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“New Food Safety Incentives and Regulatory,  
Technological, and Organizational Innovations”  
AAEA preconference workshop – July 22, 2006

# Sweden’s Success with Private Insurance for *Salmonella* Control in Broilers

***Tanya Roberts, ERS*** - [tanyar@ers.usda.gov](mailto:tanyar@ers.usda.gov)

The views expressed here are those of the authors, and may not be attributed to the  
Economic Research Service or the U.S. Department of Agriculture.

***Hans Andersson, SLU, Sweden***



# Overview

- Examine economic incentives for control
  - human health
  - animal health
- Compare and contrast control results
  - US animal diseases
    - bovine tuberculosis
    - scrapie in sheep
  - Sweden: *Salmonella* in broilers
- Identify public and private incentives



# Economic incentives for control

- Animal diseases with obvious symptoms
  - Animal mortality (ID immediate cause – lag a problem)
  - Animal morbidity
    - Visual signs, feed efficiency, time to market
    - Separate disease from management & other factors
  - Medium/strong economic incentives for private control
- Animal diseases with NO obvious symptoms
  - Minimal impact on animal health or long lag
  - Yet pathogen may have human health impact
    - Infection, illness, death, chronic complications
  - Weak incentives to control unless contracts or laws



# Control of 2 US animal diseases

- Diseases are not obvious in early stages
  - Cause animal deaths and productivity losses
  - Uncertain human health implications
  - Farmers request gov't help in eradication
- Bovine tuberculosis (TB)
  - 1917 Federal-State on-farm tuberculin testing
  - Tests triggered by TB+ carcass at slaughter
- Scrapie in sheep
  - 1952 USDA and farmers start controls

# Economic incentives for TB control

- Control of TB+ cattle
  - 1941, all US counties <0.5% positive cattle
  - USDA pays farmers for cattle destroyed
  - TB+ cattle cannot be moved out of state
- 2002 Animal Health Protection Act (AHPA)
  - Indemnity set at appraised value, max. \$3,000
  - If animal is insured, indemnity is reduced
  - Fines increased for smuggling of animals
- AHPA impact on private insurance:
  - NO economic incentive to insure food animals
  - Breeding animals often insured

# Economic incentives: Scrapie control

- 1952-1992: poor incentives to eradicate due to information problems (Kuchler & Hamm)
- 1992 Scrapie Flock Certification Program
  - Flocks monitored for 5+ years
  - Higher economic value with certification
  - Voluntary program, destruction not required
  - Scrapie+ sheep cannot move out of state
- 2002 AHPA impact on private insurance:
  - NO economic incentive to insure food animals
  - Breeding animals often insured



# US economic incentives for control of bovine TB and scrapie in sheep

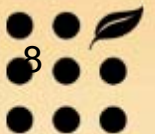
- Mandatory testing on farm before slaughter? NO
- If positive animal found, is destruction required? NO
- Government indemnity payments? YES
- Is private insurance required? NO
- Do laws require disease control? NO
- **Main incentive for control is movement of animals in US or for international trade**





# Sweden's *Salmonella* Poultry Policy

- **1941 Policy Objective:**
  - Eradicate 2 *Salmonella* diseases in poultry
- **1961 Policy Objective:**
  - Deliver *Salmonella*-free food to consumers
  - Strategy:
    - Prevent contamination of production chain
    - Monitor for *Salmonella* in chain
    - Act to achieve control if *Salmonella* detected

