FOOD AVAILABILITY AND NATURAL RESOURCE USE

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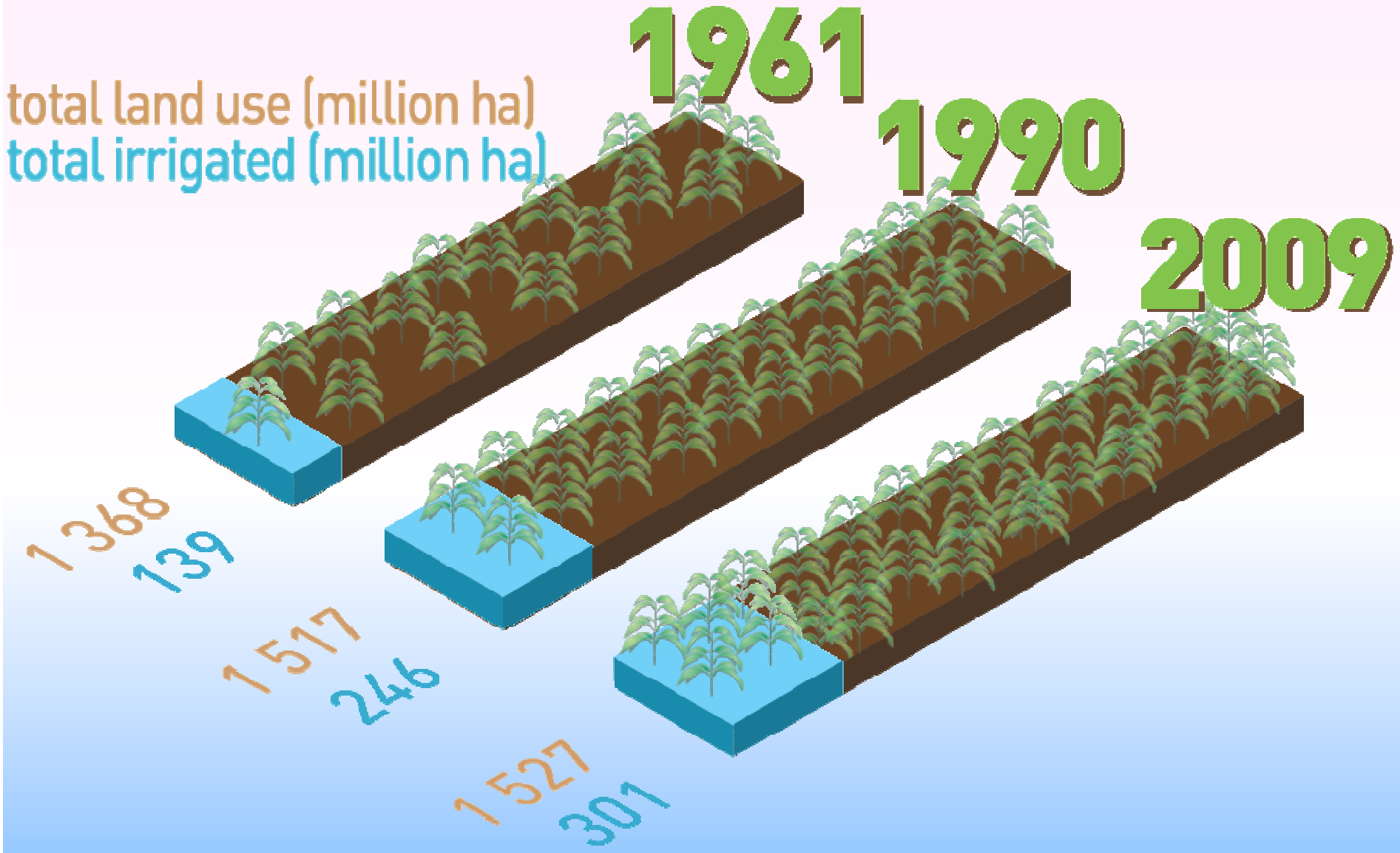
DEFINITION OF AVAILABILITY

