وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
Kingdom of Saudi Arabia المملكة العربية السعودية

Promoting Sustainable Development through Innovative Cutting-edge Agricultural Technologies for Increased Production

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Kingdom of Saudi Arabia

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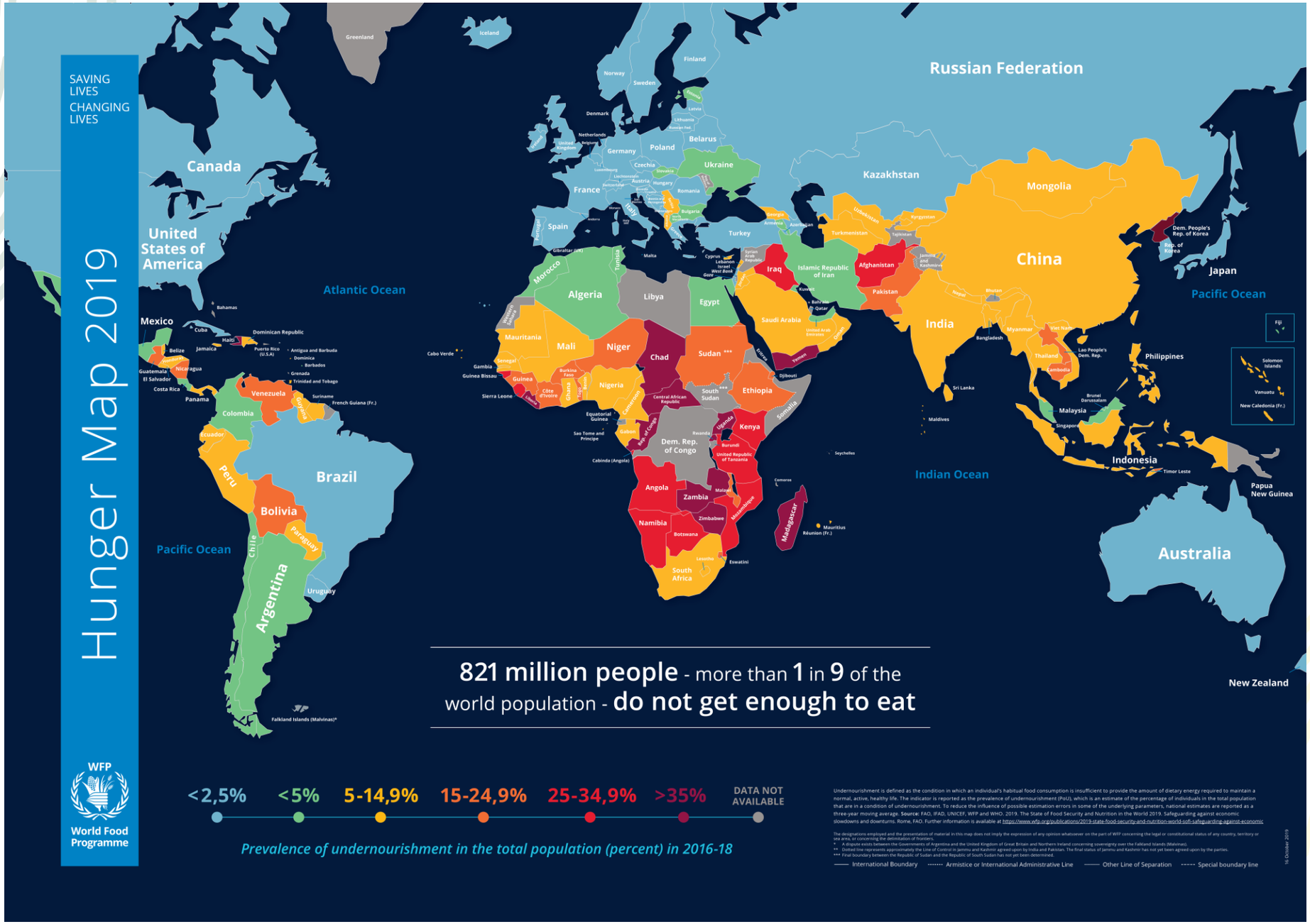
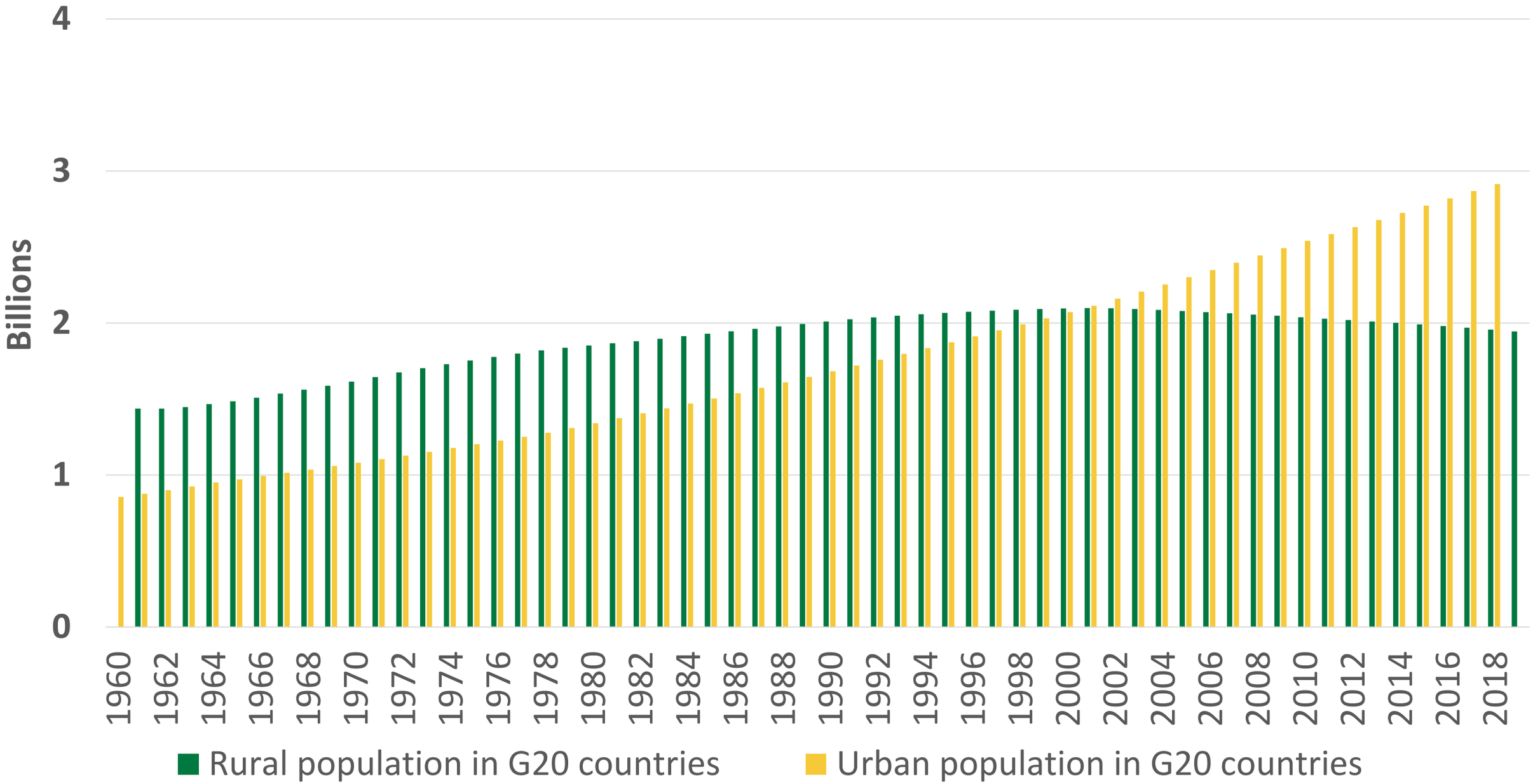
18th-19th February 2020, Khobar, Kingdom of Saudi Arabia

