CIMMYT - *the challenge today and the way it is likely to evolve.*

Dr. Abdelfattah A. DABABAT

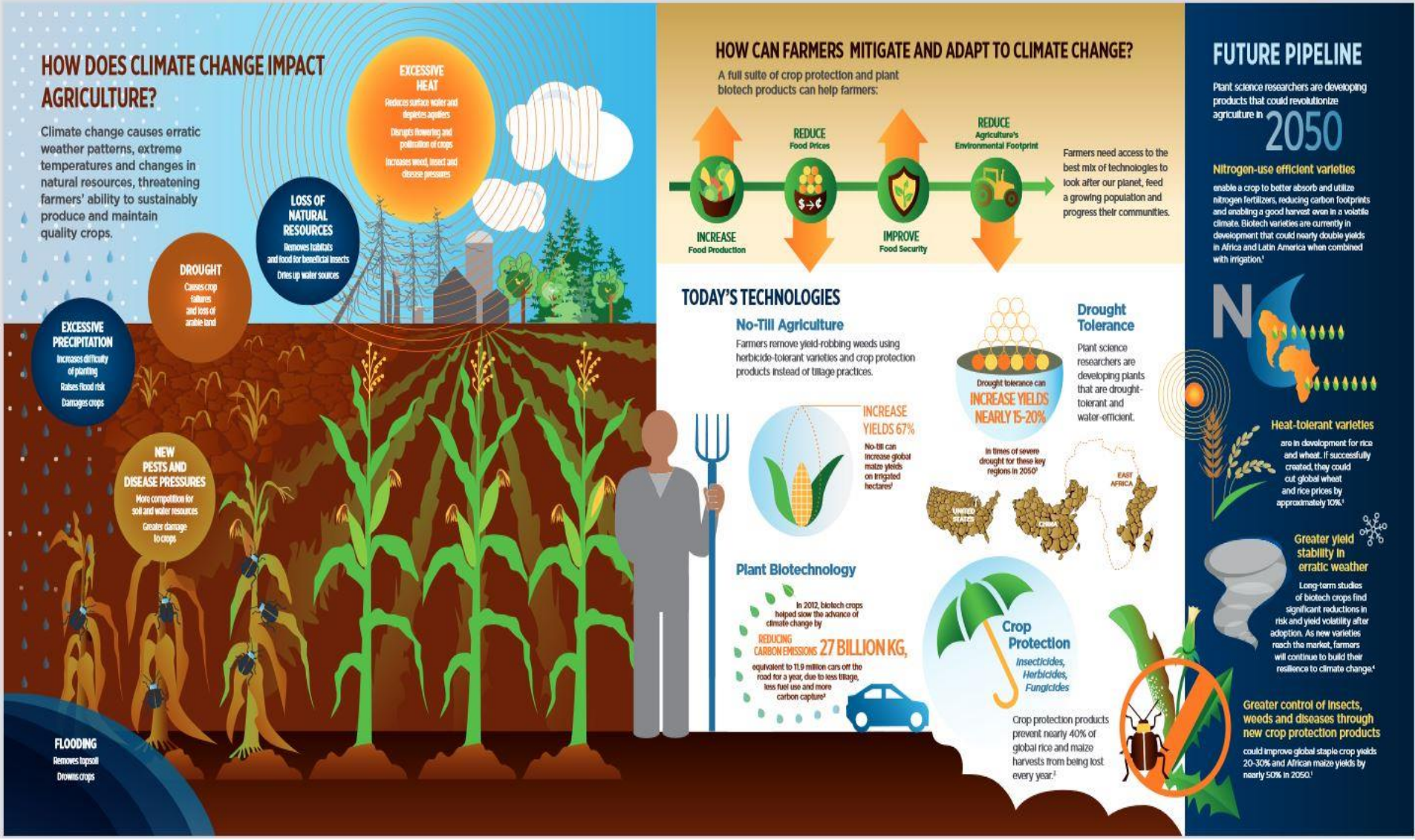
One Earth Soil and Root Health Forum

9:00 – 11:30 CET on 1 March

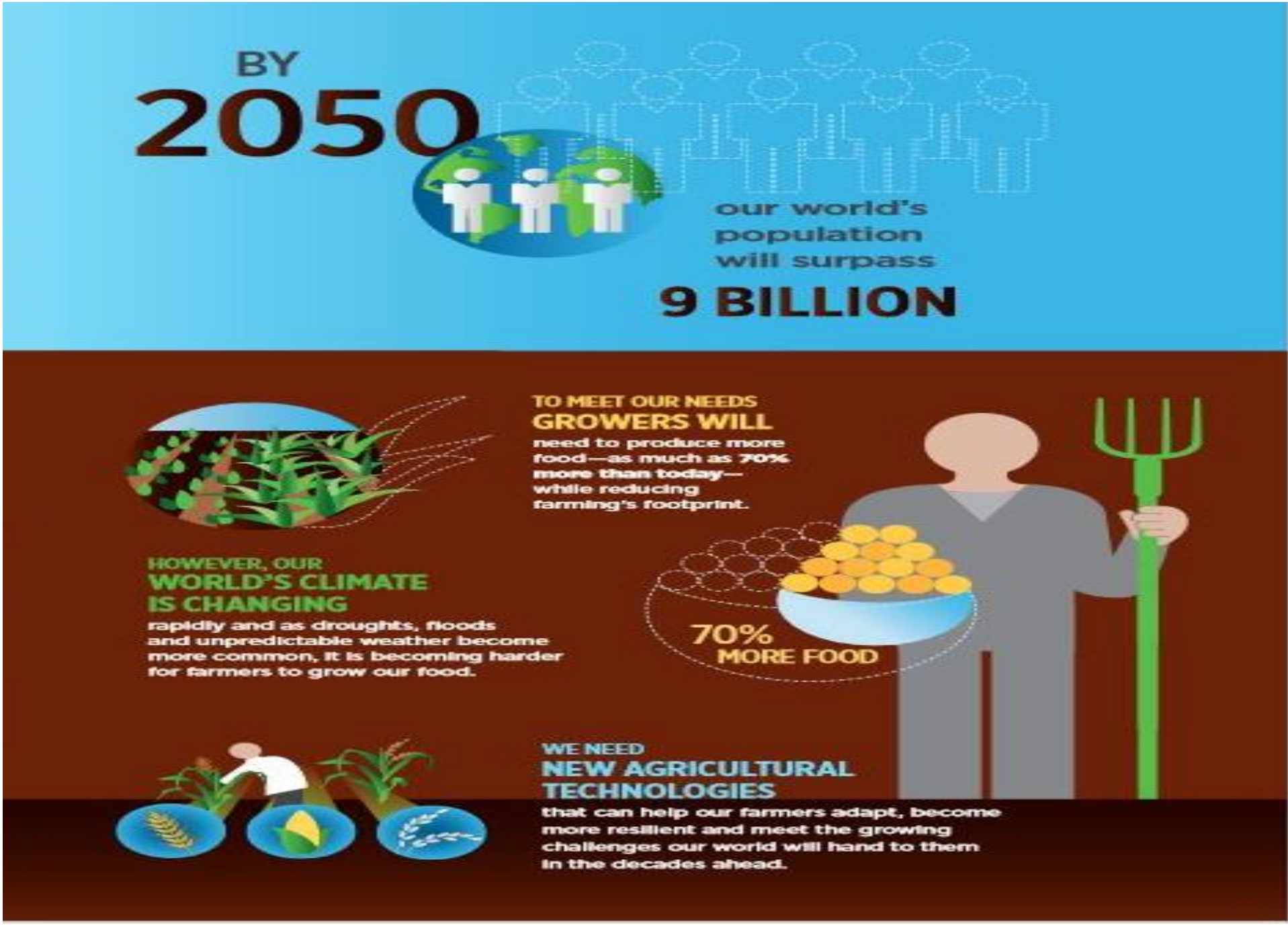
Highlight

Growers in CWANA basically do not recognize soil/root health as a problem. In fact, most of them do not know that what soil borne diseases are in their fields affecting yield, this is why the term “hidden enemy” perfectly applies to the problems in the region. SBP management is therefore, not practiced in the entire region and those disease induced yield losses are simply accepted.

