

# International policies for sustainable intensification of agricultural production systems

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# Summary

## ❖ Challenges we face today

- ❖ Limited land resources
- ❖ Limited water resources
- ❖ Climate change
- ❖ Consumption patterns
- ❖ Food prices

## ❖ Agriculture needs to change beyond the green revolution

- ❖ Reducing the footprint
- ❖ Labeling and traceability
- ❖ Human health
- ❖ Ecosystem services
- ❖ Wastes
- ❖ Incentives/penalties

## ❖ What FAO does at the global level

- ❖ International Treaty on Plant Genetic resources for Food and Agriculture
- ❖ Rotterdam Convention
- ❖ International Plant Protection Convention
- ❖ International Rice Commission

## ❖ What FAO does at the technical level

- ❖ Global soil Partnership
- ❖ Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security
- ❖ Payment for environmental services
- ❖ Seed sector regulation
- ❖ Farmer field schools

## ❖ Common Agricultural Policy

## ❖ Conclusions

# Challenges we face

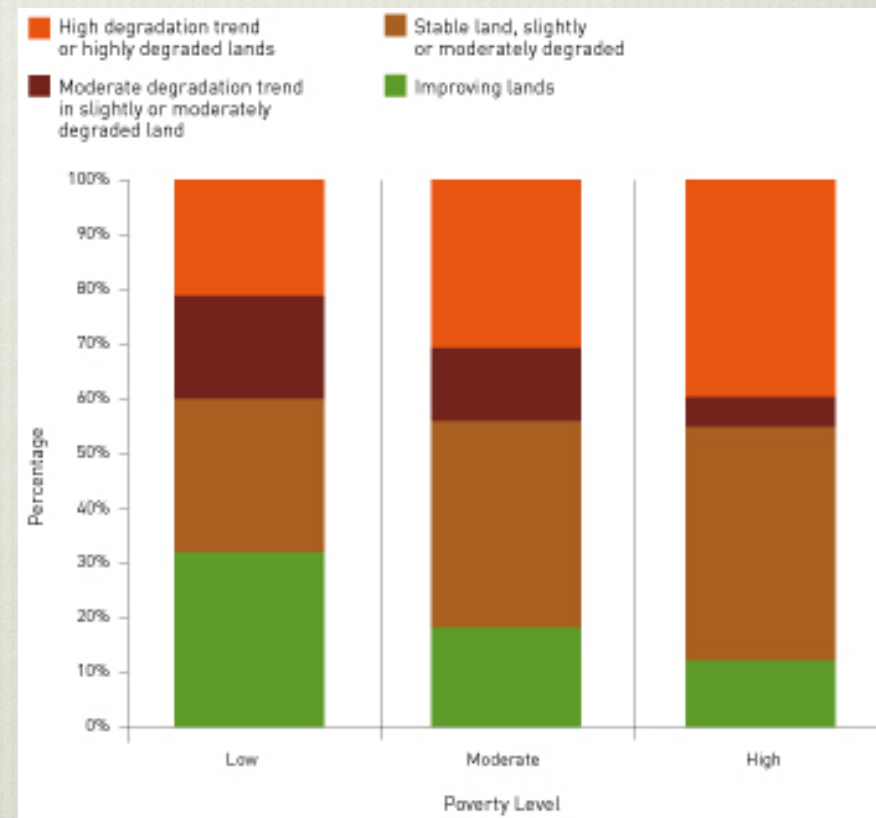
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- ❖ Agriculture has fallen from the developing- country and donor agenda
- ❖ Developing countries must almost double production by 2050 to feed majority of the **9.2 billion people**
- ❖ Yield growth rate for cereals declining: **3.2% in 1960 to 1% in 2050**
- ❖ Increased demand for better variety, quality and safety of agricultural products
- ❖ Low and improper fertilizer use- **21kg/ha/year** in Africa and **9kg/ha/year** in Sub-Saharan Africa
- ❖ Smallholder system: **85% of developing-country farmers farm on <2ha**
- ❖ Unfair internal and external competition for smallholders

# Challenges we face

## Limited land resources

- ❖ Land area (per capita) **declining: from 4.3 ha in 1961 to 1.5 ha in 2050**
- ❖ Worldwide **16%** of the poor live on land considered degraded
- ❖ Degradation is increasing in many parts of the world, with over 20% of all cultivated areas, 30% forest and 10% of grasslands already in the process of degradation
- ❖ Land use changes such as deforestation account for an additional 17%
- ❖ Use of land and other resources for biofuel production



