

Emerging Public Concerns with Animal Agriculture

Horizons in Livestock Sciences

The future of agriculture - value or volume?

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What is quality?

"Quality in a product or service is not what the supplier puts in. It is what the customer gets out and is willing to pay for."

Peter Drucker, *Innovation and Entrepreneurship*, 1985.

What is quality?

“A subjective term for which each person.. has (their) own definition. In technical usage, quality can have two meanings:

1. the characteristics of a product or service that bear on its ability to satisfy stated or implied needs;
2. a product or service free of deficiencies.”

American Society for Quality (www.asq.org/glossary/)

Consumer perception of “quality” in livestock products – key issues

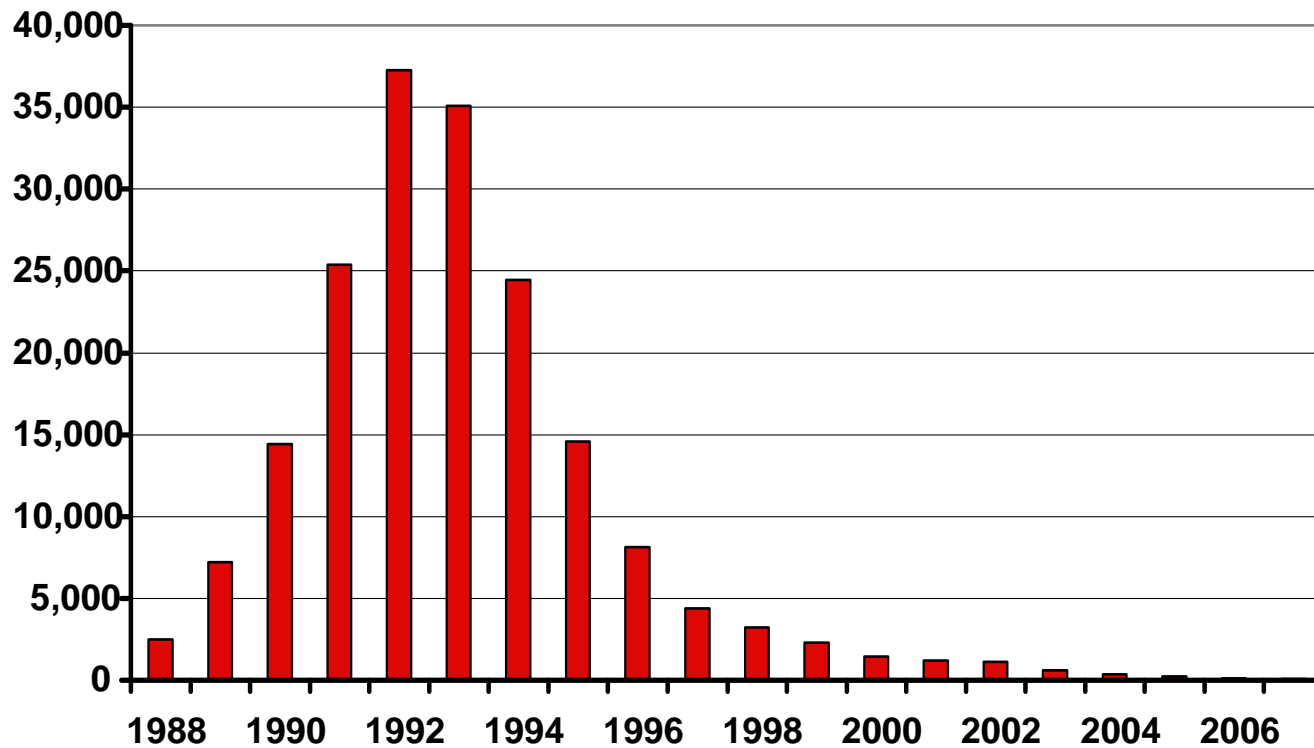
- Food safety
- Production methods
 - Animal welfare
 - Genetic modification (biotechnology)
- Diet and health
- Environmental footprint

