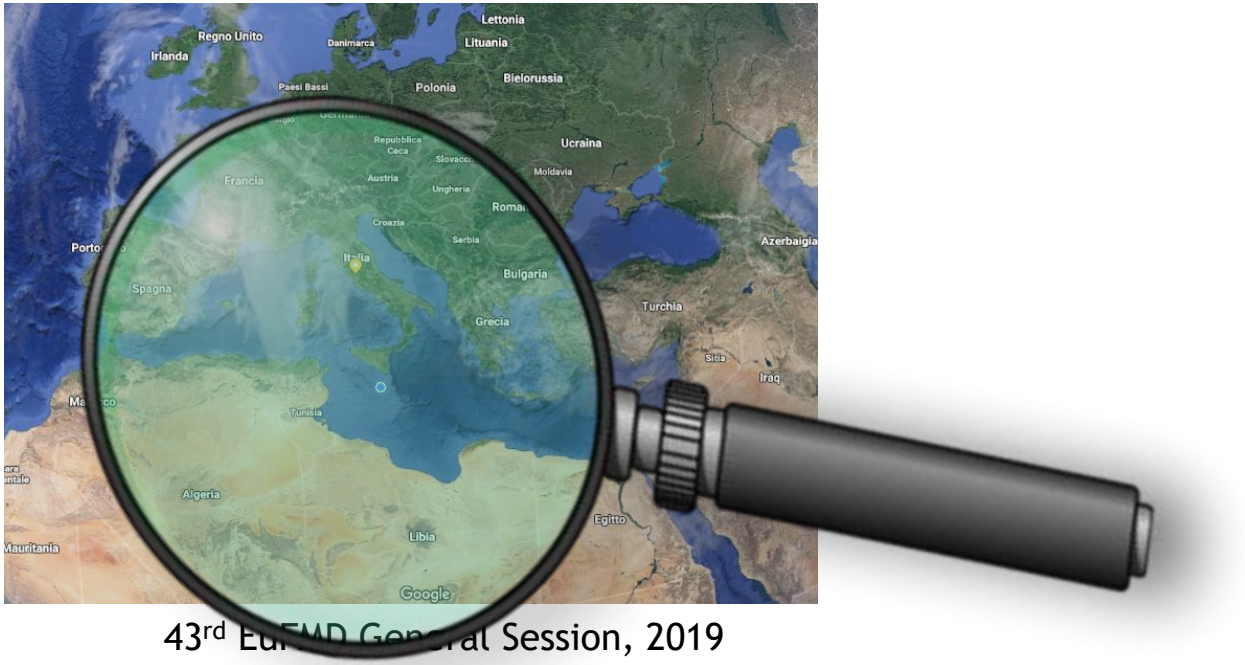
Early warning and better preparedness for FAST diseases in the European neighbourhood

The case for an integrated approach

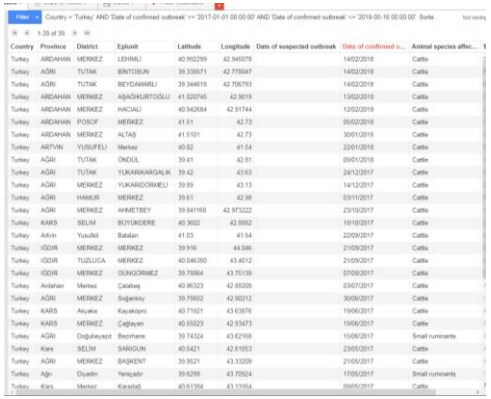


Early warning can be defined as a **system** of data collection and analysis to **monitor** the occurrence of a specific event in order to provide **timely notice** when an emergency threatens and trigger early and appropriate response

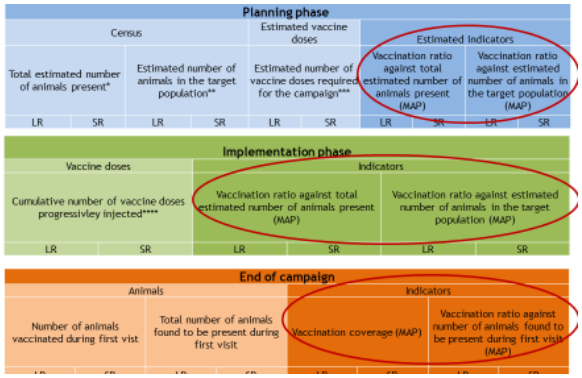
- Systematic collection and analysis of information
- Regular monitoring
- Timely information sharing

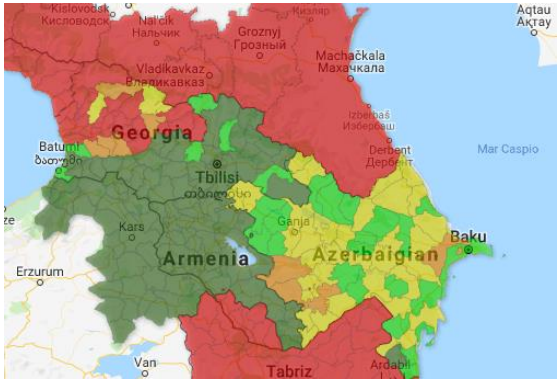
Regional cooperation between Transcaucasia and neighbouring countries (statement of intention)

