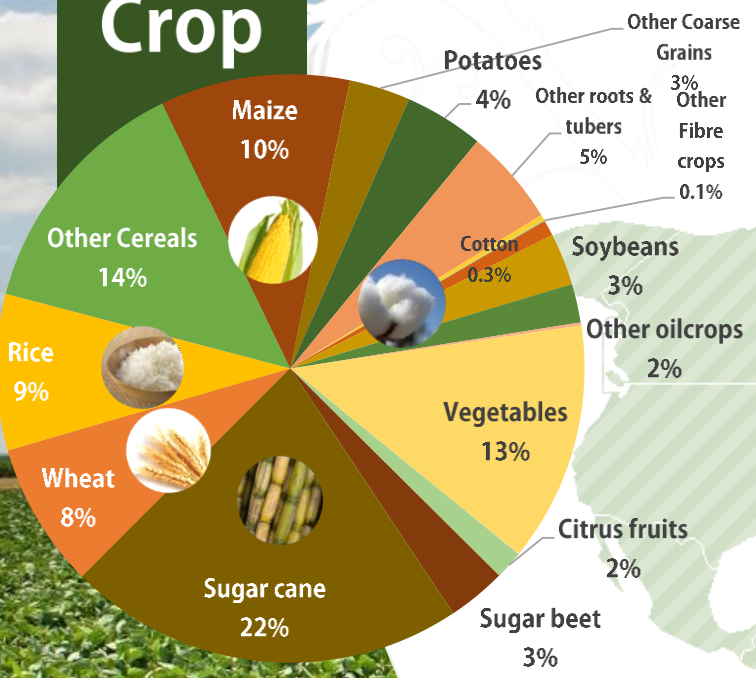


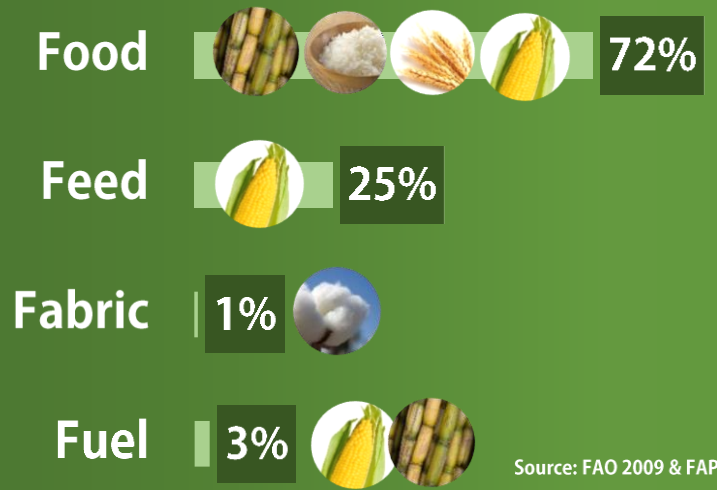
A wide-angle photograph of a lush green soybean field stretching to the horizon. The sky is bright blue with scattered white cumulus clouds. The text is overlaid on the upper half of the image.

