

# Global Status of GM Crops and where is Malaysia?



*Mahaletchumy Arujanan*  
*Malaysian Biotechnology Information Centre (MABIC)*

---

# ADOPTION OF BIOTECH CROPS

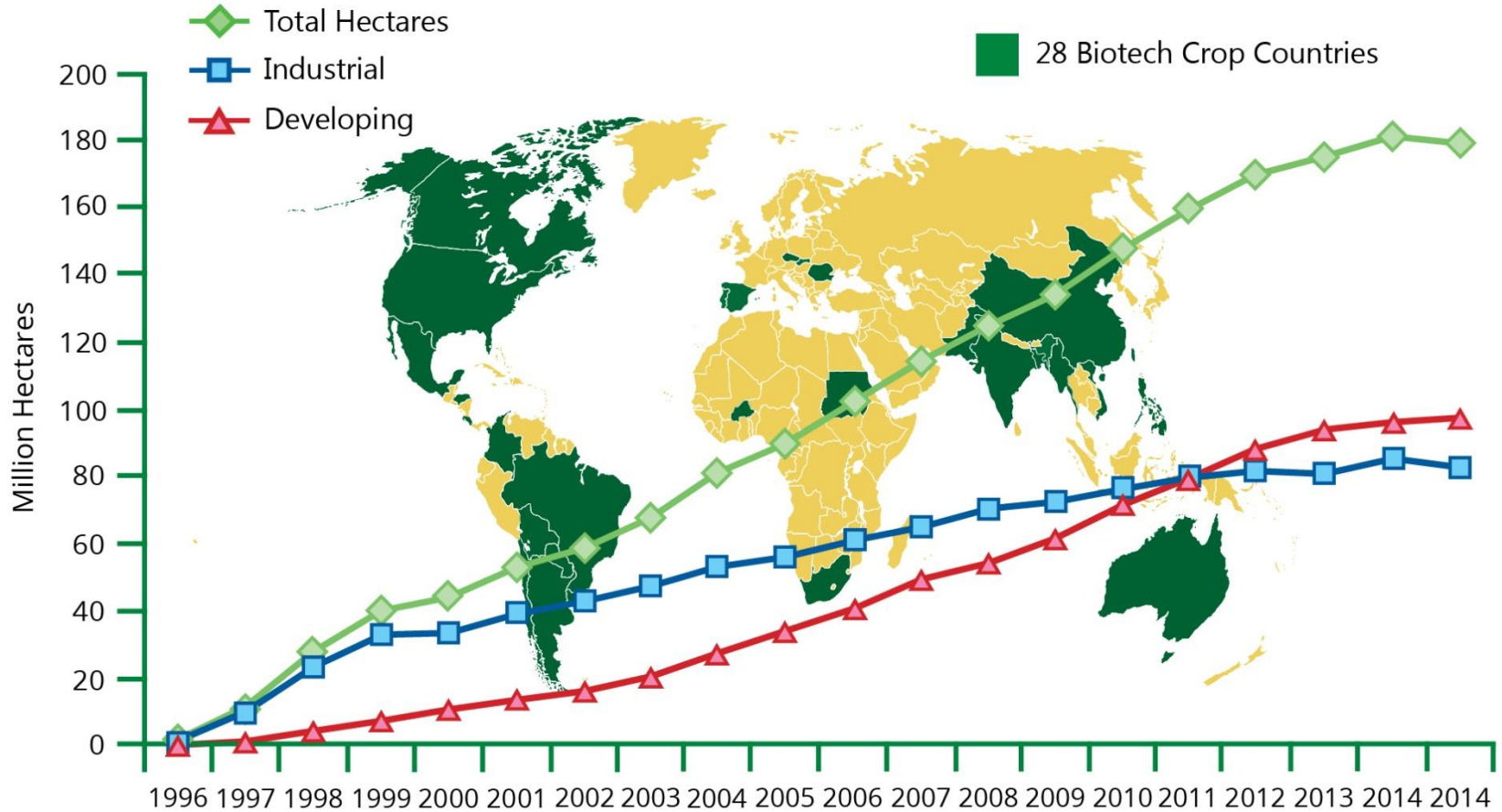
1996 to 2015

>100-fold increase from 1.7 to 179.7 M ha

**fastest adopted crop technology**

20<sup>th</sup> year of commercialization

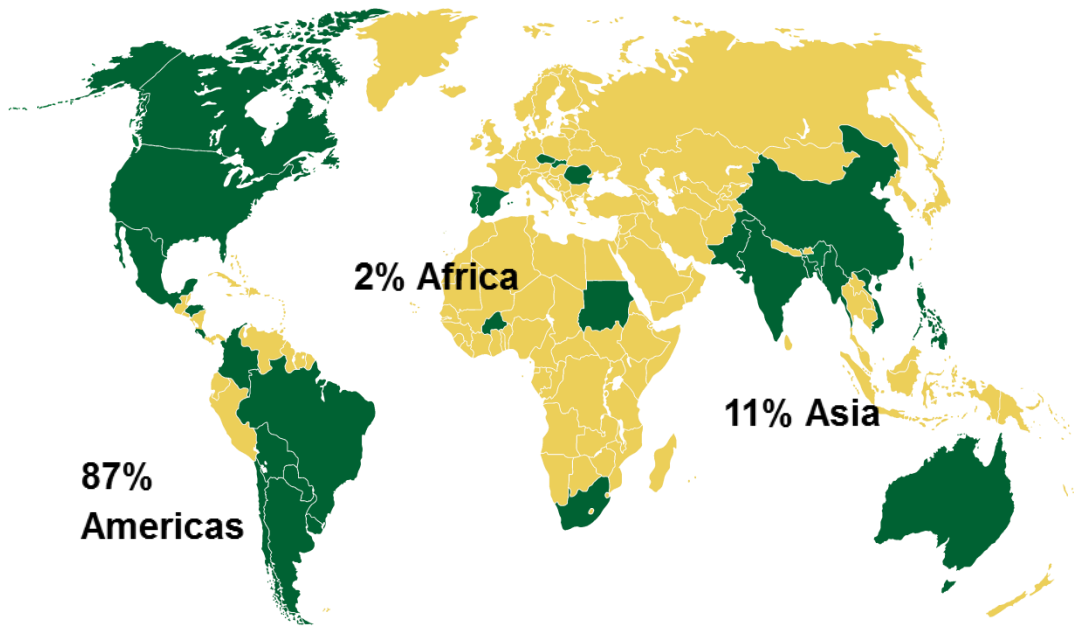
## GLOBAL AREA OF BIOTECH CROPS Million Hectares (1996-2015)



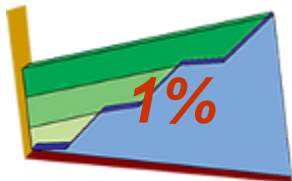
***Up to ~18 million farmers, in 28 countries planted 179.7 million hectares (444 million acres) in 2015, a marginal decrease of 1% or 1.8 million hectares (4.4 million acres) from 2014.***

Source: Clive James, 2015.

# Global Area (Million Hectares) of Biotech Crops, 2015: by Country



*Marginal Decrease  
from 2014*



 28 countries which have adopted biotech crops

In 2015, global area of biotech crops was 179.7 million hectares, representing a marginal decrease of 1% from 2014, equivalent to 1.8 million hectares.

## Biotech Mega Countries

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

	Million Hectares
1. USA	70.9
2. Brazil*	44.2
3. Argentina*	24.5
4. India*	11.6
5. Canada	11.0
6. China*	3.7
7. Paraguay*	3.6
8. Pakistan*	2.9
9. South Africa*	2.3
10. Uruguay*	1.4
11. Bolivia*	1.1
12. Philippines*	0.7
13. Australia	0.7
14. Burkina Faso*	0.4
15. Myanmar*	0.3
16. Mexico*	0.1
17. Spain	0.1
18. Colombia*	0.1
19. Sudan*	0.1

