Montgomery, Howard & Frederick County 2015 Agronomy Update

Agricultural Biotechnology: A Reality Check

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Urbana Firemen's Activity Center
Urbana, MD

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The Information Technology & Innovation Foundation

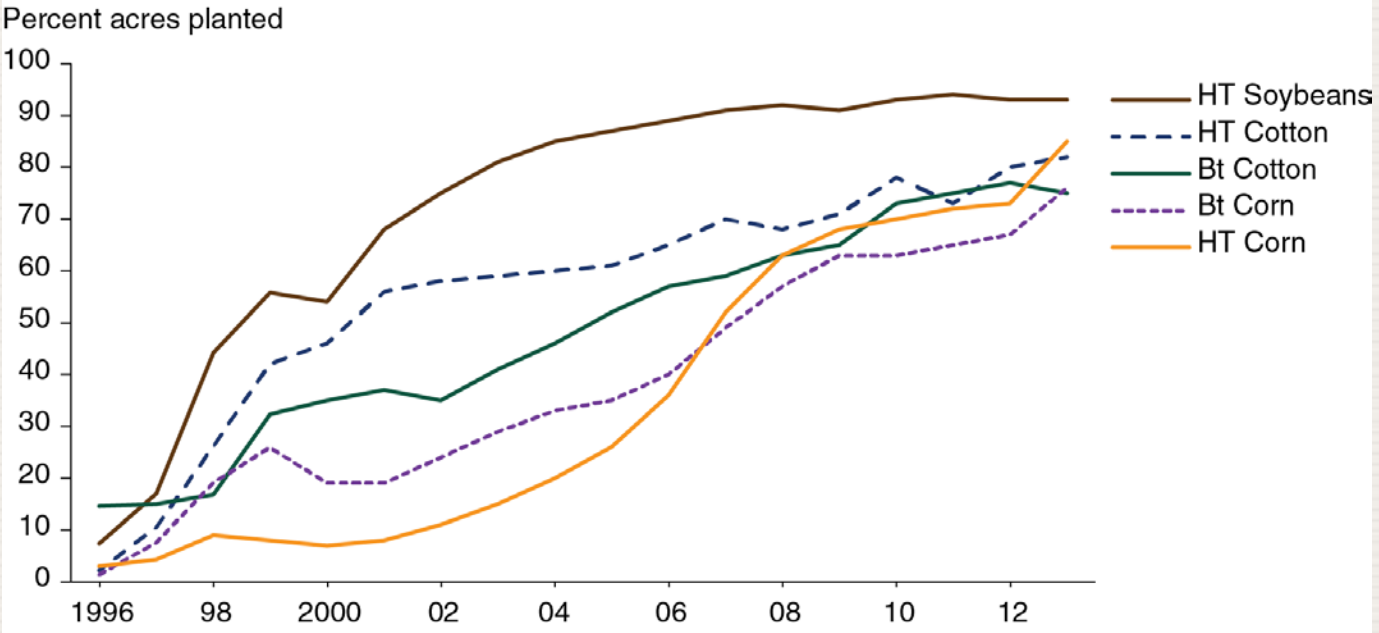
- The Information Technology and Innovation Foundation (ITIF) is a Washington, D.C.-based think tank at the cutting edge of designing innovation policies and exploring how innovation will create new opportunities to boost economic growth and improve quality of life. ITIF focuses on:
  - Innovation "verticals": energy, life sciences, manufacturing, Internet and information technology, and telecommunications
  - Innovation "horizontals": regulatory, trade, tax, talent, and technology policy
  - "Innovation economics" as an alternative to mainstream neoclassical economics

"The greatest challenge of the 21st century: feeding 9 billion people with a sustainable agricultural production system."

--Chrispeels, 2000

Figure 5

Adoption of genetically engineered crops in the United States



Bt crops have insect resistant traits; HT crops have herbicide tolerance traits.
Data for each crop category include varieties with both Bt and HT (stacked) traits.

Source: U.S. Department of Agriculture (USDA), Economic Research Service (ERS). 2013. *Adoption of Genetically Engineered Crops in the U.S.* data product.

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- What does this translate to globally?

1996: First major commercial plantings

2014: Over 448 M acres harvested

(http://isaaa.org/resources/publications/briefs/46/default.asp)

18 Million Farmers in 28 Countries

2014: Over Four Billion Acres planted

(http://www.truthabouttrade.org/2014/05/05/major-milestone-4-billion-acres-of-biotech-crops-now-planted-globally/)

