



Trim,  
14<sup>th</sup> Sept. 2007

A wide-angle photograph of a lush green rural landscape. In the foreground, a large green field contains a few brown cows grazing. A single tree stands on the left. The middle ground shows rolling green hills with stone walls and a few buildings. The background features more distant hills under a cloudy sky.

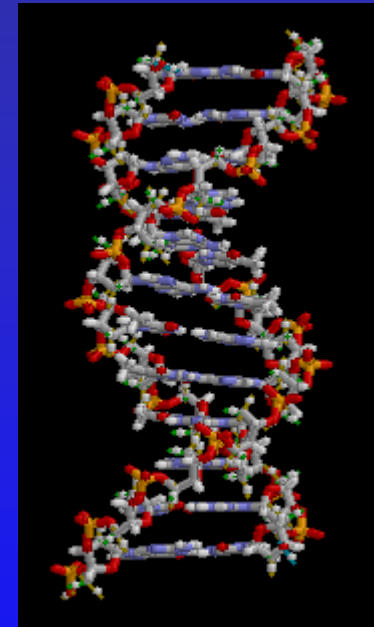
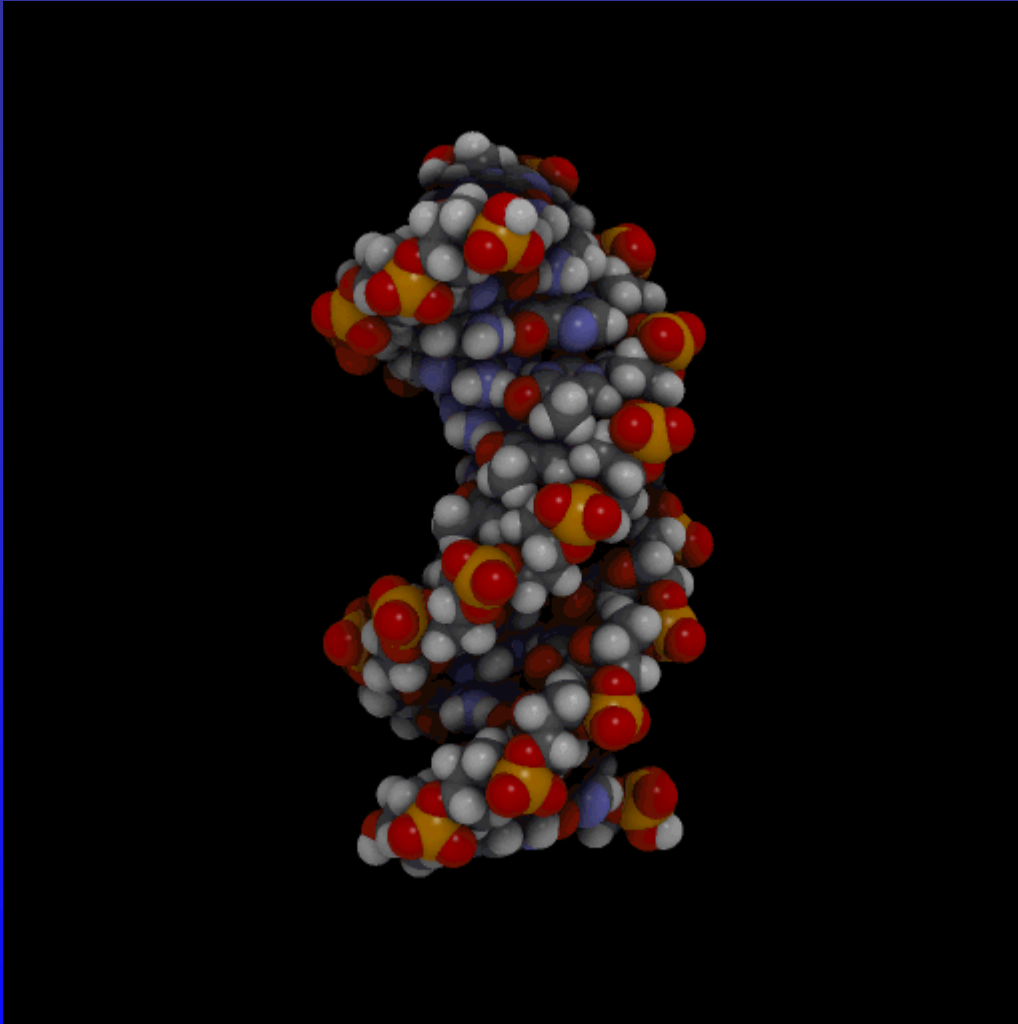
# Science and the the New Agri-Food Sector – The GM Case

Patrick Cunningham,  
*Chief Scientific Adviser to the Government*

# Timeline to GM

- **1866 Mendel's Laws of Heredity**
- **1953 Crick-Watson determine the structure of DNA**
- **1970 Restriction Enzymes characterised**
- **1978 Gene for Human Insulin cloned**
- **1981 Transgenic mouse**
- **1983 PCR developed**
- **1992 EU Approves first GM vaccine**
- **1994 First GM plant enters the US market**
- **2006 102 million h.a. planted.**

# DeoxyriboNucleic Acid

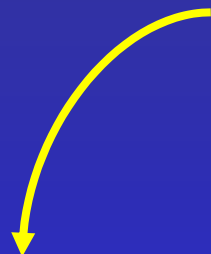


7: Disease assessment



Conv. potato GM potato

1: Sterile potato culture



2: Excise internodal explant



Generation of GM blight resistant potato (~18 weeks from phase 1-7)

3: Explant dip in Agrobacterium equipped with RB gene to confer blight resistance

