

# **The future of GM technology in the EU for Industry and Agriculture in the international context**

**GMO Technology Conference  
Dublin, 11 Oct 2013**



# EuropaBio: European Association of Biotechnology Industries

## Three sectors:

Industrial biotechnology / White : Industrial processes  
Healthcare biotechnology / Red : Pharmaceutical products  
Plant biotechnology / Green : Agriculture/ seeds

- 54 corporate members (Healthcare + Industrial + Agbiotech)
- 14 associate members and 2 Bioregions
- 17 national biotech associations = +1800 biotech SMEs

The voice for the biotech industry at the European level, representing 2000 agricultural, pharmaceutical and industrial biotechnology companies. Promotes an innovative and dynamic biotechnology-based industry in Europe.

## 9 Green biotech member companies



# Contents

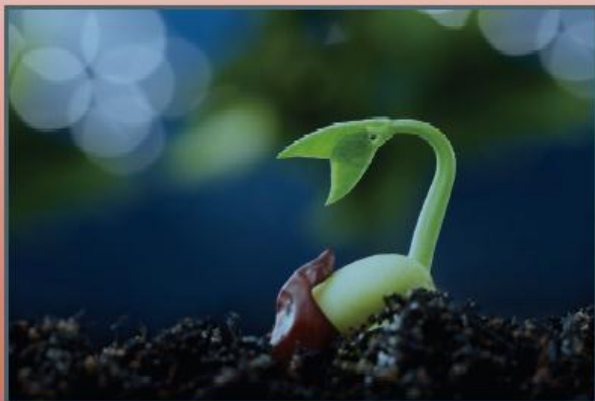
1. Global developments
2. Growing GMOs in Ireland and the EU
3. Global Trade impacts
4. EU regulatory/political framework
5. Secondary effects
6. Future global developments

# Global developments

# Recent report and headlines

**“There is compelling evidence that *GM crops can contribute to sustainable development goals* with benefits to farmers, consumers, the environment and the economy.”**

Planting the future: opportunities and challenges for using crop genetic improvement technologies for sustainable agriculture



EASAC policy report 21

June 2013

ISBN: 978-3-8047-3181-3

This report can be found at  
[www.easac.eu](http://www.easac.eu)

building science into EU policy



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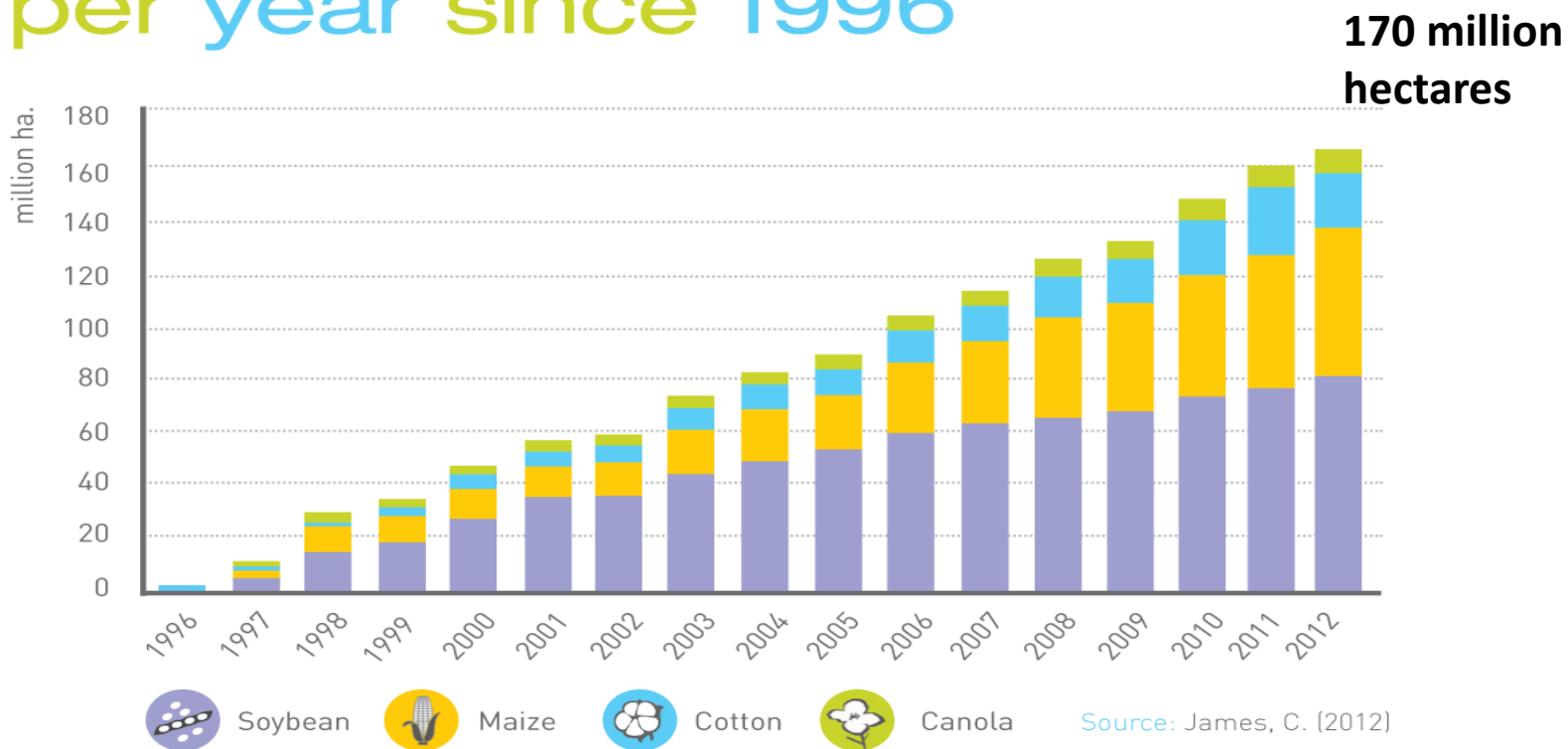
### ‘Unethical’ not to use GM crops in countries facing famine