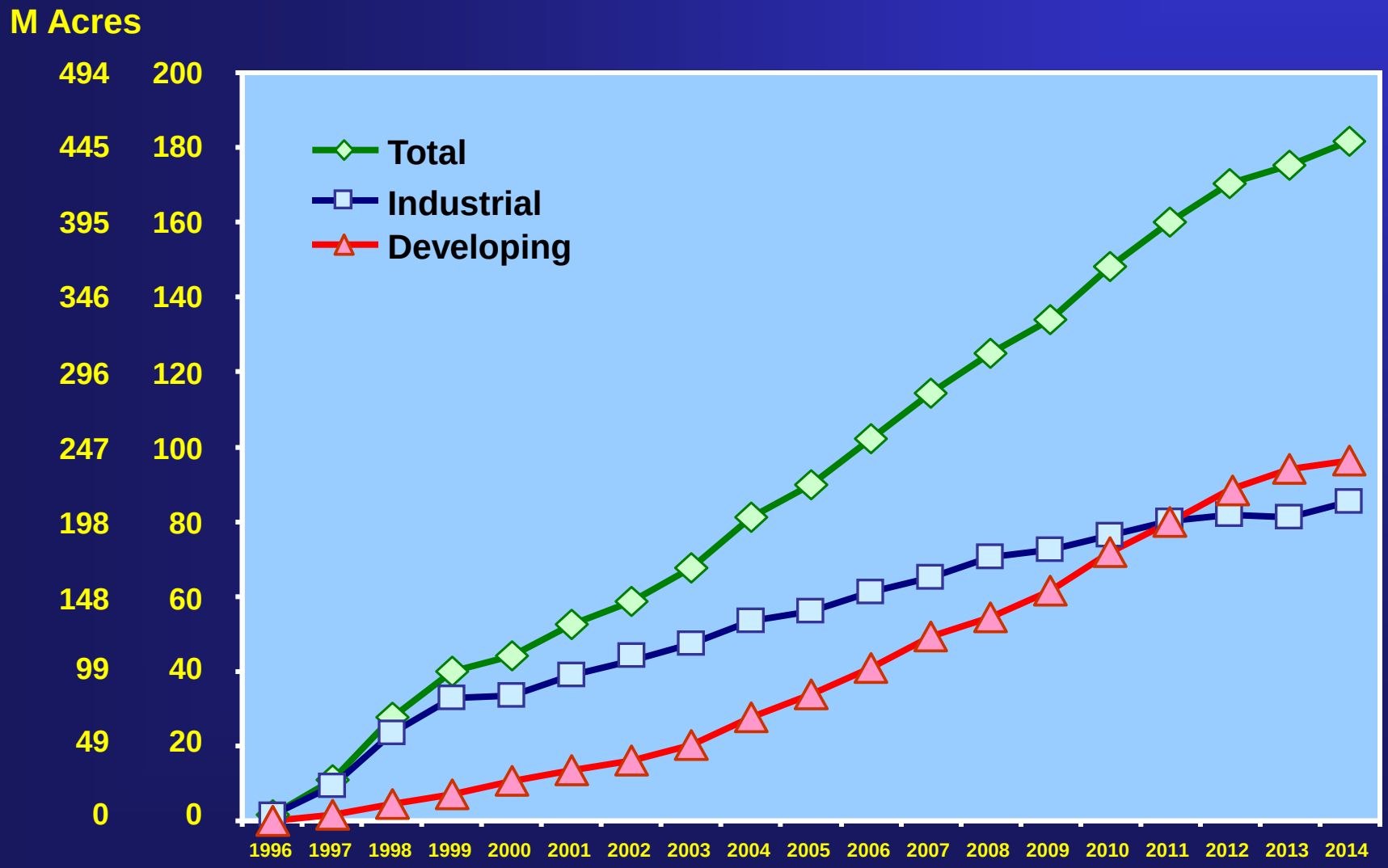
2014 ISAAA Report on Global Status of Biotech/GM Crops

by
Dr. Clive James
Founder and Emeritus Chair, ISAAA

International Service for the Acquisition
Of Agri-biotech Applications (ISAAA)