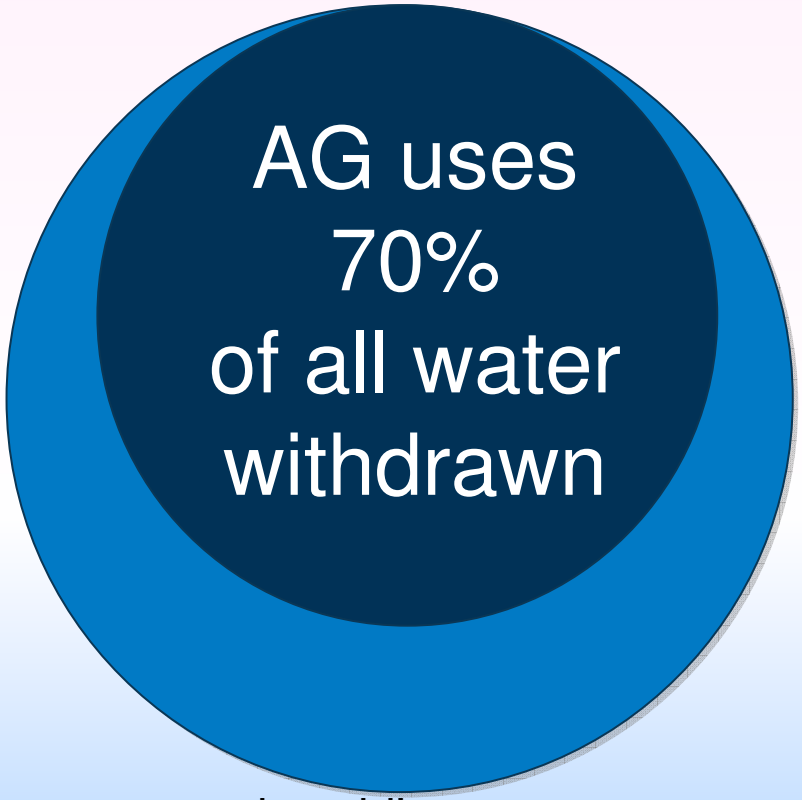
- Food availability is defined as sufficient quantities of food of appropriate quality, supplied through domestic production or imports, including food aid
- In a green economy context, food availability is closely linked to the availability and use of natural, human and economic resources, especially scarcity of natural resources

Trends in land use 1961-2009



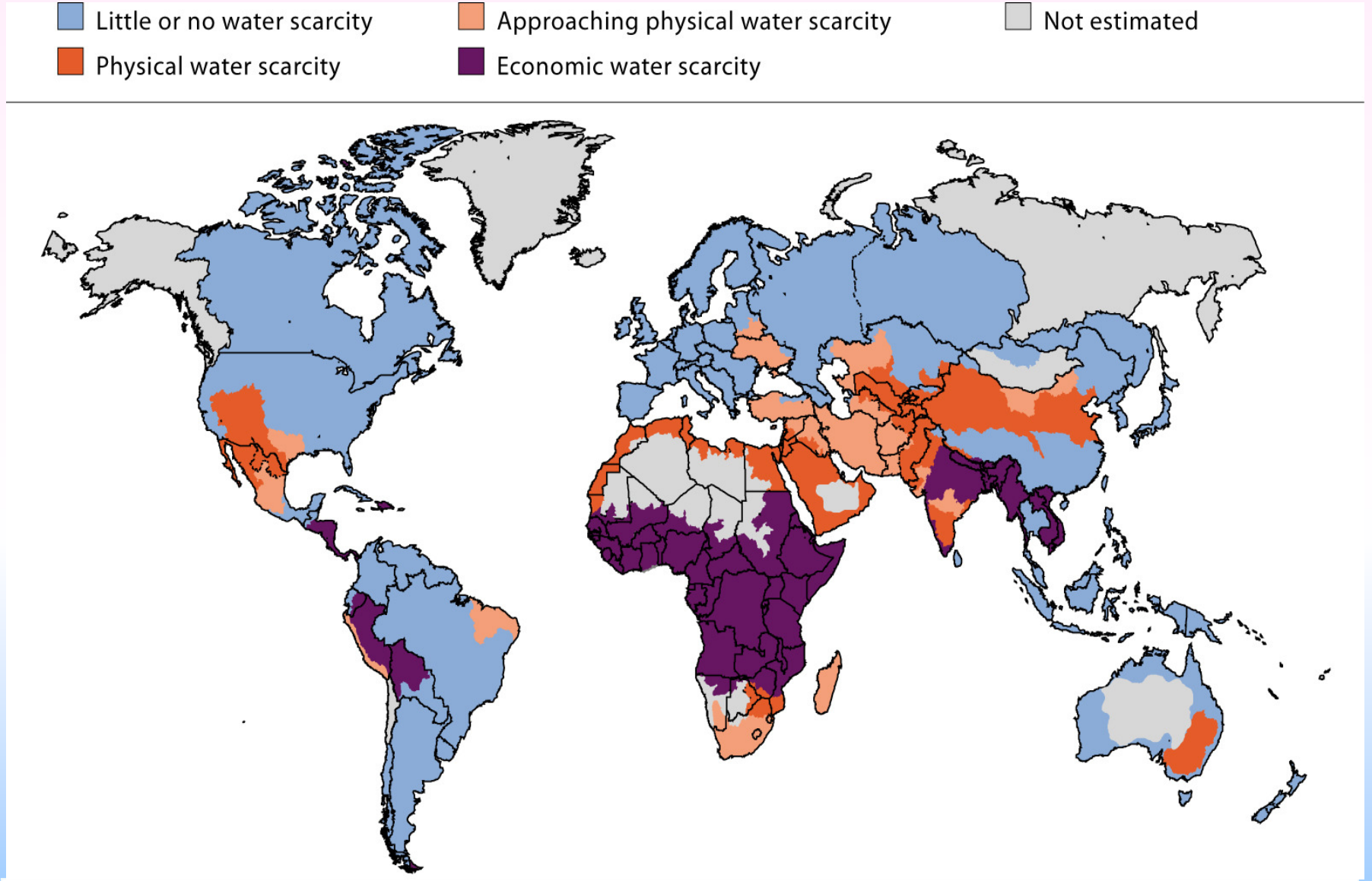
The use of resources by agriculture 2010

