# Climate change and animal genetic resources for food and agriculture

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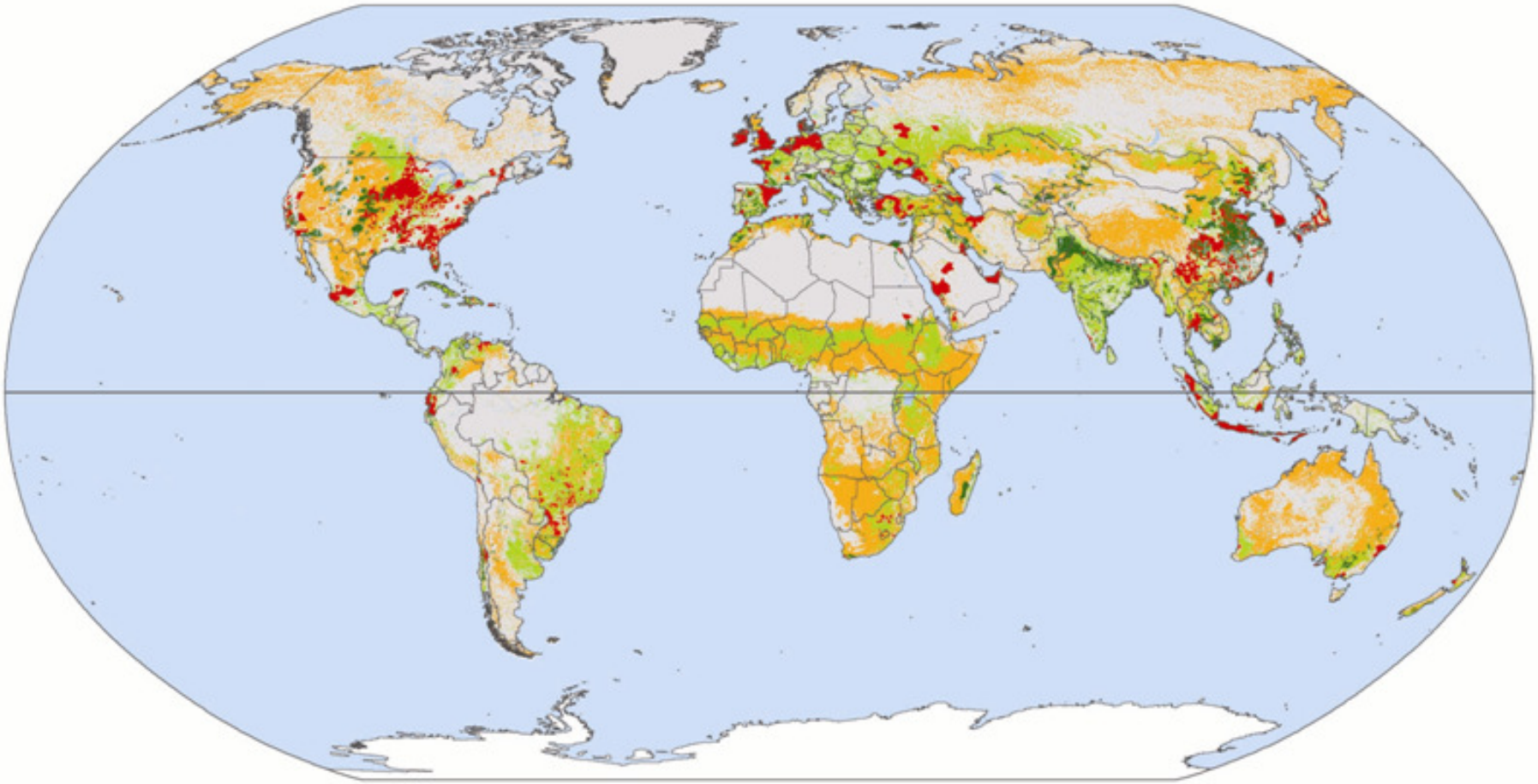
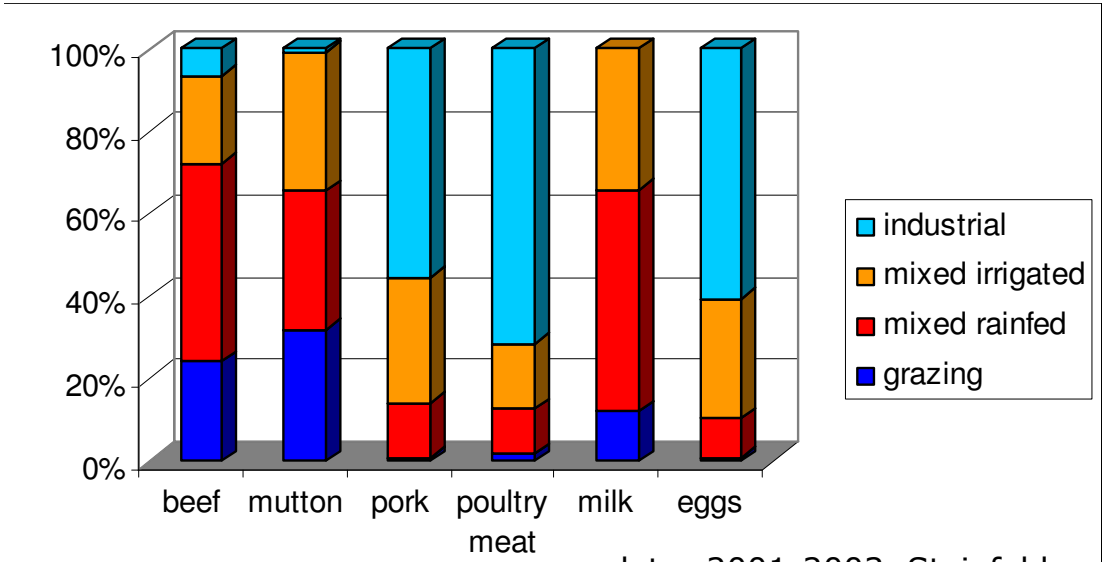
# Estimated distribution of livestock production systems



