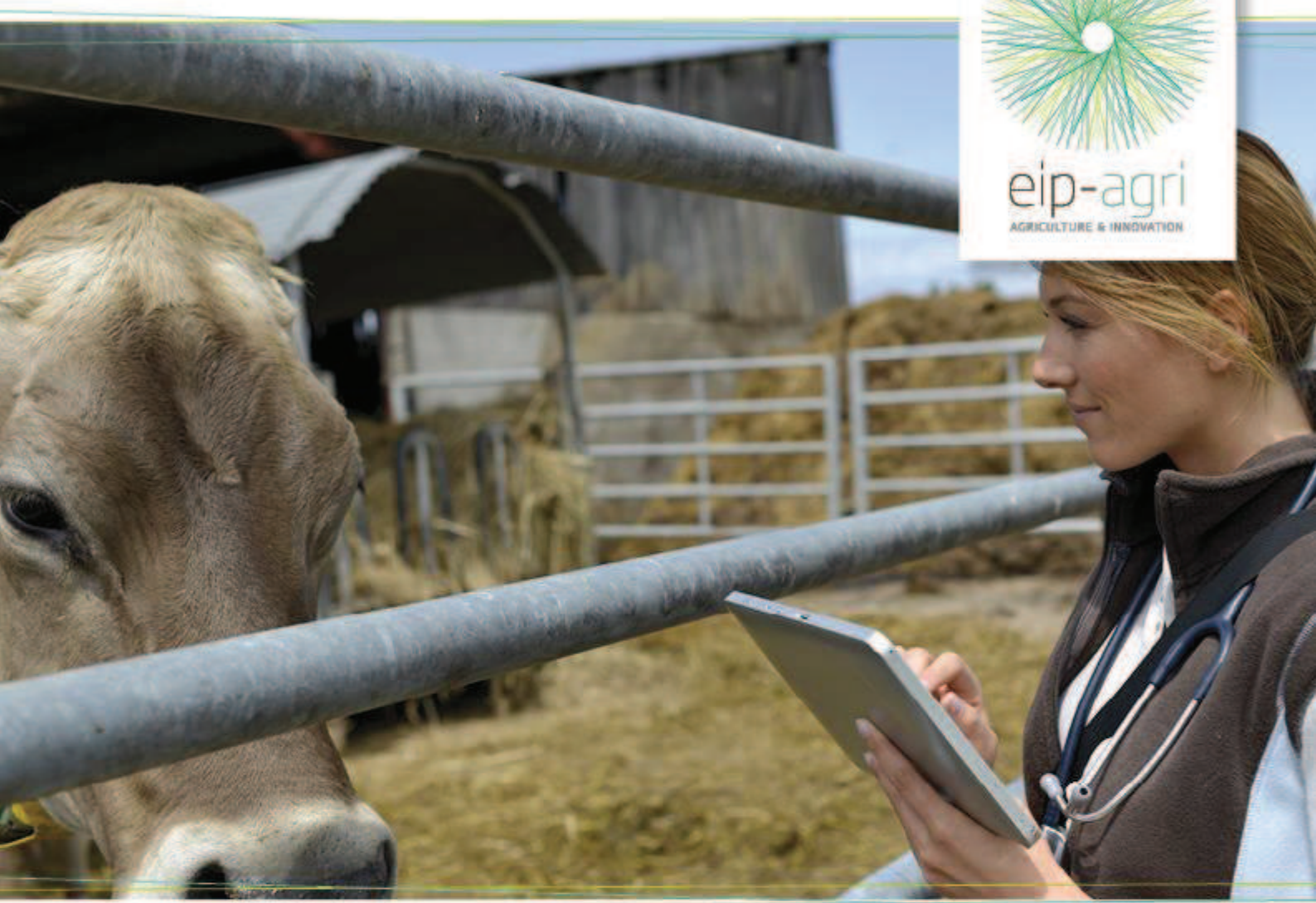


eip-agri
AGRICULTURE & INNOVATION



EIP-AGRI Workshop

Biosecurity at farm level

Challenges for innovation

REPORT

22-23 JANUARY 2015

funded by



European
Commission

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Introduction

The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) aims to stimulate innovation and to contribute to the competitiveness of European agriculture. Biosecurity is a crucial element to ensuring sustainability in the long term. Biosecurity in this context means the combination of management and physical measures designed to reduce the introduction, development and spread of diseases to, from and within an animal population or an establishment. On the 22nd and 23rd of January 2015 a workshop was held in Brussels which aimed to contribute to innovation in on-farm biosecurity, within production systems related to poultry, cattle and pigs. It identified key elements of 'routine' biosecurity measures and formulated actions to stimulate knowledge exchange, demonstration, experimentation, dissemination, and to define research needs and cooperation needs.

The workshop dealt with the following questions:

- ▶ **Characterising biosecurity measures:** what are the key elements for on-farm biosecurity measures?
- ▶ **Motivators and obstacles:** What are the motivators and obstacles to the implementation of biosecurity measures?
- ▶ **Knowledge exchange and uptake:** which biosecurity measures require additional knowledge exchange and demonstration to be implemented? What are the appropriate formats (using the EIP-AGRI tools) to stimulate the uptake of biosecurity measures?
- ▶ **Research needs:** which elements of on-farm biosecurity measures require additional experimentation and research? What are the appropriate formats (using the EIP-AGRI instruments) to identify research needs from practice? How can we stimulate practical research?
- ▶ **Networking and cooperation:** which partnerships do we need to build for promoting biosecurity at farm level?