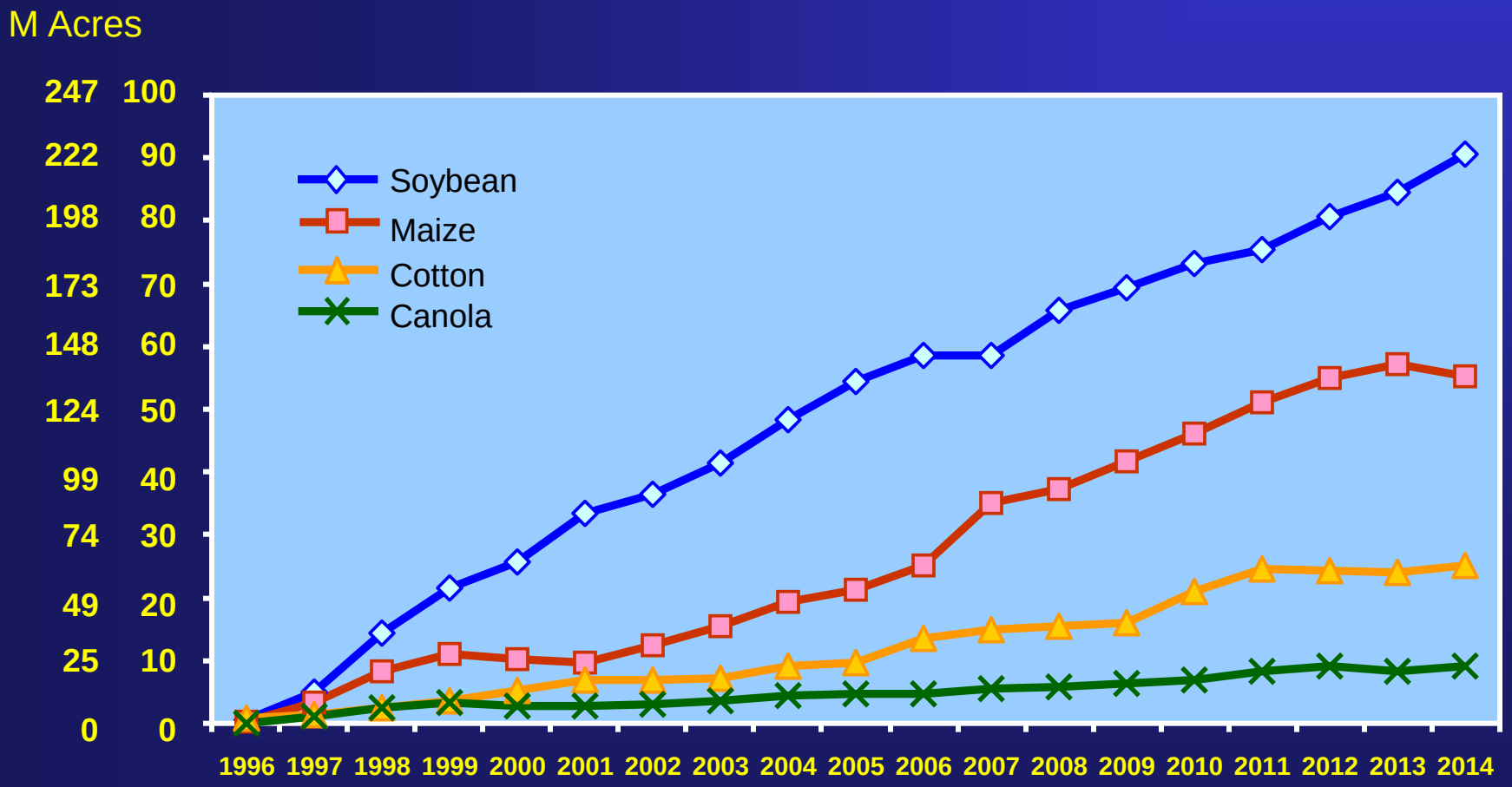
http://www.isaaa.org

Global Area of Biotech Crops, 1996 to 2014: Industrial and Developing Countries (M Has, M Acres)



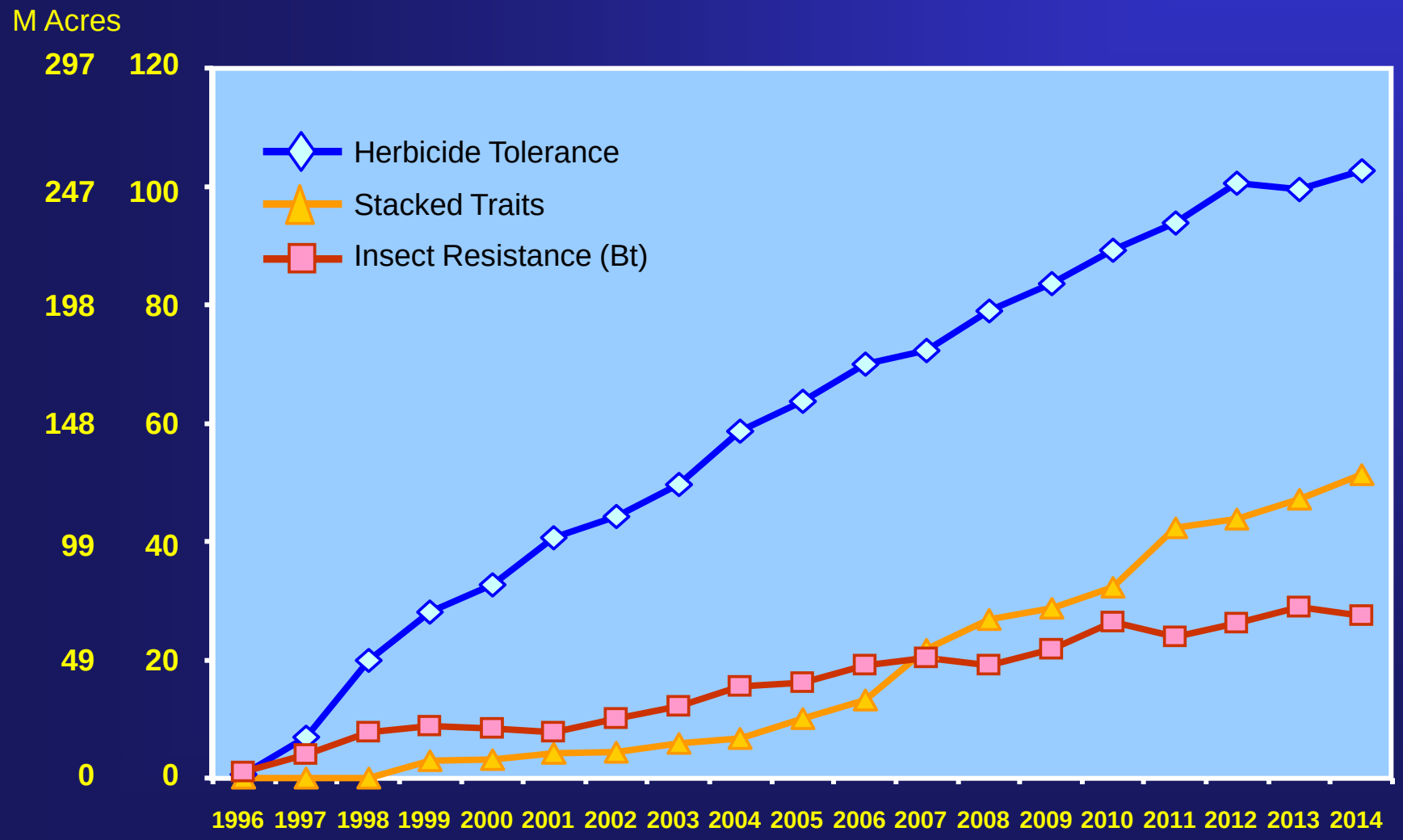
Source: Clive James, 2014

Global Area of Biotech Crops, 1996 to 2014: By Crop (Million Hectares, Million Acres)