world's land surface



total world's water uses

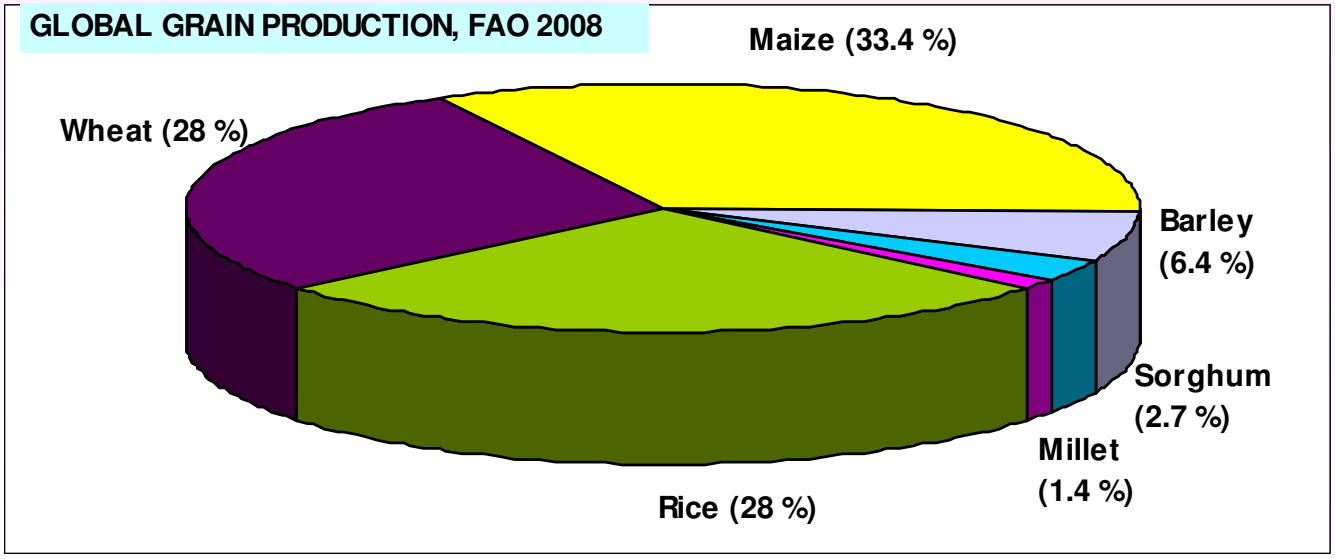
Water Scarcity



1/3 of the world's population