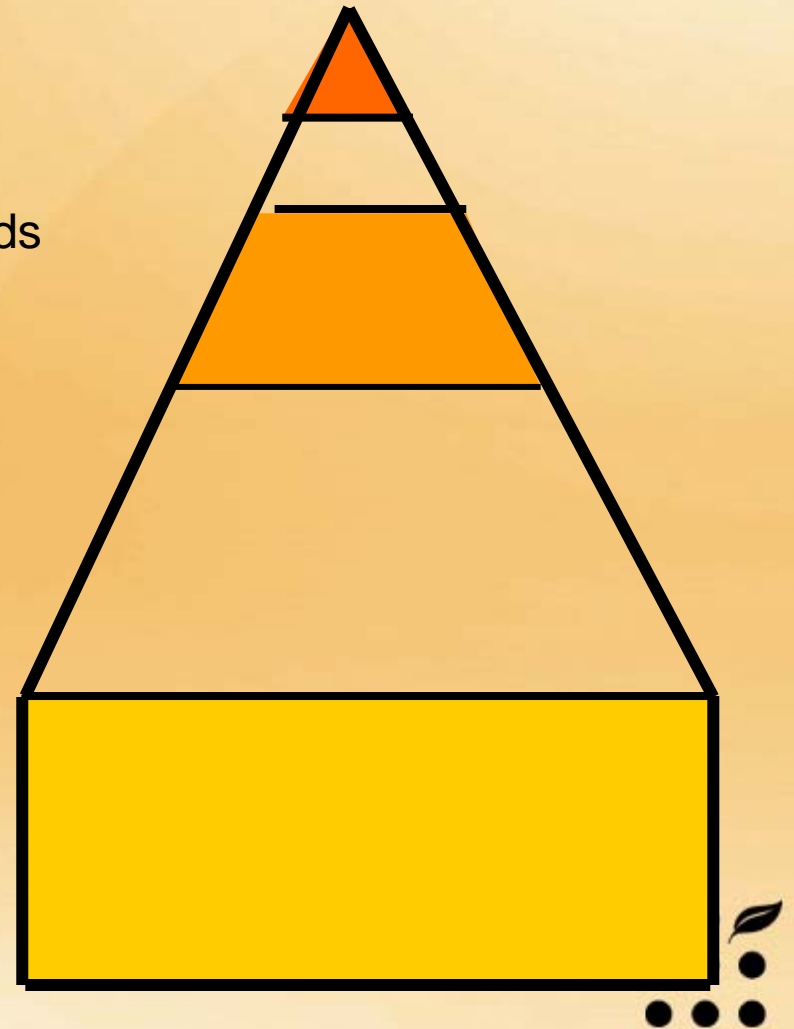


# *Salmonella* control morphs into insurance

- 1970: Voluntary *Salmonella* test of broilers
  - gov't pays 90% of production loss if S+ flock
- 1971: *Salmonella*-contaminated food unfit for human consumption
- 1970s: Gov't/private collaboration on how to control *Salmonella* in supply chain
- 1984: Flock must test S- before slaughter
  - private insurance replaces gov't payments