Hunger Map 2019



World Food Programme, 2019

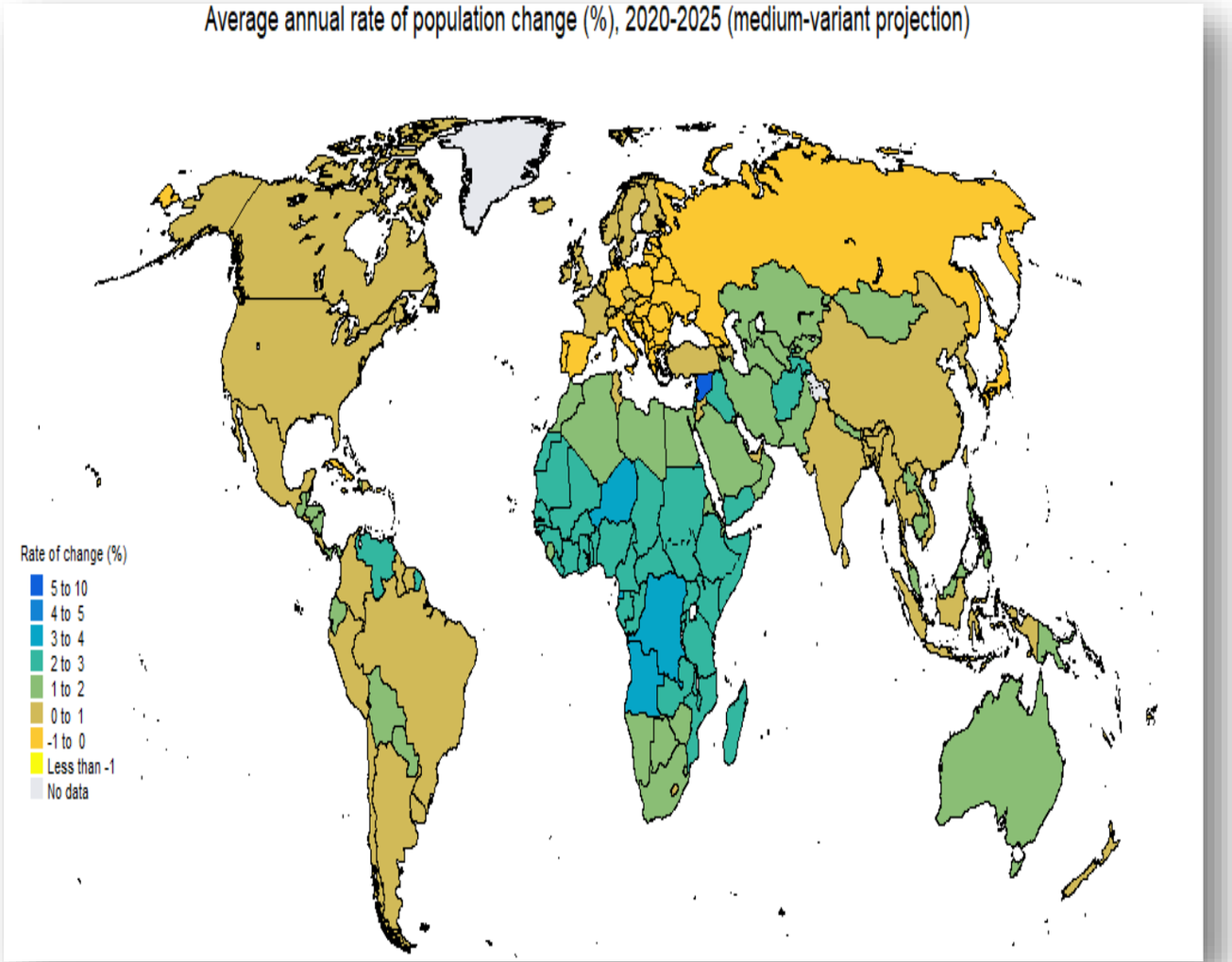
Rural-Urban Population Trends in G20 Countries