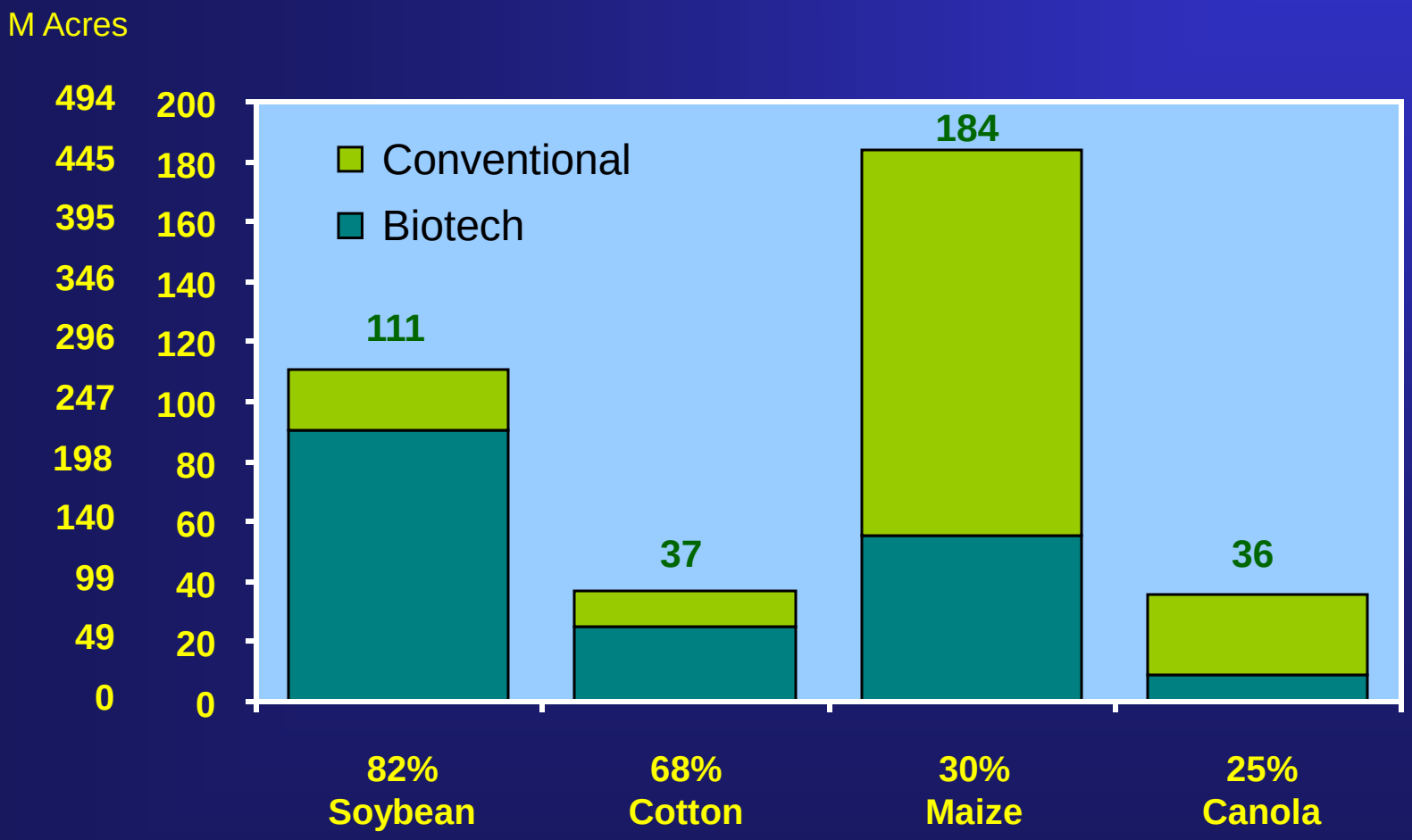
Source: Clive James, 2014

Global Area of Biotech Crops, 1996 to 2014: By Trait (Million Hectares, Million Acres)