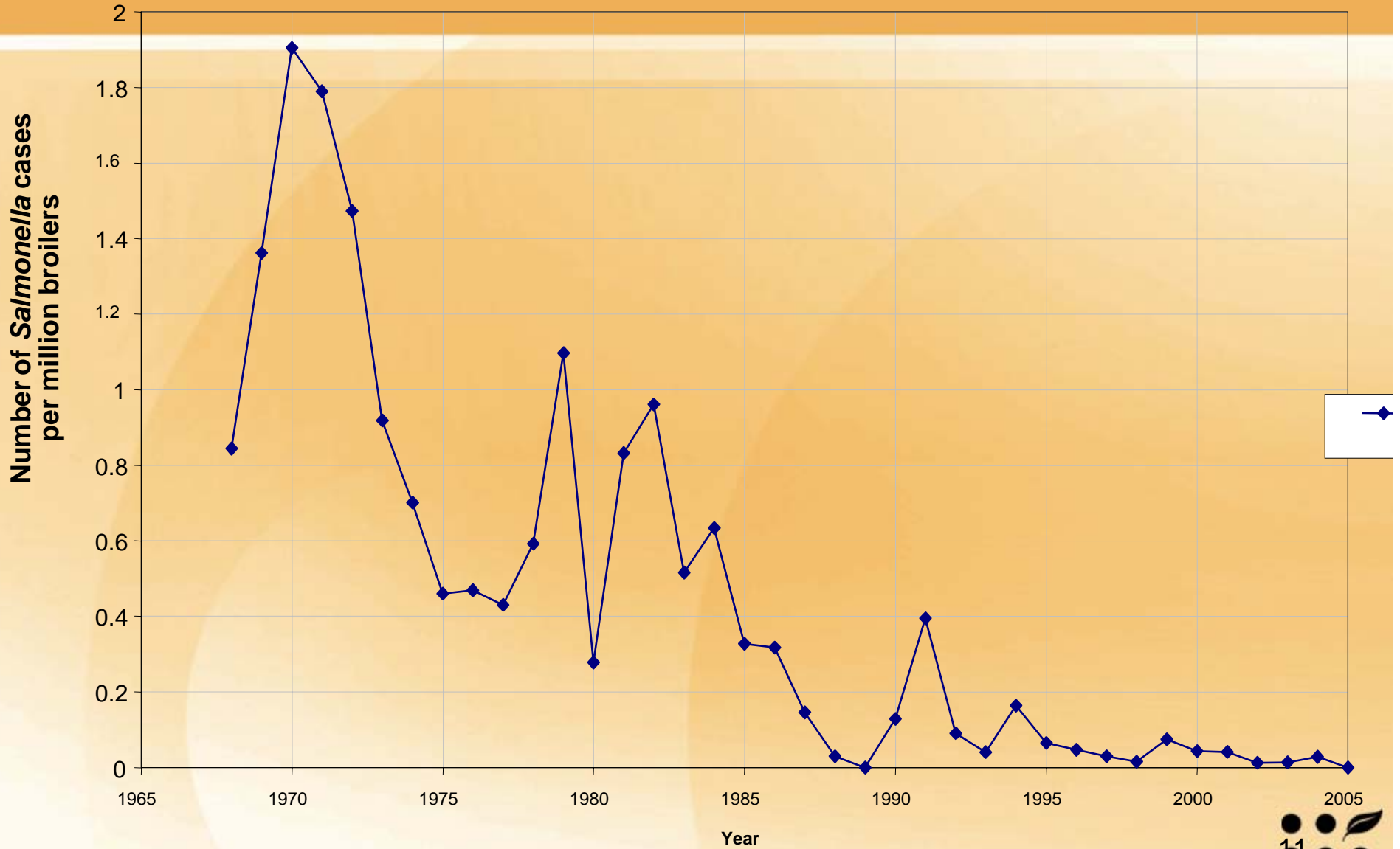


# Broiler Production Chain



# Salmonella cases in broilers, Sweden, 1968-2005

Number of cases per million broilers



# Industry *Salmonella* control cost/broiler

Swedish öre (US¢), 1992 and today

		<u>Swedish öre</u>
Grandparent rearing-extra cost		2
Production of parents		13
Hatching of broilers		4
Growing broilers		52
- testing for <i>Salmonella</i>	5	
- improved hygiene	20	
- higher feed costs, etc.	27	
Private insurance for S+		8
Buildings		7
Slaughterhouse (vet, adm)		8
<b>TOTAL</b>		<b>94 öre</b>

.....**16¢/broiler**

**10¢/broiler now?**

Engvall, Andersson, & Cerenius, 1994



# Industry *Salmonella* control cost/broiler

## Swedish öre (US ¢), 1992 and today

- Broiler farm: 55% of cost of S- birds @ slaughter
  - Feed major cost
  - Hygiene major cost
- Private insurance: 9% of control costs for S- broilers
  - Farm practices required
  - *Salmonella* tests required
- *Salmonella* controls are gov't/industry collaboration

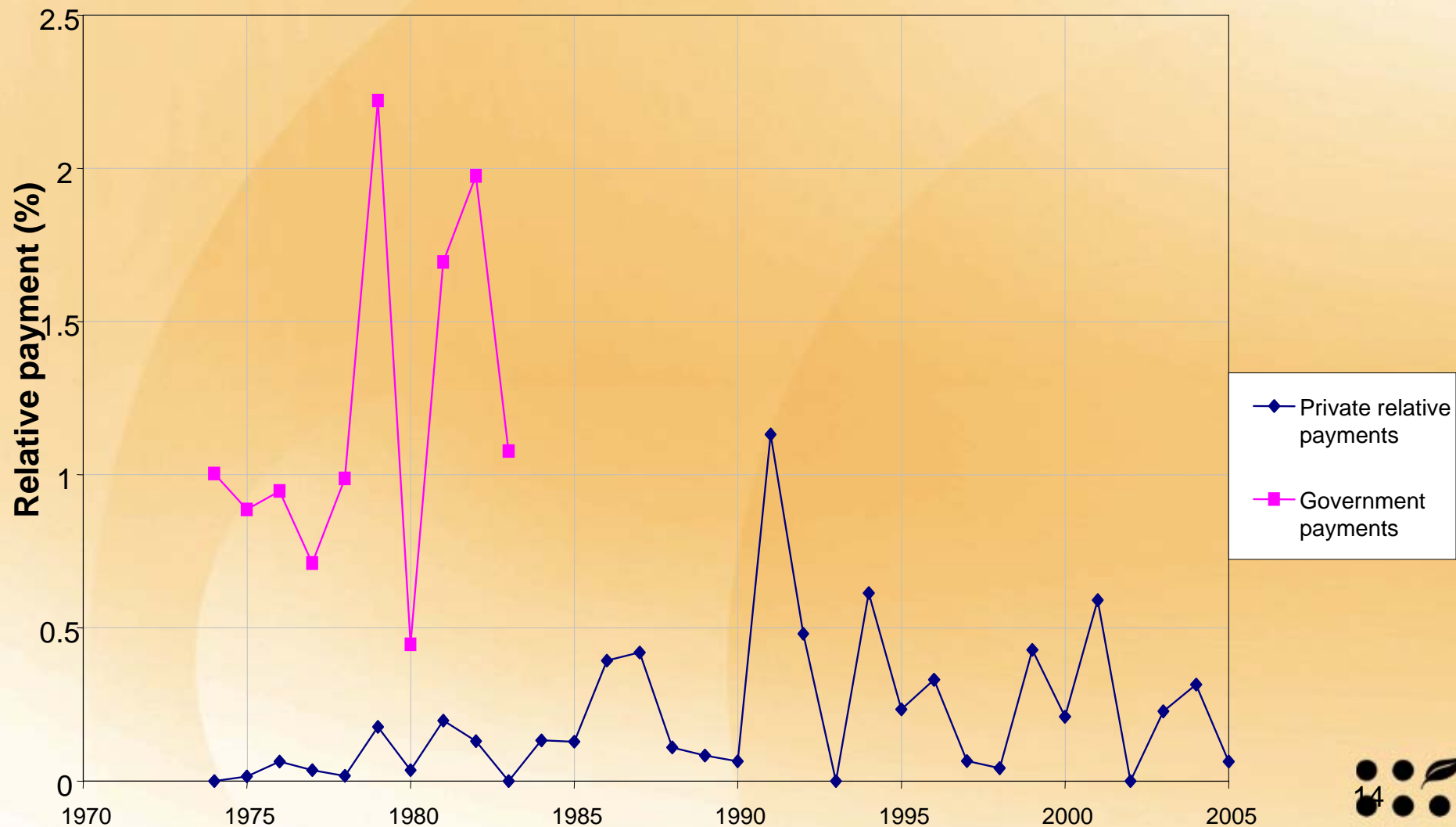
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TOTAL		94 öre

