

Agricultural Innovation and Market Access

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Global Representative for Plant Science



AFRICA/MIDDLE EAST

AFRICABIO
CROPLIFE AFRICA/
MIDDLE EAST

ASIA PACIFIC

CBI JAPAN
JAPAN CROP PROTECTION
ASSOCIATION
CROPLIFE ASIA

NORTH AMERICA

CROPLIFE CANADA
CROPLIFE AMERICA
BIOTECHNOLOGY INDUSTRY
ORGANIZATION (BIO)
AGROBIO MEXICO

EUROPE

EUROPABIO
EUROPEAN CROP
PROTECTION ASSOCIATION

LATIN AMERICA

CROPLIFE LATIN AMERICA
AGROBIO BRAZIL
CIB BRAZIL
ARGENBIO

CropLife Engagement

- Intergovernmental policy
 - Food security, sustainability, climate change, biodiversity
- Education, market acceptance, communication
- Regulatory frameworks
- International trade
 - Import market approvals
 - Asynchronous approvals
 - Low level presence (LLP)
 - TradeStatus database
- Stewardship
 - Launch Stewardship Guideline
- Intellectual property

Agriculture & Innovation

Population Growth → More Agricultural Demand

1960 Food Production



Farmers have doubled global food production over the last 50 years

Present Day



Plant science technologies have helped farmers increase production to keep up with the world's growing demand for food

Present Day



Food production must increase by 70% to meet rising demand

2050 Food Demand



Future production requires **greater adoption of innovative technologies like plant biotechnology**

Source: UN Food and Agriculture Organization (FAO), 2009

Global Adoption of Biotech

Crops
1.6 Billion Hectares
Planted since 1996

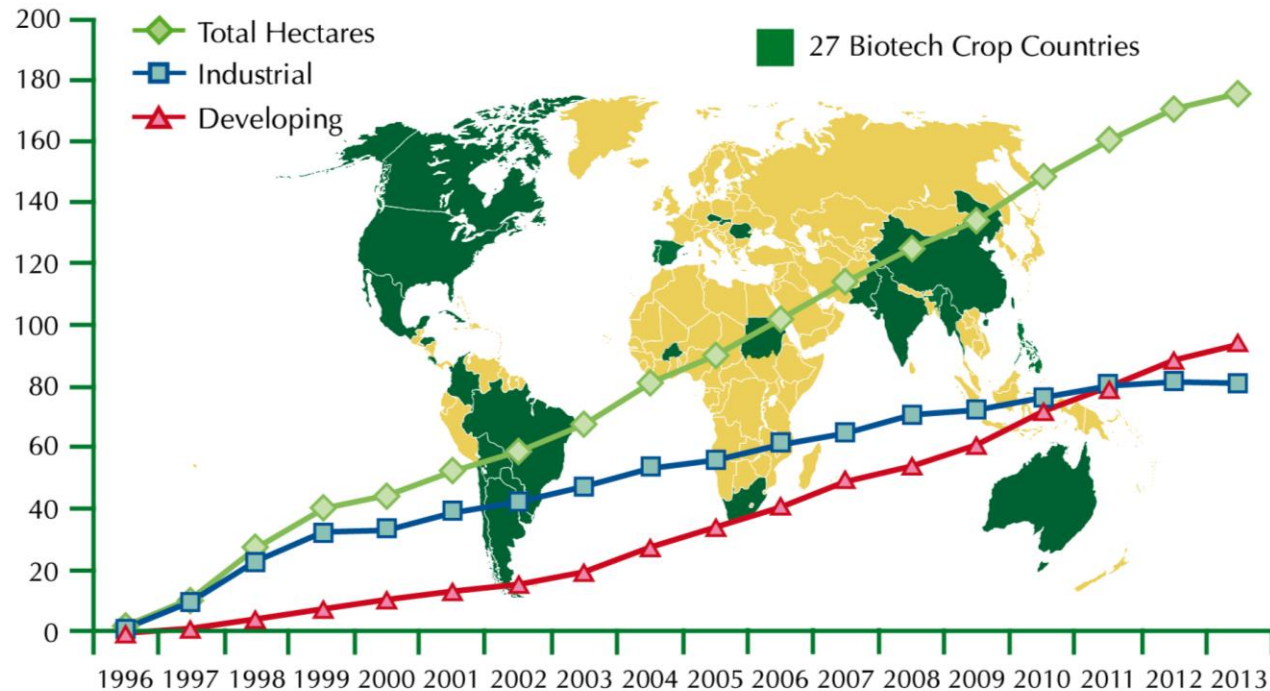
2013
175 Million Hectares
27 Countries
18 Million farmers

90% Resource-poor
Repeat planting
“Virtually 100%”

12.5% Global Arable Land

79% of Soybeans
70% of Cotton
34% of Canola
32% of Maize

GLOBAL AREA OF BIOTECH CROPS
Million Hectares (1996-2013)

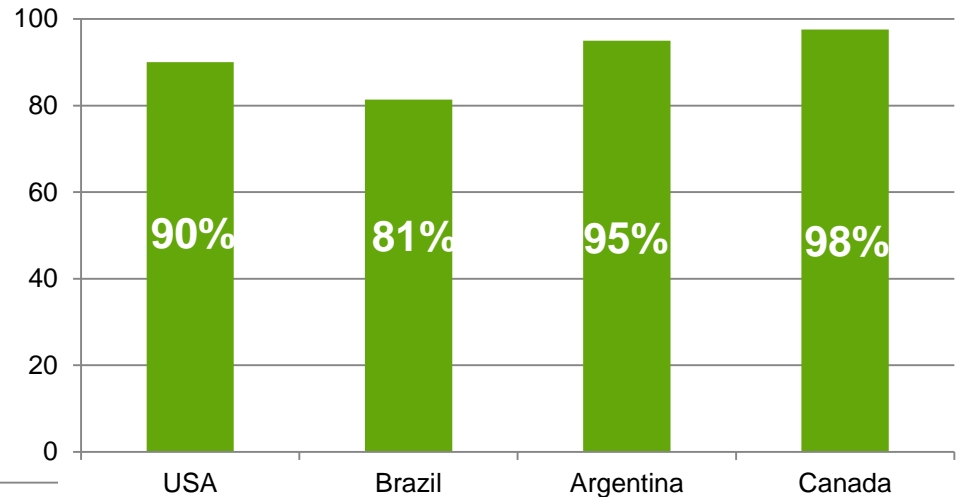


Source: International Service for the Acquisition of Agri-biotech Applications (ISAAA), 2014