Food safety

- Priority #1!
- Consumer confidence is under threat:
 - Animal disease (BSE and Foot and Mouth)
 - Pathogens (*Salmonella*, *Listeria monocytogenes*, and especially *E. coli* O157:H7)
 - Residues (antibiotics, hormones, pesticides)
 - Contamination (dioxin in livestock feed in Belgium, melamine in milk and other livestock products in China)

BSE

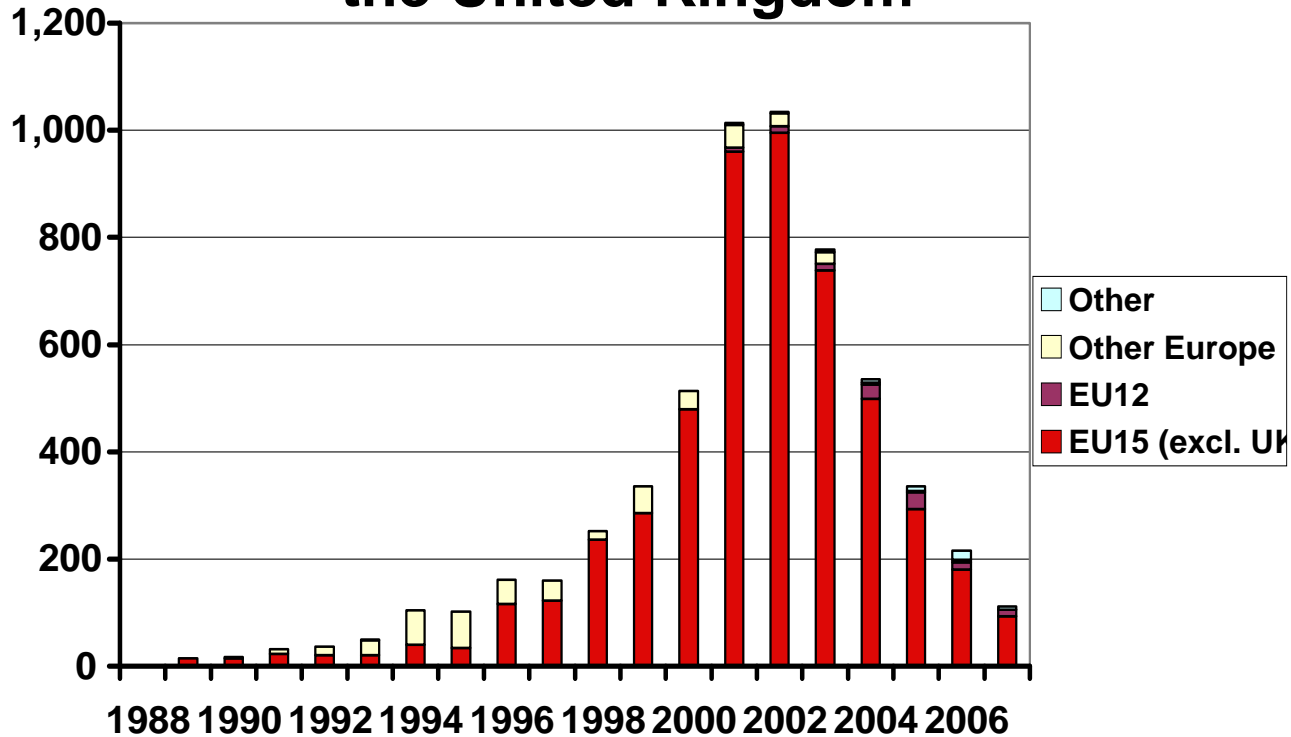
Recorded Cases of BSE in the United Kingdom



