

# Economische aspecten van preventie: De positie van de veehouder in de zoönoseketen

Henk Hogeveen & Bart van den Borne



# Topics in this presentation .....

- **Zoonoses from an economic perspective**
- Incorporating public health in economic analyses
- Zoonoses from a farmers' perspective
- Some examples



# Do it yourself

- Let's start with a small questionnaire .....





**Companionship**



**Sport**



**Status**



**Draft power**



**Eggs**



**Capital**



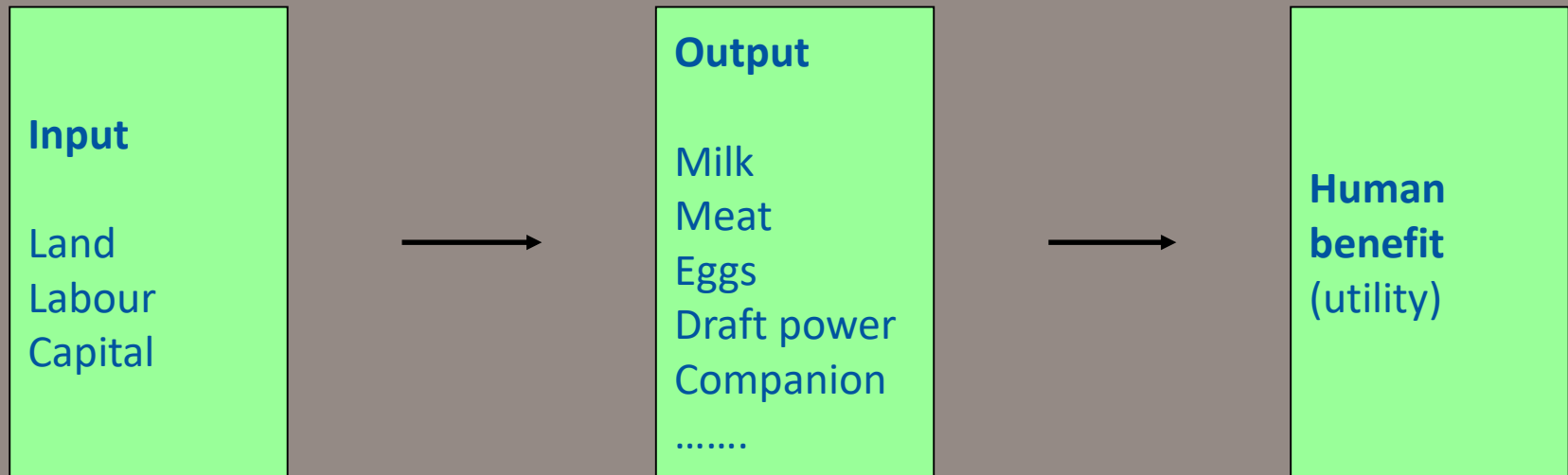
**Meat**

**Milk**

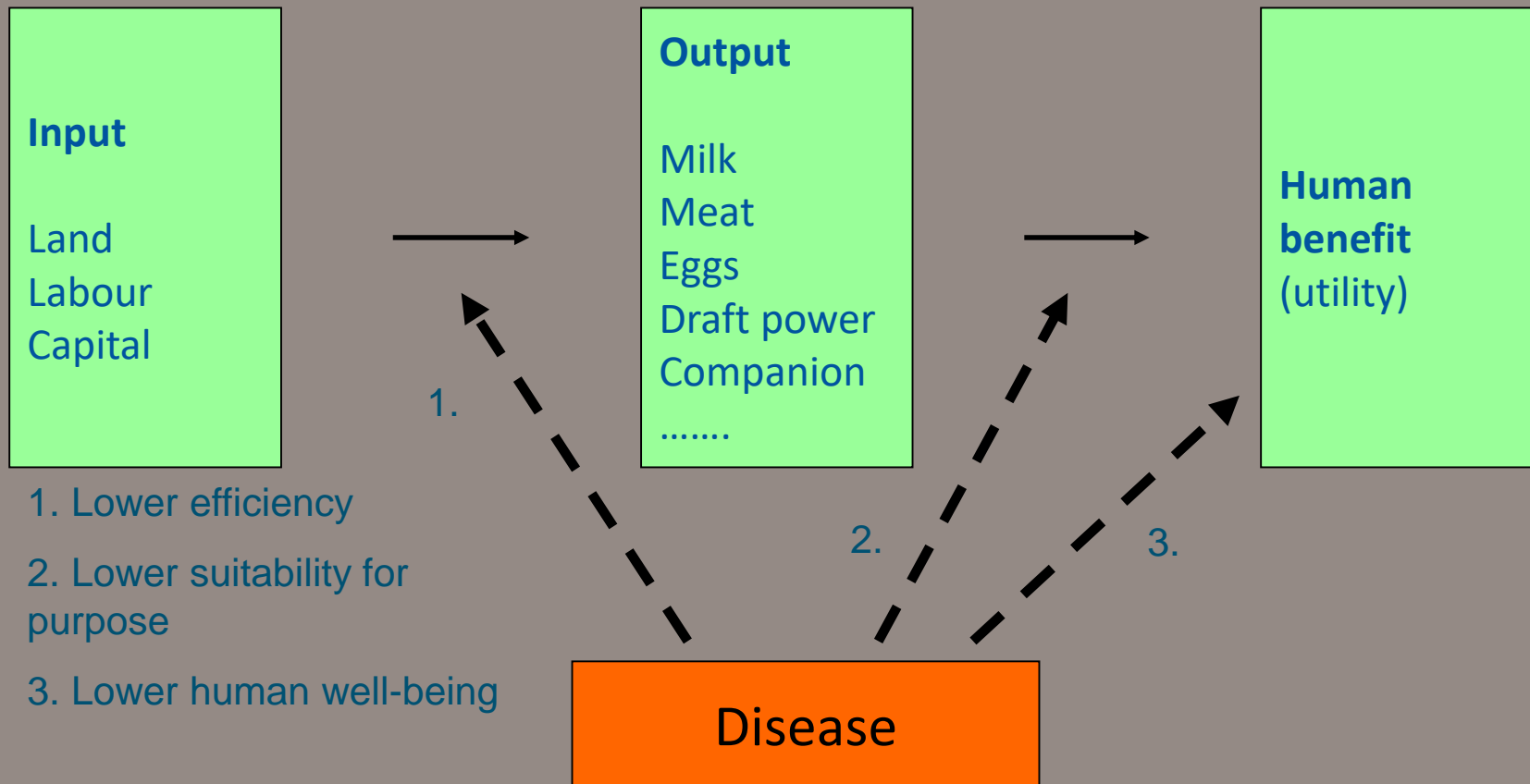




# Economic effects of animal disease



# The field: Economic effects of animal disease



OLD ECONOMICS FOR NEW PROBLEMS –  
LIVESTOCK DISEASE: PRESIDENTIAL ADDRESS

John McInerney\*

J. Agricultural Economics, 1996



# Zoonoses from an economic perspective

- Is it a private good?
  - A product that must be purchased to be consumed; consumption by one individual prevents another individual from consuming it