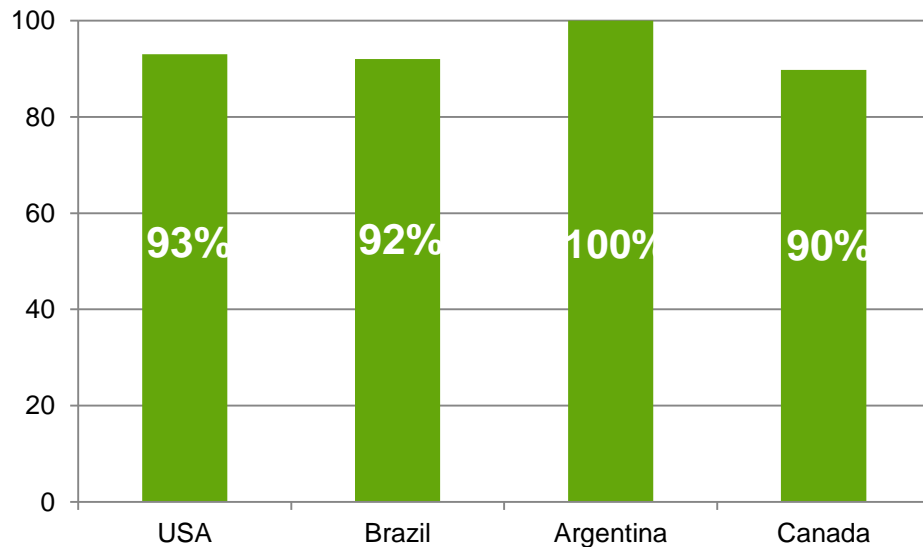
Biotech Adoption Levels



Maize



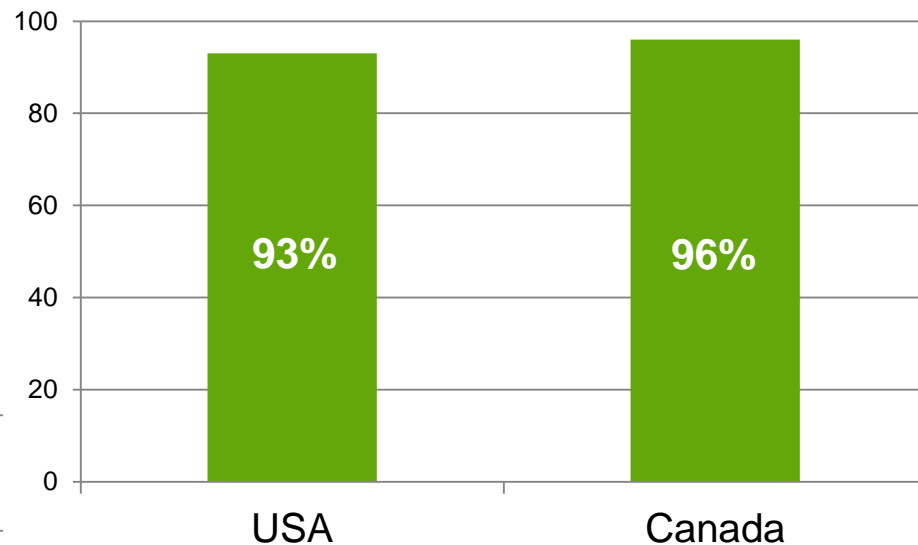
Soybeans



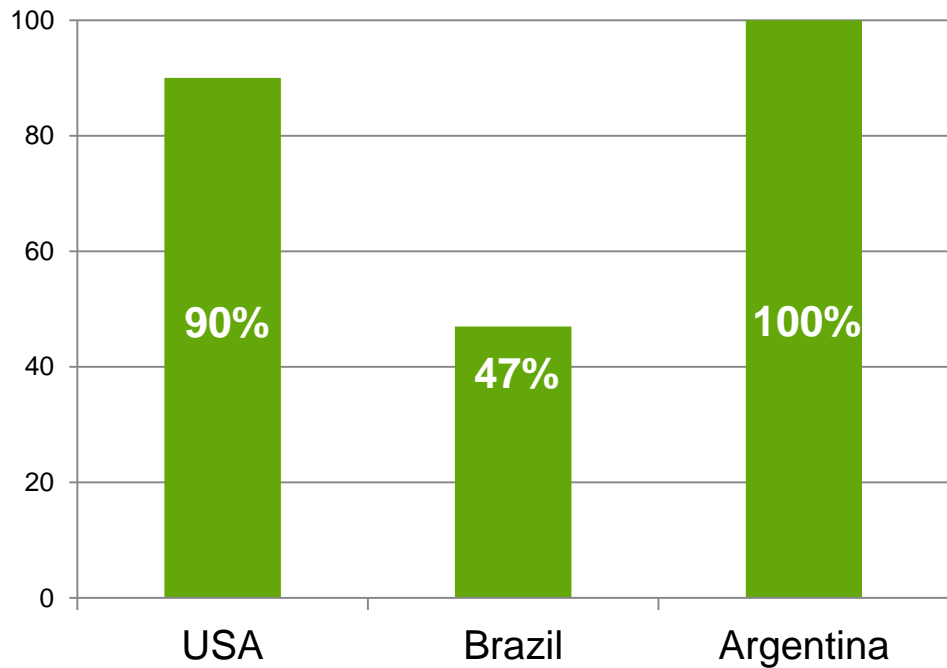
Biotech Adoption Levels



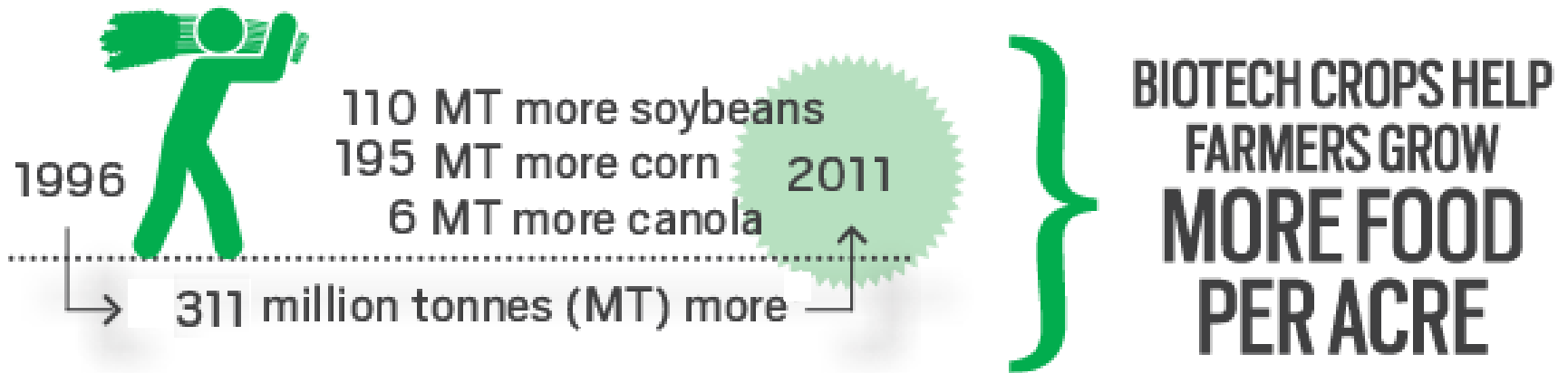
Rapeseed



Cotton

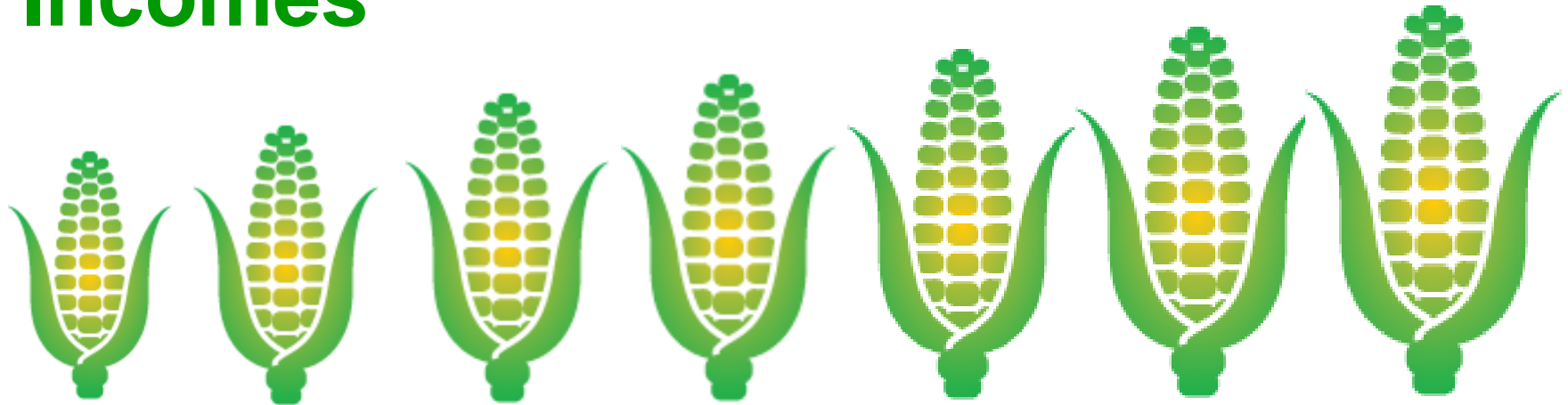


Biotech Crops Increase Food Production



Source: PG Economics, 2014

Biotech Crops Increase Incomes



From 1996 to 2012, the **global economic benefit** at the farm level due to enhanced production and efficiency from the adoption of plant biotechnology was **\$117.1 billion**

Source: *PG Economics, 2014*

