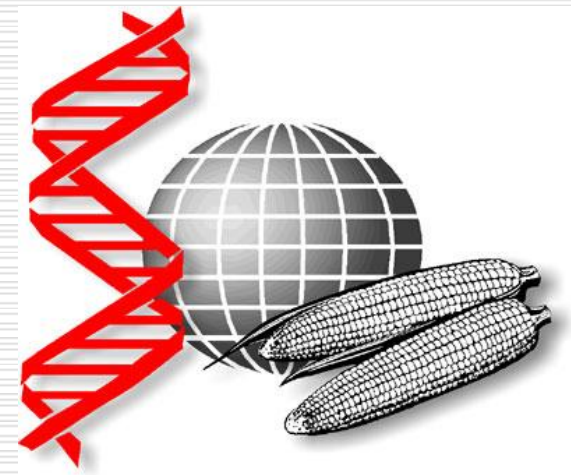


Consumer Responses to Technology in Food

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and Food Science
NC State University



Presentation given to Association of Agricultural Production
Executives on February 2, 2006 @ Amelia Island, FLA

Challenges of Introducing Technology into Society

- New food technologies are initially resisted (hybrid corn, pasteurization, microwaves)
 - Most people have limited knowledge about and interest in science and agriculture.
 - Cultures and values differ widely across the world (complex and dynamic situation)
 - Politics and economics are driving US and EU conflict (not science or humanitarian needs).
 - Biotechnology raises complex ethical and social issues that need attention (much more so with humans and animals than plants or microbes).
-

Consumer Concerns about Agriculture

- Food is now a “lightning rod” for diverse issues (most not resolved by science):
 - n Food safety and human nutrition.
 - n Environmental impacts
 - n Corporate control and concentration
 - n Ethical implications (animal welfare)
 - n Consumer choice and information
 - n Globalization and trade protection
-

Social Changes Impact Demand for Food Products

- Consumer preferences and lifestyles
 - n Time shortage --> convenience
 - n Health concerns --> low-fat, nutritious
 - n Taste and value remain paramount
 - Food safety and environmental impacts
 - n Media stories drive fear (GM Foods)
 - n Trend toward organic foods
 - n Concerns about industrialization
-

Critical Social Issues Related to Food Biotech

- More consumers are opting out of the industrial food system in favor of booming organic market
 - Growing sense among consumers and food industry that risks are not being discussed and addressed in open manner
 - Food industry is very opposed to using food crops for drug production
 - Confidence in US government has dropped significantly in recent years.
 - Poorly-timed WTO case has made trade matters worse in Europe and elsewhere
-

Controversy Erupts in EU

- 1996 – Mad cow disease linked to human brain disease
- 1997 – European consumers protest US shipments; Monsanto targeted
- 1999 – Activists get violent; Secretary Glickman is pummeled in Italy; Monsanto PR campaign backfires in the EU; Brazil, Australia and China threaten ban; Monarch butterfly scare
- 2000 – Starlink corn crisis

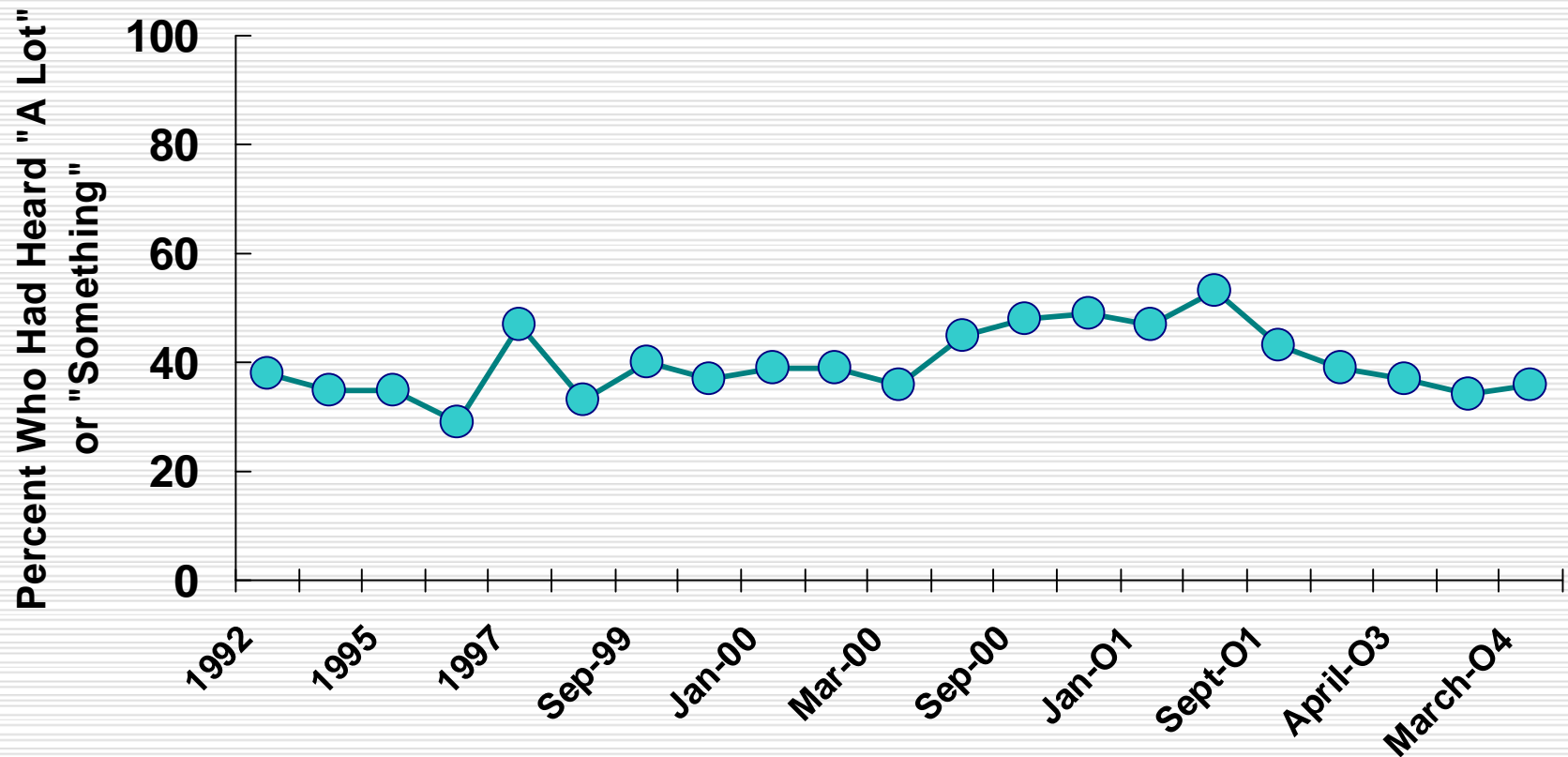


Controversy Spread to the US

- 2001 – Application for GM fish is submitted to FDA; EU says labeling will be mandatory, trade war looms; Mexican maize contamination reported; Monsanto abandons New Leaf potato
 - 2002 – Prodigene episode
 - 2003 – SubSaharan African nations reject US food aid with GM corn; US sues EU in WTO; organic becomes “gold standard”
 - 2004 – New EU rules go in effect; Monsanto shelves GM wheat; Glofish released unregulated
-