A workshop of two half days cannot cover the wide variety that exists between countries and sectors. The outcome is therefore not complete or exhaustive. It serves the purpose of stimulating the relevant persons and organisations to take action, to look for knowledge and partners and to utilise the opportunities at national and European level as much as possible.

This report describes both the outcome of the workshop and some further analysis of its outcome. It answers the questions above and contains possible follow-up actions to stimulate the EIP-AGRI network.

As much as possible, participants with a close link to farm practice were invited to the workshop, reflecting different fields of expertise. Representatives of 23 countries were present during the workshop.

The participants list is attached in [http://ec.europa.eu/eip/agriculture/sites/agri-eip/files/field_event_attachments/2015-ws-bio-participants_list - update 20150127.pdf](http://ec.europa.eu/eip/agriculture/sites/agri-eip/files/field_event_attachments/2015-ws-bio-participants_list_update_20150127.pdf)

The profile of the participants is illustrated in figure 1.

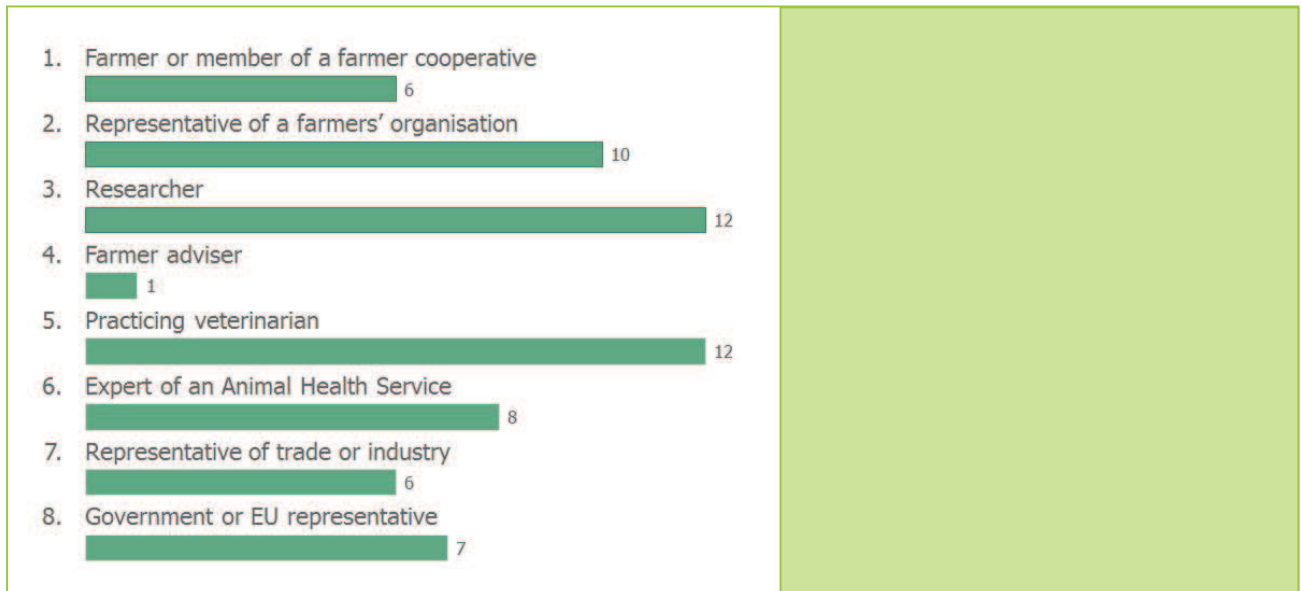
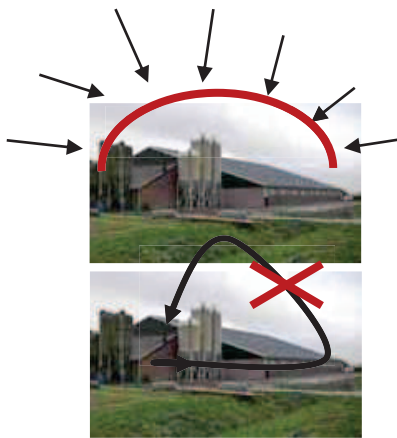
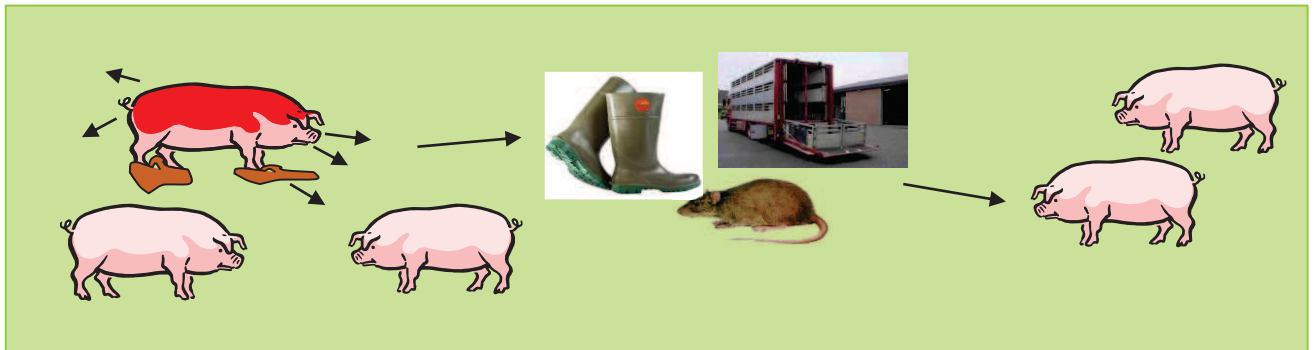


Figure 1 – Profiles of workshop participants

Principles of biosecurity

BIOSECURITY is the combination of all measures that are taken to reduce the risk of introducing and spreading diseases in a herd, at regional or country level.