Improved system for **immediate and monthly reporting** of the FMD **outbreaks**



Monthly reporting of **level of implementation of the vaccination programmes**





Country	Vaccination Program	Vaccine Schedule	Vaccine Manufacturer	Vaccine Strains for Cattle	Vaccine Strains for SR
ARMENIA	• Cattle are vaccinated twice a year (in spring and autumn) • Calves are vaccinated 3 times every 3 months up to 18 months of age • SR are planned to vaccinate once in the risks zones	• March-July (Start of the campaign depends on the tender procedure, the weather of the year and the regional location. In some regions animal movements starts early, vaccination starts I February) • Early Autumn or August-at the end of year	FGBI "ARRIAH", Vladimir, RF	• A-Iran05 • A-G VII • O-Panasia II • Asia-1-Sindh08	• A-Iran05 • A-G VII • O-Panasia II • Asia-1-Sindh08
AZERBAIJAN	• Cattle are vaccinated twice a year • Calves are vaccinated 3 times every 3 months up to 18 months of age	• March-May • At the end of September-November • Revaccination of calves	Shchelkovo Biokombinat, Russia	• A (GVIII/SAU2015, Turkey 2014) • O (Panasia II) • Asia-1 (Turkey 2015)	• A/Turkey/2015 • O Panasia II
GEORGIA	• Cattle are vaccinated twice a year • Calves are vaccinated 3 times every 3 months up to 18 months of age	• February-end of June • July-November • Revaccination of calves • Break between the campaigns is from December to February	Shchelkovo Biocombinat, Russia	• A-Iran05 • A-G VII • O-Panasiall • Asia-1-Shamir	• A-Iran05 • A-G VII • O-Panasia II • Asia-1-Shamir
IRAN	• Every 4 months	• Cattle vaccination started in April which is lasted one month • Booster vaccination performed in Industrial dairy farms			
TURKEY	• Cattle are vaccinated twice a year (in spring and autumn) • SR are vaccinated once in Thrace region	• 15th of February-30th of April • 3th of September-31th of October	SAP inst	• O Tur07(panasia II) • A TUR 15/GVII • A SAM16 • Asia1TUR14-SINDH08	• O Tur07(panasia I) • A TUR 15/GVII • A SAM16 • Asia1TUR14-SINDH08

Partnerships for integrated approach

Improving country capacity to **design and implement** Risk Based Strategic Plan for FMD control and **monitor and evaluate** the implementation of control activities under stages 2 and 3 of the Progressive Control Pathway (PCP);

cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

Improving the capacity of veterinary services of Algeria, Chad, Mauritania, Morocco, Senegal, and Tunisia (+ Libya, Egypt, Sudan) on **development of risk information and mapping tools** and **update surveillance protocols**

cirad

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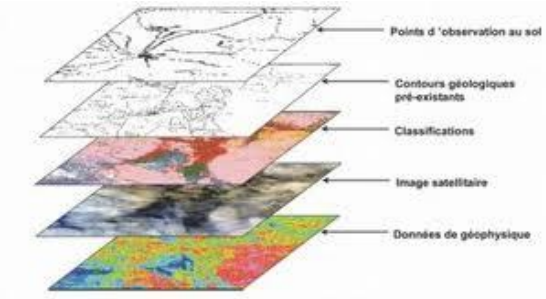
ASTRE

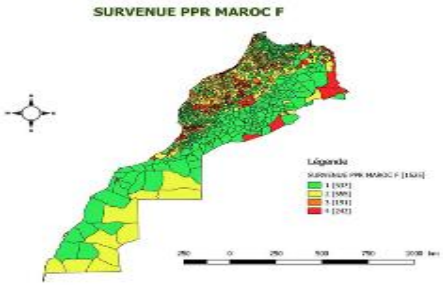
An integrated method : from field data to risk based surveillance

Animal mobility

Network analysis



Spatial analysis based on multiple data sources & risk factor weighting



Risk mapping, risk based surveillance optimization

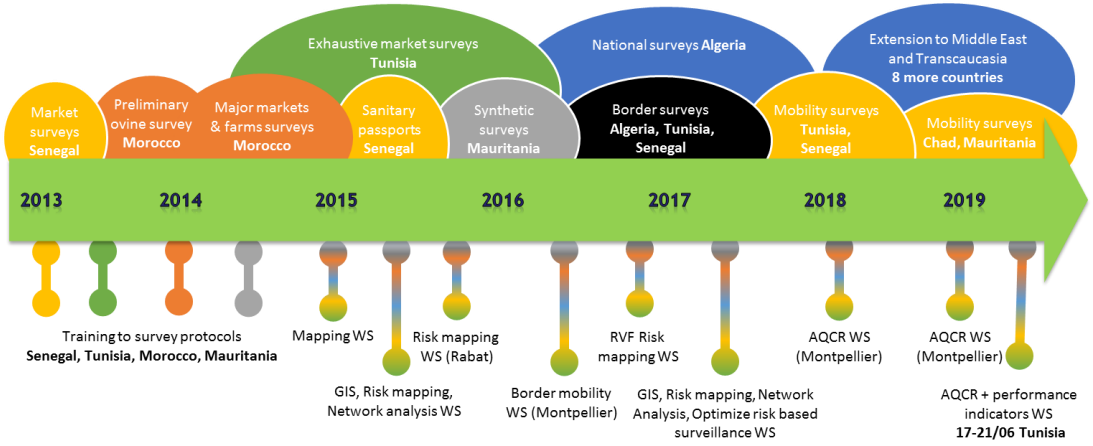
Qualitative risk analysis team team.aqcr@cirad.fr ASTRE Research unit

Integrated iterative framework

1. **Identify risk factors**
   - Introduction assessment
   - Spread assessment
2. **Qualify their importance**
   - *Prob. (Introduction)*
   - *Prob. (Spread)*
3. **Combine probabilities and animal health related activities**
   .... to produce risk map
4. **Optimize surveillance and control system**
   based on risk map