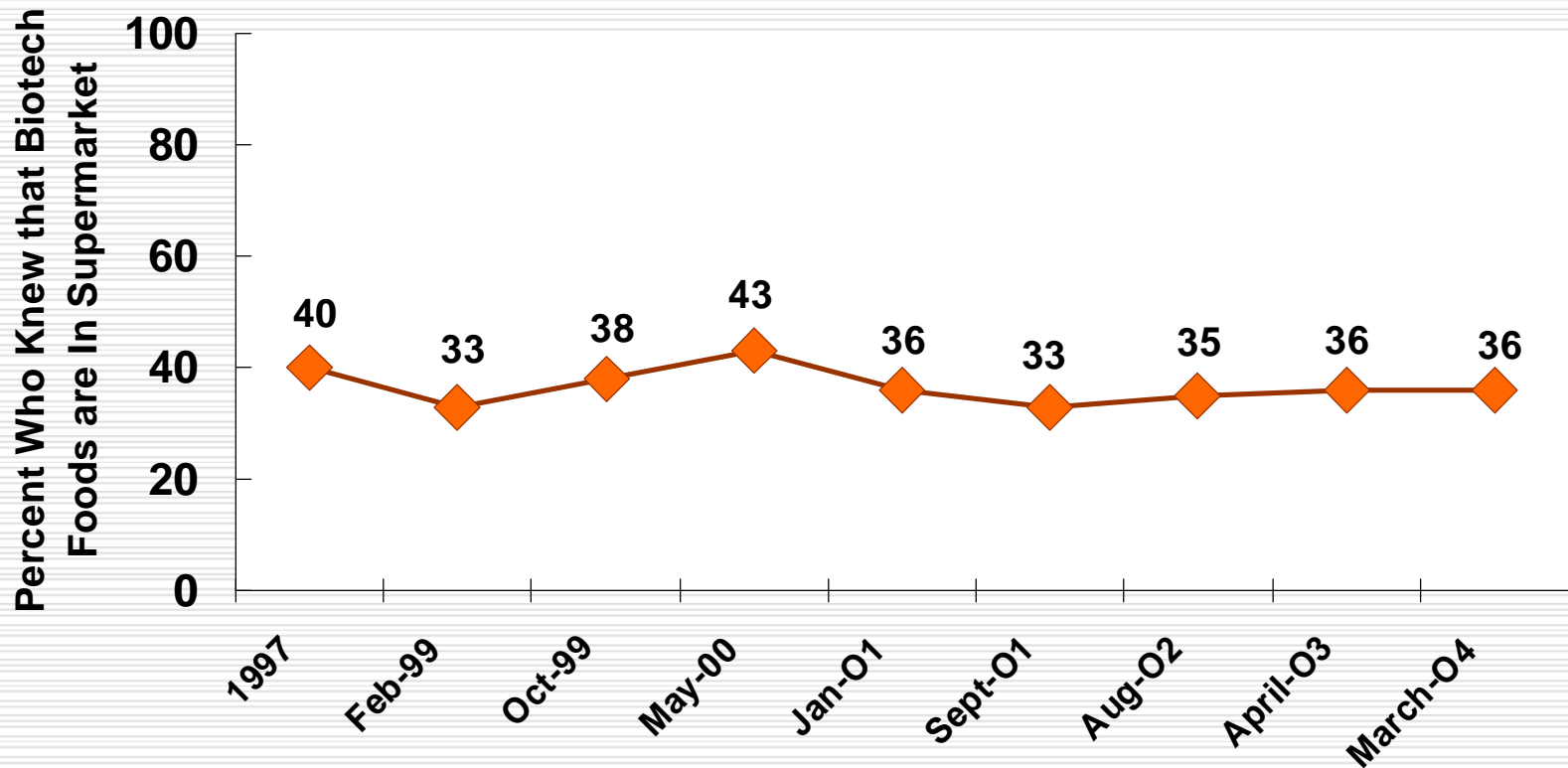
US Acceptance of Biotech is Trending Toward the EU

Trends in U.S. Consumers' Awareness of Biotechnology



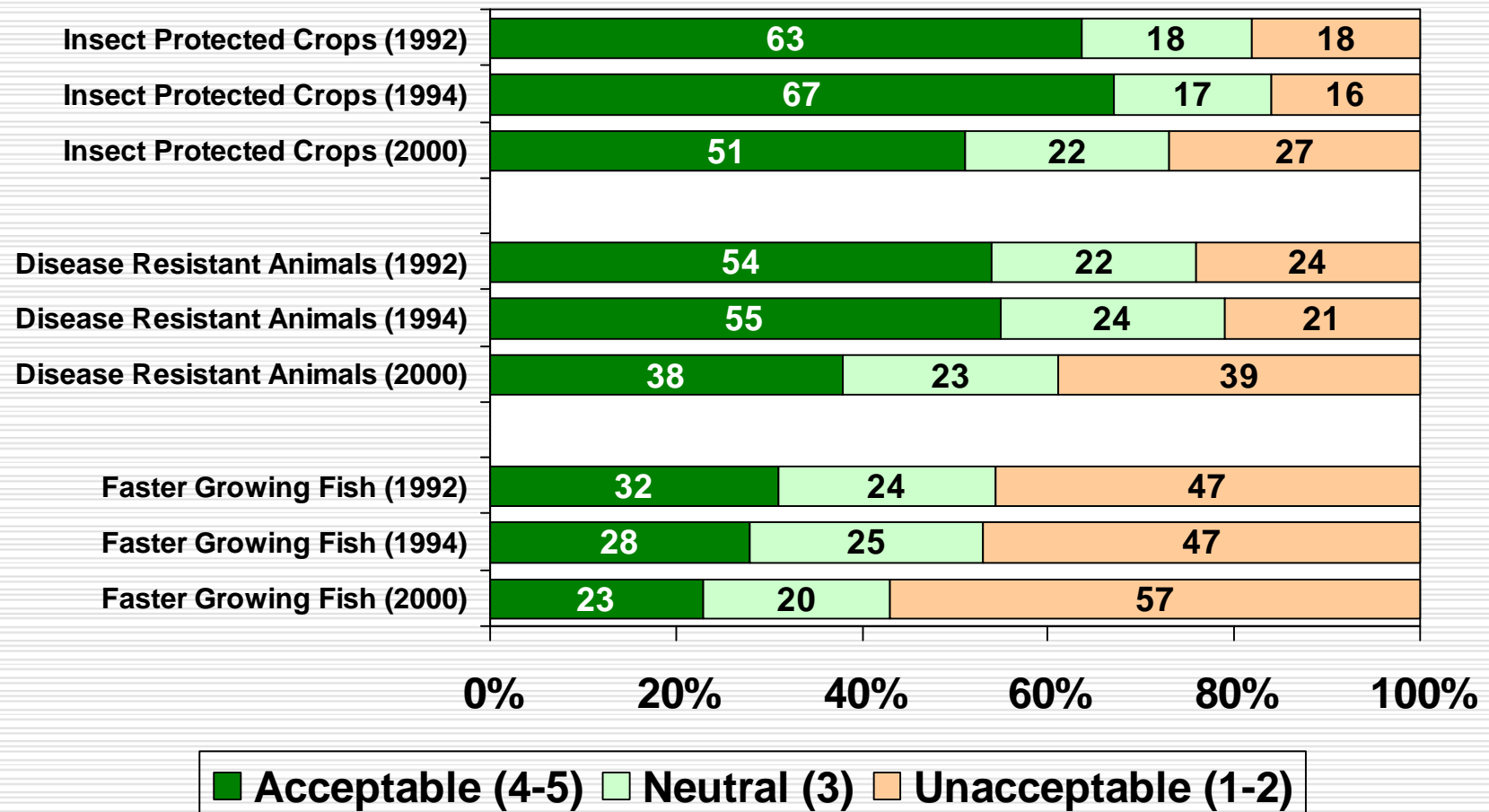
(Various Sources)