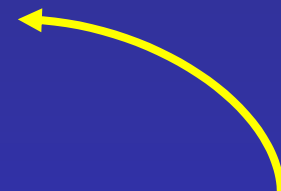
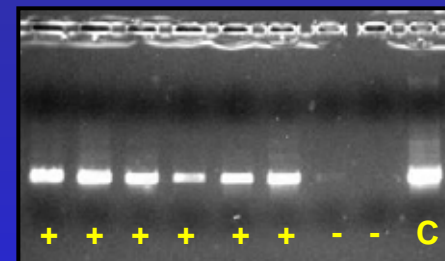


4: Regeneration of GM line from treated explant tissue



4

6: Molecular verification of modification



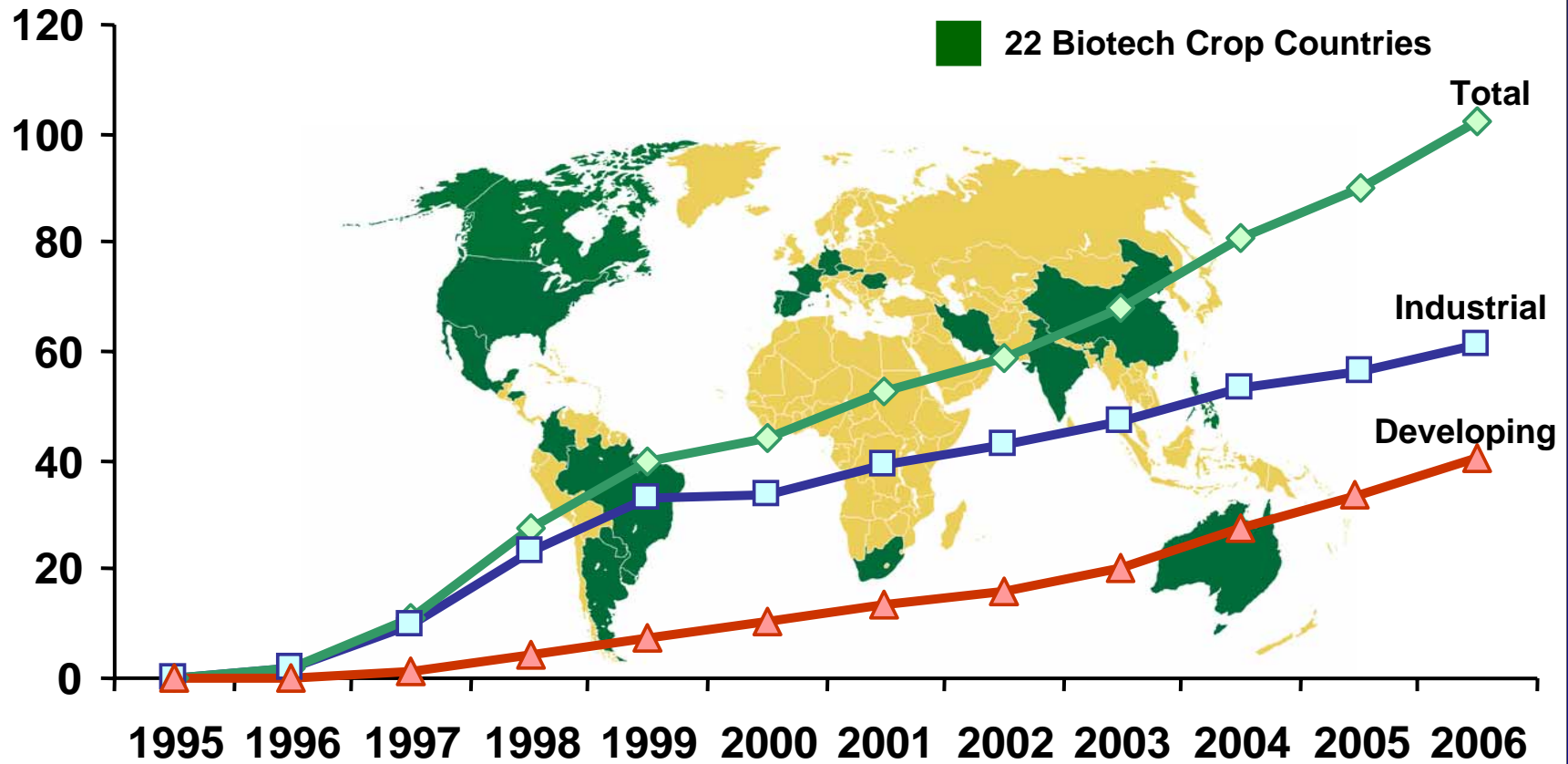
5: Growth of GM line in high nutrient media