*Monday, September 30, 2013*

**“We have a major challenge to feed a world of seven billion, soon nine billion people. GM is a valuable technology to have to help in addressing this.”** *Anne Glover, Chief Scientific Adviser to the European Commission*

# Rapid increase in GM planting

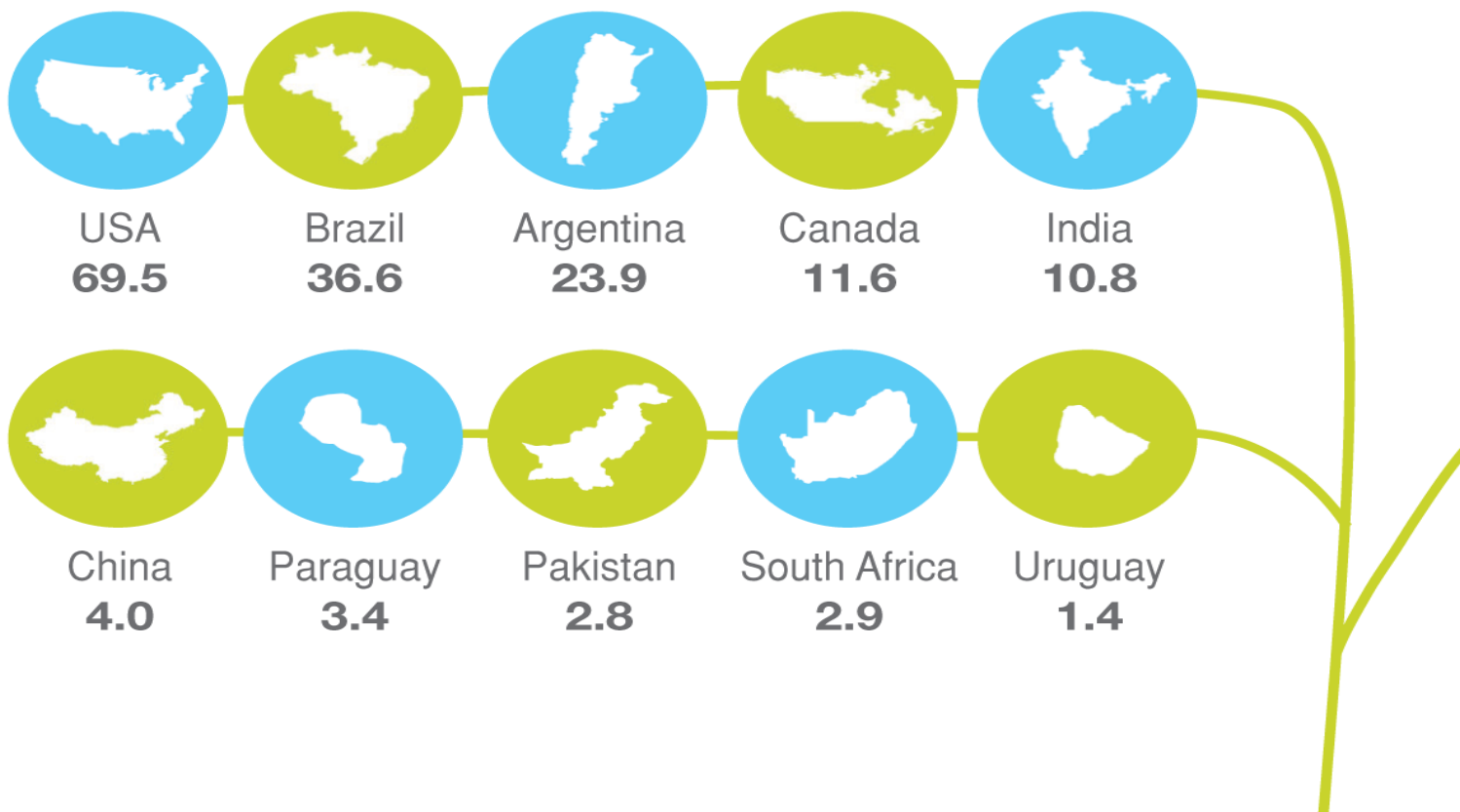
## GMOs – Global planting per year since 1996