live already under water scarcity

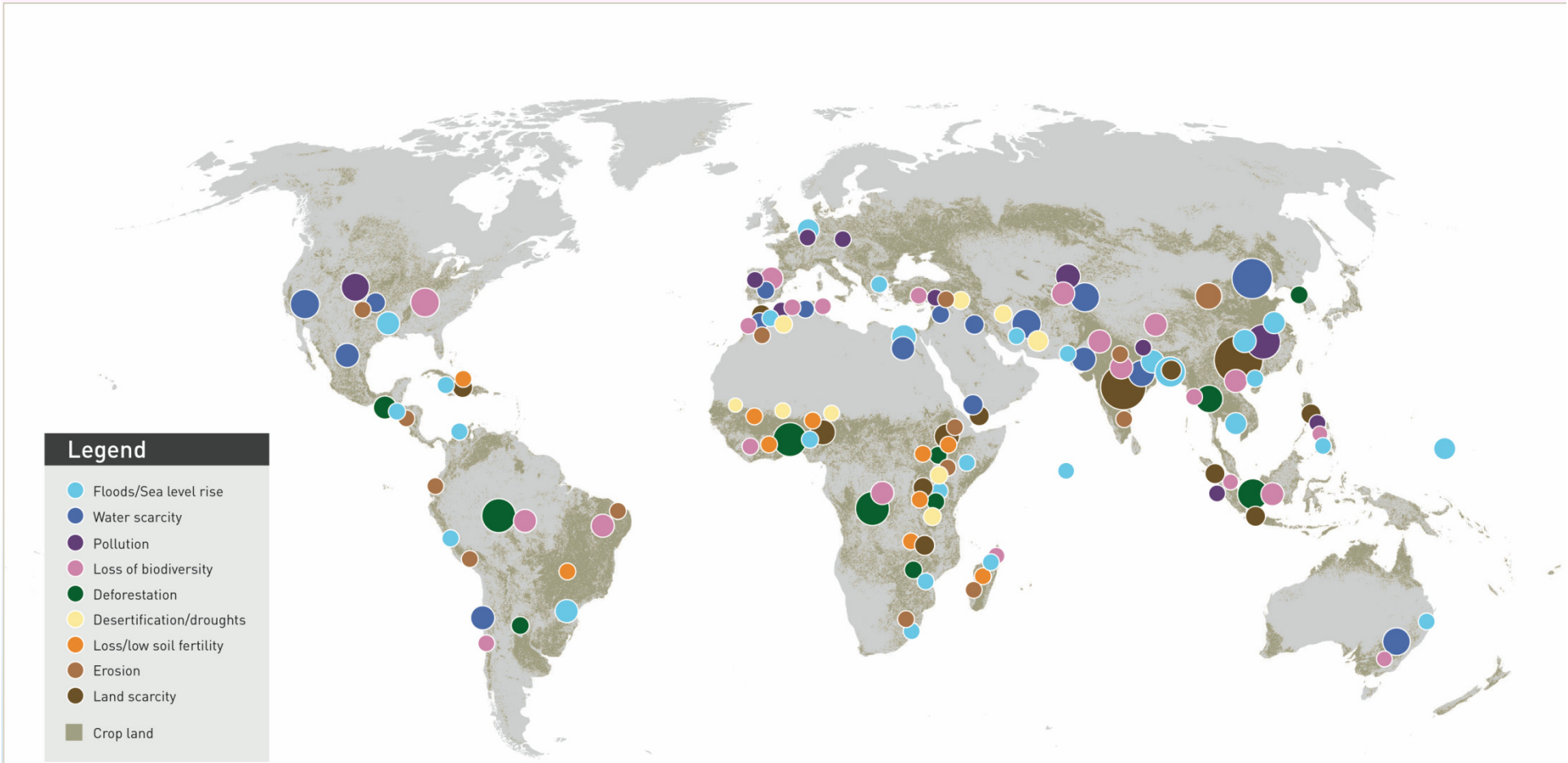
FOOD BASKET is decreasing in diversity (and equity)