UPGRADING : NEW DATA AND NEW REGIONAL TRAINING

FIELD WORK



REGIONAL TRAINING WORKSHOPS

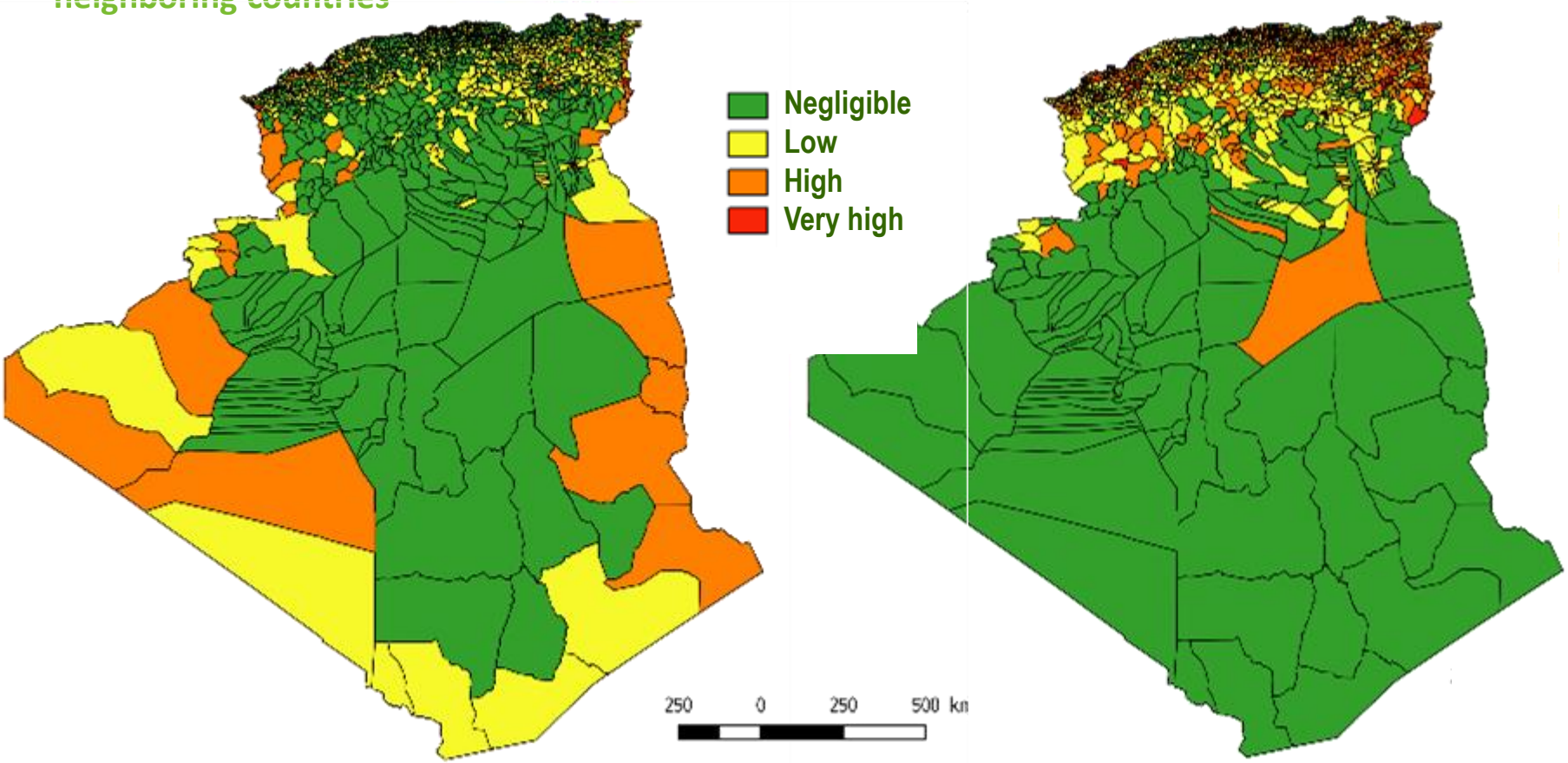
FMD risk mapping in Algeria

Risk of **introduction** (2018)

- Crossborder mobility, border accessibilty
- Surveillance & epidemiologic status in neighboring countries

Risk of **spread and endemicity** (2018)

