



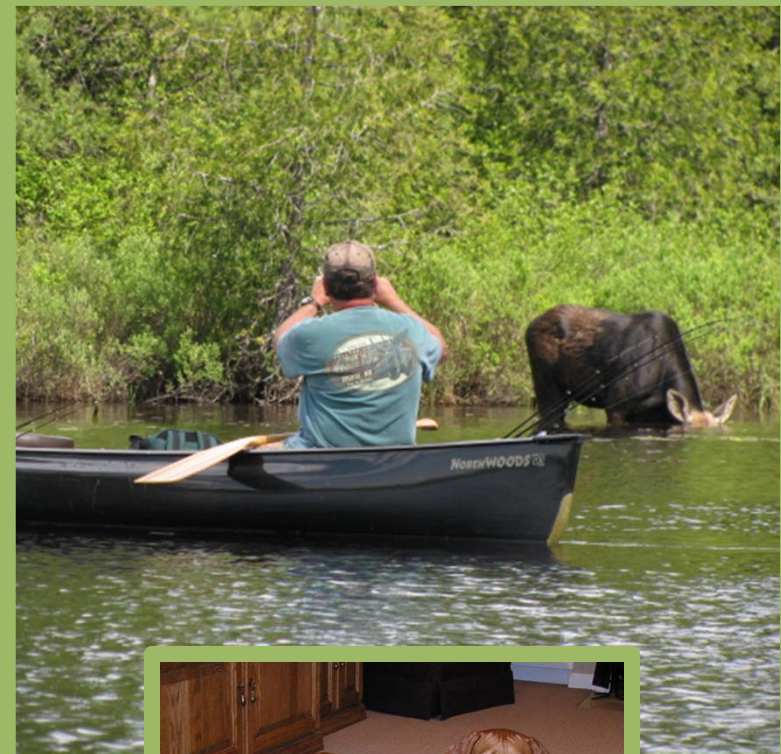
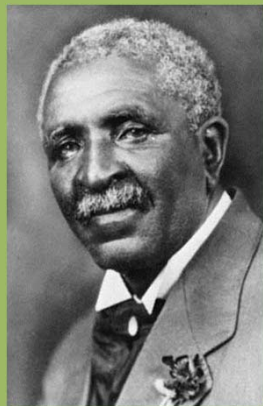
A Conversation about GMO Labeling

Philip Miller PhD

Vice President of Global Regulatory and Government Affairs

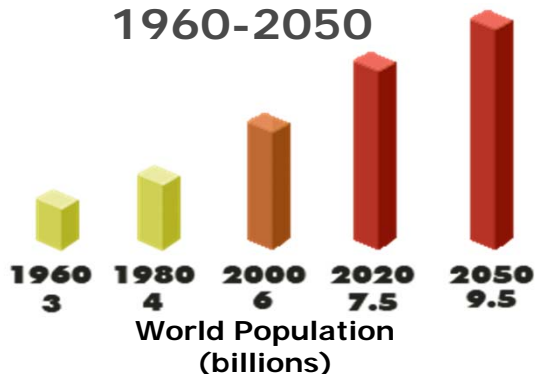


My journey through life



Agriculture is at the center of global trends

**Population Growth
1960-2050**



Rise in Middle Class



Changing Economies & Diets



**43% increase in calories
from animal protein**

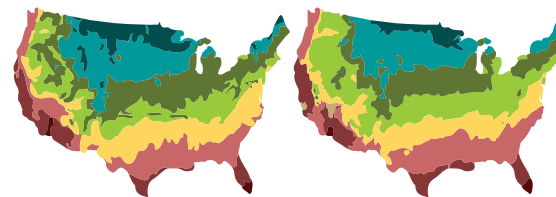
**= 2X Food Demand By 2050
in a more challenging production environment**



