



**Contribution of low-input livestock farming to biodiversity**

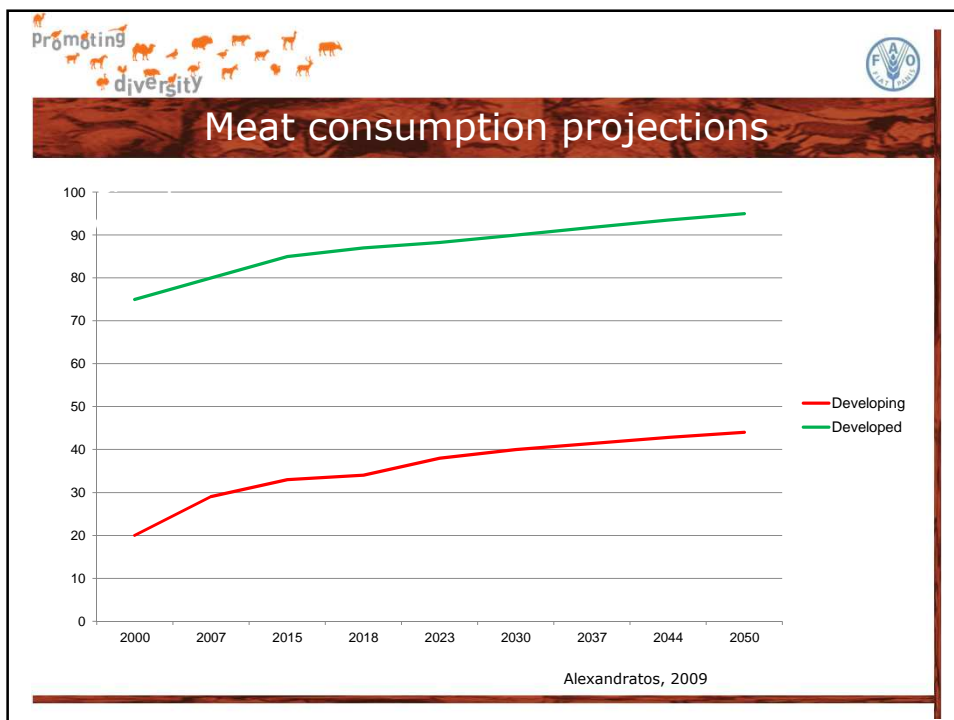
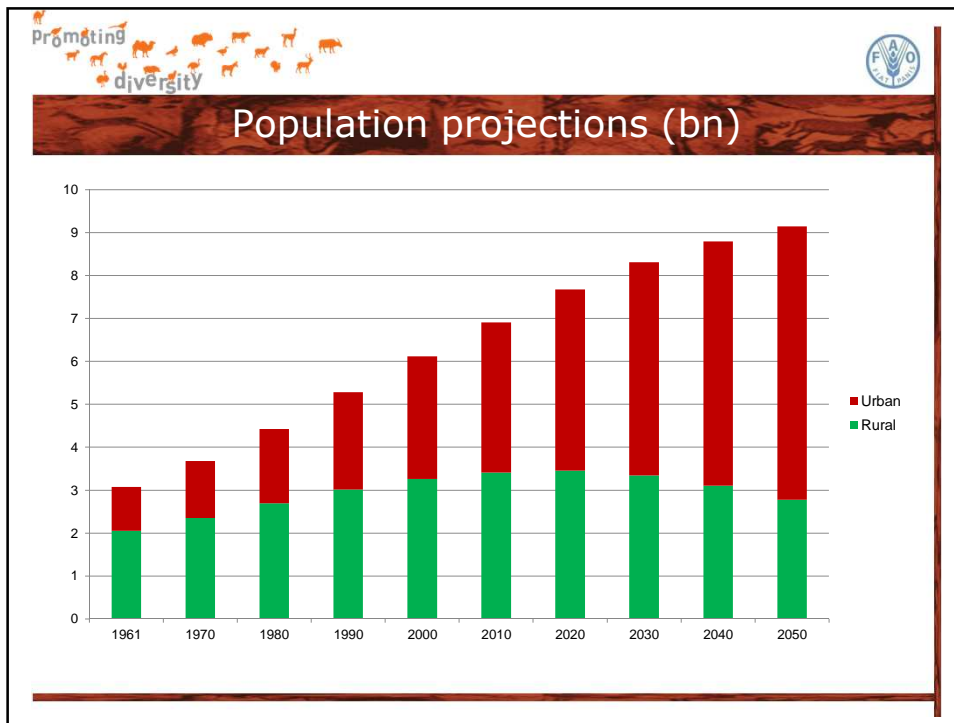
Irene Hoffmann  
FAO

