



# Better Training for Safer Food *Initiative*

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# BTSEF

Better Training for Safer Food is an initiative of the European Commission aimed at organising an EU training strategy in the areas of food law, feed law, animal health and animal welfare rules, as well as plant health rules.

**2nd Quarter 2017**

# Animal Identification and traceability as a fundamental tool in animal health

## Module 5.1

Basics of the use of animal IRT for AH –  
conceptual framework and  
epidemiological basics



## Agenda

- Introduction
- The need to assess a disease in populations – Indicators
- Strategies towards disease management
- General approach to the management of sporadic and exotic diseases
- The questions to be answered
- General requirements and specific impact: What can animal IRT systems do for AH?

## Introduction I

- Animal diseases may have negative impacts in human and animal health, in the economy and in society
  - Direct impact on human health (zoonoses) and AH (death, abortions, still births)
  - Farmers and industry costs
    - Treatments and other direct and indirect costs, productivity loss (milk, meat, fertility problems), product loss, dealing with disease
    - Business disruption: sales restraints due to limited access to markets within and between EU countries but also with third countries.
    - Market losses due to changes in the consumption patterns.
  - Public sector: Costs of monitoring, prevention, eradication
- AH and production systems benefit from prevention and control measures
  - It is virtually impossible to sustain the modern animal production under the burden of important contagious animal diseases
- Society, public health and food safety may also benefit from this activity



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# Animal Population in the EU

Livestock numbers per EU Member State, 2014

([http://ec.europa.eu/eurostat/statistics-explained/index.php/Agricultural\\_production\\_-\\_animals](http://ec.europa.eu/eurostat/statistics-explained/index.php/Agricultural_production_-_animals))

	Bovine animals	Pigs	Sheep (*)	Goats (*)
<b>EU-28</b>	<b>88.39</b>	<b>148.31</b>	<b>83.13</b>	<b>10.58</b>
Belgium	2.48	6.35	:	:
Bulgaria	0.56	0.55	1.34	0.29
Czech Republic	1.37	1.61	:	:
Denmark	1.55	12.71	:	:
Germany	12.74	28.34	1.60	0.12
Estonia	0.26	0.36	:	:
Ireland	6.24	1.51	3.32	0.00
Greece	0.66	1.05	9.07	4.25
Spain	6.08	26.57	15.43	2.70
France	19.25	13.29	7.17	1.27
Croatia	0.44	1.16	0.61	0.06
Italy	6.13	8.68	7.17	0.94
Cyprus	0.06	0.34	0.32	0.24
Latvia	0.42	0.35	:	:
Lithuania	0.74	0.71	0.12	0.01
Luxembourg	0.20	0.09	:	:
Hungary	0.80	3.14	1.19	0.07
Malta	0.01	0.05	0.01	0.00
Netherlands	4.17	12.07	1.07	0.44
Austria	1.96	2.87	0.35	0.07
Poland	5.66	11.27	:	:
Portugal	1.55	2.13	2.03	0.38
Romania	2.07	5.04	9.52	1.42
Slovenia	0.47	0.28	:	:
Slovakia	0.47	0.64	0.39	0.04
Finland	0.91	1.22	:	0.00
Sweden	1.44	1.47	0.59	0.00
United Kingdom	9.69	4.49	23.03	0.00
Iceland	0.07	0.04	:	:
Montenegro	0.09	0.02	0.20	0.03
FYR of Macedonia	0.24	0.17	:	:
Serbia	0.92	3.24	1.75	0.22
Turkey	14.24	:	31.12	10.35

