BovINE ON FARM PRACTICE ABSTRACTS (PAs)

The PAs listed in this document are the innovations and good practices identified and validated by BovINE partners 2020-2022 for direct use by beef farmers across Europe and beyond. The listings of the PAs contained here are a 'mirror copy' of the entries contained in the BovINE Knowledge Hub (BKH) accessed at https://hub.bovine-eu.net/. The aim of this document is to ensure a separate record of the titles and content generated by BoviNE. It is available as a stand-alone document on the BovINE website www.bovine-eu.net.

How to use this document

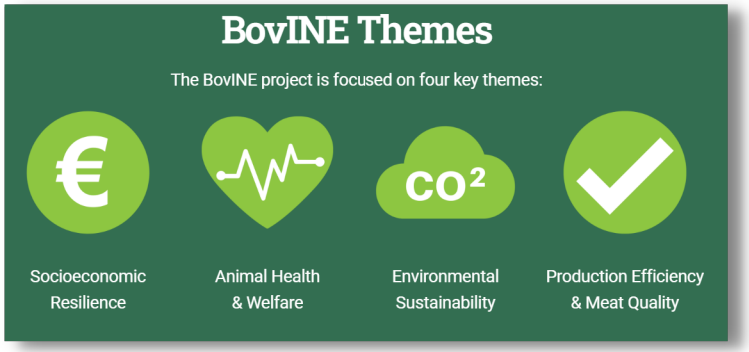
This document is organised according to the four key themes utilised by the BovINE project – Environmental Sustainability, Production Efficiency and Meat Quality, Socioeconomic Resilience, Animal Health and Welfare.

Each theme is organised by topic area and then alphabetically, according to the first word of the title of the 'on farm' PA as it appears on the BKH. All of the PAs are annotated with extra information provided by a 'Key' explained on page number 2 to show the characteristics of each PA. Each listing of the PAs provides a direct link to the online BovINE Knowledge Hub where the full abstract can be viewed.

Front cover of the BovINE magazine to be published early 2023

This project has received funding from the European Union's Horizon 2020 rural renaissance programme Project No: 862590 under call H2020-RUR-2019-15

BovINE ON FARM PRACTICE ABSTRACTS (PAs)



Themes - This document is organised according to the four BovINE themes

- **Environmental Sustainability** - 3- 9
- **Production Efficiency and Meat Quality** - 10 - 15
- **Socioeconomic Resilience** - 16 - 21
- **Animal Health and Welfare** - 21 - 30

Key - Each practice abstract is annotated with one or more of these items

- EIP = EIP AGRI Submitted
- GP = Good Practice
- RI = Research Innovation
- D = Demonstrated 'on farm'
- CBA = Cost Benefit Analysis available
- W = Webinar available on this topic

BovINE Animations

1. Long-term financial planning approaches
2. Reducing lameness in beef cattle
3. Optimising the number of calves/cow/year
4. Methods to reduce nutrient leaching
5. Animal health and welfare checks
6. Economically efficient beef housing systems
7. Improving the quality of beef meat
8. Improving on-farm Biodiversity

Click on the topic to watch the animations on youtube

BovINE Webinars

1. **Risk factors associated with beef cattle losses on intensive fattening farms**
2. **Methods of assessing the vitality of newborn calves and the benefit**
3. **Strategies to reduce enteric emission from beef production**
4. **Virtual fences to manage beef cattle**
5. **Tools to measure & communicate high welfare standards on beef farms**
6. **Future and forward contracts. What if we could guess the future?**
7. **Feed efficiency**
8. **Carbon sequestration**
9. **Automatic feeding systems - autofeed**
10. **Training in animal welfare**
11. **Marbling in european beef cattle**
12. **Biodiversity & agriculture**

Click on the Link below to watch all the webinars
https://www.bovine-eu.net/webinars/

This project has received funding from the European Union's Horizon 2020 rural renaissance programme Project No: 862590 under call H2020-RUR-2019-15

Environmental Sustainability

The objective of this BovINE theme was to improve the environmental sustainability of the European beef cattle industry at farm level by reducing the carbon footprint of meat production; reducing volatile emissions (both greenhouse gasses & ammonia emissions) coming from the beef cattle industry, and to reduce nutrient excretions (especially nitrogen and phosphorus P). BovINE identified the grassroots needs of beef farmers in relation to environmental sustainability in order to prioritise the topics tackled in detail. The Institute for Agricultural, Fisheries and Food Research (ILVO) in Belgium led the theme dividing their group's effort into two main sub-themes -'Reduction of the carbon footprint of beef production' and 'Water use and improving water quality'.

An example of an abstract post -
DEMONSTRATION Common Agricultural Policy Ireland

Topics - This section is organised according to the topics listed below

- Carbon sequestration
- Environmental sustainability general
- Methods to enhance biodiversity on beef cattle farms without the need for large investments
- Reward schemes for farmers meeting environmental deliverables
- Strategies to reduce the enteric emission of beef cattle
- Reduction of nutrients pesticide leaching to improve quality of surface water
- Tools for calculating and improving environmental sustainability on beef cattle farms
- Water use and water quality

Links to the BovINE webinars are available on the BovINE website - https://www.bovine-eu.net/webinars/

Environmental Sustainability

Carbon sequestration

Refer to the key on Page 2

A Targeted Scenario Analysis, future perspectives for sustainable agriculture in Estonia			RI			W
Bale grazing for improving permanent pasture without plowing	EIP	GP				W
Carbon sequestration by humus		GP				W
Explanation priority topic Carbon sequestration						W
Farm Carbon Calculator		GP				W
Grazing cover crops, Estonia	EIP	GP				W
Green infrastructures in a beef farm	EIP	GP				W
Haagsystemen			RI			W
Hedgerow systems	EIP		RI			W
Demonstration: Holistic Management and Carbon sequestration	EIP			D		W
Holistic Management and Carbon sequestration			RI			W
Demonstration holistic management portugal				D		W
Increase in the proportion of grass in the ration during the finishing phase in favour of carbon sequestration	EIP	GP				W
Natural Cork Islands	EIP	GP				W
Preservation of permanent grassland		GP				W
Demonstration regenerative agriculture estonia				D		W
Silvopastural systems			RI			W
Terraprima – Sown Biodiverse Pastures		GP				W
The Teagasc Signpost Programme - a campaign to lead climate action by Irish farmers	EIP	GP				W
Wat is biochar en hoe kan het de C-opslag beïnvloeden?			RI			W
What is biochar and how can it influence C sequestration?	EIP		RI			W

Environmental Sustainability

Environmental sustainability general

Refer to the key on Page 2

Increasing soil pH reduces fertiliser derived N2O emissions		GP				
Measuring losses by volatilisation when spreading organic fertilisers on permanent grassland		GP				
Meeting: allevamenti sostenibili						
Online Slurry Spreader Calibration Calculator						
Silvopastoral Systems for Beef Cattle		GP				