**100-fold increase in biotech crop hectarage 1996 to 2012**

# Countries growing around the world

The top ten countries planting GM crops each grew more than 1 million hectares in 2012:



# What are the main GM crops?

## Global adoption rates for GM crops



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### **SOYBEAN: 81%**

93% in the US, 100% in Argentina, 88% in Brazil

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### **COTTON: 81%**

94% in US, 93% in India, 80% in China

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### **MAIZE: 35%**

88% in US, 75% in Brazil

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### **CANOLA: 30%**

93% in US, 97.5% in Canada

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# Global economic gains because of GM

## Over 2011

Net economic benefit at farm level = **\$19.8 billion** = an average increase in income of \$133/hectare

## 1996-2011

Global farm income gain has been **\$98.2 billion**

- 49% due to yield gains from lower pest/weed pressure and improved genetics
- 51% from cost of production reductions

GM was responsible for an additional

- 110 million tonnes of soybeans
- 195 million tonnes of corn
- 15.8 million tonnes of cotton lint
- 6.6 million tonnes of canola

**If GM crops were not cultivated around the world, an additional 74.97 million hectares would be needed to produce the same amount of food/feed.**

# Do consumers benefit from GM crops?

## Indirect consumer benefits

Environmental benefits and yield increases **are** consumer benefits ....*lower prices, decreased sprayings, more efficient water use, less CO2....*

### **EXAMPLE: Drought-tolerant maize = more food**

- Can withstand periods with less water ....now growing in the US

## Direct consumer benefits

### **EXAMPLE: Bt maize = benefits human health**

- Lower mycotoxin levels recorded than in conventional and organic produce

### **EXAMPLE: Healthier soy oils = healthier consumers**

- 0 grams trans fat, 20% less saturated .....now growing in the US

### **EXAMPLE: Golden Rice = less blindness**

- Rice that can deliver more Vit. A to help combat diet deficiencies.... Philippines in 2014?

# Environmental gains from GM

## Preserved biodiversity

- Higher yields = less conversion of natural land to crop production
- Studies indicate GM crops have not decreased crop diversity

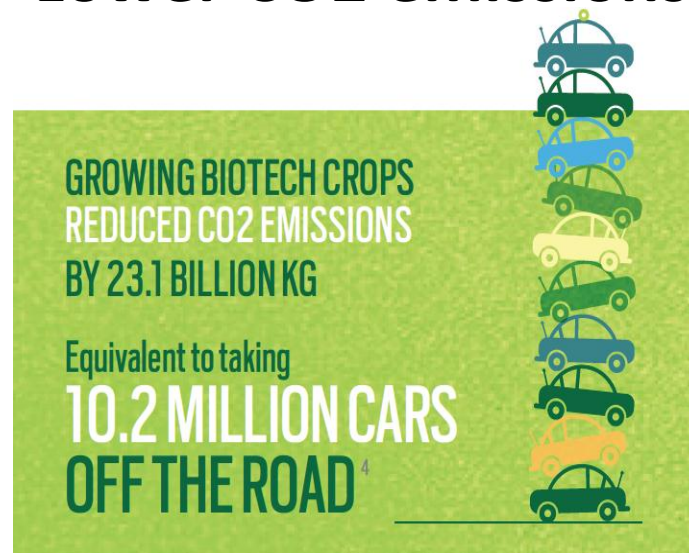
## Reduced soil erosion

- Biotech crops = little or no-till practices
- Conserve soil moisture/reduce erosion

## Reduced input use

- More targeted pesticide spraying
- Less water, less tractor, less diesel...

