Direct and indirect economic effects of Foot and Mouth Disease and the economics of controlling diseases

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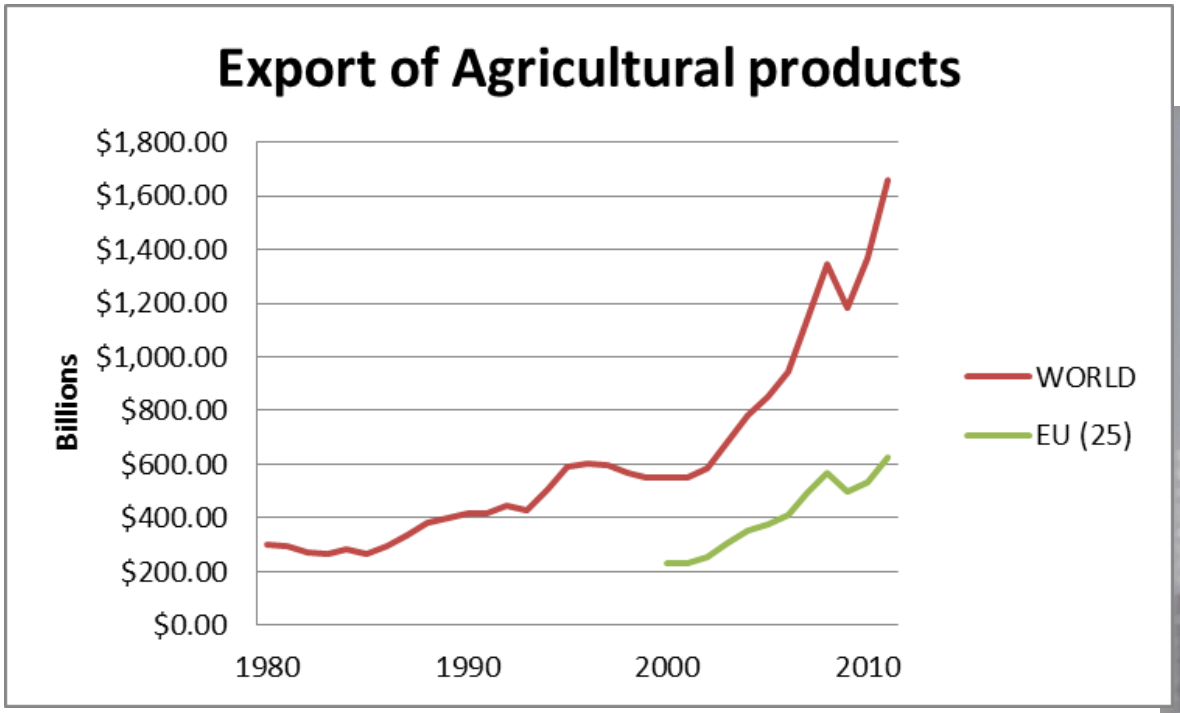
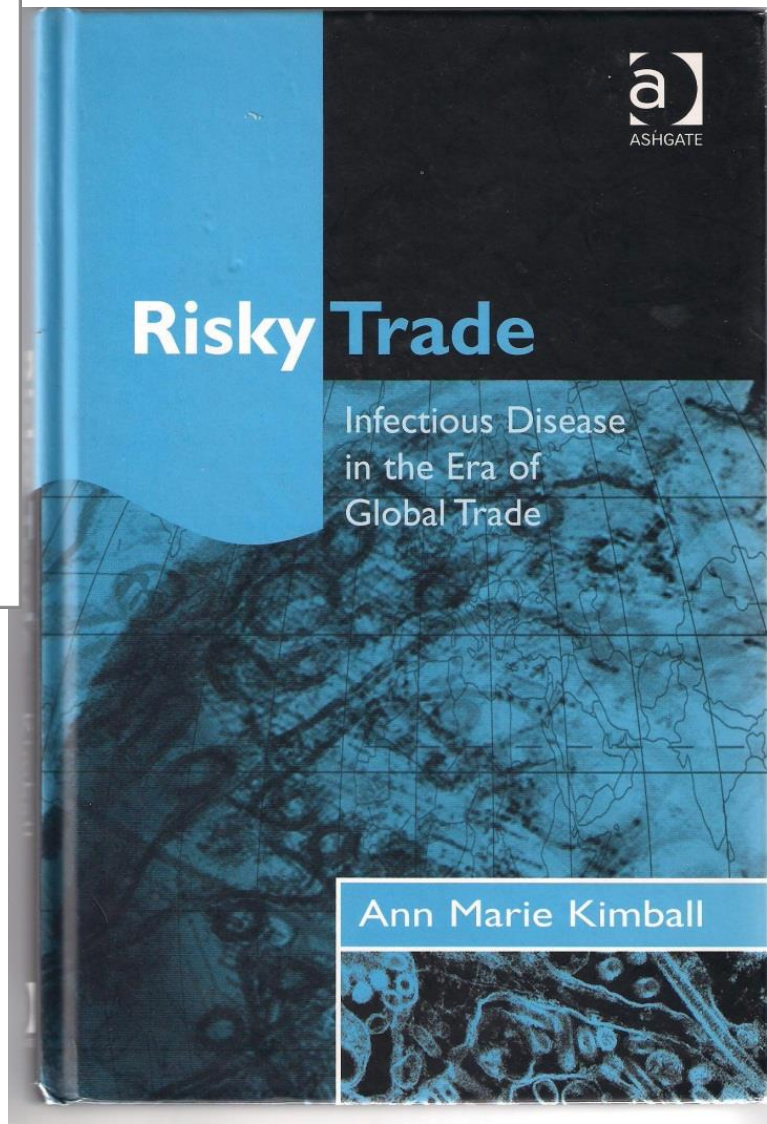
“the World has become a global market place”