Improved biosecurity aims at safeguarding and even promoting animal health, which in turn is translated into better health and production performances, lower medication needs and better prices for the products. Biosecurity measures are seen as the fundamentals of every animal health programme. They are based on the principle of avoiding direct and indirect contact between groups of animals and reducing the general infection pressure. Therefore, biosecurity measures are grounded in knowledge on disease transmission processes.



BIOSECURITY at herd level is split into EXTERNAL BIOSECURITY, grouping all measures that are taken to prevent pathogens from entering and leaving the herd,

and INTERNAL BIOSECURITY, grouping all measures that are taken to prevent pathogens from spreading within the herd.

External biosecurity

External biosecurity includes measures related to:

- ▶ Cautiously purchasing animals and sperm, to avoid the introduction of diseases. The more the purchase of animals can be avoided, the better.



- ▶ Avoiding contact between animals from different farms (e.g. through pasture contact).
- ▶ Proper disposal of animals and materials, to avoid the introduction of diseases through the persons or vehicles transporting the animals or materials.
- ▶ Management and storage of carcasses to ensure that dead animals are removed and stored in a hygienic manner.
- ▶ Supply of good and safe feed, water and goods to ensure that no diseases are introduced through these routes.



- ▶ Entrance control for visitors to avoid unnecessary visits and to ensure that all visitors wear herd-specific and clean clothing and footwear.



- ▶ Vermin and bird control to avoid these animals coming into contact with the herd animals.



- ▶ Taking all necessary precautions, depending on location (e.g. densely populated livestock areas) and surroundings (e.g. presence of wildlife).



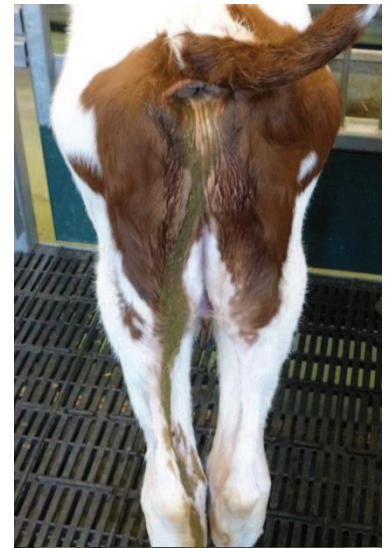
Internal biosecurity

Internal biosecurity includes measures related to:

- ▶ Good separation and management of diseased animals to avoid them continuously infecting other animals in the herd.



- ▶ Clear separation of animals of different age groups to avoid transmission of disease from the older animals to the younger animals.
- ▶ Clear compartmentalisation between different animal groups, and the use of strict working lines.
- ▶ Making sure that no pets can enter the stables, to avoid them carrying around pathogens.
- ▶ Using clean materials that are properly stored and frequently cleaned and disinfected.
- ▶ Using properly stored medicines and sterile needles that are frequently changed.
- ▶ Performing good and frequent cleaning and disinfection of all stables and used equipment.



Biosecurity measures in Europe: a quick scan

Application of biosecurity measures in Europe (examples)

Prior to the workshop, a questionnaire survey was held among the participants. A selection of 21 measures for each sector was made. For each measure, participants were asked to give their opinion on:

- the estimated level of application in the participant's country
- the expected efficacy in disease prevention
- the expected feasibility of implementation
- the expected return on investment (ROI)

In total, 60 reactions were received. Although the samples for each sector are relatively small, some conclusions can be drawn: As figure 2 shows, there are quite some differences between the sectors. In general, lower estimated levels of application are shown in the cattle sector, compared to the pig and poultry sectors. It should be kept in mind that the variety in answers may also be due to country differences.

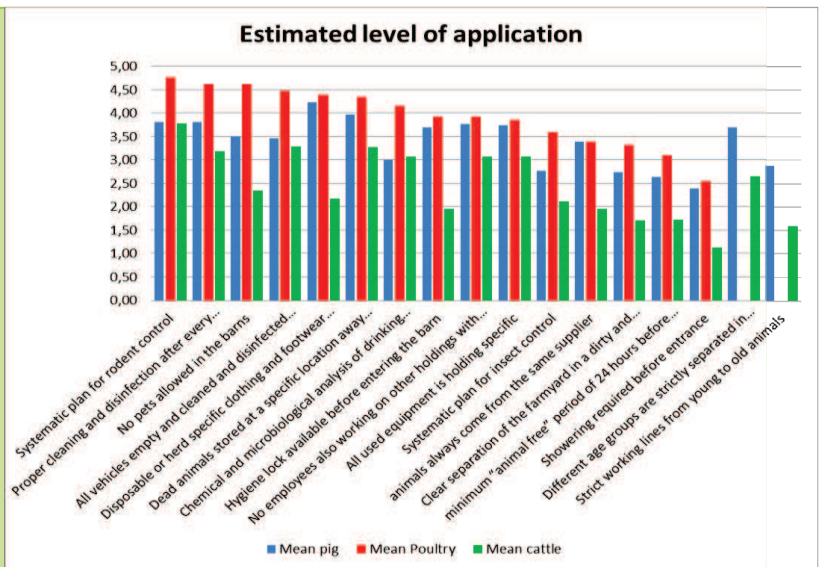


Figure 2 – Estimated level of application

Figure 3 shows the expected level of efficacy. In contrast to the expected level of application (figure 2), differences between the sectors are not that large. This leads to the conclusion that the importance and efficacy of the measures is believed to be relatively species-independent.