Rice + Wheat
+ Maize = 90.1 %



- Hidden hunger: missing micronutrients
  - More than 2 billion worldwide
  - Mostly women and children
- Double burden: diseases of “affluence”
  - Type 2 diabetes, obesity, heart disease, cancers

Systems At Risk



NATURAL RESOURCE AVAILABILITY IN 2050

- Growing scarcities: agricultural land (40%), forests (31% of land) irrigation water (> 70%), marine fisheries (52% fully exploited, 32% overexploited, depleted or recovering), biodiversity at stake
- Degraded lands in Southeast Asia (~13 mi ha), through peat composition, are global hotspots for carbon vulnerability (30% GHG)
- N budget differences: N-deficiencies and N-surpluses (60% N_2O)
- 80% P currently used by agriculture: peak P? (from 3 countries)
- Shortages = price increases and sudden and unpredictable effects

THE FAO AT2030/50 PROJECTIONS

- The FAO AT2030/50 projection
  - Natural resources will be available for meeting global food demand: 3130 kcal per capita of 9 billion
  - A global equilibrium between food production and use
- 65% consumption increases 2000-2050: 224% in SSA, 112% Near East/Africa and 105% in South Asia
- Geopolitical, socio-economic (prices!), technical conditions will be compounded by negative pressures from climate change

ALTERNATIVE SCENARIOS

IFPRI, UNEP, CIRAD/Agrimonde scenarios agree on higher consequences of shocks in resource availability

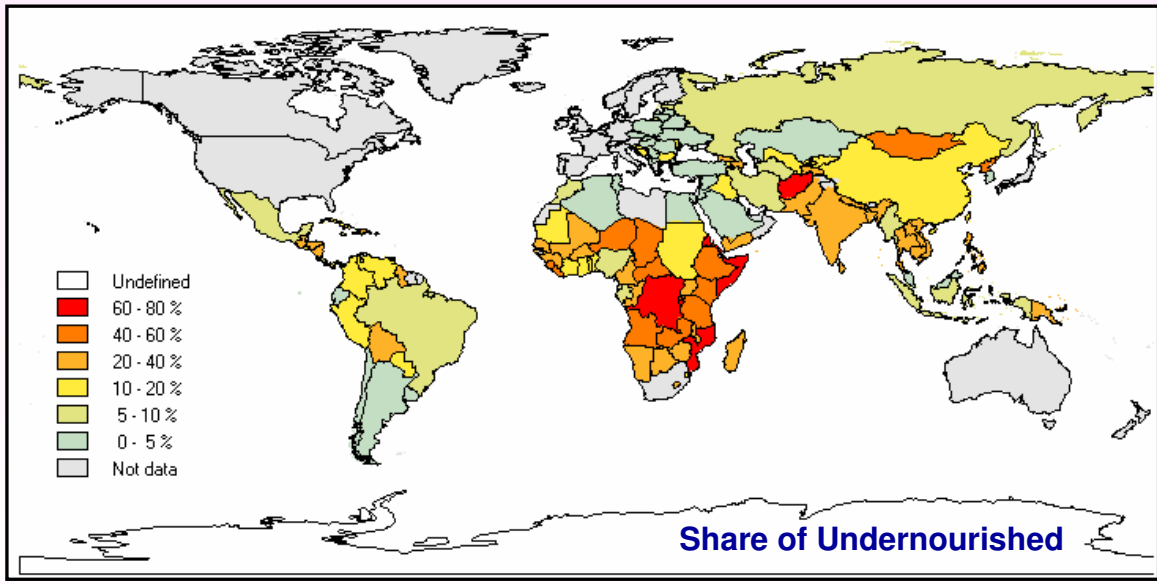
- Imbalances in supply and demand, especially regionally
- Resource boundary impact on prices: -5% of grain yield due to climate would increase grain price by 25%
- Reducing the risk of ruptures in overall food availability requires a transition to more efficient production systems