Biotech Crops Decrease Footprints



CONSERVATION AGRICULTURE

HERBICIDE-TOLERANT BIOTECH CROPS REDUCE THE NEED FOR TILLAGE - USING LESS FUEL AND KEEPING CARBON IN THE SOIL. IN 2012, THE AMOUNT OF CO₂ SAVED BY BIOTECH CROPS WAS EQUAL TO REMOVING 11.88 MILLION CARS FROM THE ROAD FOR ONE YEAR¹⁸

Source: Barfoot P, Brookes G. Key global environmental impacts of genetically modified (GM) crop use 1996–2012. *GM Crops and Food: Biotechnology in Agriculture and the Food Chain*

Technology → Productivity

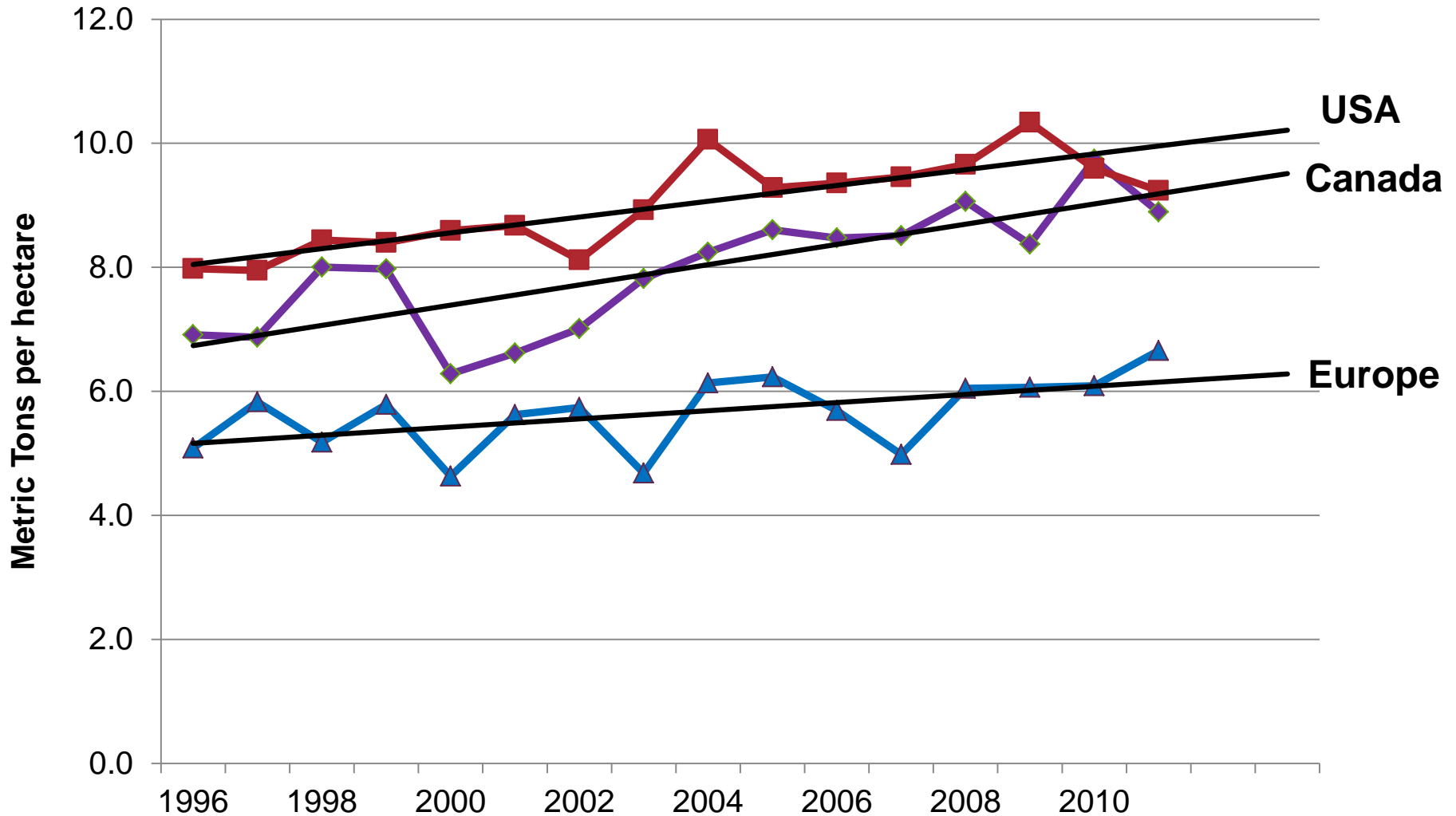
Impact in 2050 under climate change conditions