Credit Ewen Mullins, Oak Park Teagasc ASA 2007

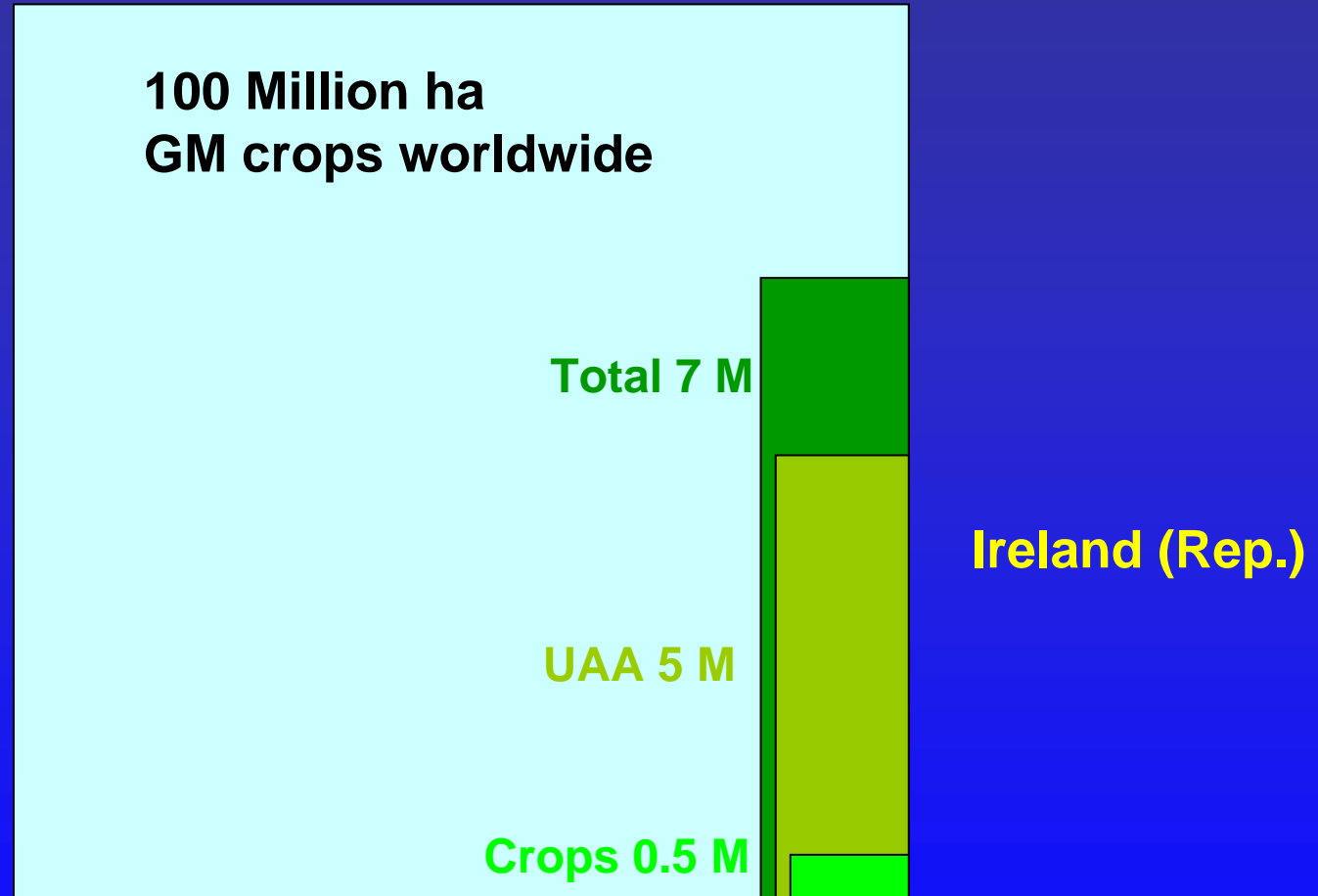
# GLOBAL AREA OF BIOTECH CROPS

Million Hectares (1996 to 2006)

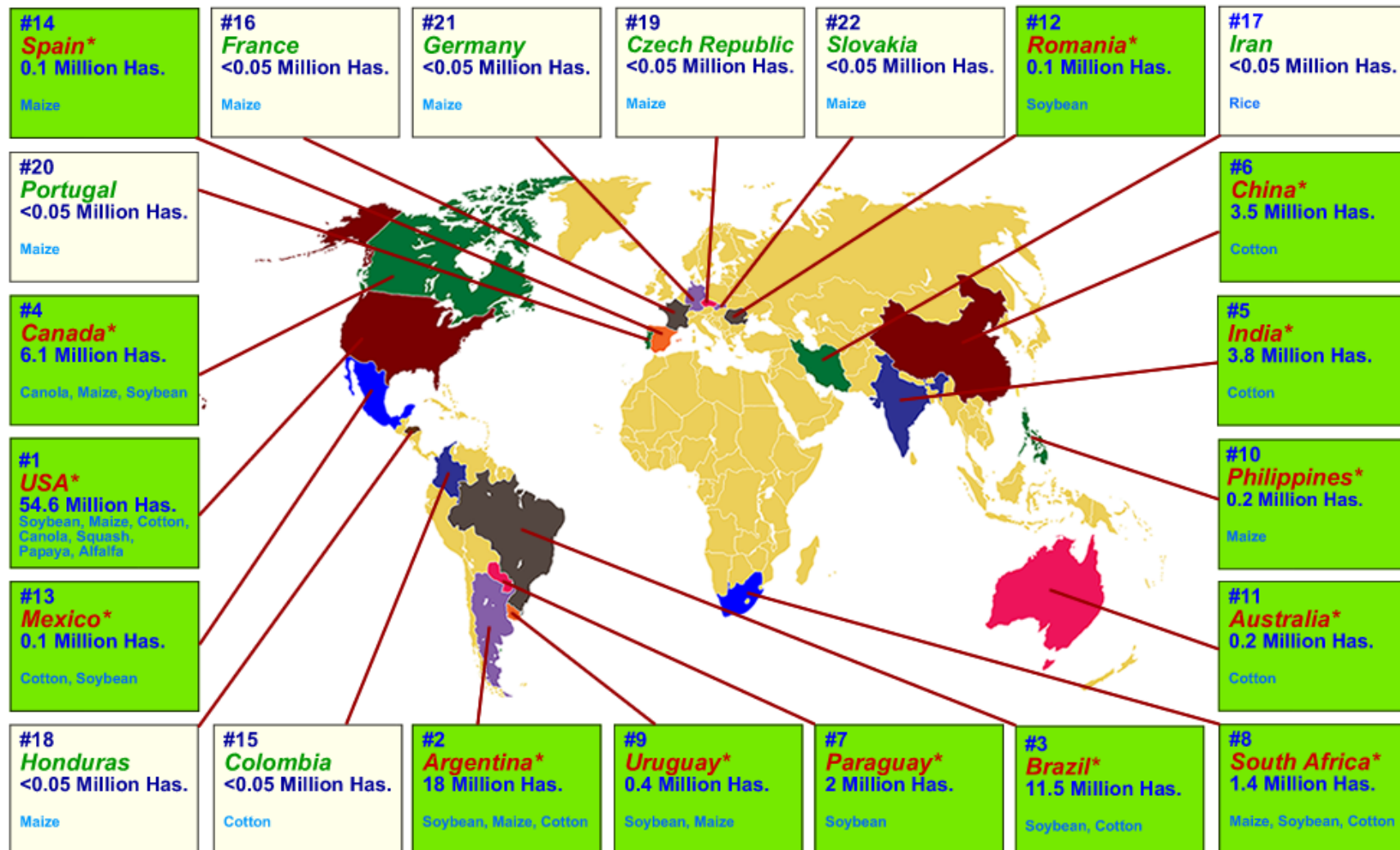


Source: Clive James, 2006.