Most American Consumers Still Do Not Know that Foods Produced with Biotechnology are Already in Stores



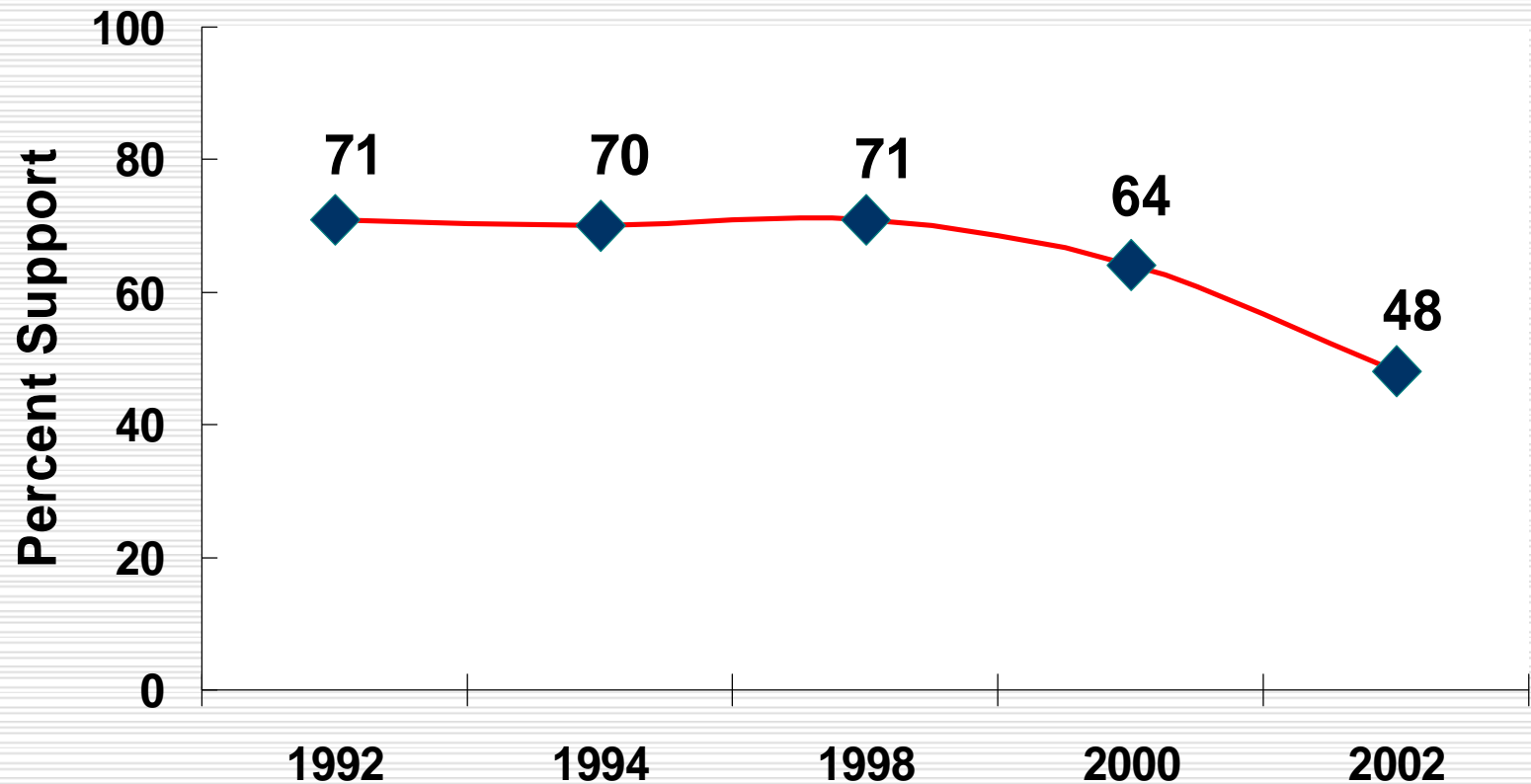
(IFIC, 2003)

US Acceptance of Biotechnology has Dropped –



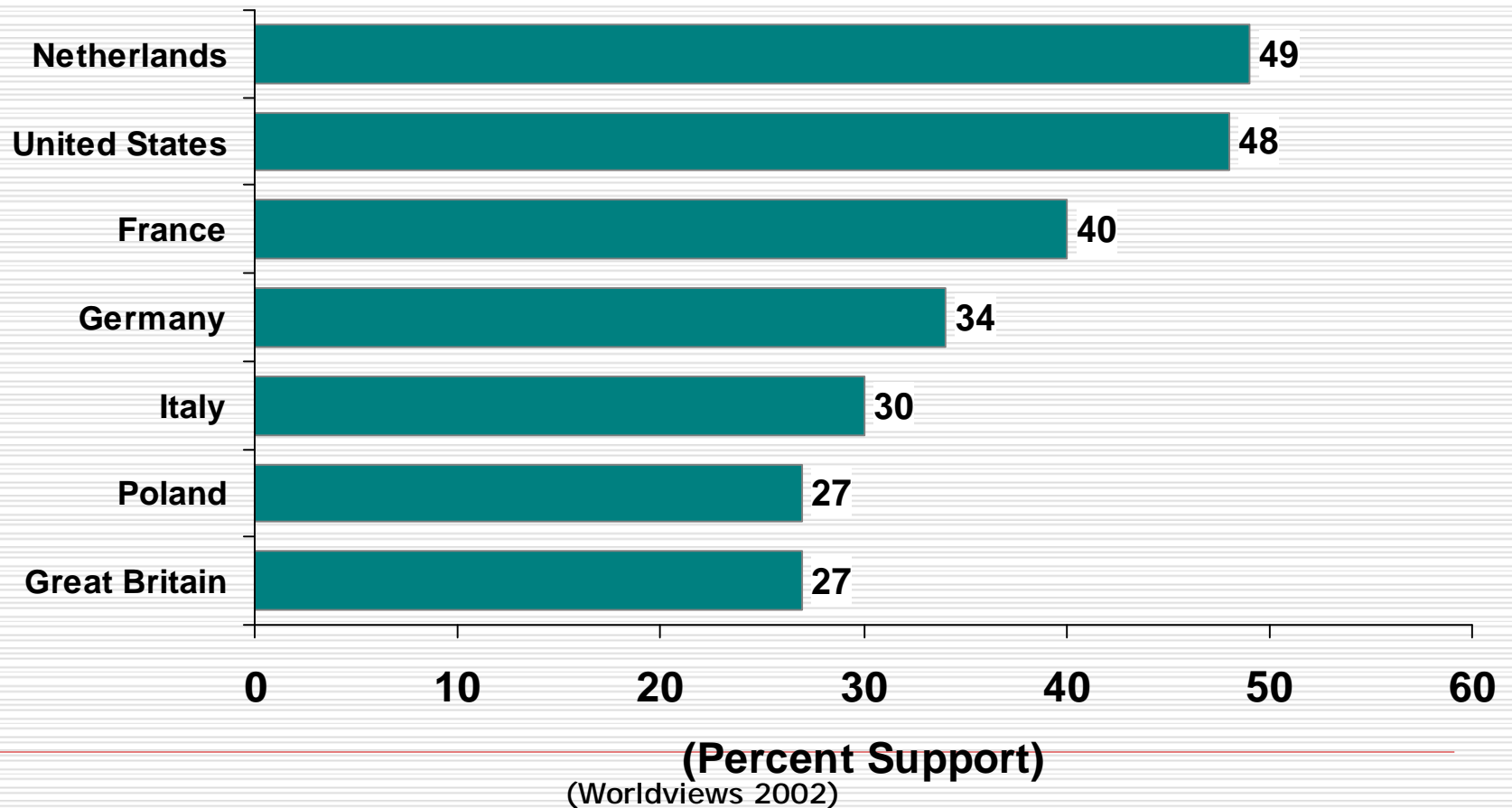
(Hoban, 1992-2000)