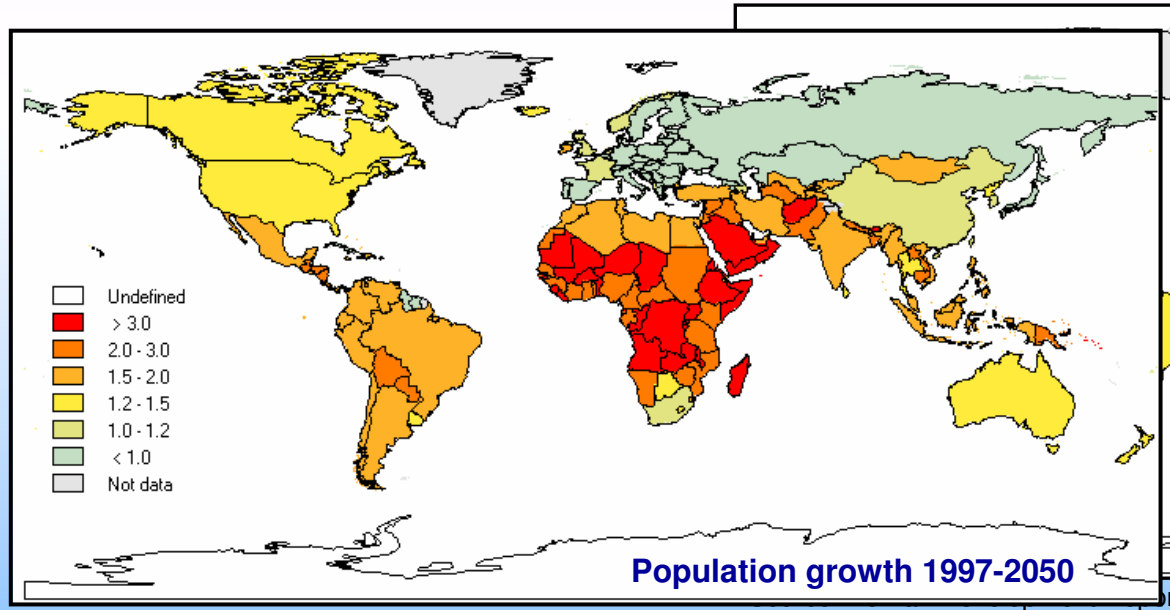
FROM MODELLING AVERAGE AVAILABILITY TO RISK PREVENTION

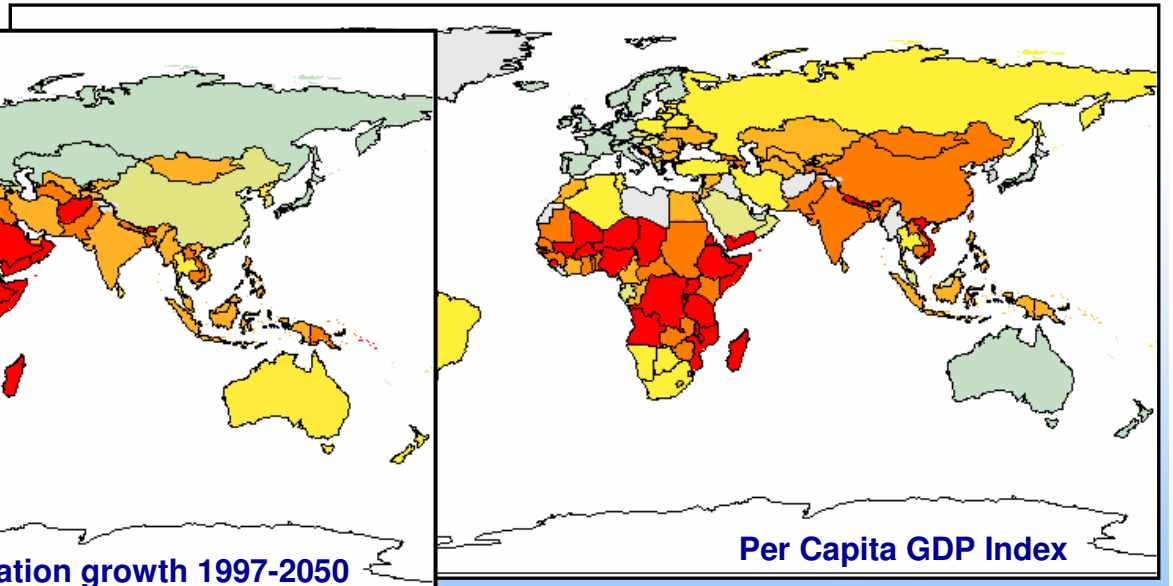
- FAO/IIASA Global Agro-Ecological Zone framework to assess impact of climate change on suitability of potential agricultural land, environmentally suitable production patterns and yields
- On top of climate uncertainties, still poorly understood natural resources dynamics, regional imbalances, access issues …