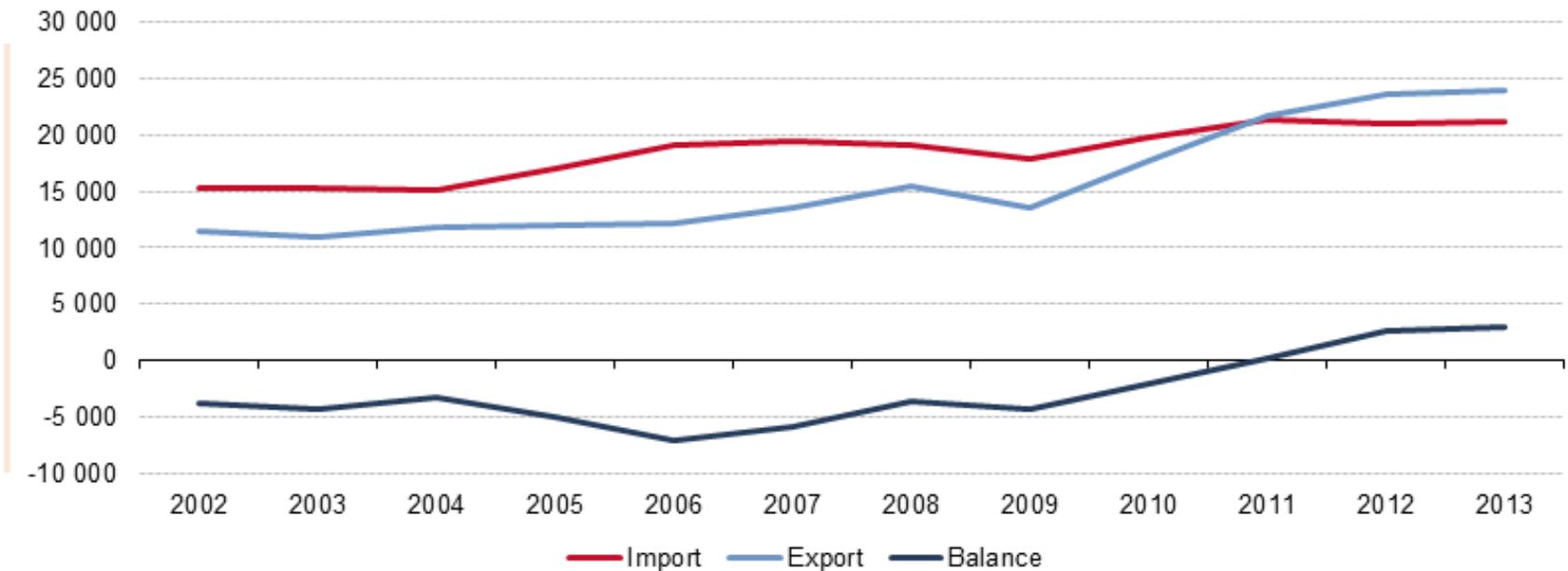
(\*) Figures on sheep population are due only by 14 EU Member States. The EU aggregate is estimated on their sum.

(†) Figures on goat population are due only by 5 EU Member States. The EU aggregate is estimated on their sum.



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## Animal production is about EU trade and non-EU countries trade of animals and animal products 2002 - 2013



[http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Extra-EU trade in animal agricultural products, EU-28, 2002%E2%80%932013.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Extra-EU_trade_in_animal_agricultural_products,_EU-28,_2002%E2%80%932013.png)

## Introduction II

- Strategies to manage disease varies according to its importance – impact - and epidemiology, the knowledge available on the disease and the tools available to deal with it.
  - **Regulation (EU) 2016/429 : the Animal Health Law**
  - It introduces a single piece of legislation to regulate AH in the Union based on the principle that "prevention is better than cure".
- Disease management needs quality information
  - Animal IRT are information building blocks therefore subjected to the same criteria
    - Accurate and precise, in time, cheap, relevant
- Regulation (EC) 178/2002 states that Animal Health (AH) and Animal Welfare (AW) are key in achieving high levels of protection of human health and good market function (Art. 5.1), defines traceability (Art. 3.15) and specifies its components (Art. 18) and assign specific roles to authorities and to operators in the context of product recall and withdrawal
  - Animals and animal products intended for consumption are considered AH and AW items and therefore traceable items

## Introduction III

- “The traceability of animals is of crucial importance during a disease outbreak so that the epidemiology of the disease is understood and can be better controlled”.
- Data required involves stakeholders, activities, animals, holdings, abattoirs and industrial units, transports and movements.
- Official services (authorities), field veterinarians and laboratories generate specific AH data which used in combination with data from efficient and well conceived animal IRT systems are required to deal adequately with diseases
- Periodically a quality assessment about the performance of animal IRT and monitoring and surveillance systems needs to be carried out

## Three key layers in disease control and prevention

### ➤ Disease

- Epidemiologic patterns, tools (tests & vaccines)

### ➤ Organization (CA)

- Competent authority (CA): legislation, resources, capabilities (knowledge, training, experience)

### ➤ Business (Stakeholders (S))

- Value drives animal and product flows,  
– markets change => Risk  $\neq$  K (risk is not a constant)

