CropLife Asia

Global GM Grain Supply Chain

August 21, 2025

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Executive Director

CropLife Asia: Who we are

CropLife Asia, based in Singapore, is a non-profit organisation dedicated to promoting plant science.

Being part of the global federation, CropLife International, we advocate crop protection and plant biotechnology to enhance sustainable farming and benefit farmers, governments, consumers, and the environment.

Sustainable agriculture means employing a wide range of solutions that incorporate nature and technology.

To help farmers' grow sufficient amounts of food for a growing population through access to innovative technologies.

CLA Member Companies

- Agricultural biotech products
- Conventional crop protection products
- Biologicals
- Digital & precision agricultural technologies

syngenta

Bayer

CORTEVA™ agriscience

FMC An Agricultural Sciences Company

BASF We create chemistry

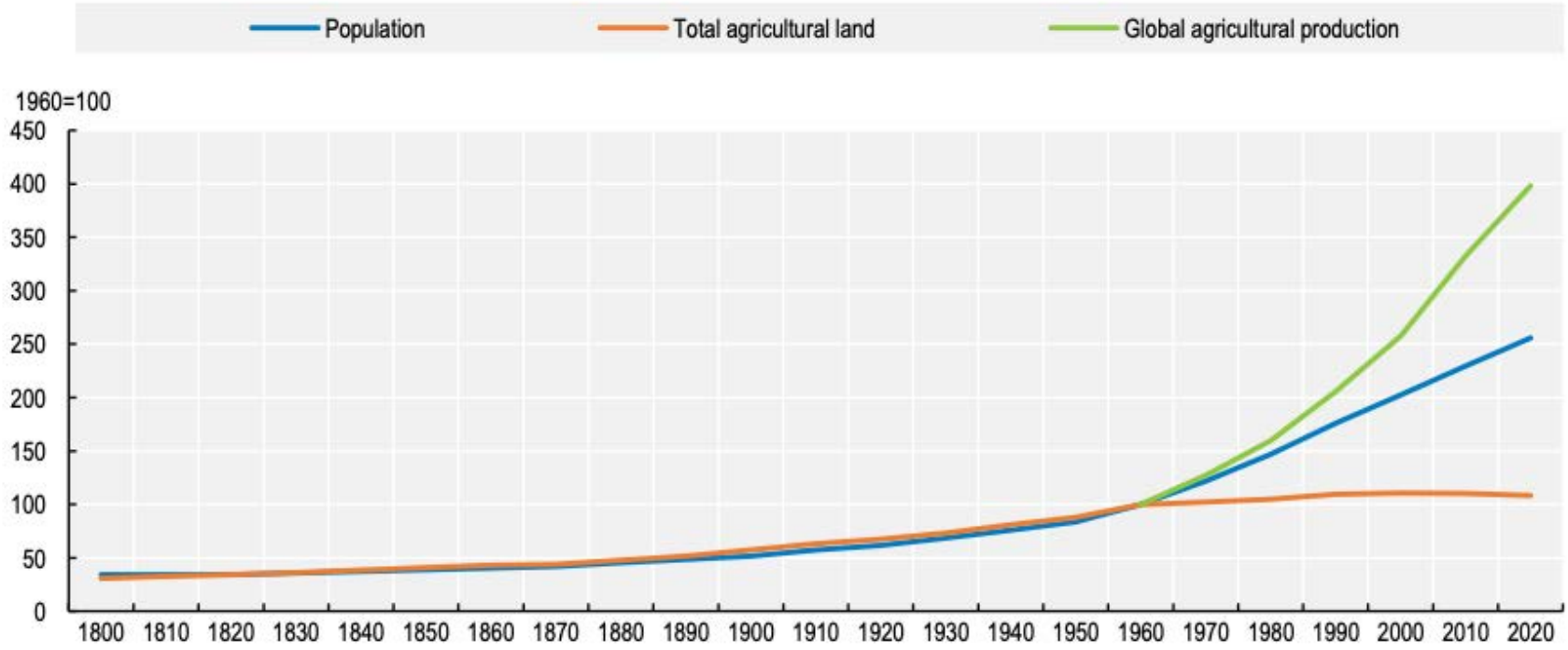
SUMITOMO CHEMICAL

Associate member: Simplot

Outline

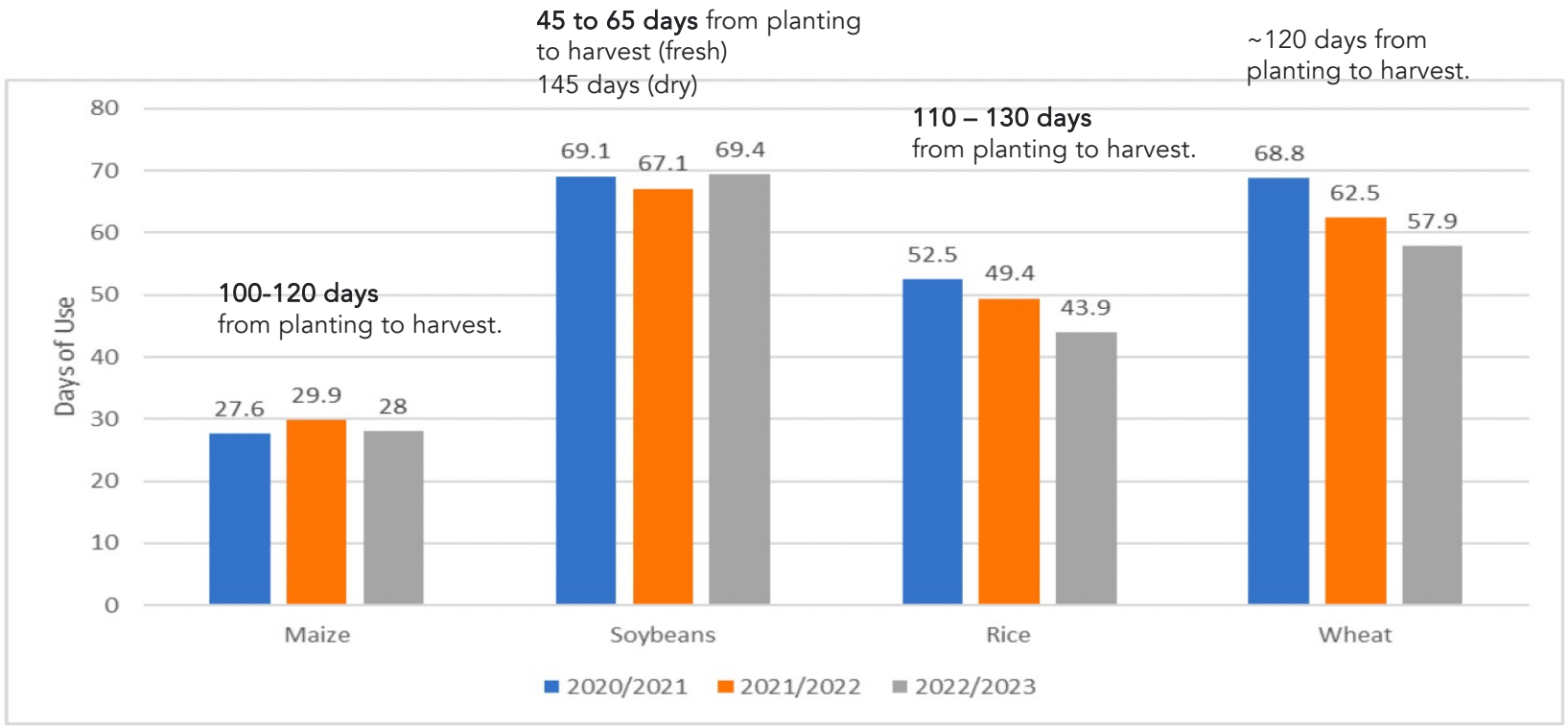
- Area under GM crops and seed trade
- GM grain world trade
- Challenges to GM grain trade
- Need for regulatory harmonization
- Cost of delays and need for regulatory harmonization
- Conclusion

Population, Food Production & Agricultural Land Use in the Long Run



Source: Population data from Maddison's historical statistics for 1820-1940; UN Population Division for 1950-2010; 1800 and 1810 extrapolated from Maddison. Agricultural (crops and pasture) land data for 1800-2010 from the History Database of the Global Environment (HYDE 3.2), Klein Goldewijk et al. (2017). Global agricultural production data for 1960-2010 from FAOSTAT (Net Agricultural Production Index); data for 2020 from OECD/FAO (2020), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

Global Ending Stocks (Excluding China)