Methods to enhance biodiversity on beef cattle farms without the need for large investment

Animations link available on page 2

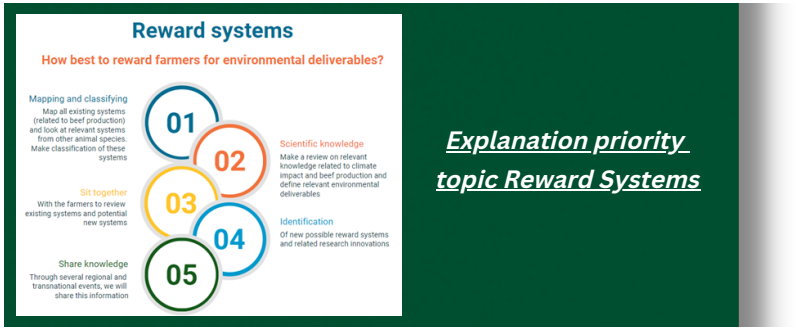
Beetle Banks for improving biodiversity		GP				W
Biological crop protection	EIP		RI			W
Biostimulants			RI			W
Biotex			RI			W
Drones to map meadow birds	EIP		RI			W
Dynamic rotating grazing in cattle breeding		GP				W
Ecosystem Services - The example of Santo Isidro farm		GP				W
Farming for Nature Initiative						W
Farming with Barn Owls		GP				W
Improvement of pollinating insects		GP				W
Local cattle breed us a suckler cows		GP				W
Mixed cropping systems	EIP		RI			W
Non-intensive utilization of farm land for production of animal feed		GP				W
Planting a hedge for bees		GP				W
Preserving the Dung Beetle		GP				W
Promoting biodiversity on Flemish farms		GP				W
Using the Greenmeter tool for improving farm biodiversity and using this as a demo to show other farmers, Puutsa farm, Estonia		GP		D		W

Environmental Sustainability

Reward schemes for farmers meeting environmental deliverables

Refer to the key on Page 2

Beef farming that is neutral for the environment		GP				
Carbon crediting			RI			
Demonstration carbon crediting ireland				D		
Demonstration common agricultural policy ireland				D		
Ecosystem services - Castro Verde Biosphere Reserve		GP				
Environmental performance rewarding system for farmers: High Environmental Value French label (HVE)			RI			
Environmental Reward Schemes that aim to optimise carbon credits to the benefit of farmers, in order to ensure a financial return proportional to the reduction of emissions		GP				
Environmental Reward Schemes that aim to reduce the leaching of nutrients into water bodies in Ireland	EIP	GP				
Explanation priority topic Reward Systems						
Demonstration of Hedgerows to increase carbon storage in the soil				D		
Hessian Program for Agri-environmental and Landscape Management Measures (HALM)		GP				
How can local governments help in rewarding farmers for environmental measures?	EIP		RI			
How can private investors contribute to a reward system?			RI			
Navarra payment for sustainable farm systems	EIP	GP				
Reward schemes for beef farmers meeting environmental deliverables - Regional Rural Development Program 2014-2020(2)		GP				
Rewarding system to increase the organic carbon content in the soil of arable land		GP				
The Common Agricultural Policy: some practical examples from different regions	EIP		RI	D		



Environmental Sustainability

Strategies to reduce the enteric emissions of beef cattle

Refer to the key on Page 2

Beef carbon plan in Fernandez Terreros family farm	EIP	GP				W
CAP'2ER tool		GP				W
Costs and benefits of use of linseeds in reducing enteric emissions					CBA	W
Decrease the age at first calving			RI			W
Genetic selection to reduce enteric CH4 emissions			RI			W
GHG mitigation in fodder production for beef cattle		GP				W
Holistic Management a new grazing concept		GP				W
How do fats reduce enteric methane emissions?			RI			W
Improvement of the performance of beef cattle through targeted breeding for meat performance (from Germany)	EIP	GP				W
TEKLa - Software tool for CO2 fingerprint analysis for farmers in Germany		GP				W
The role of seaweed in reducing enteric methane emissions			RI			W
To in vitro from in vivo: effect of Mix 3.0 on rumen fermentation and effect of Qualix® Yellow on dairy cows' performances and their environmental impact			RI			W
Using nitrate as a feed additive to reduce enteric methane emissions			RI			W
Using ruminal stimulant to reduce methane emissions	EIP	GP				W
Using the BDGP (Beef Data and Genomics Programme) and BEEP-S (Beef Environmental Efficiency Programme-Suckler)	EIP	GP				W
Using the feed additive 3-NOP to reduce enteric methane emissions			RI			W

Reduction of nutrient & pesticide leaching to improve quality of surface water

Animations link available on page 2

Application of liquid manure with trailing shoe (from Germany)	EIP	GP				
Beef manure turning net	EIP	GP				
Costs and benefits of trailing shoe in Ireland					CBA	
Cover crops to decrease nutrient leaching	EIP					
Demonstration Green cover crops in maize				D		

Environmental Sustainability

Reduction of nutrient & pesticide leaching to improve quality of surface water (continued)

Animations link available on page 2

Refer to the key on Page 2

Improvement and promotion of grasslands management practices in order to limit nutrients leaching			RI			
Nitrogen efficiency of organic fertilisation			RI			
Precision irrigation on crop for animal feeding		GP				
Reducing nutrient losses during storage of manure by improvement of storage conditions or composting		GP				
The use of drones in agriculture to help reduce the climatic impact			RI			
Timing of manure application: (E)-mission project			RI			
Use of nutrient management plan to improve environmental sustainability and water quality (Ireland)	EIP	GP				
Vermicomposting of cattle manure- by greenresults.eu			RI			

Tools for calculating and improving environmental sustainability on beef cattle farms

Belbeef sustainability monitor for beef cattle		GP				
BOVIDCO2: a tool for environmental assessment specialized in Spanish beef cattle farms		GP				
Cap2er			RI			
CAP2ER as a tool to measure the Carbon footprint of Italian beef farms		GP				
Carbon calculator			RI			
Climate effectiveness calculator		GP				
DECiDE			RI			
Klimrek			RI			
Kringloopwijzer			RI			
Maintenance of grasslands, especially in areas where cultivation is not possible		GP				
Meatguide from Estionia		GP				
Taking grass more into account in existing tools, and the benefits of grazing		GP				
The Carbon Navigator		GP				