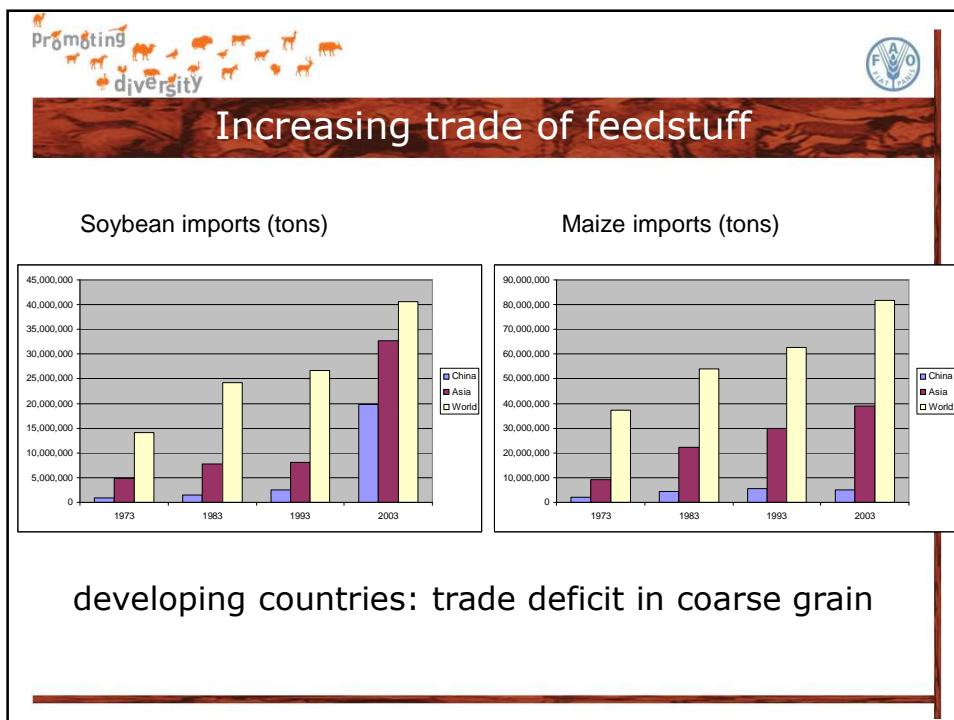
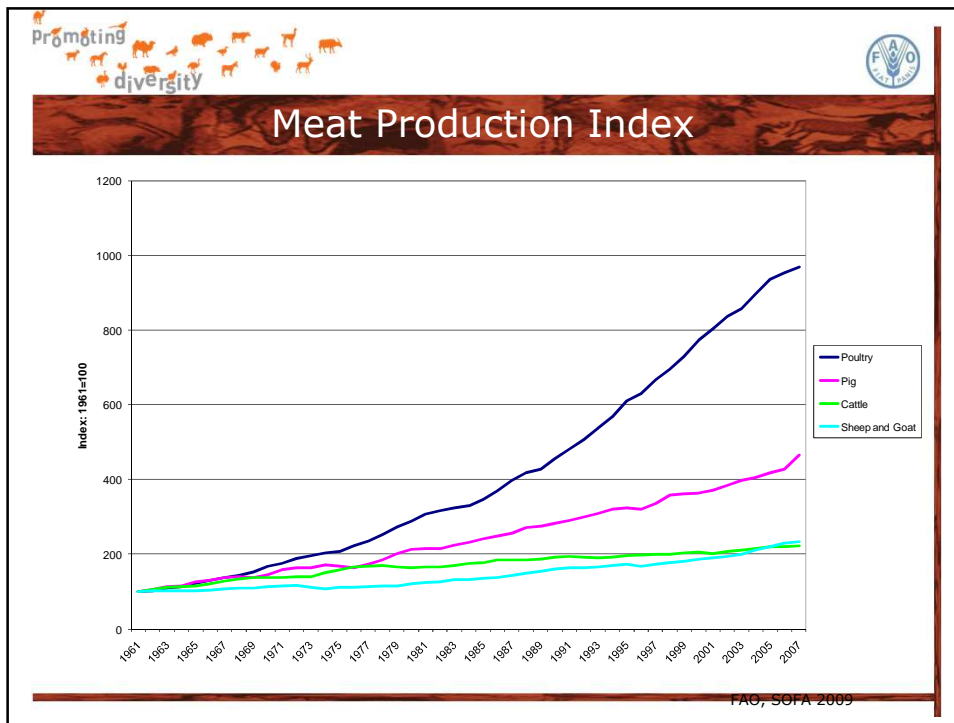
First Low Input Breeds Workshop, Wageningen, 15-16 March 2011