How does Climate Changes Impact Agriculture?



https://croplife.org/wp-content/uploads/pdf_files/Climate-Change-Brochure.pdf



https://croplife.org/wp-content/uploads/pdf_files/Climate-Change-Brochure.pdf

Climate Change in Central Asia

Climate change in Central Asia: key findings, trends and projections

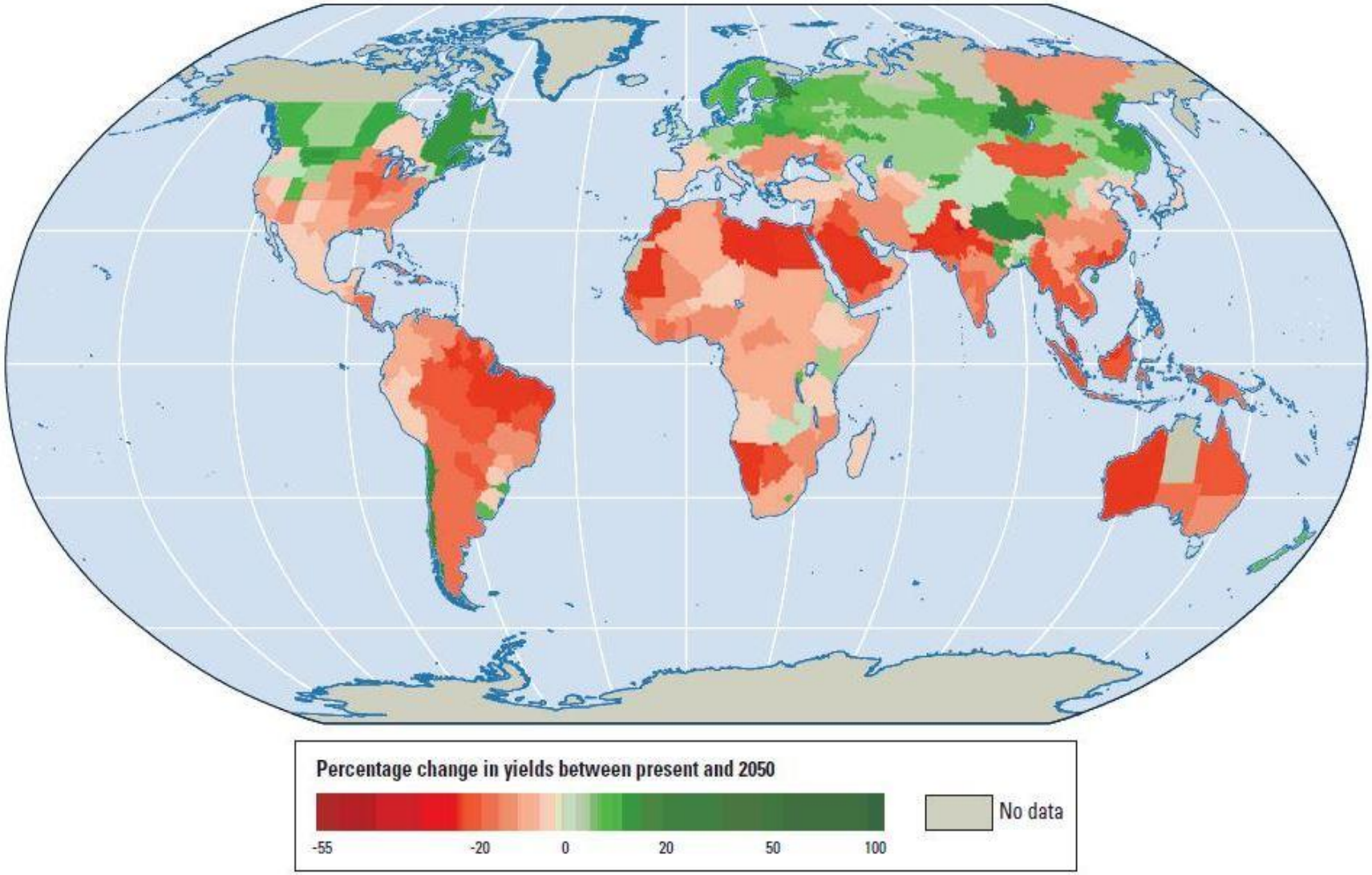
Indicators	Kazakhs	Kyrgyst	Tajikist	Turkme	Uzbekis
Air temperature[1]	↑	↑	↑	↑	↑
Precipitation incl. snow[1]	↑	↑↓	↑↓	↑↓	↑↓
Desertification	↑	↑	↑	↑	↑
Extreme weather & hazard[2]	↑	↑	↑		↑
Melting ice & permafrost[1]	↑	↑	↑		↑
Water availability in future[3]	↑↓	↓	↓	↓	↓