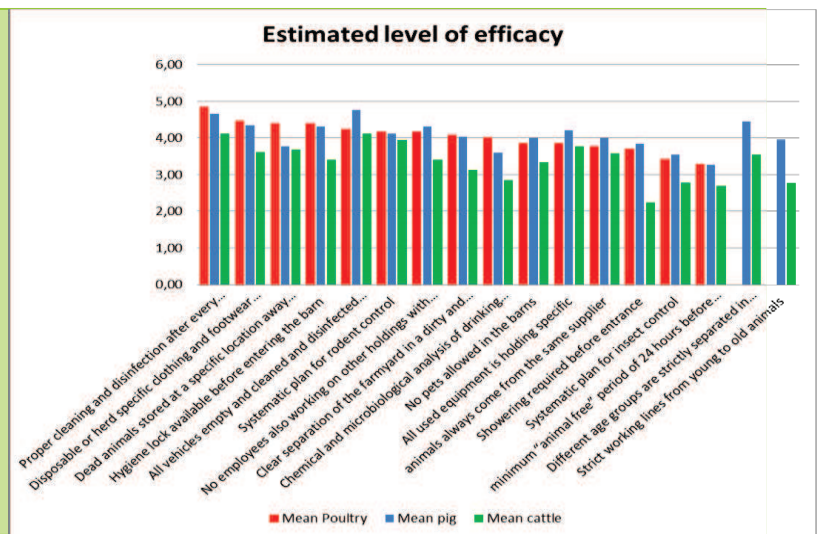


Figure 3 – Estimated level of efficacy

Within the different sectors, the level of implementation of each measure was compared with the expected efficacy and the expected return on investment. A few remarkable differences are presented in figures 4 to 6.

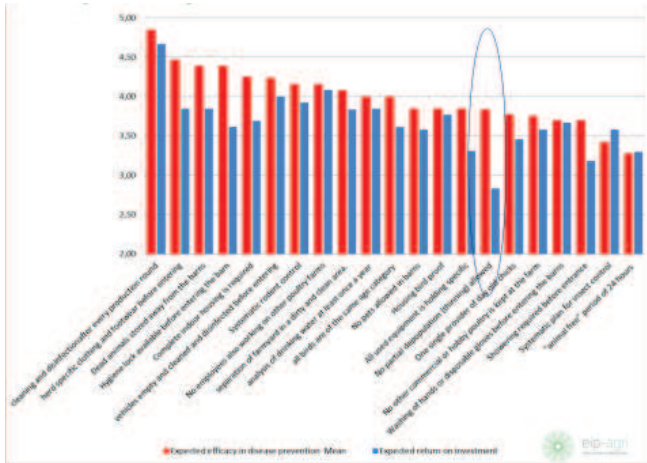


Figure 4 – Poultry: Efficacy vs ROI

The measure of avoiding partial depopulation (thinning) in poultry farming is considered very effective, while the expected return on investment is very low.

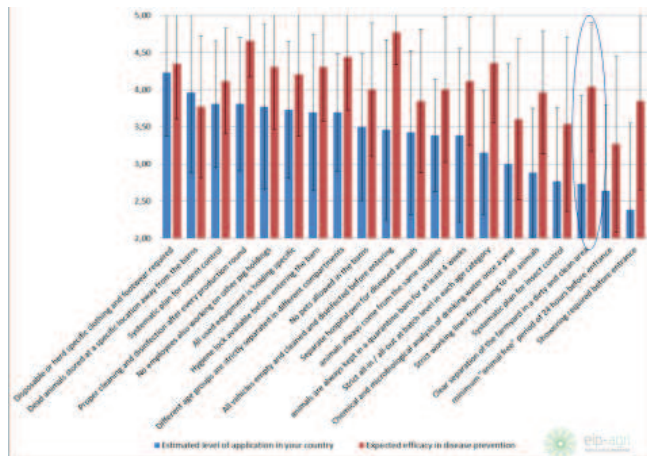


Figure 5 – Pig: implementation vs efficacy

The measure of clearly separating the farm into a clean and a dirty area is considered highly effective, while the level of application is low.

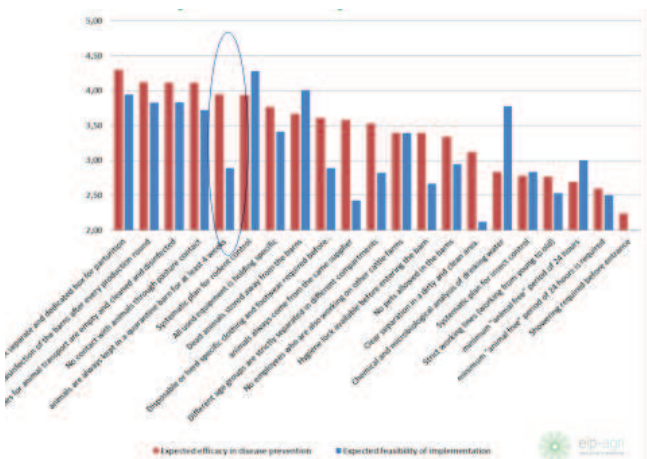


Figure 6 – Cattle: efficacy vs feasibility

The measure of keeping animals in quarantine for at least four weeks is considered very effective, while the level of application is low.

During the workshop the full outcome was used in discussions which were focused on two questions:

- ▶ which measures are missing?
- ▶ what are high potential measures and what are the important underlying drivers and obstacles for the uptake of biosecurity measures?