# GM Crops in Perspective



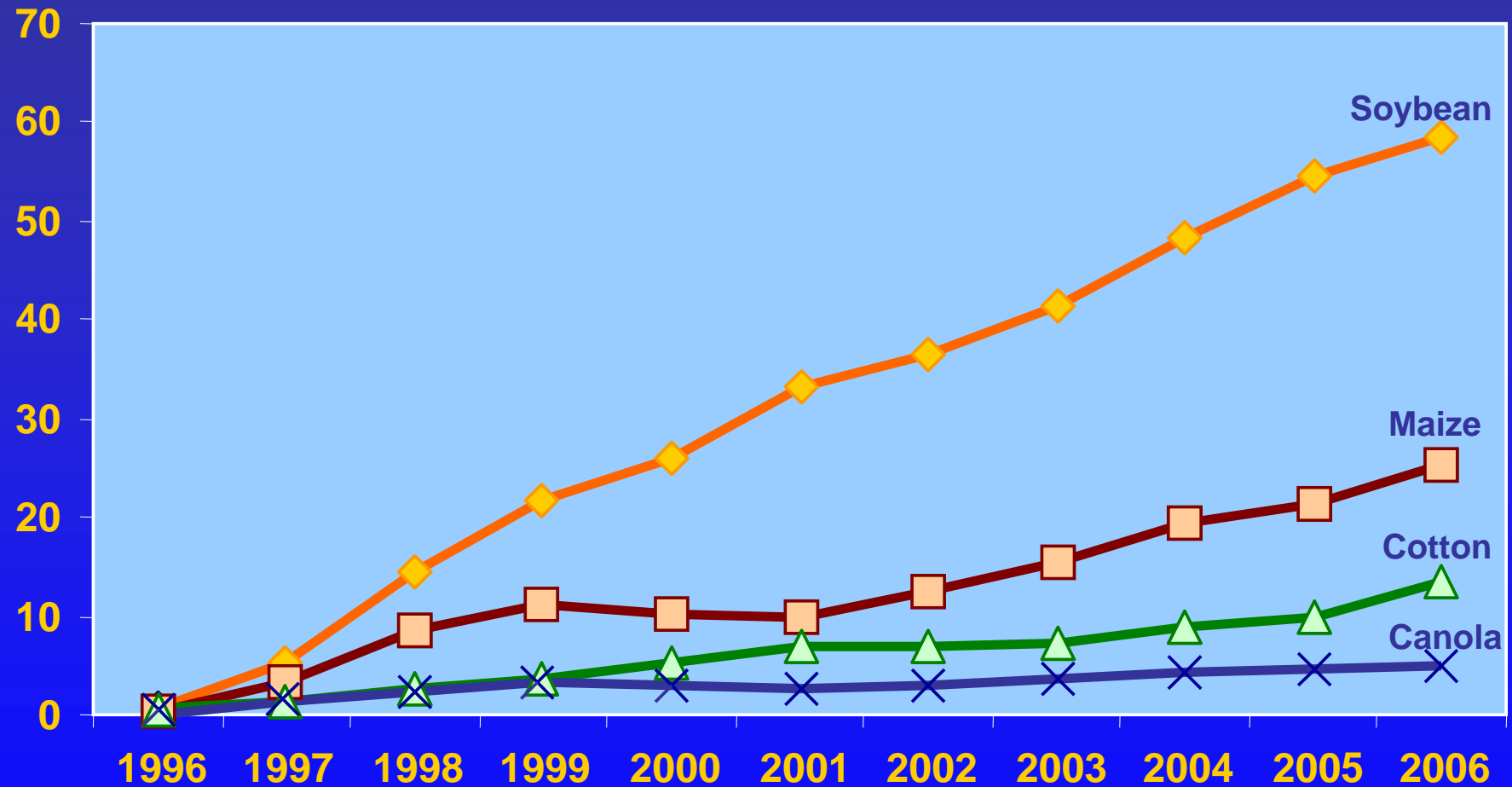
# Biotech Crop Countries and Mega-Countries\*, 2006



\* 14 biotech mega-countries growing 50,000 hectares, or more, of biotech crops.