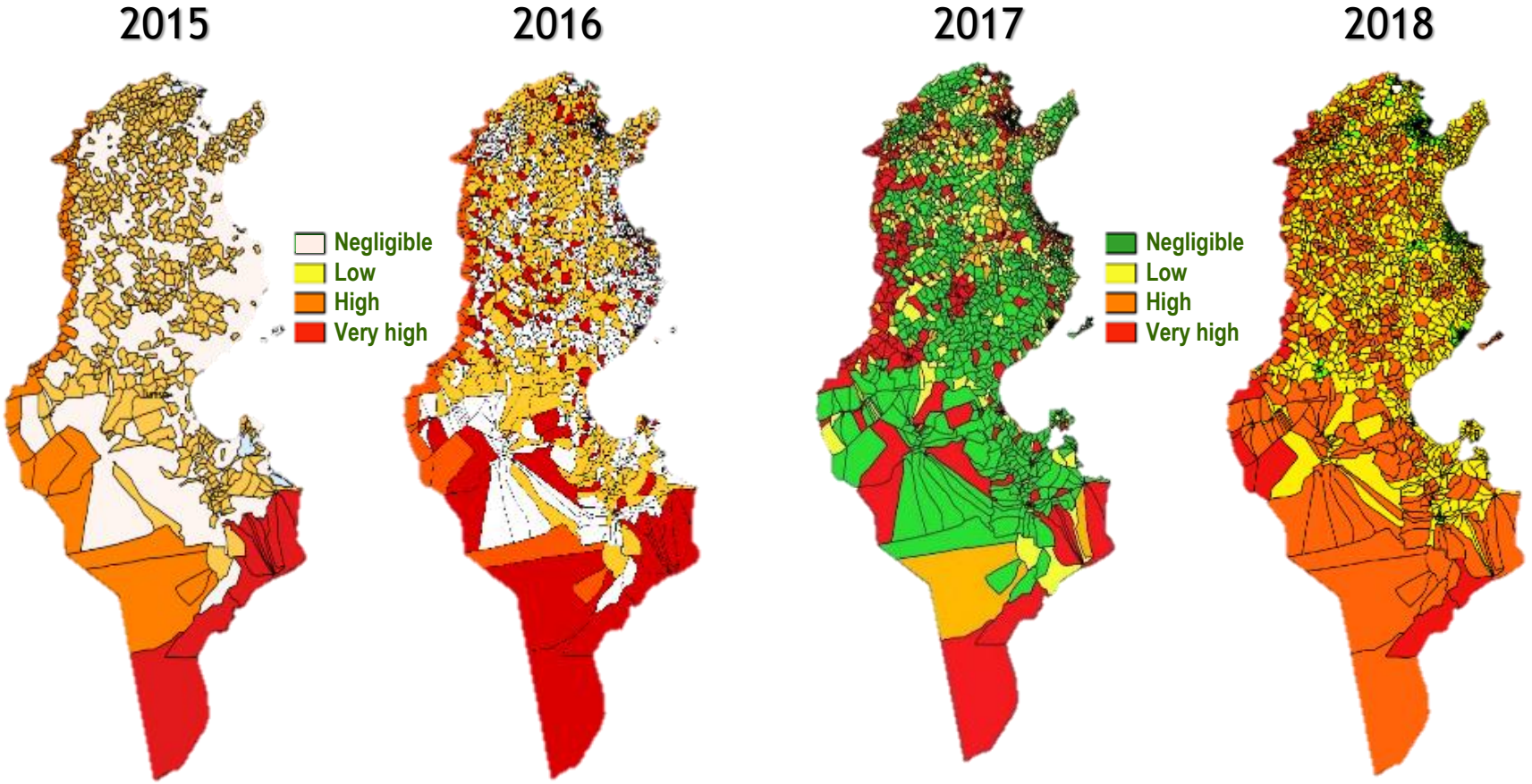
- Animal movements, accessibility
- Animal density, animal markets



FMD risk mapping in Tunisia

First mapping in 2015 with 20 % of mobility surveyed → 100 % in 2016

2017 → consolidated market data
2018 → consolidated animal densities



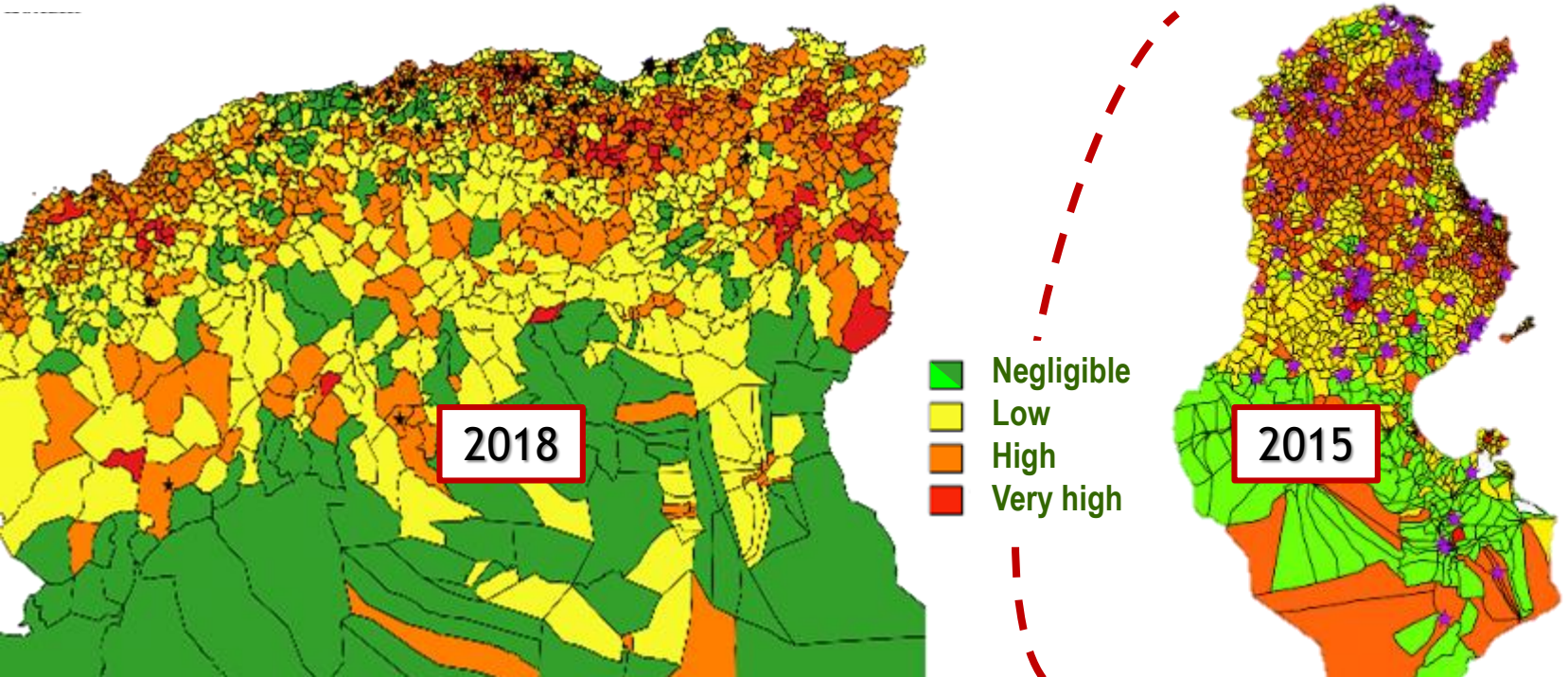
Validation of the results

Algeria : 2018 epizootic

★ **2018 FMD outbreaks**
- Units at different level of risk
- 70% outbreaks at H and VH risk areas