American Consumer Support for Ag Biotech Dropped around 2000

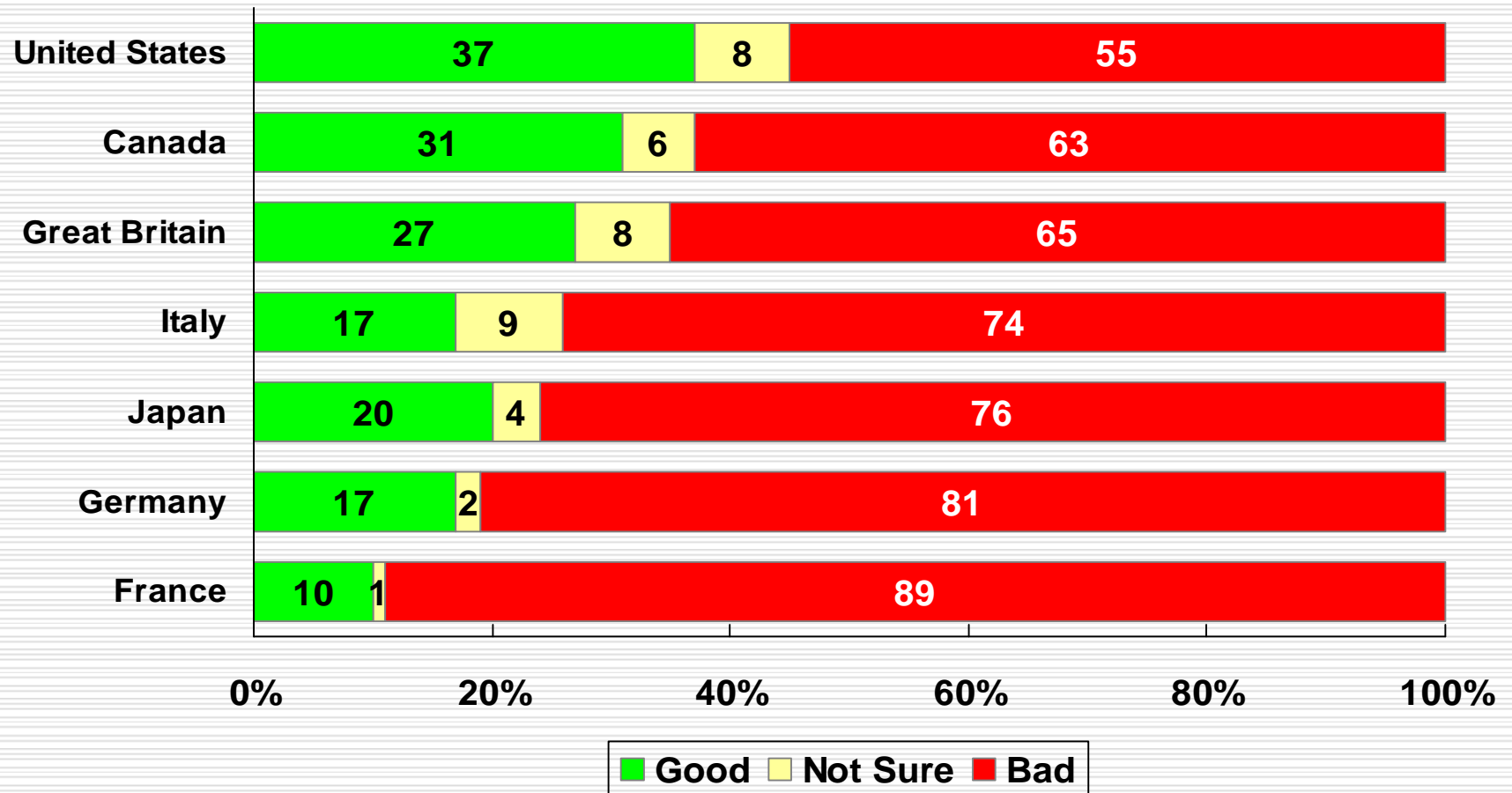


(Hoban and Others)

US Support for Ag Biotech is No Higher than in Parts of Europe



Is it good to scientifically alter fruits and vegetables because it increases yields to feed more people and is good for the environment; Or is it bad because it could hurt human health and the environment.



(Pew Global Attitudes 2002)

The Timing of the WTO Case Could not Have Been Worse

- Following so close after the Iraq war, the WTO case was perceived as retaliation against France for their lack of support for the US invasion.
 - The Bush administration is seen as having a poor environmental record and no credibility with the world community on such issues
 - The situation in the EU had actually improved significantly in prior to the case.
 - The WTO case has forced the EU to impose their strict labeling and traceability regulations.
 - World opinion about the US is already very negative and this only makes matters worse.
-