- Drought Tolerance
 - Can increase grain yields 15-20% during severe drought in the U.S., China & East Africa
- No-till Practices (enabled by Biotech)
 - Single most impactful technology for improving global maize & wheat production
 - 67% increase in irrigated maize yields & 57% increase in irrigated wheat yields
- Nitrogen-use efficiency
 - Could nearly double maize yields in Sub Saharan Africa and Latin America when combined with irrigation

Source: IFPRI, *Food Security in a World of Natural Resource Scarcity: The Role of Agricultural Technologies*, 2014
AgriTech Toolbox: <http://apps.harvestchoice.org/agritech-toolbox/>

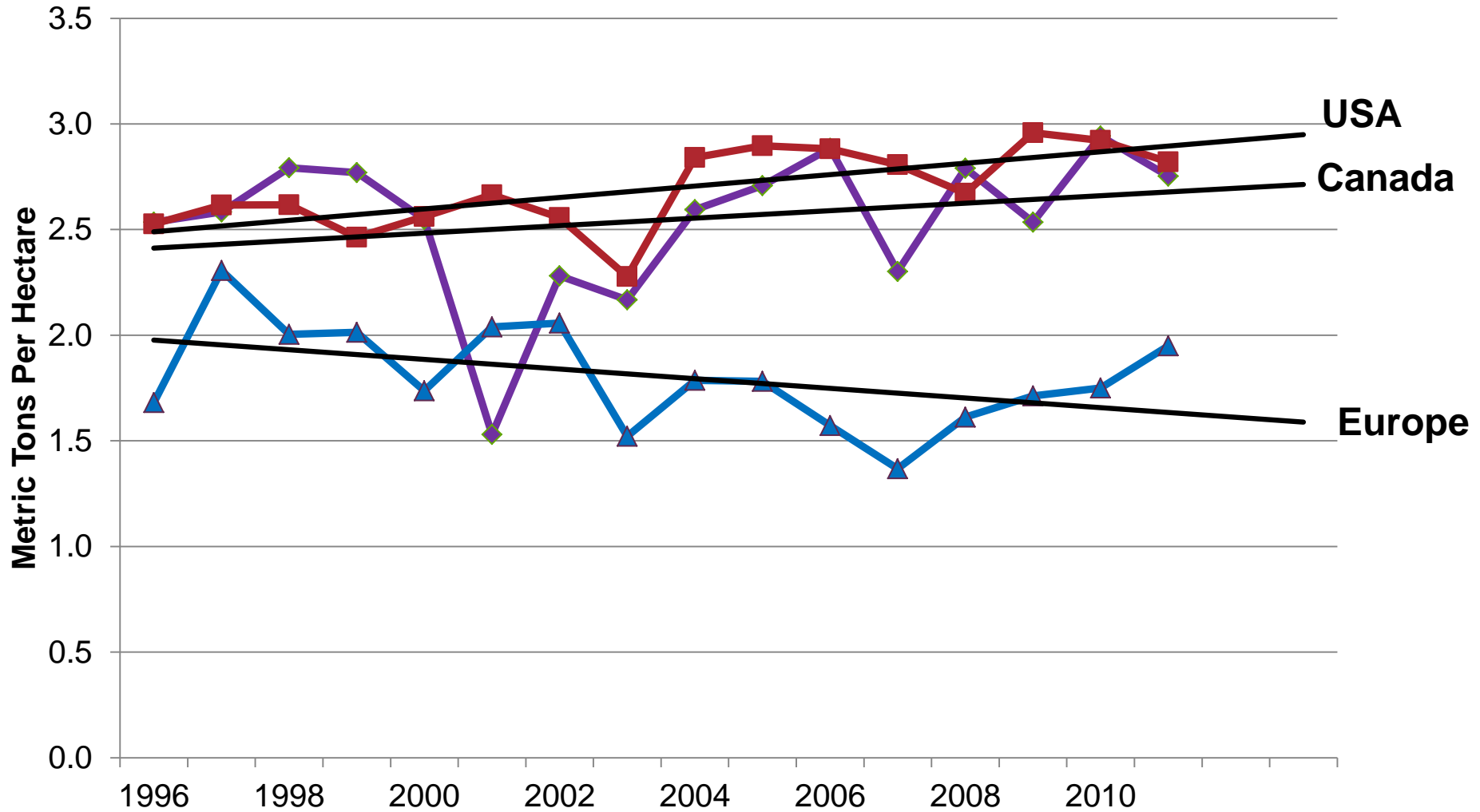
Maize Productivity

Biotechnology contributes to productivity growth



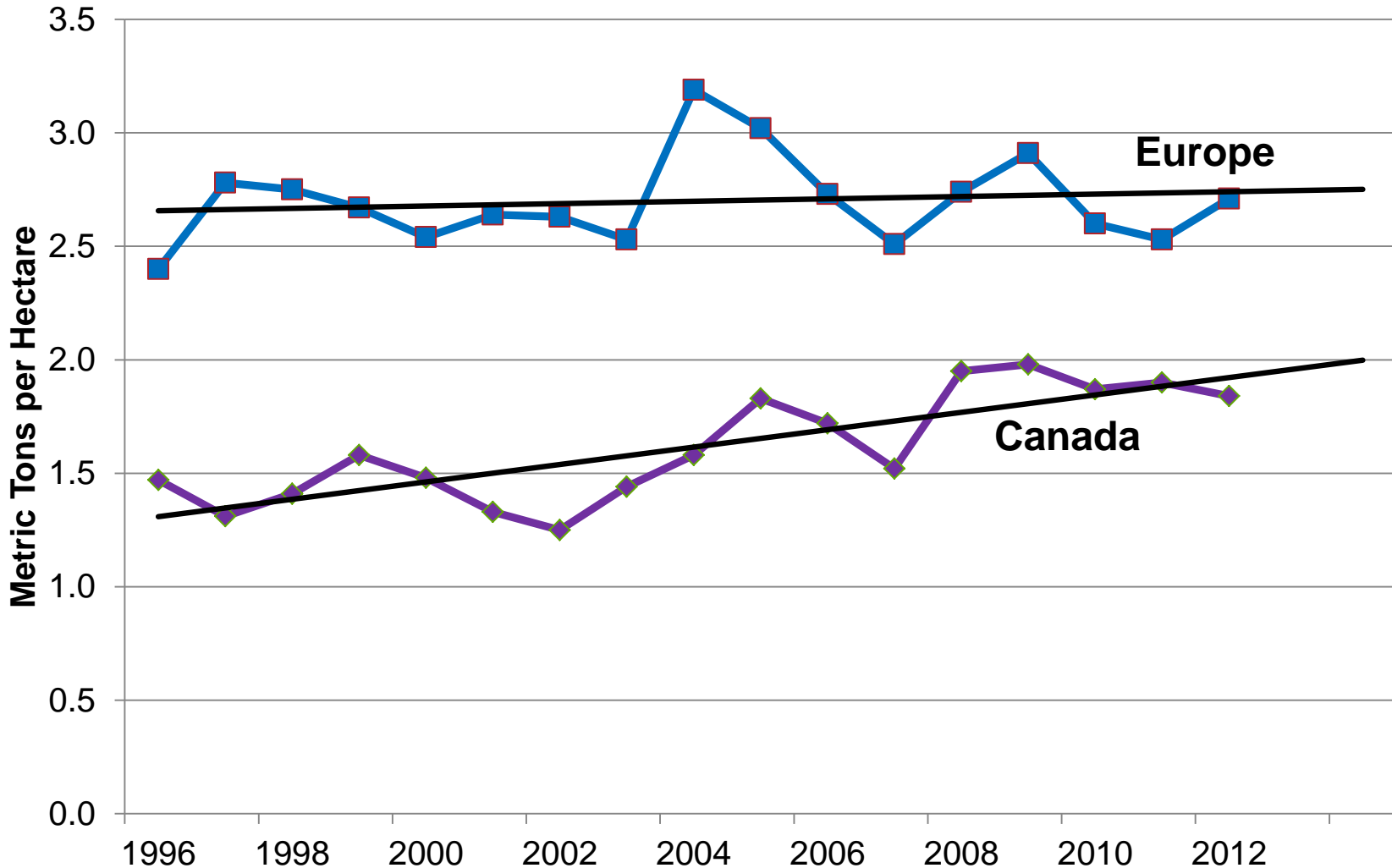
Soybean Productivity

Biotechnology contributes to productivity growth



Rapeseed Productivity

Biotechnology contributes to productivity growth



Biotech Could Improve Productivity in Europe

Potential European Impacts in 2050

- **Higher yielding varieties (Maize and wheat)**
 - Highest productivity increases in Spain, Portugal, Italy & France from drought tolerance
 - 10-15% boost to irrigated maize and wheat yields with nitrogen-use efficiency
- **Herbicide tolerant wheat**
 - Greater adoption of no-till, facilitated through HT crops, can increase Western Europe wheat yields 19%
- **Improved Insect Control through Bt crops**
 - 6-9% yield increase for maize, rice and wheat in Western Europe
 - 8-10% yield increase for maize and wheat in Eastern Europe

Source: *International Food Policy Research Institute (IFPRI), 2014*
AgriTech Toolbox: <http://apps.harvestchoice.org/agritech-toolbox/>

Future of Plant Biotech

CropLife International Member Companies

- **Farmer & Processor Benefits**
 - New disease, insect and weed control (resistance control)
 - Drought tolerance & nitrogen-use efficiency
 - Next-generation yield, feed efficiency and ethanol traits
- **Consumer Benefits**
 - Healthy edible oils
 - No trans fat; low saturated fat soybean
 - Higher omega-3 levels (soybean)
 - Enhanced Nutrition
 - Rice: Higher beta-carotene
 - Biofortified Sorghum: Higher vitamin A, iron, & zinc

