What does Sustainable Intensification of Agriculture mean?

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The goal of sustainable intensification is to increase food production from existing farmland while minimising pressure on the environment. It is a response to the challenges of increasing demand for food from a growing global population, in a world where land, water, energy and other inputs are in short supply, overexploited and used unsustainably.

University of Oxford (cont…)

Any efforts to ‘intensify’ food production must be matched by a concerted focus on making it ‘sustainable.’ Failing to do so will undermine our capacity to continue producing food in the future.

Global Initiatives

- FAO – Save and Grow
- WORLD BANK
- IFAD
- USDA
- DEFRA UK
- CGIAR – CCAFS, IFPRI
- UNIVERSITY OF OXFORD
- Others

Sustainable Agricultural Intensification

Principles:

- Simultaneous achievement of increased agricultural productivity and enhanced ecosystem services
- Enhanced input-use efficiency, where key inputs include water, nutrients, pesticides, energy, land and labour

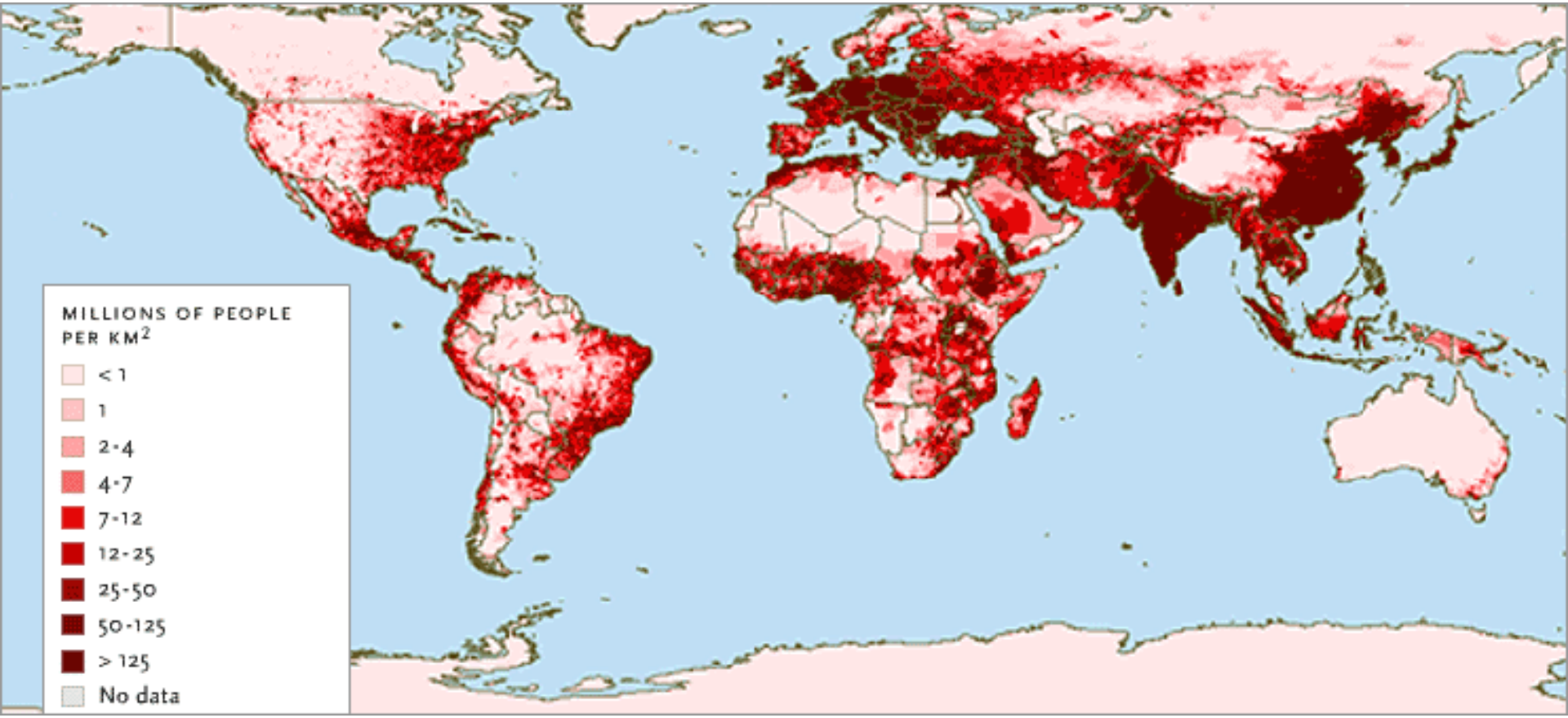
Sustainable Agricultural Intensification