### ➤ 178/2002

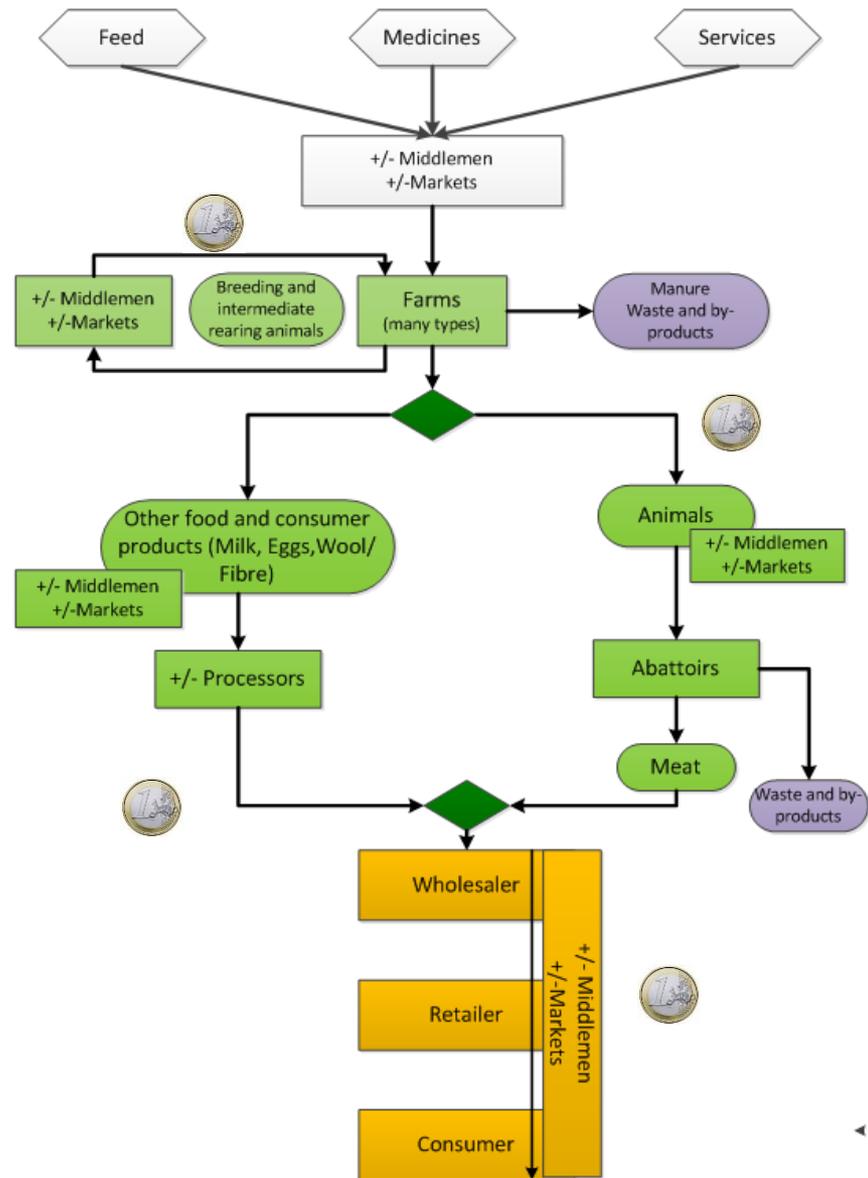
- Under this Regulation: Food Safety => Animal Health and Animal Welfare (AH & AW); Internal Market & 3<sup>rd</sup> Countries; Responsibilities (**S/CA**); Traceability



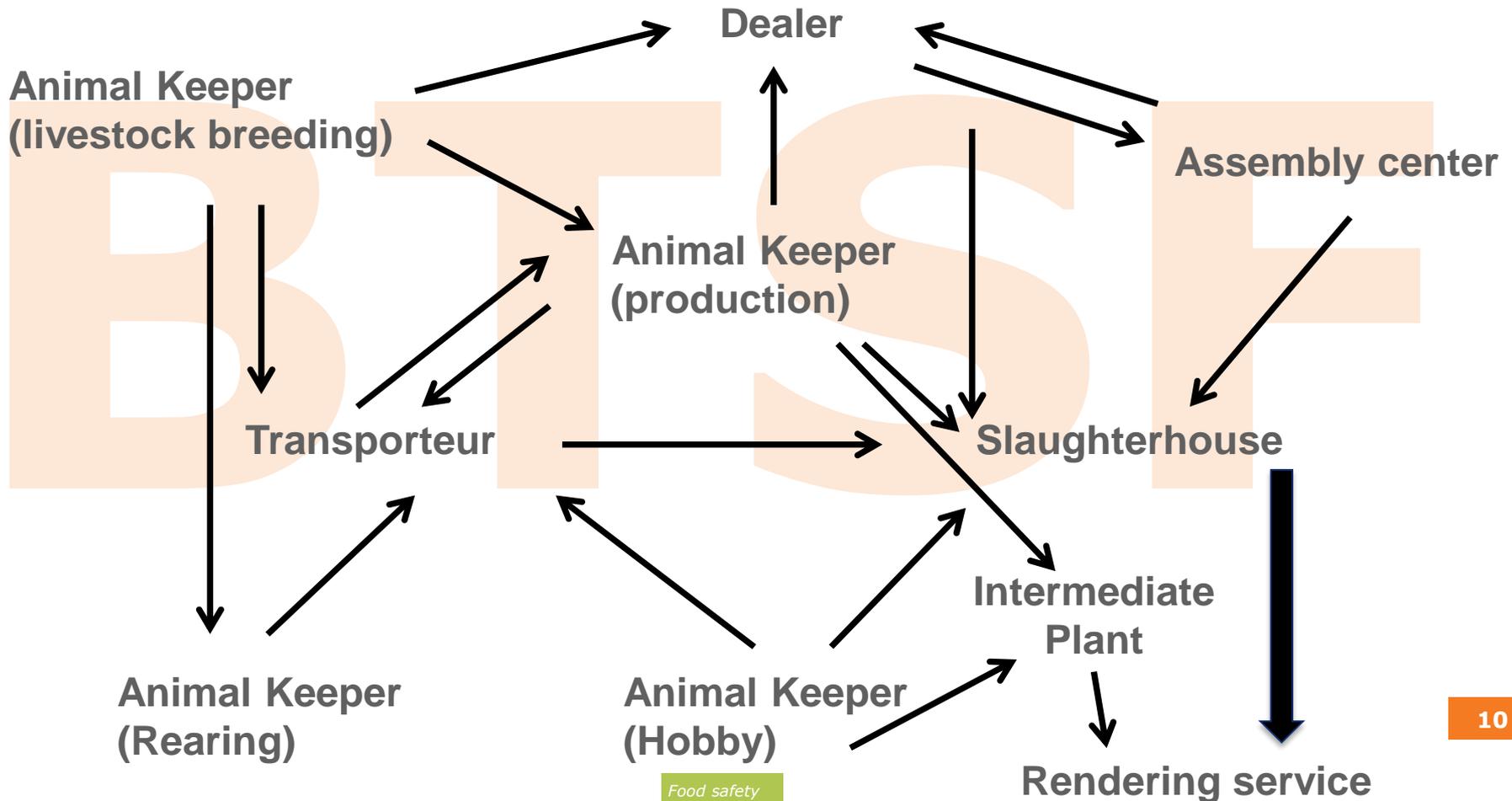
## Examples of market framework approaches in which disease management is needed - part 1