Engvall, Andersson, & Cerenius, 1994

.....16¢/broiler  
may be 10¢ now

# Insurance & government payments to broiler producers

(Total payments/total value of production)



# *Salmonella* controls for broiler farm: collaboration between gov't & industry

- Import/quarantine Grandparent chicks
  - Test to assure S-
- All-in/all-out breeder and broiler flocks
- Building requirements
  - Hygiene barrier, ventilation, rodent control
  - Empty, clean and disinfect after each flock
  - Floor litter S-
  - Drinking water system regularly cleaned
- Feed S-; empty and clean bins after flock
- Regular *Salmonella* tests of broiler flock
  - Destroy when S+
  - Broiler flock has to be S- to slaughter



# Today, S- broiler/breeder flocks

- Sweden
  - <5 flocks S+ destroyed in last 5 years
  - All unprocessed broilers are S-
  - 1995, Sweden joined the EU
    - Denmark is selling S- broilers in Sweden
    - imports of S+ processed poultry allowed
- Denmark achieved S- broilers in 5 years
- EU regulations: S- broilers in 2009

# Summary: economic incentives for control of animal diseases

- On-farm testing for pathogen?
  - Sweden: mandatory S- on farm (before slaughter)
  - Scrapie: autopsy voluntary for dead sheep
  - TB: herd tested if cattle+ at slaughter
- Government indemnity paid?
  - Sweden initially, no payments since 1984
  - Scrapie: yes
  - TB: yes

# Summary: economic incentives for control of animal diseases (con't)

- Private sector buy disease insurance?
  - Sweden: mandatory for all broiler farms
  - Scrapie: voluntary, only buy for breeding stock
  - TB: voluntary, only buy for breeding stock
- US weak incentives for disease control & insurance
  - Government payments subtract insurance coverage
  - US disease control not as strict as Sweden
  - Incentives mainly from restrictions on sale and movement of animals (US & international)

**Tanya Roberts** is a senior economist in the Economic Research Service, USDA. Her research focuses on the public/private interface of food safety regulation, information, and private markets. Recent publications have evaluated private economic incentives for food safety innovations and integrated risk assessment into benefit/cost analyses of pathogen-control options for a beef slaughter plant. Ongoing research includes the economics of new rapid tests for pathogens and how innovative public regulatory programs impact private economic incentives. A major effort is a benefit/cost analysis of *Salmonella*-control options for U.S. broilers, based on the success in Sweden and Denmark in raising *Salmonella*-free broilers. Tanya received her BA (with distinction in economics), Masters, and Ph.D. (1979) in economics from the University of Washington in Seattle, Washington. [tanyar@ers.usda.gov](mailto:tanyar@ers.usda.gov)

**“New Food Safety Incentives & Regulatory, Technological & Organizational Innovations” - 7/22/2006, Long Beach, CA**

AAEA section cosponsors: FSN, AEM, FAMPS, INT

***Industry perspectives on incentives for food safety innovation***

Continuous food safety innovation as a management strategy

Dave Theno, Jack in the Box, US

Economic incentives for food safety in their supply chain

Susan Ajeska, Fresh Express, US

Innovative food safety training systems

Gary Fread, Guelph Food Technology Centre, Canada

***Organizational and technological food safety innovations***

Is co-regulation more efficient and effective in supplying safer food?