## Free good

- Good with no opportunity cost, e.g. water



## Private good

- Rivalry, and excludability, e.g. coca-cola



## Public good

- Non-rivalry, non-excludable. e.g. street lights



# Zoonoses from an economic perspective

- Is it a public good?
  - Commodity provided without profit to all members of a society



## Free good

- Good with no opportunity cost, e.g. water



## Private good

- Rivalry, and excludability, e.g. coca-cola



## Public good

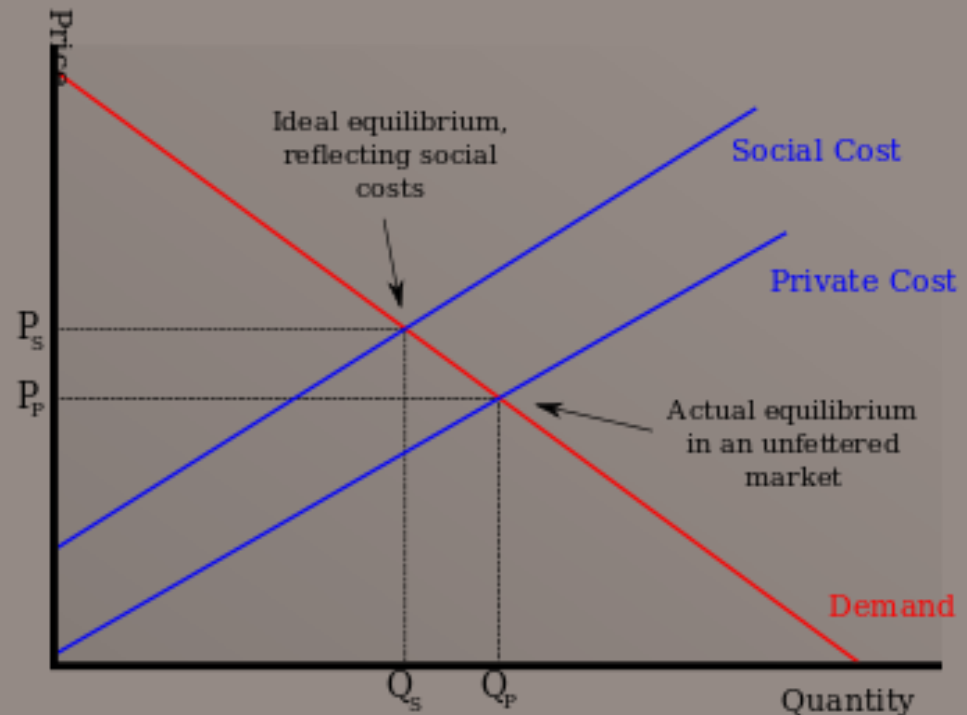
- Non-rivalry, non-excludable. e.g. street lights





# Zoonoses from an economic perspective

- Is it an externality?
  - Consequence of a commercial activity which affects other parties without this being reflected in market prices



3



THREE

# Do it yourself

- Think about a food safety issue and describe the economic aspects for this food safety issue
  - Private good
  - Public good
  - Externality





# As a starting point

- Zoonoses as a private good
- If zoonoses are linked to safety of food, it may have an effect on the demand
  - Effect on prices
- Food companies want to optimize their level of food safety
  - Cost of programme/testing vs
    - Moneterized risk of contamination
    - Expected benefit of high quality image or specific (labelled) food line



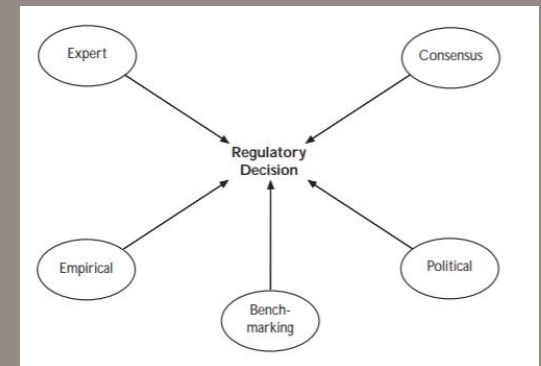
# What about a government?

- Zoonoses as a public good
- Task for public health authorities
- By organizing health care system
  - State health care
  - Insurance systems
- By regulating food safety
  - Minimum standards of safety (MRL)
  - Traceability systems
  - Farm animal regulations
  - Chemical regulations



# How to make decisions as government

- Expert: based on a trusted expert
- Consensus: creating a common position in group of stakeholders
- Political: by representatives of political parties
- Benchmarking: decisions based on outside models, such as international regulation
- Empirical: based on fact-finding and analyses using parameters according to established criteria





# Regulatory impact analysis



OECD Home

About

Countries ▾

Topics ▾

[OECD Home](#) > [Directorate for Public Governance](#) > [Regulatory policy](#) > Regulatory Impact Analysis

> Budgeting and public expenditures

> Anti-corruption and integrity in the public sector

> Public employment and management

> Public procurement

> Digital government

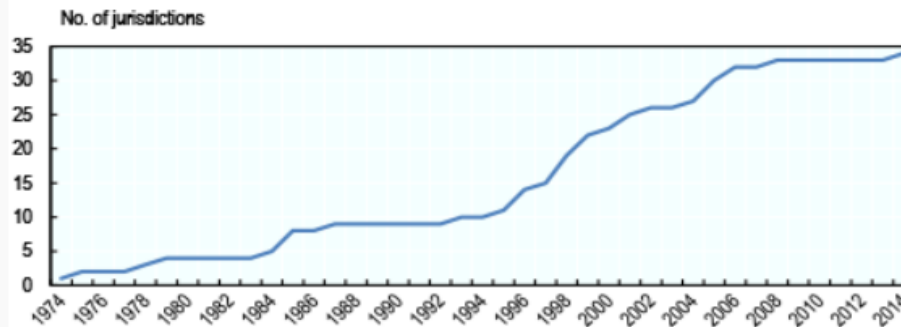
> Innovative government

> **Regulatory policy**

> Risk governance

## Regulatory Impact Analysis

Trend in RIA adoption across OECD jurisdictions



Source: 2014 Regulatory Indicators Survey results, [Measuring Regulatory Performance](#).