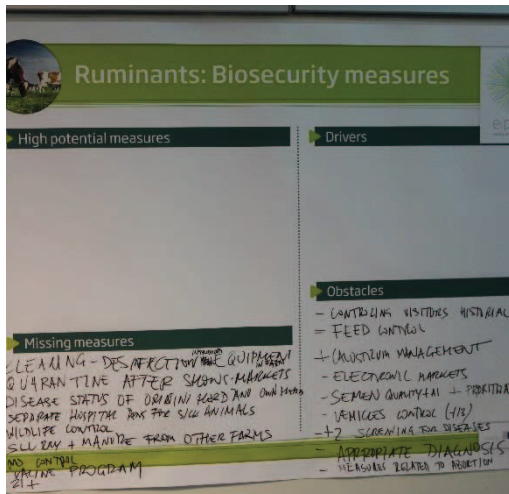
High potential measures

Split up into sub-groups, participants identified a number of high potential measures. These are measures with high efficacy and return on investment but still with a low level of application. Part of the prioritised measures were included in the questionnaire sent to participants beforehand. Participants also identified additional measures for biosecurity. Some of these were also prioritised.



Poultry

Quality check of health status of day-old chicks
Separation of the farm in a dirty and clean area
Correct cleaning and disinfection (incl. micro-biologic analysis of drinking water)
Proper maintenance of old buildings and materials
No partial depopulation (thinning)
All in – all out principle (single age system)
Site-specific plan based on risk assessment
Comprehensive monitoring system of the health status
Proper litter disposal
Continuous water sanitation



Cattle

Less live animal contact (+ quarantine)
Control measures to minimalise contact with wildlife
Hygiene measures for professional visitors
Age groups are separated in different compartments
Isolation of sick animals – hospital pens
Barriers to avoid contact with neighbouring livestock
Introduction strategy incoming animals incl. quarantine measures
Minimal contact with slurry and waste from other farms
Minimal source of new animals (limited number of suppliers)
Hygiene and cleaning (e.g. hygiene lock and disinfection of barns)



Pigs

Proper vehicle cleaning before entering the premises
Proper cleaning and disinfection (Index + score)
Proper collection, management and destruction of dead animals
Integration strategy and quarantine for new animals
All in – all out principle at batch level
Health status of farms and suppliers
Avoiding mixed sources of new animals
Control measures regarding wild animals
Training and education

Joint initiatives for improving biosecurity

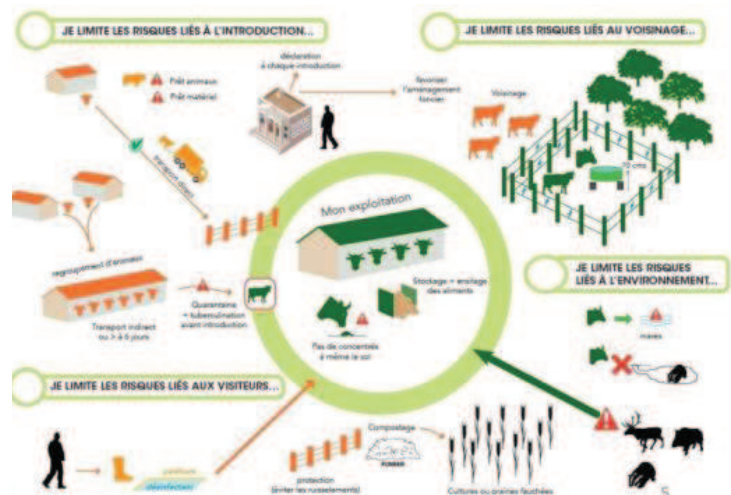
During workshop preparations, the general assumption was that farmers may often lack the knowledge, time and motivation to make decisions to improve biosecurity on their farms. During the workshop some examples were presented that showed farmers working together and inspiring each other to take biosecurity measures. Three of them are presented here.

Bovine tuberculosis in France

Contact persons: Didier Delmotte, president of FESASS - Célia Lesage, GDS Dordogne

Bovine tuberculosis is a chronic disease that affects domestic and wild animals. The bacteria causing the disease can survive for months in dark, cold and humid conditions. The disease usually spreads through direct contact between animals. The situation in the Dordogne region in France is quite specific as it witnesses 20 to 25 infections per year. An increasing number of infected wild animals like badgers, deer and wild boars has been identified. As eradication of wild animals is difficult, it is crucial to increase biosecurity on the farm. In 2010 actions to raise awareness were started, followed by a biosecurity programme in 2013. The programme intends to advise farmers on tailor-made measures in four steps:

1. A local meeting with the contaminated farm, neighbouring farms and vets to discuss tensions and measures
2. Interview with the farmer and a tour on the farm to set goals, check practices and risk factors
3. Report to the farmer to advise measures and to present a risk map with – among others – the presence of badger burrows
4. Providing assistance in funding biosecurity proposals that aim to take measures like double fencing, water systems and measures to reduce risks caused by wildlife



Although the risks caused by wildlife cannot be completely eradicated, experiences so far are positive since the programme leads to increased implementation of biosecurity measures. This does not only reduce bovine tuberculosis but also other diseases.