## Lower CO2 emissions



## Six GMO trends

### EVERY YEAR:

- ↑ More farmers growing: 17.3 million farmers
- ↑ More countries growing: 28 countries
- ↑ More hectares growing: 170.3 million hectares
- ↑ More products growing: soy, cotton, maize, oilseed, sugar
- ↑ More income for farmers and traders
- ↑ More financial investment by producers

# Growing GMOs in the EU

# Cultivated in EU: Insect-resistant Bt maize

- Authorised in EU since 1998
- Protection against European Corn Borer
- Cultivated in: Spain, Czech Republic, Romania, Portugal, Slovakia
- Illegal bans in 8 countries: France, Germany, Hungary, Greece, Austria, Luxembourg, Bulgaria, Poland



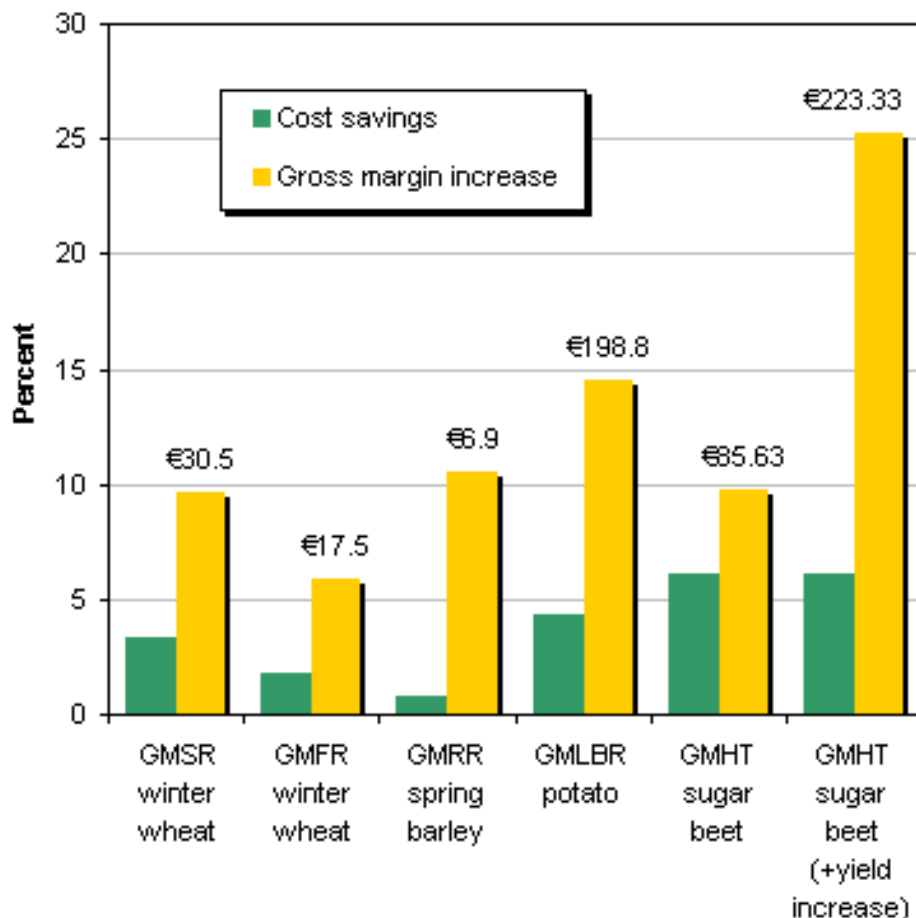
# Room for growth in EU

- 25% of EU maize is affected by the European Corn Borer (ECB)
- But only 1% of EU maize is Bt today
- There is a need for cultivation of this crop in areas affected by ECB
- More crops are available to meet other needs but are blocked/delayed in the EU approval system