Future of Plant Biotech

Public Sector

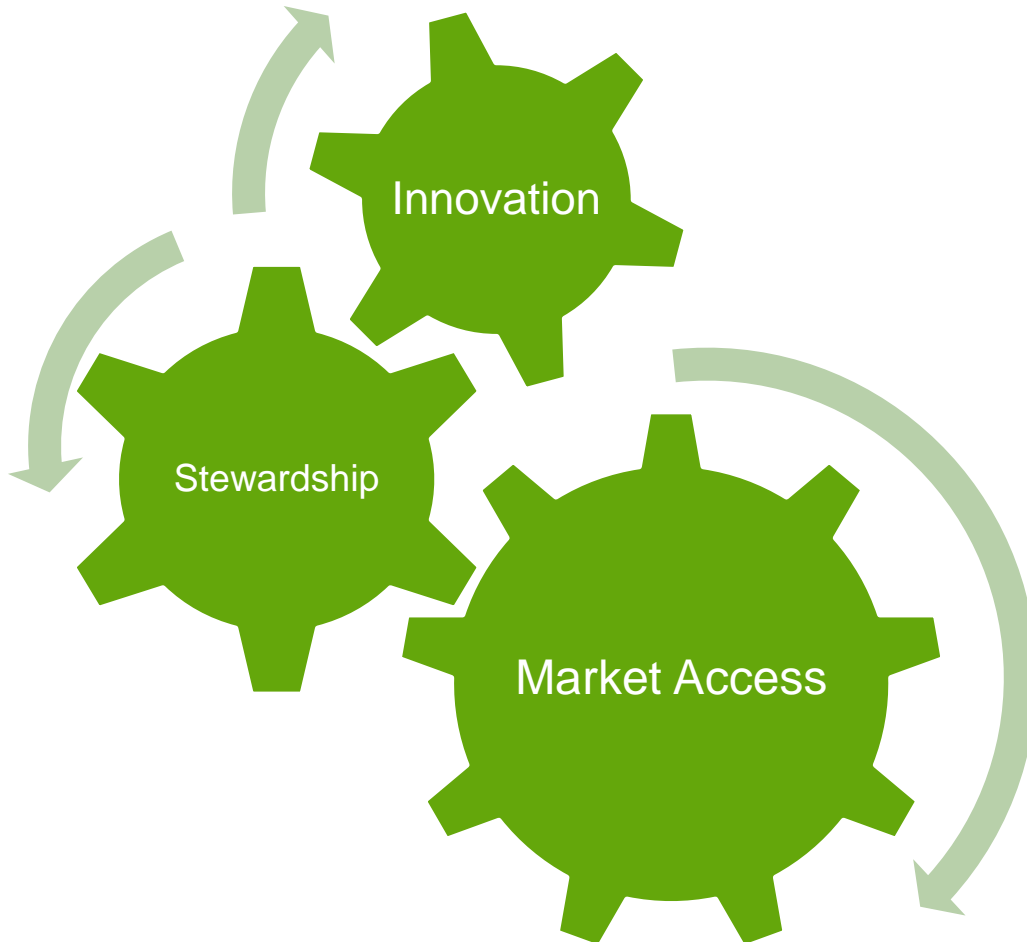
- **EMBRAPA** (Brazil)
 - Herbicide & disease tolerant soybeans
- **CSIRO** (Australia)
 - Salt-Tolerant & nutrient enhanced wheat, insect-resistant cotton
- **Kenyan Agricultural Research Institute**
 - Nitrogen-use efficient & drought-tolerant maize
- **African Agricultural Technology Foundation**
 - Pest control and drought tolerance in maize, cowpea, rice & bananas
- **Rothamsted Research Institute** (UK)
 - Aphid-resistant wheat
- **China Public Pipeline**
 - Sweet pepper, tomato, papaya, soybeans, maize, rice, potatoes
- **India Public Pipeline**
 - Brinjal, tomato, cabbage, cauliflower, okra, mustard, wheat, chili, peanuts, maize, cotton, rice, potatoes

How Will This Impact Trade?

- More differentiated crop production
 - Challenges
 - Grain segregation; Asynchronous approvals; LLP
 - Stewardship
 - Communication
 - Business Opportunities
 - Manage the challenges

INNOVATION → PRODUCTIVITY → TRADE

Innovation and Market Access



- Innovation, stewardship and market access must work together
- Barriers to market access impede innovation
- Stewardship is key to keep innovation and market access moving smoothly

What is the greatest barrier to market access for biotech innovations?

Regulatory Environments That Impede Innovation and Trade

- Unpredictable regulatory frameworks
 - Authorization timelines and processes
 - Lack of low level presence (LLP) policy
 - Asynchronous approvals
- Political decisions
 - Protectionism
 - Ideology
 - Anti technology
 - Anti MNC

What is required to bring a new biotech trait to market?

Commercializing New Innovations

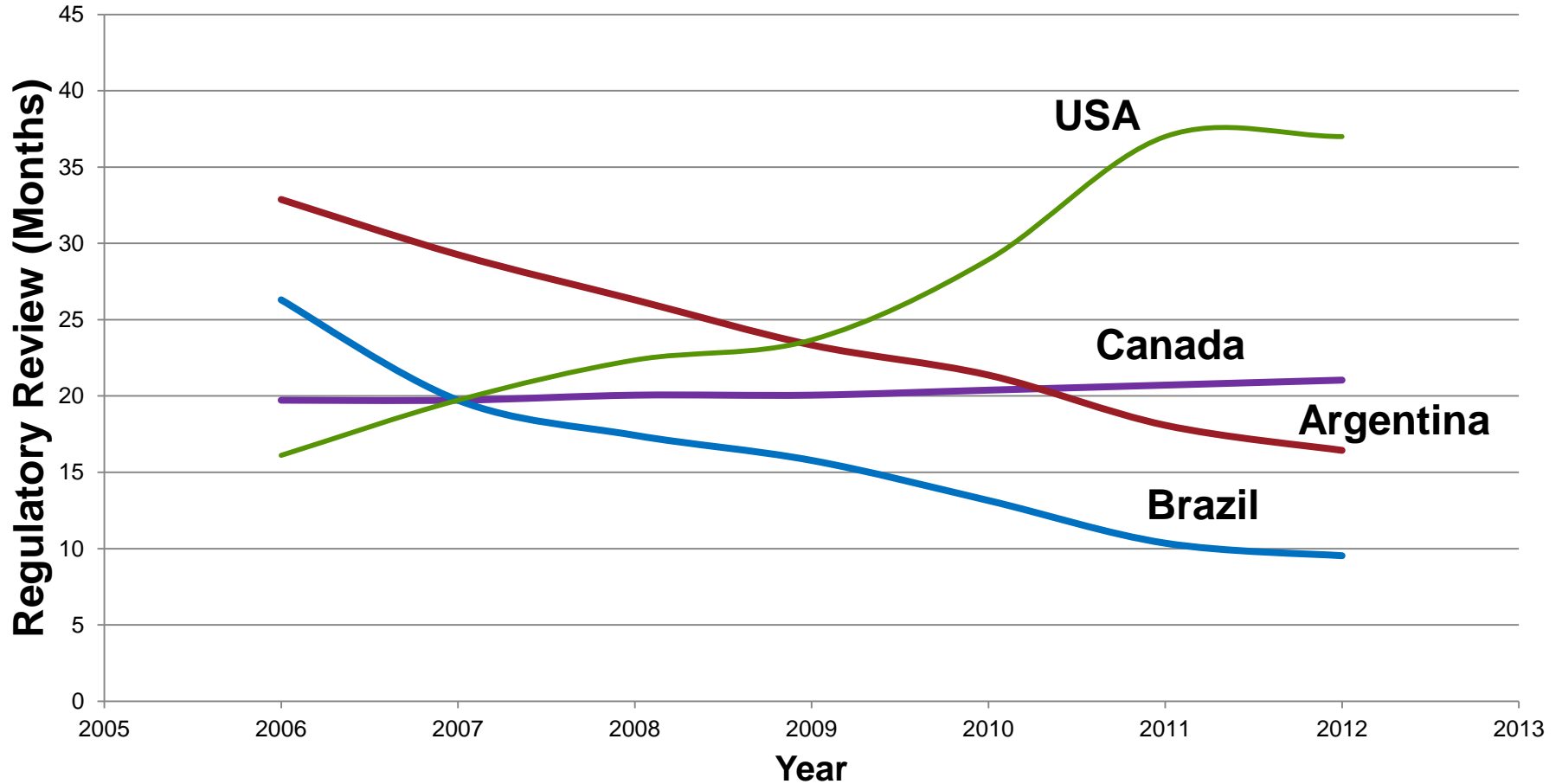
- **\$136 million:** Cost to develop a biotech crop
- **13.1 years:** Time to develop a biotech crop
- Cost & time for cultivation and import regulatory approvals up 50% in past decade

