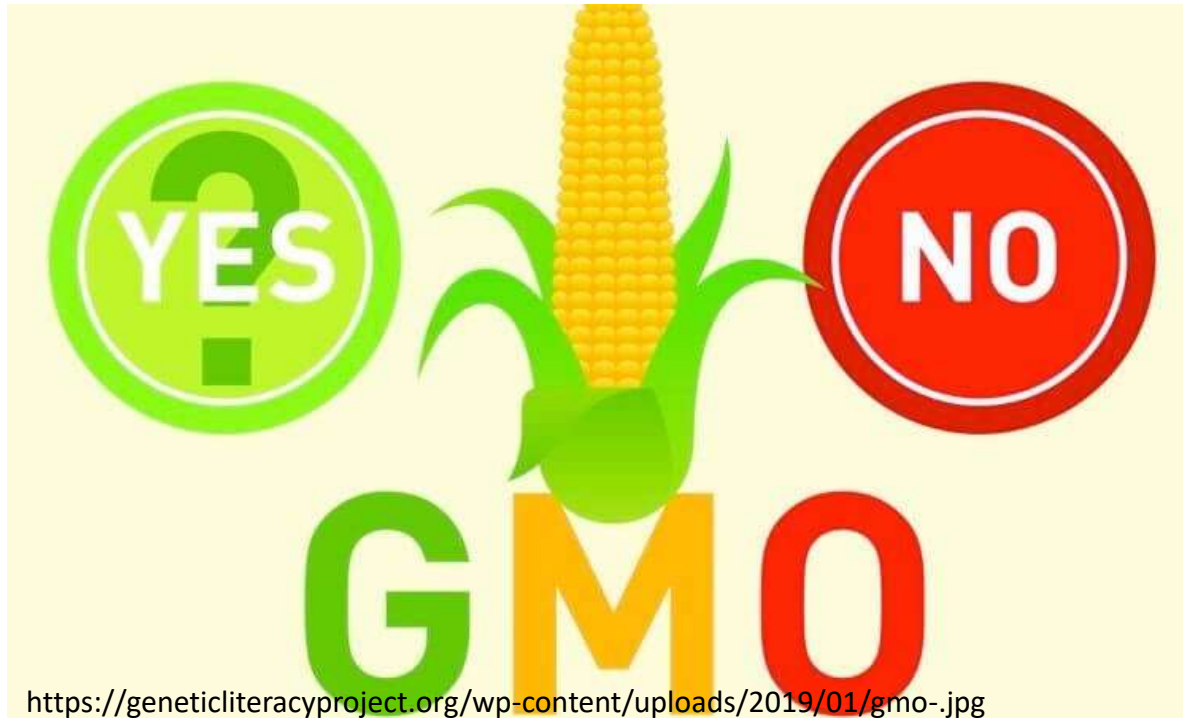


# Чи можливий сталий розвиток без генетичної біоінженерії?



# Центр колективного користування науковим обладнанням СумДУ

## Обладнання центру:

- Скануючий електронний мікроскоп SEO-SEM Inspect S50-B
- Просвічуючий електронний мікроскоп ПЭМ-125K
- Мікропроцесорний спектрофотометр Lasany LI-722
- Високоєфективний рідинний хроматограф Agilent Technologies 1200
- Рентгенівський дифрактометр ДРОН-3М
- Спектрометр ElvaX Light SDD



**BIOMATERIALS RESEARCH GROUP**

# Центр колективного користування науковим обладнанням СумДУ

## Вартість проведення досліджень

№	Найменування послуги	Одиниця виміру	Вартість для структурних підрозділів СумДУ		Мінімальна вартість для сторонніх замовників, грн.
			для виконання НДР та наукових грантів, грн.	для освітньої або іншої діяльності, грн.	
1	Дослідження зразків методом растрової електронної мікроскопії	1 зразок	70	70	150
2	Дослідження зразків методом рентгено-структурного аналізу (без обробки результатів)	1 зразок	45	45	120
3	Дослідження зразків методом рентгено-структурного аналізу (з обробкою результатів)	1 зразок	75	75	180



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# Why are you against GMO?





