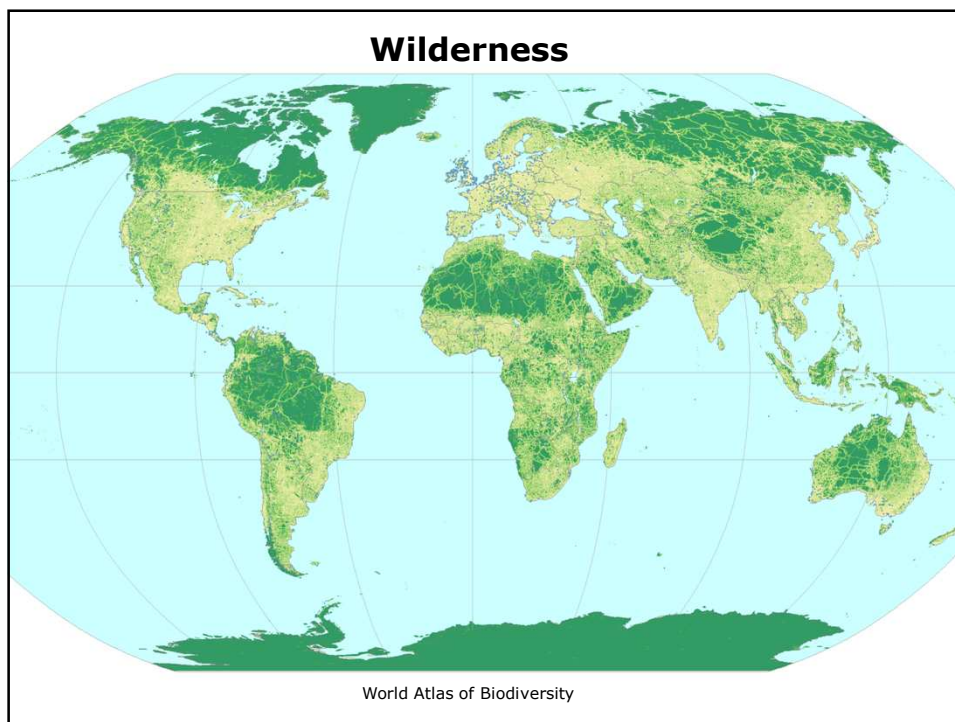
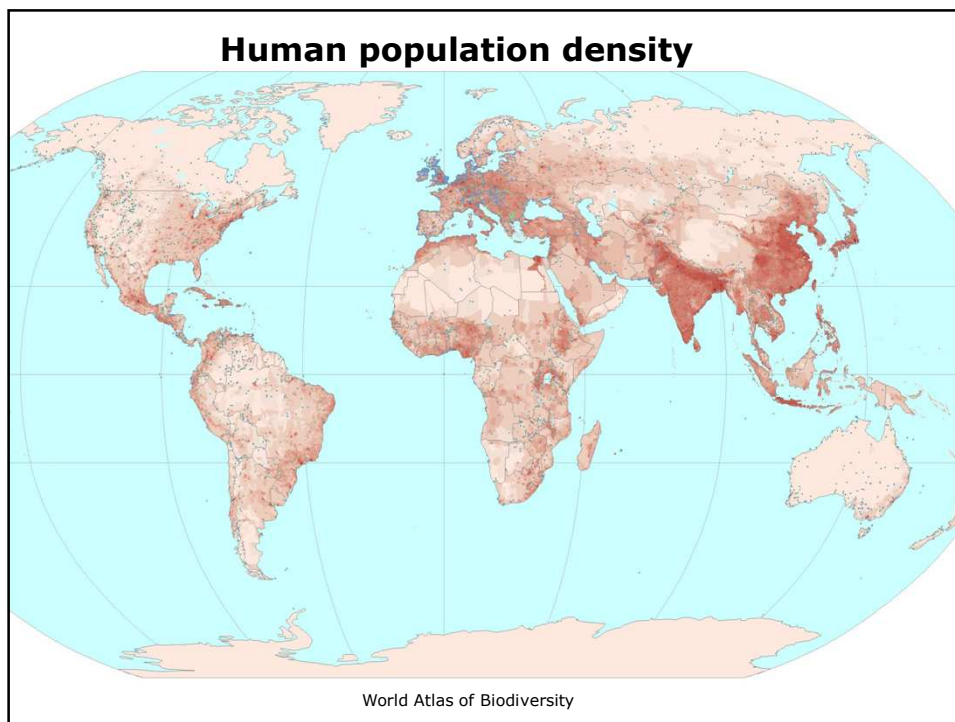