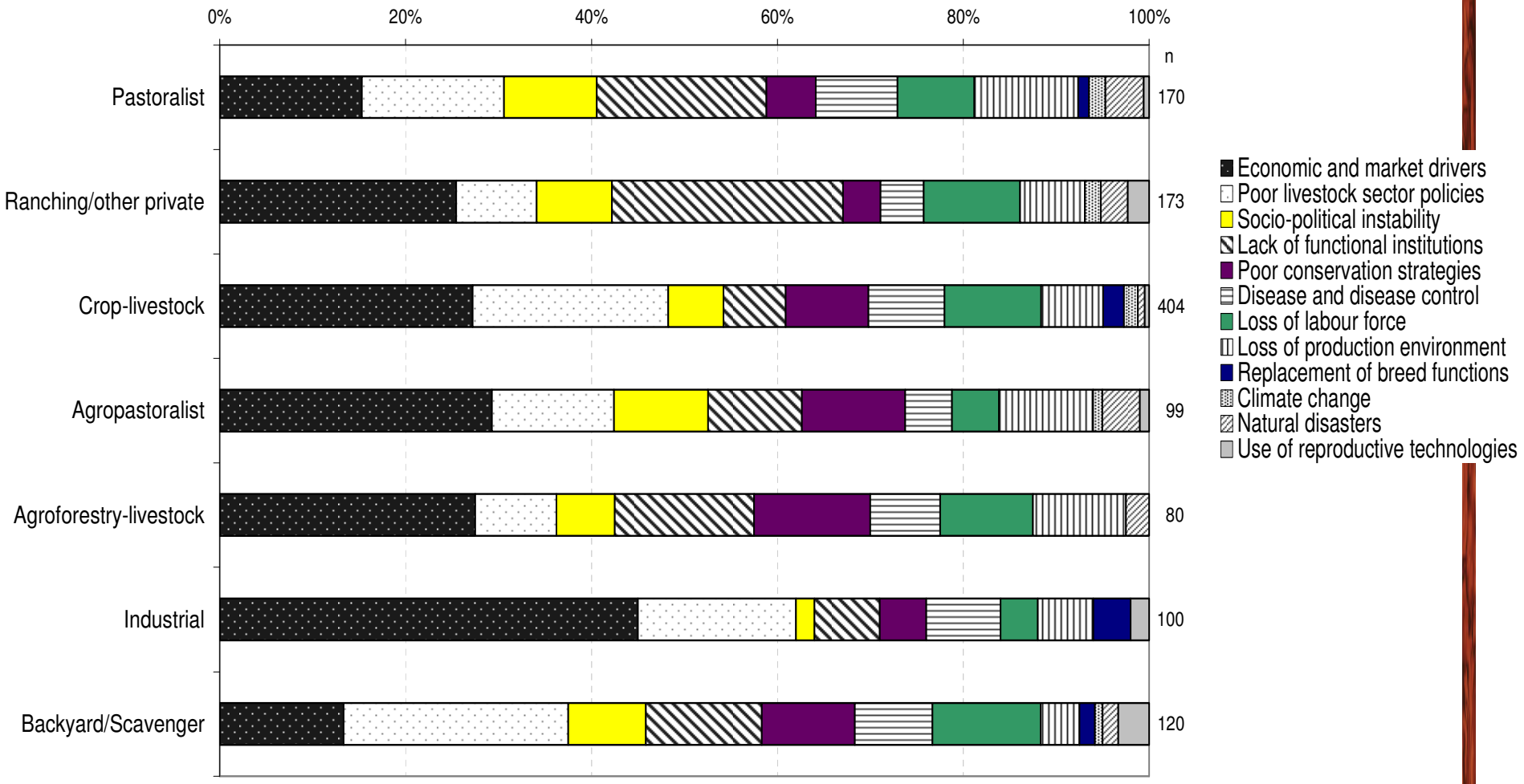
# Contribution of livestock production systems to global food production