Source: OIE

BSE

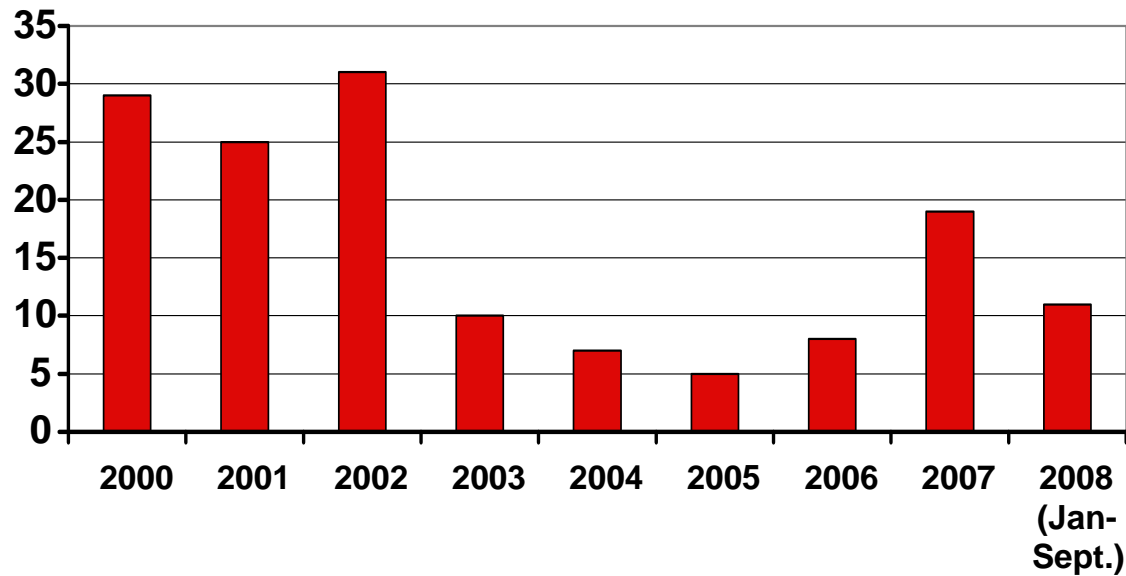
Recorded Cases of BSE outside the United Kingdom



Source: OIE

E. Coli

US Food Safety and Inspection Serv for E. Coli in Beef Products



s.usda.gc

Source: FSIS

Consumers' response to food safety issues

- 1996 – possible link between BSE in cattle and new-variant Creutzfeldt Jakob disease (vCJD) in humans announced: UK sales of beef products fall by 40 percent
- 1999 – dioxin contamination of livestock feed: Belgium meat exports fall by over 30 percent
- 2001 – FMD outbreaks in UK and elsewhere: volume of world trade in beef falls by 4 percent
- 2008 – impact of Chinese product contamination?
- Longer term impacts – do consumers forget (evidence from the UK BSE experience) or are there permanent shifts in consumption (growth of vegetarianism in the UK)?

Production methods – animal welfare

- Issues with on-farm methods (e.g., sow crates, hen cages), transportation, and slaughter
- A major issue in Europe, less so in the United States but pressure for regulation increasing particularly at the state level (e.g., California)
- What do consumers think?