Source: FAO, 2011 SOLAW, LADA project

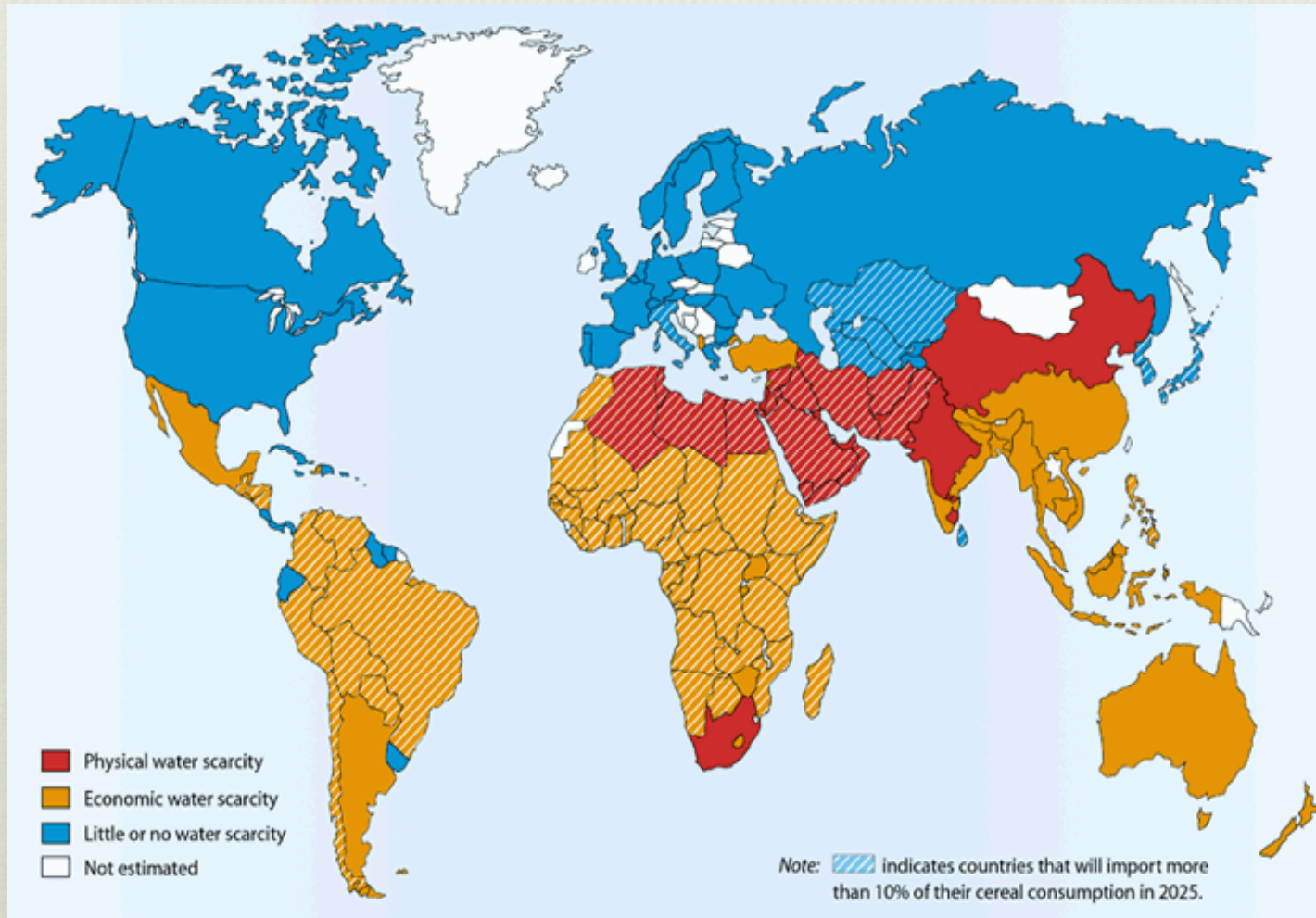
# Challenges we face

## Limited water resources

- ❖ 1.6 billion people face economic water shortages
- ❖ Competition for water – 70% of fresh water already used for irrigation