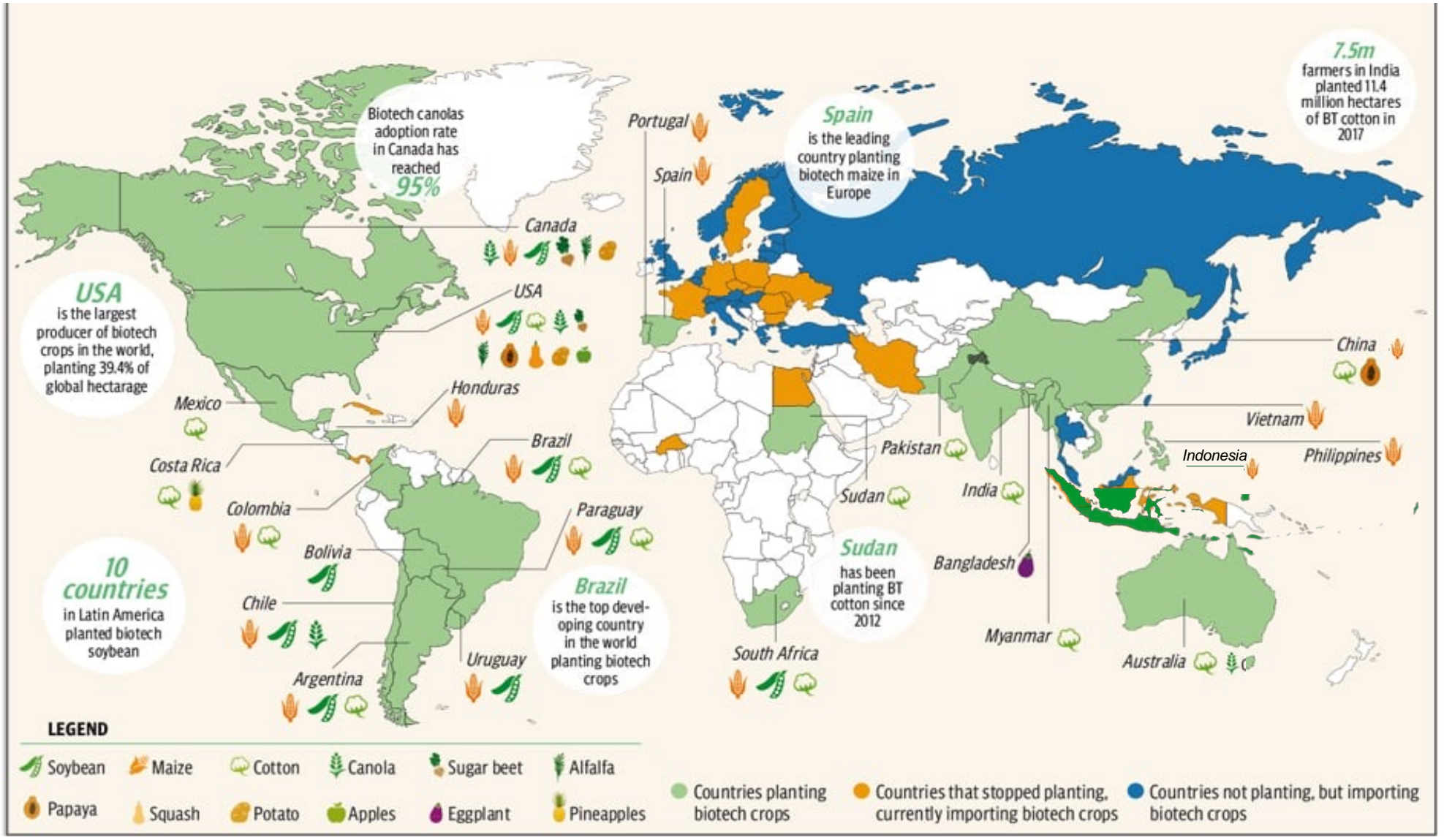


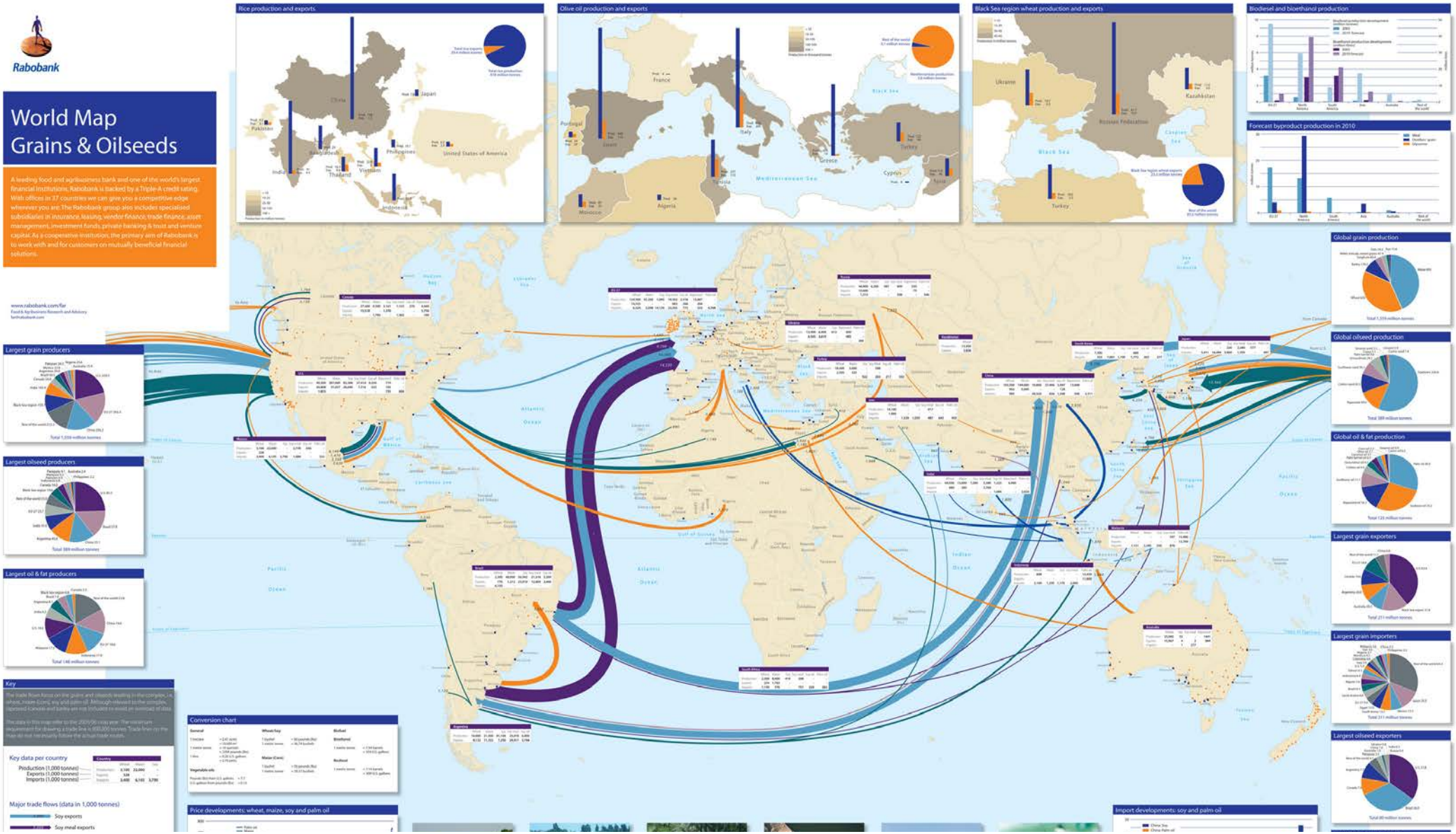
Source: IFPRI, 2023

Note: Data reflects days of use

https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-LXXVIII-February-09-2023.pdf