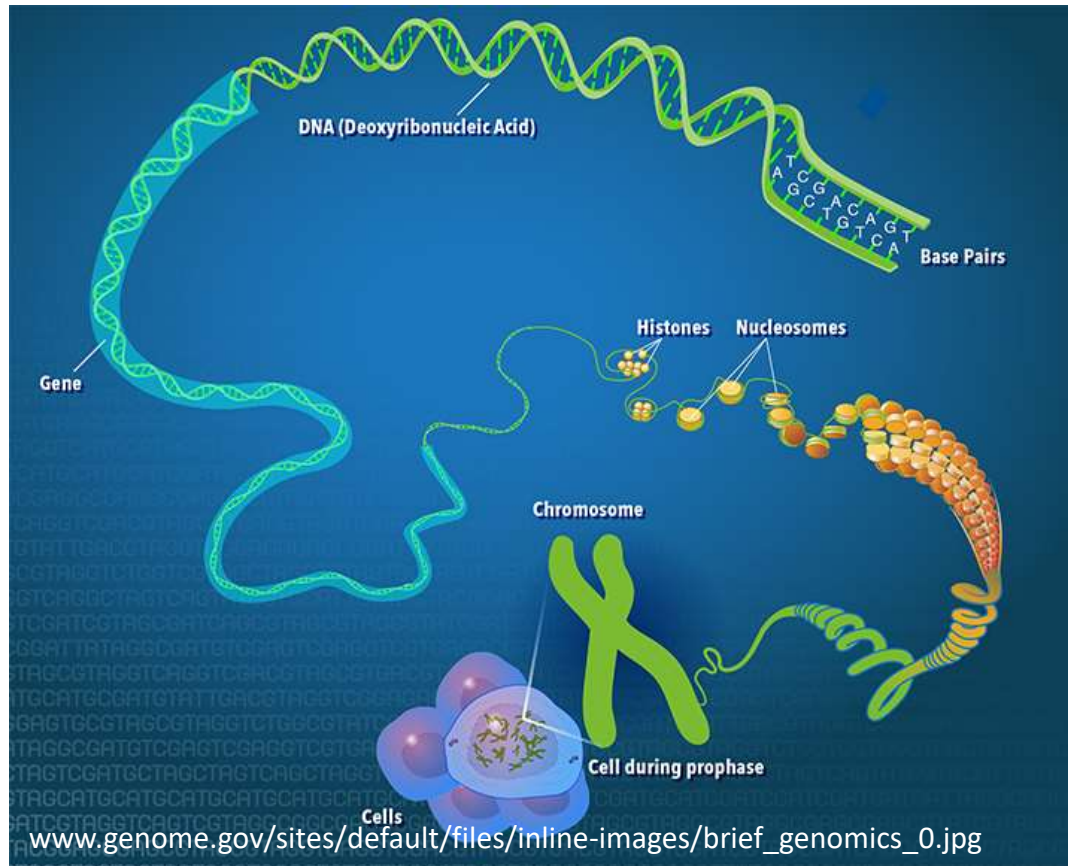






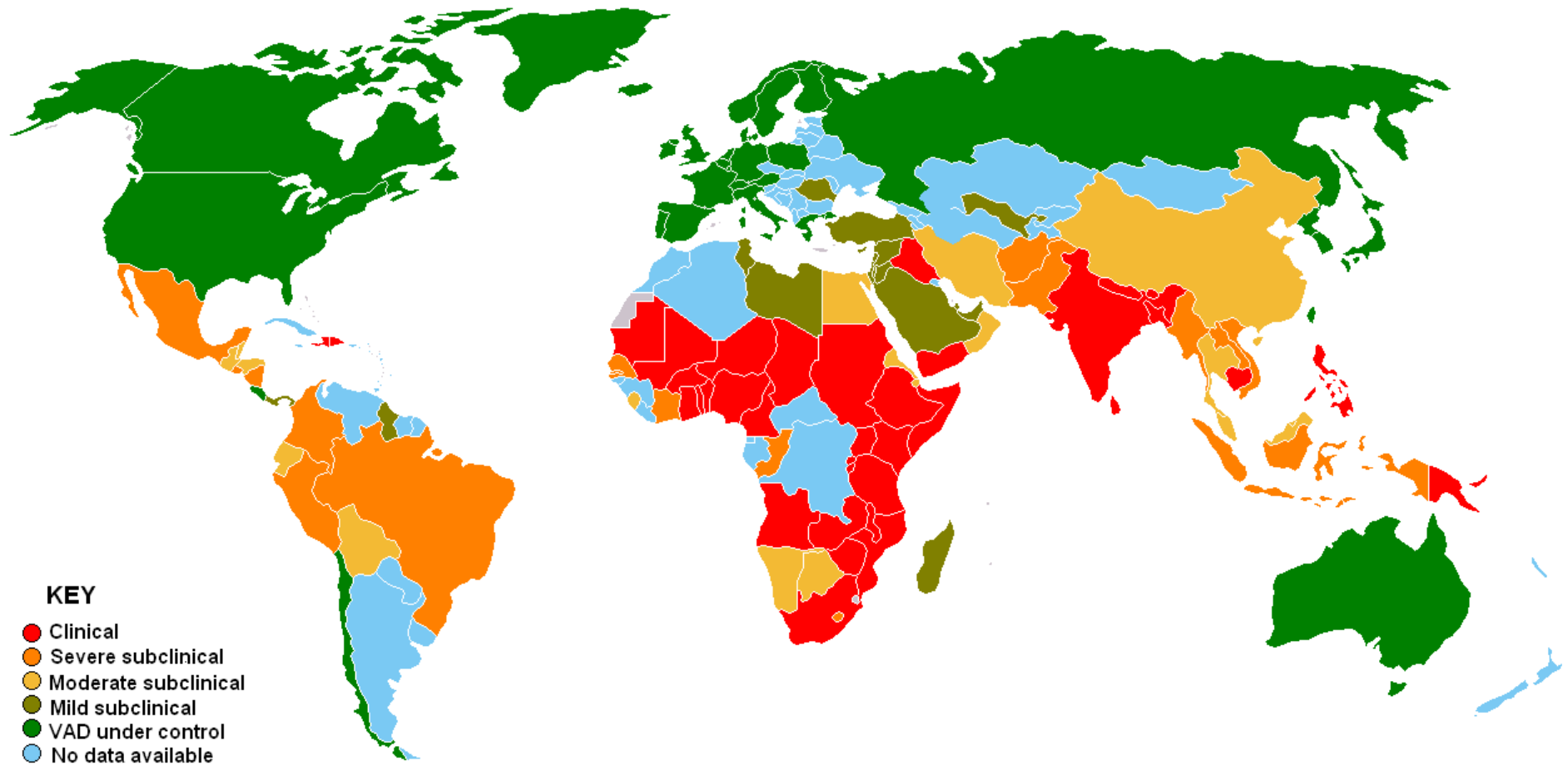


# Genes and genomes



15% of the Drosophila genome , 35% of the human genome and >50% of the maize genome  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC117186/>





[Shortage of dietary vitamin A](#), a deficiency which each year is estimated to kill 670,000 children under the age of 5 and cause an additional 500,000 cases of irreversible childhood blindness.

[https://en.wikipedia.org/wiki/Golden\\_rice](https://en.wikipedia.org/wiki/Golden_rice)









# Meta – analysys



**A Review of 6,000 Studies Over Two Decades Delivers Its Verdict on GMO Corn**



<https://www.sciencealert.com/review-of-6000-studies-over-two-decades-delivers-its-verdict-on-GMO-corn-safety>

# Genetic engineering



[cff2.earth.com/uploads/2018/08/15204028/Most-Americans-support-animal-genetic-engineering-for-health-perks.jpg](http://cff2.earth.com/uploads/2018/08/15204028/Most-Americans-support-animal-genetic-engineering-for-health-perks.jpg)

