



A coordinating and support action reviewing Precision Livestock Farming, May '09-April '11

## 1 Executive Summary

Livestock farming has a major role to play in the decades to come. Rising protein intake in the developing countries as well as rising concern for animal health and welfare in the developed countries present serious challenges to farmers. Precision Livestock Farming (PLF) wants to return to the farmer to connect to individual animals or small animal groups in spite of growing intensification. PLF uses technology to give farmers additional hands, ears and eyes.

The EU funded Coordination and Support Action “BrightAnimal” set out in 2009 to assess what has been achieved so far in Precision Livestock Farming (PLF) and to highlight needs for future research in the area. The goal of BrightAnimal was to identify *practical* and *acceptable* PLF. This has been performed with a multi-disciplinary team of experts from all 5 continents. In particular, the project team included experts on business and on ethics, as well as biologists and engineers.

The team developed and presented in several public conferences a series of recommendations for precision livestock farming. These recommendations cover pathways for marketing and penetration, research objectives, research fund expenditure distribution, transparency in the food business, a new farm evaluation scheme and education.

As the main result, the project has published a 200 page book on Acceptable and Practical Precision Livestock Farming. The book has been distributed to key researchers and institutions and will be made available for download as an e-book. It has a novel structure and should appeal to both people wanting to get an overview over the different subjects covered as well as to specialists.

In addition to the book, the project also started a Wiki, as a web-home for PLF and its developments. A flyer was developed for farmers and distributed.

## 2 Project context and objectives

Precision Livestock Farming (PLF) has in recent years found itself in the cross fire between engineering, natural sciences (especially biology), and of course livestock farming. Regular conferences on PLF and their proceedings<sup>1</sup> show that the science has now secured its place among general topics.

The European Commission, through Agenda 21 and other initiatives, is committed to improving sustainable development, especially within the member states and among its trading partners. Of course, Food in general plays a vital role in sustainable development and livestock farming in particular.

The original hope was that PLF, by application of precision methods, would reduce resource needs and improve the efficiencies of livestock farming, improve animal health and welfare and reduce the gap between producers and consumers. In other words, that it would contribute to more sustainable animal production systems.

The question is whether this is true.

In a keynote speech<sup>2</sup>, Peter Groot Koerkamp concluded that the contribution of PLF on sustainable development of animal production systems is not yet known and that current PLF is a collection of attempts to optimize the systems of today on specific one dimensional aspects, without reflecting on their possible structural limitations or failures.”

In our analysis of the situation BrightAnimal believes there are two main factors why PLF has not achieved the expected results:

- PLF needs to be *acceptable*
- PLF needs to be *practical*

Livestock farming is influenced by four main stakeholder groups which of course have different interests in PLF.

- Governments, through food laws and regulations
- Animal and human welfare interest groups (e.g. NGOs)
- Consumers, through their purchasing patterns
- Farmers, many of which are small scale operations

Two of these stakeholder groups are key to influencing improvements in the management of livestock farming: consumers and farmers. Governmental influence in Europe is not as strong (as for example in Asia) and only indirect. Animal and human welfare interest groups are strong in Europe, but also have only an indirect influence on the application of PLF.

Consumers on the other hand are the main driving force of the food market. Their decisions very much drive the innovations on the farms, be it to meet their expectancy of low food prices by improving efficiency or by providing information to the consumer via labels, traceability or other means.

Farmers of course have a major influence. They are the ones who actually have to make the decision to implement the PLF. Livestock farmers in Europe are still relatively small operators.

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<sup>1</sup> Precision Livestock Farming, 2003, 2005 and 2007 edited by S Cox, Wageningen Academic Publishers

<sup>2</sup> Precision Livestock Farming '07, keynote speech.

Precision livestock farming needs to take these two stakeholders groups into account when deciding what is acceptable and practical.

BrightAnimal is a project that aims to revisit, analyse and integrate current research and other efforts across Europe and beyond under these two criteria. BrightAnimal has the following mission:

**To produce a framework for European and non-European small and medium enterprises on effective and acceptable precision livestock farming and to create an international, interdisciplinary network for further development and dissemination.**

Our aim is to crystallise from existing efforts a framework for the study and the implementation of Precision Livestock Farming and to exemplify the use of this framework for four different types of livestock farming

- Fish from aquaculture
- Cattle
- Pigs
- Chicken

With this framework BrightAnimal wants to contribute to an economically, socially and environmentally sustainable development especially with respect to Precision Livestock Farming.

In consequence, the strategic objectives of BrightAnimal are:

<b>SO-1:</b>	To evaluate, assess and coordinate existing research and to extract from this a framework for PLF in Europe and beyond, with special focus on SMEs.
<b>SO-2:</b>	To provide practical guidance to those most directly involved in PLF (mainly farmers) where the <i>practicality</i> and the <i>acceptability</i> of the proposed PLF measures for SMEs can be explicitly taken into account.
<b>SO-3:</b>	To create an international network of experts in the different areas of PLF to interact in a cross-disciplinary manner and further develop the framework.