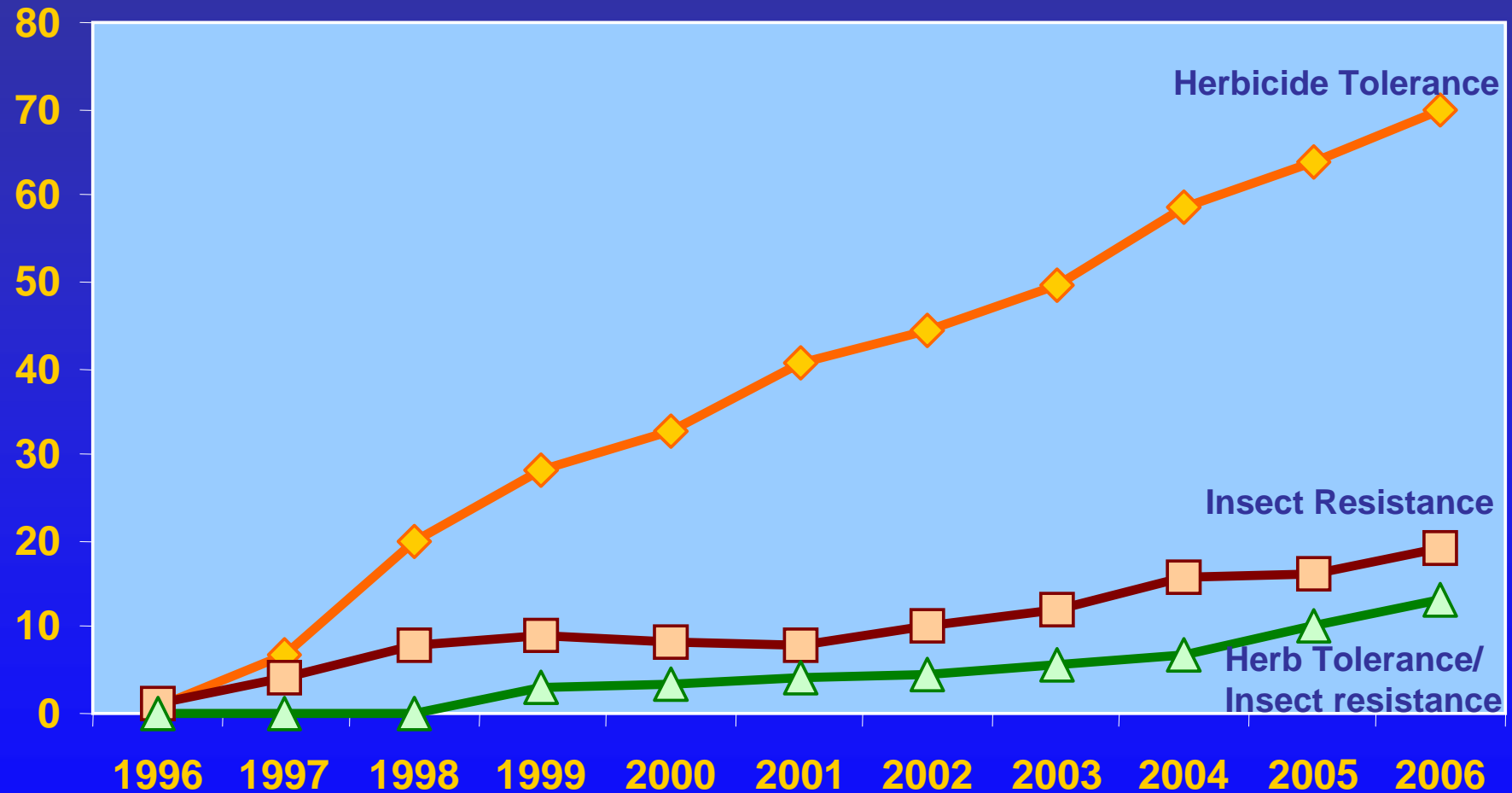
Source: Clive James, 2006

## Global Area of Biotech Crops, 1996 to 2006: By Crop (Million Hectares)



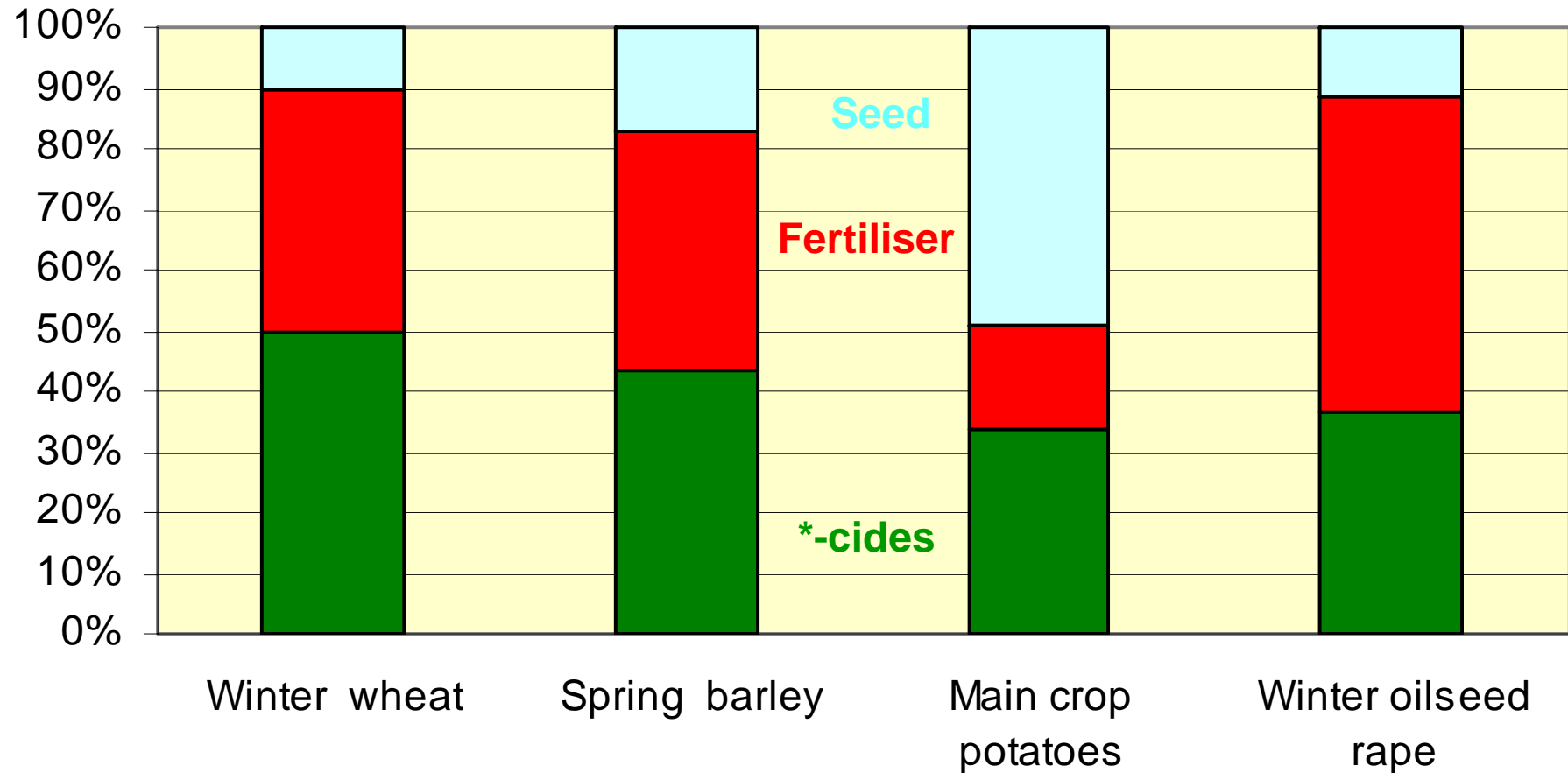
Source: Clive James, 2006

## Global Area of Biotech Crops, 1996 