Marian Garcia, Dept. of Agricultural Sciences, Imperial College London

Andrew Fearne, Centre for Supply Chain Research, University of Kent, UK

Chain level dairy innovation and changes in expected recall costs

Annet Velthuis, Cyriel van Erve, Miranda Meuwissen, & Ruud Huirne

Business Economics & Institute for Risk Management in Agriculture,

Wageningen University, the Netherlands

## **“New Food Safety Incentives & Regulatory, Technological & Organizational Innovations” - 7/22/2006, Long Beach, CA (con’t)**

### ***Regulatory food safety innovations***

Prioritization of foodborne pathogens

Marie-Josée Mangen, J. Kemmeren, Y. van Duynhoven, A.H. and Havelaar, National Institute for Public Health & Environment (RIVM), the Netherlands

Risk-based inspection: US Hazard Coefficients for meat and poultry

Don Anderson, Food Safety and Inspection Service, USDA

UK HAS scores and impact on economic incentives

Wenjing Shang and Neal H. Hooker, Department of Agricultural, Environmental & Development Economics, Ohio State University

### ***Private market mechanisms and food safety insurance***

Sweden’s decade of success with private insurance for *Salmonella* in broilers

Tanya Roberts, ERS, USDA and Hans Andersson, SLU, Sweden

Are product recalls insurable in the Netherlands dairy supply chain?

Miranda Meuwissen, Natasha Valeeva, Annet Velthuis & Ruud Huirne, Institute for Risk Management in Agriculture; Business Economics & Animal Sciences Group, Wageningen University, the Netherlands

Recapturing value from food safety certification: incentives and firm strategy

Suzanne Thornsburry, Mollie Woods and Kellie Raper

Department of Agricultural Economics, Michigan State University



**“New Food Safety Incentives & Regulatory, Technological  
& Organizational Innovations” - 7/22/2006, Long Beach, CA (con’t)**

***Applications evaluating innovation and incentives for food safety***

Impact of new US food safety standards on produce exporters in northern Mexico

Belem Avendaño, Department of Economics, Universidad Autónoma de Baja California, Mexico and Linda Calvin, ERS, USDA

EU food safety standards and impact on Kenyan exports of green beans and fish

Julius Okello, University of Nairobi, Kenya

Danish *Salmonella* control: benefits, costs, and distributional impacts

Lill Andersen, Food and Resource Economics Institute, and Tove Christensen, Royal Danish Veterinary and Agricultural University, Denmark

***Wrap up panel discussion of conference***

FSN section rep. – Tanya Roberts, ERS, USDA

AEM section rep. – Randy Westgren, University of Illinois

INT section rep. – Julie Caswell, University of Massachusetts

FAMPS section rep. – Jean Kinsey, University of Minnesota

Discussion of everyone attending conference

Note: speaker is either the 1<sup>st</sup> person named or the person underlined.

**Thanks to RTI International for co-sponsoring the workshop.**



## **“New Food Safety Incentives & Regulatory, Technological & Organizational Innovations” - 7/22/2006, Long Beach, CA (con’t)**

### **Workshop objectives**

- Analyze how new public policies and private strategies are changing economic incentives for food safety,
- Showcase frontier research and the array of new analytical tools and methods that economists are applying to food safety research questions,
- Evaluate the economic impact of new food safety public policies and private strategies on the national and international marketplace,
- Demonstrate how new public policies and private strategies in one country can force technological change and influence markets and regulations in other countries, &
- Encourage cross-fertilization of ideas between the four sponsoring sections.

### **Workshop organizing committee**

Tanya Roberts, ERS/USDA, Washington, DC - Chair  
Julie Caswell, University of Massachusetts, MA  
Helen Jensen, Iowa State University, IA  
Drew Starbird, Santa Clara University, CA  
Ruud Huirne, Wageningen University, the Netherlands  
Andrew Fearne, University of Kent, UK  
Mogens Lund, FOI, Denmark  
Mary Muth, Research Triangle Institute Foundation, NC  
Jayson Lusk, Oklahoma State University, OK  
Randy Westgren, University of Illinois, IL  
Darren Hudson, Mississippi State University, MI