Tunisia : Serologic survey 2015

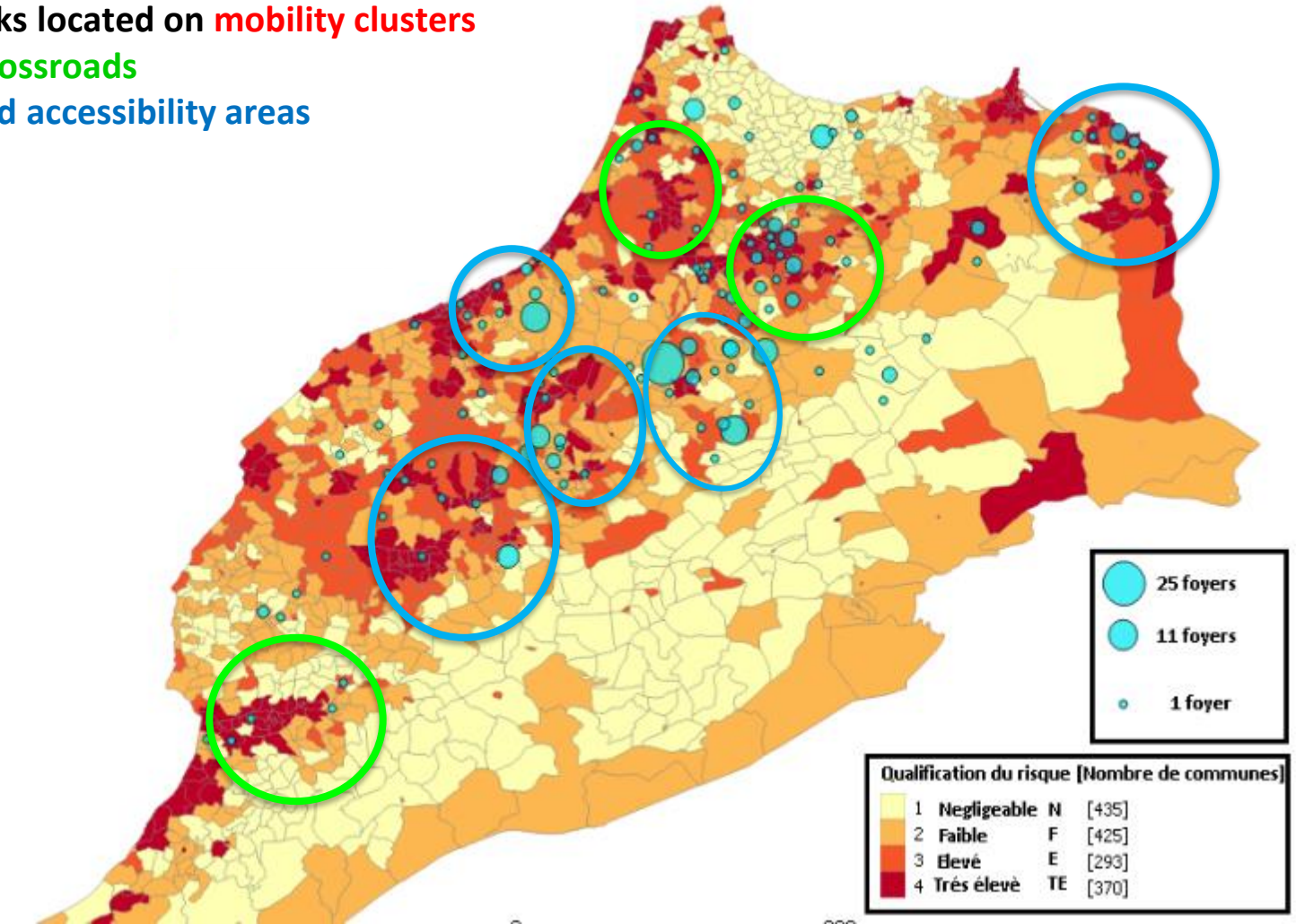
★ **2015 FMD seropositiveness**
- 75% in areas at high / very high risk
- Positive correlation r = 0,87 (p=0)