Source: WTO, international trade statistics (2012)
Current prices



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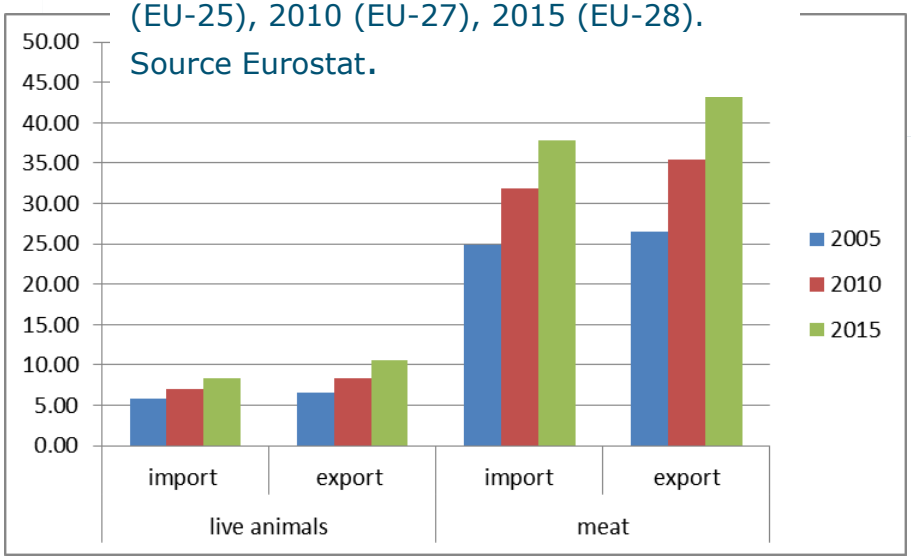
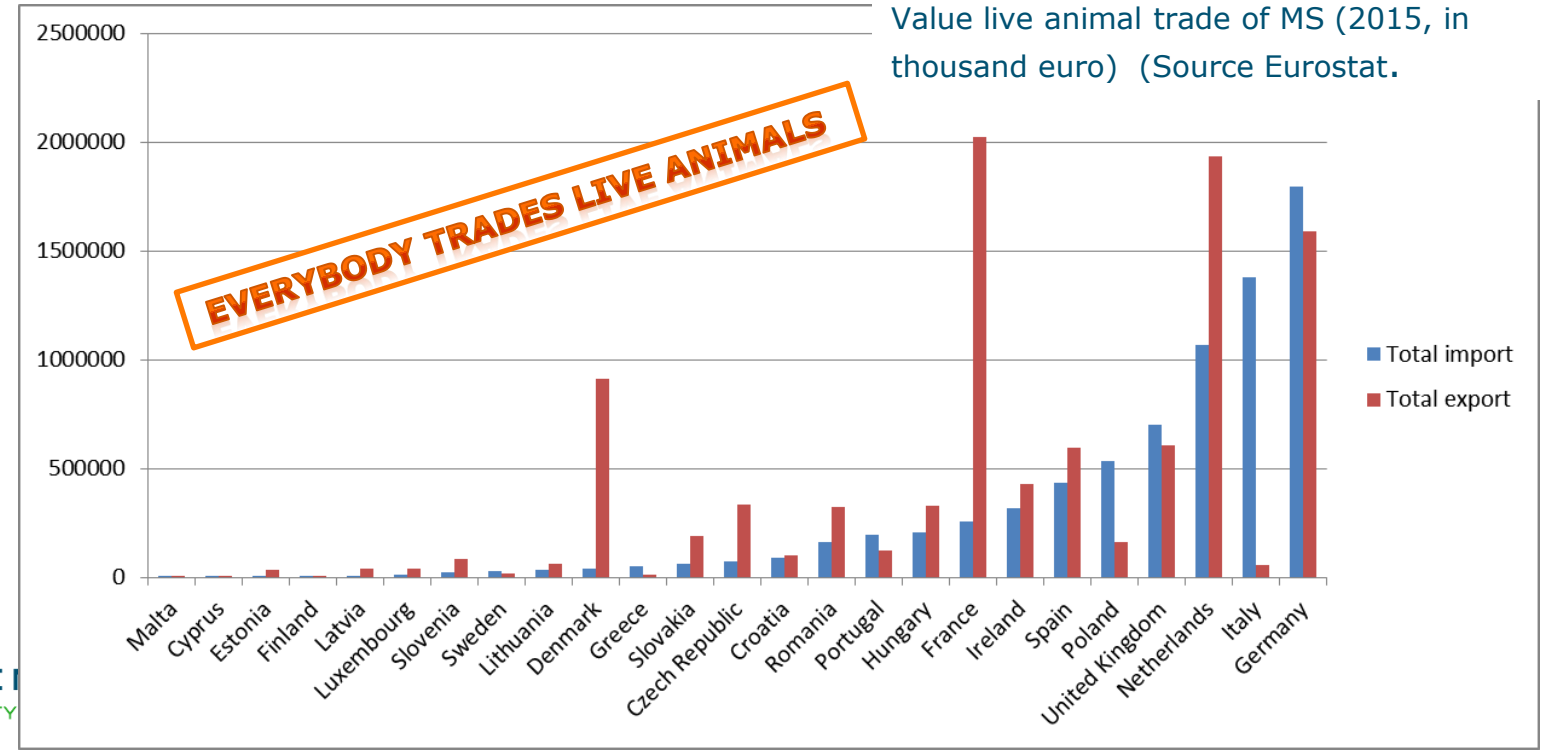
Value of trade (in billion euros), in 2005 (EU-25), 2010 (EU-27), 2015 (EU-28). Source Eurostat.



Value live animal trade of MS (2015, in thousand euro) (Source Eurostat.



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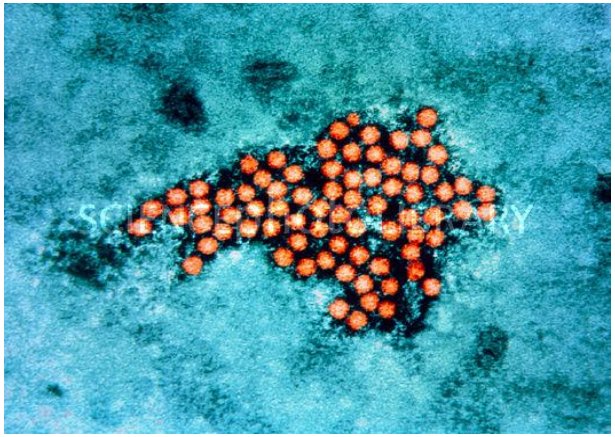
History of recent outbreaks in the Netherlands in the period 1996-2014

Disease	# Infected Farms	# Culled	Losses[1]	
CSF (1997-1998)	**492**	Animals: 1.8 million (of which 1.1 million pre-emptively)	**€1,269 million**	(Elbers et al., 1999)
FMD (2001)	**26**	Animals: 270,000 (of which 200,000 after vaccination)	**€900 million**	(Huirne et al., 2002)
AI (2003)	**255**	Farms: 1,349 commercial and 16,490 hobby farms	**€270 million**	(Backer et al., 2011)
Bluetongue (2006-2007)	**470 (2006) 11017 (2007)**	No animals were compulsorily culled	**€200 million; the cattle sector suffered 86% of these losses**	(Velthuis et al., 2010)
Q fever (2008-2010)	**98**	Animals: 58,150	**€307 million**	(van Asseldonk et al., 2013a)

Socio-economic effects of trans-boundary animal diseases and its control

- are determined by:
  1. the probability of occurrence of an outbreak in one or more MS's,
  2. the economic effects of the outbreak and the control measures and the reaction of stakeholders/public and trade partners.

