



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



Sustainable Agriculture Development in Drylands

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Ninth Meeting of Agricultural Chief Scientists (G20)

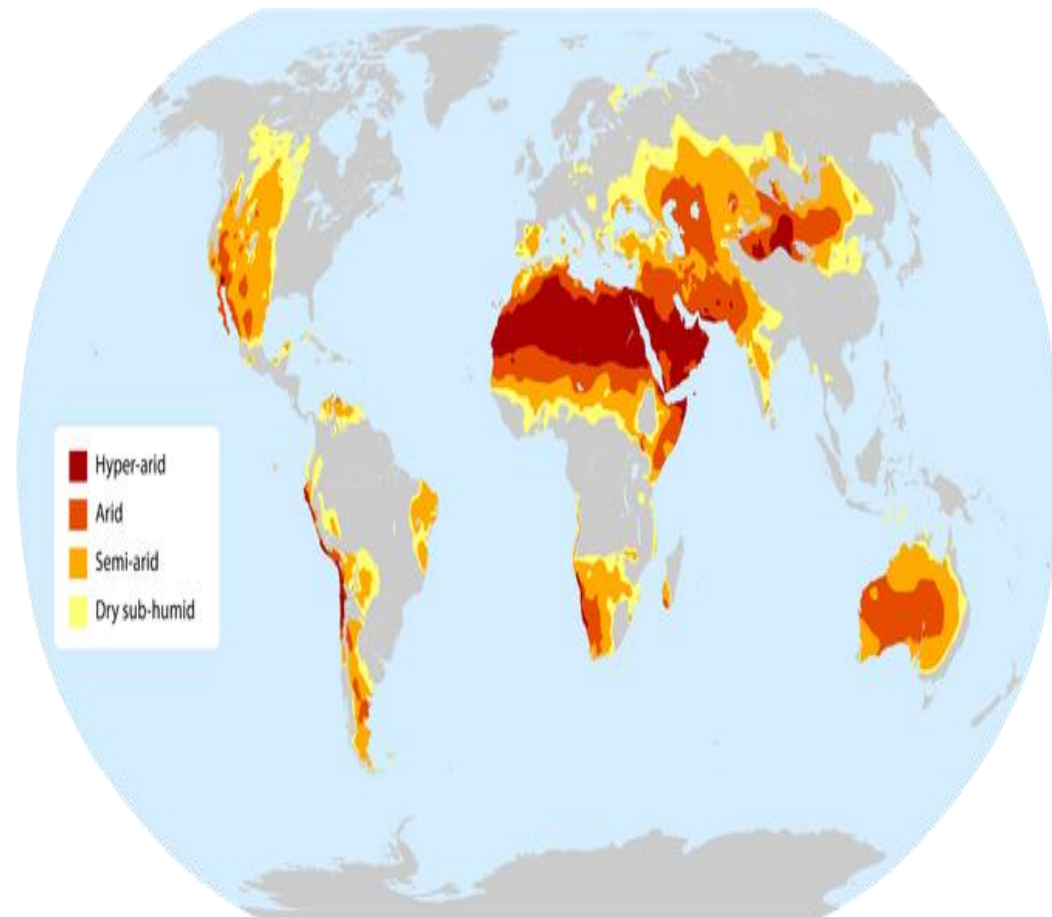
18th-19th February 2020, Khobar, Kingdom of Saudi Arabia



Drylands

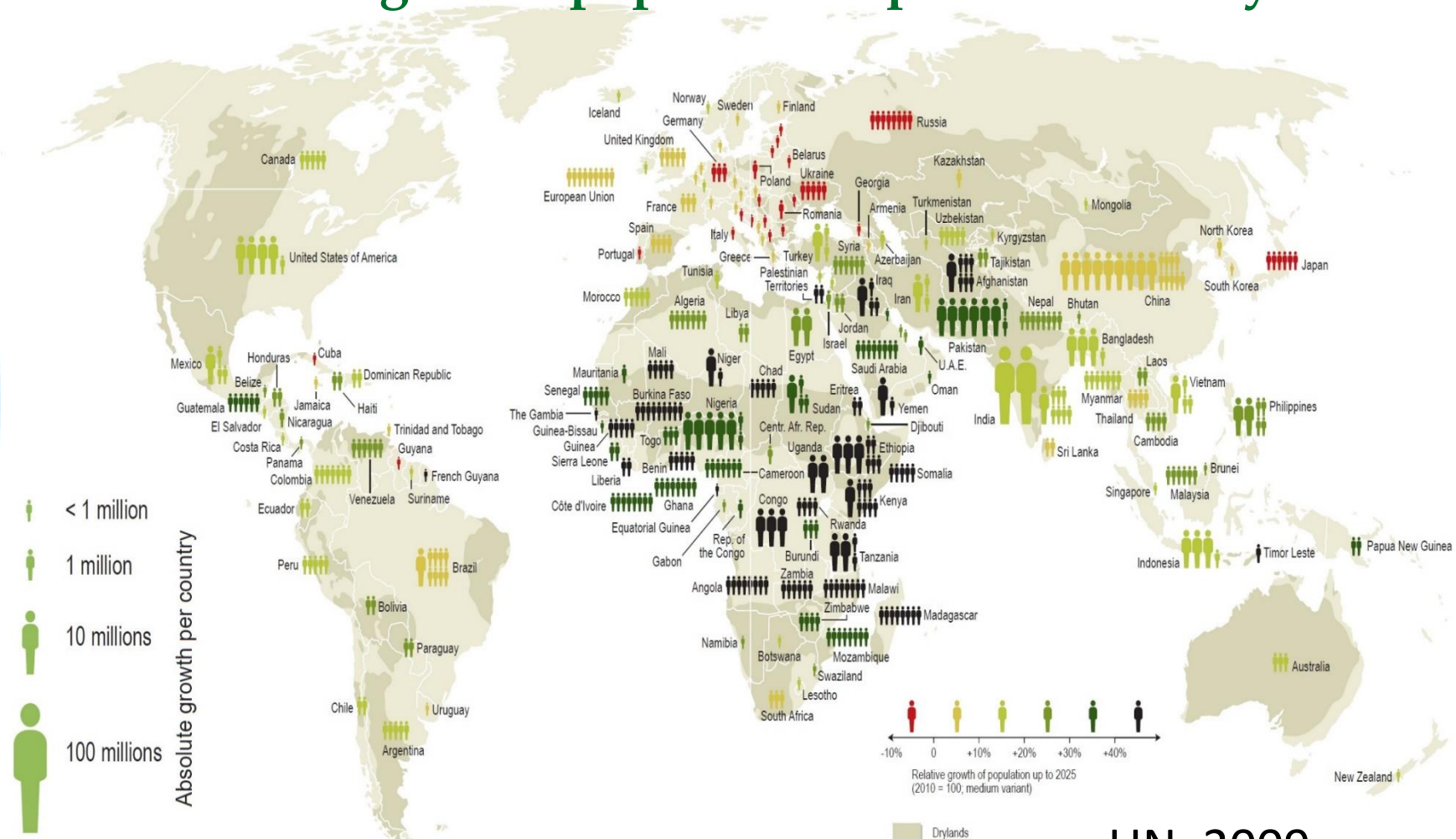
Drylands—zones with an aridity index of less than 0.65