Principles:

- Judicious use of energy-demanding external inputs (e.g. biological nitrogen fixation v N fertilizer; IPM v pesticides)
- Protection of soil, water and biodiversity through use of minimum disturbance systems
- Use of managed and natural biodiversity to build system resilience to abiotic, biotic and economic stresses

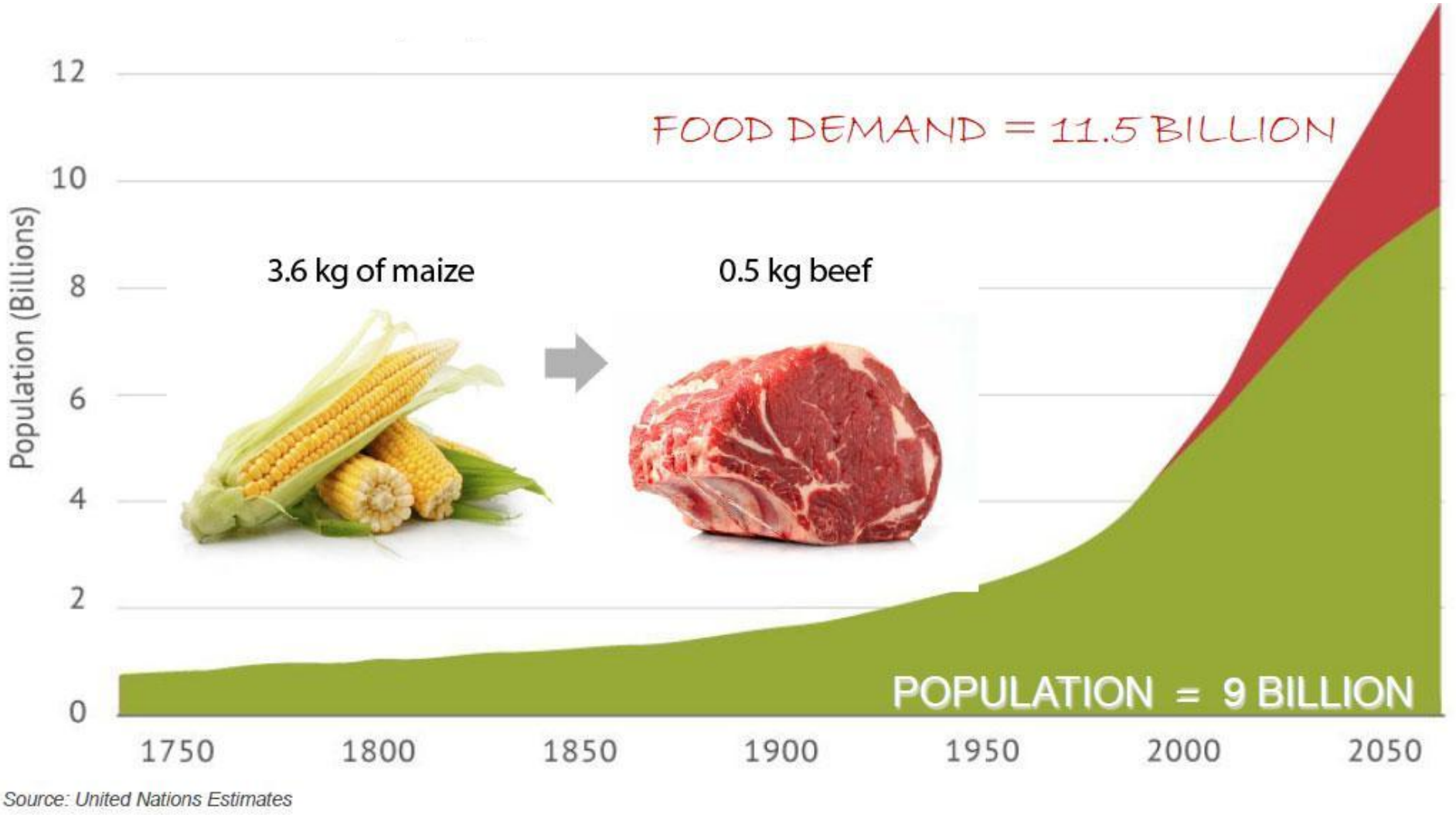
Challenge:
‘Double’ food production by 2050