The probability of occurrence of an outbreak in one or more MS's



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Probability of occurrence of an outbreak

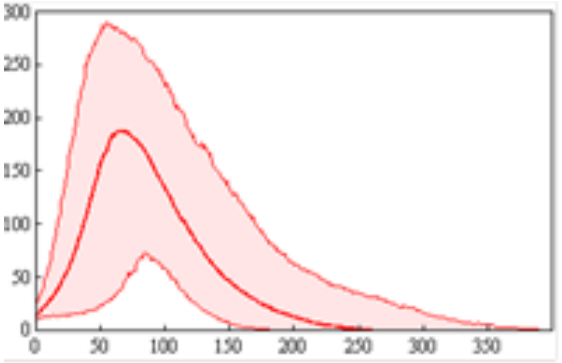
Table. Number of reported outbreaks of epidemic livestock disease in the EU, 2010-2016

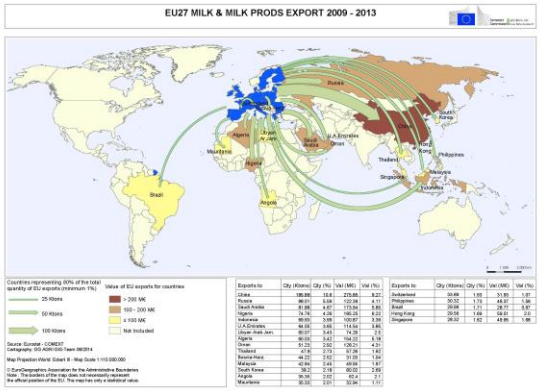
Source: (ADNS)

	2010	2011	2012	2013	2014	2015	2016	2017
Foot-and-mouth disease		12						
Bluetongue	175	39	332	6190	9414	607	134	4474
Classical swine fever		5	3					
Highly pathogenic avian influenza (HPAI) source ADNS)	2			6	10	70	394	820
ASF (source ADNS)				109 (all IT)	74	58	71	142

The economic effects of an outbreak.

- Determined by:
  1. the outbreak (the size and duration of the outbreak)
  2. the control measures taken by Competent Authorities
  3. the reaction of stakeholders/public and trade partners





Economic effects of the outbreak

- Direct costs:
  - *Compensation for depopulated animals*
  - *Depopulation (taxation, culling, transport & destruction, cleansing & disinfection)*
  - *Tracing*
  - *Screening*
  - *Vaccination*
  - *Additional surveillance in movement restriction zone*
- Consequential losses
  - *Business interruption*
  - *Losses related to established movement restriction zones*
  - *Repopulation of the farm*.
  - *Losses from emergency vaccination*

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Costs born by government (or PPP) & by EU

Costs born by directly affected farmers

Consequential losses

- Export market losses
- Ripple effects.
  - upstream and downstream along the livestock value chain
- Spill-over effects.
  - During outbreaks e.g. tourism and other services

Arrangements to cover direct losses

- Member State
  - Public finance from the national budget (most MS's)
  - Public private partnerships: DE, NL, BE (farmers collectively participate in contributing to direct losses)

- EU contribution (max 50 % co-financing of the eligible costs) (Regulation (EU) 652/2014 art. 8)

Arrangements to cover consequential losses

- Affected stakeholders have to take the losses themselves
- Except:
  - Insurance and Mutual
    - Private (e.g. DE animal disease insurance)
    - With and without MS and or EU support (e.g. FR FMSE)
  - In case of large crisis:
    - National crisis management systems of MS together; and
    - EU: animal diseases and loss of consumer confidence due to public, animal or plant health risks (Article 220 of CMO Regulation (EU) 1308/2013),

Control of FMD in the EU

- Prophylactic vaccination in EU has been banned in the EU since 1992 (Directive 90/423/EEC)
- EU minimal measures:
    - culling of infected herds,
    - pre-emptive slaughter of contact herds,
    - establishment of control and surveillance zones
- Additional measures:
    - Ring culling and/or
    - Emergency vaccination
        - Delayed culling
        - Vaccination to live

2001 FMD outbreak in NL

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2001 FMD outbreak in NL

- 26 outbreaks were detected.
- All susceptible animals on approximately 1800 farms were vaccinated. All farms subsequently were depopulated.
- In total, approximately 260,000 animals were killed.