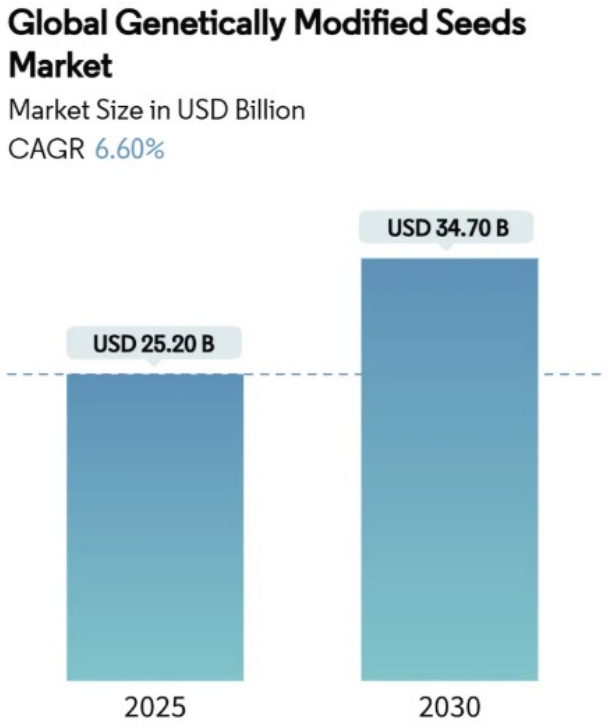
Greatest Misconception Organisms (GMOs)


Biotech canolas adoption rate in Canada has reached 95%
USA is the largest producer of biotech crops in the world, planting 39.4% of global hectarage
10 countries in Latin America planted biotech soybean
Brazil is the top developing country in the world planting biotech crops
Spain is the leading country planting biotech maize in Europe
Sudan has been planting BT cotton since 2012
7.5m farmers in India planted 11.4 million hectares of BT cotton in 2017
Canada
USA
Mexico
Honduras
Costa Rica
Colombia
Brazil
Paraguay
Bolivia
Chile
Uruguay
Argentina
Portugal
Spain
Pakistan
Sudan
India
China
Vietnam
Philippines
Indonesia
Bangladesh
Myanmar
South Africa
Australia
LEGEND
Soybean
Maize
Cotton
Canola
Sugar beet
Alfalfa
Papaya
Squash
Potato
Apples
Eggplant
Pineapples
Countries planting biotech crops
Countries that stopped planting, currently importing biotech crops
Countries not planting, but importing biotech crops


Rabobank
World Map
Grains & Oilseeds
A leading food and agribusiness bank and one of the world's largest financial institutions, Rabobank is backed by a Triple-A credit rating. With offices in 37 countries we can give you a competitive edge wherever you are. The Rabobank group also includes specialised subsidiaries in insurance, leasing, vendor finance, trade finance, asset management, investment funds, private banking & trust and venture capital. As a cooperative institution, the primary aim of Rabobank is to work with and for customers on mutually beneficial financial solutions.
www.rabobank.com/far
Food & Agribusiness Research and Advisory
farthatsbank.com
Rice production and exports
Olive oil production and exports
Black Sea region wheat production and exports
Biodiesel and bioethanol production
Forecast byproduct production in 2010
Global grain production
Global oilseed production
Global oil & fat production
Largest grain exporters
Largest grain importers
Largest oilseed exporters
Largest grain producers
Largest oilseed producers
Largest oil & fat producers
Key
Key data per country
Production (1,000 tonnes)
Exports (1,000 tonnes)
Imports (1,000 tonnes)
Major trade flows (data in 1,000 tonnes)
Soy exports
Soy meal exports
Conversion chart
Price developments: wheat, maize, soy and palm oil
Import developments: soy and palm oil