[1]1950-2005 [2]1990-2009 [3]2050-2100

↑ increase, enhancement ↓ decrease, reduction ↑↓ mixed trends

2nd National Communications of Kasakhstan, Kyrgyzstan, Tajkistan, Uzbekistan, Turkmenistan, 2009

Map 1 Climate change will depress agricultural yields in most countries in 2050, given current agricultural practices and crop varieties



Sources: Müller and others 2009; World Bank 2008c.

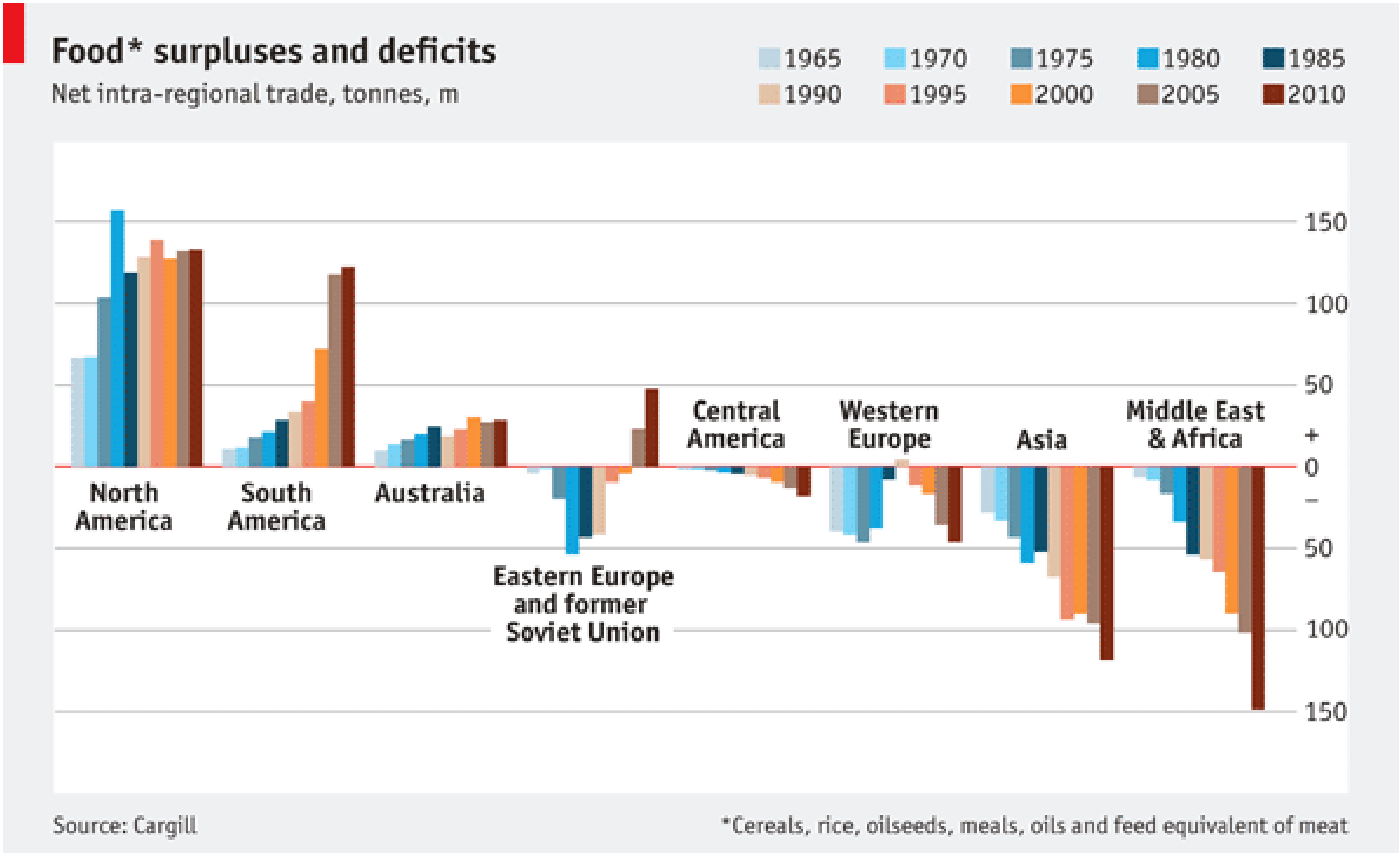
Note: The figure shows the projected percentage change in yields of 11 major crops (wheat, rice, maize, millet, field pea, sugar beet, sweet potato, soybean, groundnut, sunflower, and rapeseed) from 2046 to 2055, compared with 1996–2005. The values are the mean of three emission scenarios across five global climate models, assuming no CO_2 fertilization (a possible boost—of uncertain magnitude—to plant growth and water-use efficiency from higher ambient CO_2 concentrations). Large negative yield impacts are projected in many areas that are highly dependent on agriculture.