Food Security and Climate Change

Those with least resources have least capacity to adapt and are most vulnerable







rt, 2001

Source: UN Population Projections, Medium Variant, 2000 Revision

Ecological intensification

Intensification can be achieved either through the intensification of external input use or intensification of ecosystem services for enhanced system performance

Ecological intensification is defined as maximization of primary production per unit of land without compromising the ability of the system to sustain its productive capacity in the long-term

Availability
System's **capacity** to produce food

Functional properties

Efficiency
of resource use assessed under **normal** conditions in terms of

- Physical yield per unit of input (productivity)
- Commercial yield per unit of input
- Life quality of producers and consumers

Resilience
to environmental and macro-economic risk assessed under **disturbed** conditions in terms of

- Physical yield per unit of input (productivity)
- Commercial yield per unit of input
- Life quality of producers and consumers

Structural properties

Connectedness
Assessed in terms of

- Transboundary pollution and environmental connectedness
- Financial and input dependency
- Participation and social integration

Coherence
Assessed in terms of

- Ecological balance (water, soil, habitat, nutrient, energy)
- Economic integration
- Household labour

Diversity
Assessed in terms of

- Biodiversity
- Income diversification
- Knowledge

NATURAL MANAGEMENT RESOURCE OPTIONS

Low-external input | Intermediate-external input | High-external input

NATURE

MAN-MADE

- Aquaculture and capture fisheries
- Forestry systems
- Conservation agriculture, IPM, Precision farming systems
- Organic agriculture
- Multi-trophic marine systems
- Grassland and forage crops
- Biodynamic agriculture
- Mountain systems
- SRI
- GMO-based systems
- Permaculture
- Agroforestry systems
- UPA
- (Polydome systems)
- High external input livestock systems
- Traditional & perennial polycultures
- Mixed crop-livestock systems
- Mixed rice-fish systems
- High external input cropping systems

PERENNIAL / INTEGRATED ⟷ ANNUALS

More resilient & efficient
Less energy to maintain, low GHG emissions
High diversity, connectedness, coherence
Knowledge-intensive

Less resilient & efficient
More energy to maintain, high GHG emissions
Low diversity, connectedness, coherence
Hard technology-intensive

SCALING-UP CHALLENGES

- Management options will need to include gradual shifts from fossil fuel based and synthetic agricultural inputs towards informed use of ecosystem goods and services and green inputs
- Scaling-up alternative systems will require:
  - Creation of local markets for “alternative” products
  - Ecological knowledge of food systems
  - Upfront financing to sustain transition phases

TRADE ISSUES

- Trade is essential to food availability, especially where there are local or regional scarcities of natural resources and inputs
- There is an increasing concern in developing countries to reach self-sufficiency to be resilient against global price shocks
- At the G8 Summit held in Italy in July 2009, USA President Barack Obama said “there is no reason that Africa cannot be self-sufficient when it comes to food”

TRADE MEASURES (2)

- Avoid risk of trade protection related to green economy: carbon tariff, unequal R&D subsidies, environmental standards and compliance for aid, loans and debt relief
- Going beyond carbon markets for bundled ecosystem and social services (e.g. payments for more efficient animal waste management systems; more efficient fertilizer management)
- Access to, and transfer of, green technology to: support to local technology design capacity, enhance the pool of knowledge to all

ACTION AREAS

✓ The technological innovations of GEA include both environmental science (e.g., agroecology and marine multi-species dynamics) and green inputs, meaning safe, environment-benign substances designed to maximize energy efficiency and minimize waste disposal

✓ Institutional and financial policy measures should be put in place to support the production of more food with less resources, including global agreements on food production and trade; national standards, taxes, incentives and public procurement of green foods; and landscape-level PES

THANK YOU FOR YOUR ATTENTION

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