Environmental Sustainability

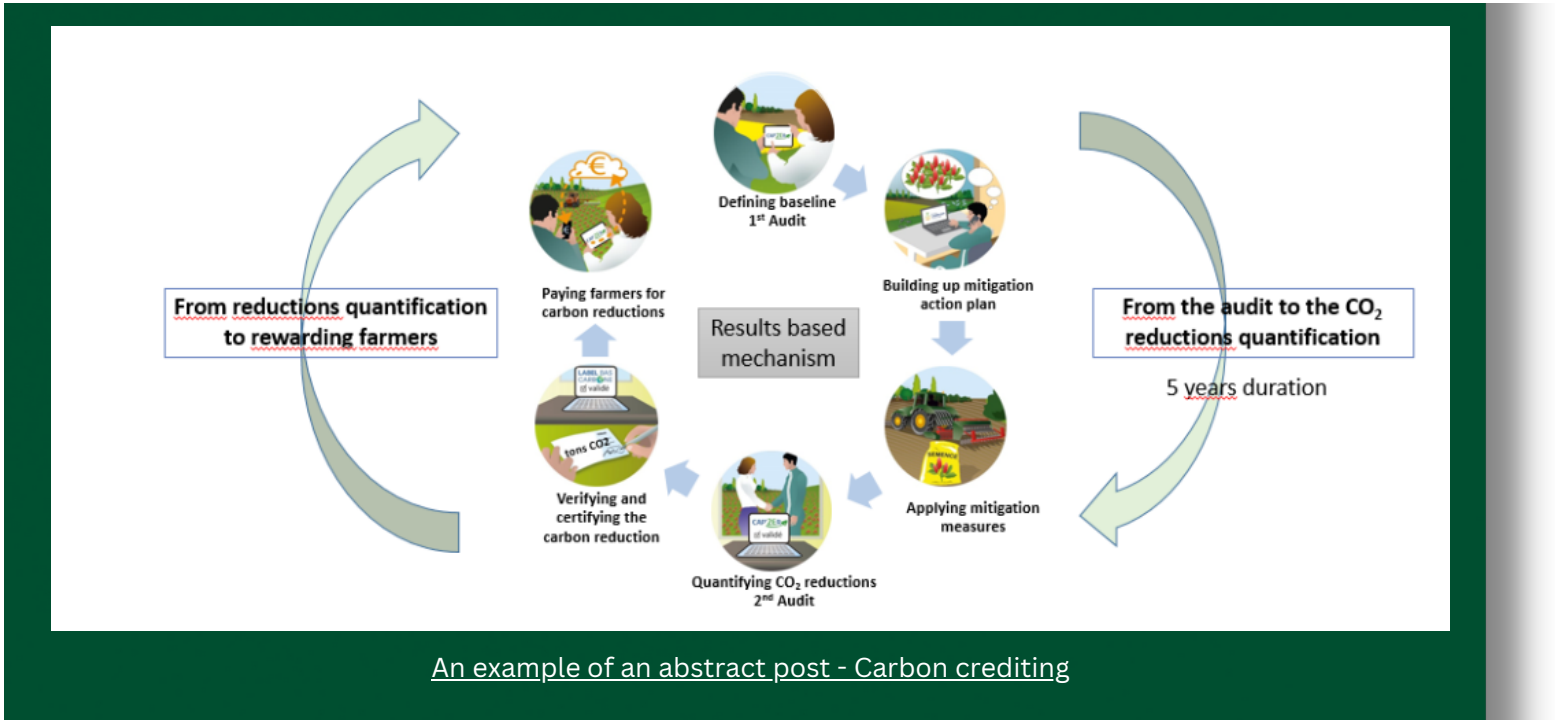
Tools for calculating and improving environmental sustainability on beef cattle farms (continued)

Refer to the key on Page 2

The cool farm tool			RI			
Use of the relative breeding value of meat to optimise resource use		GP				

Water use and water quality

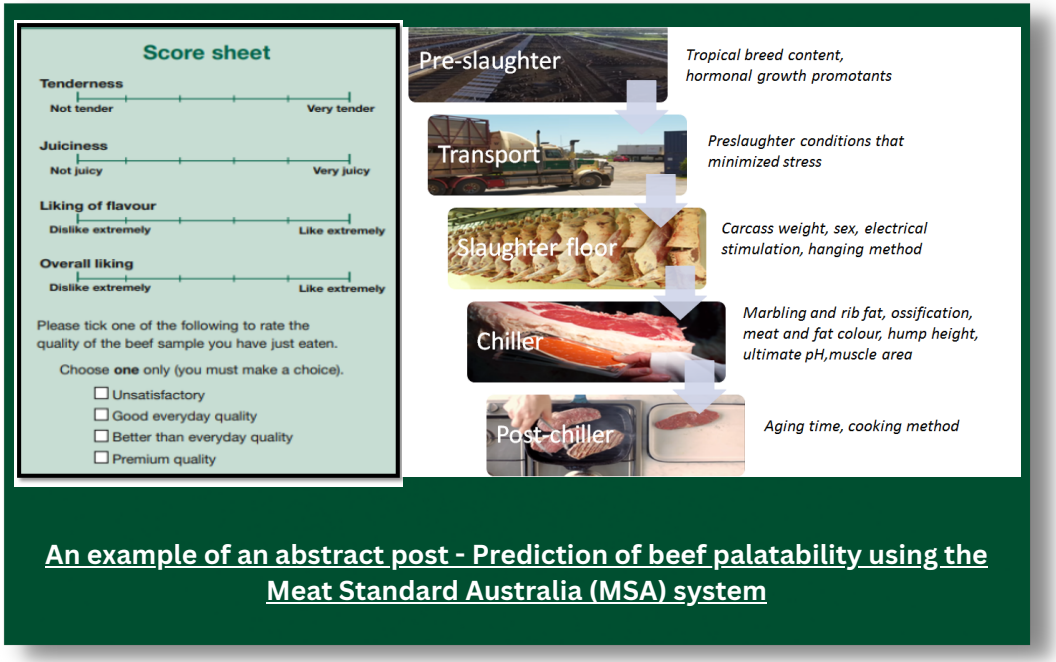
Biogas residues in substitution for chemical fertilizers			RI			



An example of an abstract post - Carbon crediting

Production Efficiency and Meat Quality

The goal of the Production Efficiency and Meat Quality (PEMQ) theme within the BovINE project was to improve production efficiency at the farm level in the European context whilst considering meat quality. This theme's specific objectives included identifying the main production efficiency and meat quality concerns of farmers involved in keeping beef cattle (suckler, finisher) through bottom-up approaches, including future issues by analysing European and national regulations or recommendations. UNIZAR in Spain led the Production Efficiency and Meat Quality Theme and identified beef farmers' priority needs and good practices, tested some of the solutions identified in demonstration farms to assess the feasibility and facilitated knowledge exchange between farmers and academic experts in Spain and trans-nationally. Responding to eight grass-root needs during the period of the project, this theme shared the innovations coming from research, successful farms or associations with beef farmers around nine European countries.