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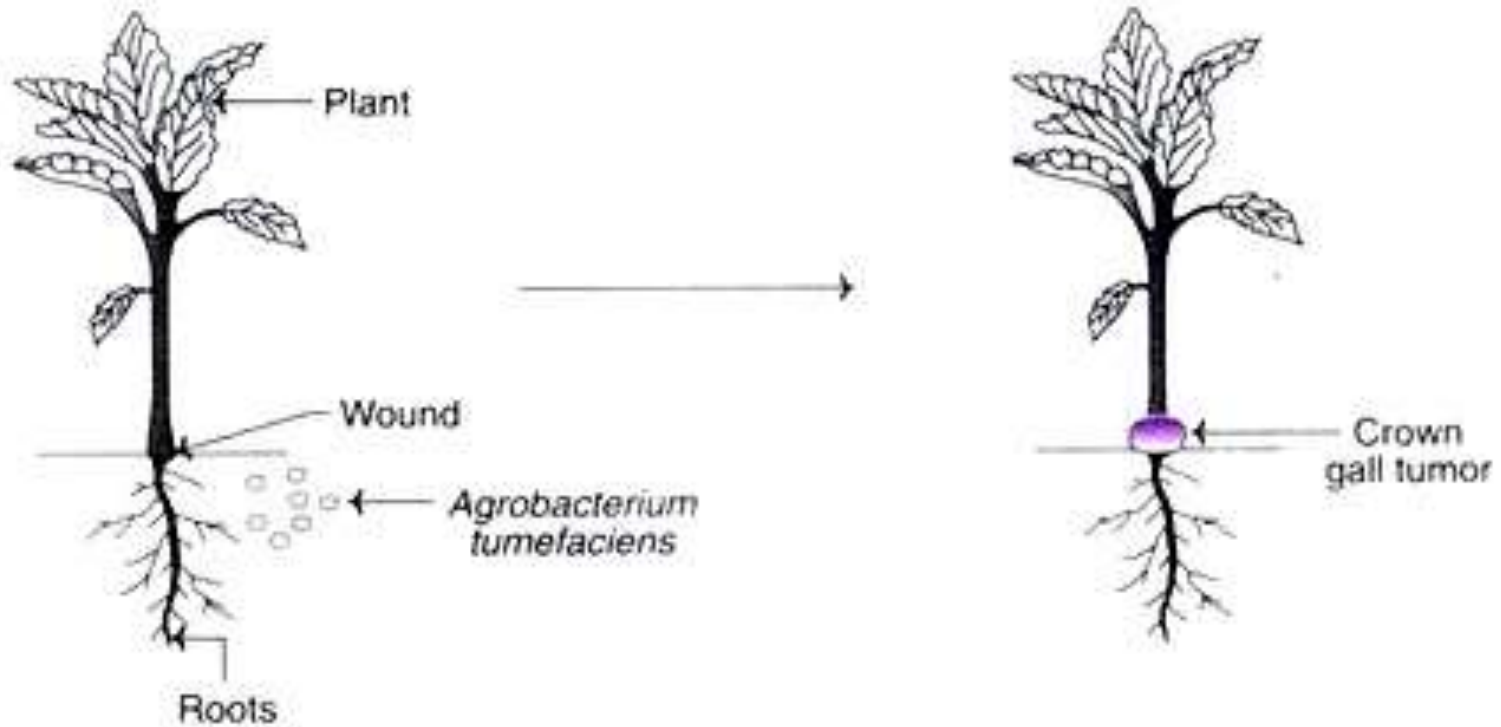








# Recombinant DNA technology – plant genetic engineering



**Fig. 49.1 :** Formation of a crown gall tumor in a plant infected with *Agrobacterium tumefaciens*.

<http://www.biologydiscussion.com/genetics/engineering/methods-of-gene-transfer-in-plants-2-methods/10824>

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## Gene transfer in plants:

- **Ti plasmid**
- **Gene gun - ballistic transformation**
- **Electroporation**
- **Microinjection**
- **Viral vectors**

# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## FOODS TWEAKED BY BIOTECHNOLOGY ARE SAFE TO EAT

Over 25 years of independent research, **there is no documented evidence of harm to human health or deaths from consumption of GM foods** since they were introduced to the market. None. (sources: National Research Council, European Commission)



# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## GENETICALLY MODIFIED FOODS IMPROVE NUTRITION AND HEALTH

The new generation of GM crops—Golden Rice, which delivers **vitamin A enhanced rice, high carotene mustard seed oil, Vitamin A enhanced cassava, enriched sweet potatoes and even edible vaccines**—are just a few innovations awaiting approval. (source: Plant Physiology, Journal of American College of Nutrition, Gates Foundation)

# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## BIOTECH CROPS CAN HELP ADDRESS THE GLOBAL FOOD CRISIS

Biotechnology has helped farmers grow **311.8 million tons more food in the last 15 years.**

(source: [www.croplife.org](http://www.croplife.org))



# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## CROP BIOTECHNOLOGY HELPS SMALL FARMERS

**90% of the 17 million farmers** who grow biotech crops are resource-poor with **farms of less than 10 hectares**. The growth rate for biotech crops is at least three times as fast and five times as large in developing countries than industrialized countries. (source: ISAAA, *New York Times*)

# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## BIOTECH CROPS SPUR GLOBAL ECONOMIC GROWTH

**Economic benefits of GM crops amounts to an average of over \$130/hectare.** In the last 16 years, planted biotech crop acres have increased 100-fold from 1.7 million hectares to 170 million hectares. (source: ISAAA)



# 10 REASONS WE NEED BIOTECH FOODS and CROPS

## FARMING USING GM CROPS REDUCES CHEMICAL USE

**Biotechnology saves the equivalent of 521,000 pounds of pesticides each year** and helps cut herbicide runoff by 70 percent. (sources: ISAAA, PG Economics)

# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## BIOTECH CROPS INCREASE YIELDS

Productivity in GM crops has delivered gains in some cases that are **7-20% higher than conventional varieties** (which are on average 33% higher than organic yields). (sources: Nature, PG Economics)