Rain

=

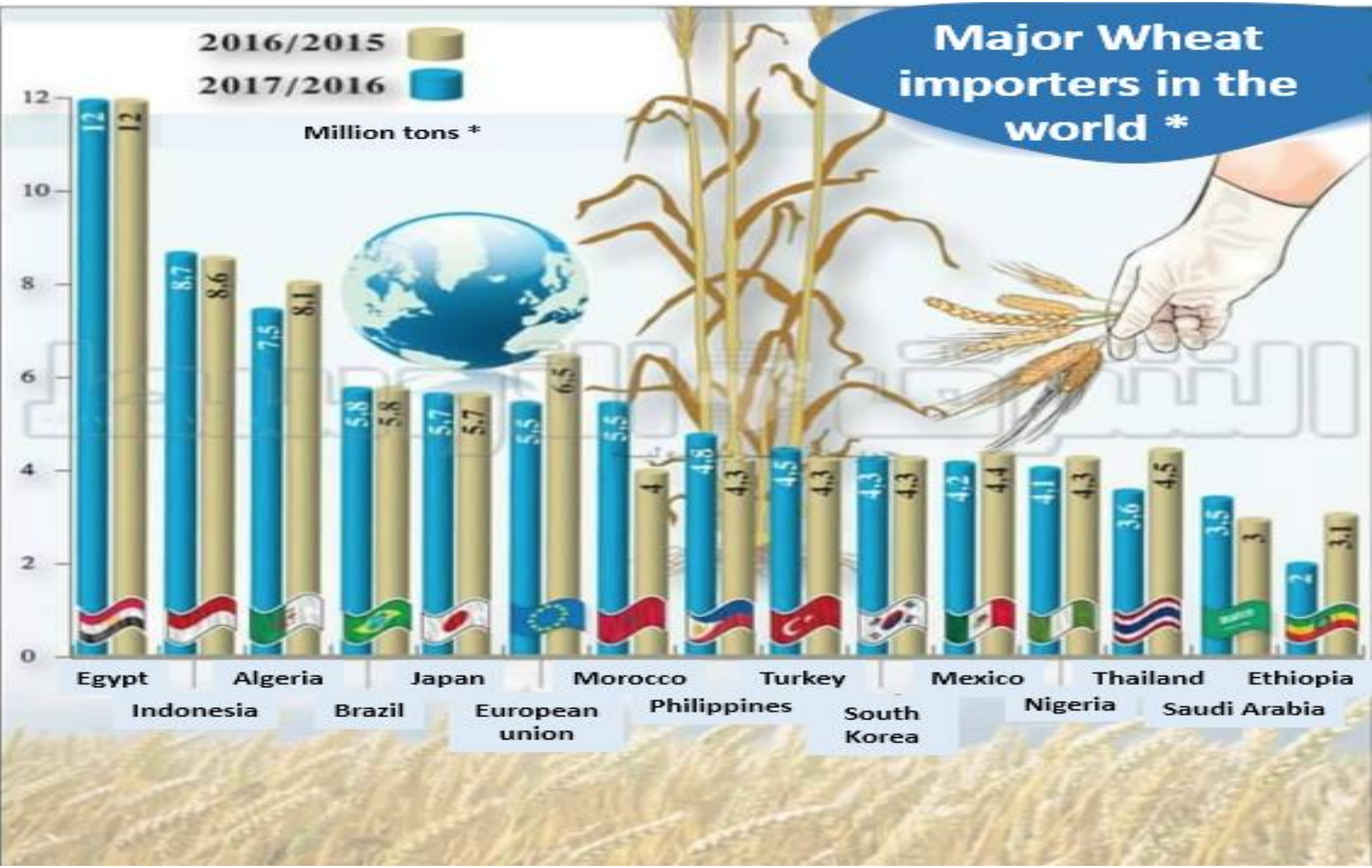
Grain

It seems likely that Asia and the Middle East and Africa will continue to require **increased imports** to satisfy growing populations. To feed itself for the next half century, the world needs an agricultural **revolution** in Africa.



From the Economist Online, 28 May 2012

Wheat Import in the world 2015-16 and 2016-17



Technologies to Improve Root Architecture for Small Farmers?

- Breed SBDs/abiotic stress res/tol varieties
- Closer collaboration with breeders (IITA, ICRISAT, CIMMYT)
- Affordable seed treatment
- Plant growth/health promoting biologicals PGPRs
- Soil health/fertility enhancement – agronomy
- Targeted fertilization

CIMMYT CR Yield Trials - KONYA

SBP CIMMYT-Turkey

Future

The yield reduction in wheat due to root rot diseases in CWANA could be lessened by improving and understanding the concept of INM in the region where the practice of winter mono-culturing of wheat is the norm. Management of cereal nematodes especially CCN could involve an integrated approach that includes; crop rotation, genetic resistance, crop nutrition, and appropriate water supply.

The major requirements for the future management are:

1. Create awareness among the farmers in the developing countries especially through educating researchers at the extension services to support growers.
2. Establishment of yield losses caused by root rot diseases in real time which could be challenging due to uneven distribution and presence of multiple species in a single field.
3. New chemistry nematicides, which are less dangerous for the environment and human health, must be developed and tested under the field conditions.
4. Novel biological management options like seed treatment with biocontrol agents need to be examined further.
5. Cell phone apps based on the identification of the damage caused by root rot diseaes and other IT and social media services could be developed and utilized for better understanding for the farmers.
6. Understanding the interactions among the different root rot diseases is important to devise management approaches for multiple pathogens in a particular field.