Phillips McDougall 2012

Authorization Timelines Are Increasing Globally

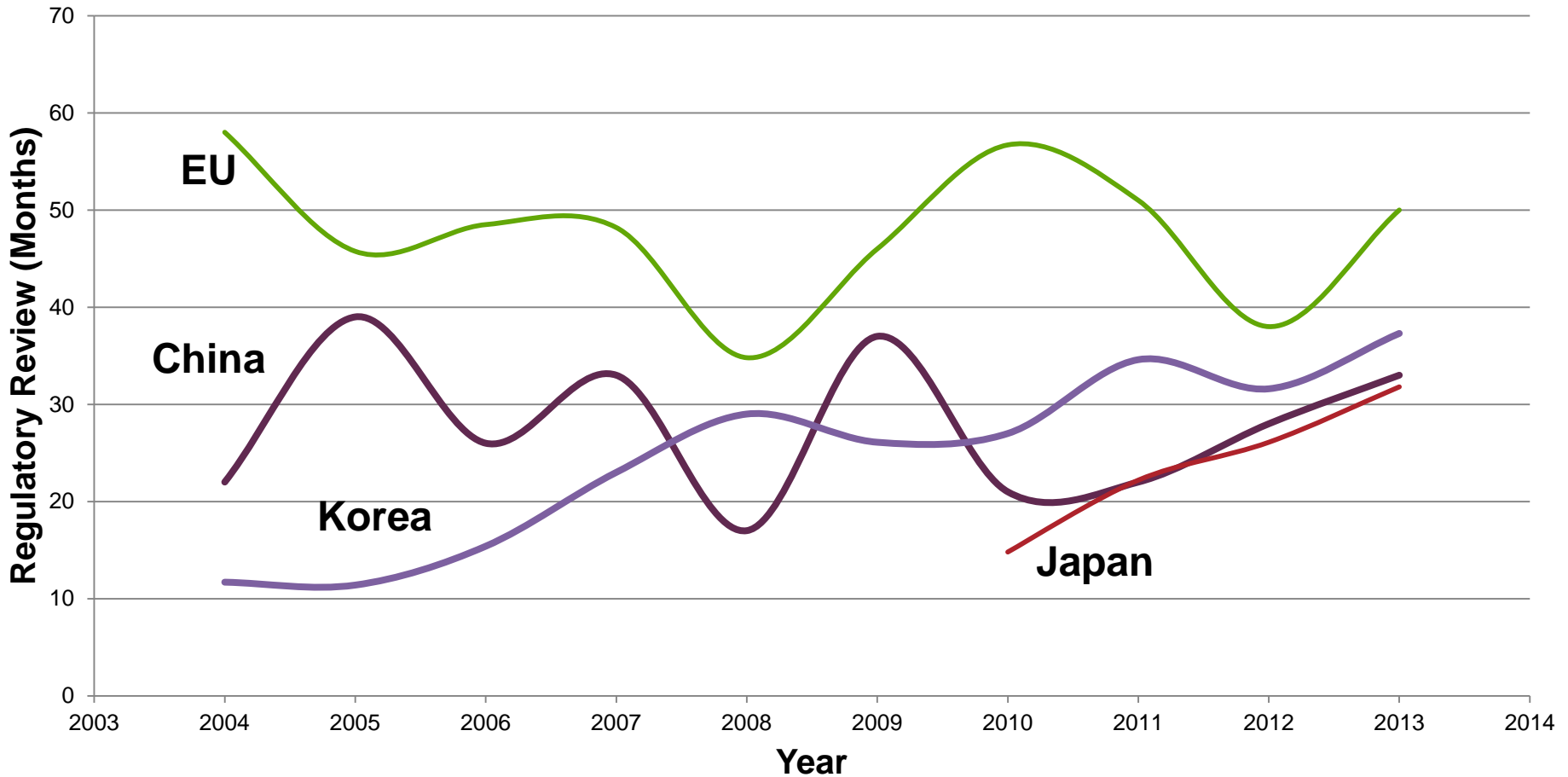
- Regulators are not adhering to authorization timelines (import and cultivation) in regulatory frameworks
- Backlogs of pending submissions are increasing
 - US: 14
 - EU: 74
 - China: 11
- Unpredictable and dysfunctional authorization processes cause trade disruptions and delay access to innovation