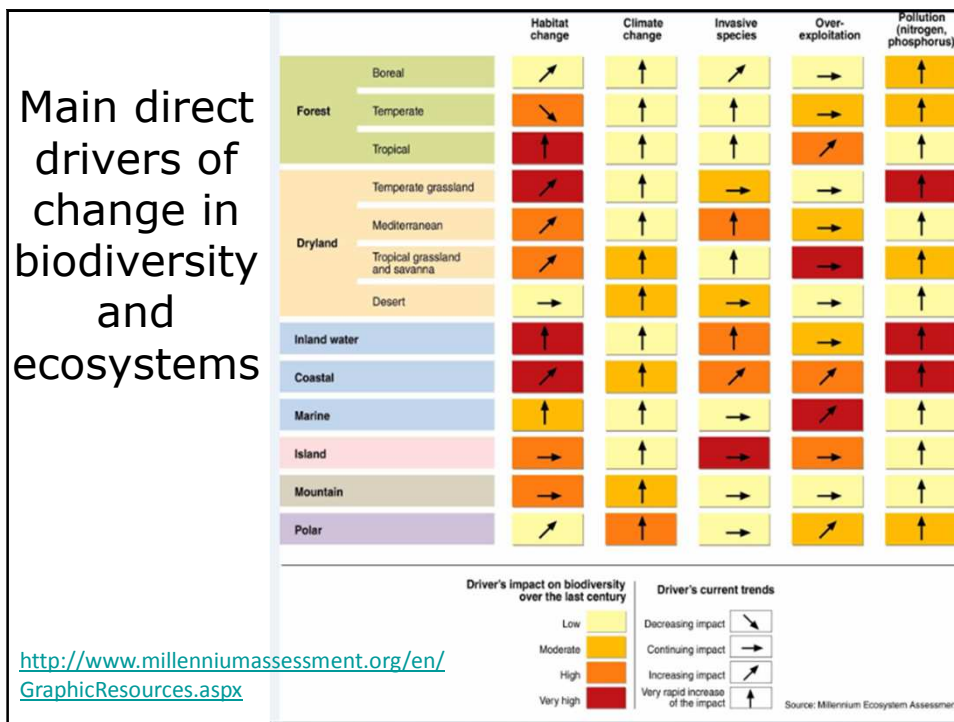
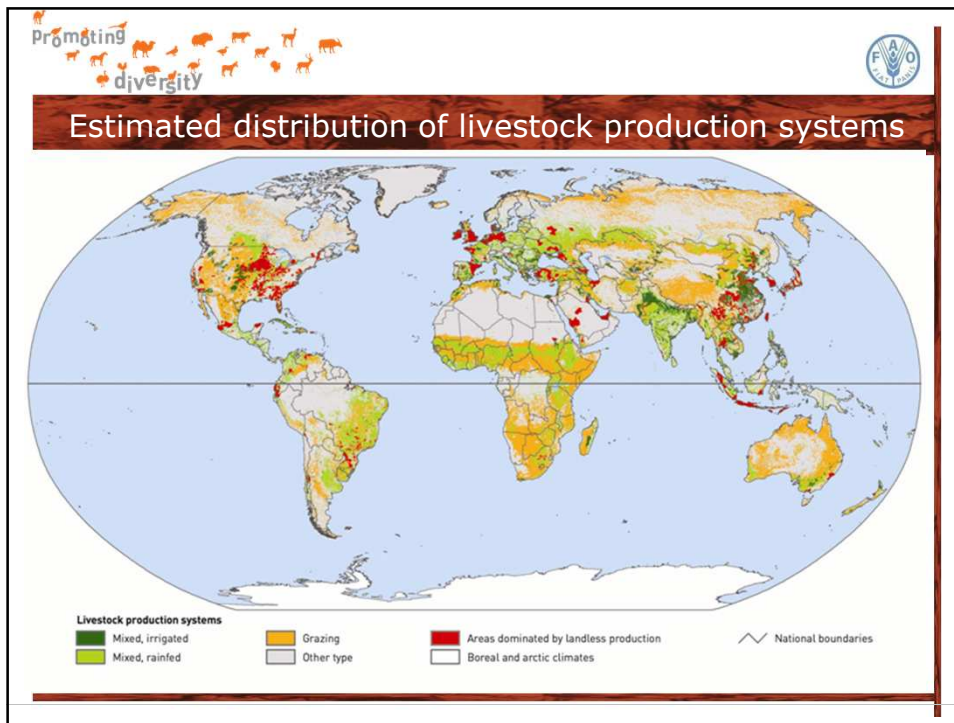
**Content**

- Consumption and production growth
- Environmental impact of livestock production
- Biodiversity impact
- How to conserve biodiversity?
  - Breeds and protected areas
  - Environmental services in production systems












## livestock's long shadow

environmental issues and options

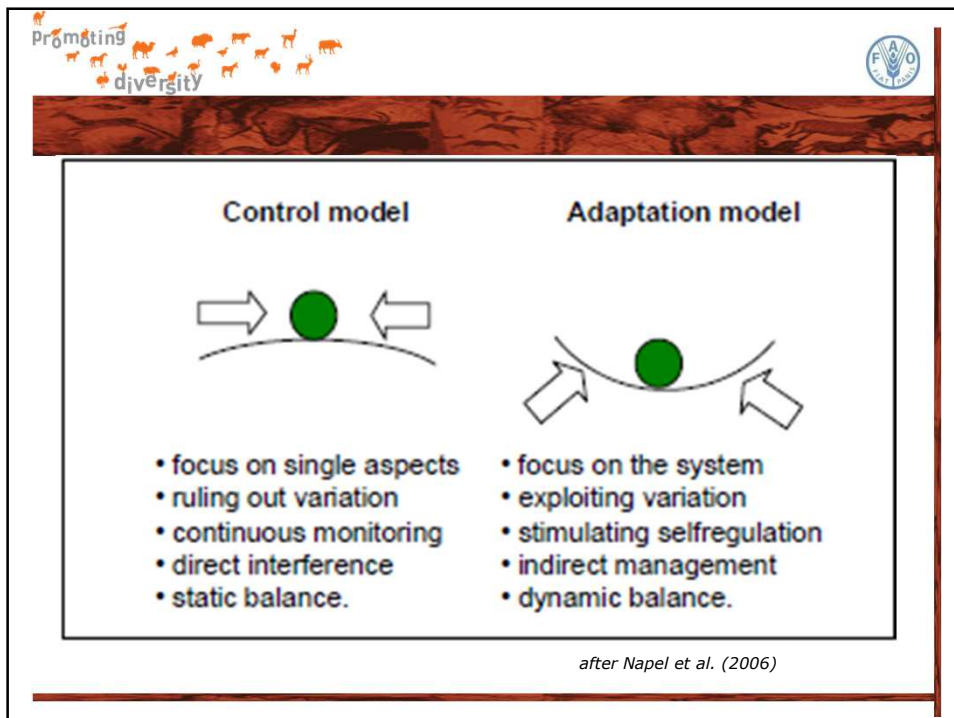
- **Land**
  - 26% of emerged land used as pasture /rangeland
  - 33% of crop land dedicated to feed production
- **Water**
  - 8% of water use, mostly for feed
  - alters the status of the resource (quality and quantity)
- **Biodiversity**
  - wildlife: follow on effects of habitat degradation and destruction
  - narrowing agricultural biodiversity
- **Climate**
  - 18% of anthropogenic emissions when taking a food chain approach
  - main causes: deforestation, manure management and enteric fermentation