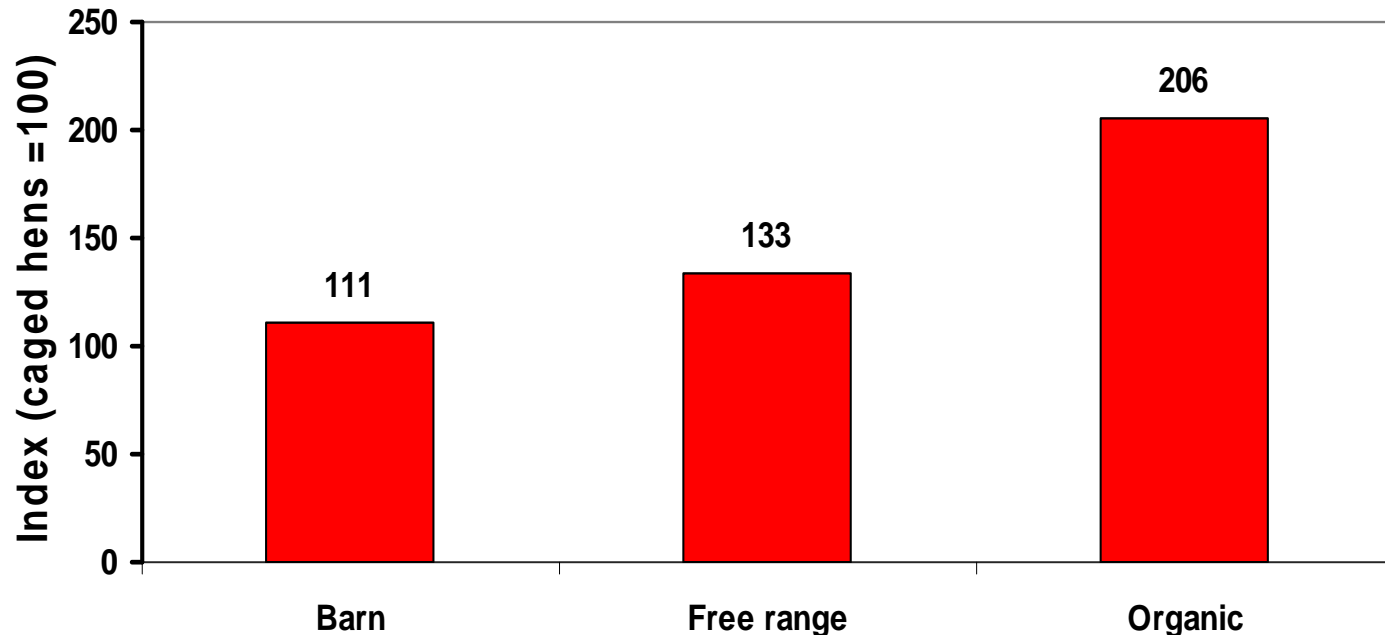
EU consumer attitudes to animal welfare

- 66 percent rated the welfare/protection of dairy cows to be “good”; 58 percent rated it as “bad” for laying hens
- 55 percent believe that animal welfare is not given enough policy attention
- 43 percent “think about” the welfare of farm animals when they purchase meat or livestock products
- 38 percent indicate a preference for “free range” eggs - strongest preference shown by females; strength of preference increases with age and level of education
- 34 percent are not willing to pay any price premium for “welfare friendly” eggs; 46 percent willing to pay 10% or less

Source: Eurobarometer, “Attitudes of Consumers towards the Welfare of Farmed Animals”, 2005.

The willingness to pay challenge

Costs of production of "welfare friendly" eggs
relative to conventional eggs in the EU



Source: Computed from Agra CEAS Consulting Ltd. "Study on the socio-economic implications of the various systems to keep laying hens", 2004.

Production methods – biotechnology

- GM food has been a key issue in Europe, cloning is an emerging issue, nanotechnology may be an issue in the future
- What do consumers think?

US attitudes to biotechnology

- 75 percent of those questioned thought they had a good understanding of food production
- But only 13 percent indicated that they had heard or “read a great deal” about biotechnology
- And only 41 percent were aware that GM foods were on sale in U.S. supermarkets
- Strongest support for use of GM to give direct medical benefits for humans (e.g., insulin) and less work (grass that needs less mowing!)
- Public knowledge of basic science is quite good in comparison to EU respondents

Source: Hallman, Adelaja and Schilling, “Public Perceptions of Agricultural Biotechnology in the United States in 2001”

EU attitudes to biotechnology

- 86 percent of those questioned thought that GM foods should only be introduced if scientifically proven to be harmless
- 71 percent do not want GM food
- 59 percent believe GMOs could damage the environment
- 95 percent want the right to choose (labeling)
- Only 35 percent knew that both ordinary and GM tomatoes contain genes (vs. 57% in US)!

Source: Eurobarometer, "Europeans, Science and Technology", 2001.

US attitudes to GM in animals

- 52 percent indicated they had read or heard nothing about applying biotechnology to animals
- Roughly equal proportions (35 percent) supported and opposed genetic engineering in animals
- 50 percent had an unfavorable impression of animal cloning
- Over 60 percent indicated they would buy products from genetically engineered animals, but less than 50 percent indicated they would purchase products from cloned animals

Source: International Food Information Council, "Food Biotechnology: A Study of U.S. Consumer Trends", 2007.