# Physical and economic water scarcity



# Challenges we face

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## Climate Change

- Climate change is likely to add greater and unpredictable stresses

Higher climate variability

Extended drought periods

Extreme precipitation

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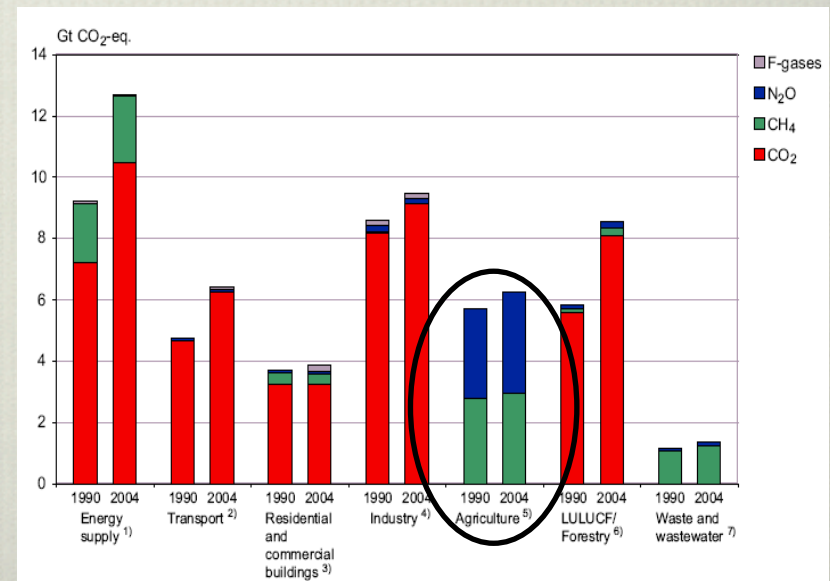
**Less reliable  
rainfall**



# Challenges we face

## Climate Change (cont.)

- ❖ We need to reduce the carbon footprint
- ❖ Each year, agriculture emits **10 to 12%** of the total estimated GHG emissions, some **5.1 to 6.1 Gt CO<sub>2</sub> equivalents** per year
- ❖ High levels of reactive nitrogen (NH<sub>4</sub>, NO<sub>3</sub>) in soils may contribute to the emission of nitrous oxides and are main drivers of agricultural emissions
- ❖ As of September 2011, **191** states signed and ratified the Kyoto