to 2006: By Trait (Million Hectares)



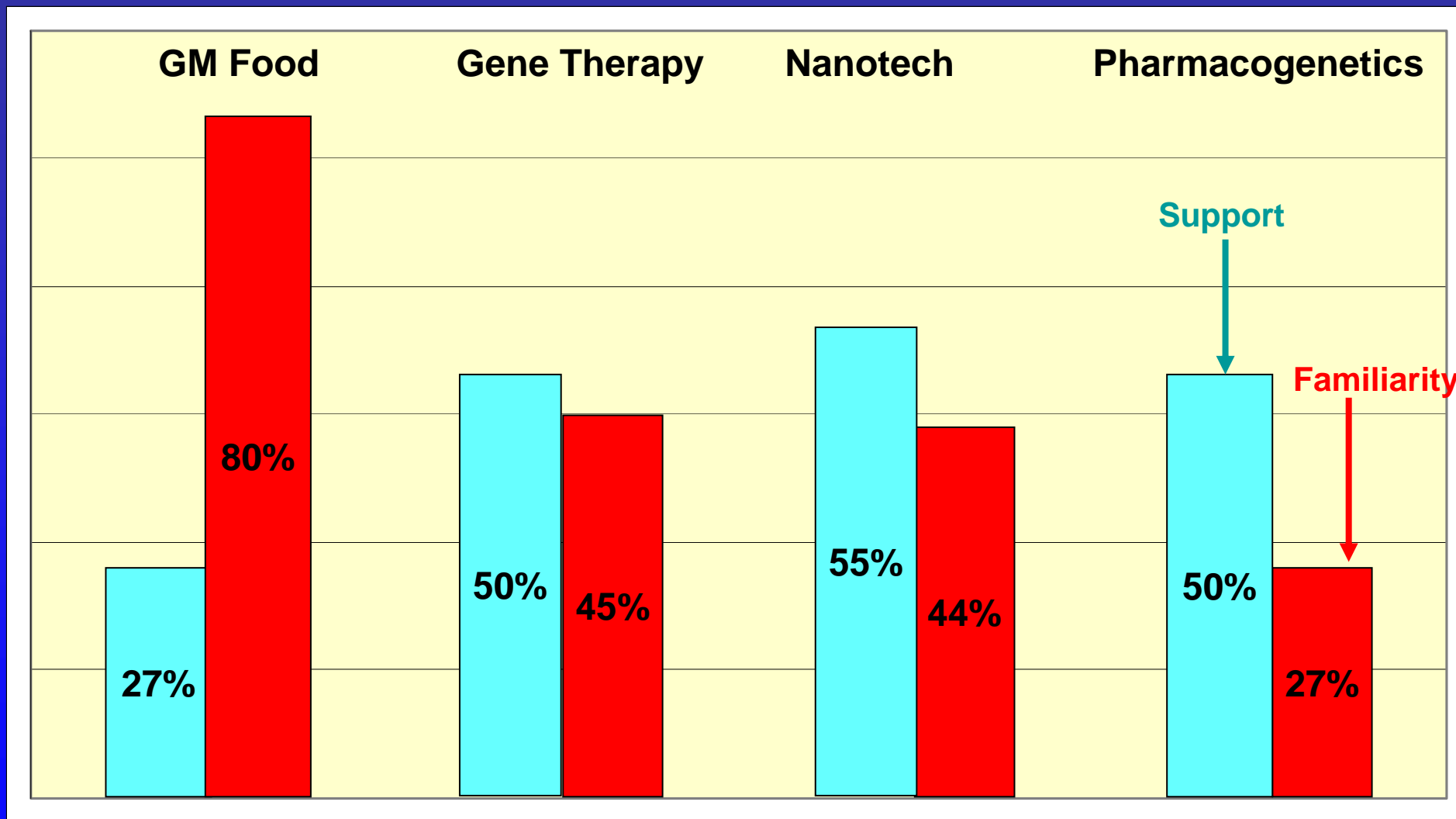
Source: Clive James, 2006

# Annual input costs



Source  
Meade & Mullins, Oak Park  
Teagasc

# Support for Four Technologies



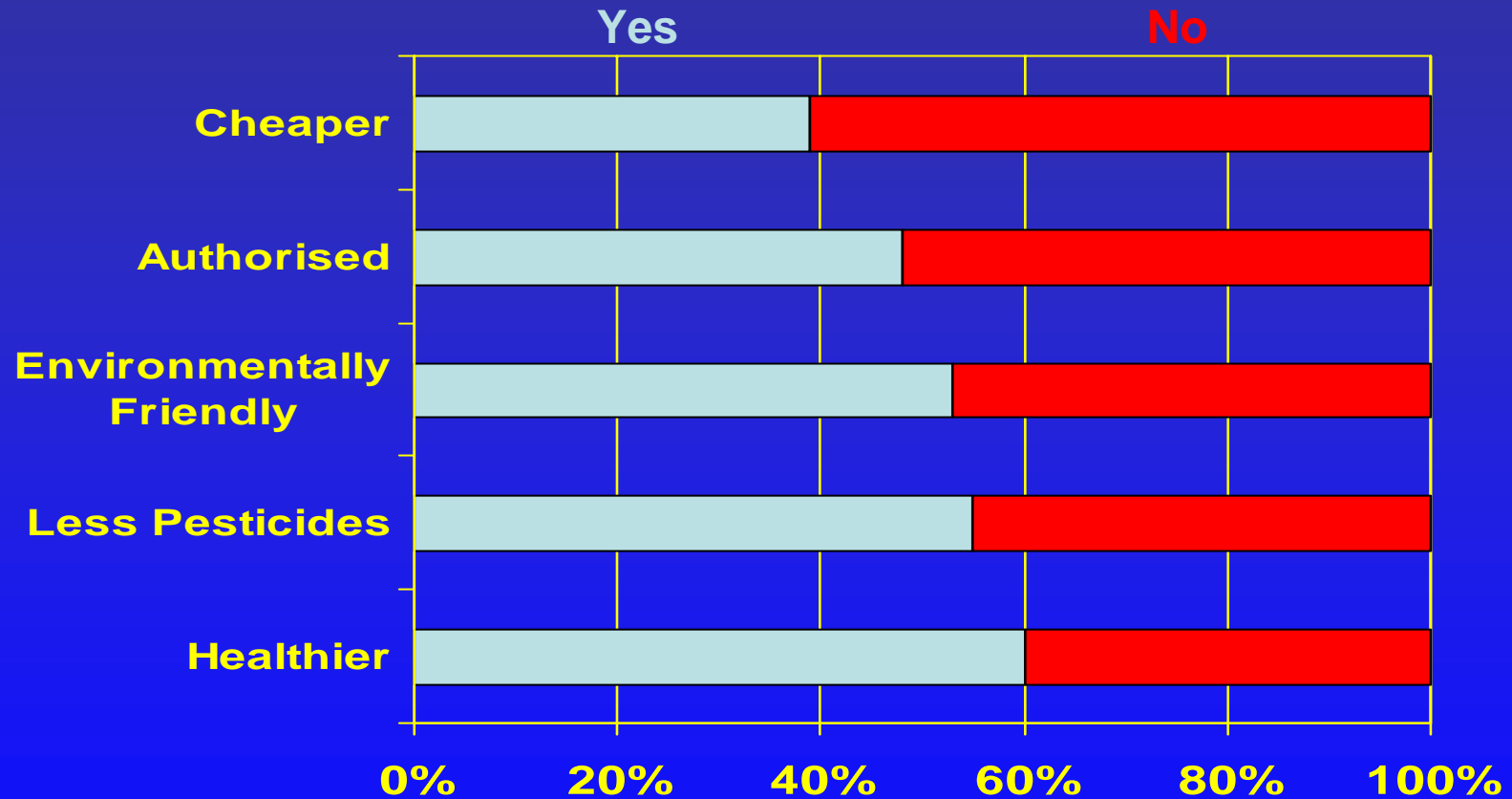
Source: Eurobarometer, 2006.

# Reasons for Opposition:

- Risk to human health;
- Environmental impact;
- Power of multi-national corporations;
- Deterioration in food quality;
- Threat to traditional farming; and
- General moral acceptability.