# Impact on Ireland: case study



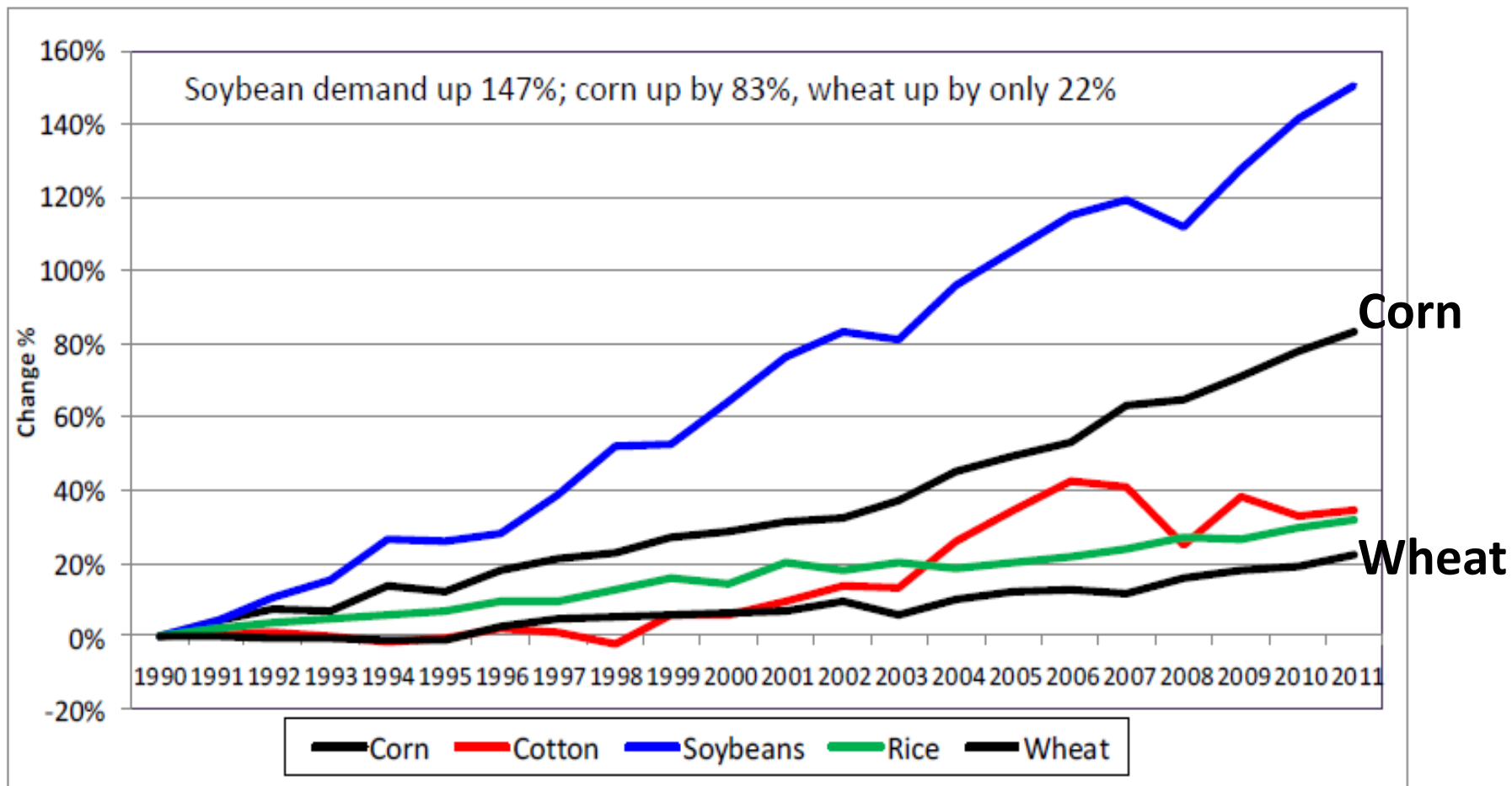
**Average impact of GM crop cultivation on cost savings and gross margins for GMSR and GMFR wheat, GMRR barley, GMLBR potato, and GMHT sugar beet (2002 and 2003)**



# Global trade impacts

# Global demand growing fast

## Soy, corn, wheat, cotton, rice Percentage change in global consumption



# Impact on the EU and Ireland

## Disruptions of global commodities trade

- EU five years behind in approving products
- Zero-tolerance policy
- Countries exporting commodities to EU less inclined to wait for EU approvals before approving and cultivating new products for export
- Results in higher food prices

GM events	Variety	US authorization	EU authorization	Time lag
Herculex RW (59122)	Maize	2004	October 2007	<b>3 years later</b>
Agrisure GT (GA21)	Maize	1996	March 2008	<b>12 years later</b>
Liberty Link (A2704-12)	Soya	1996	September 2008	<b>12 years later</b>
RR II (MON 89788)	Soya	2007	December 2008	<b>1 year later</b>
YieldGuard VT (MON 88017)	Maize	2005	October 2009	<b>4 years later</b>
Agrisure RW (MIR 604)	Maize	2007	December 2009	<b>2 years later</b>

## Ireland:

- Animal feed imports increased by 58% in 2012

# EU regulatory/political framework

# Problems in EU authorisation processes

## What's wrong with the EU system?

- EU product authorisations take substantially longer than comparable systems
- For products for cultivation, the process has never been correctly implemented
- Some EU governments vote against scientific experts at EFSA for political reasons
- Every year, twice as many GM products enter the system than exit it
- New requirements lacking scientific basis introduced for political reasons

## What are the future challenges?

- Processing of stacked products
- Development of a forward-looking policy to deal with the increasing likelihood of Low-Level Presence (Adventitious Presence) of GM products not yet authorized
- Varieties for which no-one will seek approval
- Increased politicisation of authorization process