The WTO Case is Seen as Self-serving

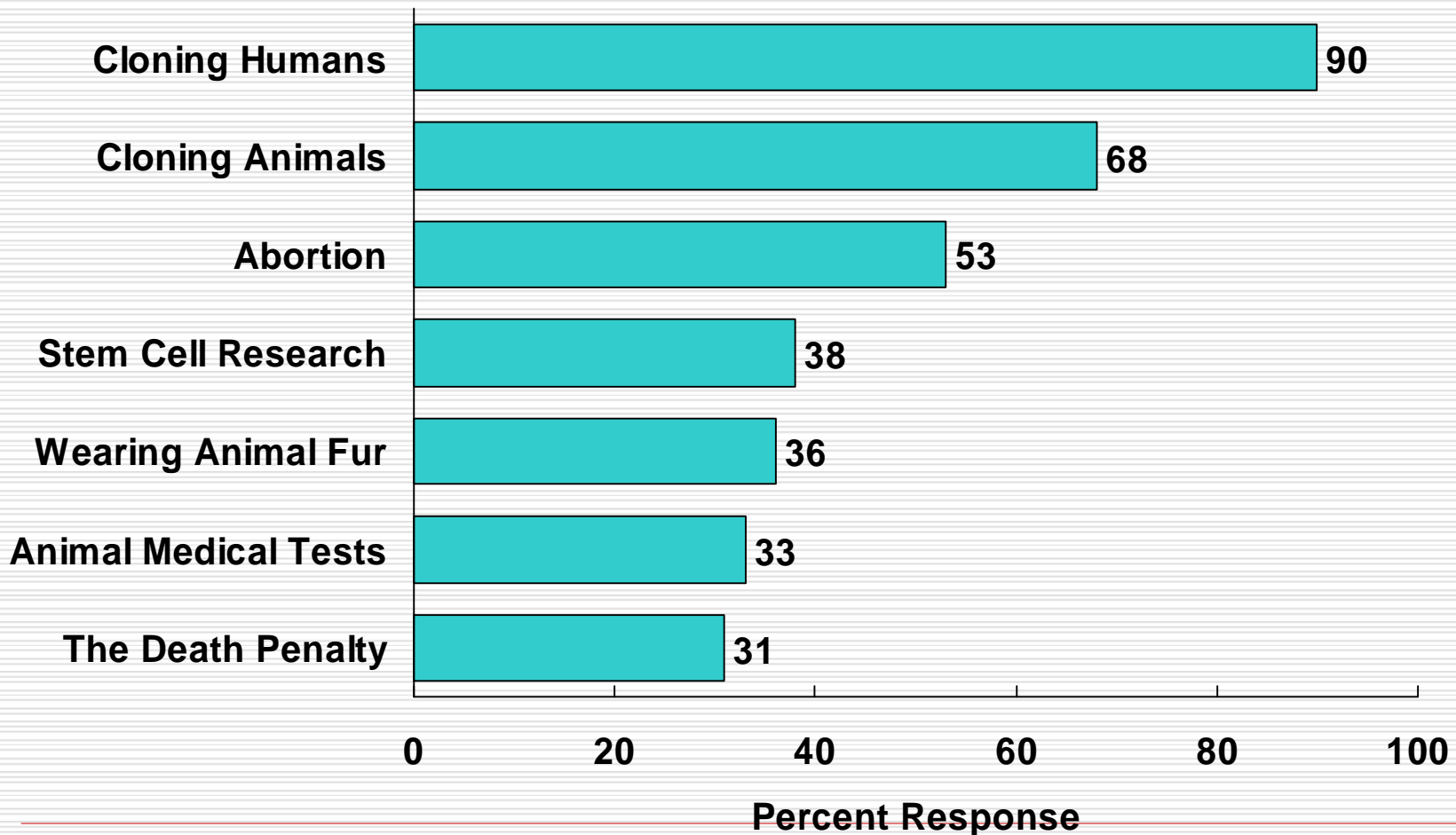
- Perceived as using the problem of African starvation to promote US biotechnology.
- This case is seen as hypocritical because the US has only three percent of the world's people, but we consume 25 percent of the world's oil.
- High rates of US obesity and our "fast-food culture" means Americans have little credibility with the EU or others when it comes to issues associated with food
- As the global leader, US-based Monsanto is seen as the primary beneficiary of biotechnology and hence driving US government policy.

**Most People Have
Serious Concerns
about Meat and Milk
from Cloned or
Transgenic Animals**

Why Animal Biotechnology is Less Acceptable than Plants

- People worry a lot about animal pain and suffering (anthropomorphism). People love their pets and care about wildlife.
 - Trend toward vegetarianism and animal rights (especially among young women)
 - Animals can move around once released into environment (concerns over GM fish)
 - Once we modify animals, it could be a slippery slope to genetically modified people. Animal biotechnology sounds bad (“yuck”)
 - The federal government is unprepared for the arrival of cloned or GM animals (which will be met with considerable consumer opposition).
-

US Consumers' Views that Actions are Morally Wrong

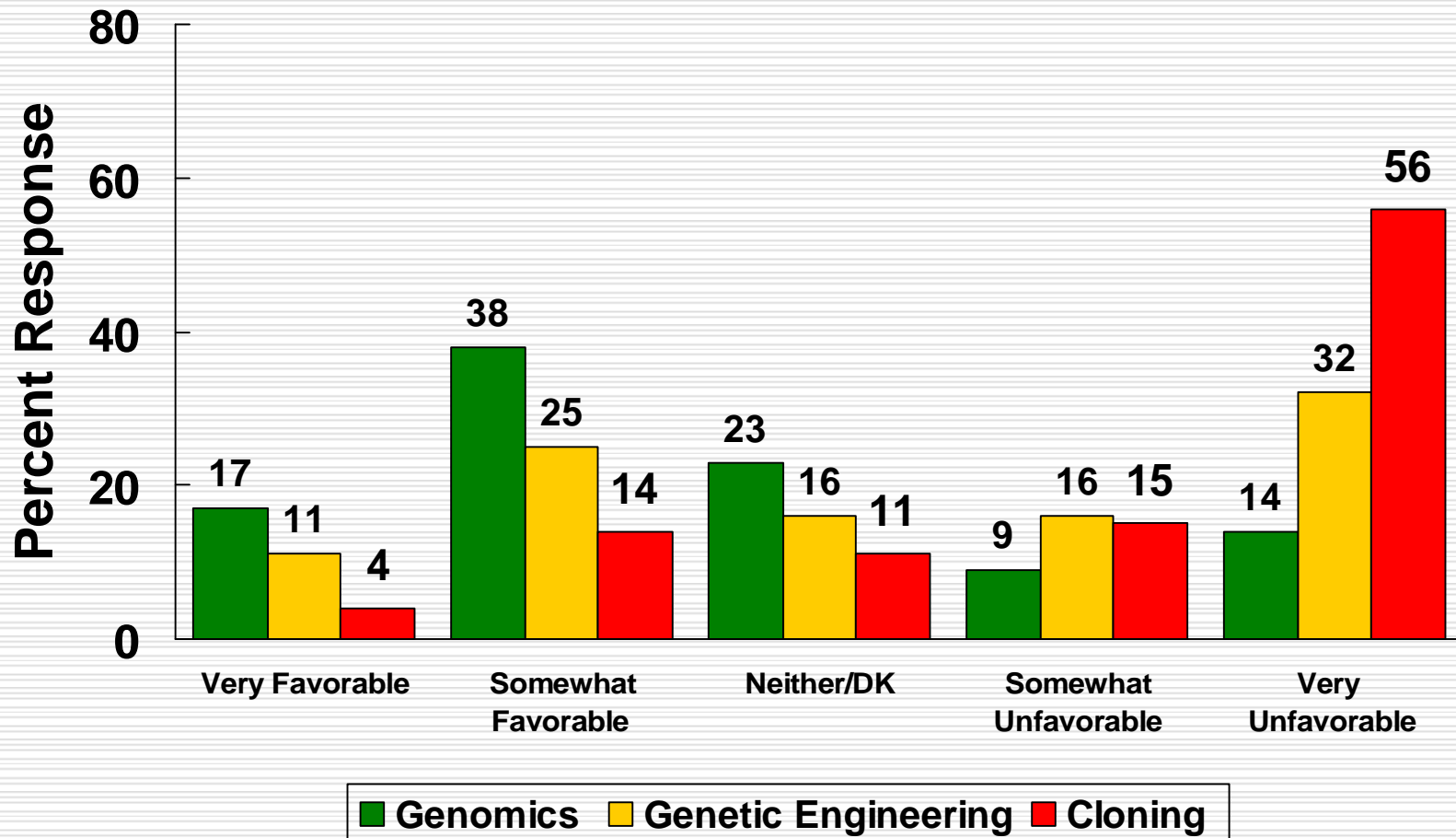


(Gallup, 2003)

Descriptions of Three Different “Forms of Animal Biotechnology”