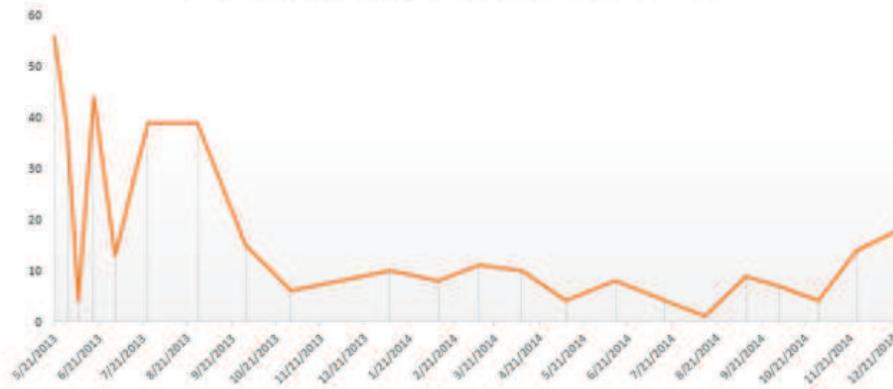
Improved biosecurity on Spanish pig farms by innovative rodent control

Contact person: Carlos Piñeiro, PigCHAMP, Pro Europa S.L. (U.E.C.B.V.)

Biosecurity is a growing concern in the Spanish pig sector. The application of biosecurity measures is growing and mainly focused on fencing, visitor control, pests and quarantine procedures. Rodent control is of increasing importance since a rat can contaminate 10 times the feed it eats and be a carrier of 45 diseases including salmonellosis and swine dysentery. Besides that, they damage buildings and destruct insulation. With this new system proposed, rodents are attracted by a non-toxic bait and trapped when they try to eat. In a joint experiment a special device was developed and tested. This new type of trap leaves no poison on the farm and no cadavers. It was first tested on the Swine Research Farm in Aguilafuente in Segovia in 2013 with good results. Around this farm a network of participating farms was set up. At the end of 2014, 59 farms participated and more than 70.000 rats were captured. The main conclusion is that good applied research needs a clear catalyst and proper networking to disseminate and promote the take-up of biosecurity measures. In this way, innovations in rodent control could be stimulated, leading to increased biosecurity at farm level.

Tested on Swine Research Farm; Aguilafuente, Segovia in 2013-14

Monthly captures 2013-2014



Biocheck.ugent: a free and objective tool for the evaluation of biosecurity in pigs and poultry

Contact person: Jeroen Dewulf, University of Ghent

A risk-based online biosecurity scoring system was presented by Ghent University, Belgium. This Biocheck.ugent system is a freely available online scoring system (in several European languages) that assists farmers in assessing the level of biosecurity in their pig or poultry herd. It is based on a questionnaire in which each answer is translated into a specific score related to the importance of the biosecurity measure taken. After finalising the questionnaire, an automated report is provided that describes the level of internal and external biosecurity of the herd. Moreover, it relates the outcome to country-specific averages. In this way farmers and herd advisers or veterinarians can make use of this tool to obtain a reproducible and objective insight into the current biosecurity situation and to identify aspects that need to be improved.



Drivers and obstacles for biosecurity

Divided in small groups the participants were asked to discuss drivers and obstacles for implementing biosecurity measures. As Table 1 below shows, the three sectors identified different drivers and obstacles, but at the same time they refer to common themes. Concerning the drivers, five main areas were addressed in all sectors. These are

- (1) economic aspects
- (2) legislation
- (3) collective initiatives (assurance, control programmes)
- (4) values and awareness and, finally,
- (5) advice and training.

Concerning the obstacles, again, four relevant blocks can be identified in all three sectors:

- (1) economic aspects related to different dimensions of cost-benefit functions,
- (2) unclear or incoherent institutional set-up,
- (3) gaps in knowledge and communication on biosecurity linked to path dependency in the sectors and, finally,
- (4) some obstacles linked to the inherent needs of production systems (including structures and facilities).

Drivers	Cattle	Pigs	Poultry	Obstacles	Cattle	Pigs	Poultry
Cost-benefit return	x			Cost-benefit economics		x	
Return on investment			x	Cost of implementation / uncertainty about return on investment			x
Profitability & productivity		x		Biosecurity too expensive / laborious	x		
Studies cost-benefit			x	Cost of investment			x
Better price for biosecurity measures			x	Market pressure / demand			x
Creation of financial premium High health animal status	x			Competition from imports			x
Market demand			x	Lack of time		x	
Legislation/enforcement	x			Lack of resources	x		
Action plans on the farm		x		Welfare requirements vs biosecurity requirements			x
Control Programmes	x			No clarity on rules / responsibilities different parties	x		
Assurance schemes		x		Farmers do not like rules imposed if seen as unnecessary	x		
Insurance group		x		Lack of integrative approach			x
Producers' groups			x	Knowledge transfer		x	
Assurance and certification			x	Language (staff)		x	
Awareness among all actors	x			Communication			x
Pride	x			Communication not clear / not addressing farmers	x		
Job satisfaction - Proud of job		x		Trust about use information			x
Pressure (next-door farmers)	x			Lack of knowledge, procedures, guidance, awareness		x	
Benchmarking between farms		x		Lack of skills			x
Peer Teaching		x		Traditions	x		
Advice-Quality support to farmers	x			History industry			x
Training			x	Old infrastructure		x	
Management of stock			x	Lack of disinfection to clean trucks away from the farm		x	
				Operating multiple sites/grazing places	x		
				Need to move animals (anyway)	x		

Table 1: Drivers and obstacles for implementing biosecurity measures

Actions to increase the level of implementation

Three groups discussed potential actions to increase the implementation of biosecurity measures, overcoming the identified obstacles. It is interesting to see how the parallel groups, although listing different actions, focused consistently on five main areas (Table 2). The first one refers to improving cost-benefit analysis and its communication so that economic advantages of biosecurity are shown. Actions that are identified as being highly necessary include improving communication and translating scientific knowledge into practice. Benchmarking and promoting interaction among farmers through diverse strategies were broadly mentioned by the experts to increase awareness and motivation. Finally, the experts advised the development (and implementation) of concrete action plans at farm level.