**Demand For
Healthier Options**



**Decreasing Water
Availability**



1990

2013

**Changing Climate &
Declining Arable Land**

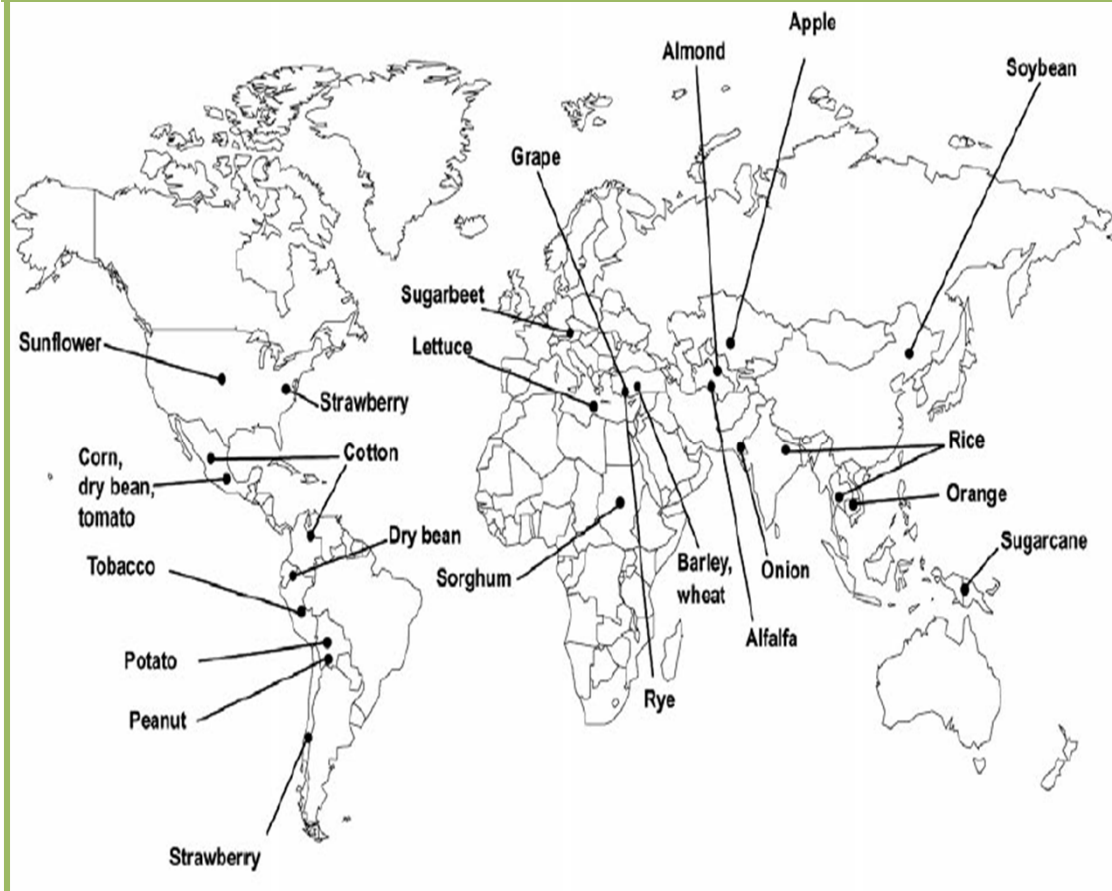
Source: U.S. Census Bureau, International Data Base, June 2010 Update. And UN FOA

Source: Ray DK, Mueller ND, West PC, Foley JA (2013) Yield Trends Are Insufficient to Double Global Crop Production by 2050. PLoS ONE 8(6): e66428.



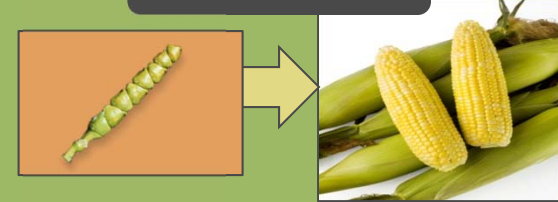
Humans have been genetically modifying crops since the beginning of time