Mechanism of biodiversity loss	Livestock production system		Biodiversity level affected		
	extensive	intensive	Intra-species	Inter-species	Ecosystem
Deforestation / fragmentat.	↗	↑	★	★	★
Land use intensification	↗	↑		★	
Desertification	→			★	
Reversion of former pastures / abandonment	↗			★	★
Climate change	↗	↑	★	★	★
Invasive livestock species	↘			★	
Invasive plant species	↘	→		★	★
Competition with wildlife	↘	↑		★	
Overfishing		↗	★		
Livestock diversity erosion		↑	★		
Toxicity		↑	★		
Pollution (N, P etc.)	→	↑		★	★

livestock's long shadow



Production system		
	High external input	Low external input
Global	High GHG from deforestation, land-use change, fertilizer production Low wild biodiversity Low GHG / kg product	High CH4 from enteric fermentation Low N2O / ha C-sequestration / ha High land use / kg product
Regional	Homogenous landscape Water + soil pollution Low wild biodiversity Large farms	Heterogenous landscape Med-high wild biodiversity Small farms Tradition / culture Transfer payments
Local	Systems: intensive or landless International breed Traded feed Sown pastures High output + productivity	Systems: Mixed-crop-livestock or pastoral Local breed + feed N-fixation Low stocking rate Biodiversity Low output + productivity
cost-benefit ratio – personal + social preferences		

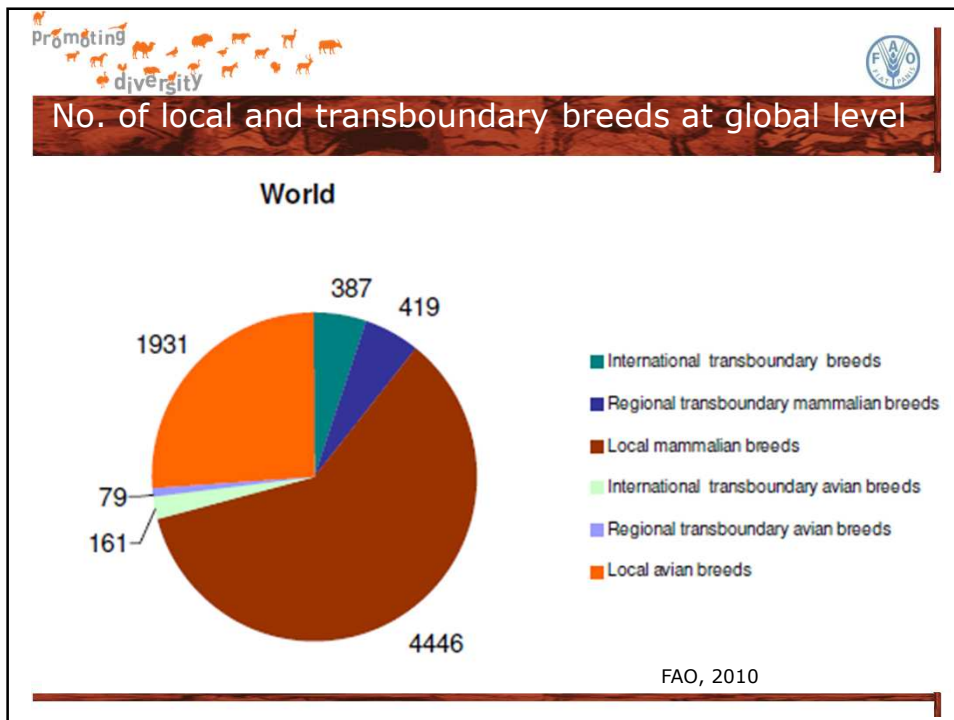
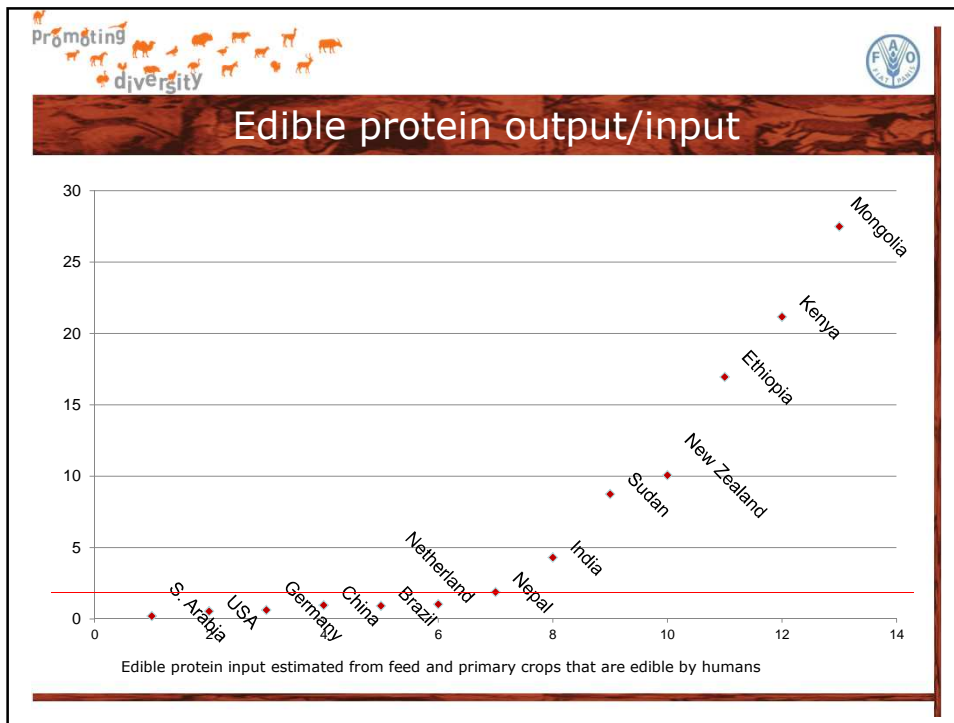