EU attitudes to animal cloning

- 80 percent correctly identified cloning
- 58 percent believe that cloning is not justified for food production
- Less than 40 percent believe cloning is justified even if it could provide health benefits, cheaper food or solve worldwide food problems
- More than 60 percent indicated it was unlikely they would buy meat or milk from cloned animals
- 83 percent wanted such products to be labeled

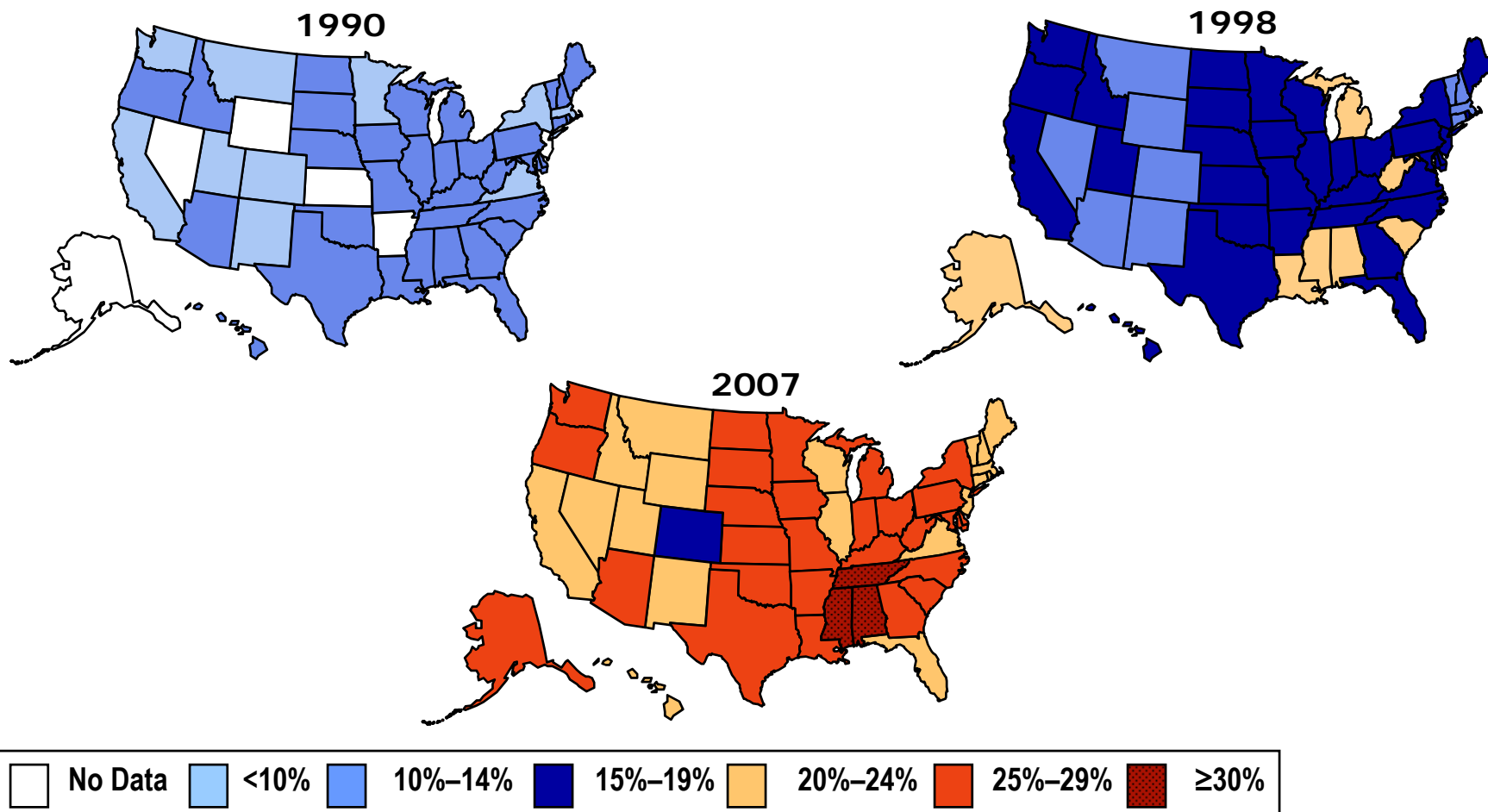
Source: Eurobarometer, "Animal Cloning", 2008.