Drylands Map



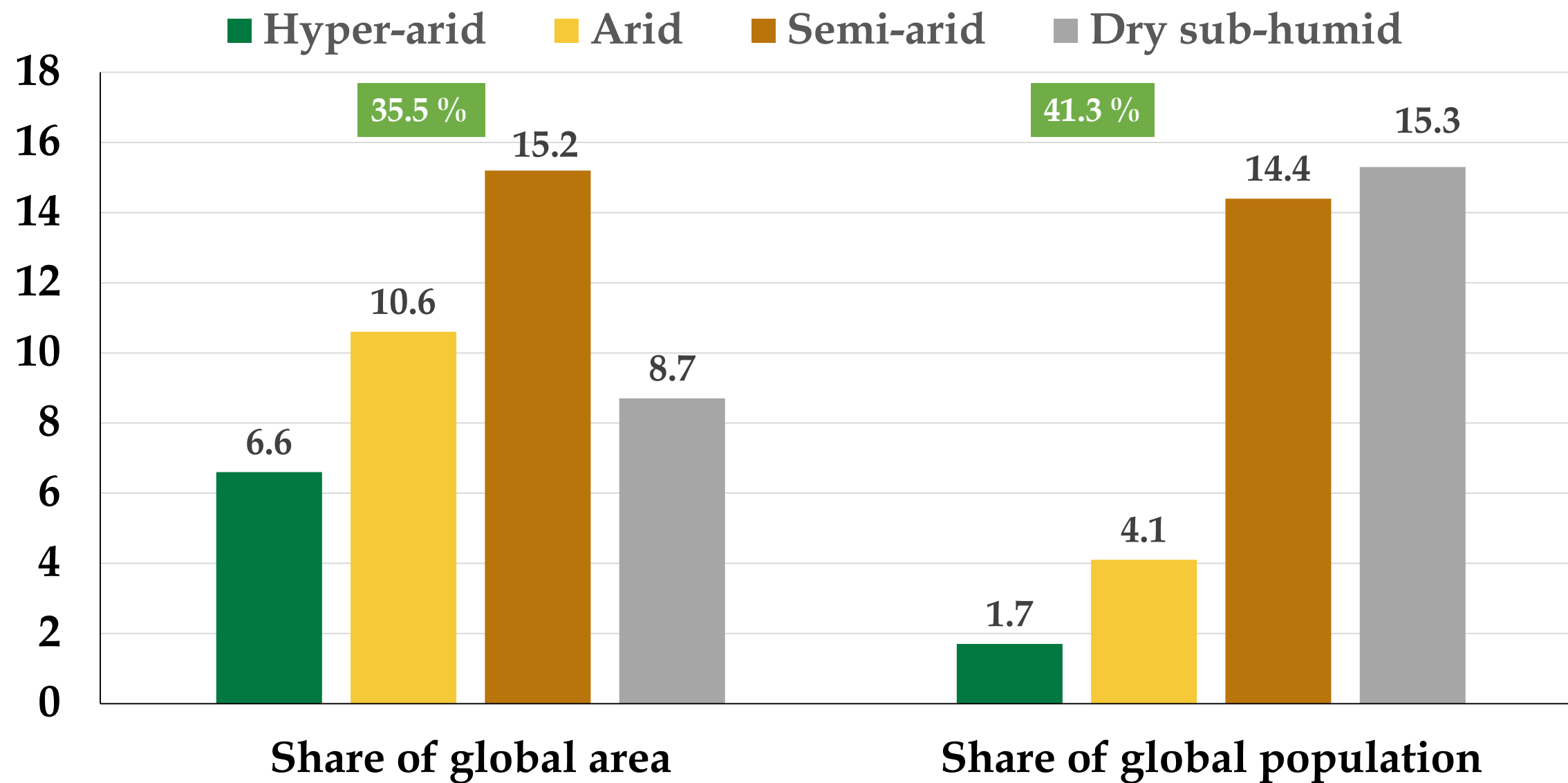
UNEP-WCMC, 2007

Relative growth population up to 