Validation and role of animal mobility

Morocco – **2008 PPR outbreaks**

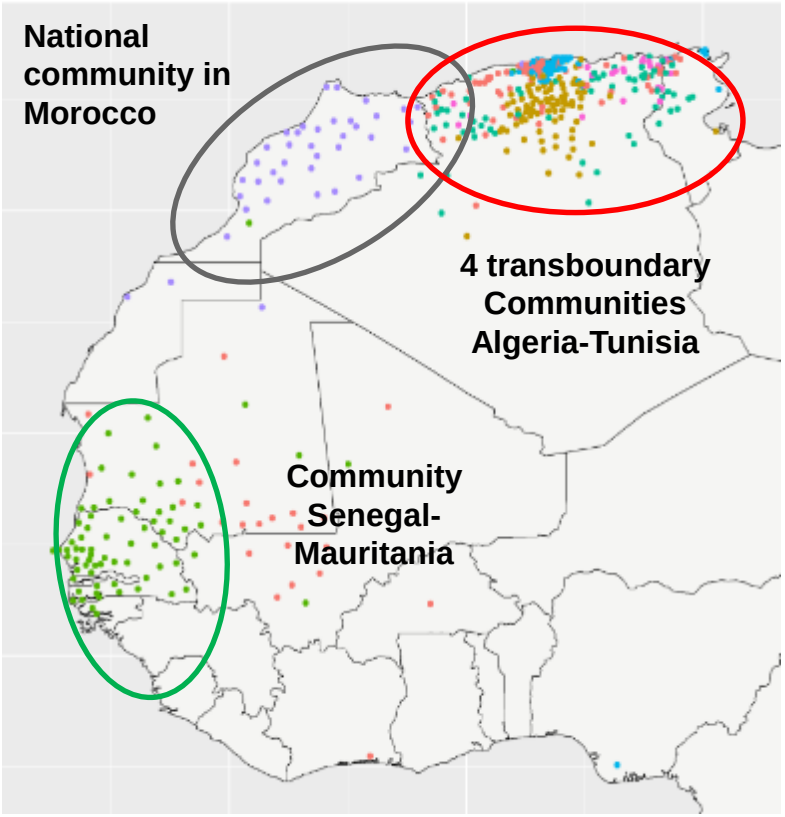
- **Outbreaks located on mobility clusters**
- **Major crossroads**
- **High road accessibility areas**



Mobility is more than movements : communities and networks

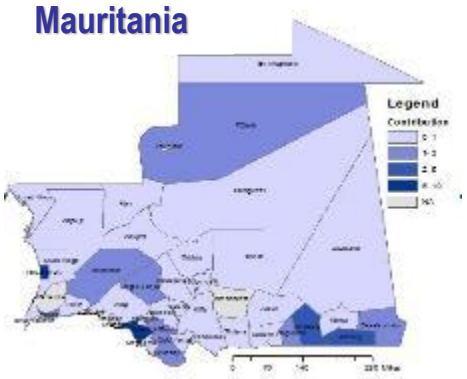
Community structure (West Africa)

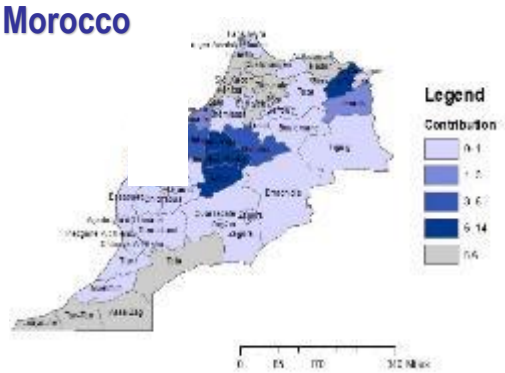
- Links in networks reveals 6 densely knitted regional communities

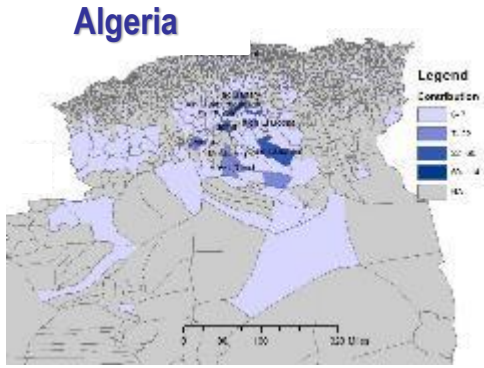


Network contribution (West Africa)

- Connection gives a role in TADs transmission
- Network analysis







Considerations

Collegial (net)work within a panel of experts (national, regional, international)

Capacity building (toolkits) and national expertise consolidated

Multiple operational applications

Unpublished data on animal mobility and diseases

Optimization of targeted and cost-benefit surveillance and control protocols

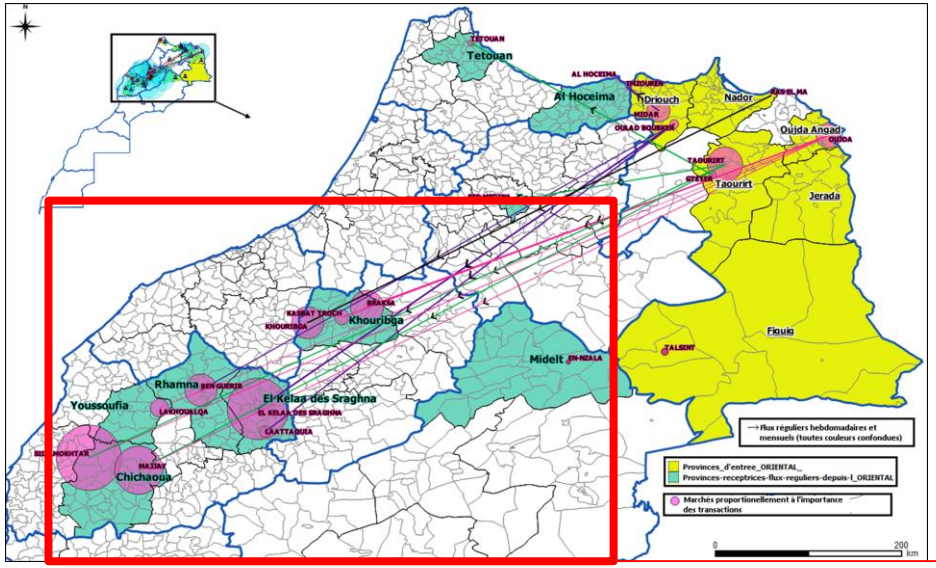
Essential regional approach and regional risk assessment