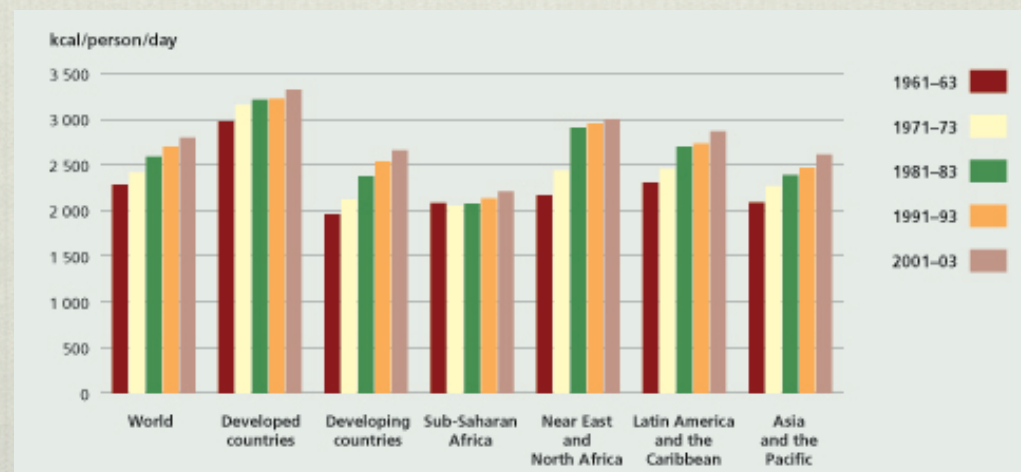




# Challenges we face

## Consumption patterns

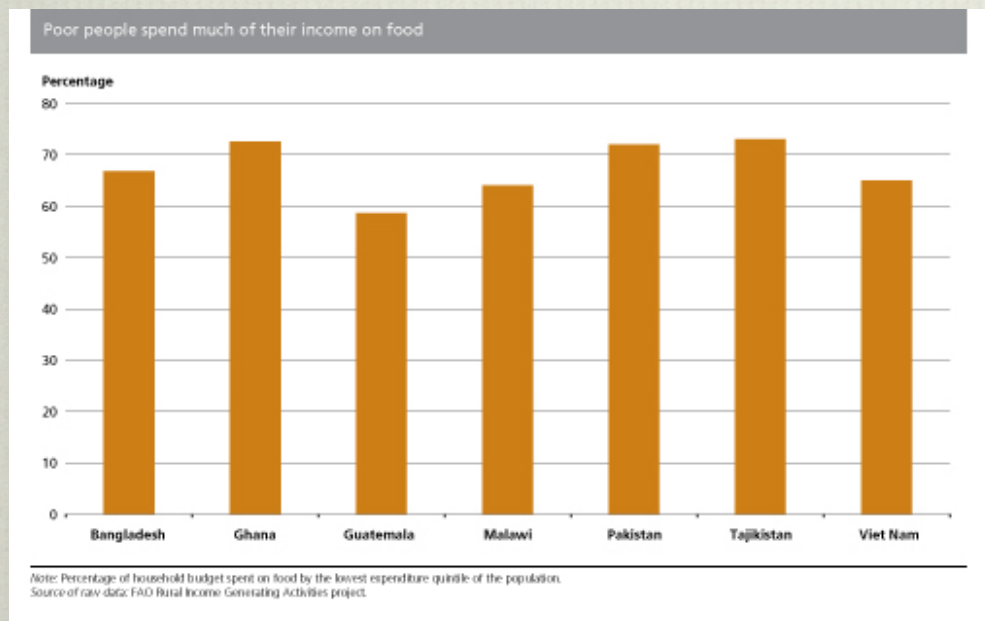
- ❖ Up to 3 billion people will join the middle class, boosting demand for meat, and a diversified diet
- ❖ 70% will be urban
- ❖ Daily per capita food consumption will be **10% higher in 2050** and the population will be 33% higher
- ❖ Due to changing diets, the food that has to be produced will have to increase more ( $\pm 70\%$ ) than when diets would stay similar (45%)
- ❖ Population is taken for 2010 (6.85 billion) and consumption is averaged between 1999/01 and 2015 (2850 kcal/person/day)



# Challenges we face

## Food prices

- ❖ Price volatility makes both smallholder farmers and poor consumer increasingly vulnerable to poverty
- ❖ Small farmers' incomes and livelihoods in developing countries affected by influx of imports



- ❖ According to the World Bank, in 2010-2011 rising food costs pushed nearly 70 million people into extreme poverty
- ❖ A 33% rise in food prices lowers standard of living by 3% in developed countries and by 20% in developing countries (Gary Becker, Nobel Laureate, University of Chicago)

# The Green revolution

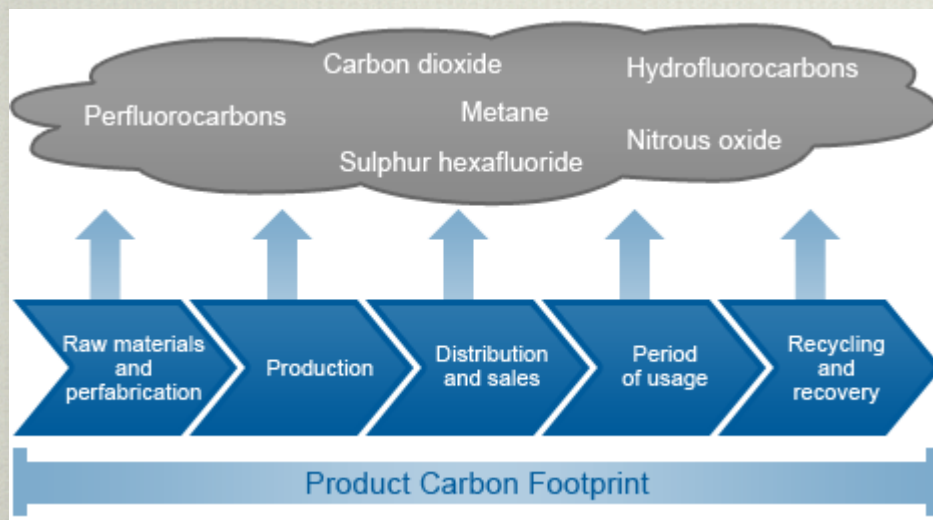
- ❖ Series of initiatives aimed at increasing agricultural production and feeding the world's population affected by hunger
- ❖ Was essentially a success, accounting for a 300% increase of rice yields in the subsequent 40 years
- ❖ The rise led to a deduction in food prices by 40% and helped to reduce the proportion of hunger from 34% in 1970 to 16% in 2006
- ❖ In 2009, the number of people facing chronic hunger rose to a staggering 18% in the Asia-Pacific region, an increase of 2% since 2006