Less than 50,000 hectares

Honduras\*  
Chile\*  
Portugal  
Vietnam\*  
Czech Republic

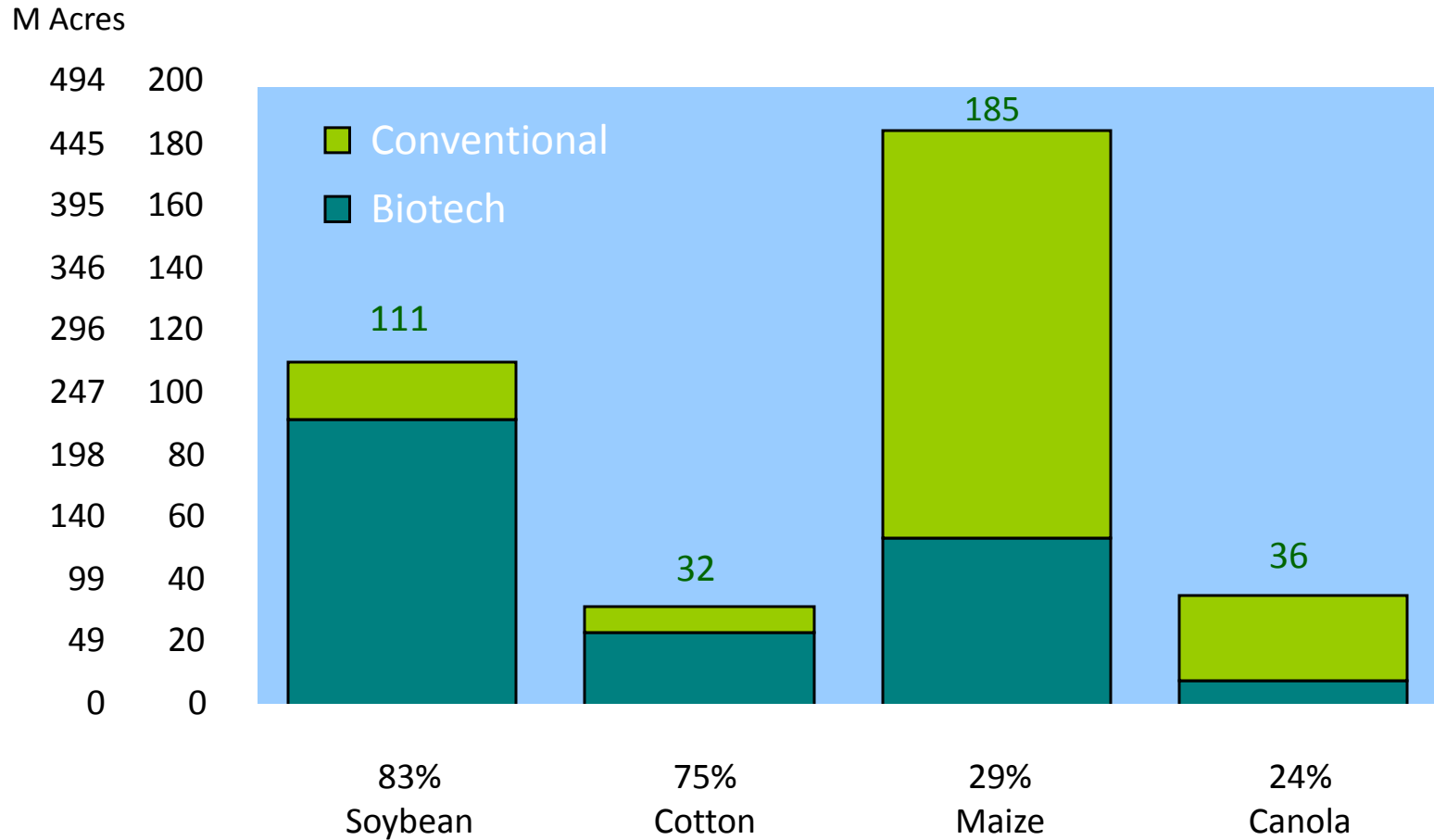
Slovakia  
Costa Rica\*  
Bangladesh\*  
Romania

\* Developing countries

# Performance of Biotech Crops from 1996-2015

- **Accumulative hectarage of 2 billion hectares comprised of:**
  - 1.0 billion hectares biotech soybean
  - 0.6 billion hectares biotech maize
  - 0.3 billion hectares of biotech cotton
  - 0.1 billion hectares a biotech canola
- **28 countries** planted biotech crops, annually
- **Hectarage peaked at 181.5 million ha (2014)**, a marginal 1% decrease in 2015 at 179.7 million ha, after achieving a record 19 years of consecutive growth
- **ChemChina bids \$43 billion for Syngenta** and DuPont and Dow merge to form DowDuPont

# Global Adoption Rates (%) for Principal Biotech Crops (Million Hectares, Million Acres), 2015



Source: Clive James, 2015  
 Hectareage based on FAO Data for 2013.