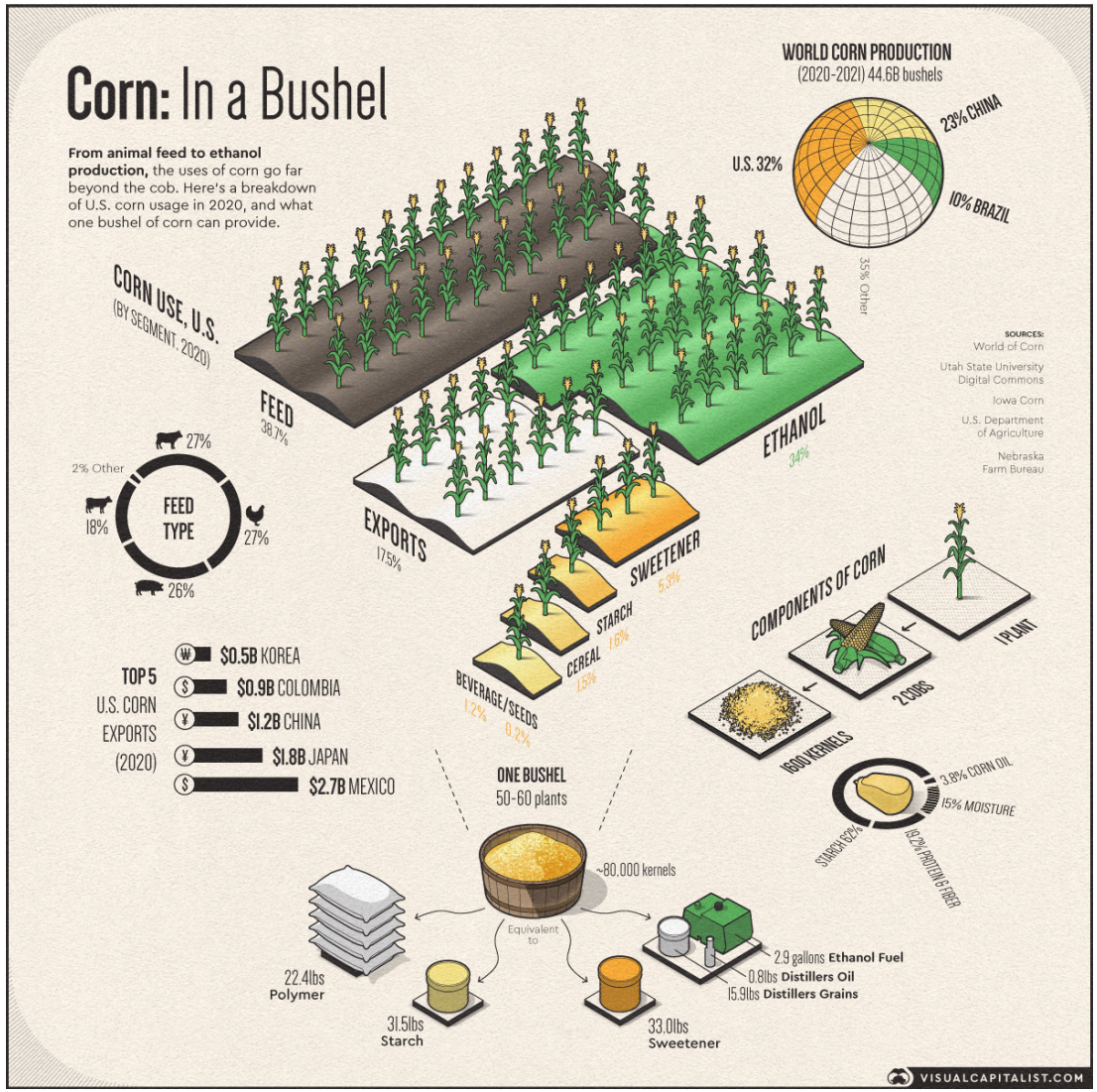
Area under GM Crops & Seed Trade

Country	Area (Mha)	GM Crops
United States	71.5	Cotton, Papaya, Alfalfa, Sugar beet, Rapeseed, Soybean, maize, Squash
Brazil	52.8	Soybean, Cotton, Maize
Argentina	24	Soybean, Cotton, Maize
Canada	12.5	Soybean, Sugar beet, Rapeseed, Maize
India	11.6	Cotton
Paraguay	3.8	Soybean, Cotton, Maize
China	2.9	Cotton, Papaya, Tomato, Sweet pepper