a brief overview of
CROP SCIENCE

Crop



Use



Source: FAO 2009 & FAPRI

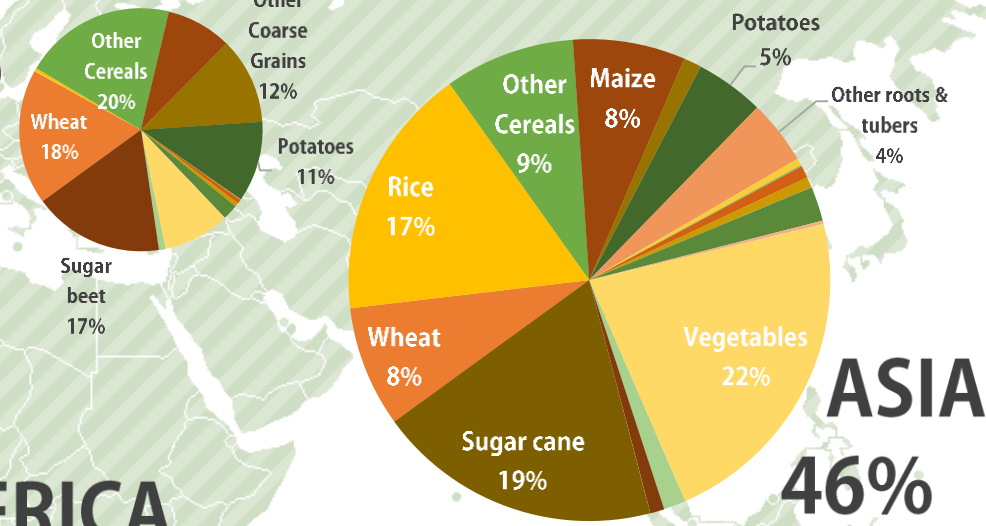
Crop Production

TONNES/YEAR



EUROPE

13%

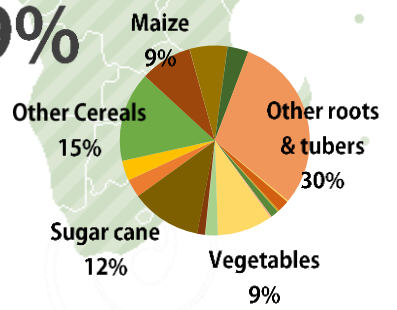


ASIA

46%

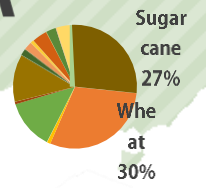
AFRICA

9%



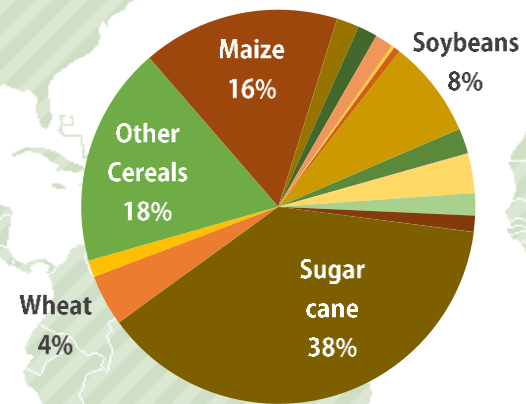
OCEANIA

1%



AMERICAS

31%



Source: FAO 2012

Definition

Crop science is about increasing the **YIELD** by maximizing output and minimizing input