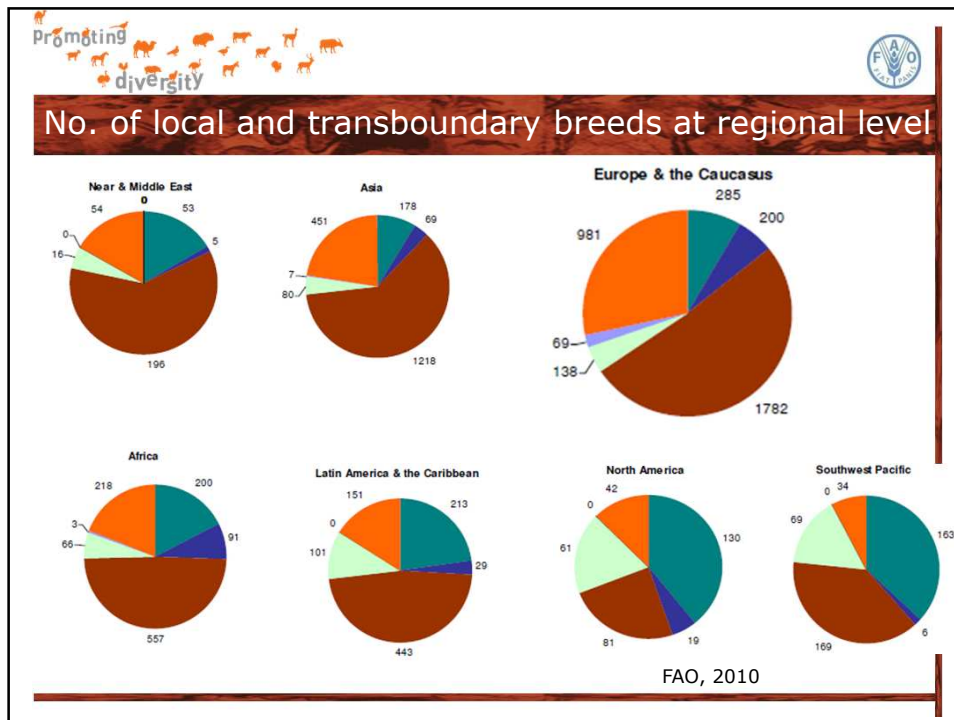
## Solutions to reduce biodiversity impact

- Supply: Waste reduction and intensification in all production systems
  - Use non human edible feeds (forage, residues/by products)
    - Extensive systems: opportunities for productivity gains; options for CC mitigation;
    - Intensive systems: frontier research in breeding and feeding; focus on land use emissions associated with feed; limited options for CC mitigation;
- Demand: Modify meat consumption
  - Reduce meat consumption
  - Separate meat from animal
  - Substitute meat

BUT: Loss of breeds







Promoting diversity


### Tradit. farming + associated land mgt. practices

- produced a range of semi-natural environments that favoured a variety of wild fauna and flora
  - relatively low levels of inputs
  - presence of 'neglected' areas - mixture of land uses on the farm
  - livestock 'mimicked' the role of large herbivores in controlling vegetation
- local breeds with (?) special adaptation


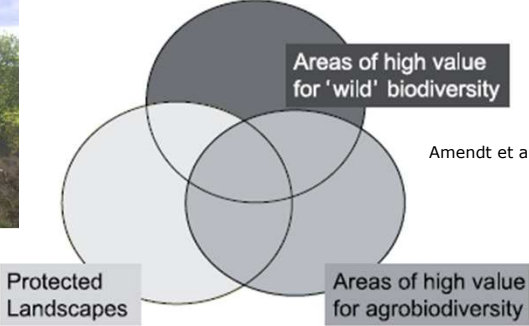
**But: Little research on functions on both sides and linkages**

Amendt et al, 2009

Promoting diversity




## Protected landscapes


Amendt et al, 2009

Protected Landscapes and Areas of High Value for Wild Biodiversity and Agrobiodiversity

- *what types or proportion of agrobiodiversity might be included within a protected area?*

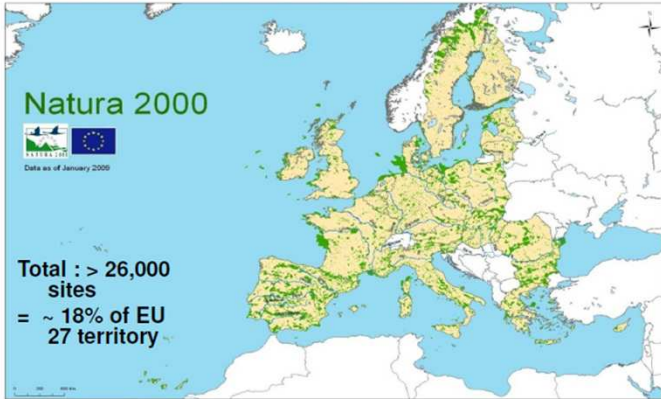


## EU Biodiversity Action Plan



**Objective 1** : To safeguard the EU's most important natural habitats and species

A1.1 Target: Natura 2000 network established (13 actions)