2025 in Drylands



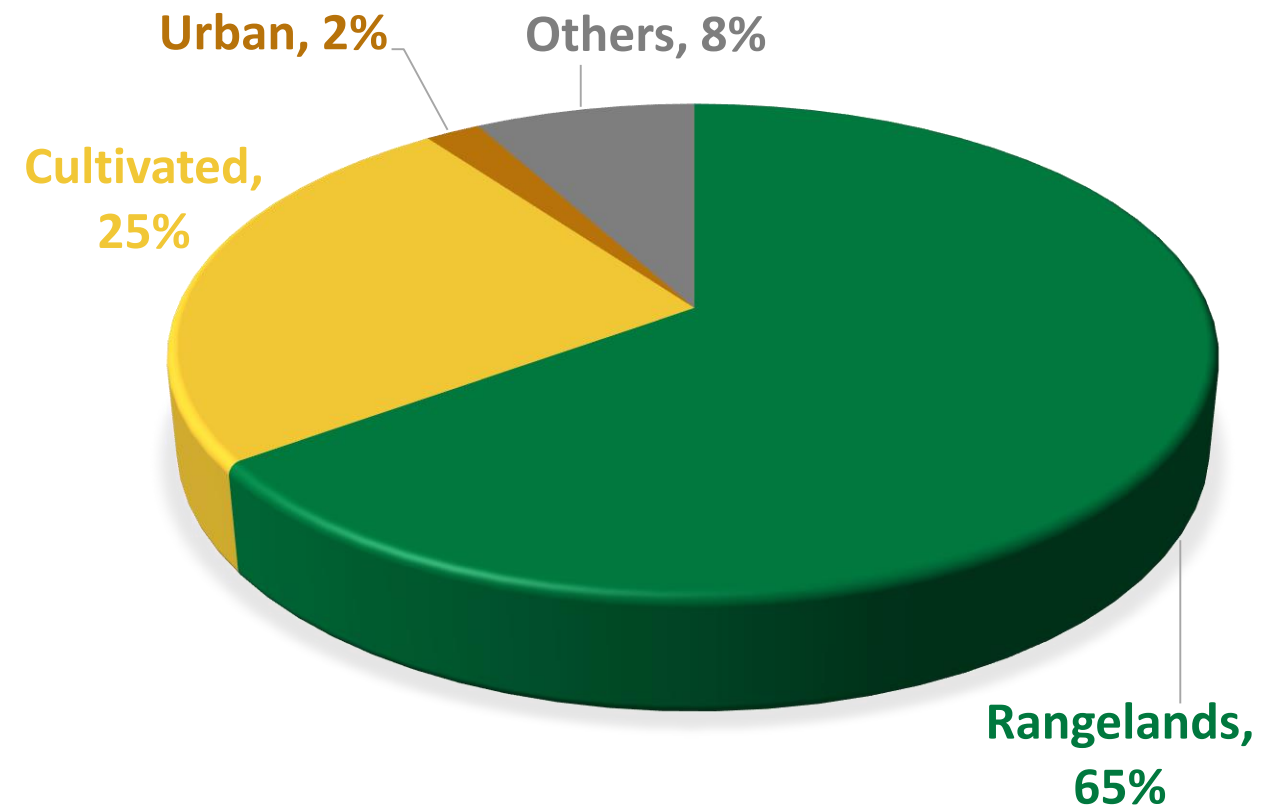
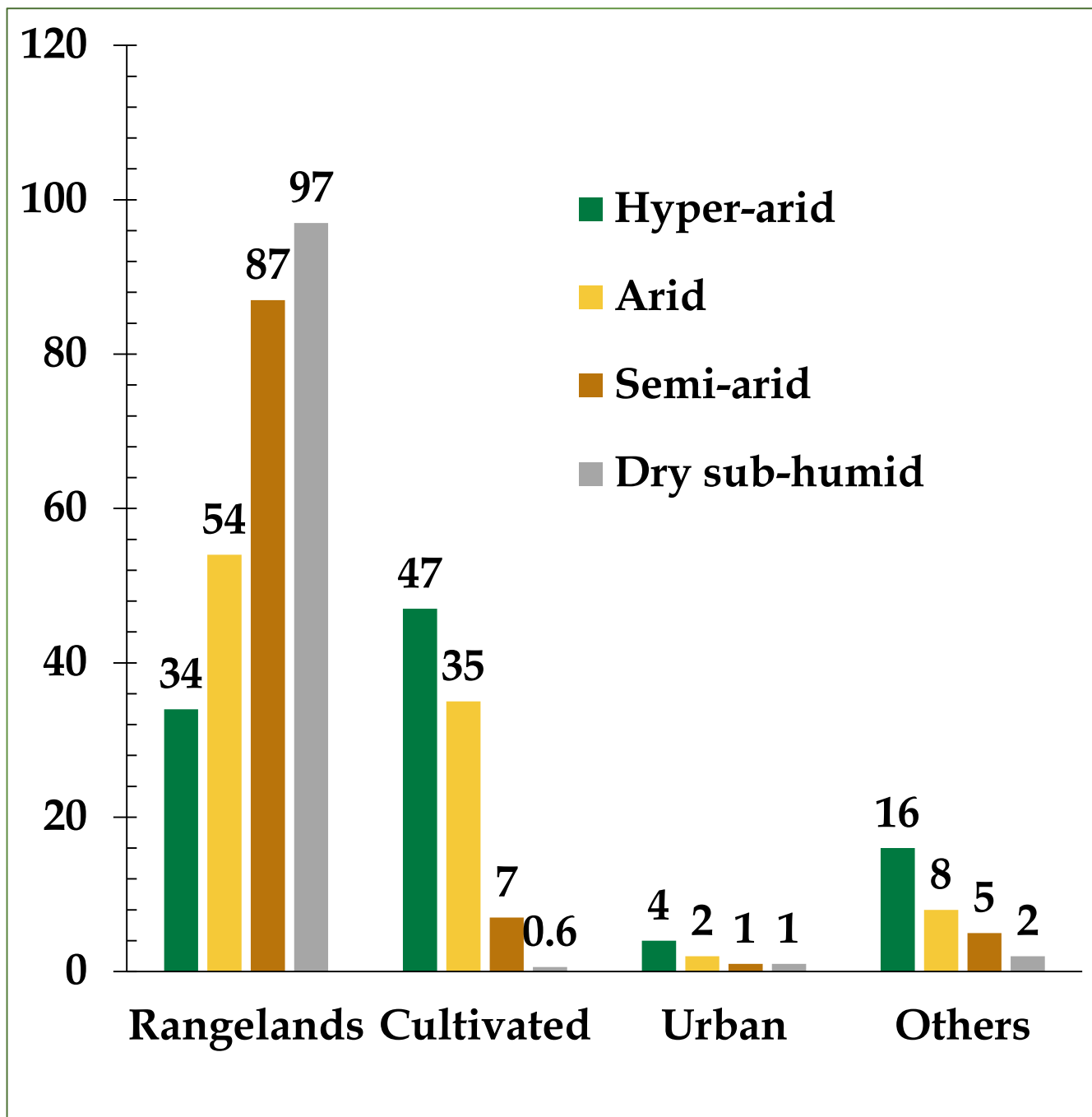
UN, 2009