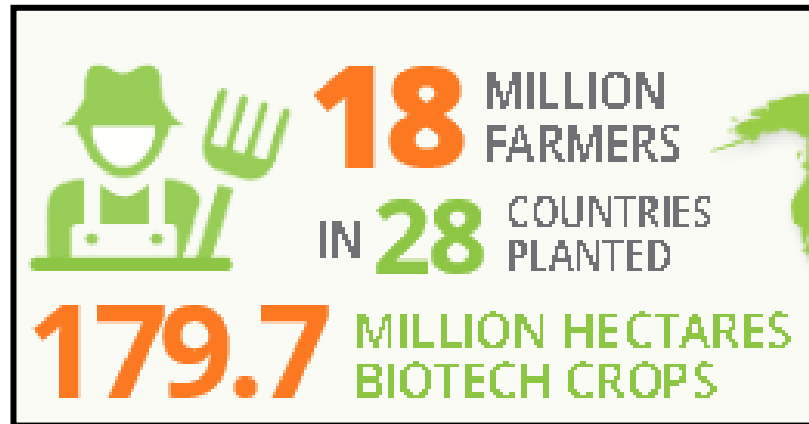
# Global Highlights in 2015

- **Vietnam planted stacked herbicide tol. and insect res. maize** for first time in 2015; 8th biotech country in Asia and Oceania
- **An increasing number of home-grown biotech crops** approved for commercialization in developing countries
- **New breeding technologies (NBT), such as genome-editing CRISPR,** increasingly recognized as new powerful tools
- **Decreased total plantings of** maize (-4%) and cotton (-5%) due to low crop prices – decreases likely to reverse when crop prices revert to former higher levels
- **Drought tolerant maize in the US, increased impressively by 15-fold** from 50,000 ha in 2013 to 810,000 ha in 2015 reflecting strong farmer satisfaction

**USD150** bil farm  
economic gains (1996-  
2014)

Reduced  
CO2/reduced fuel use

**12 mil** cars removed  
from the roads for one  
year (1996-2014)



**583.5 mil kg** reduced  
pesticide use (1996-2014)

**16.2 mil** resource poor  
farmers in developing  
countries



# “New” Biotech Crop Approvals, 2015

	<b>Crop</b>	<b>Trait</b>	<b>Country</b>
1	Potato	Innate™ Gen 2 = Non-bruising, less browning, less acrylamide plus late blight resistance	USA
2	Potato	Virus Y resistance	Argentina
3	Soybean	Drought tolerant	Argentina
4	Apples	Golden Delicious and Granny Smith Arctic® Apples, Non-browning	USA
5	Apples	Golden Delicious and Granny Smith Arctic® Apples, Non-browning	Canada
6	Eucalyptus	Up to 20% more biomass	Brazil

# FUTURE PROSPECTS

## A three- prong Strategy

- **Expansion** in hectarage of Current Biotech/GM Crops
- **New GM/Biotech Crops in the Pipeline**
- The potential of the **New Breeding Technologies (NBT)**, such as **genome-edited CRISPR technology** – awarded Science's coveted breakthrough technology of 2015

# Future Prospects

## Expansion of hectarage of Current GM Crops

- High rates of adoption (90 to 100%) of current major biotech crops leave little room for expansion – plateauing effect already witnessed in 2015
- Bt cotton potential in up to 10 African countries each growing 100,000 hectares, or more
- Substantial potential:
  - Biotech maize – additional 100 mil hectares (60 million Ha of maize in Asia, with 35 M Ha in China alone, and up to 35 M Ha, in smaller parcels in Africa)

# Future Prospects

## “New” Biotech Crops in the Pipeline

- **More than 85 potential new products** already being field-tested globally: resistance to weeds, pests & diseases, resistance to nematodes and other biotic/abiotic stresses associated with climate change
- **Golden Rice** being field tested in the Philippines and Bangladesh – **could prevent the unnecessary deaths of up to 2.5 million children every year**
- **Pro- poor crops being field tested in Africa:** fortified bananas, pest resistant cowpea, and WEMA biotech maize on track for release in Africa in 2017
- **Public-private partnerships are best to develop and deliver** approved products to farmers in timely manner

## TWO strong push factors in 2015

- Public-private partnerships
- Political will (Bangladesh, Vietnam)
- This is what is needed/lacking in Malaysia  
+ Research culture

# What is it in for Malaysia?

- Do we need GM tech to transform our crops?
  - Food security
  - Managing yield, diseases and pests (rice, banana)
  - Climate change
- Where are we in our research on GM crops?
- Do we have clear priorities, timeline, team...?
- Are we ready to embrace newer technology – gene editing using ZF, TALENS, CRISPR and synthetic biology ?

# Malaysia's scenario

- Animal feed bill amounts to RM5.6bil a year
- Corn import - RM3.1bil a year
- Malaysia's food import bill last year - RM45.39bil
- What is the status of local fruits industry?
- Where do our farmers get their vegetable seeds from?
- How many local seed companies have we nurtured?



Thank you

[maha@bic.org.my](mailto:maha@bic.org.my)

[www.isaaa.org/subscribe/my](http://www.isaaa.org/subscribe/my)