Diet and health

- “Overnutrition” is an increasing problem across the world
- Livestock products provide 17% of global calorie consumption and 45% of global consumption of fat – 51% in high income countries (FAO, “Livestock’s long shadow,” 2007)

Obesity Trends* Among U.S. Adults

(*BMI ≥ 30 , or about 30 lbs. overweight for 5'4" person)



Source: US Centers for Disease Control and Prevention

The problem of obesity in the US

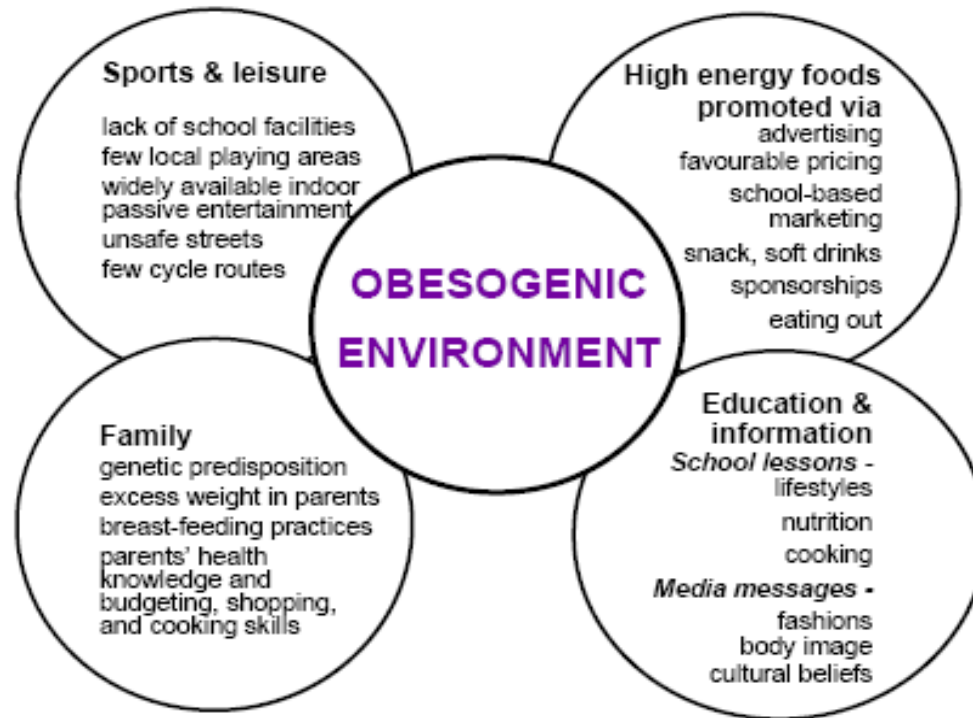
- Nearly 2 out of 3 adult Americans are overweight or obese
- Overweight prevalence among children and adolescents rose from 5% in 1970s to 15% in 2000
- Linked to increased risk of heart disease, diabetes, several types of cancer
- Generates increased medical costs, lower productivity and output
- 2001 U.S. Surgeon General's report estimates cost of \$117 billion to U.S. economy (equivalent to roughly 30 percent of total expenditure on food in that year)

The problem of obesity in Europe

- According to the WHO* the proportion of overweight adults in European countries ranges from 30-80 percent
- The prevalence of obesity has risen at least threefold since the 1980s - 150 million adults expected to be obese by 2010
- More than 38 percent of school-age children are projected to be overweight by 2010 and 15 million will be obese
- The direct and indirect costs of obesity were estimated to be 0.3 percent of GDP in the EU15 in 2002 (roughly 30 billion Euros)

* World Health Organization. "The challenge of obesity in the WHO European region and the strategies for response", 2007.