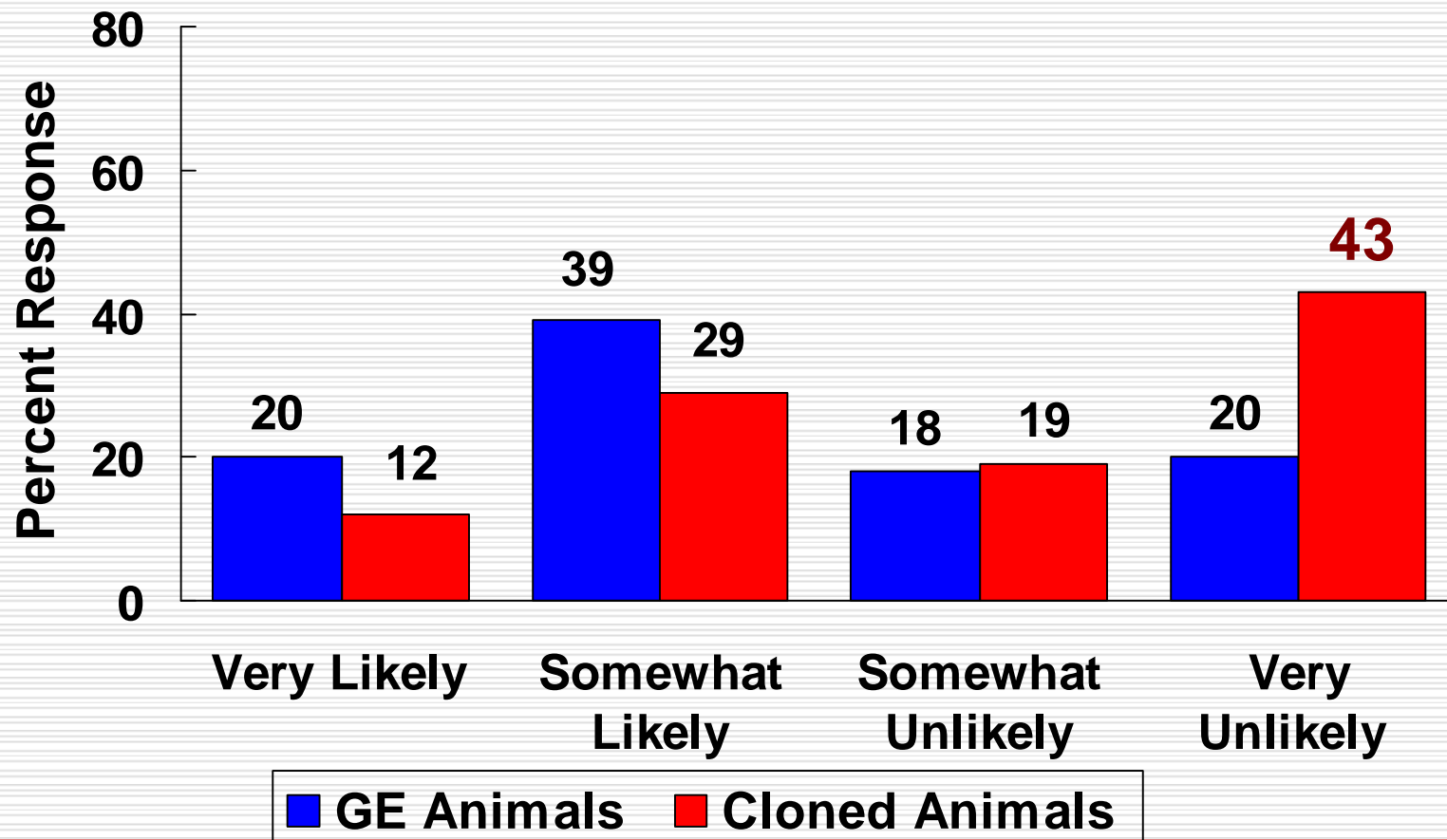
- Genomics “uses knowledge about genetics to improve overall animal care and nutrition.”
- Genetic Engineering “allows us to move beneficial traits from one animal to another in a precise way.”
- Cloning “retains desirable traits by producing animals that are biologically identical to their parents.”

American Consumers' Overall Impressions of Animal Biotechnology



(IFIC, 2004)

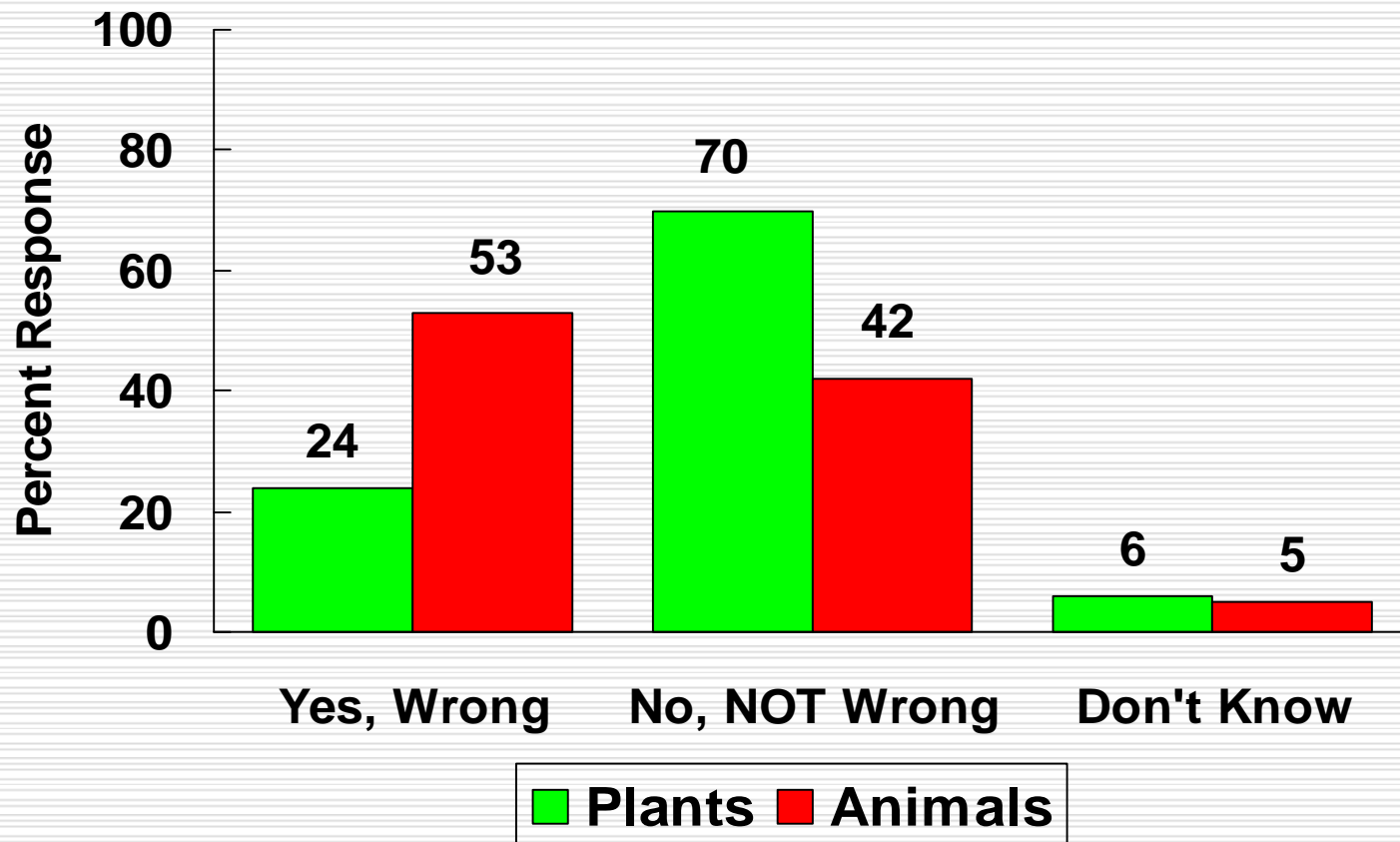
“If FDA determined that meat, milk and eggs from animals enhanced through genetic engineering (*cloned animals*) were safe, how likely would you be to buy them?”