# Secondary effects

# Over-regulation = negative effects on innovation

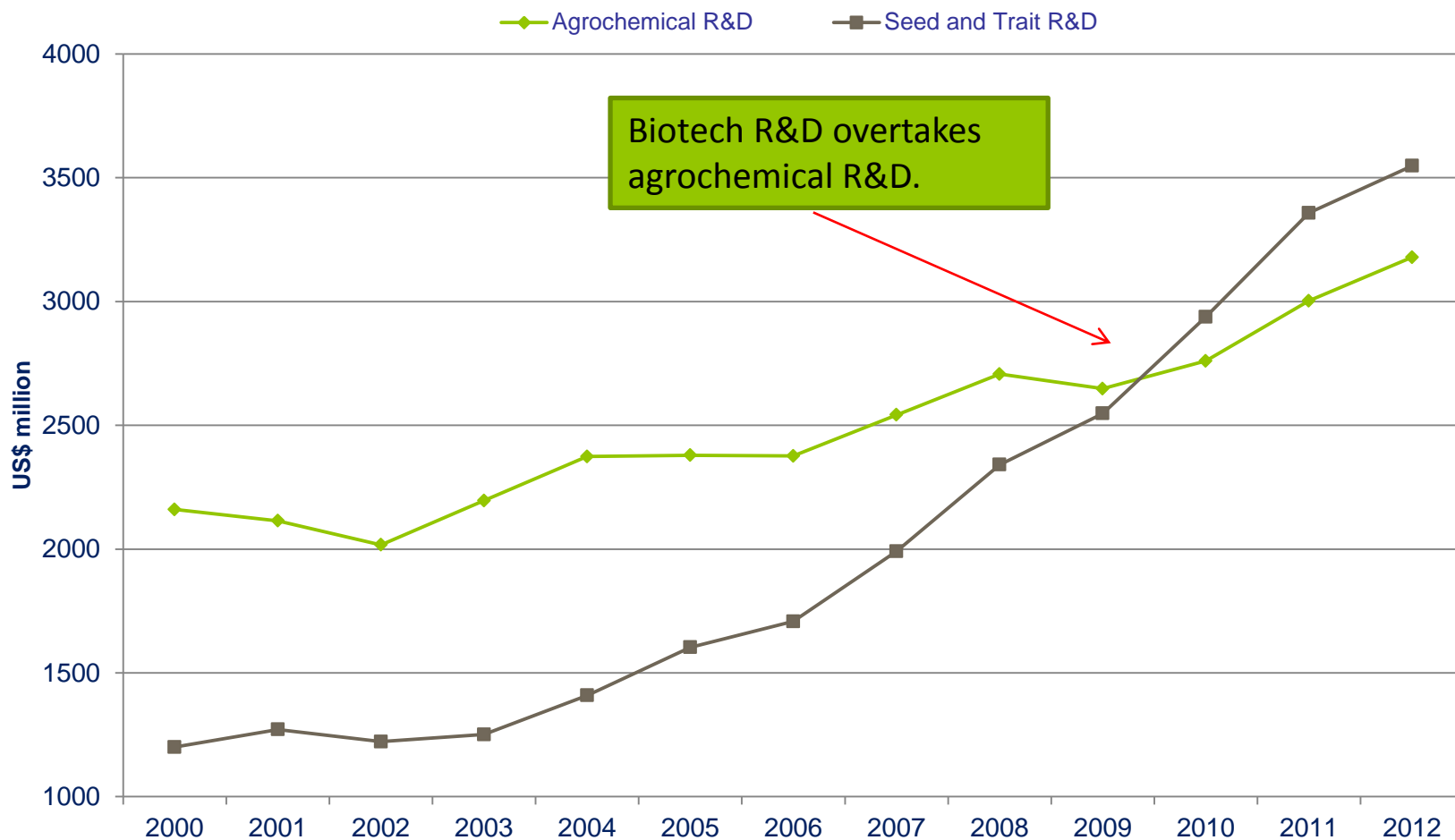


- High regulatory costs – major market barrier for small firms
- Brain drain – the best researchers and labs go to more welcoming places
- No incentives for SMEs
- Block for certain types of innovation, especially for small market crops or traits
- European seed firms competitiveness decline (access to high-yielding germplasm)
- Field trial research is strongly lagging