An example of an abstract post - Prediction of beef palatability using the Meat Standard Australia (MSA) system

Topics - This section is organised according to the topics listed below

- Animal feeding and stress on meat quality
- Animal monitor tools in fattening unit
- The Use of Available Data (Traceability) to Improve Performance & Meat Quality
- On-farm strategies to increase/ improve marbling/ tenderness/ colour in beef meat
- Optimizing the number of calves per cow per year in suckler beef herds
- Production Efficiency and Meat Quality General
- Tools to evaluate the carcass and meat quality prior to and in the slaughterhouse

Links to the BovINE webinars are available on the BovINE website - https://www.bovine-eu.net/webinars/

Production Efficiency and Meat Quality

Animal feeding and stress on meat quality

Refer to the key on Page 2

A Farmer Scheme to produce superior quality beef - Certified Irish Angus Beef		GP				W
Analogue of maternal appeasing pheromones in beef cattle			RI			W
Beef+: Beef circularity through vegetable by-product feeding strategies			RI			W
Feeding of animals before transport to slaughterhouse		GP				W
Gently touching of beef calves early in life reduces stress at the abattoir			RI			W
Incorporate grass, flax, omega-3 rich foods into animal feed for fattening		GP				W
Individual temperament evaluation in young bulls by an exit score from the squeeze chute	EIP	GP				W
Low Stress Stockmanship method applied in a suckler farm in Germany		GP				W
Mobile slaughterhouse to reduce stress in cattle			RI			W
Monitoring carcass pH to provide feedback to farmers in order to reduce pre-slaughter stress		GP				W
On-farm demonstration on Gently touching of calves				D		W
Optimization of management in a consortium of farmers to reach better and standardized quality	EIP	GP				W
Pre-slaughter nutritional therapy to reduce carcass and meat quality issues			RI			W
Recommendations to prevent thermal stress at transport of beef cattle	EIP	GP				W
Sponge cake and cake scraps in finishing cattle feeding improving meat marbling		GP				W
The use of antioxidants to extend the shelflife of the meat from intensive finished cattle			RI			W
Vitamin D3 supplementation of cattle diets 30 day before slaughter is efficacious to enhance total beef vitamin D activity			RI			W
Research Innovation Demonstrated: Appeasing pheromones						W

Animal monitor tools in fattening units

A smart feeding system implemented on cattle farms		GP				
A virtual fence pilot innovation for mountain farms (e-barana)	EIP		RI			W
Demonstration: An automated weight system implemented in fattening farms Spain	EIP			D		
Automated assessment of individual weights when drinking		GP				
Automated individual data for improving feed efficiency in Mertolenga cattle	EIP	GP				

Production Efficiency and Meat Quality

Animal monitor tools in fattening units (continued)

Refer to the key on Page 2

Automated measurement of temperature on cows' hind legs			RI			
Demonstrations on automated weight in Belgium, Ireland and Poland				D		
Automatic individual weighing of animals (as frequently as they visit the water trough)		GP				
Forage intake in grazing cattle with an acoustic monitoring system			RI			
Individual automated weight system in fattening farms			RI			
Monitoring animal comfort with ear tags and microclimate sensors		GP				
Demonstration: Monitoring of grass quantity and quality consumed by suckler cows				D		
Monitoring ruminal temperature in young bulls		GP				
Demonstration: Precision Feeding by Roughage Intake Control (RIC) system				D		
Smart Farms: individual herd monitoring	EIP		RI			
Using precision feeding through Keenan systems PACE technology in feeding finishing cattle		GP				W

The use of available data (traceability) to improve performance & meat quality

A dairy beef index (DBI) to rank beef bulls for use on dairy females			RI			W
Beef Label Rouge: A quality specification in France	EIP	GP				W
Beefs Own Worth (B.O.W.): a predictor of carcass value at the time of sale	EIP		RI			W
Carcass data registered at slaughter available to farmers		GP				W
Genetic improvement for eating quality traits	EIP	GP				W
Improving carcass quality through annual inspections of certified grass-fed beef	EIP	GP				W
Marker-assisted selection related to meat tenderness in two local Spanish breeds	EIP		RI			W
Muscle ultrasonography as a method for phenotype evaluation of meat quality in vivo	EIP	GP				W
Prediction of beef palatability using the Meat Standard Australia (MSA) system	EIP		RI			W
Demonstration: The evolution of the genetic improvement of the Pirenaica breed - New possibilities	EIP			D		W
Use of carcass and meat quality data in the genetic improvement scheme of the Pirenaica breed		GP				W
Data from slaughterhouses coming back to farmers		GP				

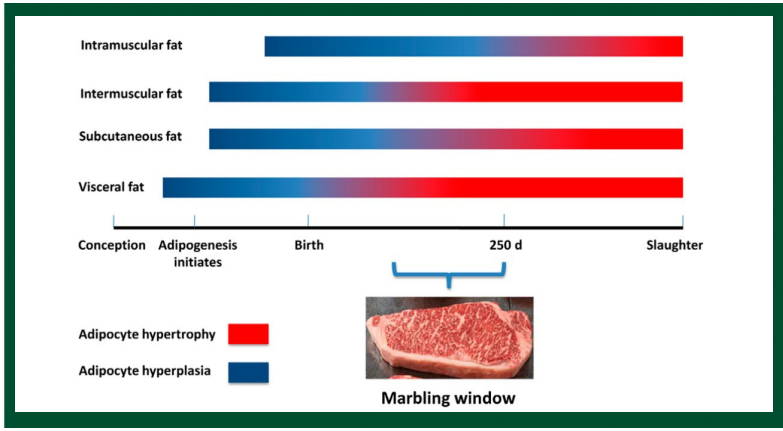
Production Efficiency and Meat Quality

On-farm strategies to increase/ improve marbling/ tenderness/ colour in beef meat

Animations link available on page 2

Refer to the key on Page 2

Marbling window : from 150 to 250 days of age			RI			W
Advantages of the Angus breed in terms of meat marbling		GP				W
Cross breeding with Wagyu		GP				W
Different modifications of finishing diets for beef cattle for better carcass and meat quality	EIP	GP				W
Early weaning and high energy intake before grazing			RI			W
Effects of vitamin A on beef marbling			RI			W
Finishing cull dairy cows to improve carcass and meat quality			RI			W
Genetic selection (genetic index) to improve the quality of carcass on farm-produced animals		GP				W
Grass ration in a finishing of young cattle		GP				W
Irish Angus Producer Group Elite Breed Improvement Programme		GP				W
Main factors of marbling level in beef cattle – The Angus Breedplan		GP				W
Neogen genetic test implemented in an Angus farm in Estonia to increase beef marbling		GP				W
Nutrigenomics of beef marbling and fatty acid composition			RI			W
The use of MEAT + sires in Belgian Blue.		GP				W
Vitamin E and selenium extra-nutritional supplementation in finishing diets to reduce meat deterioration		GP				W