Pakistan	2.8	Cotton
South Africa	2.7	Soybean, Cotton, Maize
Bolivia	1.3	Soybean



Corn has a share of 39% of the genetically modified seeds market in 2024 with North America having 39% of the total share.

Abdul Aziz et al, 2022; Mordor Intelligence



https://www.weforum.org/agenda/2021/06/corn-industries-sustainability-food-prices

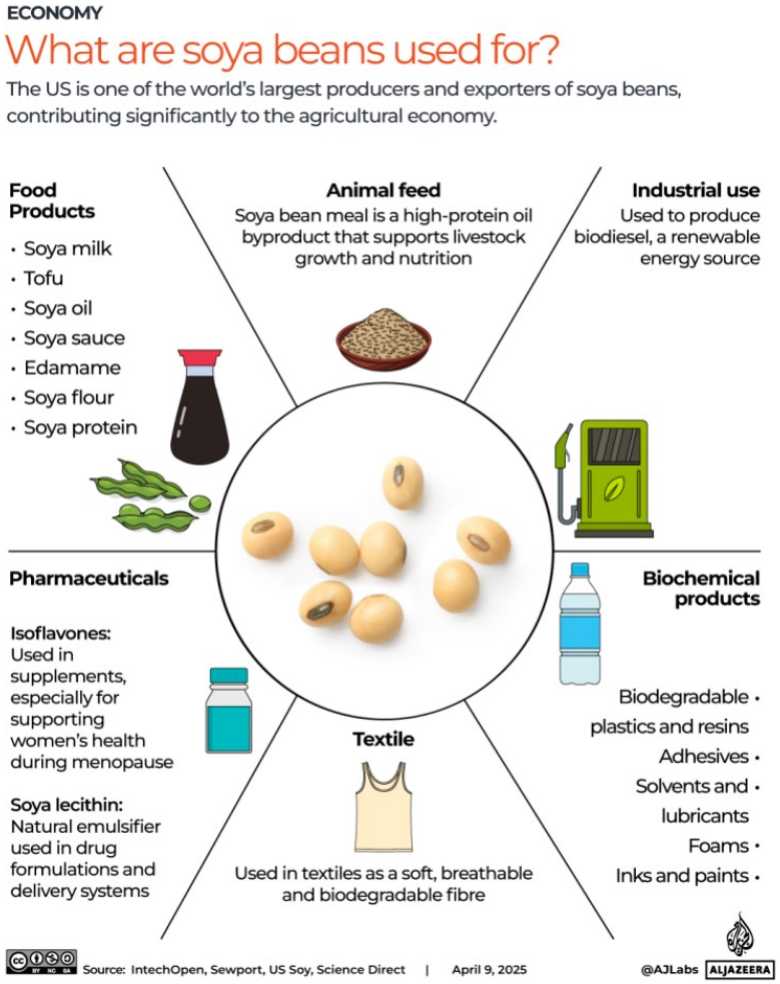
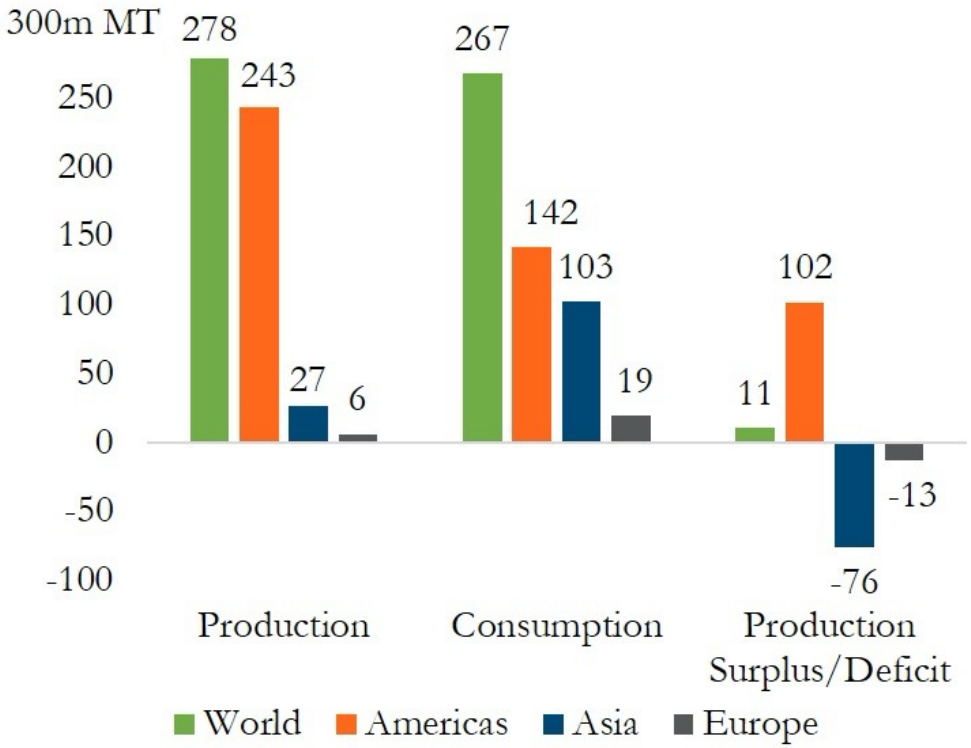