Cultivation Approvals



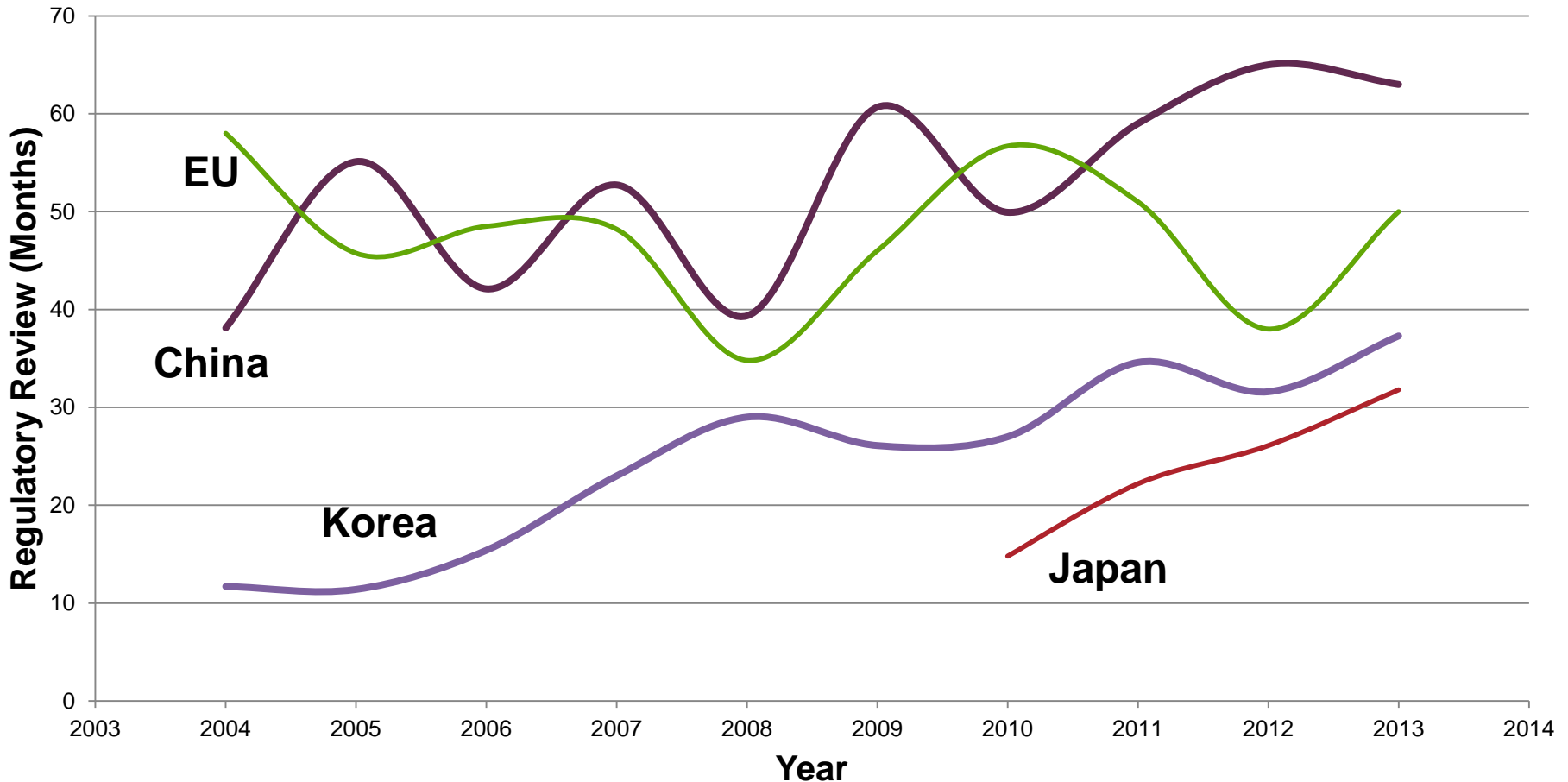
Import Approvals

Review time from date of submission



Import Approvals

Reality: China's approval process requires additional 2+ years since import dossiers cannot be submitted until cultivation is approved elsewhere



What is Being Done to Reduce Regulatory Barriers to Innovation and Trade?

CropLife & Coalition Engagement

Process the Backlog

- Regulatory systems function as designed



- Export Market Approvals Committee
- Regional & National Assns
- Regulatory Committee
- MAIZALL
- ISGA

LLP

- Thresholds
- Minimize short-term trade disruption



- Global Alliance on Ag Biotech Trade (GAABT)
- China LLP Coalition
- Regional & National Associations

Regulatory Reform

- Predictable regulatory system
- Compress timelines



- Regional & National Associations
- Regulatory Committee

Synchronous Approvals

- Concurrent multilateral submissions



- Export Market Approvals Cmte
- GAABT
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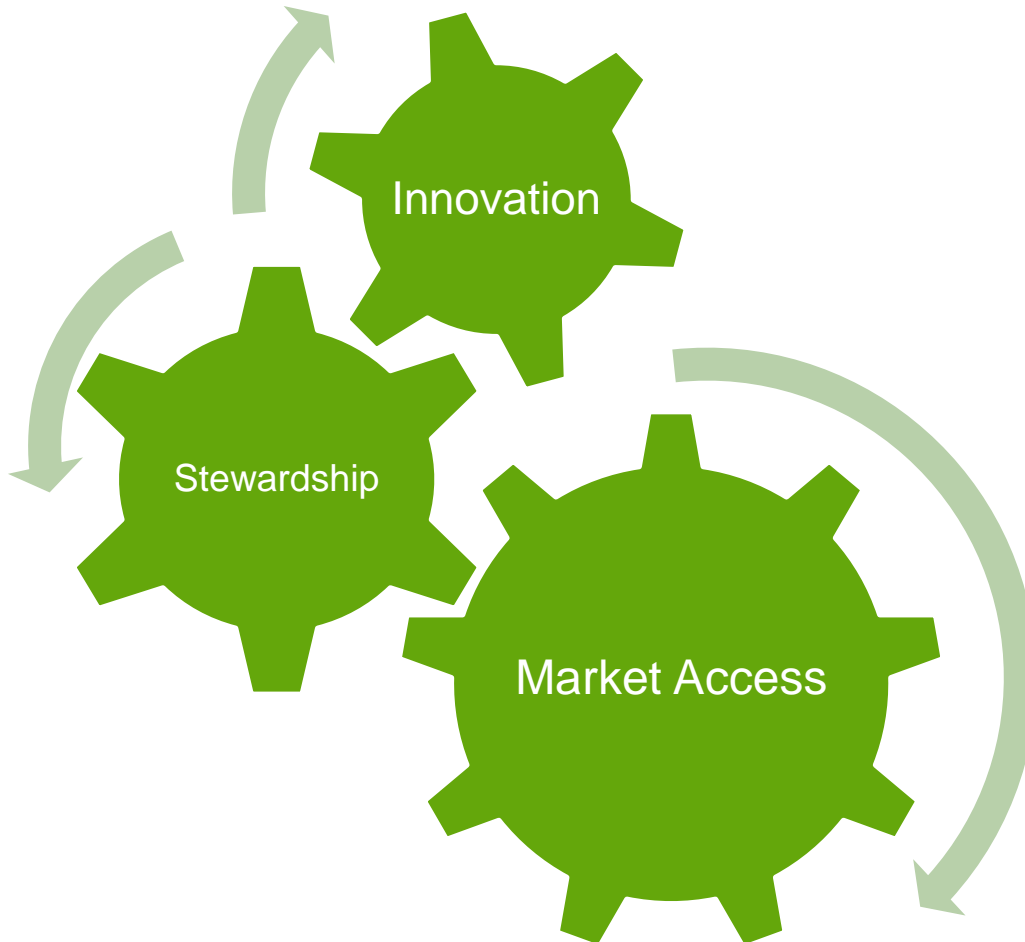
Harmonization

- Harmonize food and feed approvals



- Regulatory Committee
- Emerging Regulatory Systems Project Team

Innovation and Market Access, Working Together



- Dialogue, collaboration and communication
- Focus on sustainable food security goals
- Address market access and trade barriers disguised as regulatory issues
- Roles & Responsibilities
 - Stewardship

THANK YOU!

Questions?