Global figures for subtypes of drylands





Land Uses in Drylands





Sub-Themes



Sub-Themes



**Soil Fertility
Management**



**Modern Smart
Irrigation
Technologies**



**Improved
Dryland Crop
Varieties**



**Promoting Animal
and Plant Health**

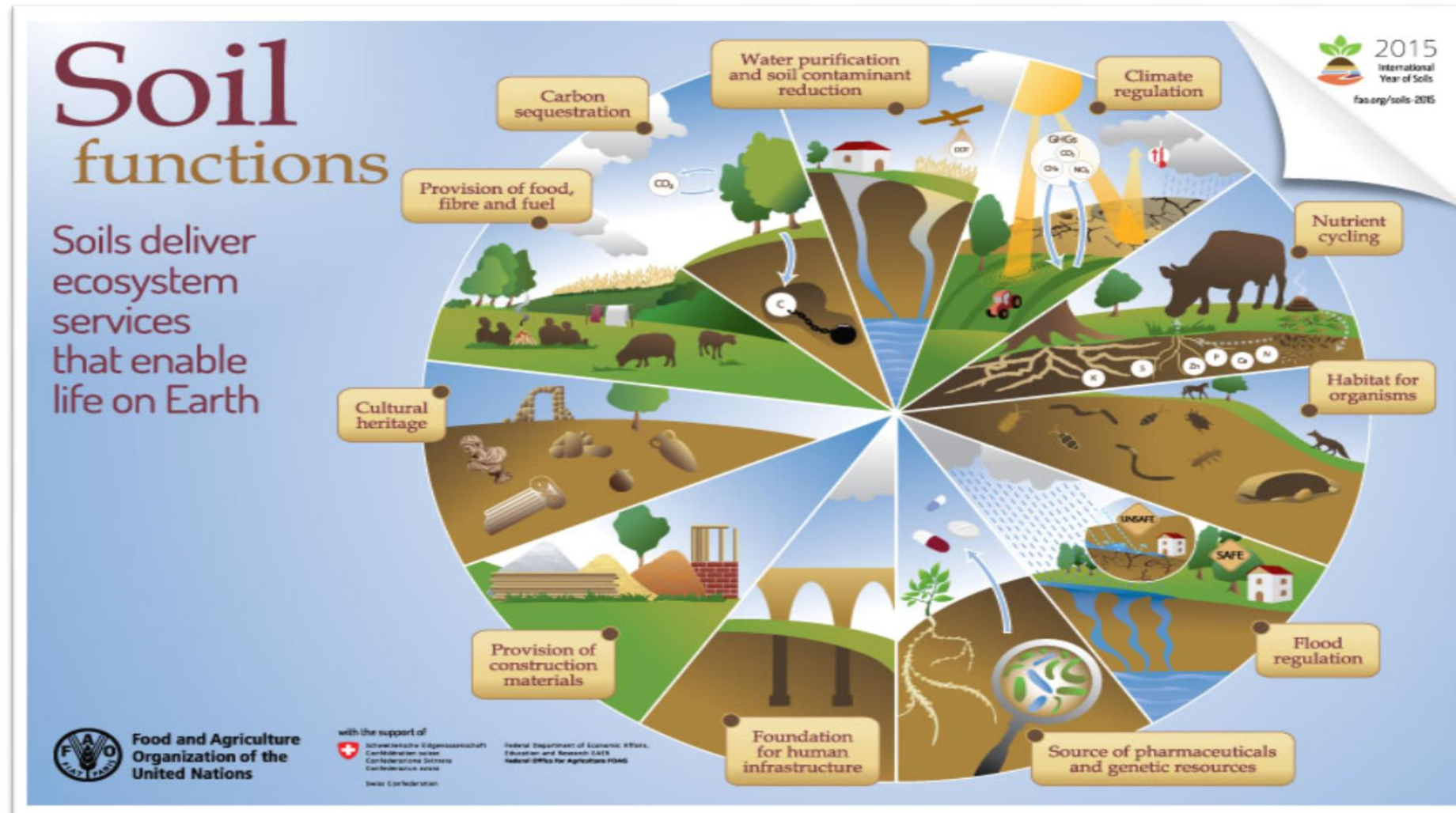


1. Soil Fertility Management in Drylands



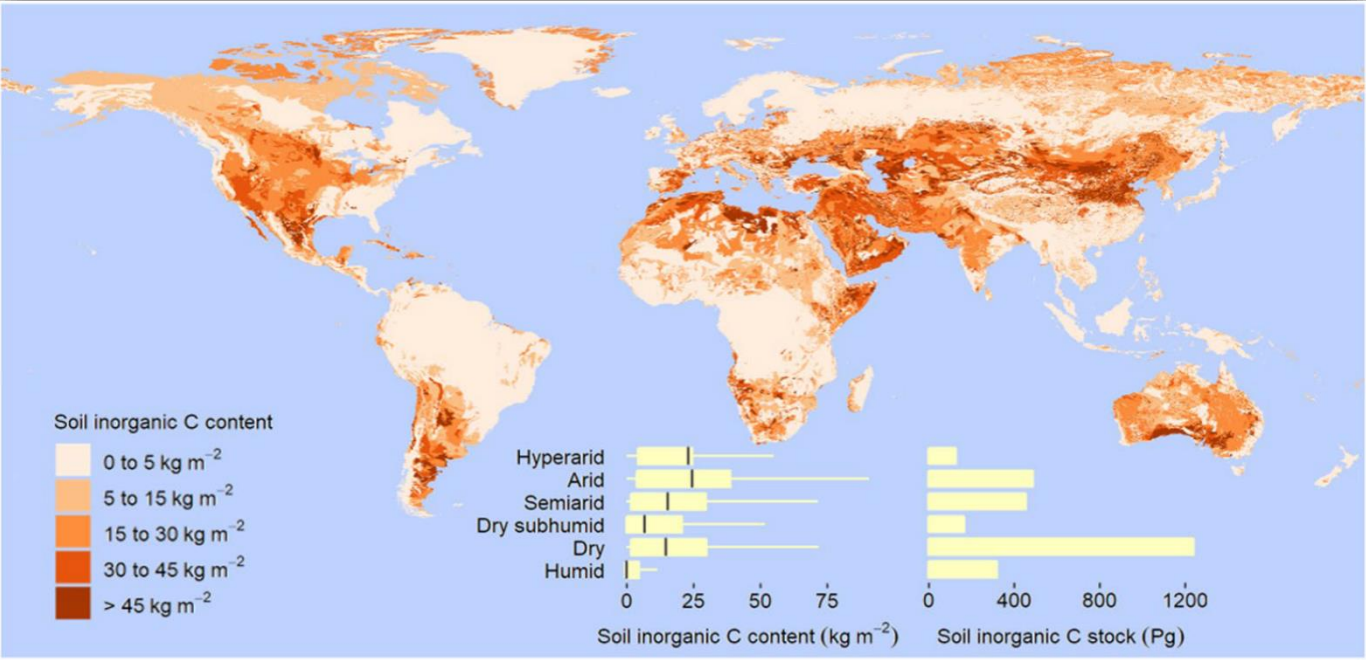
Soil fertility

- ❖ The capacity to receive, store, and transmit energy to support plant growth. These processes require healthy soils – living, self-organizing systems with physical, chemical, and biological components all functioning and in balance.