# 10 REASONS WE NEED BIOTECH FOODS and CROPS

## BIOTECH CROPS HELP INCREASE INCOME OF POORER FARMERS, REDUCING POVERTY AND MALNUTRITION

As the rate of Indian farmers adopting GM cotton has grown, calorie consumption linked to increased incomes has grown and undernourishment in families has dropped, translating into a **15–20 percent reduction in food insecurity** if all the non-Bt adopters in India alone take to this technology. (source: PLOS)

# 10 REASONS WE NEED BIOTECH FOODS and CROPS

## FARMING WITH BIOTECH CROPS IS SUSTAINABLE

GM crops in general need fewer field operations, such as tillage, which allows more residue to remain in the ground, sequestering more CO<sub>2</sub> in the soil and reducing greenhouse gas emissions. In 2011, **these practices were equivalent to removing 10.2 million cars from the road for one year.** (source: PG Economics)



# 10 REASONS WE NEED BIOTECH FOODS and CROPS



## GM CROPS AND FOODS COMPLEMENT CONVENTIONAL AND ORGANIC FARMING

**Independent scientists reject claims** that GM crops or animals “contaminate” or anyway endanger our food supply or produce dangerous “Trojan genes.” (source: NPR, Nature, USDA)







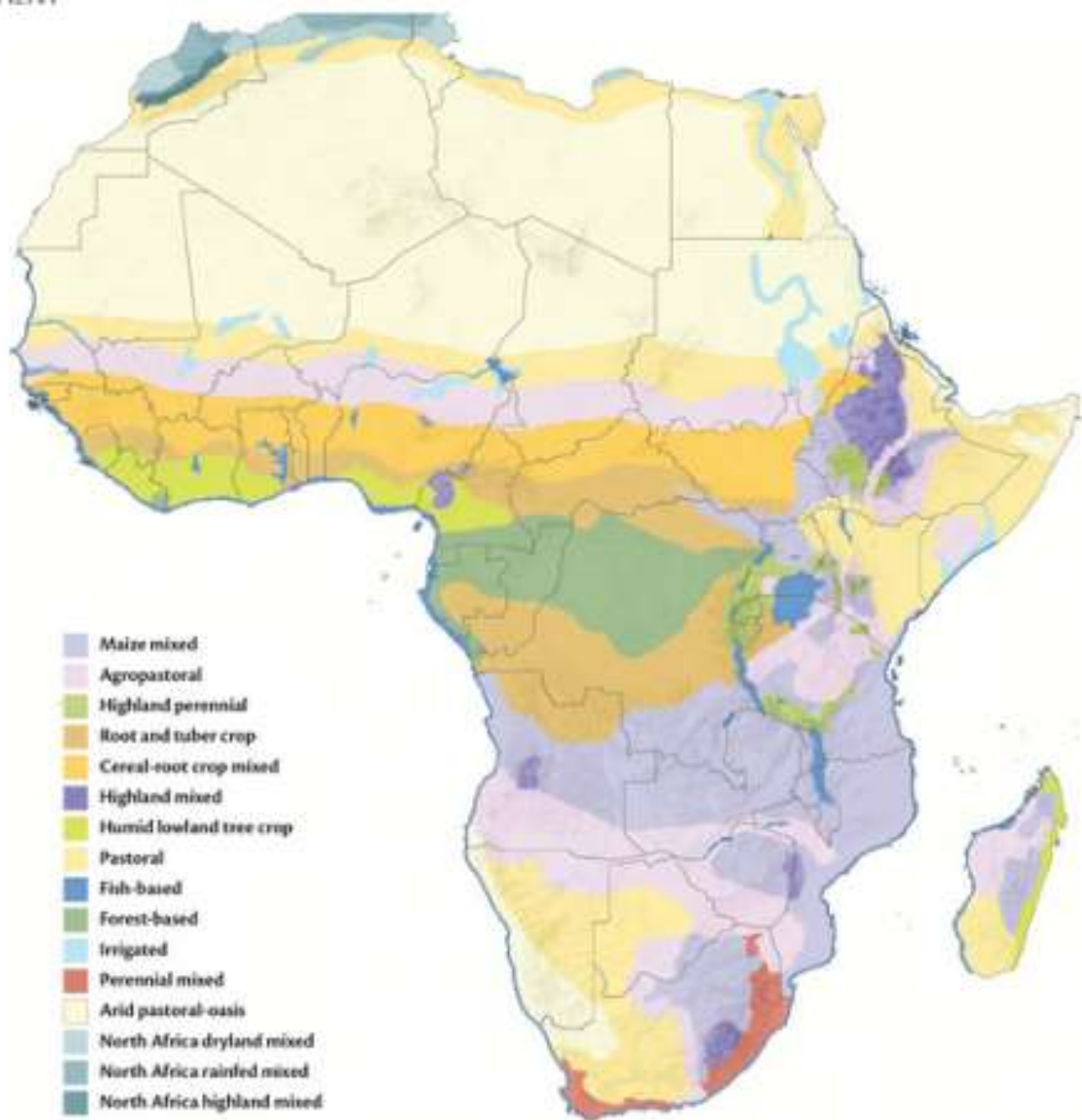
# Soybean designed to grow on exhausted pasture land could help protect Amazon rainforest