An example of an abstract post - Marbling window: from 150 to 250 days of age

Production Efficiency and Meat Quality

Optimizing the number of calves per cow per year in suckler beef herds

Animations link available on page 2

Refer to the key on Page 2

A suckler-fattening farm in France without unproductive females		GP				
Demonstration performed in France on Automated estrus detection				D		
Demonstration performed in Ireland on Automated estrus detection				D		
Demonstration performed in Spain on Automated estrus detection				D		
Establishment of breeding and calving seasons in a farm in Portugal		GP				
Estrus detection in suckler cows using automated on-farm tools			RI			
Good practices in a high genetic Limousine suckler beef farm for optimization of calving period		GP				
INTIA protocol to optimizing number of calves per cow and year		GP				
Methods to reduce calf mortality and ensure a calf every year from beef cows in Natura area, by advancing the calving season and vaccinating against rotavirus		GP				
Observatory for cattle reproductive performances in France	EIP		RI			
On-farm demonstration performed in France on Standardized procedures for bull evaluation				D		
On-farm demonstration performed in Ireland on Standardized procedures for bull evaluation				D		
On-farm demonstration: Feeding in the first third of pregnancy				D		
Optimizing the cow-calf performance in beef cattle through an adequate nutrition during early pregnancy	EIP		RI			
Demonstration performed in Germany on Ovarian Synchronisation Protocols				D		
Demonstration performed in Spain on Ovarian Synchronisation Protocols				D		
Ovarian synchronization protocols to improve reproductive efficiency in beef heifers	EIP		RI			
Proposed standard procedure for bull evaluation in Spain: The VART guide	EIP		RI			
Restricted nursing as a tool to improve beef cow performances			RI			
Standardized procedure for bull evaluation in UK		GP				
Suckler cow oestrus synchronisation: 7-day CO-Synch + CIDR(TM).		GP				
Demonstration: Tools for Monitoring the Reproductive Efficiency				D		
Using a measuring tape for timing the first mating	EIP	GP				
Using Moocall Heat detection technology to reduce the calving interval and enable a change to AI in suckler herds	EIP	GP				

Production Efficiency and Meat Quality

Production efficiency and meat quality - general

Refer to the key on Page 2

Biochar benefits in cattle farming - by greenresults.eu		GP				
Selecting for resilience and efficiency: The solution for European cattle farming						

Tools to evaluate the carcass and meat quality prior to and in the slaughterhouse

A vision system for measuring eye muscle area, marbling score and intramuscular fat at the slaughterhouse			RI			
Image processing method to predict beef tenderness			RI			
Mapping of intramuscular marbling of carcasses in cooperation with LinnamÃ¤e Meatfactory and Liivimaa Lihaveis NPO grassfed quality scheme, with the aim of selecting suitable carcasses and providing feedback to farmers.	EIP	GP				
MASTERBEEF - An Integrated Tool to Evaluate the Carcass and Meat Quality in the Abattoir		GP				
Meat marbling measuring tool		GP				
Meat@ppli – a smartphone application to determine the fat content of beef in real time	EIP		RI			
Mechanical Classification of carcases using video imaging analysis (VIA)		GP				
Non-invasive automatic beef carcass classification based on sensor network and image analysis		GP				
On-farm demonstration: Meat quality prediction by in vivo ultrasound analysis				D		
Prediction of bull's slaughter value from growth data			RI			
Train actors in the sector (and especially cattle breeders) in the conformation of live animals		GP				
Training in the S-EUROP classification system in Navarre		GP				
Ultrasound images for the quantification and prediction of intramuscular fat in living beef cattle		GP				
Using a genetic Index for improving marbling and average daily gain		GP				
Using the 3D imaging technology to estimate lean meat yield			RI			

Socio-economic Resilience

The goal of the Socioeconomic Resilience (SR) theme within the BovINE project was to improve the economic sustainability of beef farmers in Europe, resulting from organisational innovations and changes in practices as much as from technological innovations. The SR theme, led by Centro Ricerche Produzioni Animali (CRPA) in Italy, looked at opportunities to improve incomes and lifestyle through improved management and explored issues such as labour saving and thus work-life balance, farmer health and safety and complementary income streams. This theme's specific objectives included identifying the main socioeconomic concerns of farmers involved in keeping beef cattle (suckler, finisher) through bottom-up approaches, including future issues by analysing European and national regulations or recommendations.

An example of an abstract post -
UV treatment of water to make drinking water for animals.

Topic - This section is organised according to the topics listed below

- Economic planning tools for beef cattle farms
- Examining economically efficient housing systems of beef cattle
- Initiatives to improve the image of and promote the sustainable consumption of beef
- Methods to ensure a fairer distribution of the final price along the supply/food chain
- Risk management system for farmers
- Socio-economic Resilience General
- The use of alternative feedstuff to reduce the higher costs of raw materials for feeding

Links to the BovINE webinars are available on the BovINE website - https://www.bovine-eu.net/webinars/

Socio-economic Resilience

Economic planning tools for beef cattle farms

Refer to the key on Page 2

Demonstration: French tool COUPROD for calculation of production costs				D		
Demonstration: Teagasc eProfit tool in Spain				D		
Beef cost: an app for beef cattle farmers to calculate production costs			RI			
Beef farm management 'app'		GP				
Cattle Manager: a design of a web application for farm and animals management to simplify and improve the management of cattle in Spain			RI			
Economic Benefits of Genetic Improvement			RI			
Economic effectiveness of cattle feeding with the RolnikON system	EIP	GP				
Efficiency. A key-word in beef production systems.			RI			
High fluctuations in the quantity of sales in self marketing of meat. Great uncertainty in economic planning.	EIP	GP				
Livestock Farm Networks, a system at the center of French farming development		GP				
Mathematical model to estimate the ideal culling weight and age in finishing cattle	EIP	GP				
Monitor of economic sustainability parameters			RI			
Protocols with Banks		GP				
Simulation model of technical-economic management of beef cattle farms in Spain			RI			
Simulation model to cost home produced feed for ruminant stock: the Grange Feed Costing Model (TEAGASC)			RI			
Technical and economic data management program for ruminant farms in Navarra		GP				
The Construction of an Economic Evaluation Model			RI			
The French national production cost method for grazing animals		GP				
The use of the Teagasc e-Profit Monitor and Farm Plans to improve technical and economic performance.		GP				
Trimestrial benchmark tool for full production costs of batches of bulls and heifers by breed		GP				
Yearly benchmark tool for full production costs for different types of beef farms (FOCUS)	EIP		RI			