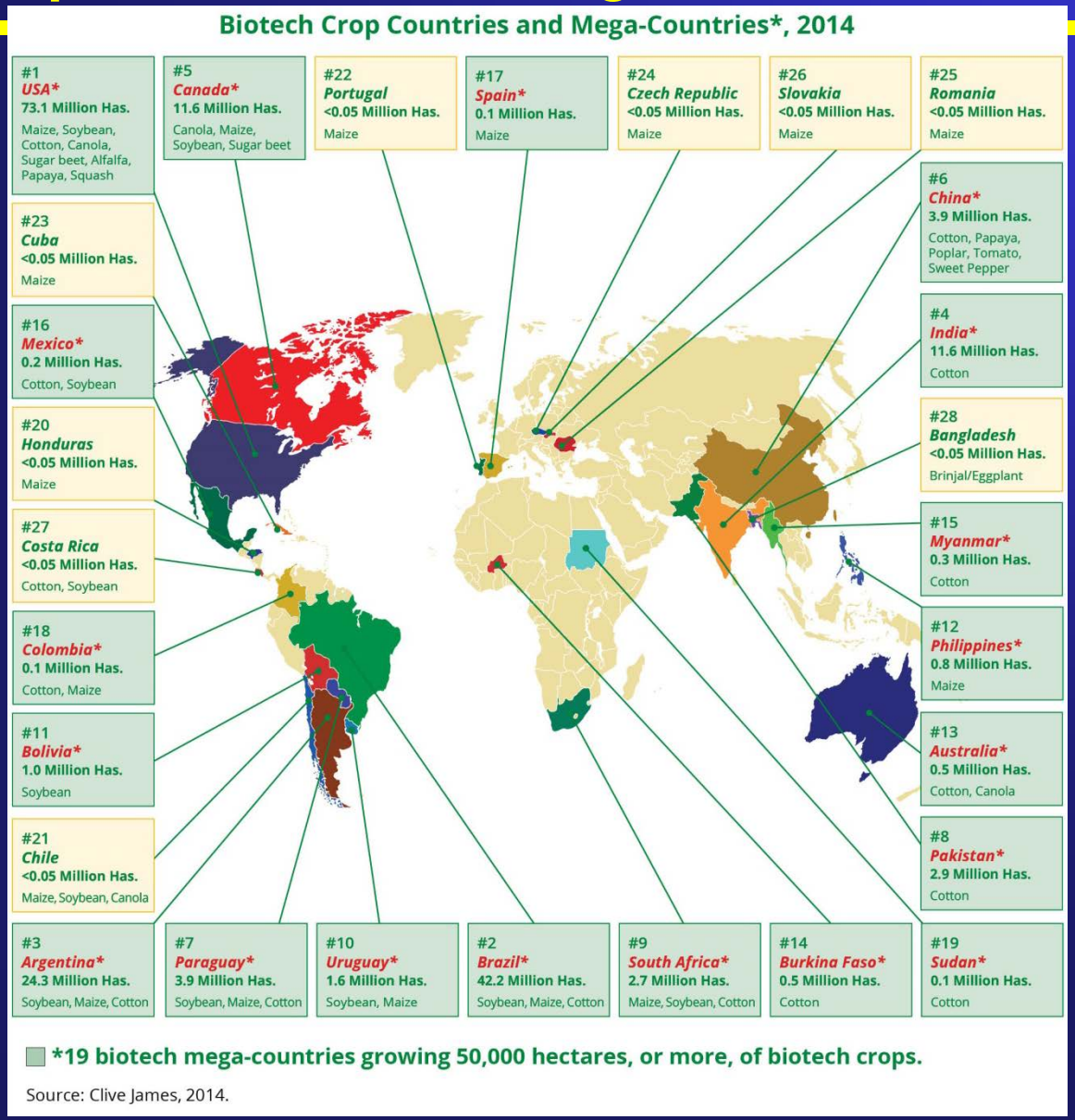
Source: Clive James, 2014

Global Adoption Rates (%) for Principal Biotech Crops (Million Hectares, Million Acres), 2014

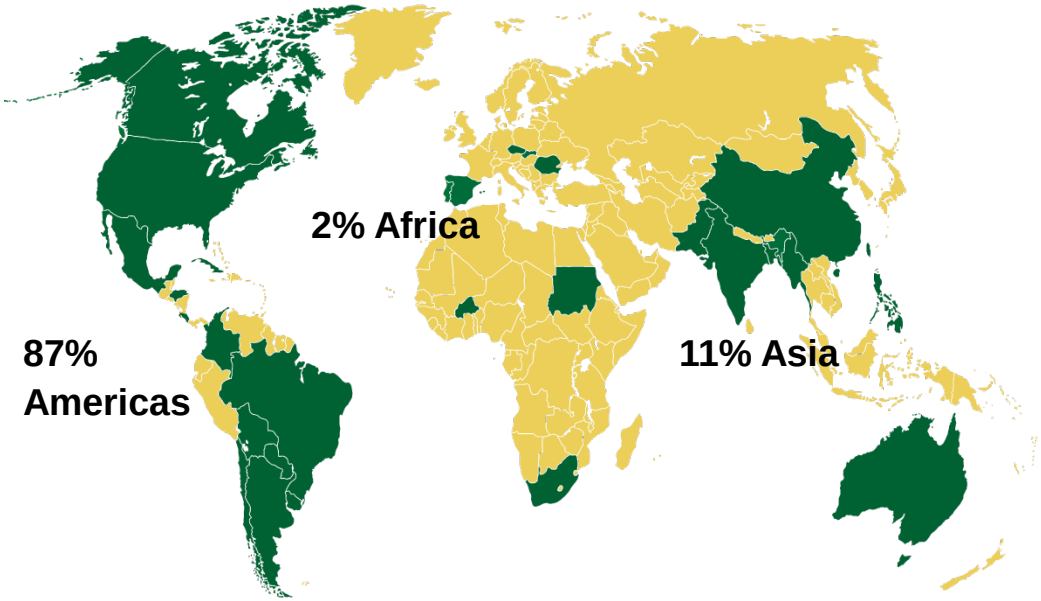


Source: Clive James, 2014
Hectarage based on FAO Preliminary Data for 2012.