WAGENINGEN UNIVERSITY  
WAGENINGEN UR

Source: [www.oecd.org/gov/regulatory-policy/ria.htm](http://www.oecd.org/gov/regulatory-policy/ria.htm)

# Topics in this presentation .....

- Zoonoses from an economic perspective
- **Incorporating public health in economic analyses**
- Zoonoses from a farmers' perspective
- Some examples





# So the benefits of programs are difficult to estimate


- There are several methods that still can be used by companies and governments:
  - Cost-minimization analysis
  - Cost-effectiveness analysis
  - Cost-utility analysis
  - Social cost-benefit analysis





 **Nordic Guidelines for Cost-benefit analysis**




 **HM TREASURY**


**THE GREEN BOOK**  
Appraisal and Evaluation in Central Government


Note explaining changes made to the Green Book in July 2011.  
This is the 2003 edition of the Green Book. However pages 17-18, which deal with the valuation of non-market goods, have been updated alongside the release of a Green Book discussion paper on this subject - *Fujinori and Campbell (2011) Valuation Techniques for Social Cost-Benefit Analysis: Stated Preference Revealed Preference and Subjective VNM-Barg Approaches*.  
The changes first on pages 17-18 has been highlighted in red within this updated document. Because of the changes there is some duplication of paragraph numbers, and there is some change to the sequence of footnotes in this section.

Treasury Guidance  
LONDON: TSO




**GUIDELINES FOR PREPARING ECONOMIC ANALYSES**

 United States Environmental Protection Agency Office of the Administrator

 **Treasury Board of Canada** Secrétariat du Conseil du Trésor du Canada **Interim**


**Canadian Cost-Benefit Analysis Guide**  
**Regulatory Proposals**



 **ALGEMENE LEIDRAAD VOOR maatschappelijke kosten-batenanalyse**

Grasbert Achtsin  
Gisela Rentes



 **Guidance Note**

**COST-BENEFIT ANALYSIS**  
February 2016

**Purpose**  
The Australian Government is committed to the use of cost-benefit analysis (CBA) to assess regulatory proposals in order to encourage better decision making. A CBA involves a systematic evaluation of the impacts of a regulatory proposal, accounting for all the effects on the community and economy, not just the immediate or direct effects, financial effects or effects on one group. It emphasises, to the extent possible, valuing the gains and losses from a regulatory proposal in monetary terms.

The goal of CBA is to provide the final decision maker with as much information about a regulatory proposal as is relevant in informing their decision. It provides an objective framework for weighing up different impacts and impacts that occur in different periods. This objectivity is supported by converting all impacts into present value dollar terms. However, even when full quantification of impacts is not possible, CBA can still be useful in providing a clear decision-making framework.

The purpose of this guidance note is to guide policy makers on the use of CBA for policy proposals. The note is relevant for policy makers working on either Australian Government or COAG-related proposals.

**Introduction**  
In regulatory impact analysis, CBA is a method of evaluation that attempts to estimate and compare the total benefits and costs of a particular policy proposal.

In principle, CBA measures the efficiency or resource allocation effects of a regulatory change. It calculates the dollar value of the gains and losses for all people affected. If the sum is positive, the benefits exceed the costs and the regulatory proposal would increase efficiency.


CBA is useful because it:

- provides decision makers with quantitative and qualitative information about the likely effects of a regulation
- encourages decision makers to take account of all the positive and negative effects of the proposed regulation, and discourages them from making decisions based only on the impacts on a single group within the community
- assesses the impact of regulatory proposals in a standard manner, which promotes comparability, assists in the assessment of relative priorities and encourages consistent decision making
- captures the various linkages between the regulatory proposal and other sectors of the economy (for example, increased safety may reduce health care costs), helping decision-makers maximise net benefits to society
- helps identify cost-effective solutions to problems by identifying and measuring all costs.

Cost-benefit analysis 1

**Guide to Social Cost Benefit Analysis**

July 2015

 **THE TREASURY**  
Kaitiaki Takekōwhiri  
New Zealand Government

 **Cost-Benefit Analysis and the Environment**

**RECENT DEVELOPMENTS**

David Pearce  
Qiao Ahnson  
Susanne Mourato



# Social cost benefit analysis

- All effects, both monetary and intangible, direct and indirect, are measured and expressed in monetary terms
- Underlying theoretical assumption:
  - Within a society, those who gain could compensate those who lose by reallocating resources up to the point where any further reallocation of resources would not make anyone better off without making the other worse off
- Evaluation: Net value Benefit- cost ratio

$$\{K - \Delta W\}$$

$$\frac{\Delta W}{K}$$



# Social cost-benefit analysis

Received: 28 April 2017

DOI: 10.1111/zph.12417

**ORIGINAL ARTICLE**

WILEY

## The design of a Social Cost-Benefit Analysis of preventive interventions for toxoplasmosis: An example of the One Health approach

A. W. M. Suijkerbuijk<sup>1</sup> | P. F. van Gils<sup>1</sup>  | A. A. Bonačić Marinović<sup>2</sup> | T. L. Feenstra<sup>1,3</sup> |  
L. M. Kortbeek<sup>2</sup> | M.-J. J. Mangen<sup>2</sup> | M. Opsteegh<sup>2</sup> | G. A. de Wit<sup>1,4</sup> |  
J. W. B. van der Giessen<sup>2</sup>