(Bouma, et. al.,Prev Vet Med. 2003, 20; 57 (3) :155-66.)

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Costs of the 2001 FMD outbreak in NL

Costs born by government (or PPP) & by EU

- Total for Dutch society: €900 million or 0.3% GNP
  - Direct costs: € 90 million

    e.g. enforcement costs, compensation of culled animals, screening etc.
  - Indirect and export market losses: € 320 million
  - Other parts of the livestock chain: € 215 million
  - Tourism and recreation sector: € 275 million

Source (CPB 2001 cited by Huirne et al., 2002)

Change of policy: possible consequences

The example of the Netherlands with a change to "vaccination to live" in case of an FMD outbreak

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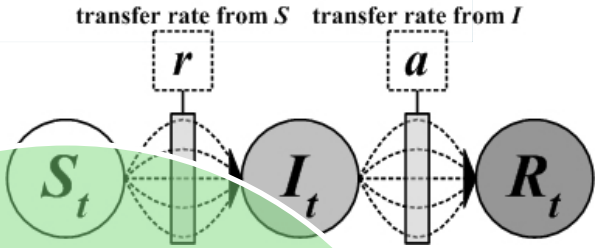
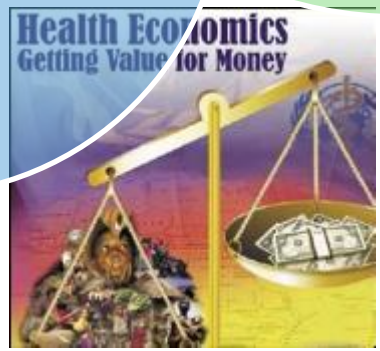
Approach to develop a control strategy



Policy makers

Epidemiological modelling

Economic evaluation



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Policy change from culling toward vaccination to live

- What has changed in the NL?
  - No more images of large scale culling of animals
  - No welfare slaughter with destruction but welfare slaughter with animals and products made available for consumption
  - Vaccination to live strategy

Export market losses

- The costs of animals and products, that because of an outbreak cannot be exported.
  - During the outbreak and after completion of screening until EU lifts export bans
  - After this period, this concerned the third countries market for live animals, meat, meat products, milk and milk products from infected countries/compartments for another 3 months without vaccination and for another 6 months with vaccination-to-live. (OIE terrestrial code article 8.5.8)
  - (Are markets after this period still available as before the outbreak?)
  - Vaccinated animals cannot be moved except to slaughterhouse

Optimal strategy influenced by density of farms

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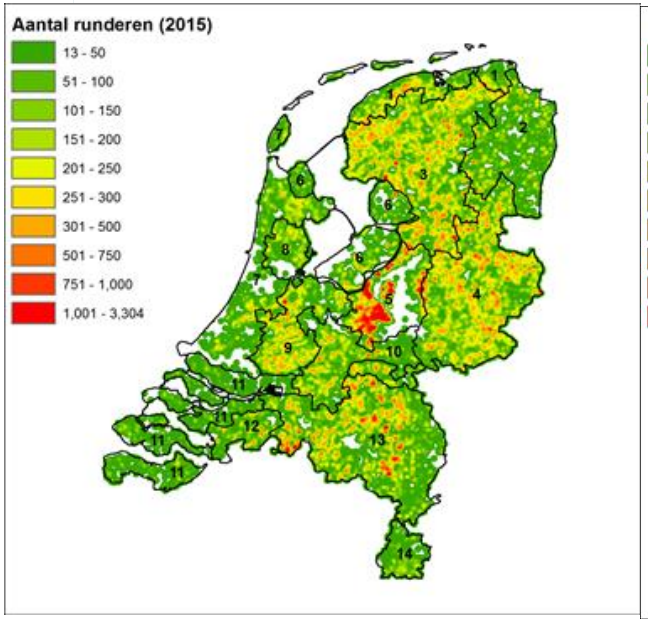