[Arthur Neslen](#) | [Politico](#) | November 19, 2019



[https://geneticliteracyproject.org/2019/11/19/soybean-designed-to-grow-on-exhausted-pasture-land-could-help-protect-amazon-rainforest/?fbclid=IwAR2yWBxhv3SgeWnJ4njlno5gkb\\_3nrw0\\_vzB75W5hsCihPO6rdO1--BuKs](https://geneticliteracyproject.org/2019/11/19/soybean-designed-to-grow-on-exhausted-pasture-land-could-help-protect-amazon-rainforest/?fbclid=IwAR2yWBxhv3SgeWnJ4njlno5gkb_3nrw0_vzB75W5hsCihPO6rdO1--BuKs)





[https://ccafs.cgiar.org/sites/default/files/resize/images/Screen%20Shot%202015-01-29%20at%201\\_08\\_07%20PM-500x459.png](https://ccafs.cgiar.org/sites/default/files/resize/images/Screen%20Shot%202015-01-29%20at%201_08_07%20PM-500x459.png)



[www.pioneer.com/CMRoot/pioneer/US/images/agronomy/crop\\_focus/corn/diseases/trichoderma\\_ear\\_rot.jpg](http://www.pioneer.com/CMRoot/pioneer/US/images/agronomy/crop_focus/corn/diseases/trichoderma_ear_rot.jpg)  
[www.nationalhogfarmer.com/sites/nationalhogfarmer.com/files/styles/article\\_featured\\_standard/public/uploads/2012/10/mycotoxin-cornjpgcropdisplay-ear-rot-purduejpgcropdisplay.jpg?itok=Hhh\\_Muam](http://www.nationalhogfarmer.com/sites/nationalhogfarmer.com/files/styles/article_featured_standard/public/uploads/2012/10/mycotoxin-cornjpgcropdisplay-ear-rot-purduejpgcropdisplay.jpg?itok=Hhh_Muam)





Corn



Soy



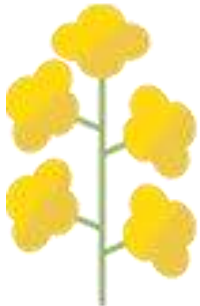
Cotton



Alfalfa



Sugar Beets



Canola



Papaya



Apples



Potatoes



Squash

The **MON 810** corn is a [genetically modified maize](#) used around the world. It is a *Zea mays* line known as YieldGard from the company [Monsanto](#).<sup>[1]</sup> This plant is a [genetically modified organism](#) (GMO) designed to combat crop loss due to insects. There is an inserted gene in the [DNA](#) of MON810 which allows the plant to make a [protein](#) that harms insects that try to eat it. The inserted gene is from the [Bacillus thuringiensis](#) which produces the [Bt protein](#) that is poisonous to insects in the order [Lepidoptera](#) (butterflies and moths), including the [European Corn Borer](#).