Figure 1a. Production, consumption and production surplus/deficit, soybeans, by region, 2013 (m MT)



https://www.krinstitute.org/Views-@-Soy-;_The_King_of_Beans.aspx

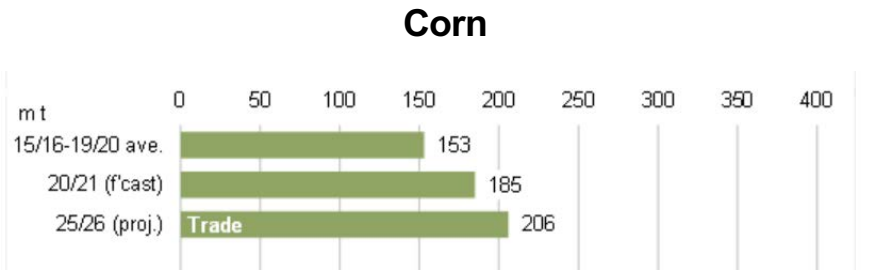
GM Grain – World Trade

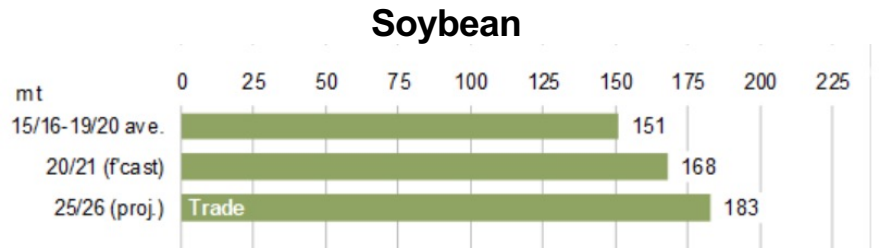
GM crop exporting countries

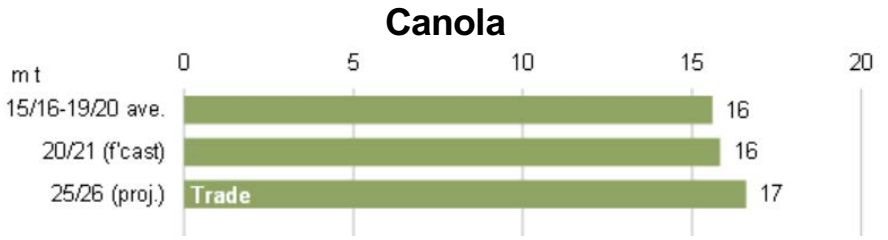
- United States- GM soybean, corn, cotton and canola
- Brazil & Argentina- GM soybean, corn and cotton.