Call it Business: stakeholders are business players

Stakeholders play an important role in risk, contributing to change in risk profiles of diseases due to market drivers



# Animal keepers and other objects of control - relationships



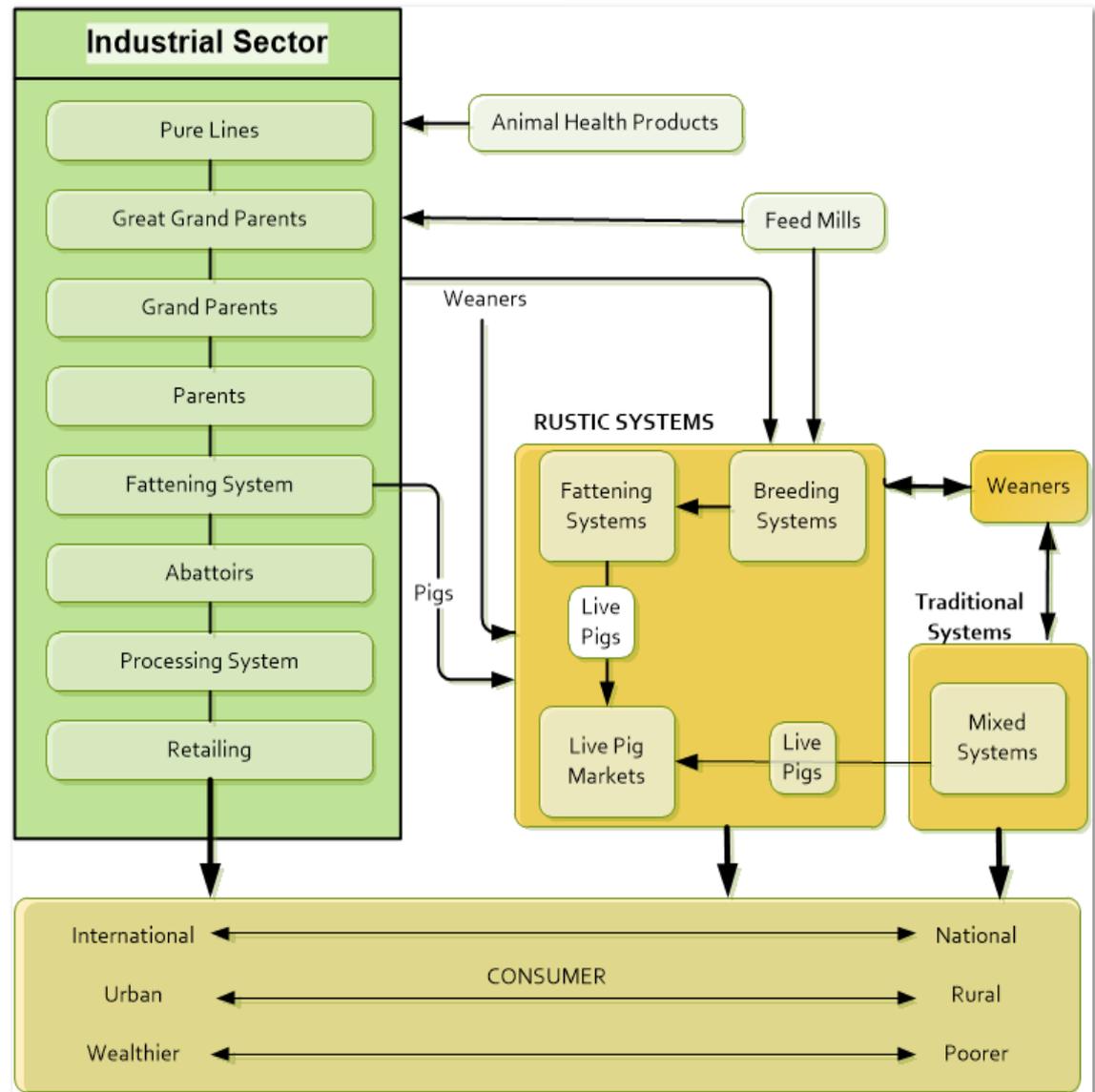


## Examples of market framework approaches in which disease management is needed - part 2

Several types of food, and living animals production and transformation systems, coexist and operate simultaneously in one territory as well as in the globe.

Different business types means differences in purposes and intentions and market position ...

This is a challenge for AH.



# Purpose of this module

BTSEF

Practical role and contributes from animal IRT to AH

AH drivers for animal IRT systems specifications

## The need to assess – Indicators

- Indicators are needed to measure disease and to assess the importance of disease
  - Prevalence measures the momentary quantity of a certain disease present in a population
  - Incidence measures the strength and velocity at which new cases arise in the population
  - Diseases express themselves in time and in space
  - The object of these measurements can be the individual animals, herds or even regions and the events can be infection, disease, death, abortion, freedom from infection, others ...
- These indicators measure effects
  - What about causes; factors!
- Requirements for animal IRT
  - From the past (effects) to the future (causes and factors)

# Diseases expressed in time and in space

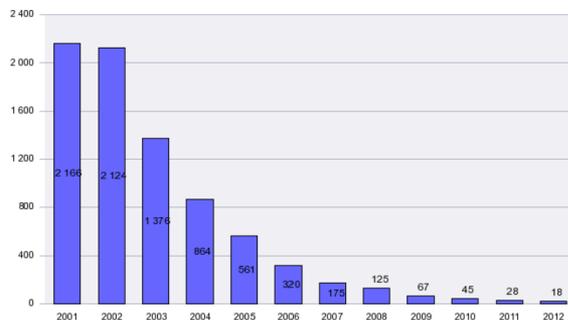


## Space clustering

Clustering in space is another key issue in disease management. Reliable information either on individuals as on their location in farms is needed to monitor and to act upon the disease. Also predictive models rely on this information.