**Natura 2000**

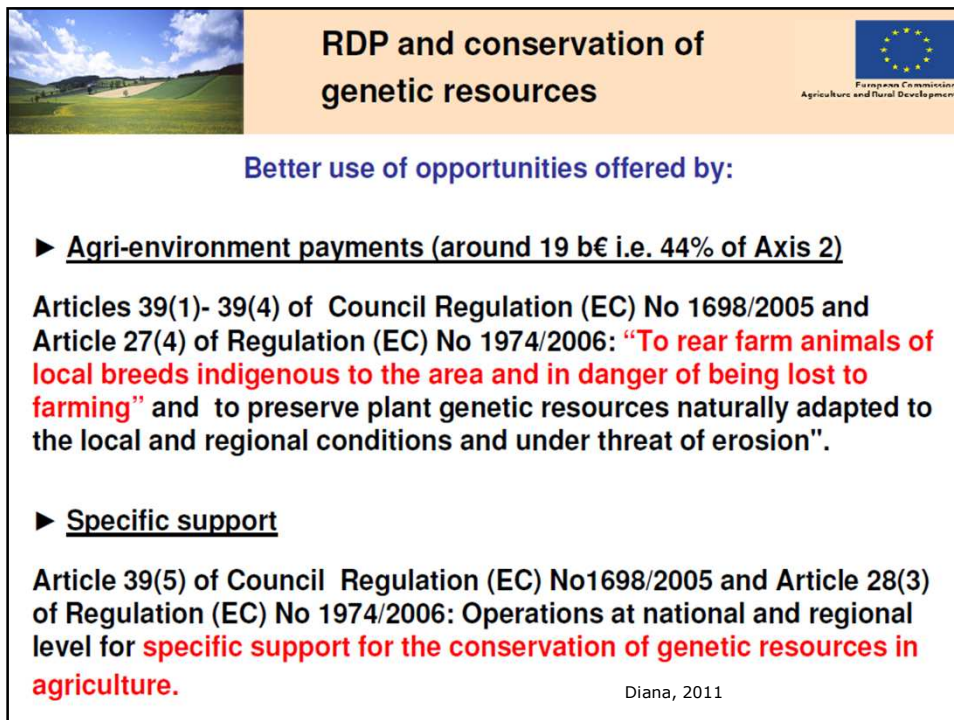
Data as of January 2006

Total : > 26,000 sites  
= ~ 18% of EU 27 territory

➔ **What is the situation of rare and endangered farm animal breeds inside and outside the Natura 2000 sites ?**

Diana, 2011

5



**RDP and conservation of genetic resources**

Better use of opportunities offered by:

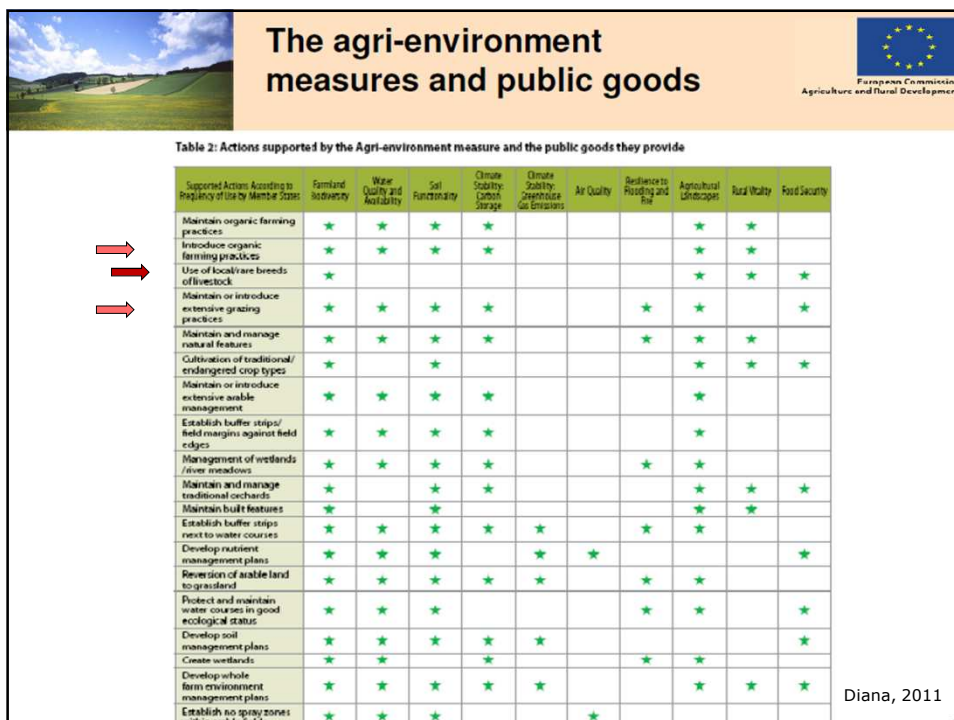
- **Agri-environment payments (around 19 b€ i.e. 44% of Axis 2)**

Articles 39(1)- 39(4) of Council Regulation (EC) No 1698/2005 and Article 27(4) of Regulation (EC) No 1974/2006: **“To rear farm animals of local breeds indigenous to the area and in danger of being lost to farming”** and to preserve plant genetic resources naturally adapted to the local and regional conditions and under threat of erosion”.