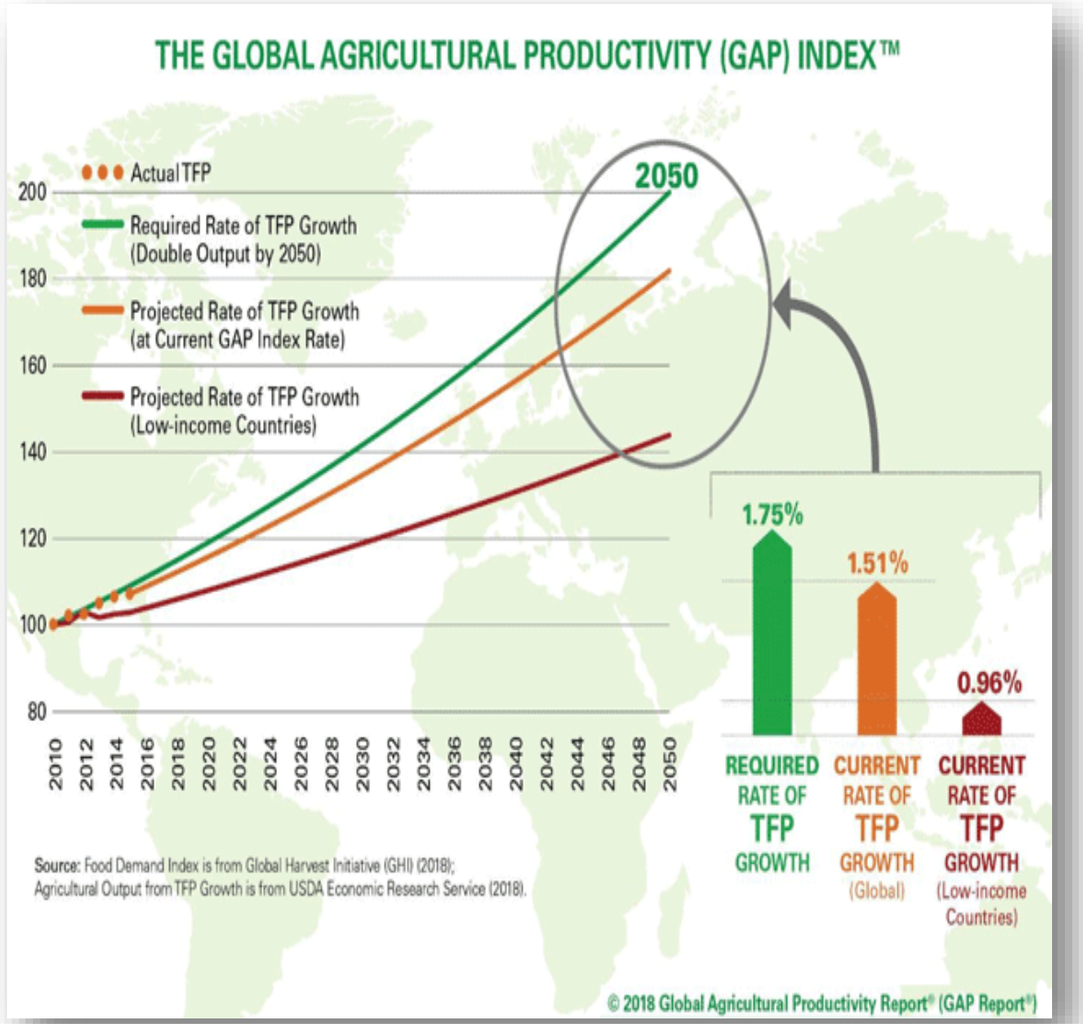


World Bank, 2019

Total-factor productivity

Total-factor productivity (**TFP**), also called *multi-factor productivity*, is usually measured as the ratio of aggregate output (e.g., GDP) to aggregate input