Table 1 Strategic objectives of BrightAnimal

BrightAnimal tries to achieve this visionary goal with the help of the following institutions and their very particular mix of science, innovation and application:

Beneficiary number	Beneficiary name	Beneficiary short name	Country	Date enter project	Date exit project
<b>NA</b>	AIDC UK Ltd	AIDC	UK	Month 1	12
<b>2</b>	AIM UK Ltd	AIM	UK	Month 1	24
<b>1</b>	FOODREG TECHNOLOGY S.L.	FR	ES	Month 1	24
<b>4</b>	NOFIMA MARIN AS	NOFIMA	NO	Month 1	24
<b>5</b>	BITLAND ENTERPRISE APS	BIT	DK/FO	Month 1	24
<b>6</b>	DANMARKS TEKNISKE UNIVERSITET	DTU	DK	Month 1	12
<b>7</b>	EESTI MAAULIKOOLESTONIAN UNIVERSITY OF LIFE SCIENCES	EMU	EE	Month 1	24
<b>8</b>	Institute of Quality standards & Testing Technology for Agro-products, Chinese Academy of Agricultural Sciences	CAAS	CN	Month 1	24
<b>9</b>	Consumer Goods Council of South Africa	CGCSA	ZA	Month 1	24
<b>10</b>	KASETSART UNIVERSITY	KU	TH	Month 1	24
<b>11</b>	MINISTRY OF AGRICULTURE AND AGRO-BASED INDUSTRY	DVS	MY	Month 1	24
<b>12</b>	EMPRESA BRASILEIRA DE PESQUISA AGROPECUARIA	EMBRAPA	BR	Month 1	24
<b>13</b>	Department of Primary Industries and Resources South Australia	SARDI	AU	Month 1	24
<b>14</b>	Aalborg Universitet	AAU	DK	Month 13	24

### **3 Main S & T results/foregrounds**

This is the final reporting period. All milestones have been achieved, all deliverables delivered on time.

The project has delivered in particular

- A project book “Practical and Acceptable Precision Livestock Farming” which will be officially presented at the 5 EC-PLF conference in Prague July 11-14<sup>th</sup>, 2011
- A Precision Livestock Farming Wiki on as a basis for Good Precision Livestock Farming Practices under [brightanimal.pbworks.com](http://brightanimal.pbworks.com)
- A leaflet for farmers on Precision Livestock Farming together with a 5 minute smart farming diagnostic
- A network of professionals from academia and industry, including from other EU projects

We believe that we have provided what could be the seed for a successful implementation of Precision Livestock Farming. Especially our recommendations as published in the project book are believed to be very valuable for the sector. They have been discussed with stakeholders and will be presented in detail at the 5<sup>th</sup> EC-PLF conference in Prague, July 10-13<sup>th</sup>, 2011.

We hope that we could contribute to an area in which we fully believe: the animal and farm-centric view of livestock farming is the key to a successful industry that is in balance with requirements for health, welfare and the environment.

## 4 Expected impact

The co-ordinating and support action BrightAnimal has been directed entirely at satisfying the challenges identified in the objective KBBE-2008-1-2-02: New and converging technologies for Precision Livestock Farming in European animal production systems.

By raising awareness of the commercial, social and ethical advantages to be gained from properly applied PLF principles and by producing a framework for their implementation together with guides for best practices and the monitoring of standards, BrightAnimal will make a significant contribution towards the creation of more profitable, efficient and socially acceptable livestock and aquaculture sectors.

Much research has already been carried out into PLF: BrightAnimal will unite these many strands, collate and analyse their findings, identify gaps in knowledge and research and recommend future actions. This, alone, will have the effect of giving PLF a higher profile among relevant stakeholders who will for the first time have an authoritative point of reference for making judgments regarding the application of PLF and for obtaining guidance and information.

We will produce a framework for European and non-European SMEs on effective and acceptable precision livestock farming and create an international interdisciplinary network for further development and dissemination, and exemplify the use of the framework with four different types of livestock farming;

- Fish from aquaculture
- Cattle
- Pigs
- Chicken

### **Contribution 1: Book on effective Precision Livestock Farming in Europe and beyond with special consideration of small and medium enterprises**

One of the main activities and achievements of BrightAnimal will be the production of a definitive book on effective Precision Livestock Farming in Europe and beyond with special consideration of small and medium enterprises. The book will describe current and near-future techniques in PLF, especially taking into account both the *practicality* for SMEs as well as their *acceptability*.

### **Contribution 2: Wiki representation of Good PLF Practice**

As the second component, BrightAnimal also kicks off an effort to provide good precision livestock farming practices (GPLFP) for aquaculture fish, cattle, pigs and chicken. The Wiki is designed to be an active resource where contributors can create or amend Good Practices. Initially the Wiki has been loaded with the material that the project has created from available sources. We have released the Wiki to the general public at <http://brightanimal.pbworks.com/>.

In addition, we have created an information leaflet that contains a 1 minutes PLF check for farmers. Farmers can use the leaflet to obtain a basic understanding of PLF and the

test to see whether an involvement in PLF would make sense for them. The leaflet provides access to more information via contact addresses and online resources.

**Contribution 3: Multi-disciplinary Network of Excellence for researchers and technologists**

The project will achieve its goals by creating an interdisciplinary network of relevant organisations in the different areas where PLF is of importance, which are mainly

- (a) Technology
- (b) Economics
- (c) Social Science and Ethics

The network will be created through the work package leaders and will have the opportunity to establish a working relationship through the two conferences and six workshops. We expect to establish a cross-disciplinary network which is perhaps more focussed on the original goals of PLF.

The network will have an important international aspect by including representatives from beyond the EU borders both as formal partners and as guest speakers and other advisors. We believe it is essential to obtain the input from countries outside of the EU, and through the network we also hope to establish working relationships between its members which transcend this project.