Agriculture needs to change beyond  
the green revolution

# Reducing the footprint

- ❖ The carbon footprint is the quantity of GHG, expressed in CO<sub>2</sub>eq, emitted across the supply chain for a single unit of that product
- ❖ Each steps of the value chain are taken into account
  - ❖ production of raw materials
  - ❖ transportation
  - ❖ transformation to the final use
  - ❖ disposal of the waste generated



Source: FAO, 2011

- ❖ Need to reduce the emissions at the different stages of the value chain
  - ❖ life cycle analysis

# Labeling and Traceability

- ❖ Labeling is a tools that exist to influence market outcomes, including taxes, subsidies, and production and marketing regulations
- ❖ Use of information to influence consumer and producer behavior
- ❖ Labels convey information about health attributes, safe-handling tips, production processes, and environmental concerns
- ❖ Traceability systems are a tool to help firms manage the flow of inputs and products to improve efficiency, product differentiation, food safety, and product quality
- ❖ Helps to identify and address risks and protect public health
- ❖ A way of responding to potential risks that can arise in food and feed traceability allows targeted withdrawals and
- ❖ The provision of accurate information to the public, thereby minimizing disruption to trade
- ❖ Since the internal market means that food and feed products circulate freely between EU countries, traceability can only be effective if common requirements are met across all Member States



Label on oranges, Belgium



# Human health

- ❖ Grassland ecosystems covers 52.2 million km<sup>2</sup> which is equal to more than 40% of the global land area
- ❖ Approximately **800 million** people depend on grassland ecosystems for their livelihoods
- ❖ A major claim is that grass-fed meat is a rich source of certain important fatty acids, in particular:
  - ❖ omega-3 fatty acids
  - ❖ omega-6 fatty acids



# Human health

## Rice Cultivar Differences in Nutrient Content

Nutrient	Range	Average	Variety with highest nutrient content	Variety with lowest nutrient content
<b>Protein</b> (n=1339)	5.55 – 14.58 g/100g	8.55	Indica CR1707 (Costa Rica)	Indica Rd 19 (Thailand)
<b>Iron</b> (n=95)	0.70 – 6.35 mg/100g	2.28	Long grained <sup>a</sup> red (China)	Undermilled Red <sup>a</sup> (Philippines)
<b>Zinc</b> (n=57)	0.79 – 5.89 mg/100g	3.34	Ganjay Roozy (IRRI)	Long grain <sup>a</sup> Fragrant (China)
<b>Calcium</b> (n=57)	1.0 – 65.0 mg/100g	26	ADT-21, red (India)	Brown Japonica <sup>a</sup> (Korea)
<b>Thiamin</b> (n=79)	0.117 – 1.74 mg/100g	0.475	Juchitan A-74 (Mexico)	Glutinous rice <sup>a</sup> special grade (China)
<b>Riboflavin</b> (n=80)	0.011 - .448 mg/100g	0.091	Tapol Dark Purple (Philippines)	Mun-pu red (Thailand)
<b>Niacin</b> (n=30)	1.97 – 9.22 mg/100g	5.32	Long grained <sup>a</sup> purple (China)	Glutinous round <sup>a</sup> grained (China)
<b>Amylose</b> (n=1182)	1.0-76.0 g /100g	22.36	Ingra 410 (Brazil)	Bpi-Ri-3 (Philippines)

<sup>a</sup> These data come from Food Composition Tables, and do not strictly represent rice varieties

*Source: Kennedy, G.; Burlingame, B. (2003). Analysis of food composition data on rice from a plant genetic resources perspective. Food Chemistry 80:589-596.*