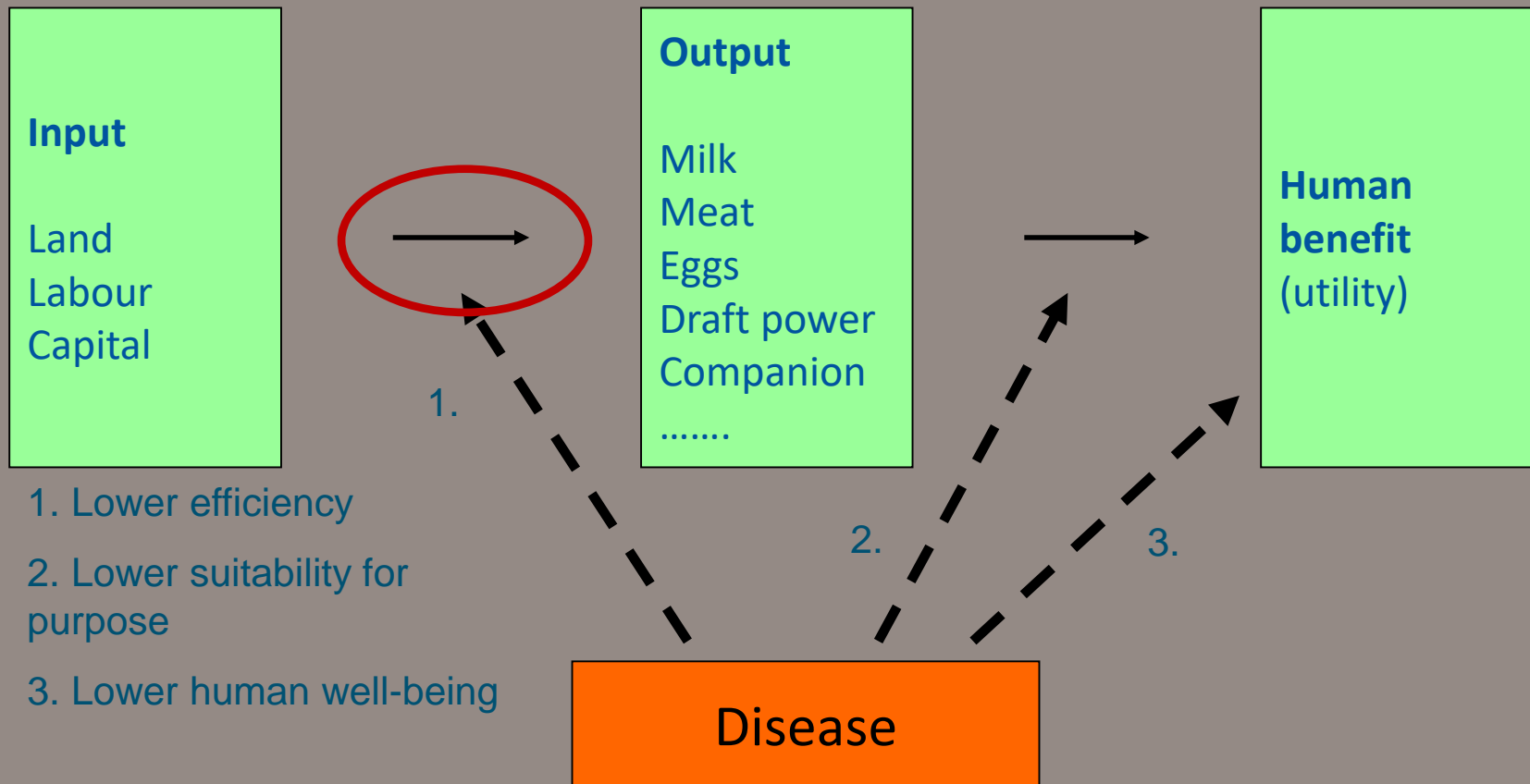


# Topics in this presentation .....

- Zoonoses from an economic perspective
- Incorporating public health in economic analyses
- **Zoonoses from a farmers' perspective**
- Some examples



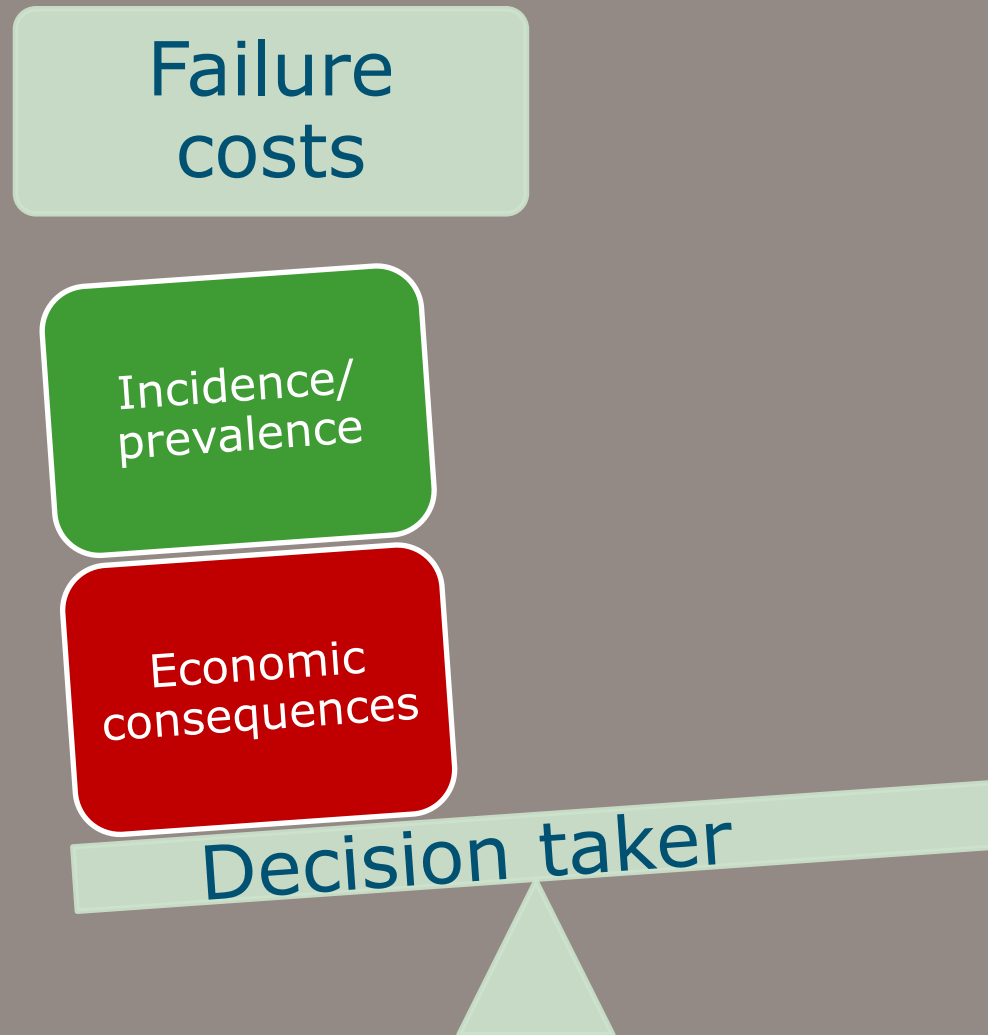
# The field: Economic effects of animal disease