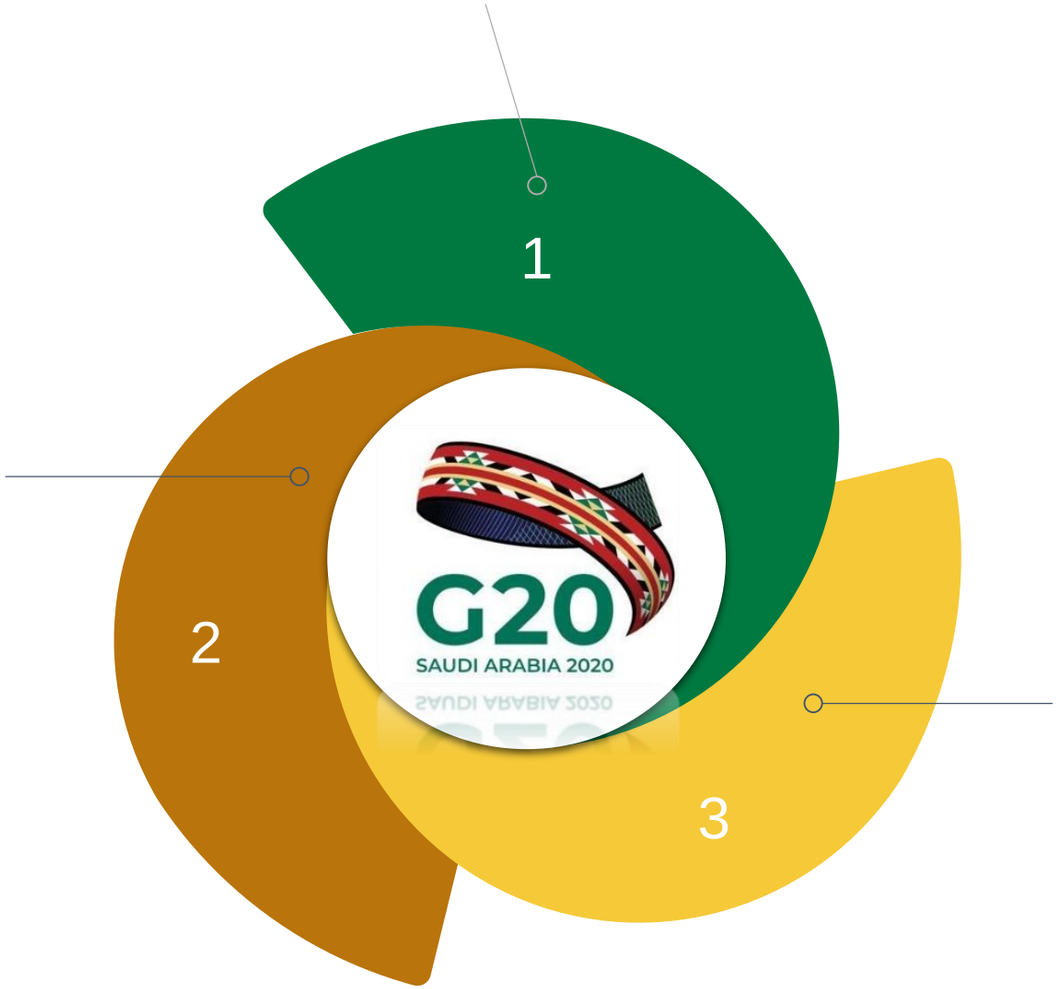


GAP Report, 2018

Sub-themes

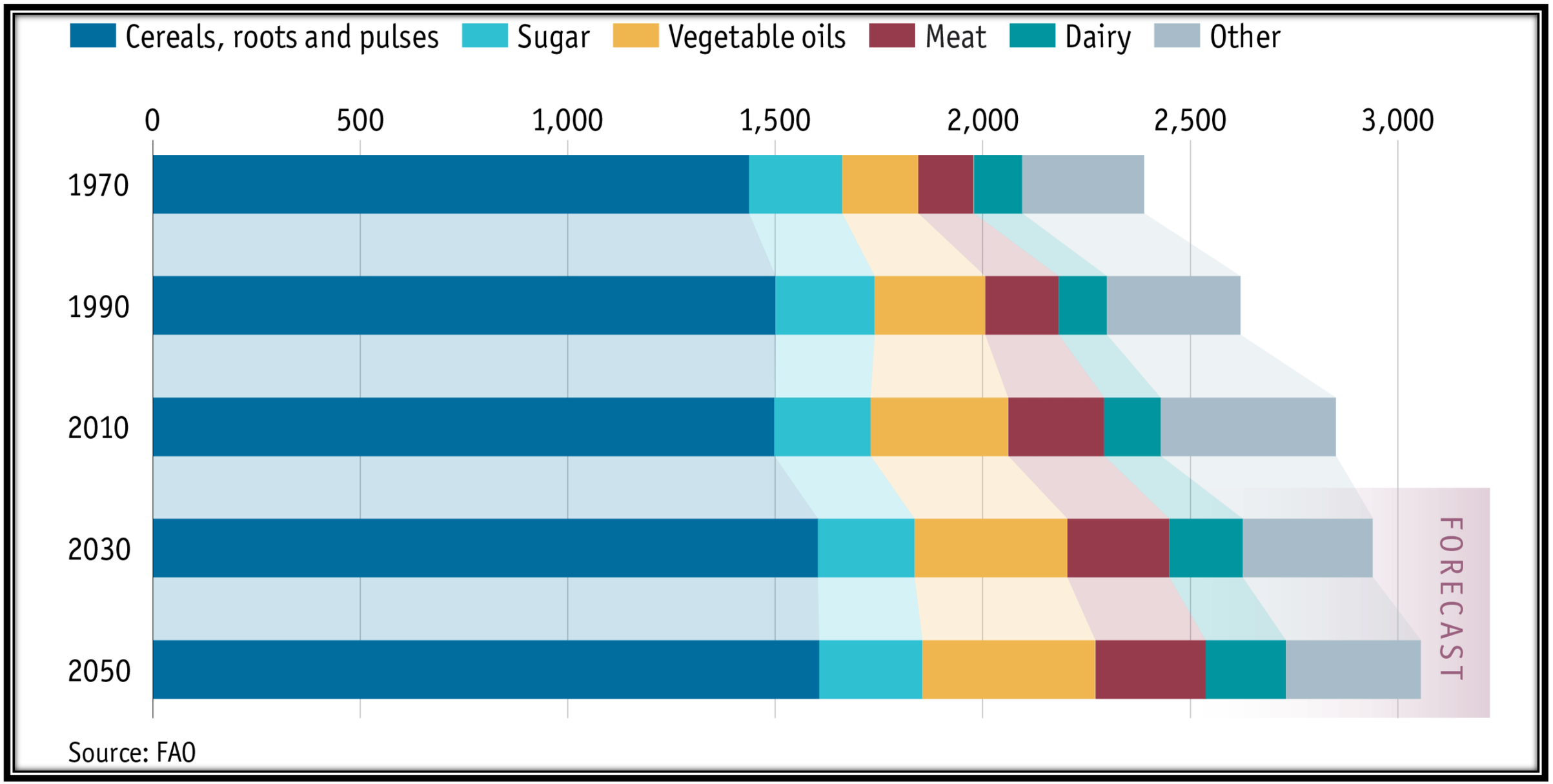
Advanced Plant Breeding Tools for Crop Improvement