# Chief EU scientist backs damning report urging GMO 'rethink'



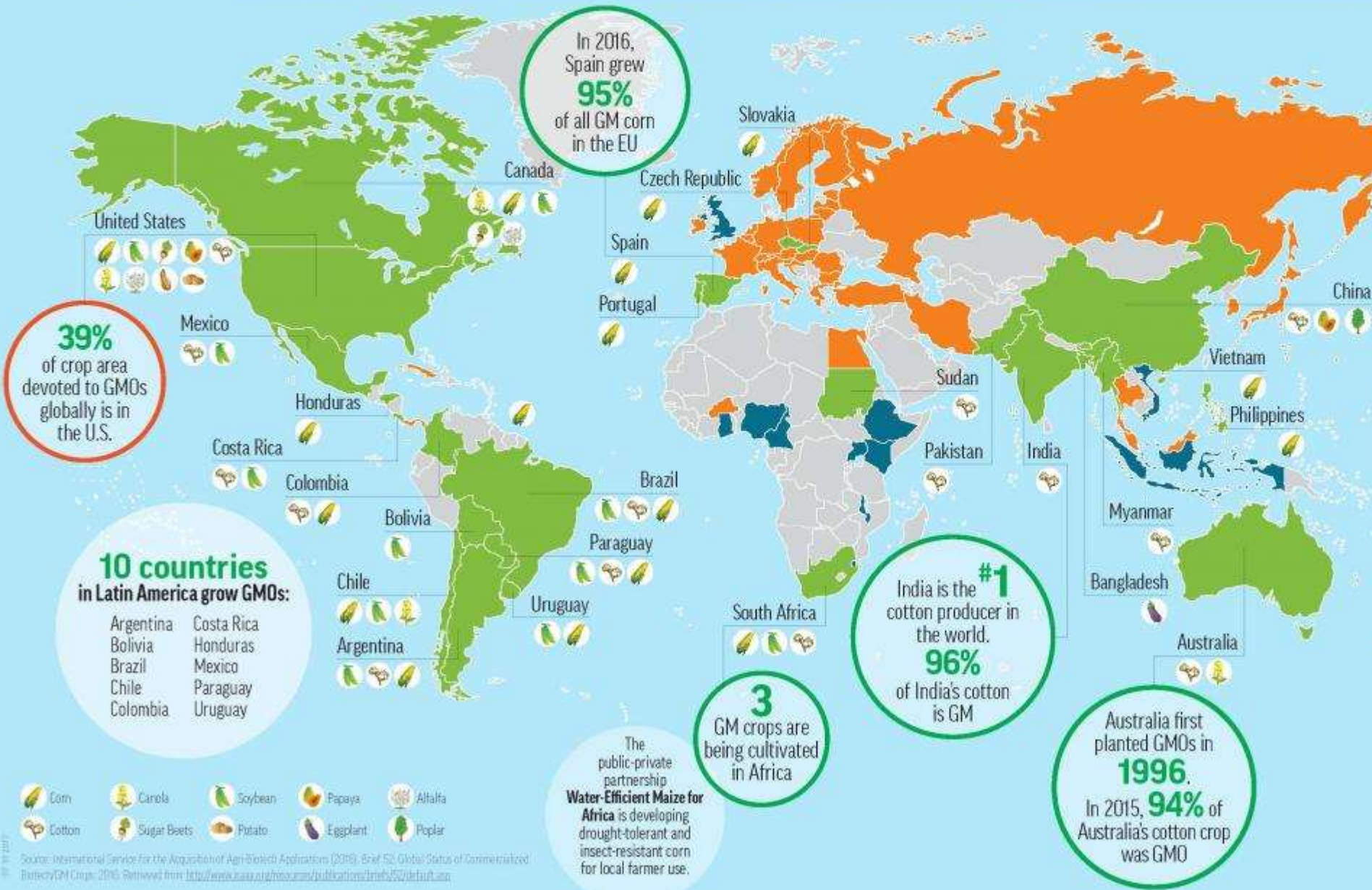
[www.euractiv.com/section/science-policymaking/news/chief-eu-scientist-backs-damning-report-urging-gmo-rethink/](http://www.euractiv.com/section/science-policymaking/news/chief-eu-scientist-backs-damning-report-urging-gmo-rethink/)