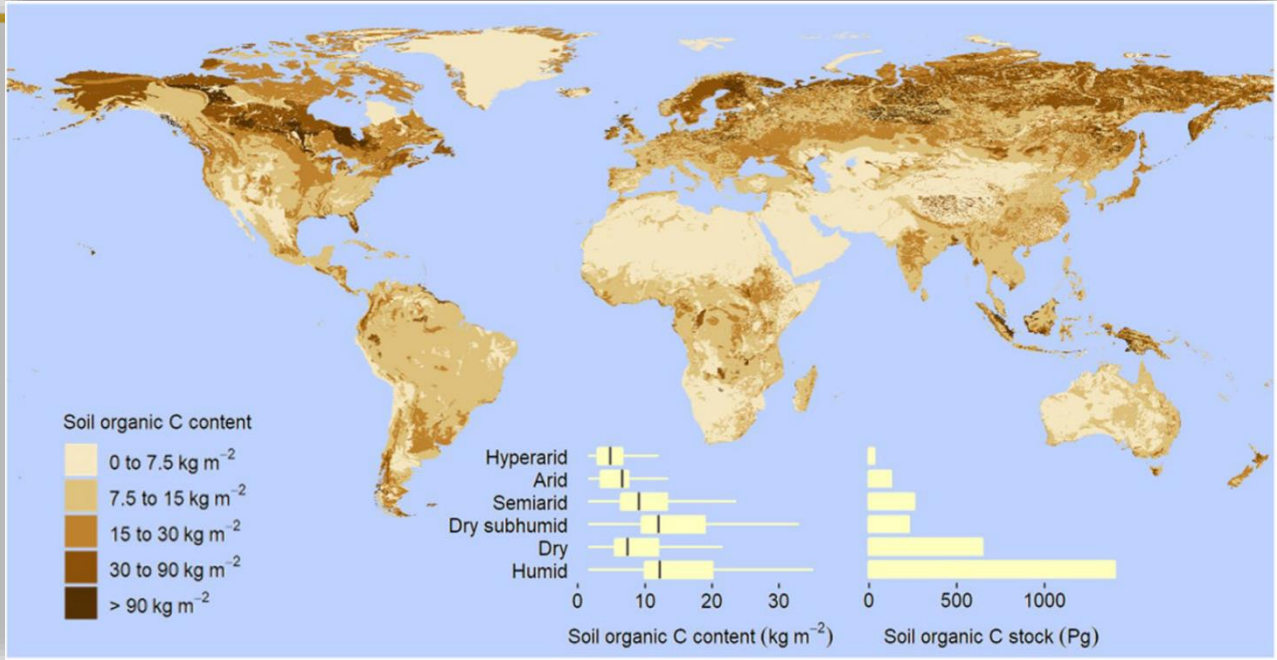




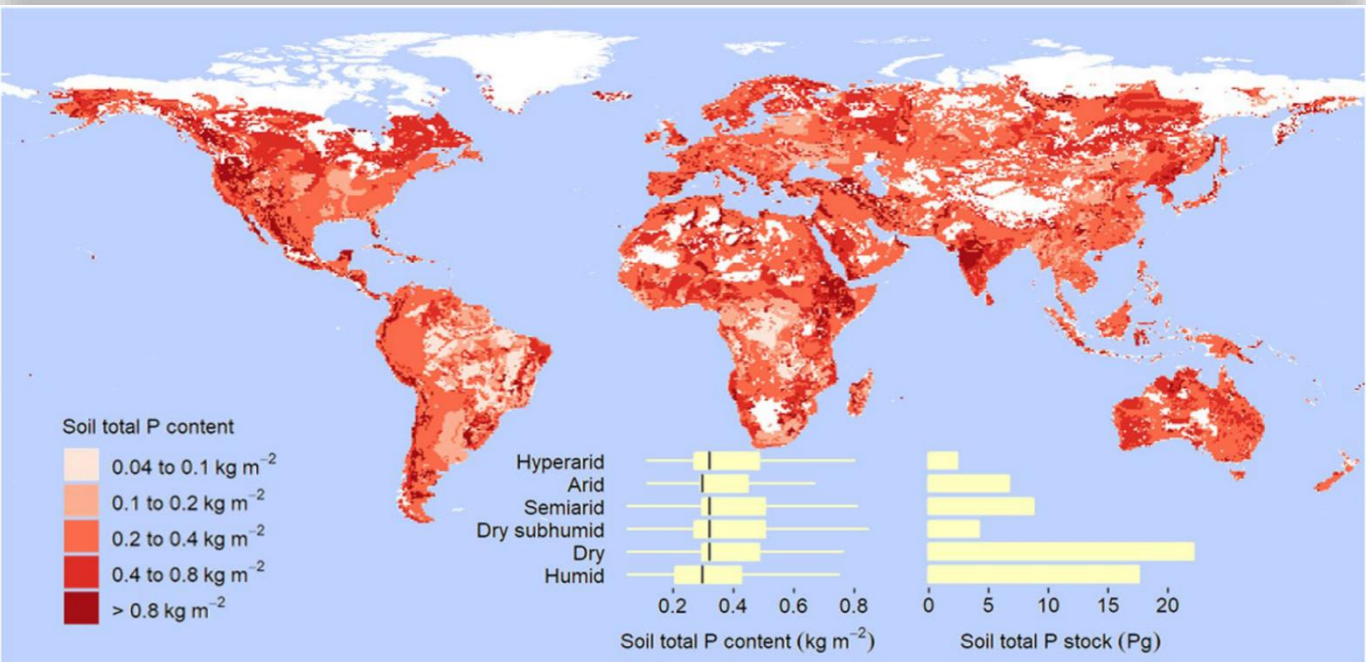
Global distribution of soil inorganic C content



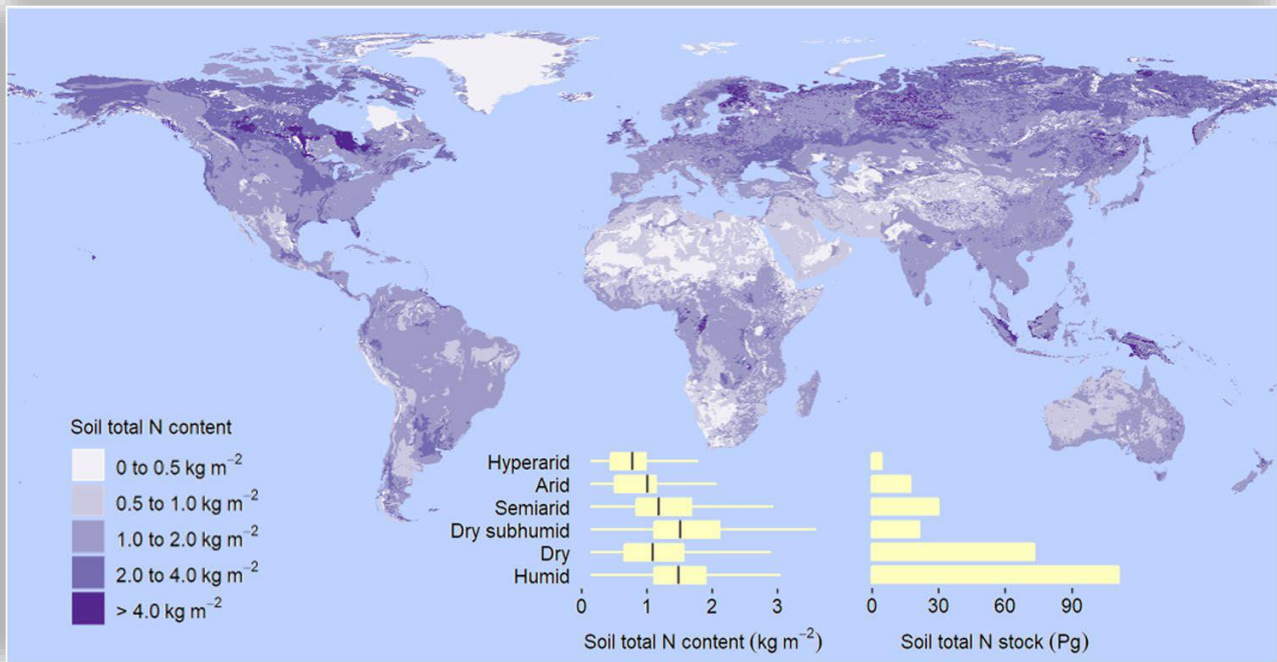
Global distribution of soil organic C content