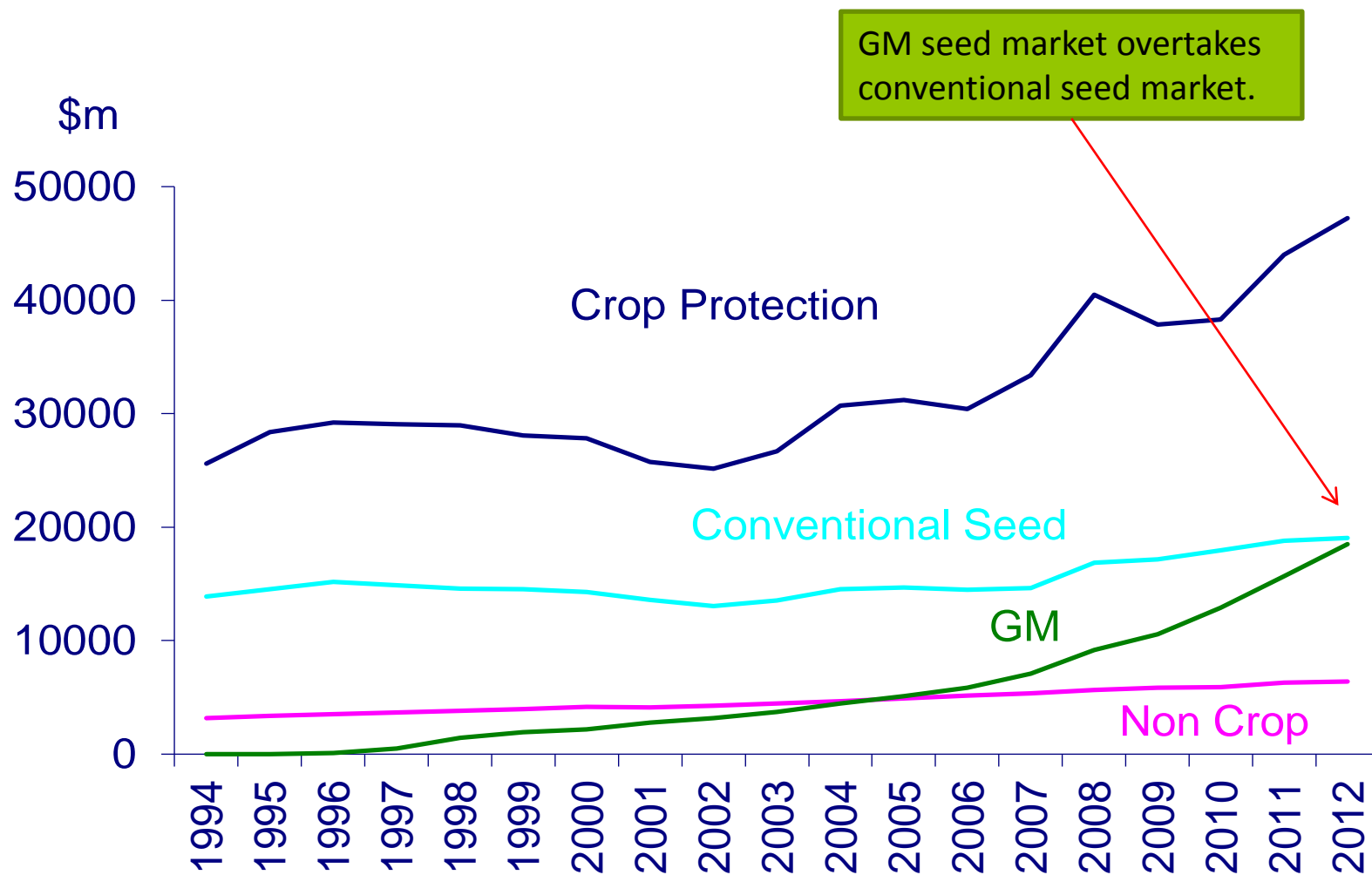
# **Future global developments**



# R&D expenditure top agchem companies

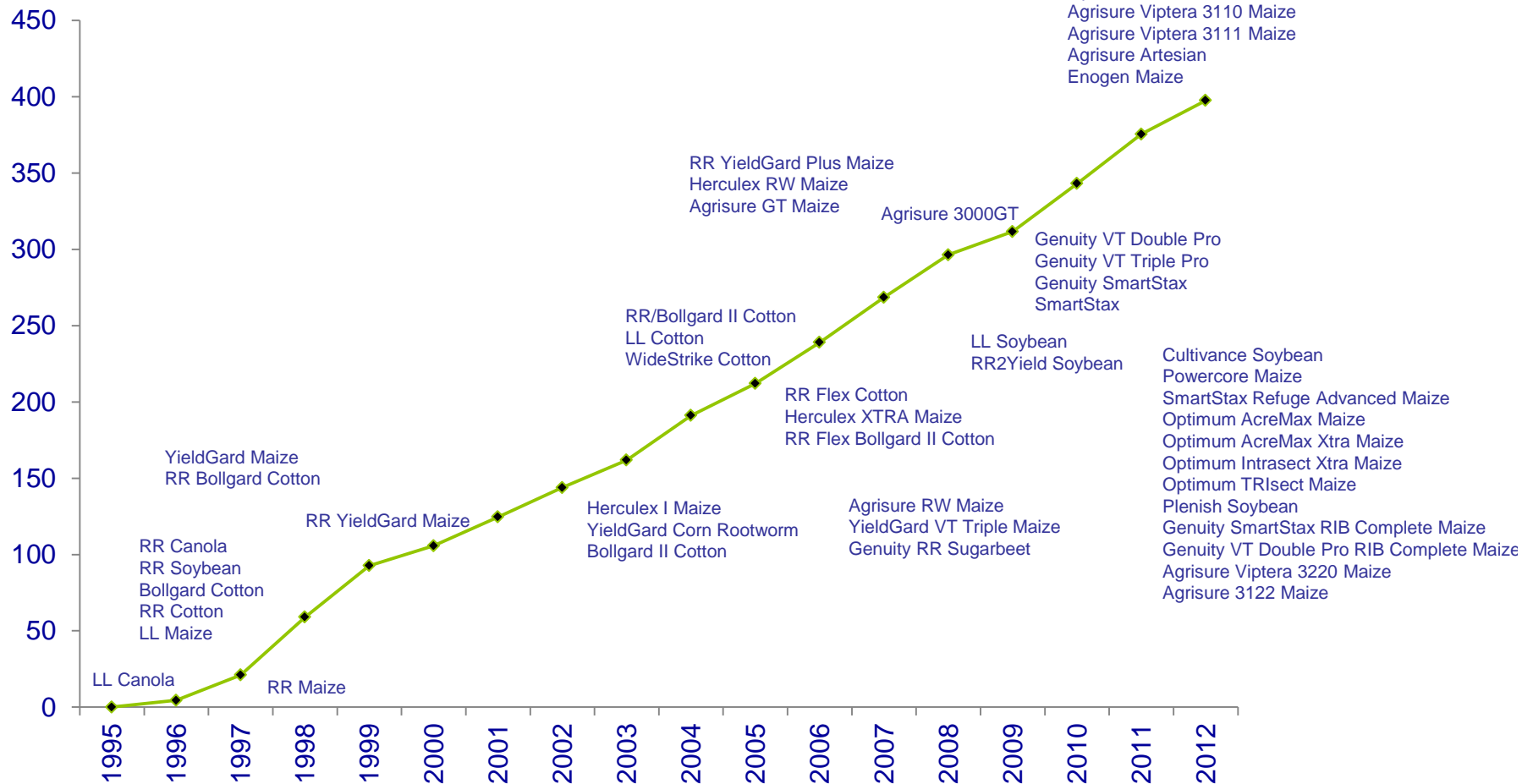


# Market development since 1994



# GM input trait introductions since 1995

Planted area of  
GM crops (Acres m.)



# Where is GM going?

## New developers

- Rise of China, India and Brazil (and other nations)
- New developers: public institutions and PP partnerships

## Technologically

- First generation: Insect resistance and herbicide tolerance
- Next : nutritional value, stress tolerance, disease resistance
- New crops: emphasis on crops for developing world
- New traits: climate change mitigation and adaptation



## New products

- Wheat, rice, potato
- Cassava, cowpea
- Sugar cane, sugar beet
- Many vegetable species



# Three interesting GM crops

## Drought-tolerant GM maize

- 1st and 2<sup>nd</sup> generation drought-tolerant crops under development
- Mitigates environmental impact to maximize yield with reduced water
- Relevant for water poor areas in southern Europe
- Cultivated in US since 2012



## GM HT sugar beet

- High potential for European farmers
- Conventional crop has high weed controls costs
- Cultivated in US since 2008



## GM potato resistant to late blight

- Late blight most important potato diseases (20% losses)
- Resistance genes transferred from South-American wild potato