# Ecosystem services

- ❖ The IUCN Red List, in 2011, gives a total of over **19.5 thousand threatened species**, including pollinators
- ❖ Pollinators contribute to global agriculture at more than **USD 200 billion a year**
- ❖ **75%** of all crop have some dependence on pollinators
- ❖ Are essential to the world's ecosystem
- ❖ The world's pollinators are disappearing due to;
  - ❖ loss of habitat
  - ❖ intensive agriculture
  - ❖ indiscriminate use of pesticides
  - ❖ climate change



# Wastes



- ❖ Roughly **one-third** of food produced for human consumption is lost.
- ❖ It is estimated that per capita food waste by consumers
  - ❖ **Europe and North America** is 95–115 kg/year
  - ❖ **Sub-Saharan Africa and South/Southeast Asia** is only 6–11 kg/year

# Incentives/penalties

- ❖ The incentives for farmers to adopt sustainable practices include:
  - ❖ Economic incentives such as increasing and/or stabilising revenue
  - ❖ Reducing average costs
  - ❖ Improved market access
  - ❖ Increased capital valuation of farm assets
  - ❖ Reduced vulnerability to poor agricultural practices of other farmers

# What FAO does at the global level

## International Treaty on Plant Genetic Resources for Food and Agriculture

- ❖ The Treaty aims at:
  - ❖ Recognizing the enormous contribution of farmers to the diversity of crops that feed the world
  - ❖ Establishing a global system to provide farmers, plant breeders and scientists with access to plant genetic materials
  - ❖ Ensuring that recipients share benefits they derive from the use of these genetic materials with the countries where they have been originated
- ❖ Sister convention of the Convention of Biological Diversity



# What FAO does at the global level

## Rotterdam Convention



- ❖ A multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals
- ❖ The objectives of the Convention are:
  - ❖ to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm
  - ❖ to contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties

# What FAO does at the global level

## International Plant Protection Convention

- ❖ An international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests
- ❖ Helps to:
  - ❖ Protect farmers from economically devastating pest outbreaks
  - ❖ Protect the environment from loss of species diversity
  - ❖ Protect ecosystems from loss of viability and function as a result of pest invasions
  - ❖ Protect industries and consumers from the costs of pest control or eradication
  - ❖ Facilitate trade through Standards that regulate the safe movements of plants and plant products



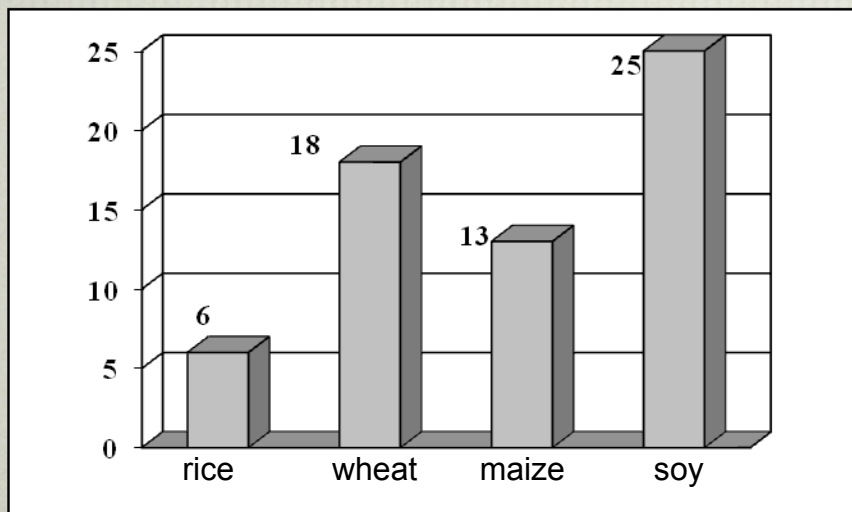
**International Plant Protection Convention**  
Protecting the world's plant resources from pests

# What FAO does at the global level

## International Rice Commission



- ❖ Has a purpose *‘to promote national and international action in matters relating to the production, conservation, distribution and consumption of rice’*
- ❖ Rice and climate change relationship