Global distribution of soil total P content



Global distribution of soil total N content

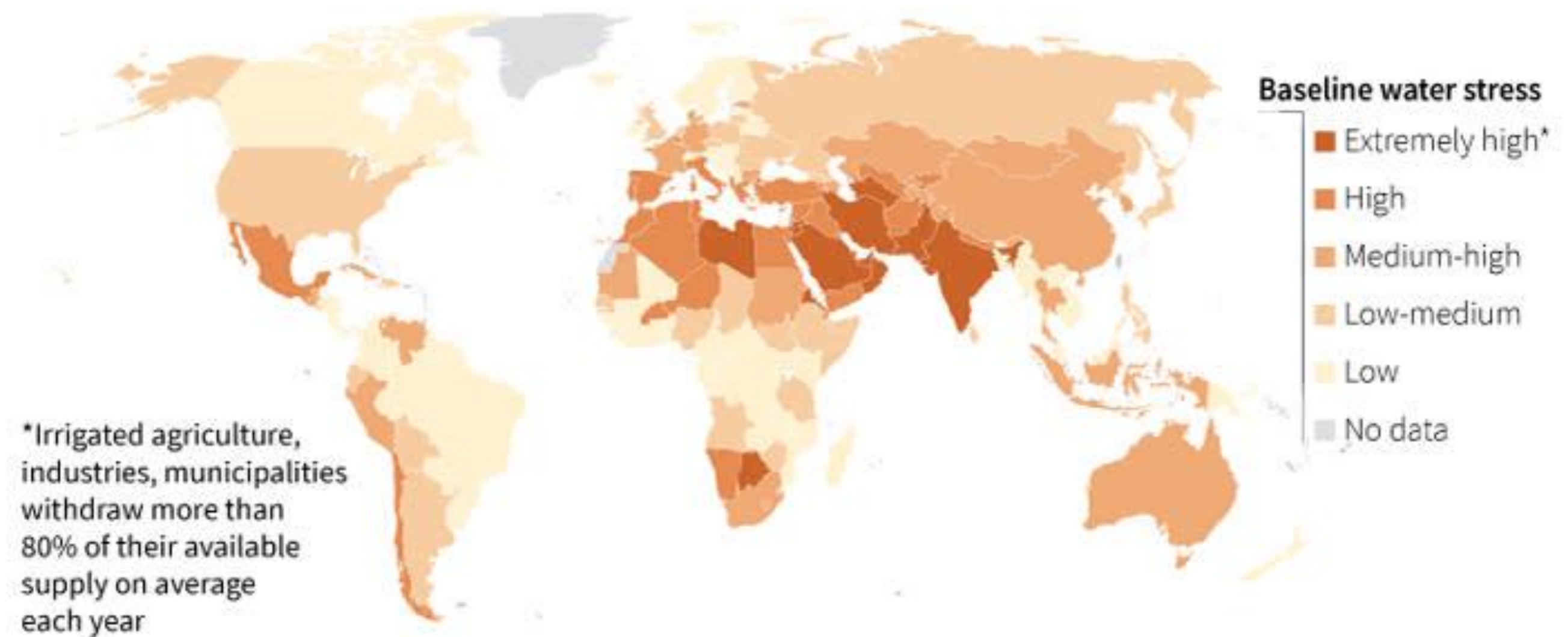


2. Modern Smart Irrigation Technologies in Drylands



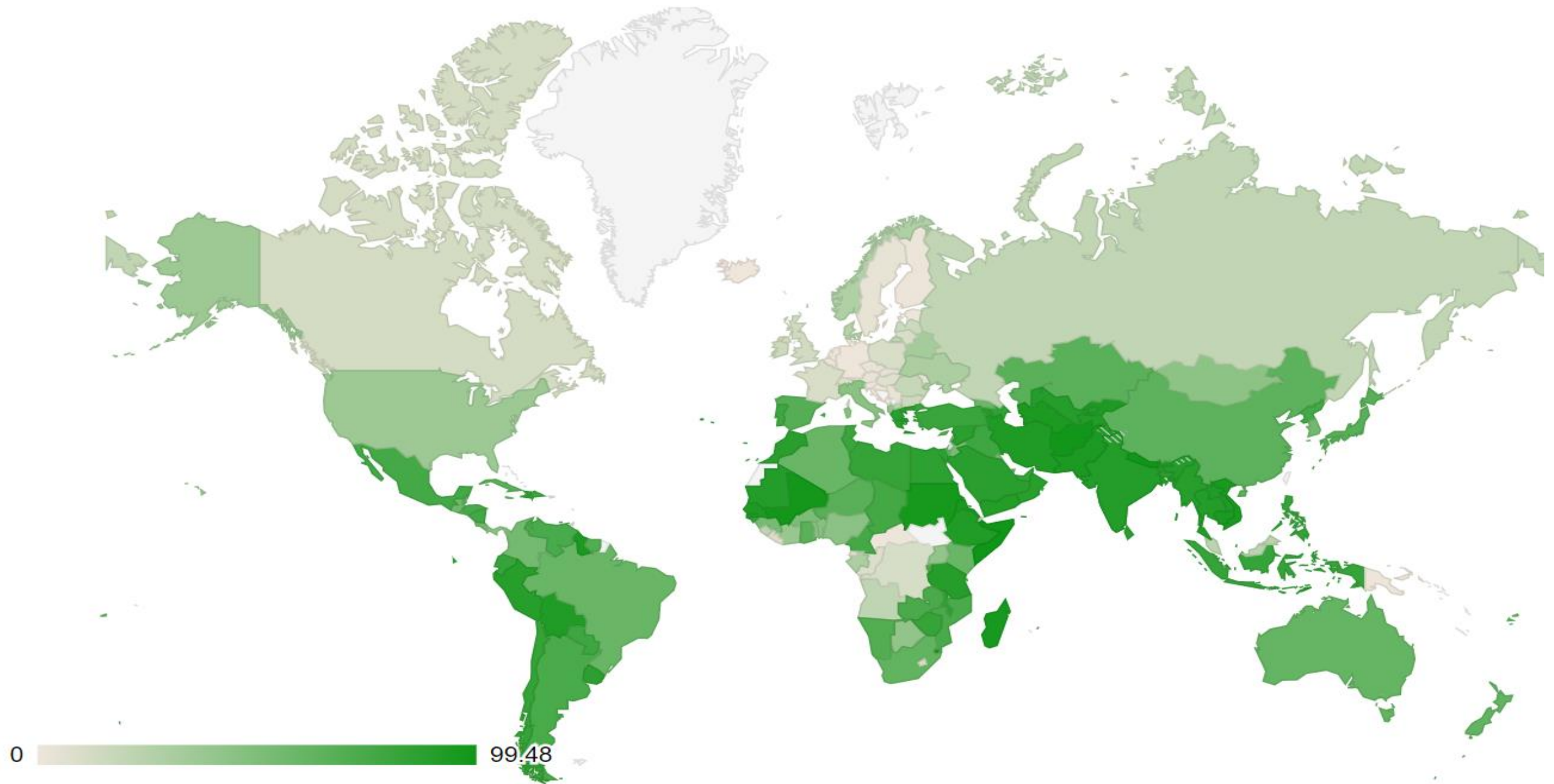
Global Map with different levels of Water Stresses

17 countries -- home to nearly a quarter of the world's population -- face extremely high levels of water stress*



Source: Water Resources Institute's Aqueduct Water Risk Atlas August 2019.