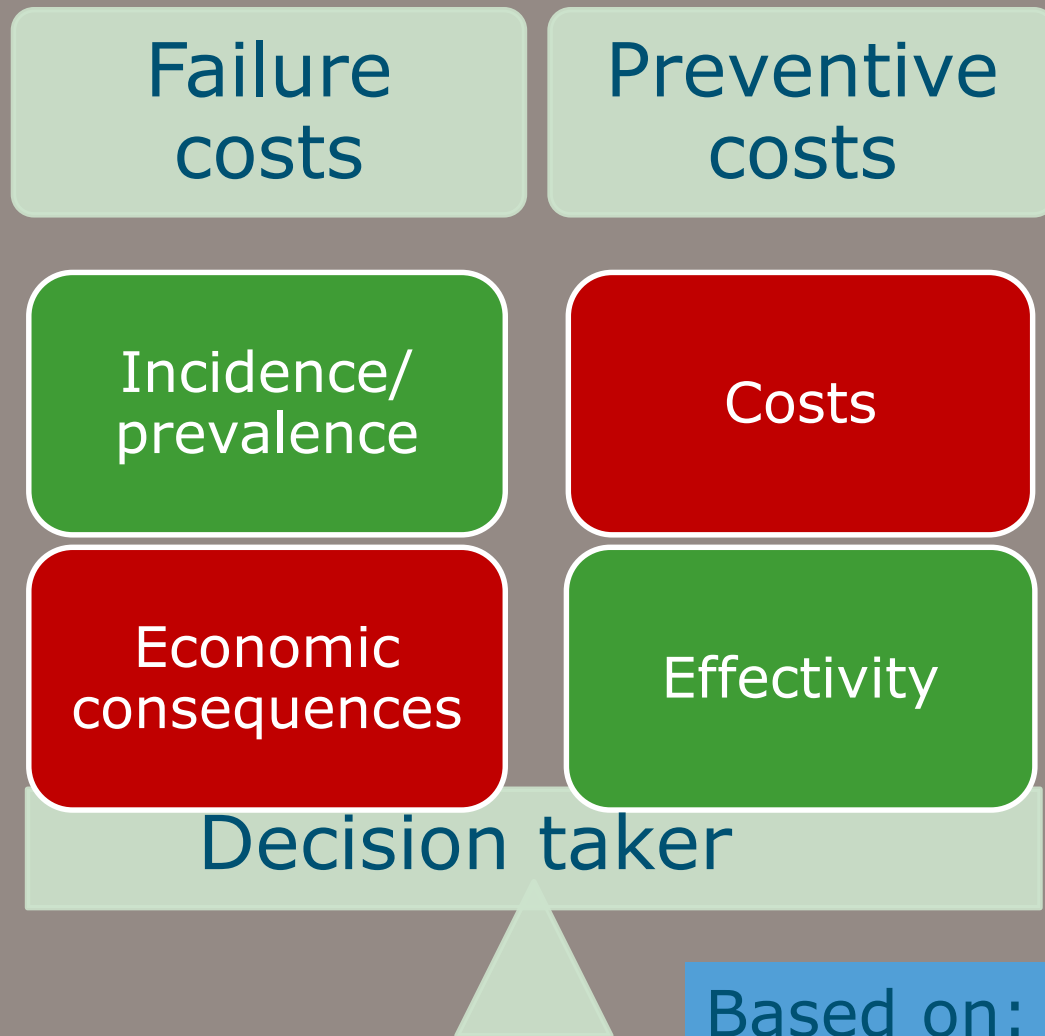
OLD ECONOMICS FOR NEW PROBLEMS –  
LIVESTOCK DISEASE: PRESIDENTIAL ADDRESS



# Decisions



# Decisions



Based on:

- Objectives
- Available resources





# Novel dimensions

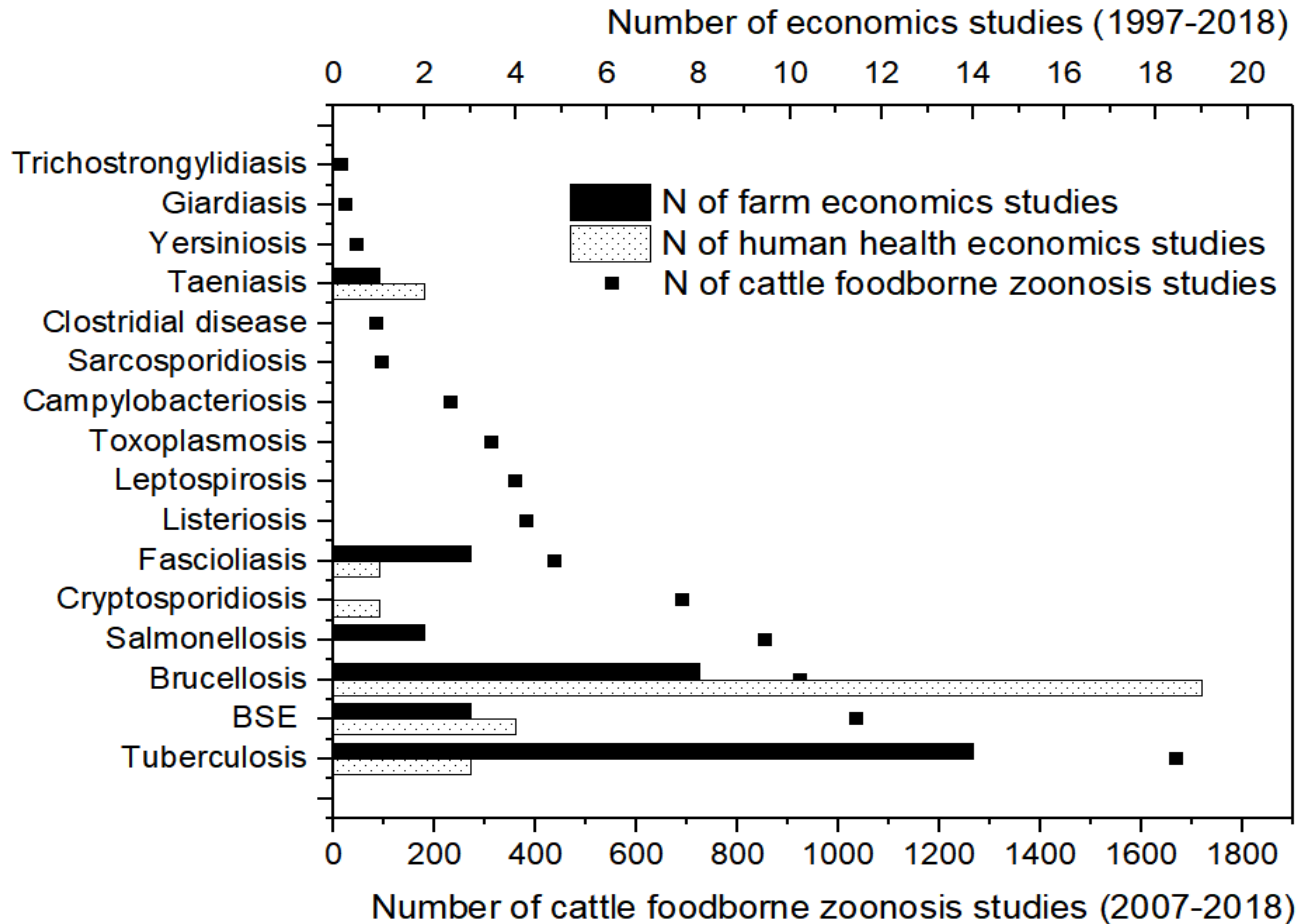


# Different types of animal health problems

<b>Public health effects</b>	<b>Animal health effects</b>	
	<b>Large</b>	<b>Small</b>
Large	Win-win	Problem
Small	Up to farmer	Who cares



# Relatively little work on economics



# Different interventions affect stakeholders differently

Suijkerbuijk et al., 2017

Domains	Effects, resulting in changes in costs and benefits	Cat Vaccination	Freezing Meat	Enhancing biosecurity at pig farms
Consumer	<i>Toxoplasma</i> -related patient costs will be assessed	X	X	X
	Consumer surplus <sup>a</sup>		X	
	Consumption of meat may change due to change in meat price		X	
	Costs for cat vaccination	X		
Human health	Health care costs	X	X	X
	Morbidity and premature mortality due to toxoplasmosis are expressed in DALYs. All short- and long-term effects of infection will be included	X	X	X
Producers	Producer surplus <sup>b</sup> . Since we consider freezing meat as an international intervention, the consequences for the producer surplus will be limited as additional costs might spill-through to the consumer.		X	X
	Biosecurity measures will lead to additional costs for pig farmers.			X
	Serological testing in slaughterhouses are additional costs for slaughterhouse that might be put through to the consumer, since we assume that this is an international intervention			X
	Toxoplasmosis is an important cause of abortion among sheep. Vaccination of cats at farms can reduce these losses.	X		
	Facilities at companies will be needed such as freezers, extra surface area and electricity costs. These facilities will have additional annual recurrent costs (e.g. electricity, maintenance) leading to higher productivity costs for slaughterhouses and the meat processing industry.		X	
Employees	<i>Toxoplasma</i> -related productivity losses will be assessed	X	X	X
	Freezing of meat will lead to extra employment.		X	
	The development, campaign, distribution and vaccination of cats will lead to extra employment for veterinarians	X		
	The biosecurity measures will affect employment of pig breeders, and fatteners, but also persons involved in rodent control and persons who perform the audits.			X
Social security, pensions	A change in employment rate will affect social security and pensions.	X	X	X
Education	Less infections will lead to less special education	X	X	X