GM crops importing countries

- Indonesia- Soybean
- India- Cotton, edible oil
- Canada- Corn and soybean
- China- Soybean, cotton, corn and canola
- South Korea- Corn, soybean
- Japan- Corn, canola







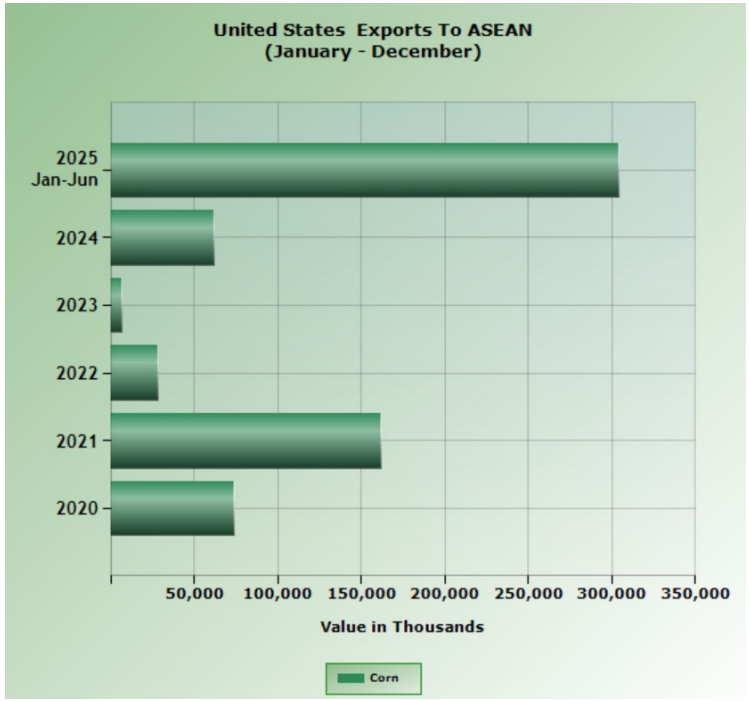
https://gm.agbioinvestor.com/, IGC

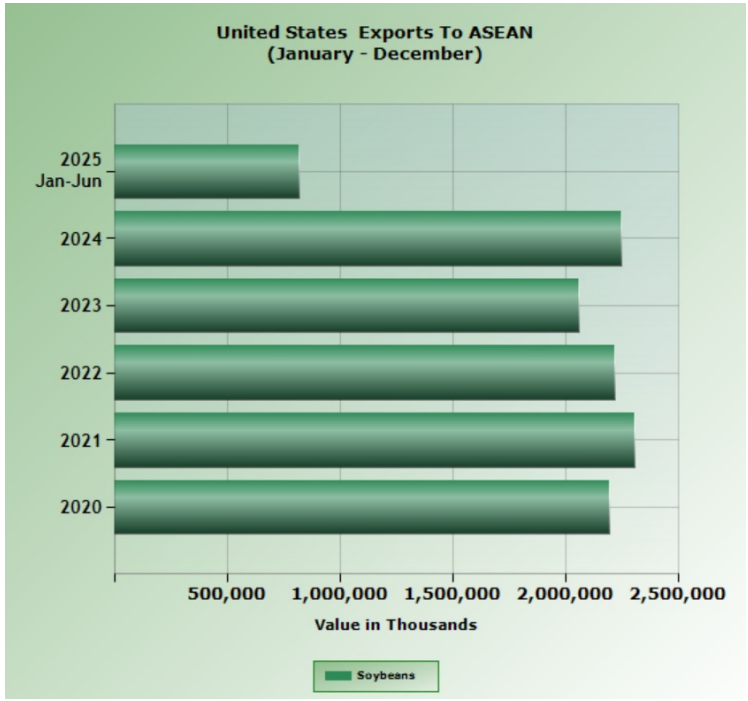
Corn Grain Trade

Country	2021-22	2022-23	2023-24	2024-25	2025-26
Exporting countries (Thousand metric tons)					
US	62,903	42,774	58,520	71,300	72,500
Brazil	31,921	53,285	46,416	40,000	42,000
Argentina	38,853	25,750	31,214	35,500	37,000
Importing countries (Thousand metric tons)					
Vietnam	9,100	9,500	11,300	12,500	13,000
Malaysia	3,678	3,448	3,870	3,800	3,800
Philippines	669	1,024	1,784	1,750	2,000
Thailand	1,480	1,346	2,018	1,800	1,850

Source: USDA

US Grain Trade to ASEAN





In 2021, Asia (not specifically ASEAN) received 52% of the total, equivalent to 31.8 million tons of corn grain exports from Argentina. Similarly, Brazil also exported high volumes to Asia, especially Vietnam.

Source: USDA

BIOTECH CROPS BENEFIT SMALLHOLDER FARMERS

CUMULATIVE FARM INCOME GAINS

52% **FARMERS IN DEVELOPING COUNTRIES**

48% **FARMERS IN DEVELOPED COUNTRIES**

ISAAA Inc.

IN 1996-2020 GROSS FARM INCOME INCREASED BY

US$261.3 BILLION

IN 2020 FARM INCOME GAINS

US$18.8 BILLION

FOR EACH EXTRA DOLLAR INVESTED IN GM CROP SEEDS, FARMERS GAINED AN AVERAGE US$3.76 IN EXTRA INCOME: $5.22 IN DEVELOPING COUNTRIES AND $3.00 FOR DEVELOPED COUNTRIES