Causes of obesity are complex



But there will be pressures for dietary change and policy response

Source: International Obesity Task Force. "Obesity in Europe: the case for action", 2002.

Obesity is not the only issue...

- Recent press reports on the health effects of meat and dairy product consumption have been negative
- Oxford University (UK) study - higher risk of prostate cancer through promotion of Insulin-like Growth Factor-1 (IGF-1)
- University of Rochester (US) study - sons of women who consume large amounts of beef during pregnancy have low sperm counts with possible link to hormone use in beef production
- Ongoing press coverage about the potential danger of antimicrobial resistance through the use of antibiotics in livestock production
- Advocacy groups and on-line providers of information (e.g., TheGreenGuide <http://thegreenguide.com>) publicize these and other issues relating to meat and dairy products

Environmental footprint

- Could be the “elephant in the room” for future consumer attitudes towards livestock products
- Dr. Rajenda Pachauri, chair of the Nobel prize winning Intergovernmental Panel on Climate Change recently called for people to “have one meat-free day a week if they want to make a personal and effective sacrifice that would help to tackle climate change”

The Observer (UK), September 7, 2008.

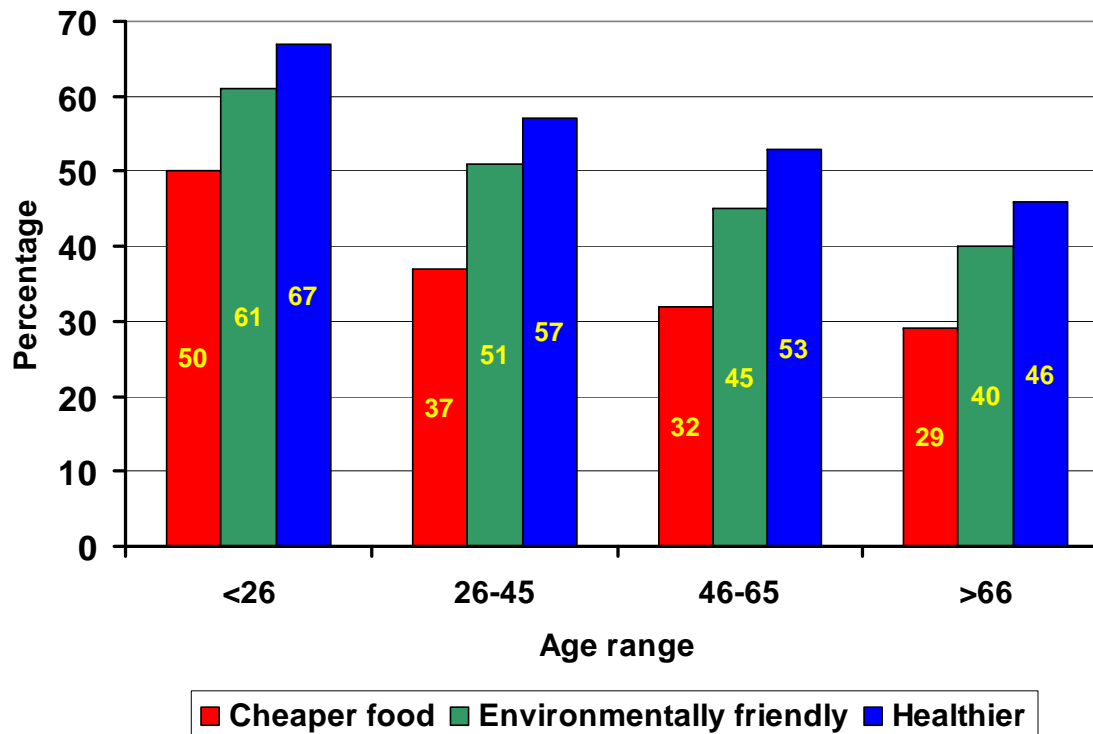
Environmental footprint – the FAO report

- “The livestock sector (is) one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global.”
- “Expansion of livestock production is a key factor in deforestation..”
- The livestock sector is... responsible for 18 percent of greenhouse gas emissions.. a higher share than transport”
- “(It) is a key player in increasing water use.. and probably the largest sectoral source of water pollution”
- “(It) may well be the leading player in the reduction of biodiversity..”
- “(It) has such deep and wide-ranging environmental impacts that it should rank as one of the leading focuses for environmental policy..”