Socio-economic Resilience

Examining economically efficient housing systems for beef cattle

Animations link available on page 2

Refer to the key on Page 2

Demonstration farm visit: Autofeed applied in the Italian farm of Marino and Gualtiero Nodari near Mantova				D		W
Demonstration: Automatic Feeding System for beef cattle farms		GP		D		W
Demonstration: Compost barn for beef cattle (Germany)		GP		D		W
Demonstration: Considerations concerning the compost barn for beef cattle in Italy				D		W
Demonstration: Slatted floors for suckler cows				D		W
Automatic Feeding System for beef cattle farms			RI			W
Compost barn for beef cattle			RI			W
Farm video surveillance (FarmCam HD)	EIP	GP				W
Installation of a calf clot for extra feeding and easier handling		GP				W
Out-wintering pads for finishing beef cattle			RI			W
Powering Farms with Solar Energy		GP				W
Producing photovoltaic energy with the installation of panels on the roofs of livestock buildings	EIP	GP				W
Slatted floors and cubicles for cows			RI			W
Space allowances for steers housed in concrete slatted floor sheds			RI			W
Use of animal welfare friendly assembly yard, chute and weighing system in beef finishing unit in Ireland.	EIP	GP				W
Use of collective drinkers during the quarantine phase		GP				W
UV treatment of water to make drinking water for animals.	EIP	GP				W

Co-operation between NGO Liivimaa Lihaveis and Linnamäe Meat Industry in meat marketing and education of farmers and consumers.

Socio-economic Resilience

Initiatives to improve the image of and promote the sustainable consumption of beef

Refer to the key on Page 2

Demonstration: THE SUSTAINABLE MEAT PROJECT" - A successful communication experience to consumers and stakeholders				D		
A new image of beef farming through the high standards of the Quality Meat Programme.		GP				
Approaches implemented by the animal sectors in France in response to societal expectations			RI			
Burren Winterage Festival: Cattle are important elements of the cultural heritage of Ireland and many other countries			RI			
Cattle as object of Intangible Cultural Heritage			RI			
Consumer attributes of beef quality from the industry and the consumer point of view			RI			
EU Quality Schemes Applied to Beef Production		GP				
#FansdelVacuno campaign to promote beef consumption	EIP	GP				
French meetings "MADE in VIANDE"		GP				
Made in Viande		GP				
Marketing in beef cattle production			RI			
Marketing strategies for a hypothetical new beef quality label (“Serrana de Teruel”)			RI			
Meat and Dairy facts			RI			
On-farm education for children and farm tours to improve image of beef production		GP				
Producers organisation creating a shorter chain		GP				
Public quality labels for beef to promote national productions	EIP	GP				
Sustainable Meat Project			RI			
The French system of official labels of quality and origin			RI			
TV commercial for grassfed beef	EIP	GP				
Use of Sustainability and Quality Assurance Scheme in Ireland to improve beef image.	EIP	GP				
Value added of local cattle breeds in Italy			RI			
Welfare Quality - Animal Welfare Certification			RI			

Socio-economic Resilience

Methods to ensure a fairer distribution of the final price along the supply / food chain

Refer to the key on Page 2

A producer's store			RI			W
Automatization of carcass classification with AI devices and direct communication and payment for beef farmer	EIP	GP				W
Beef Producer Organisations: PriceWatch App			RI			W
Bord Bia Beef Market Tracker		GP				W
Contracts between beef producers and buyers based on the market conditions and controlled by a third actor	EIP	GP				W
Contractualization of animals (cows, young cattle, calves, etc.) with the first buyer		GP				W
Co-operation between NGO Liivimaa Lihaveis and LinnamÃe Meat Industry in meat marketing and education of farmers and consumers.	EIP	GP				W
Direct sales by an association of producers to improve stockbreeders' income		GP				W
Drive -in ensures fair price to beeffarmer		GP				W
Examples of on-farm beef direct sale in Veneto Region - Qualità Verificata		GP				W
Local producers' market in superstores			RI			W
Online direct marketing with a focus on sustainability and animal welfare	EIP	GP				W
Promert - An example of shortening the distribution chain to get a fairer return		GP				W
PROMERT: Commercialisation Entity for PDO Certified Meat			RI			W
Promulgation of the EGalim 2 law			RI			W
Remunerascore		GP				W

Risk management systems for farmers

Costs and benefits of risk factors able to reduce losses on cattle farms					CBA	W
Demonstration: forward and future contracts in France				D		W
Demonstration: forward and future contracts in Portugal				D		W
Beef cattle farmers association in Spain	EIP	GP				W
Diversification of marketing channels may reduce the risk and improve financial returns			RI			W
Field management with the use of satellite imagery analysis	EIP	GP				W

Socio-economic Resilience

Risk management systems for farmers

Refer to the key on Page 2

Futures contracts and Forward contracts			RI			W
Income Stabilisation Tool subsidised by CAP to manage beef cattle farms' income risk			RI			W
Matching platform for landowners and beef cattle farmers	EIP	GP				W
Risk management: private mutual funds, self-insurance, incomes insurance			RI			W
Self-Marketing and contract slaughtering in North Rhine-Westphalia		GP				W
Significant factors able to reduce on-farm losses of beef cattle on beef finisher farms			RI			W
Use of contract pricing in risk management for finished cattle in Ireland	EIP	GP				W

Long term business planning approach

Animations link available on page 2

Benchmarking beef farms across Europe						
Economic viability of a cattle system production under high stocking rate: use in research and commercial livestock						
Rural extension programs, training/education for farmers and rural credit		GP				

The use of alternative feedstuffs to reduce the high costs of raw material for feeding

Agreement and contracts between cattle-breeders and cereal producers on straw “wrapping” and sell, for long periods		GP				
Field beans : pure or in combination with cereals	EIP	GP				
Finishing of young cattle on the basis of vegetable industry by-products	EIP	GP				
Grazing Kale in situ as an alternative winter feed	EIP	GP				
Herdade da Parreira - A Economic and environmental sustainability system that fits the farm conditions	EIP	GP				
LegForBov - Alternative Feeds for the production of beef			RI			
Mixture of self-produced legumes and forages as alternative feedstuff for beef cattle		GP				
Pasture management: integration of rotational grazing in animal finishing		GP				
Press cake silage			RI			

Animal Health and Welfare

The aim of the Animal Health and Welfare (AHW) theme within the BovINE project was to improve animal health and welfare amongst cattle in different beef production systems in Europe. Led by the Friedrich-Loeffler-Institut in Germany with support from IDELE (France), this theme's specific objectives included the identification of the main animal health and welfare concerns of farmers involved in keeping beef cattle (suckler, finisher) through bottom-up approaches, including future issues through analysing European and national regulations or recommendations. The AHW Technical Working Group worked on the collection and collation of science-based and farm-based Good Practices (GPs) that addressed the selected sub-themes and then validated, evaluated and reported on the "best of the good" practices within the identified selection, including a cost-benefit analysis. The "best of the good" practices were finalised, and abstracts based on the GPs were disseminated through BovINE channels to EIP-AGRI.