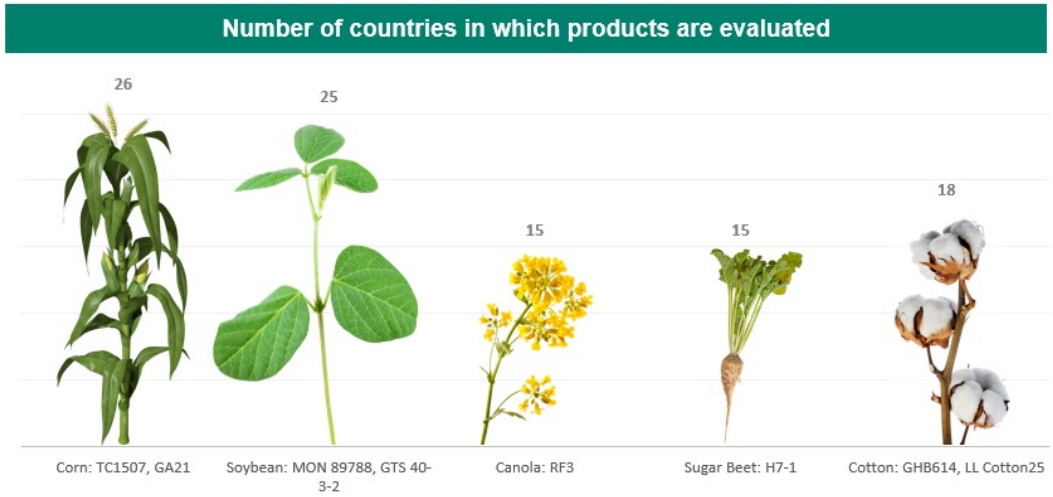
SOURCE: GRAHAM BROOKES, 2022

Challenges to GM grain trade

Challenges to GM grain trade

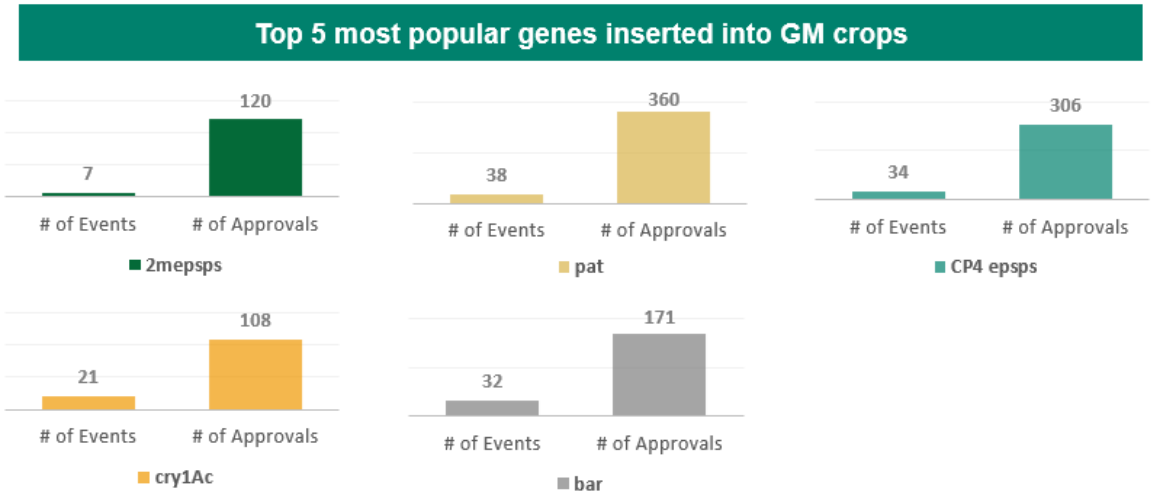
- Divergent regulations across countries- Different countries have varying approaches to approving and regulating GM crops, which creates trade barriers.
- Concerns about GM food safety and environmental impact- Public concerns about the safety of GM foods and their potential impact on the environment negatively impact trade.
- Potential for illicit trade- The spread of illicit cultivation of GM crops in countries, impacts legitimate transboundary flow of GM seeds and grains. This illegal trade undermines the regulatory framework and creates uncertainty for legitimate traders.
- Lack of harmonization in biosafety assessments- This delays and increases cost of approval and hinder the smooth flow of GM grains within the region.

Need for Regulatory Harmonization



Repeated safety evaluations in multiple jurisdictions for individual products, can cause the food industry to suffer.

Individual genes (and proteins they produce) are often reviewed for safety *hundreds of times*.



https://gm.agbioinvestor.com/

Cost of Delays- Need for Regulatory Harmonization

A LACK IN GLOBAL CONSISTENCY LEADS TO:

REDUCED PRODUCT CHOICE
for farmers and consumers

DISRUPTIONS IN TRADE
and delays in commercial launches

ADDED COSTS

$4.9bn
USD in soybeans

HUGE POTENTIAL

A well-defined, consistent, and science-based approach to assessments would lead to:

- **greater innovation,**
- increased **commercialization** of beneficial GM crops and traits,
- a **streamlined** global review process with more efficient approvals.

With more timely GM plant approvals between **2018-2022**, major export countries could increase production by**:

$4.3bn
USD in corn

LOST OPPORTUNITIES

$4-14 BILLION

China loses an estimated $4-14 billion USD annually to the overall economy each year it delays the commercialization of insect resistant maize.**

$115 MILLION

A **5-year** regulatory delay of new nitrogen efficient rice could cost the Ghanaian economy as much as $115 million USD.****

BUT REGULATION ISSUES CAUSE DELAYS

50%

The time and costs associated with regulation and registration have increased by 50% over the past decade.

Source: CropLife International

In conclusion

- ASEAN has taken significant measures to manage food security, but some challenges remain.
- GM crops can contribute to food security and potentially lower production costs,
- Regulatory frameworks and enforcement needs to be carefully addressed.
- Consumer acceptance remains a challenge.
- These can be addressed by-

  -Harmonize food safety standards and regulations across borders.

  - Data transportability and acceptance is a sustainable regulatory option

  - IPR protection across borders is essential.

  -Strengthen compliance and monitoring of food safety measures.

Thank you

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