# Step 5. Define and value costs

- Very difficult task (many assumptions)
- Decreased cost-of-illness
- Non health care costs
  - Freezing meat
    - Different cost price (production costs)
    - Different demand (product characteristics)
    - Contingent valuation – Discrete choice exp.
  - Pig biosecurity
    - Higher production costs
  - Cat vaccination





# Do it yourself

- How would you motivate .....
- Farmers
- Pet owners



# Topics in this presentation .....

- Zoonoses from an economic perspective
- Incorporating public health in economic analyses
- Zoonoses from a farmers' perspective
- **Some examples**



# 1. Economics amongst other motivators

- Quantify farmers' motivative factors for a change in mastitis management
- Adaptive conjoint analysis, 100 farmers
  - Systematically varying the motivation features in a questionnaire
  - Measuring the preferences of the farmer
  - Calculate preferences for individual features



# Are you motivated to change your mastitis management to decrease the BMSCC if:

1. It leads to better cow health/welfare
2. You will get a financial reward (bonus/penalty)
  - 50 farmers question as bonus
  - 50 farmers question as penalty
3. It is easier to fulfil legal requirements
4. Your pleasure in work increases
5. It leads to lower economic losses
6. You get recognition
7. The quality of the dairy products are better



	Premium (n = 40)	Penalty (n = 43)
Job satisfaction	17.41 <sup>a</sup> (1)	14.90 <sup>agij</sup> (2)
Overall situation on the farm	15.81 <sup>abc</sup> (2)	14.89 <sup>bfhj</sup> (3)
Economic losses	14.23 <sup>bdgj</sup> (3)	14.39 <sup>abcehi</sup> (4)
Animal health and welfare consciousness	13.95 <sup>cfgh</sup> (4)	14.51 <sup>ck</sup> (5)
Ease in meeting regulatory requirements	12.45 <sup>def</sup> (5)	9.59 <sup>d</sup> (6)
Extra financial incentive based on bulk milk SCC	11.35 <sup>ehij</sup> (6)	16.43 <sup>efgk</sup> (1)
Dairy product quality and image	8.63 <sup>i</sup> (7)	8.66 <sup>d</sup> (7)
Recognition for a job well done	6.13 (8)	6.63 (8)
Total	100.00	100.00

