

SMART FARMING FOR EUROPE

Value creation through Precision Livestock Farming

Livestock farming is changing fundamentally in the 21st Century. Global demand for meat is expected to increase by 40% in the next 15 years. New approaches and concepts are necessary to improve the efficiency of production while still respecting animal health, welfare and the environment. The Food and Agriculture Organization of the United Nations (FAO) has stated that worldwide food production will depend on some of the technologies of intensive animal food production systems. European livestock is predominantly reared in intensive systems designed to maximise profits. To support this, the scientific community is realising the potential of modern technology to monitor and improve animal health, welfare and the environmental impact.

What is Precision Livestock Farming?

Precision Livestock Farming (PLF) develops management tools aimed at continuous automatic monitoring of animal welfare, health, environmental impact and production in real-time. Using electronic information transfer, PLF applies principles of control engineering in optimising production and management processes. PLF is regarded as the heart of the engineering endeavour towards sustainability in (primary) food production. Its application allows making optimal use of knowledge and information in the monitoring and control of biological processes. The research scope ranges from monitoring feeding times, feed intake and performance parameters to real-time analysis of sounds, images, live weight, condition scoring, on-line milk analysis and more. The

final aim is to achieve a full picture of the state of the animals (cows, pigs, chickens, etc.) and their environment on a continuous basis, regarding the main parameters of animal health, animal behaviour and animal performance. Contactless sensing and sensor technology integrated in monitoring systems allows farmers to follow the individual animal's status and observe their performance or detect diseases at an early stage. With the help of this technology, farmers and veterinarians can collect and manage the information needed to assure citizens that livestock production is safer, more humane and more environmentally sustainable.

EU-PLF project: Smart Farming for Europe

The EU-PLF project is an FP7 project funded by the European Union, which aims to translate research results for Precision Livestock Farming into a practical blueprint that benefits the animal, farmer, environment and consumer. It is a four-year project which started in November 2012 and is executed by 20 research, industrial and business partners.

The objective of the EU-PLF project

A modern farmer is confronted with increasing pressure to care for a larger number of animals per farm in order to have an economically viable business, and this will become more acute in future years. Due to scale, farmers have less time to care for each individual animal, while society demands – fully supported by farmers – that animals are entitled to receive individual attention. Not only for the production-intensive sectors such as poultry and



Results of the eYeNamic behaviour monitor



Sound monitor and camera system installed in a broiler house



pigs, but also for dairy production, economies of scale make it more and more difficult for European farmers to pay continuous attention to individual animals and build a strong relationship with them.

The technology of PLF wants to deliver a fully automated monitoring and management system for the farmer. By using sensors, cameras and microphones, the eyes and ears of the farmer are replaced by technology for each individual animal night and day. In contradiction to other approaches, PLF technology monitors the animals but also warns the farmer of the need for immediate action. In this way he can improve the health, welfare and productivity of his animals whilst saving money. Within the EU-PLF project, the partners aim to check where the PLF technology can create value for the farmer and for other stakeholders in the value chain.

The objective of the EU-PLF project is to deliver a validated blueprint for an animal and farm-centric approach to innovative livestock farming in Europe, proven through extensive field studies. This blueprint represents a manual for farmers and their surrounding industry, including high-tech SMEs and other stakeholders. It is a reference tool offering pragmatic guidance on how PLF systems can be applied at the farm level in order to create value for the farmer and other stakeholders.

First year achievements

- PLF technologies have been implemented on 15 farms (ten pig and five broiler) by three industrial partners, outlined below:
 - **Fancom BV:** a leading company in the field of PLF technology;
 - Fancom's contribution consisted of the installation of the eYeNamic camera system;
 - eYeNamic allows the behaviour of a group of fattening pigs or broilers to be followed from minute to minute. Clear overviews show the position and activity of the animals. Abnormal behaviour is visible immediately. It enables the farmer to respond in time before any abnormalities can affect the welfare or health of the animals;
 - **SoundTalks:** a spin-off company of the University of Leuven (KU Leuven) and the University of Milan;
 - SoundTalks has implemented the sound monitoring system. In the pig farms, the system continuously monitors the number of coughs that occur in a pig compartment. The farmer can consult, via an easy-to-use website system, all the information

Project partners

A total of 20 highly experienced European teams from different disciplines with a proven track record in animal and PLF-related fields – animal scientists, veterinarians, ethologists, bio-engineers, engineers, social scientists and economists, leading industrial market players in the livestock industry and high-tech SMEs – have joined the consortium to deliver a useful PLF blueprint. Most of the academic partners have led previous research projects funded by the EU in animal and PLF-related fields.

needed to monitor the health of their pigs in an objective and reliable way;

- **PLF Agritech:** an SME that offers an innovative animal production management system;
- PLF Agritech is installing systems to monitor feeder supply and animal weight. Another quality system is also tested in one farm.

In each farm, depending on the species, a number of selected key indicators, representing at least one of the domains of welfare and health, environmental load and productivity, are monitored by the systems.

- To assess people's opinions in relation to PLF, a web-based questionnaire in five languages has been created to find out the social, economic and environmental benefits of implementing these systems;
- The blueprint has to assist the European farming and livestock industry beyond the duration of the project. To ensure this, SMEs or potential starters were identified all over Europe during Smart Farming innovation days in Barcelona, Wageningen and Milan to play a key role in the EU-PLF project. Ten European teams will be coached, and the best ideas will get funding to design a PLF prototype using their high-tech innovative solutions. In collaboration with a leading industrial PLF partner, they will use the blueprint to bring their prototype to farm level. This allows business models to be developed, and links high-tech SMEs to European industry players to create new PLF products with global impact.



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