Science-based solutions

Dr Martin Kropff
CIMMYT, Mexico

Climate change effects: e.g. wheat yield

Global climate change impact of -1.9%

Pequeno et al 2019 (in prep. for Climatic Change)
Yield gap: Impact of changing climates on maize production in Africa

Map 1: Van Dijk et al, 2012
Map 2: Robertson (IFPRI) and Sonders (CIMMYT)

Pressures on staples

For food prices to remain constant, annual yield gains would have to increase:

- from 1.2% - 1.7% for maize
- from 1.1% - 1.7% for wheat
Agricultural green production gap

- Filling the yield gap should not always be the only objective
- Producing the same with less resources:
  - Less nutrients
  - Less water
  - Less energy
  - Reducing GHGs

Example: Pakistan
- Reduce area of wheat (1 mil ha) but maintain total production with less water use
- Release land for higher value cash crops
- Challenge for science: increase yields and WUE and NUE

3 elements of agricultural innovation

1. Better crop varieties
2. Greener agronomic practices
3. Markets & supportive policies
Solutions for greener agri-food systems

Solution: Drought-tolerant varieties

Today: 3.5 m ha using DT maize (out of 35 m ha)
Model: DSSAT DT variety CIMMYT CZH0616
Challenge: NUTRIENTS

Example: Supplying leading food-processing companies with sustainably produced maize & wheat

MasAgro project

+500,000 farmers

380 extension workers

1,322,177 hectares

38 experimental platforms