Overcoming obstacles: increasing implementation	Group 1	Group 2	Group 3
Explanation cost-benefit	X		
Benefits: cost-benefit analysis			X
Lower costs / higher income	X		
Training / education / repetition	X		
Benchmarking	X		
Anonymous scoring system		X	
Stakeholder meeting (open minds, common sense, champion farmer)		X	
Action plans	X		
Adopting core biosecurity on farm (e.g. implementation)			X
Translate science to economical / practical		X	
Risk communication	X		
Communication			X

Table 2: Potential actions to increase the implementation of biosecurity measures

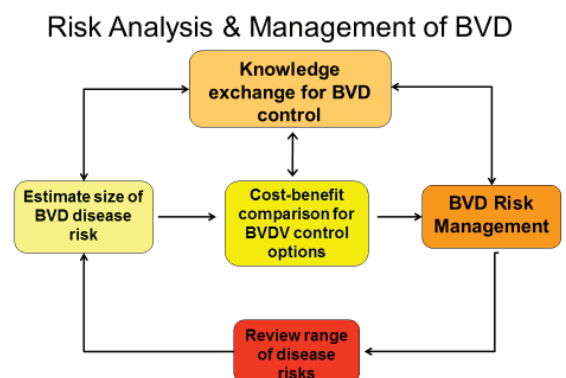
Professor George J Gunn from the Epidemiology Research Unit of Scotland's Rural College SRUC in Inverness, Scotland presented some cases of programmatic approaches towards improved biosecurity. He presented a risk analysis and management framework which has been used and tested for the case of Bovine Viral Diarrhoea (BVD) in the United Kingdom.

A comparison of the costs and benefits of different BVD control options forms the core of the framework. Different practical studies serve the purpose of getting quantitative information about costs and benefits which can be shared and used in BVD risk management programmes. More information is available on the website of Scotland's Rural College:

http://www.sruc.ac.uk/info/120464/research_impact/1453/providing_the_evidence_base_to_eliminate_bovine_viral_diarrhoea_bvd

Professor Gunn stated that farmers and veterinarians often reject the concept of risk analysis although it is something we all do every day.

Professor Gunn: "We already have a great deal of information about BVD infection with excellent tests and proven control methods. We can all benefit from the structured framework offered by risk analysis. It is a valuable way of organising results from complementary studies and identifying the most important knowledge gaps. We have presented BVD infection in Europe as an example of this. Frequent review with farmers / other stakeholders is essential. Understanding stakeholder behaviour and biosecurity is critical."



Professor Gunn stressed the need for more knowledge exchange. But as farmers behave differently in different countries, the challenge is first to find out what the issues are for a particular country or region.

Knowledge exchange and research

Based on the discussions in the previous sessions and presentations, participants were asked to reflect in groups which key aspects require additional knowledge exchange or demonstration and which aspects require additional research and experimentation. The groups were asked to come up with a maximum of three to four proposals. Knowledge exchange and demonstration is mainly relevant to the EIP-AGRI network while research needs mainly connect to the EU Framework Programme for research and innovation: Horizon 2020. Under both initiatives, opportunities exist to potentially address biosecurity or related issues.

Needs on knowledge exchange and demonstration:

The most frequent aspects and needs identified by the participants were:

- ▶ Cost/benefit ratio analysis and data on biosecurity measures, preferably based on regional data
- ▶ Social aspects including coaching, motivating and effective communication (both peer-to-peer systems of exchange and official supporting material)
- ▶ Best practices on operational procedures, hygiene standards and monitoring of the biosecurity status
- ▶ Evaluation methods for quick assessment of biosecurity levels and for identifying technical improvements
- ▶ Disease transmission routes in relation to effective measures
- ▶ Legislation and complying with regulations and standards
- ▶ Biosecurity throughout the chain, for instance who is the main responsible person in what part of the chain

Research needs:

The most frequent research needs identified by the participants are about **behavioural aspects** focusing on the different actors like farmers, but also veterinarians, consumers and citizens. The main question is how to motivate and influence behaviour.

Other aspects that were highlighted relate to:

- ▶ Comparing different biosecurity schemes at different levels
- ▶ Designing real-life farms, taking into account sustainability, for instance striking the right balance between being protected and keeping a positive image for the general public (to avoid that farms look like prisons)
- ▶ Costs and benefits of biosecurity, indicators and ways of measuring success
- ▶ Effective ways to balance biosecurity with wildlife control
- ▶ Ways and measures to effectively transfer knowledge on biosecurity
- ▶ Precision livestock farming (for instance remote sensing)

In general, the workshop did not offer enough time to get a full overview. Further identifying the gaps and research needs should be a topic for further research as well.

Possible follow-up actions

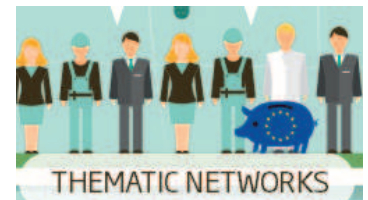
The EIP-AGRI focuses on forming partnerships, using bottom-up approaches and linking actors through interactive innovation actions such as the establishment of Operational Groups under Rural Development Programmes (RDPs), or Focus Groups at EU level. The link to EU research activities is made essentially through multi-actor projects and thematic network projects.