An example of an abstract post - Preconditioning – optimised preparation for a successful fattening

Topic - This section is organised according to the topics listed below

- Animal health and welfare - general
- Health and welfare of newborn calves on suckler farms
- Lameness in beef cattle
- Management housing and environmental factors which affect animal welfare in rearing and finishing units
- Training in animal welfare for operators/farmers (handlers, transporters and slaughterhouses) and stress-free drive systems during weighing and transport in beef cattle
- On-farm health check of young stock prior to sales/purchase including vaccination status
- Guidelines of Peripartum Measures to Prevent Dystocia (problems at calving)
- Recognising causes of lameness and pain - indicators and different assessment criteria
- Simple labour-saving tools measure and communicate high animal welfare standards on beef farms

Links to the BovINE webinars are available on the BovINE website - https://www.bovine-eu.net/webinars/

Animal Health and Welfare

Animal health and welfare - general

Animations link available on page 2

Refer to the key on Page 2

Animal welfare guideline for animal husbandry of fattening bulls and suckler cows in Lower Saxony						
Biosensoric eartags		GP				
Implementing mechanical and essential oil based methods to degrease the stress induced by two winged insect (Diptera: Insecta) in free range cattle	EIP	GP				
Next International Conference on Lameness in Ruminants - Minnesota 2022						
Quality meat program		GP				
Watering system for beef cattle		GP				

Lameness in beef cattle

Costs and benefits of rubber mats on concrete floors					CBA	
Deep litter - a sensible compromise for fattening bulls?	EIP		RI			
Demonstration: Different floors for fattening (Poland)		GP		D		
Digital dermatitis: an expert vision of foot pathology	EIP		RI			
Fattening bulls on slatted floor with perforated rubber mats. Alternative to straw litter.		GP				
Fattening bulls on straw with automated bedding and feeding. The future in view.		GP				
Increased animal welfare for fattening bulls due to combination of different floors		GP				
On farm hoof sanitization		GP				
On-farm health assessment with user-friendly software ('welfare' app) for fattening farms						
Preventing digital dermatitis		GP				
Prevention of Digital Dermatitis in housed beef cattle		GP				
Prevention of lameness in beef cattle	EIP		RI			
Prevention of ruminal acidosis			RI			
Rubbermats on slats - the animal welfare version of slats?			RI			
Rubbermats on slats - the animal welfare version of slats? (Italy)		GP		D		

Animal Health and Welfare

Lameness in beef cattle (continued)

Refer to the key on Page 2

Straw bedding for finisher bulls		GP				
The use of rubber coverings/mats on slats to improve animal welfare		GP				
Use of rubber mats on slatted floors	EIP	GP				

Management, housing and environmental factors which affect animal welfare in rearing and finishing units

Automatic fodderpushing for more productivity			RI			W
Calf and shed monitoring system: e-stado®		GP				W
Ceiling fans - Reduction of thermal stress for solid weight gain			RI			W
Demonstration: Clean Water		GP		D		W
Clean water through a small step?			RI			W
Cow brushes also recommended on beef farms.		GP				W
Development of a protocol on animal protection and welfare in INTIA		GP				W
Enrichment to prevent navel infections in young calves	EIP	GP				W
Facilities for Optimal Cattle Handling	EIP	GP				W
Finishing Betizu´s bulls in paddows		GP				W
Good animal care during the adaptation phase (from the arrival to the beginning of the fattening period.		GP				W
Light as a performance enhancer - Does beef farming need a light regime?			RI			W
Demonstration: Light as a performance enhancer - Does beef farming need a light regime? (Estonia, webinar)		GP		D		W
Low-stress weaning with pass-through gates for calves	EIP	GP				W
Mix and Match - Grouping Beef bulls affects social stress, respiratory disease and weight gain			RI			W
Demonstration: Tube ventilation Belgium						W
Using a sourcing and animal health protocol to reduce health and welfare issues on a bull beef fattening unit in Ireland	EIP	GP				W
Ventilation tubes for better air quality in old stables	EIP		RI			W
Welfare indicators for young cattle and animal with no access to the outside, a complement to the Boviwell diagnosis		GP				W

Animal Health and Welfare

Health and welfare of newborn calves on suckler farms

Refer to the key on Page 2

Bee propolis: a remedy to improve calves health			RI			W
Assessment of vitality in newborn calves			RI			W
Calf hanging upside down after birth	EIP	GP				W
Costs and benefits of the squeeze technique					CBA	W
Dehorning of calves in suckler herds - Good Practice Video		GP				W
The Madigan Technique			RI			W
Het meten van de kwaliteit van colostrum		GP				W
Vaccination of cows against rota or corona diarrhoea in calves		GP				W
Management of newborn calves with focus on supporting a strong immune system	EIP	GP				W
Management of newborn calves with emphasis on supporting a strong immune system		GP				W
Measuring the quality of colostrum		GP				W
Demonstration: Measuring the quality of colostrum (Germany)		GP		D		W
Measurement of colostrum quality		GP				W
Scoring vitality in newborn calves	EIP		RI			W
Demonstration: Scoring vitality in newborn calves (Belgium)		GP		D		W
Demonstration: Scoring vitality in newborn calves (Estonia)		GP		D		W
Demonstration: Scoring vitality in newborn calves (France)		GP		D		W
Demonstration: Scoring vitality in newborn calves (Portugal)		GP		D		W
Squeeze technique for dummy-calves	EIP		RI			W
Demonstration: Thoracic Squeeze in new-born calves with maladjustment syndrome (Germany)		GP		D		W
Demonstration: Thoracic Squeeze in new-born calves with maladjustment syndrome (Ireland)		GP		D		W
Demonstration: Thoracic Squeeze in new-born calves with maladjustment syndrome (Portugal, on-farm)		GP		D		W
Demonstration: Thoracic Squeeze in new-born calves with maladjustment syndrome (Portugal, webinar)		GP		D		W
Vaccination of cows against diarrhea in calves caused by Rota- and Coronavirus		GP				W
Vitaliteit bij pasgeboren kalveren						W

Animal Health and Welfare

On-farm health check of youngstock prior to sales/purchase including vaccination status