Origins of Key Crops

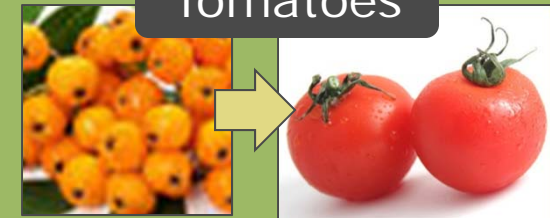


Source: Illinois Farm Bureau. Farm & Food Facts. Bloomington, 2012

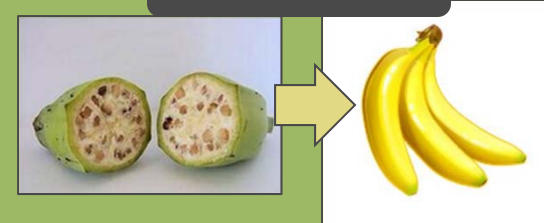
Corn



Tomatoes



Bananas



Carrots



Eggplant



Crops have been modified through a variety of techniques



Technique	Modern Day Examples
Cross Breeding	Honey Crisp Apple
Double Haploids (Dihaploid)	Multiple Corn Inbred Lines
Self Incompatibility	Vegetable Seeds
Embryo Rescue	Mildew Resistant, Seedless Grapes
Grafting	Apples and Grapes
Protoplast Fusion	Red Cabbage
Radiation/Mutagenesis	Red grapefruit
Polyploidy	Seedless watermelon
Genome Editing	Canola with weed protection
Transformation (GMOs)	Virus resistant papaya

GMOs can help plants defend against pests



GMOs are everywhere!



Food



Medicine



Personal Lifestyle



Crops



GMOs: Benefiting people and the planet for more than 20 years

Pesticide Use ↓
Land Preserved ↑
Tillage ↓
CO2 Emissions ↓
Efficient Water Use ↑

Farmer Profitability ↑
Time in the Field ↓
Production Costs ↓
Farmer's Harvest ↑
Enhanced Nutrition ↑

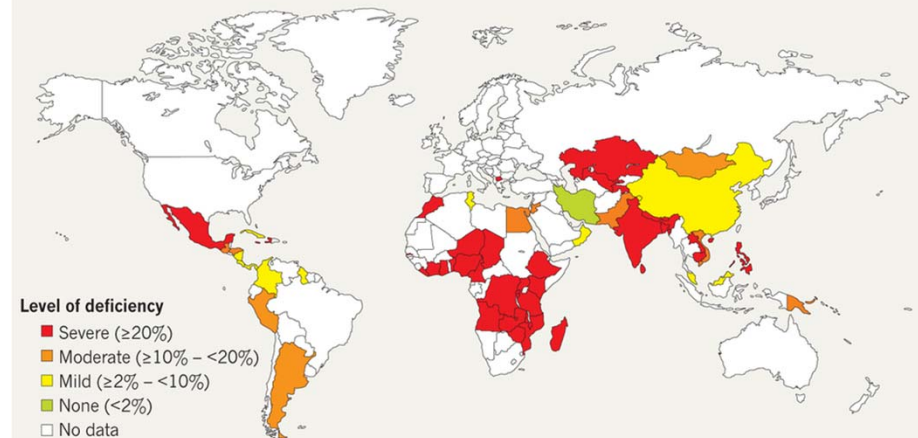
Nutritional benefits – Golden Rice

- GMO rice with added beta-carotene biosynthesis genes (*daffodil, bacteria, corn*)
- Fortified food developed to combat vitamin A deficiency (VAD)
- Could help prevent 1-2 million deaths and 500,000 cases irreversible blindness annually



PREVALENCE OF VITAMIN A DEFICIENCY

Map showing level of serum retinol (an indicator of vitamin A deficiency) in pre-school age children. Data were collected by the World Health Organization between 1995 and 2005 from populations at risk.