Annual freshwater withdrawals, agriculture (% of total freshwater withdrawal)

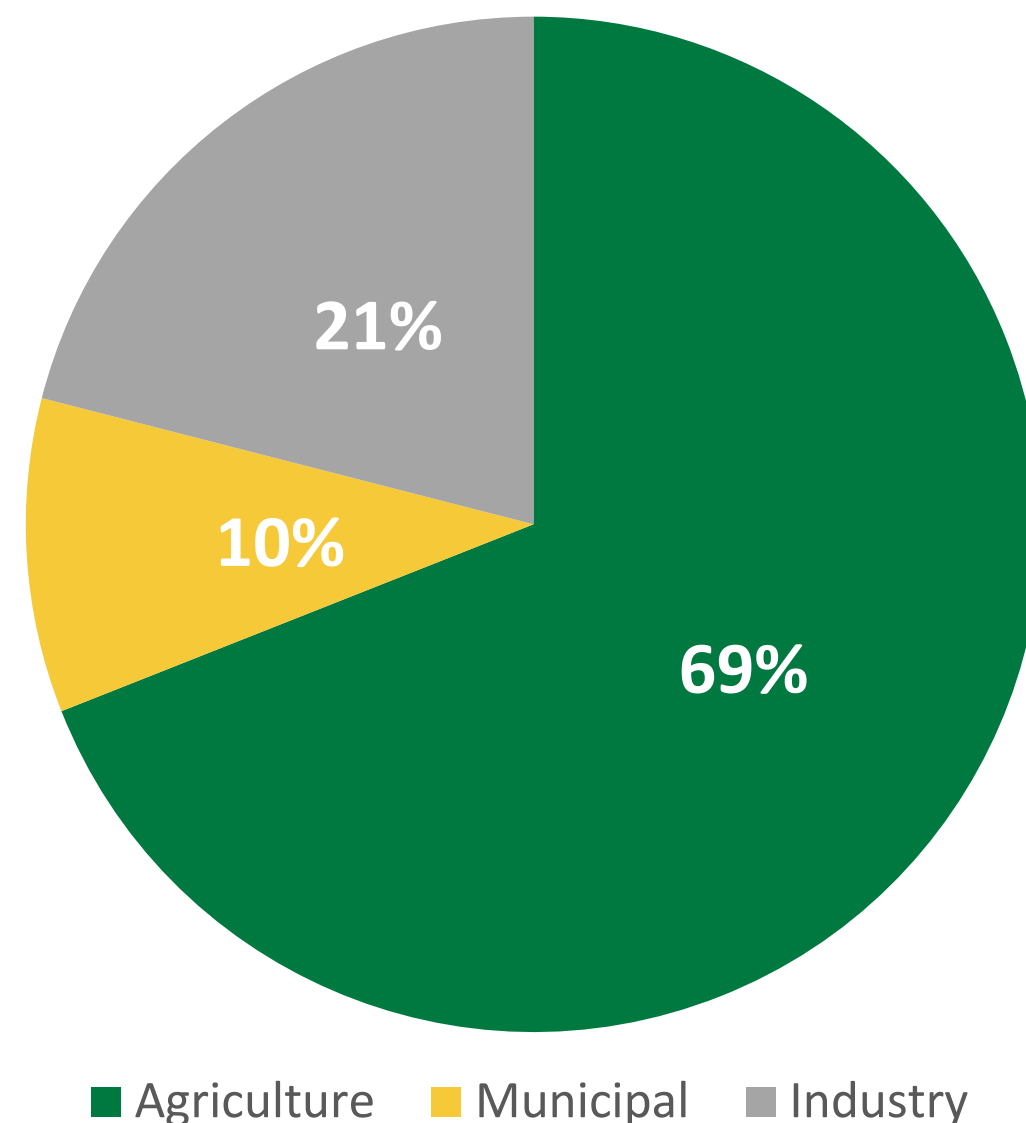


Share of water in different sectors

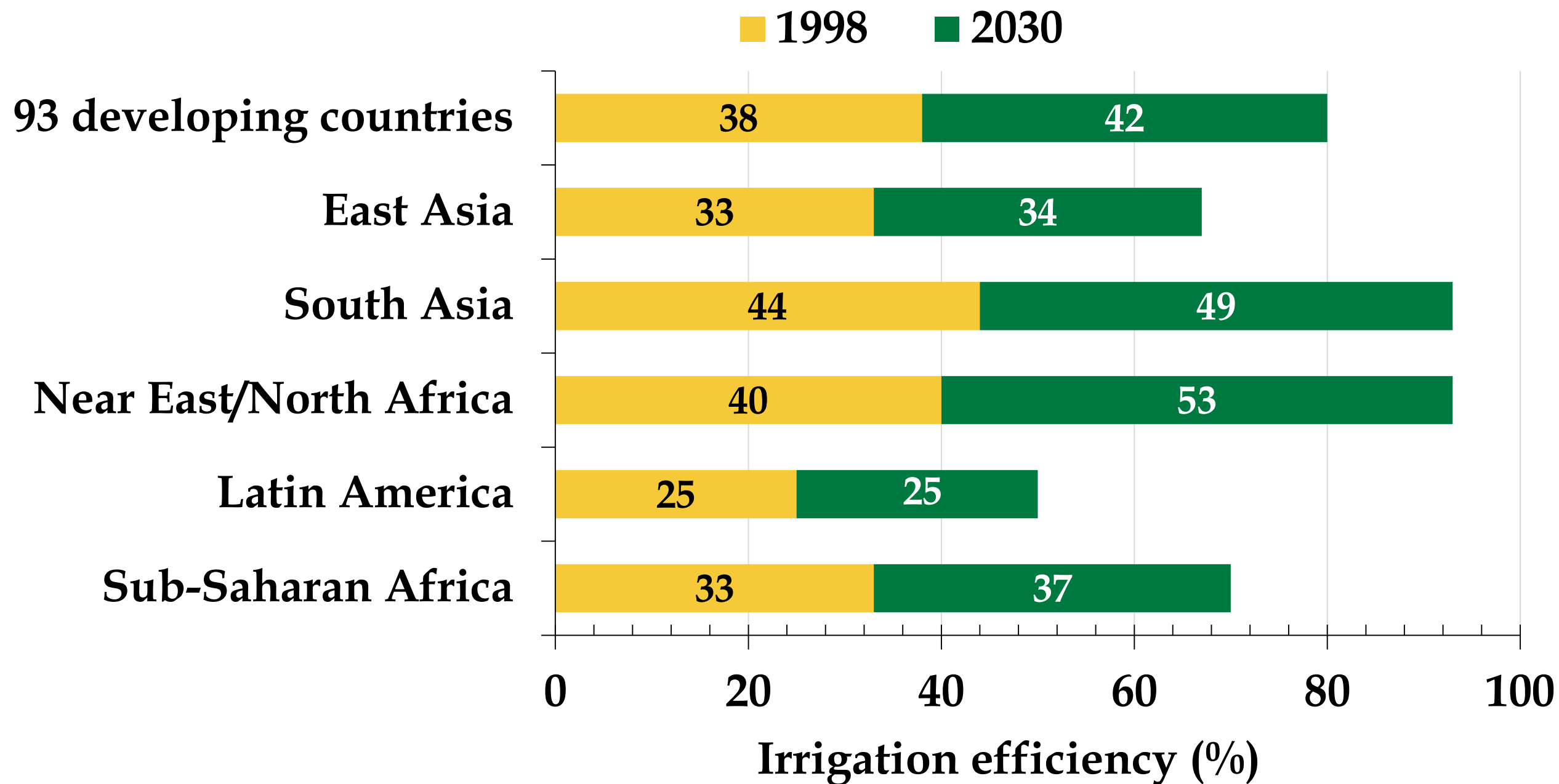


- ✓ World contains an estimated 1400 million cubic km of water. But only 0.003% of this vast amount, about 45000 cubic km, are “freshwater resources” that could be used for drinking, hygiene, agriculture and industry
- ✓ In purely physical terms, only 8% of the world’s freshwater running in the rivers and infiltrating into the aquifers are withdrawn for agriculture, cities and industries,
- ✓ It is estimated that about 50% of what could be called “reasonably accessible” water resources are already mobilized for human use.
- ✓ Irrigation represents less than 20% of cultivated land but contributes 40% to overall food production