Refer to the key on Page 2

A health check of calves prior to purchase		GP				
BoviCare Program		GP				
Health Check of Calves prior to purchase	EIP	GP				
Livestock certification to protect young animals from paratuberculosis		GP				
Livestock health program		GP				
Outdoor veal calf A novel concept from Switzerland			RI			
Preconditioning – optimised preparation for a successful fattening			RI			
Preventive vaccination to avoid antibiotic treatments		GP				
Prigo Angus farm's cooperation with Kaunissaare collection centre for vaccination of young animals		GP				
Purchasing calves for fattening - what to look out for when selecting calves			RI			
Test and evaluate vitality parameters before sale		GP				
Transport - usually necessary, but always a demanding challenge for calves.			RI			
Use of thoracic ultrasound to support the diagnosis and treatment of bovine respiratory disease in calves		GP				
Vaccination against bovine respiratory diseases (BRD) - why, against what and how?			RI			
Vaccination of animals at French birthplace farm before import to Italy for fattening	EIP	GP				
Vaccination prior to transport			RI			

Guidelines of peripartum measures to prevent dystocia (problems at calving)

An observational study on passive immunity in Irish suckler beef and dairy calves		GP				
Artificial insemination in suckler herds			RI			
Birth of oversized calves		GP				
Calving ease			RI			
Castration of young bulls, prevention of early pregnancy of heifers		GP				

Animal Health and Welfare

Guidelines of Peripartum Measures to Prevent Dystocia (problems at calving) (continued)

Refer to the key on Page 2

Consistent application of body condition scoring can make a valuable contribution to successful suckler cow management - not only for avoiding dystocia		GP				
The use of KB (artificial insemination) to reduce calving problems in suckler cow herds		GP				
Elective Caesarean Section (ECS)			RI			
Birth of oversized calves		GP				
Goal-oriented feeding for a corresponding age at first calving			RI			
How to choose a bull for the herd?			RI			
Induction of parturition			RI			
Demonstration: Pelvimetry for natural births (Ireland)		GP		D		
Pelvimetry for natural births – measuring the pelvic area to reach mainly natural calving, even for double-muscled cattle	EIP		RI			
Prediction of parturition to improve farmer's ability to assist cows at the time of delivery			RI			
Pregnant cows and heifers grazing on semi-natural and natural pastures		GP				
Real time monitoring of the reproductive behaviour and welfare of grazing animals.	EIP	GP				
Reduce the risk of dystocia by changing the genetics of suckler cows			RI			
The importance of the rearing phase for fertility of replacement heifers			RI			
The use of AI (Artificial Insemination) to reduce calving difficulties in suckler herds.	EIP	GP				

Recognising causes of lameness & pain - indicators & different assessment criteria

Animations link available on page 2

Collecting Foot and Leg Scores for Aberdeen Angus cattle in Portugal		GP				
Early detection of hoof lesions and pain detection through a standardized scoring system			RI			
Evaluating animal welfare on farms		GP				
Demonstration: Infrared thermography for diagnosis of lameness (Belgium)		GP		D		
Demonstration: Infrared thermography for diagnosis of lameness (Germany)				D		

Animal Health and Welfare

Recognising causes of lameness & pain - indicators & different assessment criteria (continued)

Animations link available on page 2

Refer to the key on Page 2

Infrared thermography for the diagnosis of lameness	EIP		RI				
Welfair TM - the first animal welfare certification scheme that is assessing the condition and behavior.		GP					

Simple labour-saving tools to measure and communicate high animal welfare standards on beef farms

Accelerometer for calves - Activity as a parameter for health and welfare				RI			
Automated monitoring of coughs for early detection of respiratory disease in calves				RI			
Automated video analysis of the behaviour of fattening bulls to improve the assessment of welfare (BeBoP)				RI			
Automatic monitoring of the BCS				RI			
BovINE Webinar: 'Tools to measure and communicate high animal welfare standards on beef farms'							W
Boviwell – a French tool to measure and communicate animal welfare on beef farms	EIP		GP				
Demonstration: Calf Health Belgium					D		
Calf health scoring during purchasing (farmer assessment)			GP				
Claw-template “claw-check” – a simple tool to measure claw health standards			GP				
Communication of calving related events a simple tool to improve animal welfare around calving				RI			
Field robotics - A smart mobile farm robot to herd cattle and to monitor animals and pasture quality				RI			
Improving and communicating animal welfare standards on beef farms with the Bord Bia Sustainable Beef and Lamb Quality Assurance Scheme and FAWAC education booklet			GP				
Infrared thermography for measuring respiration rate				RI			
Obsalim – feed check with cards				RI			
Demonstration: On-Farm-Scoring for Bovine Respiratory Disease			GP		D		
Demonstration: On-Farm-Scoring for Bovine Respiratory Disease (CA BRD scoring system)					D		
On-Farm-Scoring for Bovine Respiratory Disease (CA BRD scoring system)	EIP			RI			
Demonstration: On-Farm-Scoring for Bovine Respiratory Disease (Germany)			GP		D		
Demonstration: Online Training Animal Welfare Indicators for beef cattle					D		

Animal Health and Welfare

Simple labour-saving tools to measure and communicate high animal welfare standards on beef farms (continued)

Refer to the key on Page 2

Online Training Animal Welfare Indicators for fattening cattle			RI			
Precision feeding control by Near Infra-Red Spectroscopy	EIP	GP				
Scale at the waterpoint			RI			
Demonstration: Training in animal welfare for operators (Portugal)		GP				
Weighing animals in the treatment box	EIP	GP				
Welfare Assessment Protocol for Beef Cattle		GP				

Training in animal welfare for operators/farmers (handlers, transporters and slaughterhouses) and stress-free drive systems during weighing and transport in beef cattle

A new sorting park for a cattle farm		GP				W
Animal welfare scan on the smartphone		GP				W
Animal welfare standard for transportation	EIP	GP				W
Animal Welfare Training at Järvamaa Vocational Training Centre by Bovine network Manager, for adults and school students		GP				W
Animal welfare training for slaughterhouses			RI			W
Demonstration: Training in animal welfare for operators (Portugal)		GP				W
Cow goggles – Seeing the world through cows' eyes			RI			W
Knowledge transfer in the training of animal welfare			RI			W
Low Stress Stockmanship			RI			W
Manuals for on-farm evaluation of welfare and all good practices by the farmer		GP				W
Music to make cows less fearful during farm visits		GP				W
Online Courses and SOPs for handling calves and cows			RI			W
Stress-free cattle weighing systems		GP				W

Animal Health and Welfare

Training in animal welfare for operators/farmers (handlers, transporters and slaughterhouses) and stress-free drive systems during weighing and transport in beef cattle (continued)

Refer to the key on Page 2

Training for Mart Drovers		GP				W
Training session for beef cattle transporters		GP				W
Training stockpeople to improve the quality of life of animals and workers			RI			W

Acknowledgements
BovINE thanks all members of the BovINE consortium and network for their work, support and contribution to ensuring the success of the project.

Contact for further information:
Maeve Henchion, Project Co-ordinator - maeve.henchion@teagasc.ie