Source: FAO, “Livestock’s long shadow,” 2007.

What does the future hold?

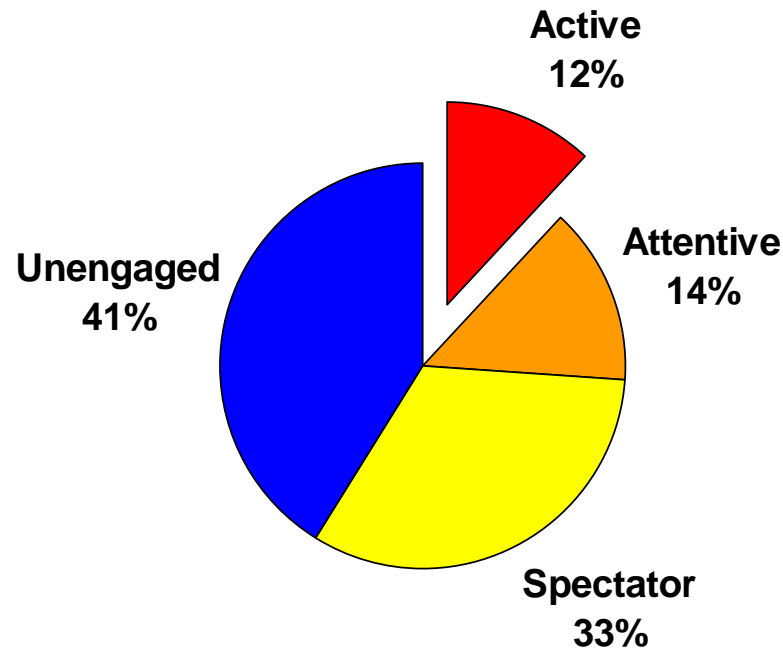
Europeans' willingness to purchase GM food



Source: Eurobarometer. "Europeans and biotechnology in 2005: patterns and trends."

What does the future hold?

Engagement of Europeans with biotechnology



Source: Eurobarometer. "Europeans and biotechnology in 2005: patterns and trends."

What does the future hold?

Major determinants of per capita food consumption:

$$Q_{it} = f(P_{it}, P_{jt}, Y_t, T_t)$$

Q_i = per capita consumption of product i in period t

P_i = price of that product

P_j = prices of substitute and complementary products

Y = per capita income

T = individual tastes and preferences

As income increases Y and T tend to dominate consumption decisions and they may become increasingly correlated (have mutually reinforcing effects)

Key factors in future consumer behavior

- Awareness – key factors are education, role of the media, food industry actions, e.g., promotion, labeling
- Income – allows consumer preferences to be exercised
- Price – still a dominant factor at low levels of consumer income and in periods of recession (i.e., now!)
- Government policy – determines what choices are consumers allowed (regulation) and/or the prices they face
- Globalization – will the consumer concerns identified become global in scope?

Strength of consumer preferences and the level of economic development

Consumer concern	Low income	Middle income	High income
Food safety	Low - Medium	Medium	High
Animal welfare	Low	Low	Medium - High
Diet and health aspects	Low	Low - Medium	Medium - High
Environmental quality	Low	Medium	High

Concluding remarks

- It would be dangerous (foolhardy?) to ignore changing consumer perceptions towards the livestock industry and its products
- Price will continue to be important, but perceptions of “quality”, i.e., the bundle of attributes that consumers perceive in livestock products will be increasingly dominant if global income continues to increase
- Consumer concerns pose challenges (e.g., meeting tighter environmental requirements) and provide opportunities (e.g., responding to diet and health concerns) for the livestock industry
- Consumers will expect suppliers to respond to their concerns - if not they will expect regulation

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