e.g. Wheat



- Volume**

Tripled weight by dwarfing stalks to support bigger seed heads



- Crop protection against pests, diseases & drought**



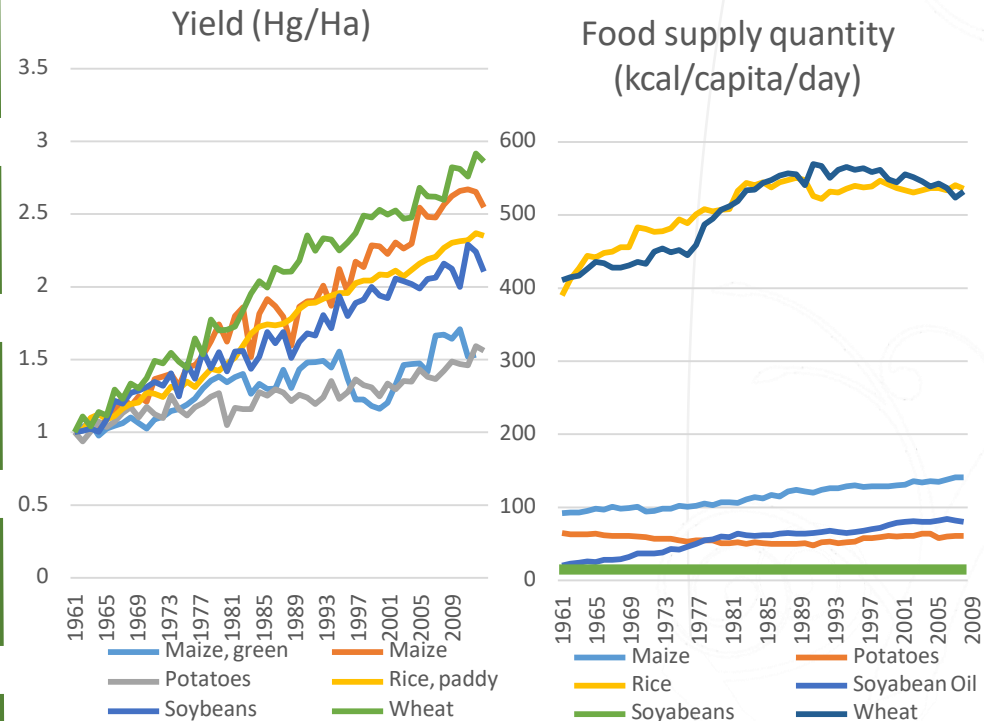
Application of fungicides increased yield by 89%

- Input management (water, fertilizer, soil, etc.)**

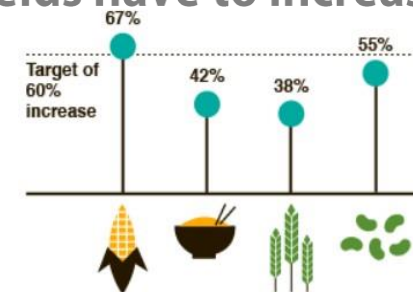


Split spring application of N can increase yield by 3 bu/acre

Crop science has led to increases in yield, and has helped in addressing the issue of food security.



However, population growth is still outpacing supply. To feed 11B people by 2050, yields have to increase by 60%.



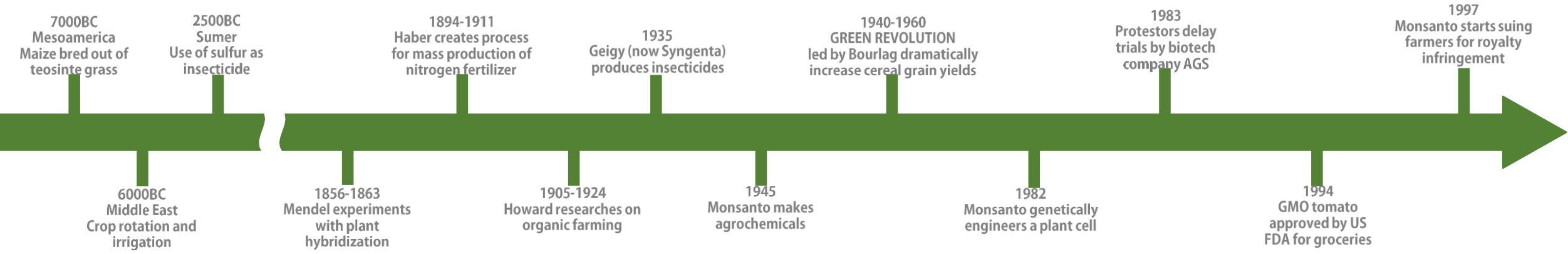


Segments

AGROCHEMICALS

Synthetic chemicals for crop protection (e.g. insecticides, fungicides, herbicides) and growth (e.g. fertilizers, hormones)

\$200B at 11% CAGR



ORGANIC

Use of traditional farming methods and "natural" fertilizers and pesticides

CROP SEED & BIOTECH

Seed and trait development through cross-breeding and genetic engineering, sold via royalties

\$45B at 6.5% CAGR

GMO: \$20B at 9.9% | Conventional: \$25B at -6.5%