Estimates of vitamin A deficiency are based on low serum retinol concentration $<0.70 \mu\text{mol l}^{-1}$



GMOs: The most thoroughly reviewed food product in the world

Monsanto: Safety = #1 Priority

	DISCOVERY Gene/Trait Identification	PHASE I Proof Of Concept	PHASE II Early Development	PHASE III Advanced Development	PHASE IV Pre-launch
AVERAGE DURATION ¹	24 to 48 MONTHS	12 to 24 MONTHS	12 to 24 MONTHS	12 to 30 MONTHS	24 to 48 MONTHS
Typically 1000's of Initial Leads					
GENES/EVENTS IN TESTING	TENS OF THOUSANDS	THOUSANDS	10s	<5	1

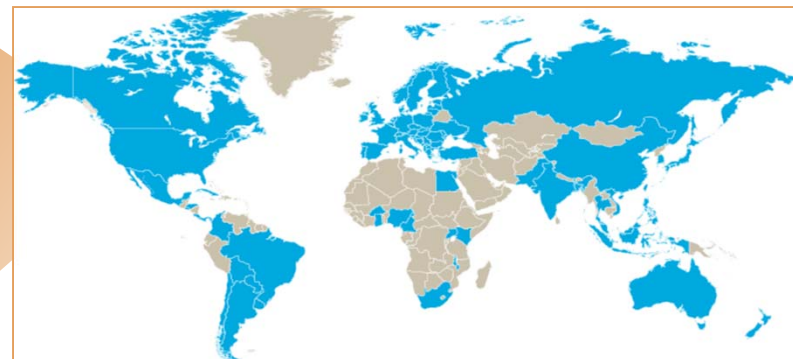
United States: Gold Standard

USDA	FDA	EPA
All Plants	Food, Feed	'Pesticidal' substances
Is it safe to grow?	Is it safe to eat?	Is it safe for the environment?

Scientific authorities around the world confirm GMO safety



Globally: > 90 government bodies' globally review and approve GMOs. GMOs have been grown or imported by >70 countries since 1996



Nature is a pretty good genetic engineer



Humans



Ferns



Sweet Potatoes



Yew Trees



Rice / Millet



Cheese



Should GMO ingredients be labeled?



Food Labels Should Be:

- Science-based
- Truthful, Not Misleading to consumers
- National--not city by city or state by state



Providing Consumers with Choice:

- Current voluntary approaches (USDA Organic, NON-GMO Project) work and we support them!
- Hundreds of companies with thousands of products available



SmartLabel™ or Similar Approach = Great Solution:

- Electronic solution supports consumers' increasing interest about food and how it is produced
- Can include data on production, processing and packaging

Engaging with Society

Listening to what matters to consumers

Discover.Monsanto.com



GMOAnswers.com

WE ANSWER YOUR QUESTIONS ABOUT GMOS

Enter your question

GO

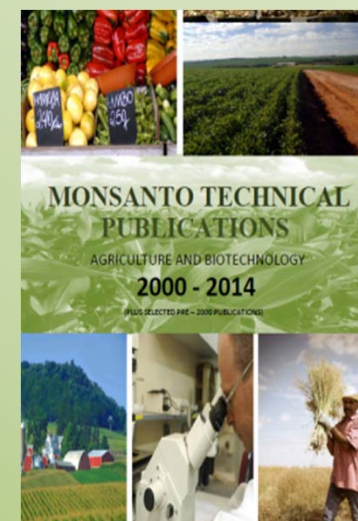
Leading with increased transparency

>2,000 publications available on our research

a window into agriculture's future

2016 Research & Development Pipeline

Working with third parties to address key topics





Thank You



Agradecemos sua visita!

Londrina/PR, 02 de fevereiro de 2012



Additional slides

Glyphosate = Safe Agricultural Tool

GLYPHOSATE SAFETY BY THE NUMBERS



40 YEARS OF SAFE USE



800+ STUDIES
DEMONSTRATING
SAFETY



160+ COUNTRIES
WHERE
GLYPHOSATE
IS USED



GMO Myths

BUSTED

MYTH	TRUTH
GMOs aren't tested/aren't safe.	Thoroughly tested...ZERO safety issues.
GMO seeds are forced on farmers.	Farmers are smart...they plant what works.
Monsanto aggressively sues farmers.	Less than a dozen trials in 20 years
Monsanto is too powerful.	<1/10 the size of Google or Apple; we are 5% of global seed market
Monsanto is against GMO labeling.	We support accurate, honest labels

GMOs?