- ❖ Rice maize and wheat cover 88% of the total cereal production



# What FAO does at the technical level

## Global Soil Partnership

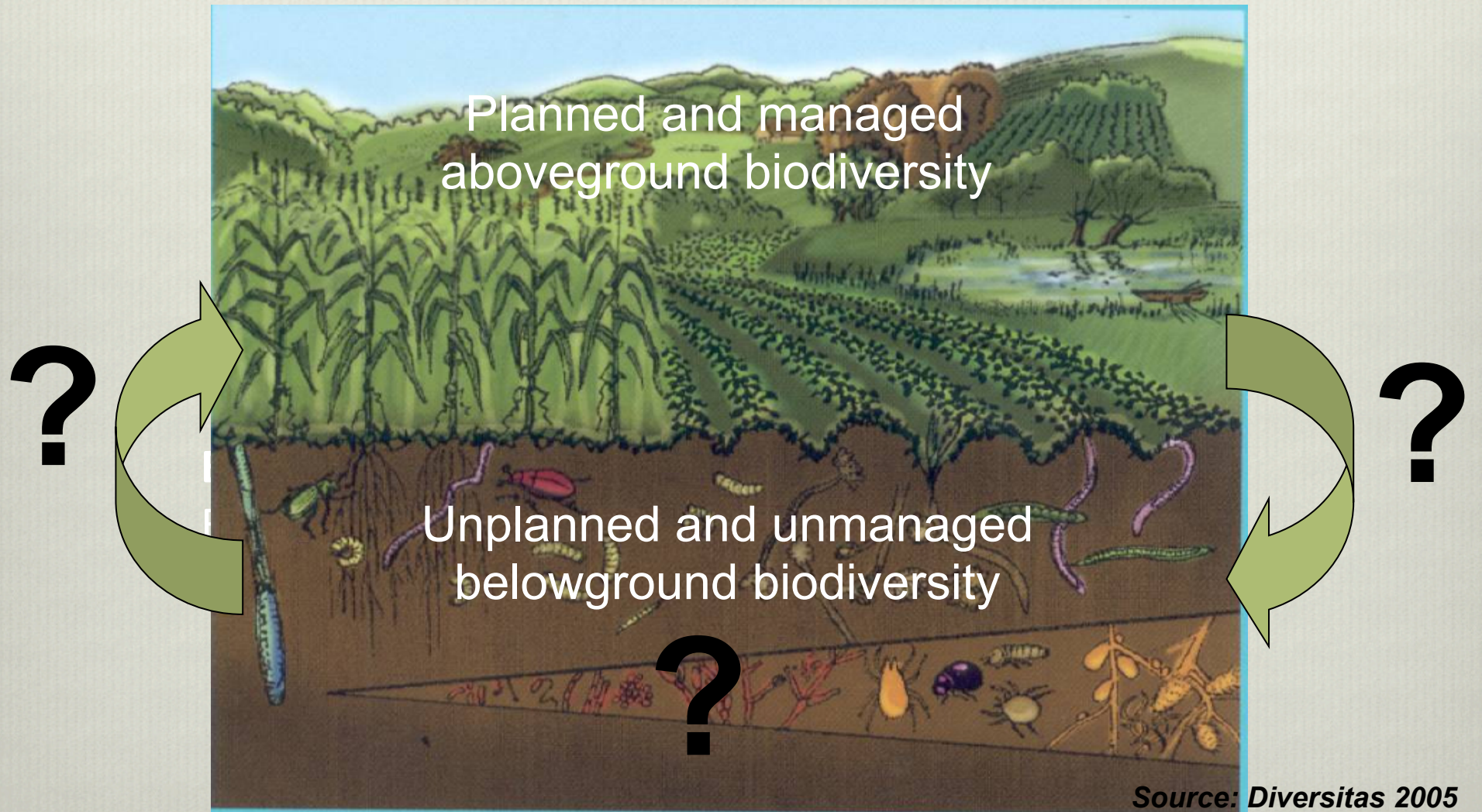
- ❖ Aims to support and facilitate joint efforts towards sustainable management of soil resources for food security and climate change adaptation and mitigation
- ❖ Through enhanced and applied knowledge of soil resources as well as improved global governance and standardization, the Partnership will:
  - ❖ Create and promote awareness among decision makers and stakeholders on the key role of soil resources for sustainable land management and sustainable development
  - ❖ Address critical soil issues in relation to food security and climate change adaptation and mitigation
  - ❖ Guide soil knowledge and research through a common global communication platform incorporating real local challenges
  - ❖ Establish an active and effective network for addressing soil crosscutting issues
  - ❖ Develop global governance guidelines aiming to improved soil protection and sustainable soil productivity