Farm Management Decision Support Systems (DSS)



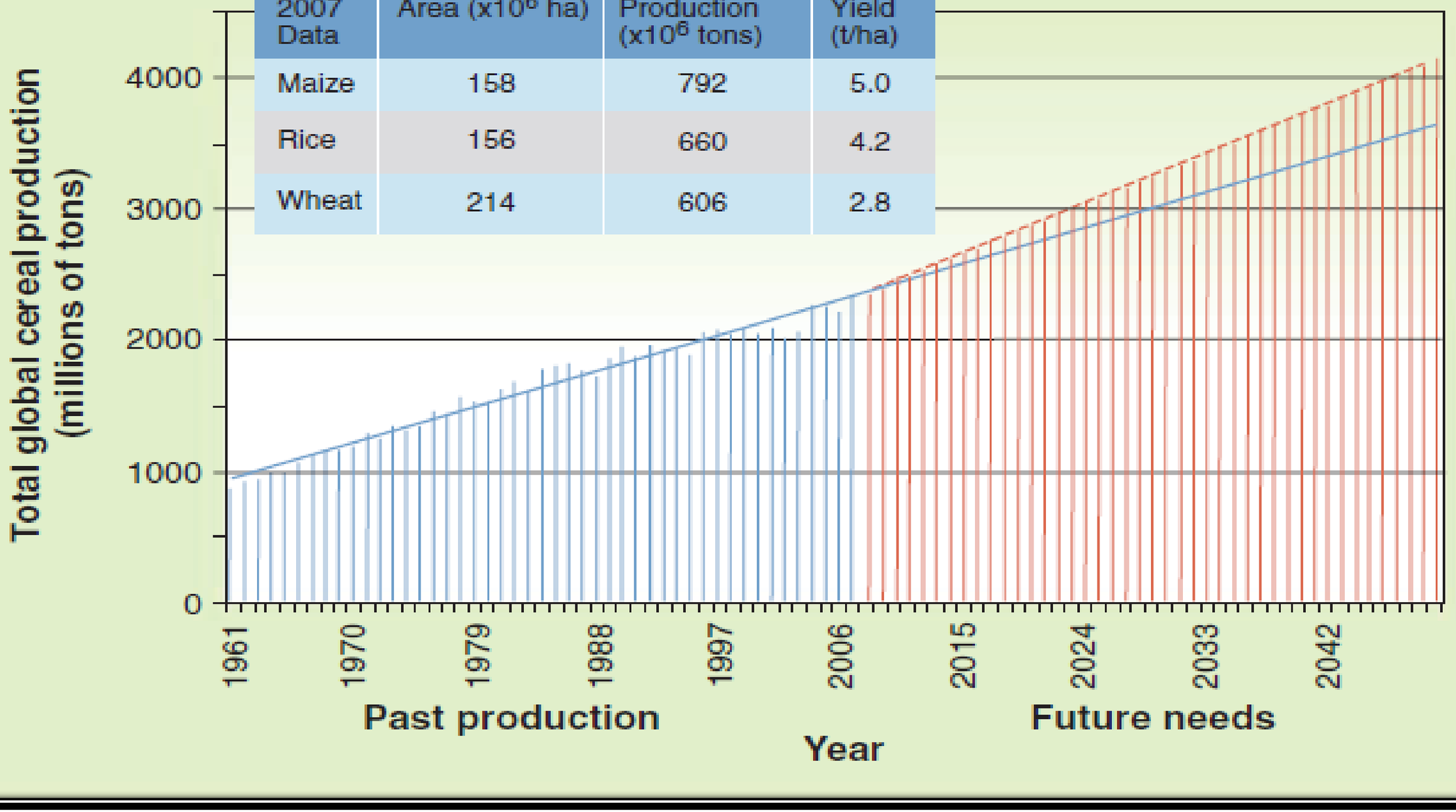
Adoption of the technologies

Daily calories per person by type of food



Cereals production targets

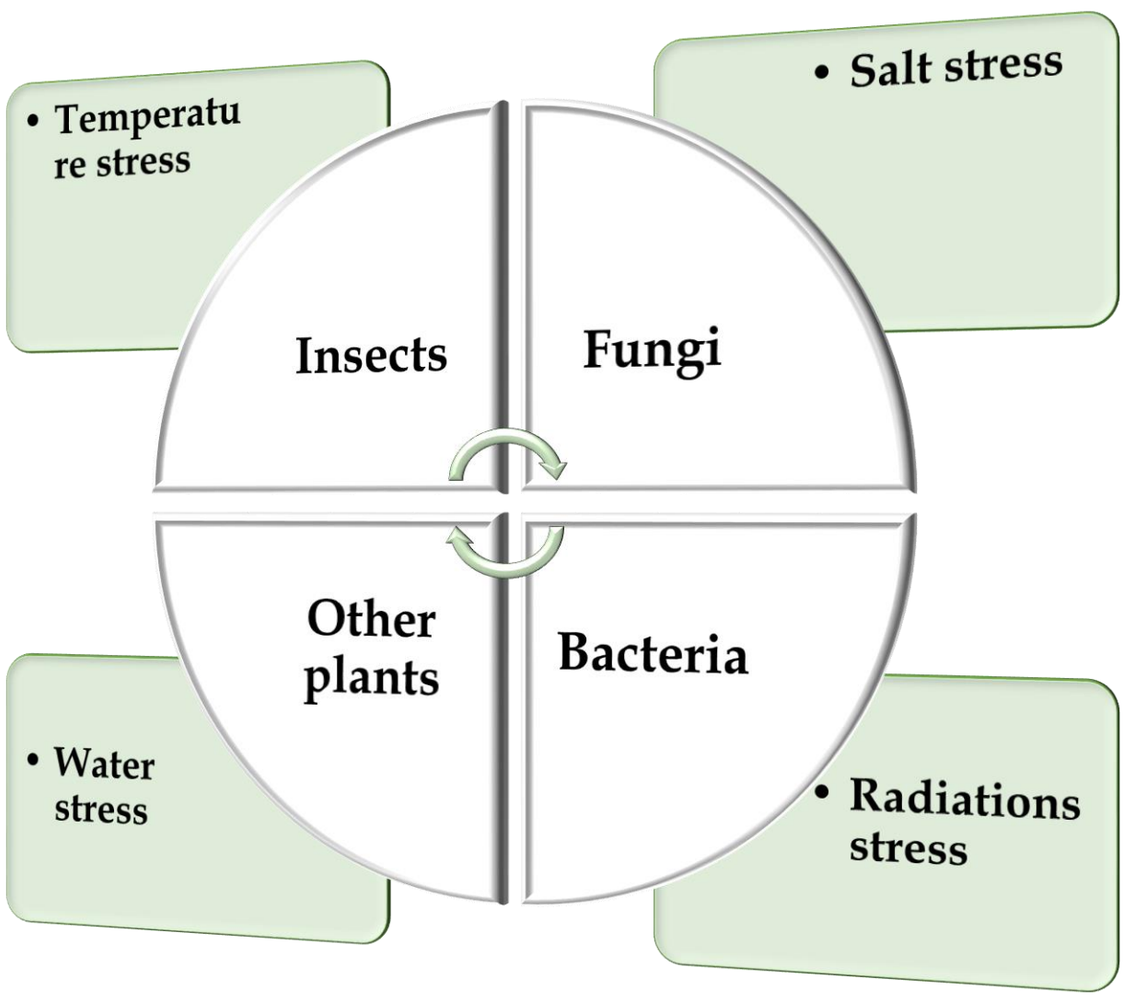
2007 Data	Area (x10^6 ha)	Production (x10^6 tons)	Yield (t/ha)
Maize	158	792	5.0
Rice	156	660	4.2
Wheat	214	606	2.8



Mark Tester and Peter Langridge, 2010. Science

Plant stresses

- Biotic and abiotic stresses especially in the face of climate change and intensive cultivation significantly affecting crops in terms of huge economic losses at various stages.
- Eco system need a synergic balance between living and nonliving parts, sunlight, temperature, wind, water, soil and naturally occurring as abiotic factor. And biotic factors such as plants, animals and micro-organisms.