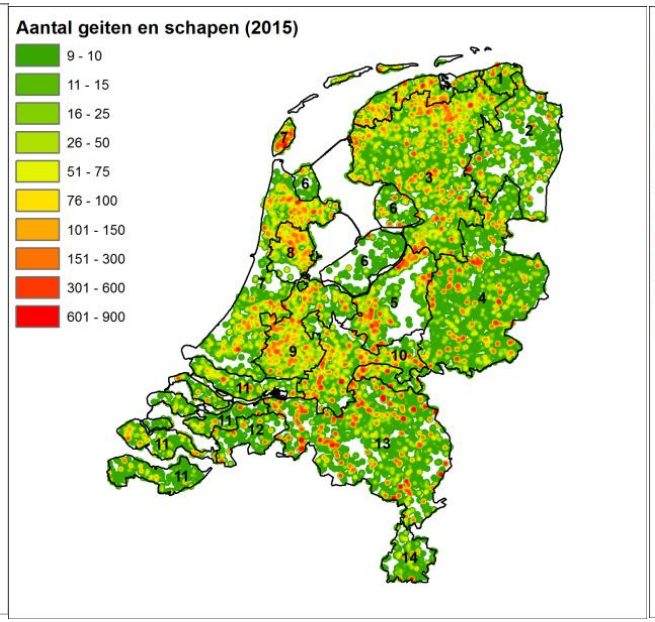

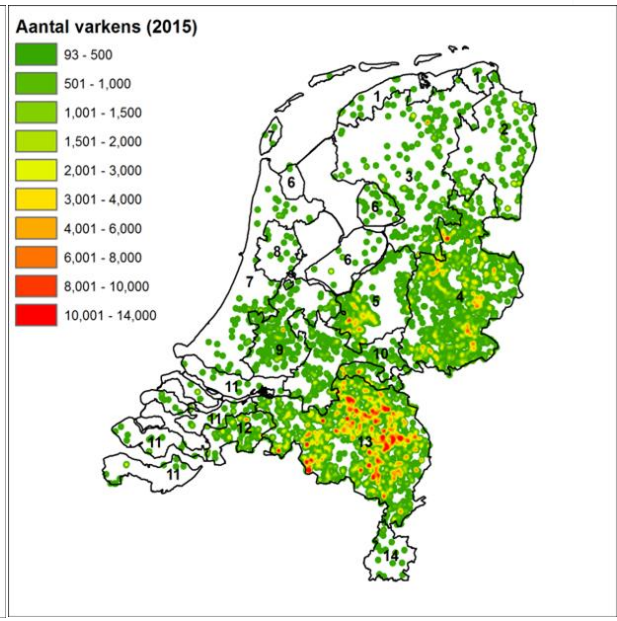

Bovine

Sheep and goats

Pigs

Distribution of animals in NL (#animals/km2)
Source: CBS/Landbouwtelling

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Consequences of the different strategies: FMD PDLA (>4 farms/km^2): Gelderse vallei