- Would lead to more targeted spraying
- Multiple trials (public and private) ongoing



# What's coming? Biotechnology traits

Major Traits	Crops
<b>Pest Management</b> (herbicide tolerance, insect and disease resistance)	Corn, soybeans, cotton, rice, canola, bean, eggplant, potatoes, sugarcane, wheat
<b>Increased Yield</b>	Corn, soybeans, rice, canola, alfalfa, sugar beet, sugarcane, wheat
<b>Nitrogen Utilization</b>	Corn
<b>Stress Tolerance (drought)</b>	Corn, cotton
<b>Crop Composition</b>	<p>Corn (improved feed, increased ethanol)</p> <p>Soybeans (healthier oils, increased oil &amp; improved feed efficiency)</p> <p>Rice (beta-carotene content)</p> <p>Canola (healthier oils, oil quality)</p> <p>Alfalfa (reduced lignin)</p> <p>Potatoes (starch content)</p>

# Conclusions

- Biotechnology is improving world agriculture
  - ✓ 17+ million farmers globally
  - ✓ 6% -10% growth rate - fastest adopted ag technology ...accelerating
  - ✓ Widely accepted social, economic and environmental benefits
  - ✓ *“one of the tools”* to increase global food, feed, fiber production
- GM has a positive, unparalleled safety record
- Increased global investments in agbiotech, both science & technology
- GM offers great economic opportunities for Ireland

# Thank you

For more information  
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