Geographic enlargement from 3 countries in 2013 to 14 in 2019

One health, general approach (methods & tools)

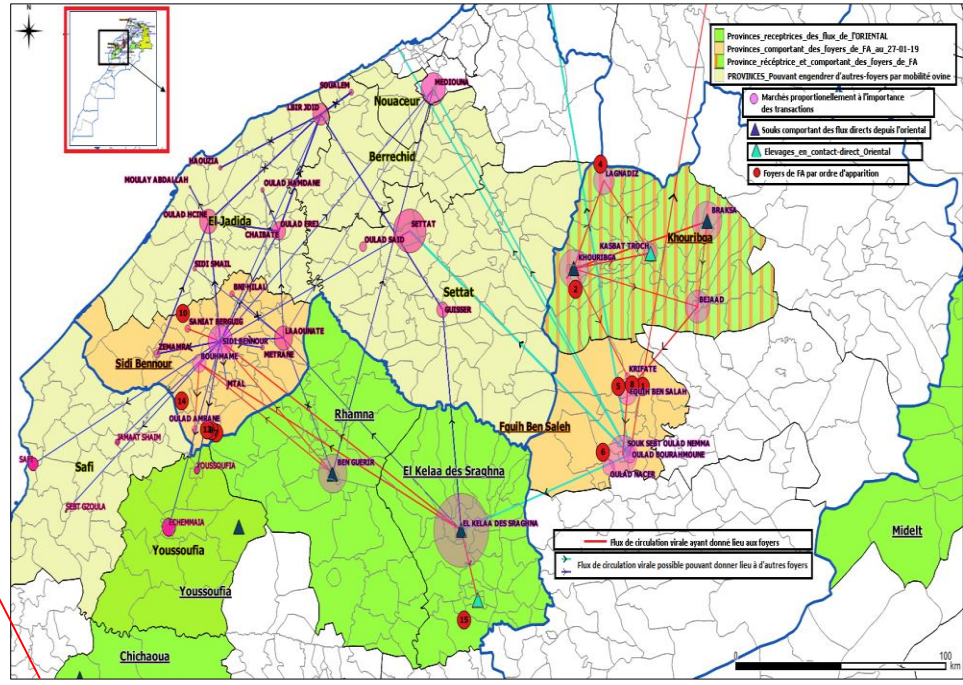
Perspectives

- **Regional participatory sessions to extend to new countries**
- **New tools are developed (toolkit, portal, logbook, …)**
- **Transposable methodology (other diseases and territories)**



Evidence of risk areas

Capacity to adapt surveillance and control



Regular monitoring

Active surveillance

Advantages :	Disadvantages:
Targeted to sample of population *Higher sensitivity (especially in vaccinated population)*	*More difficult and expensive* *Need to optimize resources (priority areas)* *Need use reliable tests (high Se and Sp)*

Primary surveillance (farmer reporting)

Advantages:	Disadvantages:
Complete coverage of population *Continuous*	*Difficult to make farmers report diseases*

Requirements for early detection and case finding

Surveillance in European neighbourhood North Africa

Assess circulation

Determine if the virus is actively circulating

In case of circulation

In case of non circulation

Surveillance for case finding

Monitor virus circulation
(assess effectiveness of control)

Collection of isolates

Maintain zero circulation

Early detection of new incursions

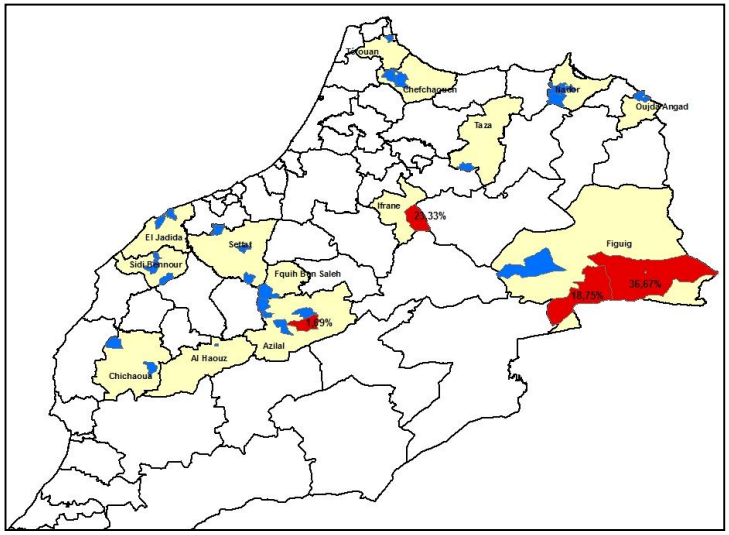
Post –vaccination
(coverage and immunity level)

Confidence of freedom from FMD overtime

RISK BASED SURVEILLANCE in HOT SPOT LOCATION to optimize resources deployed in the field

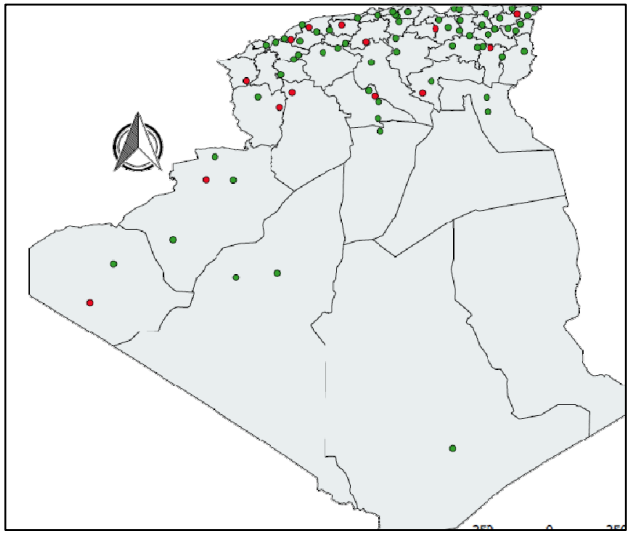
Risk based surveillance to evaluate presence of FMDV circulation in North Africa