Plant Breeding Tools for Crop Improvement

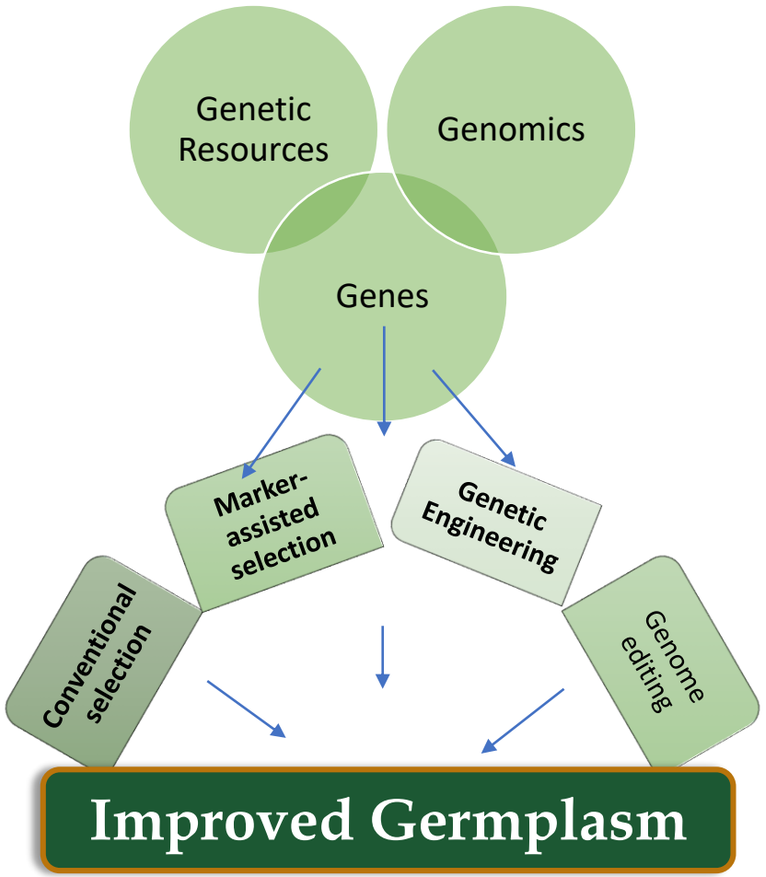
Agricultural crops are typically developed for

- higher yields
- better disease resistance
- hardier environmental resistance

Two Principles of plant breeding

Genetic variation → **Selection**

Crop improvement approaches

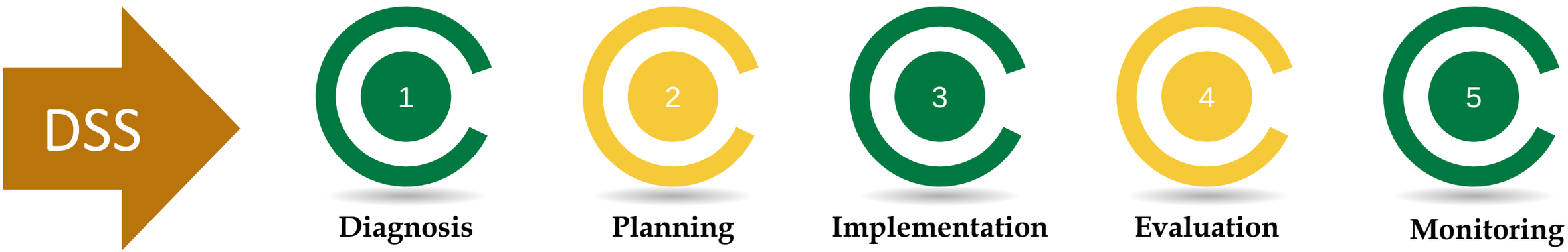


Farm Management Decision Support Systems (DSS)

- Decision Support Systems (DSS), defined as: Farm management primarily based on the decision-making process, which affects farms and farmers.

- DSS are software-based systems that gather and analyze data from a variety of sources.

- Their purpose is to smoothen the decision-making process for management, operations, planning, or optimal solution path recommendation.



DSS in Agriculture

Per-cultivation

Crop selection

Land Selection

Cultivation

Land preparation

Swing

Input management

Water management

Fertilization

Pest Management

Harvesting

Maturity

Weather

Harvesting

Future Perspective of DSS

Future of DSS

- Being a key part of sustainable agriculture, DSS will become more and more robust.
- The increased connectivity of technologies and the multiplication of smart devices on the field stimulates the accumulation and storage of data.
- By integrating and analysing the captured data, DSS are meant to become more accurate as well as reliable.
- Actors from the sector have the ambition to make DSS more ergonomic and user-friendly.
- Companies already offer mobile interfaces on smartphones and tablets, that are easy to handle and can be used in real time, directly on the field.

Adoption of technologies

1. **Ease of access**
2. **Affordability**
3. **Cost-effectiveness**
4. **Changing farmer's behavior**

Policies and Regulations

- ✓ Pro-poor policies, and actions are needed
- ✓ Ensure fair access to new technologies
- ✓ Policies should provide incentives to the farmers for the adoption of the technologies
- ✓ Government polices to support the farmers about innovative technologies
- ✓ Reduced migration from rural areas to cities
- ✓ Promote extension services through public sector
- ✓ Reducing the income gaps between urban and rural population

Proposed Actions at G20 MACS 2020

Planned Activity

- ✓International Forum Innovation in Agri-Food Systems in collaboration with FAO and relevant International Organizations

Thanks…