(IFIC, 2004)

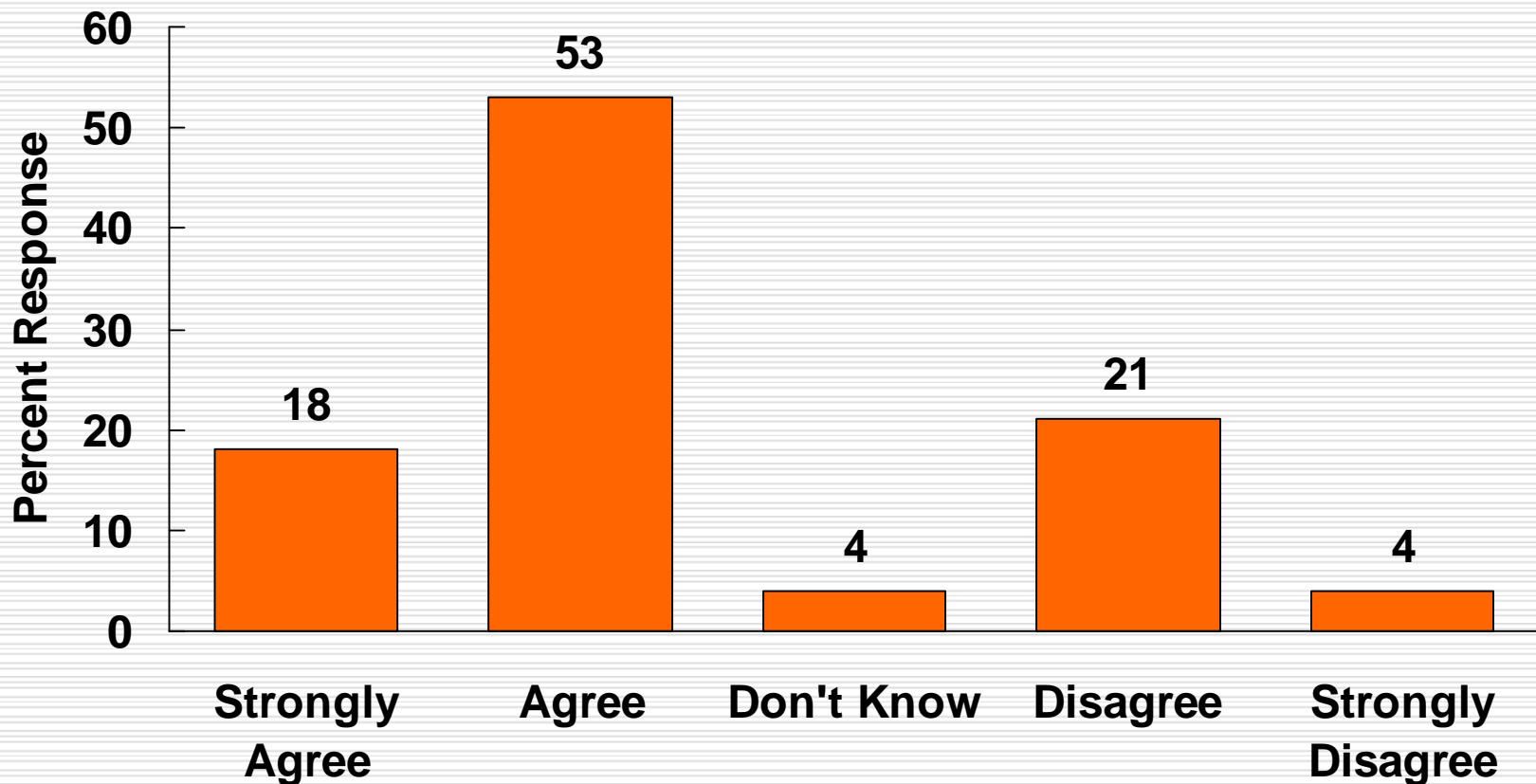
Most U.S. Consumers Believe Animal Biotechnology is Morally Wrong

(1 in 4 also object to Plants)



(Hoban and Kendall, 1992)

Most agree that “Animals have rights that people should not violate.”



(Hoban and Miller, 1998)

US Consumers have Concerns about Policies and Regulations

American Consumers Express Concerns over Biotech Risks

Ø 80% agree "Humans are not perfect, so serious accidents involving GM foods are bound to happen."

Ø 74% agreed "Nature is so complex it is impossible to predict what will happen with GM Crops."

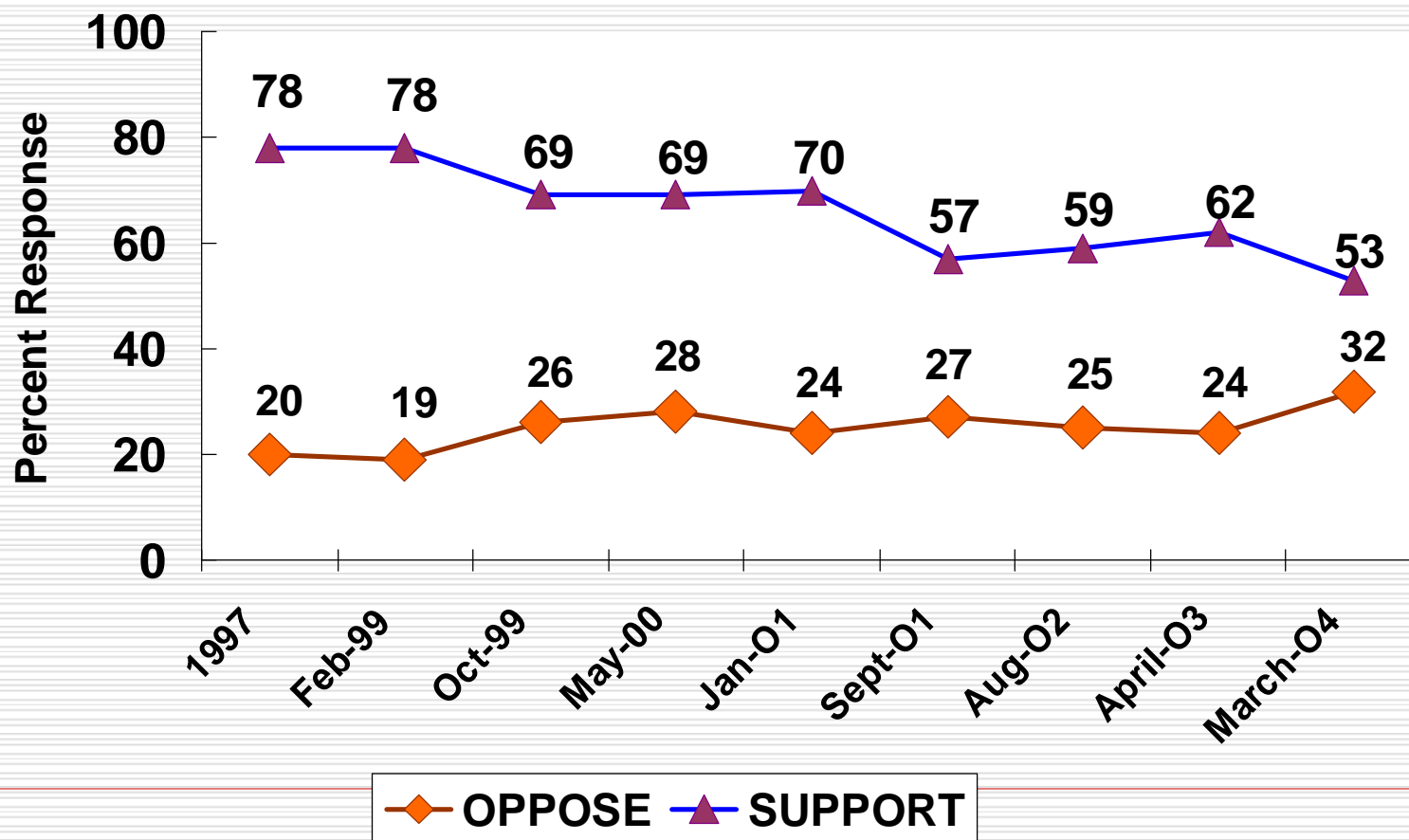
Consumers Have Doubts about Motives and Management

