incubator.

On the second day, participants joined the second and third sessions where 12 projects presented an interim poster of their projects to give participants insight into the preliminary results, potential impact and future research activities. Just like on the first day the coordinators and representatives were invited for an interview session and the parallel poster networking sessions after the pitches.

8. **Utopia** (aUtomaTed Open PrecIsion fArming Platform). Combining agricultural data and navigational data for automation is a novel approach that has the potential to benefit both. The UTOPIA goal is to come up with a result that is applicable for a wide range of agricultural applications. Utopia applied two completely different and therefore complementing Use Cases in seaweed and vineyards to be able to apply a wide range of requirements that they bring forward. Utopia was presented by the coordinator Dennis Kooijman from Intelligent Autonomous Mobility Center in the Netherlands.
9. **Adcater** (Advanced Digital Solutions for Professional Food and Nutrition Catering Services). Reducing HealthCare costs and preventing aggravation in patients' medical conditions through optimizing the food supply system, by optimal coordination with the personal nutrition profile. Adcater was presented by Itzik Levy from FoodproFix in Israel.
10. **ADDFerti** (A Data-Driven Platform for Site-Specific Fertigation). The project was presented by the coordinator Abdul Mouazen from Ghent University in Belgium. The goal of ADDFerti is to design, develop and test

a fully-automated data driven platform for variable rate fertigation. With the dry and warm summer conditions we have seen in the last few years and those of the current summer, the need for irrigation becomes more necessary than ever. To fertilize simultaneously in a targeted manner shows advantages.

11. Nikos Tsoulias from ATB, Leibniz Institute in Germany presented the **SHEET** (Sunburn and heat prediction in canopies for evolving a warning tech solution) project. As we all clearly experienced last summer, one of the main problems in recent years is the rise in temperature due to global warming. For this reason, there are cases like the risk of sunburn and heat damage to fruits. The project SHEET is developing warning technical solutions for sunburn and heat prediction.

12. **SusTainIT** (Releasing the Potential of ICT for Sustainable Milk and Beef Cattle Value Chains) was presented by Ants-Hannes Viira from Estonian University of life sciences. SustainIT aims to identify technological, economic, social and institutional barriers of widespread adoption of animal health and welfare related ICT, and to develop conceptual solutions and business models that utilize the animal health and welfare data.

13. **PLAN P** (sPectraL tools and digitalization for the development of sustAinable structured food with plaNt Proteins) aims to accelerate the design of new products such as emulsions and mousses, by diversifying the nature of the proteins, with the support of spectral analysis coupled with artificial intelligence algorithms to predict variables related to the texture of products. Plan p is coordinated by Jonathan Thévenot from ADRIA in France.

14. **IMPPeach** (Integrated Model and digital Platform for Harvest Prediction of Canned Peaches). The harvest model development is based on the collection, validation and pre-processing of a variety of data sources including field and crop data with its associated remote sensing and weather information, historical harvest and production data by producer and field. IMPPeach was presented by the coordinator Vangelis Vassiliadis from Agrostis Agricultural Information Systems S.A. in Greece.

15. Ildiko Tikasz from Research Institute of Agricultural Economics in Hungary presented **LiveStocksence** (Enhancing environmental sustainability of livestock farms by removing barriers for adoption of ICT technologies). LivestockSense has currently created a first unique knowledge base to better understand how digital technologies can benefit climate, animal welfare and the economics of livestock percentages with a focus on Europe and Israel.

16. **MERIAVINO** (Multiscale Sensing For Disease Monitoring In Vineyard Production) project is a multidisciplinary approach, which is based on several scientific fields to address the problem of disease and yield

estimation in vineyards. The proposed methodology consists of inter-combining and implementing IoT, remote sensing and big data with a multiscale approach in order to interconnect the vineyard parcels, as well as to develop a non-invasive, eco-friendly and low-cost technology for vine disease detection/warning. **MERIAVINO** was presented by the coordinator Adel Hafiane from the Institut National des Sciences Appliquées in France.

17. **POSHMyCo** (Potential of selective harvest based on mycotoxins content assessment in cereal crops). The POSHMyCo partners using modern scanning equipment scanned winter wheat and barley crops to identify fusarium infestation. The data received is analysed and modelling for the development of the innovative precision site specific spraying and selective harvesting technology is being performed. POSHMyCo was presented by the coordinator Abdul Mouazen from UGent Faculty of bioscience engineering, Ghent University in Belgium.

18. **SoCoRisk** (Implementation of soil compaction risk assessment system – end-user's evaluation of potentials and barriers). This first analysis indicated noticeable differences in the user's evaluation of the tool between countries. This is an important first result. It means that the data collected cover a range of user's perception, which is a key factor in enabling the performing of a "universal" evaluation of the tool. SoCoRisk was presented by the coordinator Mathieu Lamandé from Aarhus University in Denmark.

19. **SPECTROFOOD** (Agrifood quality estimation using hyperspectral techniques). The developments so far have allowed for the non-destructive measurement of the discreet quality characteristics of interest for each crop. The innovation will come from fusing all data gathered from each use case (different crop) thus creating a universal model for determining common quality characteristics instead of having to use different models for each crop. SPECTROFOOD was presented by the coordinator Ioannis Malounas from Agricultural University of Athens in Greece,ens in Greece.

In the afternoon, we had the opportunity to visit Forschungszentrum Jülich which combines natural, life and technical sciences in the fields of information, energy and bioeconomy with expertise in supercomputing and deploy unique scientific infrastructures. We visited the Plant Sciences site, where integrated bioeconomy concepts for the intensification and sustainability of plant production are developed. We had great insights how researchers deploy unique scientific infrastructures.

After the exciting visit to Forschungszentrum Jülich participants had a well-deserved social dinner at restaurant Indeman, in the neighbourhood of the research center. The participants enjoyed the relaxed atmosphere, delicious food and each other's company.

The third day started with a competitive game called Agropool. Three teams were busy trying to meet the rather fluctuating market demands of agricultural products with their own resources (toy cubes representing products) and commercial activities (making deals with the other teams) by using the funds raised through sales. Thus the game required a degree of competition and cooperation as well, based on the decisions of team members. The active and enjoyable workshop was given by GEEK Factory owner, Péter Bajor from Hungary.

Before closing the event, Niels Gotke co-coordinator of ICT-AGRI-FOOD gave us an insight into future funding opportunities under Horizion Europe. The seminar ended with the closing remarks of the organisers and of Johannes Pfeifer, coordinator of ICT-AGRI-FOOD project.

The event highlighted the successful collaboration among the ICT-AGRI-FOOD funders, stakeholders and research partners, representatives of the EC, experts and external partners.

Task leader of the Cofund mid-term Research Seminar:
Ministry of Agriculture (AM), Hungary

Collaborating consortium partners:
Forschungszentrum Jülich (Germany)
EV ILVO (Flanders, Belgium)

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