Target: small ruminants (6-12 months)
Risk factors considered:
- areas with previous outbreaks
- animal density
- animal movement
- markets



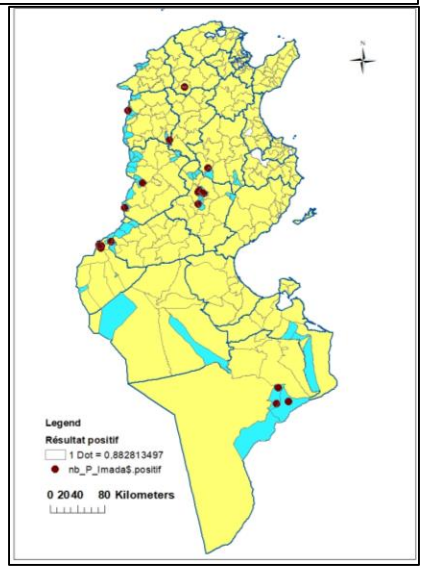
(April-May 2017)

Sample n.739 SR from 78 herds
prevalence 4,47% (0 - 23.33%)
In some cases intra-herd positivity of 80%



(October 2017)

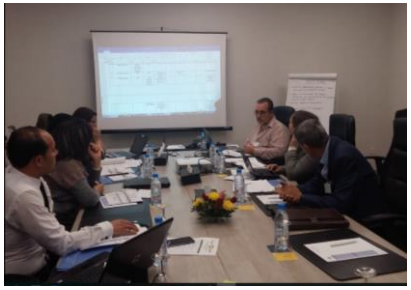
1537 SR tested in 111 herds and 43 wilayas:
n.15 herds pos in 14 wilayas (13%)



(January 2018)

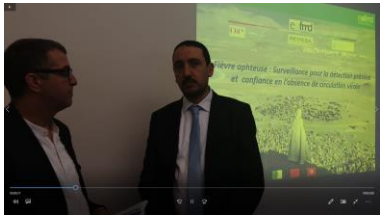
Samples 1061
Prevalence 1.66% (in some district 3.33%and 12%)

Participation of stakeholders in the assessment of primary surveillance



1. An infected animal shows clinical signs of disease
2. The farmer (keeper/herder) notices the signs as abnormal
3. The farmer (keeper/herder) contacts the veterinary services (public or private)
4. The veterinarian visits to examine the animal
5. The attending veterinarian suspects FAST
6. The attending veterinarian sends samples to the laboratory analysis
7. The samples are tested for FAST
8. The laboratory test correctly provides a positive result

		Min	Most likely	Max
Animals shows clear signs of disease				
Cattle		**0.8**	**0.85**	**0.9**
Small ruminants		**0.02**	**0.05**	**0.1**
Farmer notices disease		**0.4**	**0.5**	**0.7**
Farmer calls veterinarian	High aware	**0.6**	**0.8**	**0.9**
High awareness (high risk zone)	Low aware	**0.2**	**0.4**	**0.8**
Vet visits to examine animals		**0.9**	**0.95**	**0.99**
Vet suspects FMD	Cattle	**0.5**	**0.7**	**0.95**
	Small ruminants	**0.3**	**0.5**	**0.8**
Samples taken for lab and tested for FMD		**0.8**	**0.9**	**0.999**
Test Sensitivity		**0.97**	**0.98**	**0.99**



Understanding of the social and cultural contexts that affect the distribution and dynamics of diseases

Integrated approach allows for more synergies through connecting and integrating different aspects and activities to be the most effective.

Primary surveillance for FAST ⟹ Similar signs and symptoms

Same actors/stakeholders






FMD	RVF	BEF	LSD	SGP	PPR
Fever	Fever	Fever	Fever	Fever	Fever
Depression	Depression	Depression	Depression	Depression	Depression
Vescicles			Vescicles/ulcers		Erosive lesions
Drooling	Drooling	Drooling	Drooling		Drooling
	Nasal discharge	Nasal discharge		Nasal discharge	Nasal discharge
Lameness		Lameness			
Death young	Death young			Death (possible)	Death
Abortion	Abortion	Abortion	Abortion		Abortion
Milk drop	Milk drop	Milk drop			
	Bloody diarrhea		Cutaneous nodules	Papules	Diarrhea

Integrated approach

Active surveillance for FAST

- Serological and clinical - continuous
- Risk based (for same risk factors)
- *Negative reporting (possible)*
- *Sentinel herds (possible)*

Laboratory capacity

- Confirmation of suspicions
- Submission samples
- Laboratory networks

Timely information sharing

Different providers (national and international)

Different users with different interests and different risks

The goal is: to provide risk information in **time**, to **different providers** and to **interested users**

Priorities for EWS in European neighbourhood

- ✓ Facilitating the collection of risk information
- ✓ Identification of risk hot spot location
- ✓ Designing continuous surveillance in risk areas
- ✓ Enhance investigation and collection of good samples
- ✓ Supporting laboratory networking and training
- ✓ Facilitation cooperation (lab-epi) between countries
- ✓ Providing regular risk information to risk managers

Key messages

Collection of risk information

Identification of risk hot spot locations

Surveillance in risk areas

Regular training

Timely info on risk change

Early warning