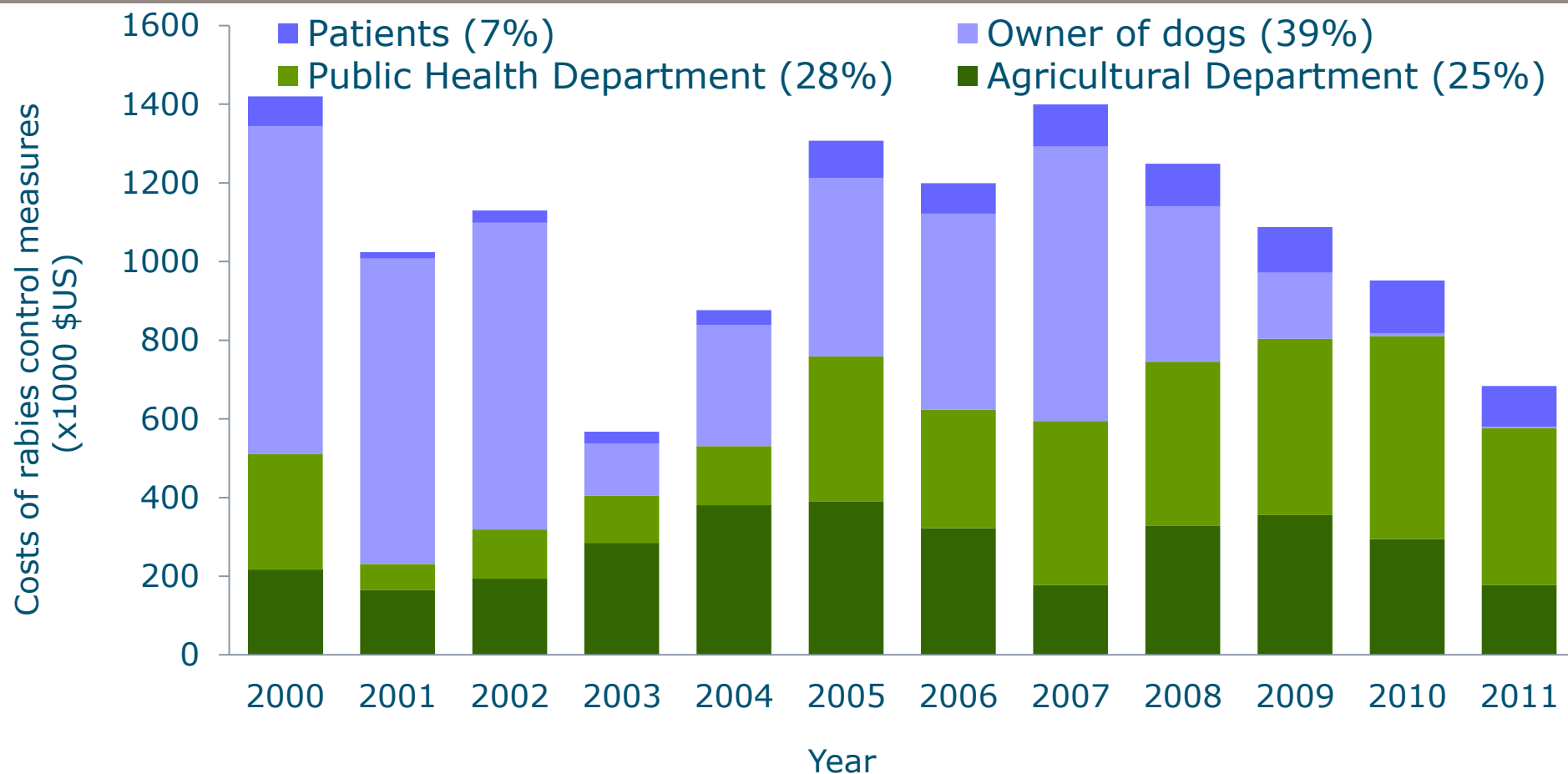




Ewaldus Wera

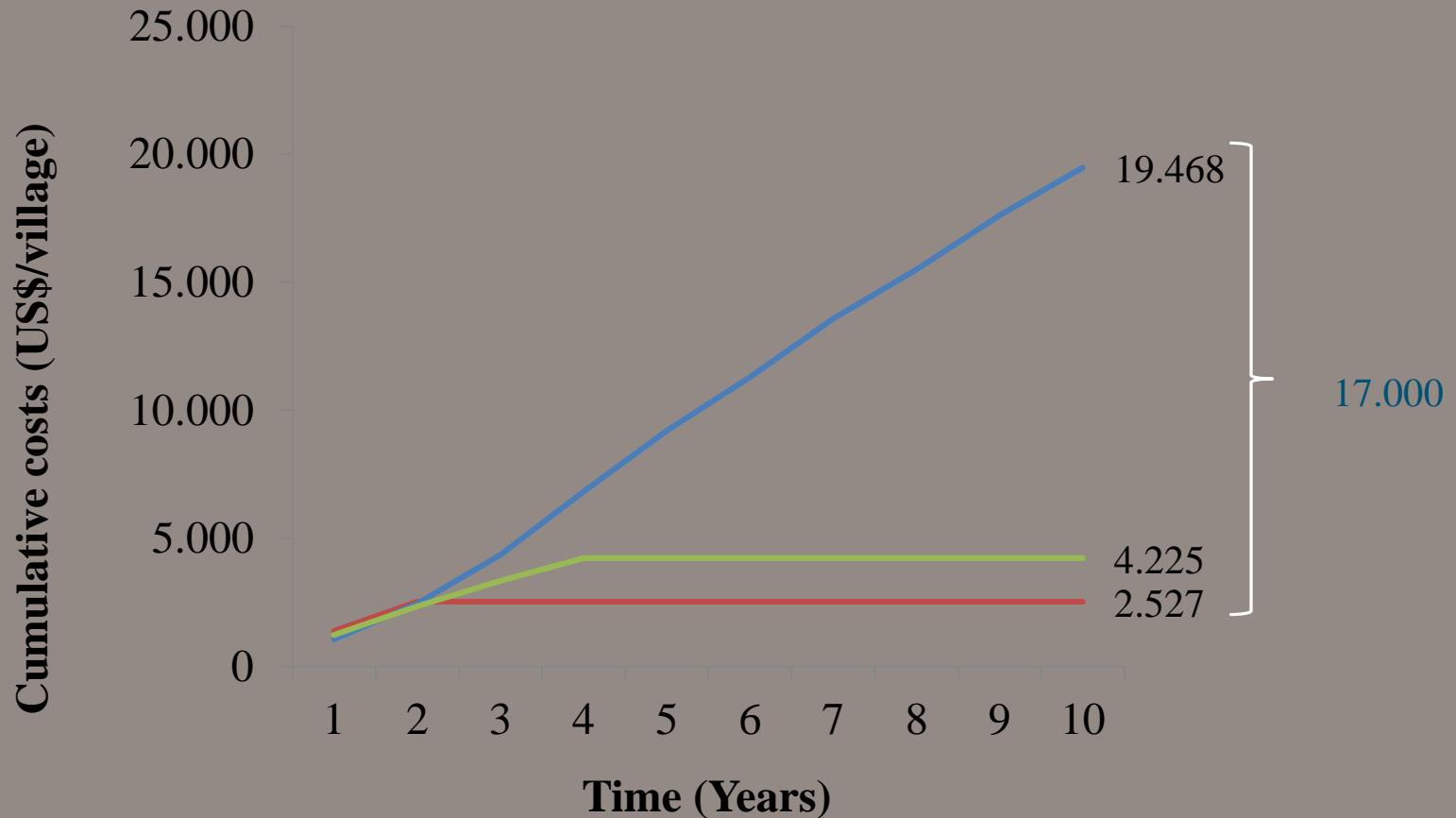
## 2. Motivating dog owners to vaccinate against rabies

- Outbreak since 2010; insufficient uptake of vaccination



# Vaccination saves money:

70 % uptake, long-acting vaccine, \$US per village (450 pp)



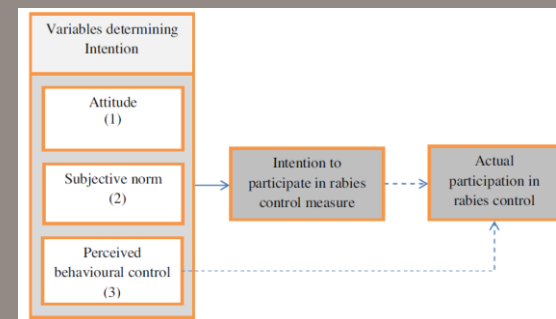
# Uptake in 2012: 48 %

Theory of planned behaviour: four intentions (2015):

- I will vaccinate my dog if the vaccine is free 96%
- I will vaccinate my dog if I have to pay 24 %
- I will cull my dog when there is rabies 40 %
- I will keep the dogs leashed when there is rabies 81 %