# Public Attitudes

*“Would buy GM products if...”*



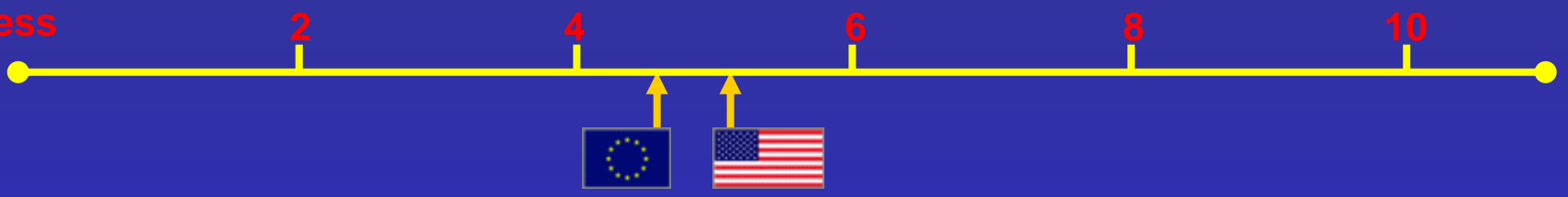
*Source: Eurobarometer, 2006.*

<<<< NEGATIVE

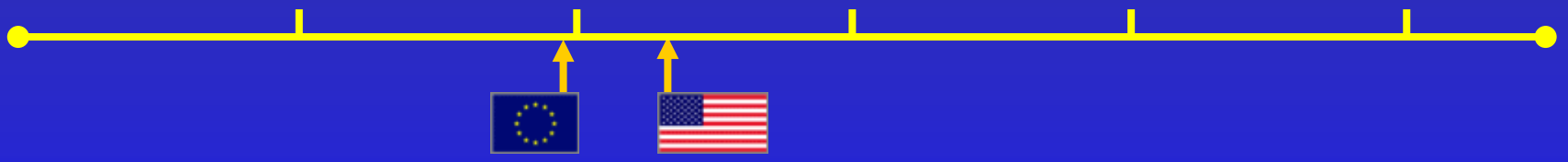
# Perceptions of GM Food

POSITIVE >>>>

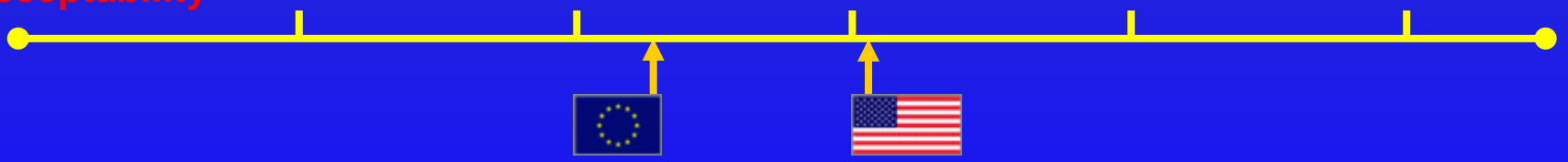
Usefulness



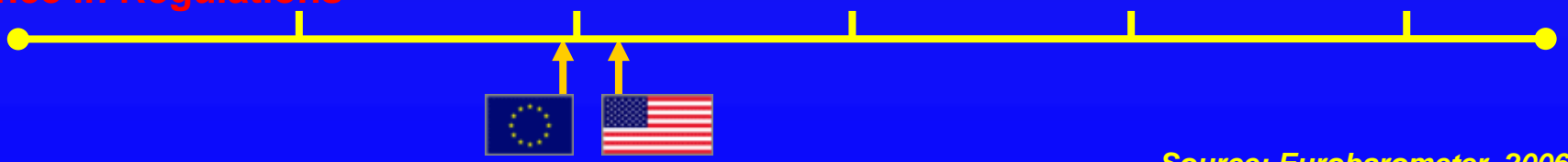
Safety



Moral Acceptability



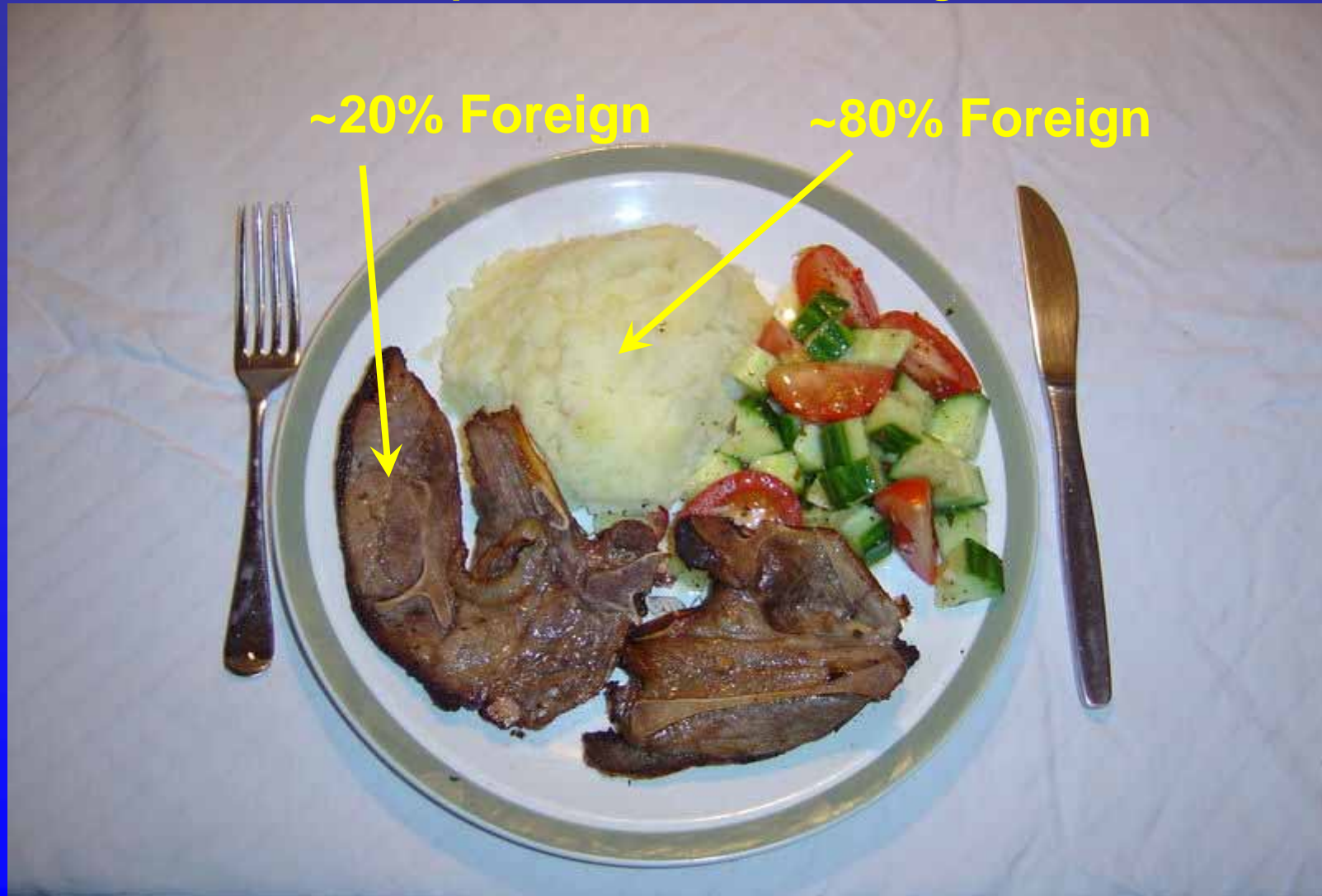
Confidence in Regulations



Source: Eurobarometer, 2006.

# Foreign DNA

We've been eating foreign DNA and its products since time began.



***“to date there have been no verifiable toxic or nutritionally deleterious effects from the consumption of GM crops or their derived foods”.***

**Genetically Modified Crops and Food: Threat or Opportunity for Ireland?**

**Irish Council for Bioethics, 2005.**

# Summary: Some GM Realities

- Most people are hostile to GM;
- Main reason is fear of health effects;
- Published research shows no negative health effects;
- No substantiated reports of negative health effects from millions of consumers;
- Surprisingly small amount of such published research;
- *More GM = less chemicals;*
- Biodiversity – more complex;
- GM crops expanding fast, even in Europe: 21 varieties now approved in EU;
- Case for research in Ireland.



**Thank You**