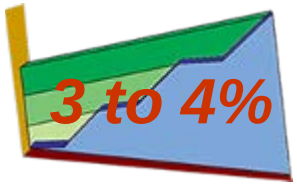
Biotech Crop Countries and Mega-Countries*, 2014



Global Area (Million Hectares) of Biotech Crops, 2014: by Country



Increase over 2013



28 countries which have adopted biotech crops

In 2014, global area of biotech crops was 181.5 million hectares, representing an increase of 3 to 4% over 2013, equivalent to 6.3 million hectares.

Source: Clive James, 2014.

Biotech Mega Countries

50,000 hectares (125,000 acres), or more

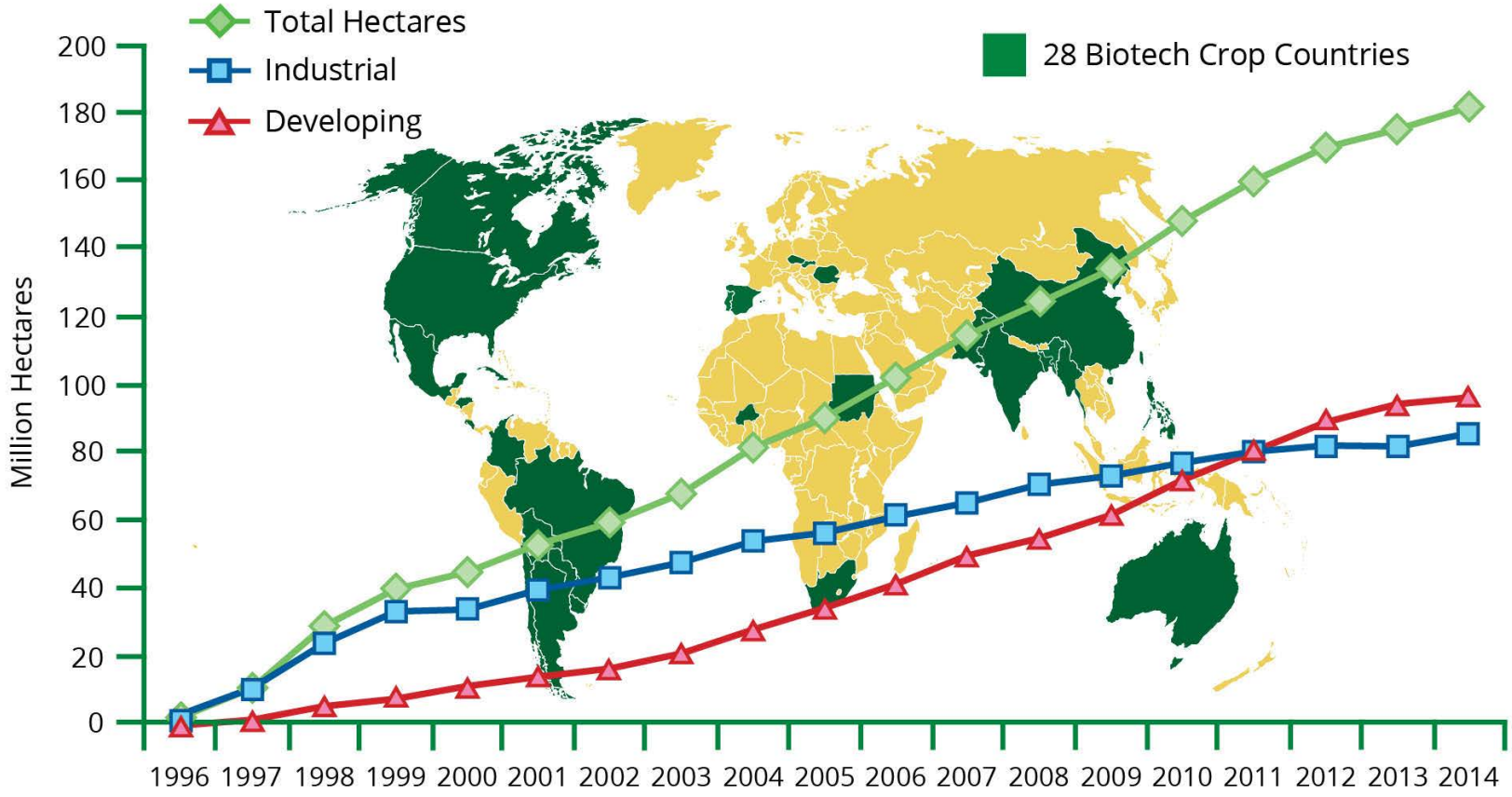
		Million Hectares
1.	USA	73.1
2.	*Brazil**	42.2
3.	*Argentina**	24.3
4.	*India**	11.6
5.	Canada	11.6
6.	*China**	3.9
7.	*Paraguay**	3.9
8.	*Pakistan**	2.9
9.	*South Africa**	2.7
10.	*Uruguay**	1.6
11.	*Bolivia**	1.0
12.	*Philippines**	0.8
13.	Australia	0.5
14.	*Burkina Faso**	0.5
15.	*Myanmar**	0.3
16.	*Mexico**	0.2
17.	Spain	0.1
18.	*Colombia**	0.1
19.	*Sudan**	0.1

Less than 50,000 hectares

*Honduras**
*Chile**
Portugal
*Cuba**
Czech Republic
Romania
Slovakia
*Costa Rica**
*Bangladesh**

** Developing countries*

GLOBAL AREA OF BIOTECH CROPS
Million Hectares (1996-2014)



A record 18 million farmers, in 28 countries, planted 181.5 million hectares (448 million acres) in 2014, a sustained increase of 3 to 4% or 6.3 million hectares (~16 million acres) over 2013.