Example: bTB in UK

**Chart B2: Evolution of the number of BSE positive cases (all types) in the 28 EU Member States since 2001**

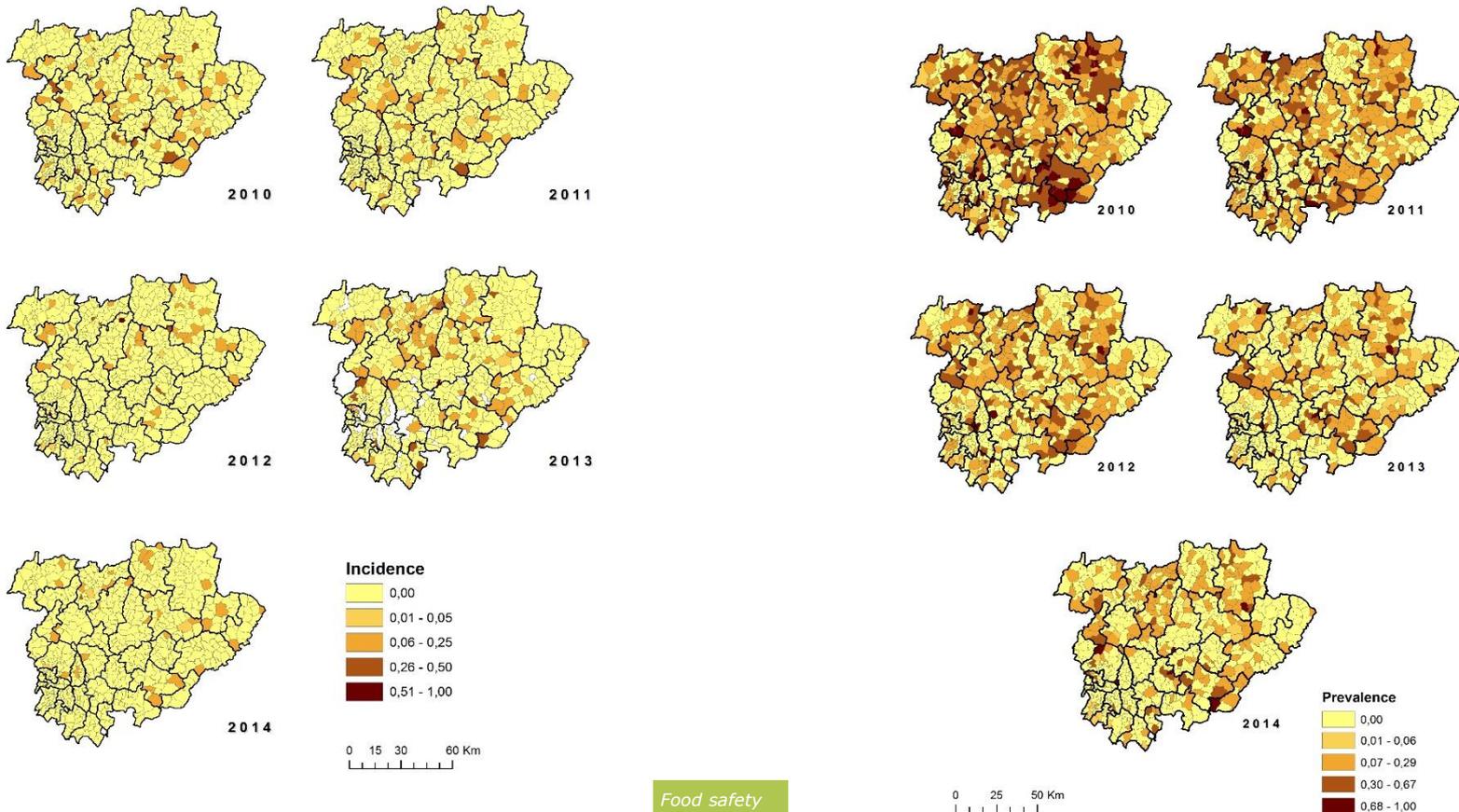




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# Disease expression in space and time

(Small ruminant brucellosis in North-east Portugal)



## General approach to manage AH and prevent or control diseases

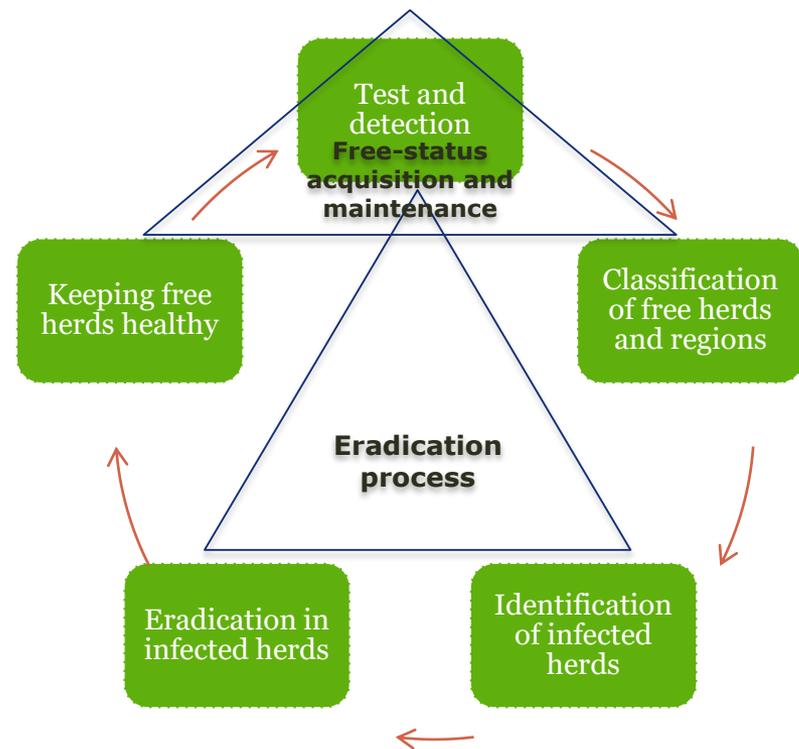
- The general framework used to set the stage for listed disease control ends up by creating two main types of scenarios according to the presence or absence of the disease in a certain territory.
  - Notification and reporting, surveillance, eradication, disease-free status
  - disease preparedness, awareness and control
- Emerging diseases are generating an increasingly growing concern. Emerging diseases are frequently subtle and difficult to detect and data for quick risk assessments are required.
- Shared responsibilities are assigned to authorities, farmers and other stakeholders as stated in food and AH acts