- **Specific support**

Article 39(5) of Council Regulation (EC) No1698/2005 and Article 28(3) of Regulation (EC) No 1974/2006: Operations at national and regional level for **specific support for the conservation of genetic resources in agriculture.**

Diana, 2011

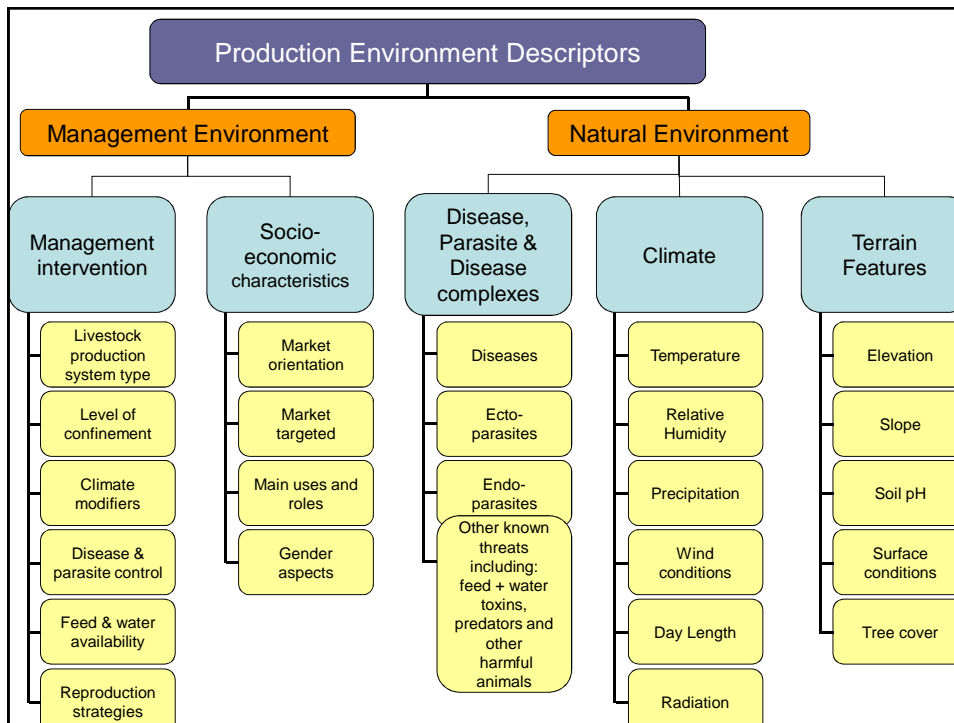



**The agri-environment measures and public goods**

Table 2: Actions supported by the Agri-environment measure and the public goods they provide

Supported Action According to Regulatory Use by Member States	Farm Income Sustainability	Water Quality and Availability	Soil Fertility	Climate Stability: Carbon Storage	Climate Stability: Greenhouse Gas Emissions	Air Quality	Resilience to Flooding and Drought	Agricultural Landscapes	Rural Vitality	Food Security
Maintain organic farming practices	*	*	*	*				*	*	
Introduce organic farming practices	*	*	*	*				*	*	
Use of local/breed breeds of livestock	*							*	*	*
Maintain or introduce extensive grazing practices	*	*	*	*			*	*		*
Maintain and manage natural features	*	*	*	*			*	*	*	
Cultivation of traditional/endangered crop types	*		*					*	*	*
Maintain or introduce extensive arable management	*	*	*	*				*		
Establish buffer strips/field margins against field edges	*	*	*	*				*		
Management of wetlands /river meadows	*	*	*	*			*	*		
Maintain and manage traditional orchards	*		*	*				*	*	*
Maintain built features	*		*	*				*	*	
Establish buffer strips next to water courses	*	*	*	*	*		*	*		
Develop nutrient management plans	*	*	*	*	*	*				*
Reversion of arable land to grassland	*	*	*	*	*		*	*		
Protect and maintain water courses in good ecological status	*	*	*	*	*		*	*		*
Develop soil management plans	*	*	*	*	*			*		*
Create wetlands	*	*	*	*	*		*	*		
Develop whole farm environment management plans	*	*	*	*	*			*	*	*
Establish no spray zones within arable fields	*	*	*	*	*	*				

Diana, 2011



Promoting diversity 

## CONCLUSIONS

- Demand will continue to increase, push to enhance livestock productivity is needed
- New technologies are required / partly available  
> most of them lead to **loss of (livestock) diversity**
- Arguments pro Low-input breeds
  - Edible protein ratio
  - Linkages to protected / HNV areas
  - Ecosystem services
- Output monitoring for PES
  - Public databases for genetic and phenotypic data
- Changing in consumer behaviour + development of niche markets and label products + sustainable agriculture, organic farming and local food production
- Policy instruments are required to stimulate implementation of a portfolio of options

**How much do we really know?**