# What FAO does at the technical level

Better understanding of belowground activity



# What FAO does at the technical level

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## Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security

- ❖ The aim of the guidelines is to promote food security and sustainable development by improving secure access to land, fisheries and forests and protecting the rights of millions of often very poor people
- ❖ The Guidelines will seek to:
  - ❖ improve tenure governance by providing guidance and information on internationally accepted practices for systems that deal with the rights to use, manage and control land, fisheries and forests
  - ❖ contribute to the improvement and development of the policy, legal and organizational frameworks regulating the range of tenure rights that exist over these resources
  - ❖ enhance the transparency and improve the functioning of tenure systems
  - ❖ strengthen the capacities and operations of implementing agencies

# What FAO does at the technical level

## Payment for environmental services

- ❖ Policies that reward those farmers who farm sustainable
- ❖ A bridge between the complex dimensions of sustainability by being economic viable, socially just and within the environmental carrying capacity (FAO, 2011)
- ❖ An important means of stimulating supply
- ❖ Increasingly used for income generation in rural areas
- ❖ Will need to cover large numbers of producer and areas, which would achieve economics of scale in transaction costs and risk management



# What FAO does at the technical level

## Seed sector regulation

- ❖ Effective regulation of the seed sector in order to ensure farmers' access to quality seeds of varieties that meet their production, consumption and marketing conditions
  - ❖ affordability
  - ❖ availability of a range of appropriate varietal material
  - ❖ having information about the adaptation of the variety
- ❖ A participatory seed system



# What FAO does at the technical level

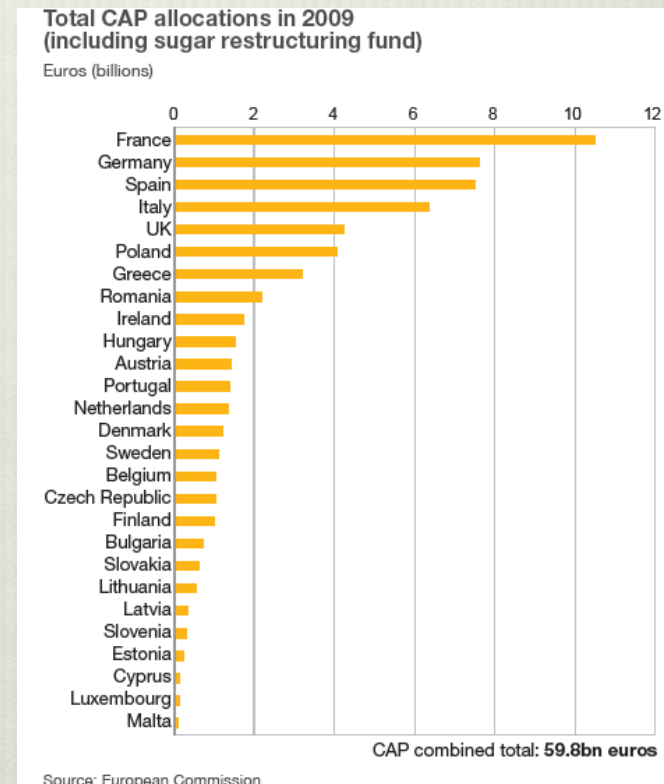
## Farmer Field Schools



- ❖ Support farmers to apply their knowledge
- ❖ Help building communication within communities
- ❖ Mainstream social and political support at ministerial level
- ❖ Contribute to scale-up information from farmers to the scientific and political
- ❖ Community through collaborative partnership with CGIAR, NGO's, Private Sector

# Common Agricultural Policy of the EU

- ❖ Direct subsidy payments
- ❖ Able to provide farmers with a reasonable standard of living, consumers with quality food at fair prices and to preserve rural heritage
- ❖ Today's CAP is demand driven
- ❖ Severing the link between subsidies and production (usually termed 'decoupling') will enable EU farmers to be more market-orientated
- ❖ In 2003, SFP-single farm payment- direct subsidy to land owners



# Conclusions

Food always retains the smell of the earth  
in which has matured





Thank you