**18 million** farmers grew GMO crops in 2016.  
Most were from small farms in developing countries.

**26 countries**  
grew GMOs in 2016



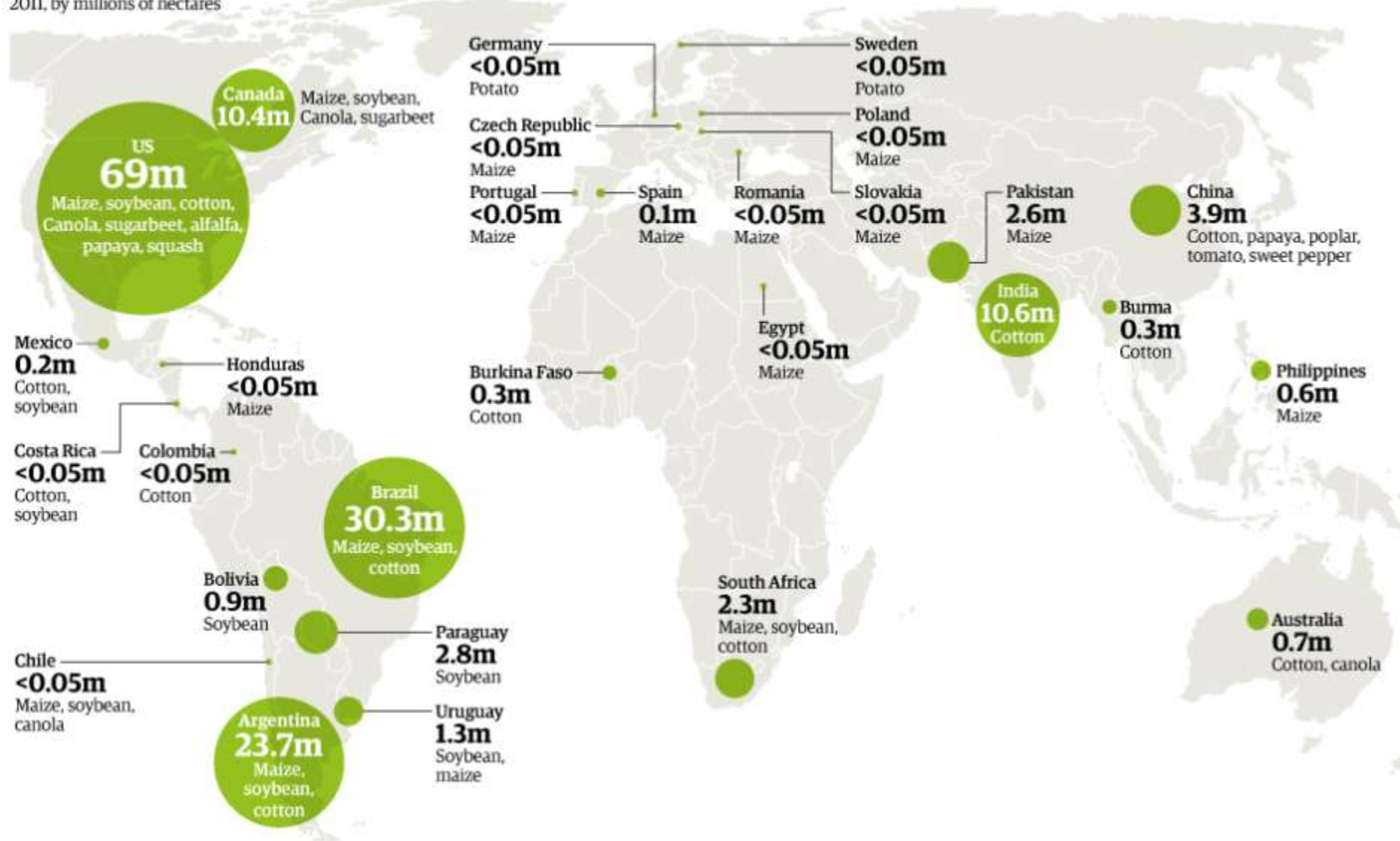
**19** developing countries  
grew GMOs





## Global status of commercial GM crops

2011, by millions of hectares









[www.researchgate.net/profile/Hector\\_Quemada/publication/255691345/figure/fig1/AS:267454119149583@1440777439157/Transgenic-poplar-plantation-in-Huairou-Beijing-China.png](http://www.researchgate.net/profile/Hector_Quemada/publication/255691345/figure/fig1/AS:267454119149583@1440777439157/Transgenic-poplar-plantation-in-Huairou-Beijing-China.png)



<https://www.icongenetics.com/>





<https://www.nomadbioscience.com/>

# Genetically modified food in the European Union

From Wikipedia, the free encyclopedia

[Jump to navigation](#)[Jump to search](#)

Logo of the [European Food Safety Authority](#)

Genetic engineering in the [European Union](#) has varying degrees of regulation.<sup>[1]</sup>

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  - [1.1History](#)
  - [1.2Labeling and traceability](#)
  - [1.3Scope](#)
  - [1.4Approach](#)
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  - [3.6Switzerland](#)
  - [3.7Scotland](#)
- [4See also](#)
- [5Notes and references](#)
- [6External links](#)

[https://en.wikipedia.org/wiki/Genetically\\_modified\\_food\\_in\\_the\\_European\\_Union](https://en.wikipedia.org/wiki/Genetically_modified_food_in_the_European_Union)



# **New GMOs cannot escape testing and labelling under EU law, EU court rules**

<https://www.greenpeace.org/eu-unit/issues/climate-energy/1265/new-gmos-cannot-escape-testing-and-labelling-under-eu-law-eu-court-rules/>













KIITOS  
DĚKUJI  
ДЯКУЮ  
СПАСИБО  
THANK YOU  
DANKE SCHÖN  
MUITO OBRIGADO