data: 2001-2003, Steinfeld et al 2006

2009: 63% of pork, 73% of eggs and 79% of poultry meat globally from industrial systems

# Global distribution of responses for threats




2009 questionnaire (1066 threats), by livestock production systems

# Impacts of climate change on AnGR

| | Extensive systems (agro/pastoral, mixed) | Intensive/landless systems |
|---|---|---|
| **Direct impacts** | – Catastrophic events<br>–productivity losses, physiological stress<br>– water availability | |

# Impacts of climate change on AnGR

| | Extensive systems (agro/pastoral, mixed) | Intensive/landless systems |
|---|---|---|
| **Indirect impacts** | **Agro-ecological changes**<br>– fodder quality and quantity<br>– host-pathogen interactions<br>– disease epidemics<br>– GHG reduction | **Resource price/availability**<br>– feed (production; biofuels)<br>– energy, water<br>– disease epidemics<br>– GHG reduction |

# Effects of climate change mitigation policies

- $CO_2$ from land-use change
  - Focus on feed efficiency
- $CH_4$ emissions from enteric fermentation
  - Focus on ruminant efficiency or nonogastrics

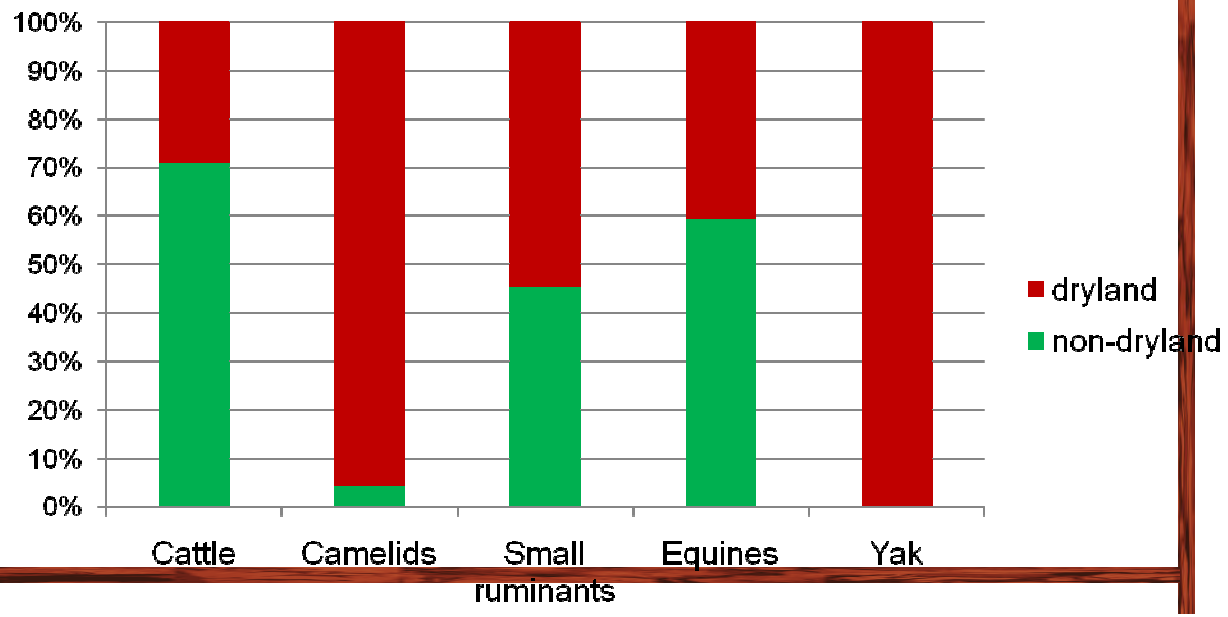
- Potential threat to ruminant production systems and (local) breeds, along with the associated livelihoods and ecosystem services
- Potential threat to local breeds, esp. monogastric

# Distribution of breeds / species / production systems

- Speed of climate change may outstrip the capacity of AnGR and livestock production systems to adapt
- Loss of the adaptive link between breeds and production environments is a potential threat both to livelihoods and to AnGR diversity

# AnGR in CC adaptation and mitigation

- Many breeds have characteristics that are potentially valuable in climate change adaptation
  - capacity to tolerate high temperatures
  - resistance or tolerance to diseases and parasites
  - capacity to utilize scarce and poor-quality feed
  - capacity to range over harsh terrain in search of feed and water



# Adjust breeding objectives

- heat tolerance and disease resistance for adaptation to changed production environments
- greater efficiency in production (e.g. feed conversion, health, reproduction) can contribute to reducing GHG emissions / unit output

# Move breeds / species into new areas

- good knowledge of breed characteristics
- thorough evaluation of the suitability of the introduced AnGR to local production environments and livelihoods
- efficient and equitable access to the relevant AnGR
- unclear to what extent climate change will affect the overall N-S pattern of gene flow

# Explore co-benefits

between sustainable use of AnGR and

- Carbon sequestration: Grasslands occupy ca 30% of ice-free area and store up to 8% of global C
  - Well-managed grasslands can store up to 260 MT C / ha while providing important benefits for climate change adaptation
- Wild biodiversity: Protected areas and High-nature-value grasslands
- Livelihood development: Payment for environmental services

Promoting diversity

# Actions required


Effective implementation of the Global Plan of Action for AnGR would strengthen the capacity of the AnGR and livestock sectors to respond to climate change

# Specific climate change-related actions

- Characterize adaptive characteristics relevant to climate change, the links between breeds and production systems, and climate-relevant local knowledge
- Assess the potential for carbon sequestration in pastureland through better grazing management and potential links to livestock-based livelihoods and AnGR management
- Review breeding objectives and breed/species choice in light of current and predicted future production environments
- Ensure fair and equitable access to the AnGR, knowledge and technologies needed to adapt production systems to climate change
- Strengthen conservation programmes *in situ* and *ex situ* to ensure relevant AnGR remain available for climate change adaptation

Promoting diversity

# Thank you for your attention !