- ∅ 73% agree "Most GM foods were created because scientists were able to make them, not because the public wanted them."
- ∅ 68% agree "Companies involved in creating GM crops believe profits are more important than safety."

American Consumers Expect MORE FDA Regulation of GM Food

- ∅ 89% agree "Companies should be required to submit safety data to the FDA for review, and no GM food product should be allowed on the market until the FDA determines it is safe."
- ∅ 35% agree "Companies should be allowed to put a GM food product on the market without any special review by the FDA, if the company can show it is as safe as any food." = Response *from Bush FDA*

Public Support for FDA's Labeling Policy has Fallen Over Time



Conclusions and Implications

Consumers and Food Industry Expect Strong Regulation

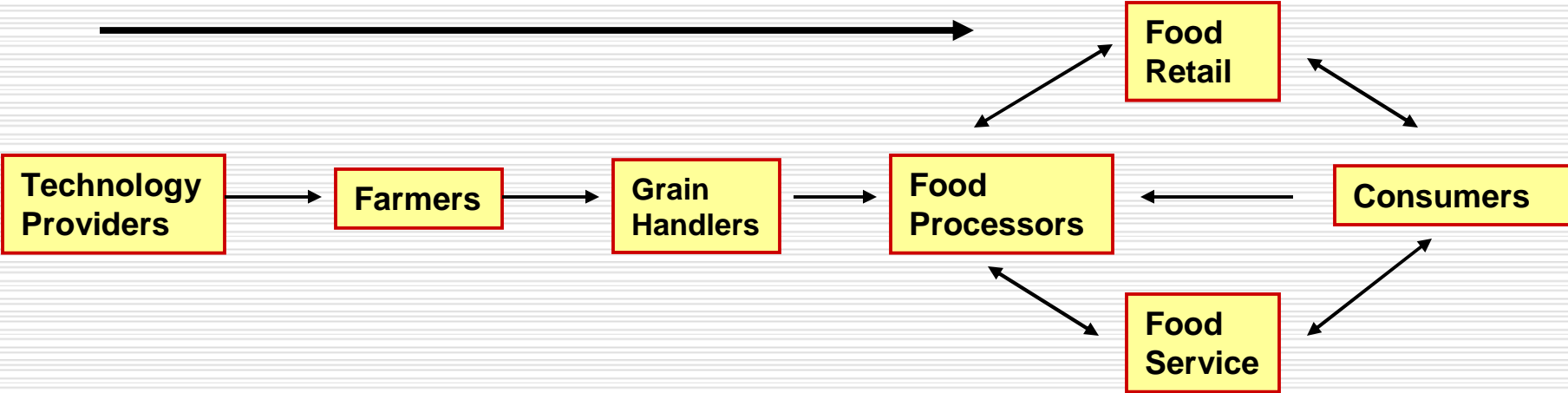
- Recognize that consumers and food industry will NOT accept use of food crops for pharma
 - Acknowledge the scientific uncertainty and market backlash with cloned and GM animals
 - Increase govern oversight once foods are no longer substantially equivalent (functionally non-equivalent)
 - Re-examine labeling policy in light of proliferation of the “non-GMO” claims (chaos)
 - But, US government is losing status as global biotech regulatory leader to the European Union
-

Must Respect the Needs and Concerns of the Food Chain

- The food processing, retail and service sectors have significantly more market clout than the agricultural and biotechnology sectors combined.
 - So far, biotech has only meant headaches and costs for the industry (no real benefits in sight for years.)
 - The food industry has stated publicly that it does not want food crops used for pharmaceutical production.
 - If food processors decide to stop accepting GMO crops, the ag biotech industry is basically done
-

Model of the Modern Food Production and Processing System (within the global economy)

Biotechnology and Identity Preservation



As this system becomes more complex and challenging there will be many opportunities for innovative partnerships.

Efficient Consumer Response (ECR)

Social and Cultural Context Has an Important Influence

	United States	European Union
Trusted sources of Information	Scientists and Government	Consumer Groups
Role of Food in Society	Eat to Live (Convenience)	Live to Eat (Culture)
Philosophy of Technology	Hopeful (Progress)	Skeptical (Caution)
Orientation toward Time	Look to the Future	Long for the Past

Politics and Economics are Major Sources of Disagreement

	United States	European Union
Structure of Agriculture	Large, Invisible, and Efficient	Small and Inefficient
Market Structure	Free Market with Government	Government managed
Basis for Regulation	Product-based (Science)	Process-based (Political)
Presumptive Position	Safe until Proven Risky	Risky until Proven Safe

Public Acceptance will be Compromised by WTO Case

- Most American consumers do not think they are currently eating any GM crops
 - The WTO-case will likely cause more people in the US to question whether they have been consuming such foods
 - As they become aware some US consumers now resent the fact that GM ingredients have been added to the food supply without consent
 - Concerns are growing over the use of food crops for pharmaceuticals and industrial materials (especially among the food industry)
-

Strategies for Reducing GM Backlash with US Consumers

- Acknowledge that we have been consuming foods with GM ingredients for many years.
 - Need to build the trust with the truth
 - Spend more time and money educating consumers and the food industry about modern US agriculture so they have a context.
 - Recognize that many US consumers now have concerns over biotechnology.
 - To promote actual consumer demand (instead of holding off rejection) you should use one message: *“Biotechnology reduces the use of chemical pesticides.”*
-

Points for Reflection

- “Sound science” is only one factor influencing public perception and public policy. For many people this is no longer enough.
 - People choose food based on emotion not logic; consumers want and will demand choice.
 - Recognize that perception is reality. Education about benefits will not calm concerns over risk.
 - Biotechnology benefits must exceed risks; but few benefits will outweigh moral objections (as with animal biotechnology)
-

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