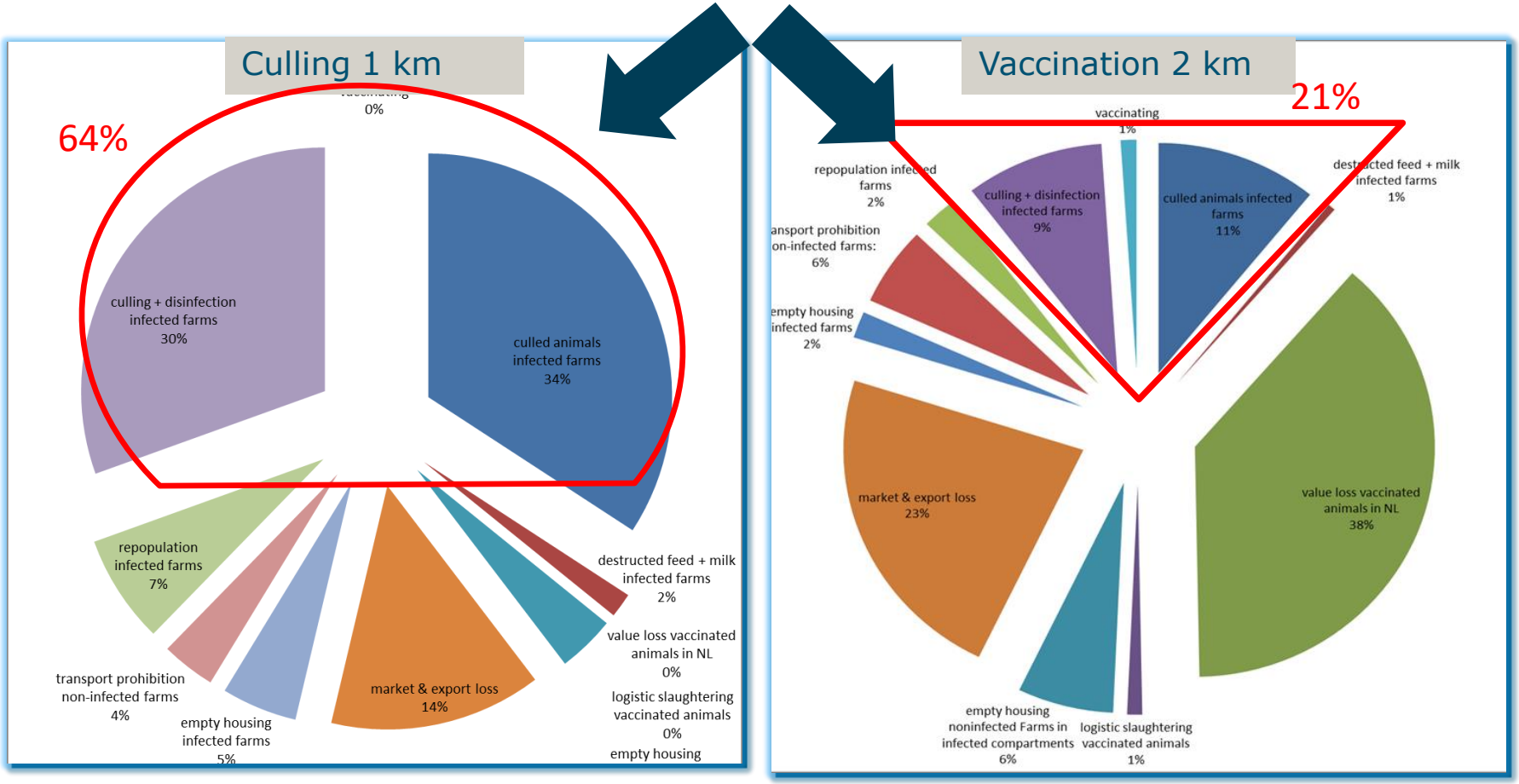
	NUMBER OF CULLED FARMS		LAST WEEK OF DETECTION		TOTAL COSTS INCL COSTS OF OPERATION (in M€)	
	50%	CI(5%-95%)	**50%**	CI(5%-95%)	**50%**	CI(5%-95%)
cul1	**971**	(206-3217)	**9**	(4-15)	**236**	(94-615)
vac2	**260**	(70-707)	**10**	(5-17)	**227**	(99-526)

SPLA area Friesland

	NUMBER OF CULLED FARMS			LAST WEEK OF DETECTION			TOTAL COSTS INCL COSTS OF OPERATION		
	50%	5%	95%	**50%**	5%	95%	**50%**	5%	95%
EU	**7**	2	46	**3**	1	12	**58**	48	102
cul1	**56**	2	295	**3**	1	8	**62**	48	109
vac2	**30**	2	117	**3**	1	8	**61**	48	108

Distribution of losses (DPLA area)

Direct losses



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Conclusions

- Economic effects of trans-boundary animal diseases are determined by frequency of introduction, size of the outbreaks and the control strategy
- Outbreaks of trans-boundary animal diseases and its control have large economic effects in an affected MS
    - Consequential losses are largest part of the effects and may vary with different strategy
- Optimal strategy is determined by "situation on the ground", *e.g*. density of farms in the infected area, and export position of MS.
- Different strategies with the same total costs can have different consequences for different stakeholders

Recommendations

- Support prevention of introduction in MS and early detection
  - Preventive measures at border and on-farm
  - Incentives for early reporting
- Cost and responsibility sharing arrangements and insurance systems need to be further developed
- Preparation and intensive communication between CA and stakeholders in ”peace time”

Thank you for your attention

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