Source: Clive James, 2014.

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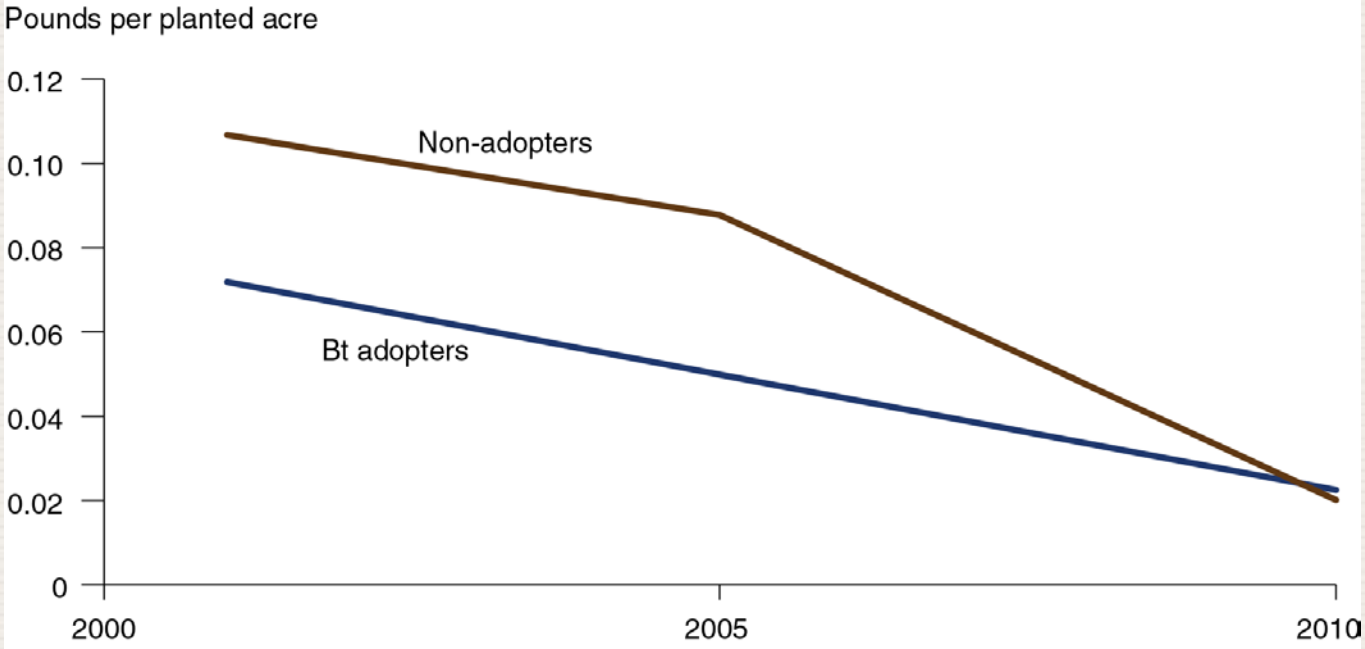
Figure 13

Insecticide use in corn farms: adopters and non-adopters of Bt corn, 2001-2010



Bt crops have insect-resistant traits.

Source: USDA Economic Research Service using data from 2001, 2005, and 2010 ARMS Phase II corn surveys.

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- Economic & Environmental impacts:

$18.8 B in AV in 2012; 116.6B since 1996

soybeans + 122 MT; maize +230MT

pesticide use -503 M kg

CO2 reductions ~ -11.88 M autos for 1yr

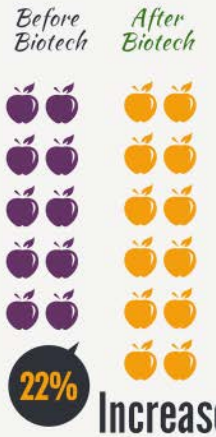
EIQ = -18.7%

https://www.landesbioscience.com/journals/gmcrops/article/28098/ &
https://www.landesbioscience.com/journals/gmcrops/article/28449/

IMPACTS OF BIOTECH

The latest PLOS ONE metastudy looked at the impacts of biotechnology. We dove in.

Reduction in Pesticides



Increase in Yields

Increase in Farmer Income

FOODINSIGHT.ORG/FACTS

- Safety is not an issue.