## Management of diseases present in the territory

- To be adequately managed, animal diseases need to be **prioritized** and the important diseases will be listed.
- Then, each country has to establish the **health status** of the susceptible animal populations in its territory towards the diseases in the list.
- When a disease is present, **control and eradication programs** can be adopted supported by monitoring and surveillance systems which are needed to follow the disease status of regions, herds and animals.
- **Activities** associated to this process are testing, culling, vaccinating, movement restrictions, biosecurity, ....
- At **the basis** of this
  - Animal identification (individual or batch)
  - Holdings, keepers, identification of the premises
  - Clear, correct and updated locations of animals in holdings
  - Clear relation between tests results, vaccines and AH status

## General approach to control and eradication

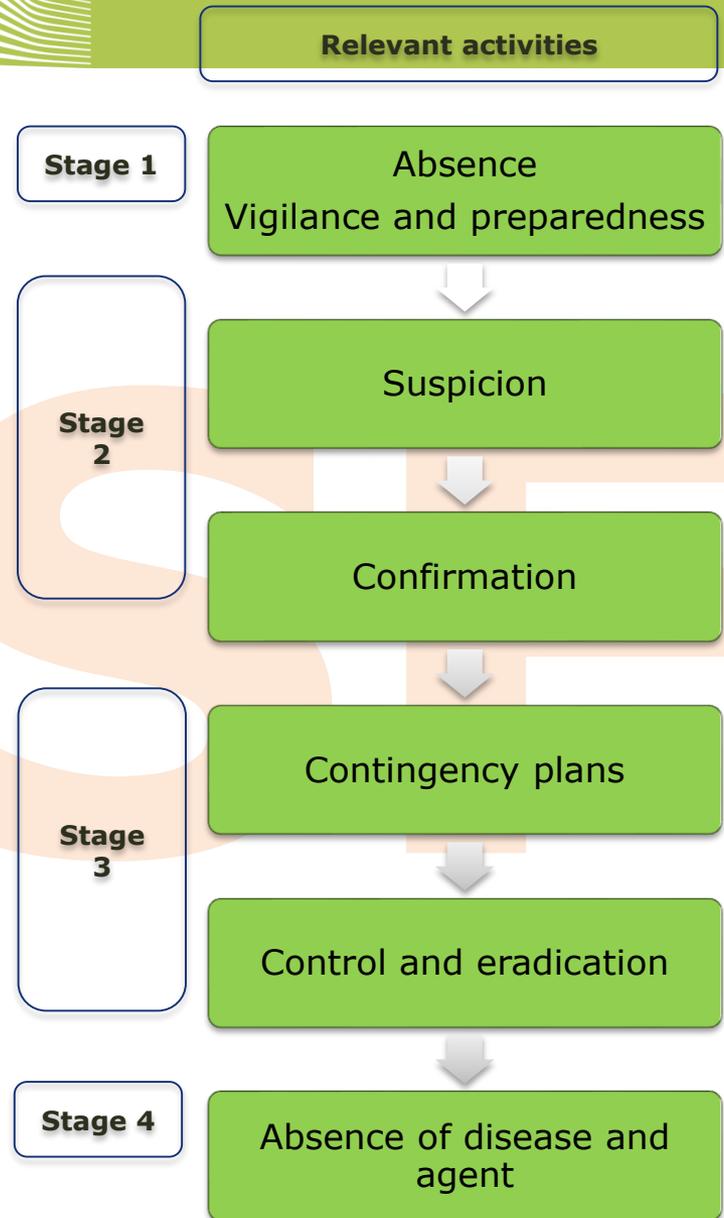
- Diseases like bTB and Brucellosis have eradication programs and monitoring and surveillance systems permanently in place. The purpose of the MS is to become an officially disease free state.
- Sanitary activity carried out by authorities leads to disease free areas and countries and has positive impact on the economy through animal (and animal products) trade and circulation.



## Management of absent and emerging diseases

- Absent diseases, some of them Trans-boundary Animal Diseases, like Foot and Mouth Disease or Avian Influenza are **undesirable diseases**, usually not present in the EU territories.
- For absent diseases **surveillance** systems are used, coupled with **prevention and preparedness** to face situations where suspicion or confirmation of outbreaks happens, upon which contingency plans are activated.
- Emerging or re-emerging diseases are important challenges for control given to the epidemiological changes or the emergence of new conditions in certain areas:
  - In particular situations when sporadic undesirable diseases like BTV can become endemic or re-emerging
  - In other situations diseases like tuberculosis may re-emerge
- **Risk assessment** of disease introduction is an important decision tool also requiring abundant data input.

- The different stages and management activities concerning absent listed diseases, like TAD.
- Actors and tasks at different phases are different
- The involvement of all stakeholders is an essential request
- Laboratories
- Role of animal IRT



## The questions to be answered

### Absent diseases Endemic diseases

- **What** happened?
- **When?**
- **What** is involved?
- **Where** are they?
- **How many** cases?
- **What** are the **relationships**?