Population density



http://www.pbs.org

Food demand



Source: United Nations Estimates

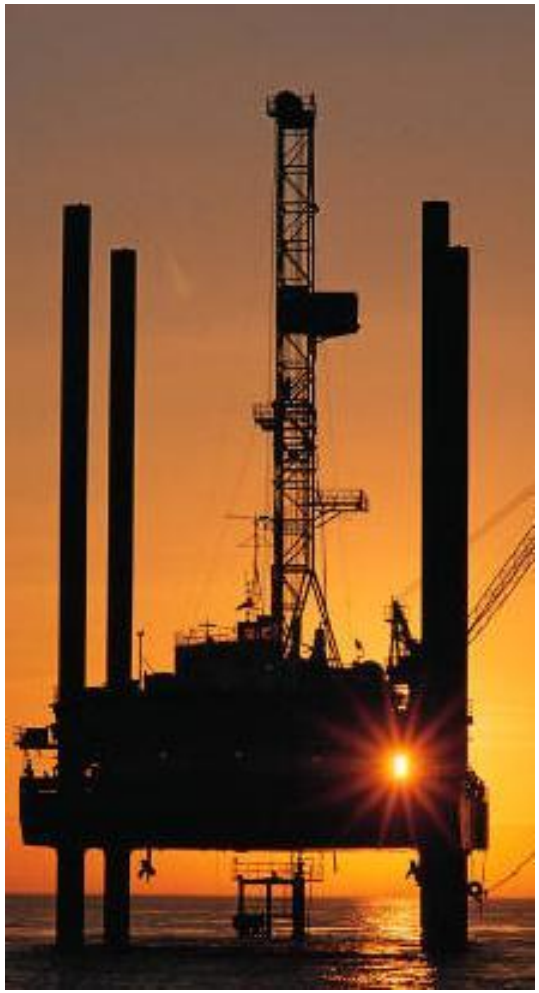
Warning signs

Hectares of grain land per person

www.worldwatch.org

Energy

- **1400 litres** oil equivalent/year to feed **one person** (developed world)
- **Nitrogen fertilizer** – utilizing ‘fossil fuel’



Food waste

- FAO – 30%+!
- Storage, handling, transport
- On-farm

Climate change

- Warmer, drier
- Greater variability
- More extreme events
- Need to reduce GHG emissions

http://earthobservatory.nasa.gov/

Energy farming

Biofuels

- Ethanol
- Biodiesels

What is needed for food security?

1. Adjust practices and technologies
2. Change farming systems
3. Enhance food systems
4. **Sustainable intensification**

Helping farmers to intensify production *sustainably*

The views expressed are those of the author and not necessarily of the institutions identified.

Technical principles

- **Agricultural productivity**
  Natural capital and ecosystems services

Simultaneously!

- **Enhanced input-use efficiency**
- **Use of biodiversity – natural and managed – to build farming system resilience**

How?

- **Minimize soil disturbance** by minimizing tillage and other interventions
- Enhance and maintain **soil organic cover**
- Cultivate a **wider range** of plant species

How?

- **Better** varieties and better animals
- **Enhanced** plant and animal nutrition based on healthy soils
- **Integrated** pest, disease and weed management
- **Efficient** water management

Practice 1

Minimum disturbance systems

Practice 2

Organic soil cover

Practice 3

Diversification

Wider range of crops and enterprises

Legumes and biological nitrogen

Livestock

Shrubs and trees

Diversification opportunities: Indo-Gangetic Plain

Bed planting to save water and promote diversification

Practice 4

Better varieties and better animals

Practice 5

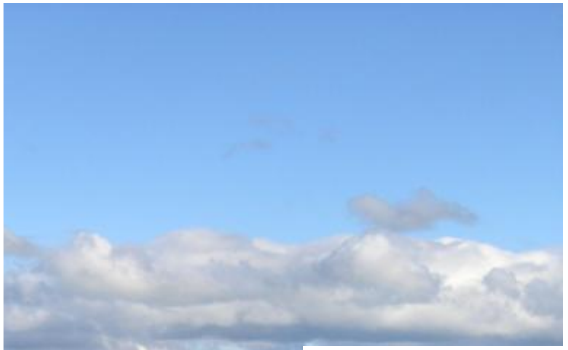
Healthy soils


Soil health is critical!

Practice 6

Integrated pest management

Inputs reduced by 50%



Insecticides
Fungicides
Herbicides

Practice 7

Efficient water management


A.S.S.


Save and Grow
Farmer practice

Scale?

Smallholder and broadacre farmers

Scale neutral!

Thank you!