EIP-AGRI Operational Groups: as various Rural Development Programmes at national and regional level are being set up, funding will become available for EIP-AGRI innovation projects that aim to tackle practical issues. Various actors will work together in a project targeted at innovation and at producing concrete results. It is up to the EU Member States themselves to select the Operational Group projects and to decide on selection criteria. The composition of Operational Groups may vary from project to project according to the objectives of the projects. They can bring together partners from research, agricultural practice, industry, the advisory sector or any relevant person or group.



EIP-AGRI Focus Groups: EIP-AGRI Focus Groups are temporary groups of selected experts focusing on a specific subject, sharing knowledge and experience. The objectives are: to provide the state of the art of practice and research; to identify needs from practice and possible directions for further research; to highlight priorities for innovative actions by suggesting practical Operational Groups or other project formats. EIP-AGRI Focus Groups are launched by the European Commission (DG AGRI), following suggestions received from various sources and stakeholders. For instance, there was an EIP-AGRI Focus Group on reducing antibiotics in pig farming, with a number of recommendations relevant to biosecurity. The report is available on the EIP-AGRI website¹.

Horizon 2020 Thematic Networks: these are Coordination and Support Action projects involving all concerned actors (researchers, farmers, advisers, enterprises, education, NGOs, administration, regulatory bodies, EIP project groups,...). They are not purely focused on research. Partners should synthesise, discuss and present existing scientific knowledge and best practices. Projects must develop end user material. In the calls for applications of 2014 (closed) and 2015 (open at the time of this workshop), there is a bottom-up topic for selecting several such thematic networks and any areas relevant to the EIP-AGRI. Themes can be linked to products or sectors, for instance arable crops, fruits, vegetables, pigs etc.) or a broad range of cross-cutting subjects. As they bring together possible actors, thematic networks help connecting and building EIP-AGRI Operational Groups and multi-actor projects.



Horizon 2020 multi-actor (research) projects: among the topics published in the EU annual calls for research proposals, some are identified as relevant to a 'multi-actor approach'. A multi-actor approach will ensure the necessary cross-fertilising interactions between researchers, businesses, farmers/producers, advisers and end users. The impact and dissemination of research results will be actively supported through communication actions, knowledge exchange and the involvement of various actors throughout the different projects.

¹ <http://ec.europa.eu/eip/agriculture/en/content/eip-agri-brochure-reducing-antibiotics-pig-farming>

General conclusions

Based on the input and discussions during the workshop the following conclusions can be drawn:

Although there was little doubt about the importance of biosecurity in animal production, it appeared that a large variety exists in the application of biosecurity measures between countries and between animal sectors. The poultry sector appears to be the sector where biosecurity measures are implemented the most, followed by the pig production sector and the cattle sector.

In contrast to the observed variety in application of biosecurity measures, there was much less variety between the animal sectors in terms of the expected efficacy of the different measures.

There is a general belief that a lack of application of measures is largely due to a lack of information and/or motivation among the farmers. It was concluded that these lacks should be addressed to improve biosecurity. Collective initiatives involving different farmers could be beneficial for motivating each other.

Finally, several knowledge gaps were identified. These gaps are mainly linked to the need for quantitative evaluation of the efficacy and the economic value of the different biosecurity measures. It is believed that this information is of crucial importance in motivating all stakeholders involved to apply more and better biosecurity measures.

More information

Workshop information

All information related the EIP-AGRI Workshop 'Biosecurity at farm level: Challenges for innovation' can be found on the [EIP-AGRI website/events/EIP-AGRI events/Past events](#).

- [Participants list](#)
- [Final programme](#)
- [CVs from the speakers](#)
- [Presentation Jeroen Dewulf](#)
- [Presentation George Gunn](#)
- [Presentation Célia Lesage](#)
- [Presentation Daniel Pearson](#)
- [Presentation Carlos Pineiro](#)
- [Presentation European Commission](#)

Related EIP-AGRI information

[EIP-AGRI Focus Group Reducing antibiotic use in pig farming: Final report](#)

[EIP-AGRI Brochure on reducing antibiotics in pig farming](#)

[EIP-AGRI Network](#)

[A service point for the EIP-AGRI network](#)

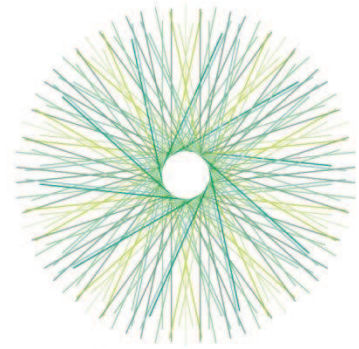
[EIP-AGRI Brochure on Operational Groups: Turning your idea into innovation](#)

[Innovation support services](#)

[EIP-AGRI brochure: Funding opportunities under Horizon 2020 Calls 2015](#)

Information for the participants

Participants who have registered to the EIP-AGRI website have access to the [collaborative area](#) of the workshop. This area includes files that reflect the discussions in the break-out groups. You can register to the website at: <https://ec.europa.eu/eip/agriculture/en/user/register>.



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The European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI) is one of five EIPs launched by the European Commission in a bid to promote rapid modernisation by stepping up innovation efforts.

The **EIP-AGRI** aims to catalyse the innovation process in the **agricultural and forestry sectors** by bringing **research and practice closer together** – in research and innovation projects as well as *through* the EIP-AGRI network.

EIPs aim to streamline, simplify and better coordinate existing instruments and initiatives and complement them with actions where necessary. Two specific funding sources are particularly important for the EIP-AGRI:

- ✓ the EU Research and Innovation framework, Horizon 2020
- ✓ the EU Rural Development Policy



Join the EIP-AGRI Network & Register via www.eip-agri.eu