### Absent diseases Endemic diseases

- **Business** involved?
- **Administration** efficiency and operationally?
- **Disease** has changed?
  - **Epidemiology** knowledge?
  - **Species** cases, hosts, reservoirs?
  - **Agent**

# The specifications from the AH side to animal IRT information systems

Purposes behind the legal structure of requirements for animal health:

- **Notification**
  - **Surveillance**
  - **Eradication**
  - **Disease freedom**
  - **Disease preparedness**
- Relevant data from AH authorities: health status, authorization for animal and animal products movement
  - Animal population census: counts, species; birth date, breed, ...
  - Herd location, activity and husbandry types
  - Stakeholders
  - Transporters
  - AH activities: laboratory data, field action data (tuberculinization, vaccination)
  - Territory – roads, rivers, mountains, winds, climate, vegetation, wild animal habitats, .....

## Specific approach: what can Animal IRT systems do for AH?

- 1. Census** - Information about keepers, holdings and animal numbers and characteristics
  - Provision of data on the livestock production systems in a country including specific units (i. e. Common grazing areas)
  - Information about location of farms and livestock density for disease control and outbreak response
  - Together with geographical coordinates it is possible to visualize the distribution of livestock throughout the country
  - Information about movements. Animals / batches entering or leaving the premises (which ones – individual ID) and their origin or destination (other farms, markets, collection centres, traders, others ...)
- 2. Health status** - Information about the health status of the herd, the region, the country
- 3. Risk assessment and profiling** - Profiling the herd according to the risk of disease occurrence in case multiple species diseases, vector or wildlife associated diseases (FMD, bTB, ....) emerge.
  - Vigilance and monitoring activities
  - In the future: assignment of a “Biosecurity category” ?

## Specific approach: what can Animal IRT systems do for AH?

### 4. Disease testing, vaccination and other veterinary activities: plans and programs definition

- Disease tests and their results can be registered for an individual animal (alive or dead/slaughtered) or a herd (samples e.g. bulk milk)
  - A blood sample is drawn from a particular animal/test made
  - The date of sampling and sample ID is saved for the particular Animal ID (individual)
  - The sample is sent to the laboratory and analysed
  - The result of the test is entered into the AIT database for the particular Animal ID and can be accessed at any time and used for disease control and marketing purposes
- Interpretation of test results for the animal/for the group/for the farm.
  - Vaccination status is important when interpreting results.
- Establish restricted areas, protection zones and surveillance zones



## Specific approach: what can Animal IRT systems do for AH?

- 5. Reporting** information about disease distribution within the country, the success of vaccination campaigns and other disease control campaigns.
- Compiling data, produce and analysing results and retrieving information to answer specific questions and respond specific needs
- Animal movement into and out of the herd
  - Proof of “Freedom of Disease”, health status
  - General or targeted surveillance for a particular disease
  - Past (indicators), present (risk factors), forecast the future (modelling) ...

## Specific approach: what can Animal IRT systems do for AH?

### 6. Effective and fast reaction to outbreaks of disease

- Epidemiological enquiry
- Source (farm) of the outbreak established; → through animal identification and movement reporting it is possible to quickly trace back the movements of animals showing the signs of a contagious or infectious disease and establish contact points with other animals: trace forward.
- Premises of origin and contact points (forward and backward) are placed under quarantine (no movements on- or off the farm will be permitted)
- Tracing of possibly infected material (milk, meat, semen etc.)
- If contingency plans foresee a restricted area and protection zone around the infected farm (the zone can be drawn around the infected farm using the GIS system and all farms located within this zone will be listed).

# Specific approach: what can Animal IRT systems do for AH?

## 7. **Compensation** of farmers on affected holdings and **cost calculation**

- If animals must be culled following the outbreak of a contagious or infectious disease, the culling will be registered in the database. For every culled animal a compensation could be paid
- The exact number of culled animals is known.
- Previous productions, if registered can be assessed for compensation.
- Vaccinations ....

## Specific approach: what can Animal IRT systems do for AH?

8. All the information previously mentioned recorded at the animal and herd levels is the basis for health **certification** which is the key issue in the intra-community and third countries **trade** of animal and animal products:
  - The levels of certification are the region, the country, country areas or compartments, the herd and the animals and animal products
9. **Animal movements** and animal traceability require certification or an equivalent procedure

# Specific approach: what can Animal IRT systems do for AH?

## 10. Data analysis

- Data about disease occurrence and distribution within the country is contained in the database
- Identification of natural barriers preventing the spread of diseases
- Identification of infected areas
- Changes in disease patterns (temporal and spatial)
- Identification of subpopulations, species, production systems at higher risk
- Basis for future disease control plans and measures



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**Thank you  
for your attention!**

**BTS**





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