EU: **the use of more precise technology and the greater regulatory scrutiny probably make them even safer than conventional plants and foods… the benefits of these plants and products for human health and the environment become increasingly clear.**

--European Commission, Press Release of 8 October 2001, announcing the release of 15 year study incl 81 projects/70M euros, 400 teams (now 25 years, 500 teams & 130 projects) (http://ec.europa.eu/research/fp5/eag-gmo.html and http://ec.europa.eu/research/fp5/pdf/eag-gmo.pdf) & http://ec.europa.eu/research/biosociety/pdf/a_decade_of_eu-funded_gmo_research.pdf

What is U.S. Public Policy re Crops & Foods Improved through Biotechnology?

- For the past 50 years U.S. Policy has been strongly supportive of crops & foods improved through biotechnology
- Major support for basic research (USDA, DOE, NSF, NIH)
- Regulatory oversight based on findings of no novel hazards (NAS, OECD, AMA, etc.) & reliance on existing regulatory authorities
- 1986 Coordinated Framework: USDA, EPA, FDA
- Regulations are science based, not process-triggered
- Implementation…

Testing - how do we know these things are safe?

USDA regulations here

APHIS Form 2000)

EPA regulations here

FDA consultation process here

FDA labeling policy here

Labeling

Proponents of new mandatory GMO labels claim:

- In the absence of federal action states must step in
- New labels required to provide choice
- “we want to know what’s in our food” – “right to know”
- Labels needed to enable traceback on adverse events
- “If you’re so proud of it, why not label it?”

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Labeling Realities Today

Under Existing FDA Policy & Regulations:

- Consumer choice delivered via USDA Organic label, nonGMO Project certification, smartphone apps
- “material changes” in composition must be labeled
- Labels MUST contain information relevant to health, safety, nutrition
- Labels MUST be accurate, informative, not misleading
- Proposed new label would not enable traceback
- See http://www.innovationfiles.org/consumers-union-makes-false-claims-against-the-safety-of-genetically-modified-foods-based-on-ideology-not-science/

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Why would food companies resist labeling?

IS LABELING REALLY ABOUT OUR "RIGHT TO KNOW"?

"We are going to force them to label this food. If we have it labeled, then we can organize people not to buy it."

—Andrew Kimbrell, Executive Director, Center for Food Safety

"Personally, I believe GM foods must be banned entirely, but labeling is the most efficient way to achieve this. Since 85% of the public will refuse to buy foods they know to be genetically modified, this will effectively eliminate them from the market just the way it was done in Europe."

—Dr. Joseph Mercola, Mercola.com

"By avoiding GMOs, you contribute to the tipping point of consumer rejection, forcing them out of our food supply."

—Jeffrey Smith, Founder, Institute for Responsible Technology

"With labeling it (GMOs) will become 0%… For you the label issues is vital, if you get labeling then GMOs are dead-end."

—Vandana Shiva, environmental activist

"The burning question for us all then becomes how—and how quickly—can we move healthy, organic products from a 4.2% market niche, to the dominant force in American food and farming? The first step is to change our labeling laws."

—Ronnie Cummins, Director, Organic Consumers Association

GENETIC LITERACY PROJECT

www.geneticliteracyproject.org

SOURCES:

http://www.responsibletechnology.org/10-Reasons-to-Avoid-GMOs
http://www.youtube.com/watch?v=HkrF39YWtmg
https://www.commondreams.org/view/2012/08/02-0
http://www.activistcash.com/person/1562-andrew-kimbrell/
http://vtdigger.org/2012/04/17/wanzek-genetically-modified-food-is-perfectly-healthy
http://articles.mercola.com/sites/articles/archive/2012/02/29/new-vermont-gmo-labeling-policy-officially-introduced.aspx

Patents

Faustian bargain – state sanctioned monopoly for a limited term in exchange for disclosure (to stimulate innovation)

new, useful, non obvious

Diamond v. Chakrabarty (1980)

"A truly extraordinary variety of alternatives to the chemical control of insects is available. Some are already in use and have achieved brilliant success. Others are in the stage of laboratory testing. Still others are little more than ideas in the minds of imaginative scientists, waiting for the opportunity to put them to the test. All have this in common: they are biological solutions, based on understanding of the living organisms they seek to control, and of the whole fabric of life to which these organisms belong. Specialists representing various areas of the vast field of biology are contributing – entomologists, pathologists, geneticists, physiologists, biochemists, ecologists – all pouring their knowledge and their creative inspirations into the formation of a new science of biotic controls."

--Rachel Carson, Silent Spring. Chapter 17 ("The Other Road") paragraph 3. Houghton Mifflin, New York, 1962.

- Reliable Sources:

Global Adoption: http://isaaa.org/

Environmental & Economic Impacts:
http://www.pgeconomics.co.uk/publications.php

General info:
http://www.biofortified.org/
http://www.geneticliteracyproject.org/
http://academicsreview.org/
http://www.itif.org/experts_publications/val_giddings
http://gmoanswers.com/

- Reliable (& fun) Sources:

A Policymakers Guide to the GMO Controversies
http://www2.itif.org/2015-policymakers-guide-gmos.pdf

Consumer's Union Makes False Claims Against Safety of GMOs
http://www.innovationfiles.org/consumers-union-makes-false-claims-against-the-safety-of-genetically-modified-foods-based-on-ideology-not-science/

Brave New Potato http://www.innovationfiles.org/brave-new-potato/

Demons Haunt LA http://www.insidesources.com/demons-haunt-los-angeles/

http://www.itif.org/experts_publications/val_giddings

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THANK YOU!!!


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