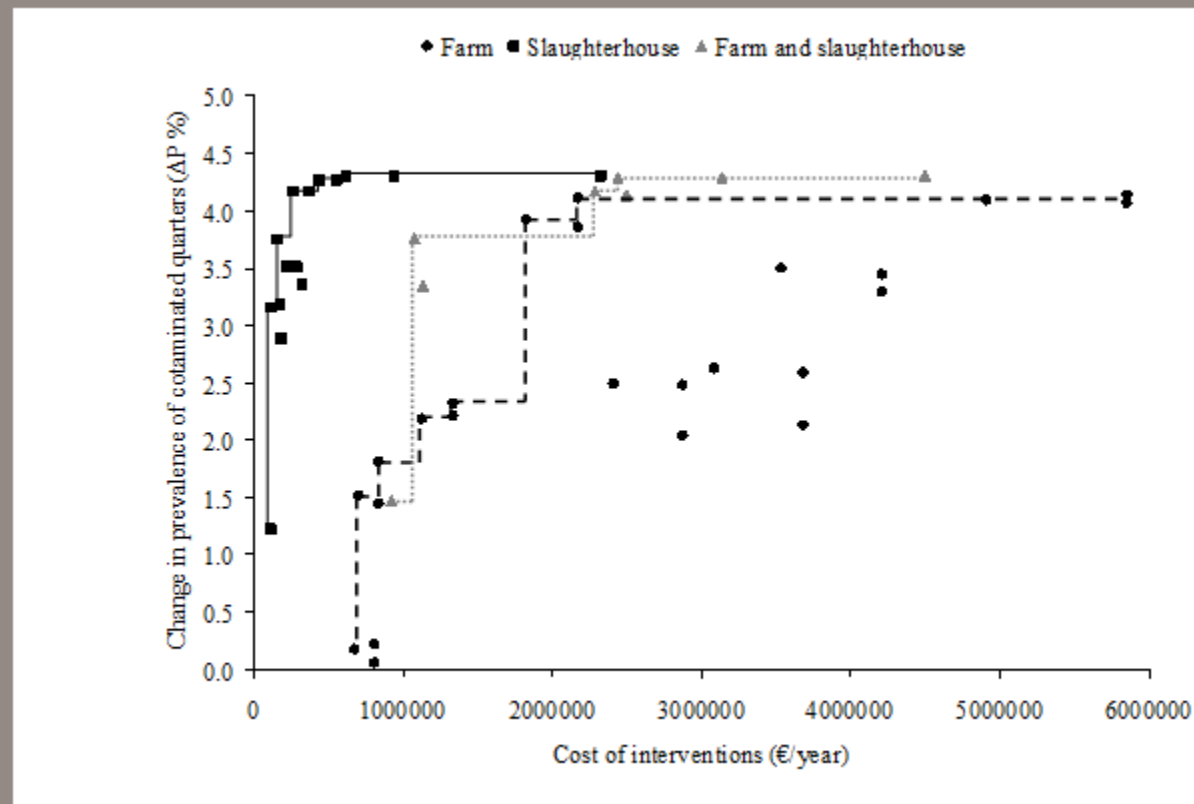
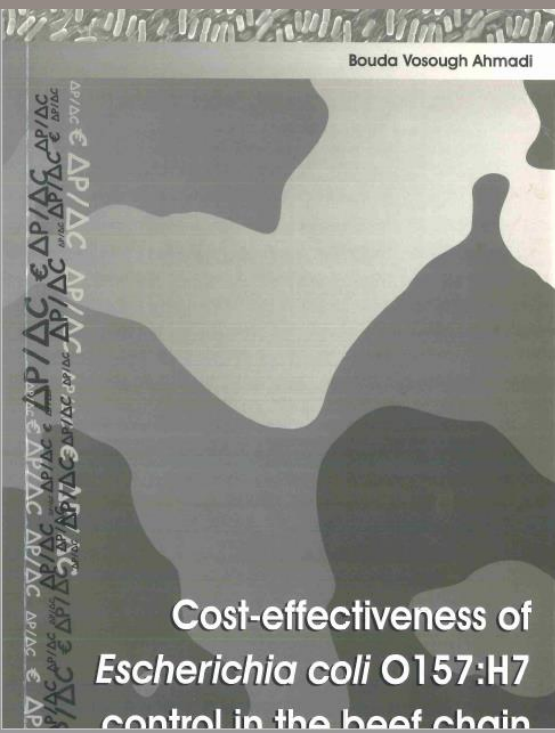
■ Vaccination affected by:

- Attitude
- Perceived behavioural control – Time
- Perceived behavioural control – Able to catch/tie my dog



# 3. Distribution of costs to prevent E coli VTEC

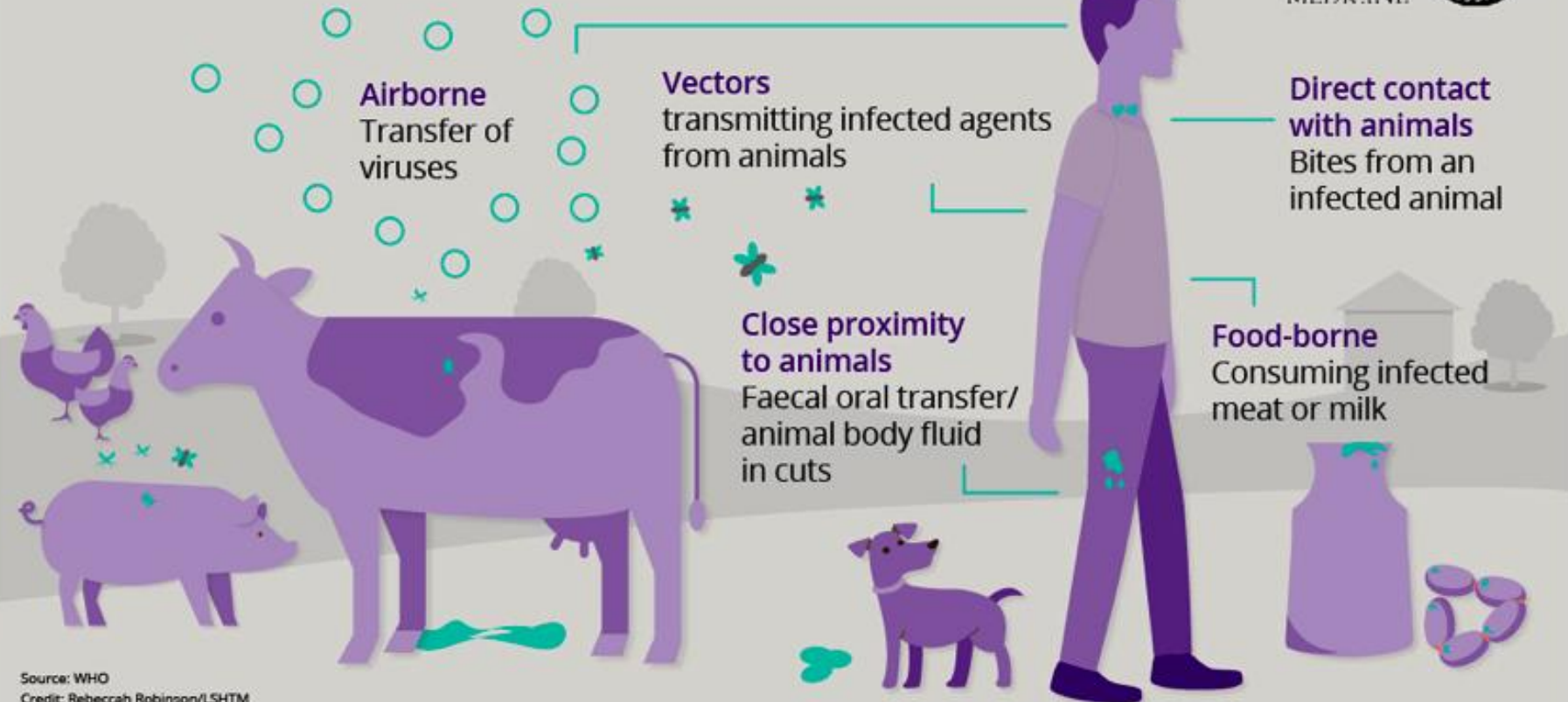
- On-farm interventions: 730-15,000 €/year
- Slaughterhouse interventions 111,000 – 2,343,000 €/year



# And how to distribute costs and benefits?

## How zoonotic diseases are transmitted

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE





# Do it yourself

- How would you distribute costs & benefits .....



Questions?

Questions?



Thank you for  
your attention



henk.hogeveen@wur.nl



@henkhogeveen



WAGENINGEN UNIVERSITY  
WAGENINGEN **UR**