Water withdrawal



Irrigation efficiency





3. Improved Dryland Crop Varieties

- ❖ The 30 percent of plants under cultivation are endemic to drylands.
- ❖ Threats to Dryland Ecosystems and Species Diversity
 - Overexploitation.
 - Climate change and pollution
 - Fragmentation, degradation or outright loss of habitats
- ❖ The prospects for improving crop production under dryland conditions mainly lies in the development of improved crop varieties with following characteristics:

- | | | | |
|----------|---|----------|----------------------------------|
| 1 | Efficient utilization of abiotic factors to maximize stable economic yield & total production | 4 | Deep rooted branched root system |
| 2 | High early seedling vigour | 5 | Photo- and thermo-insensitive |
| 3 | Wide crop adaptability | 6 | Diseases and pests resistant |

4. Promoting Animal and Plant Health



Drylands are home to 33 % of global human population and 50 % of livestock production. Plant and animal health is crucial for the production of food for human consumption.



Global food security is also threatened by reduced productivity in drylands due to pests and diseases.



Their prevalence impart huge economic losses, which risk global food security at all levels including house hold, national and global.



FAO estimates that about one sixth of global agriculture production is lost annually due to destructive pests and disease.



Due to significant contribution in global food security, there is a pressing need to develop appropriate, affordable, and environmental friendly management technologies for drylands.

Plant Pests and diseases



❖ Transboundary plant pests and diseases

1

Affect food crops, causing significant losses to farmers and threatening food security.

2

The most destructive transboundary plant pests and diseases.



Locusts



Armyworm



Red Palm Weevil



Fruit Flies



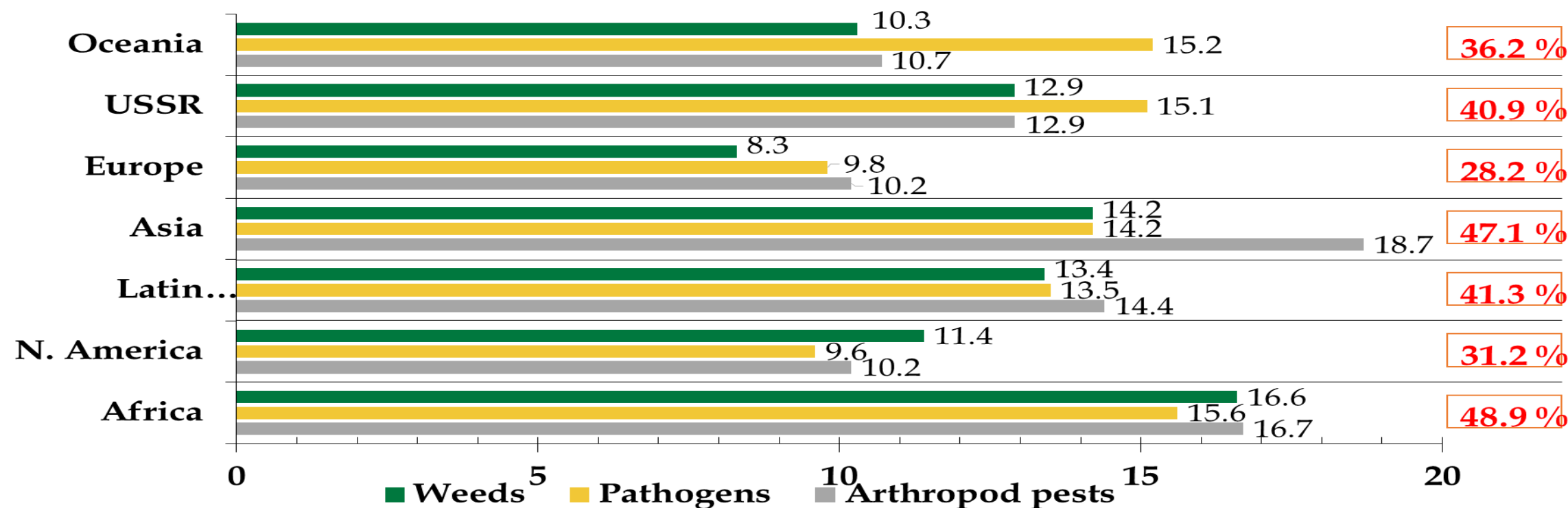
Banana Disease



Cassava Disease

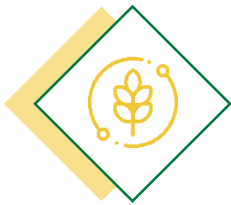


Wheat Rust

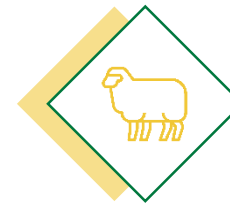




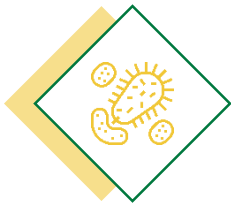
Transboundary Animal diseases



Livestock production comprises about 43% of the global value of agricultural output. The incursion of an animal disease can devastate production, livelihoods and international trade overnight.



Overall, arid zones that are largely characterized as drylands contribute to 50 percent of the livestock production



The most destructive transboundary Animal diseases are:

1

Foot-and-Mouth Disease (FMD)

2

Anthrax

3

Contagious Bovine Pleuropneumonia (CBPP)

4

Avian Flu

5

Peste des petits ruminants (PPR)

Outcomes



Outcomes

- ✓ Improve knowledge and information sharing for enhancing agricultural production in drylands
- ✓ Facilitate activities for enhancing collaboration among interested G20 members and IOs for Sustainable Agriculture Development in Drylands



Objectives

- ✓ Prospects for improving crop production through improved crop varieties in drylands.
- ✓ The novel practices and techniques for sustainable soil fertility management in drylands
- ✓ The advanced food production and protection technologies suitable for drylands
- ✓ Innovative water efficient technologies for drylands



Planned Activity (G20 members, Invitees)

- ✓ Kingdom of Saudi Arabia will organize an EXPERTS MEETING in collaboration with interested G20 members, and relevant International Organizations later in the year to discuss developing appropriate measures to enhance productivity and sustainability in drylands.



Thanks...