

Pastoralism in arid and semi-arid zones of Africa

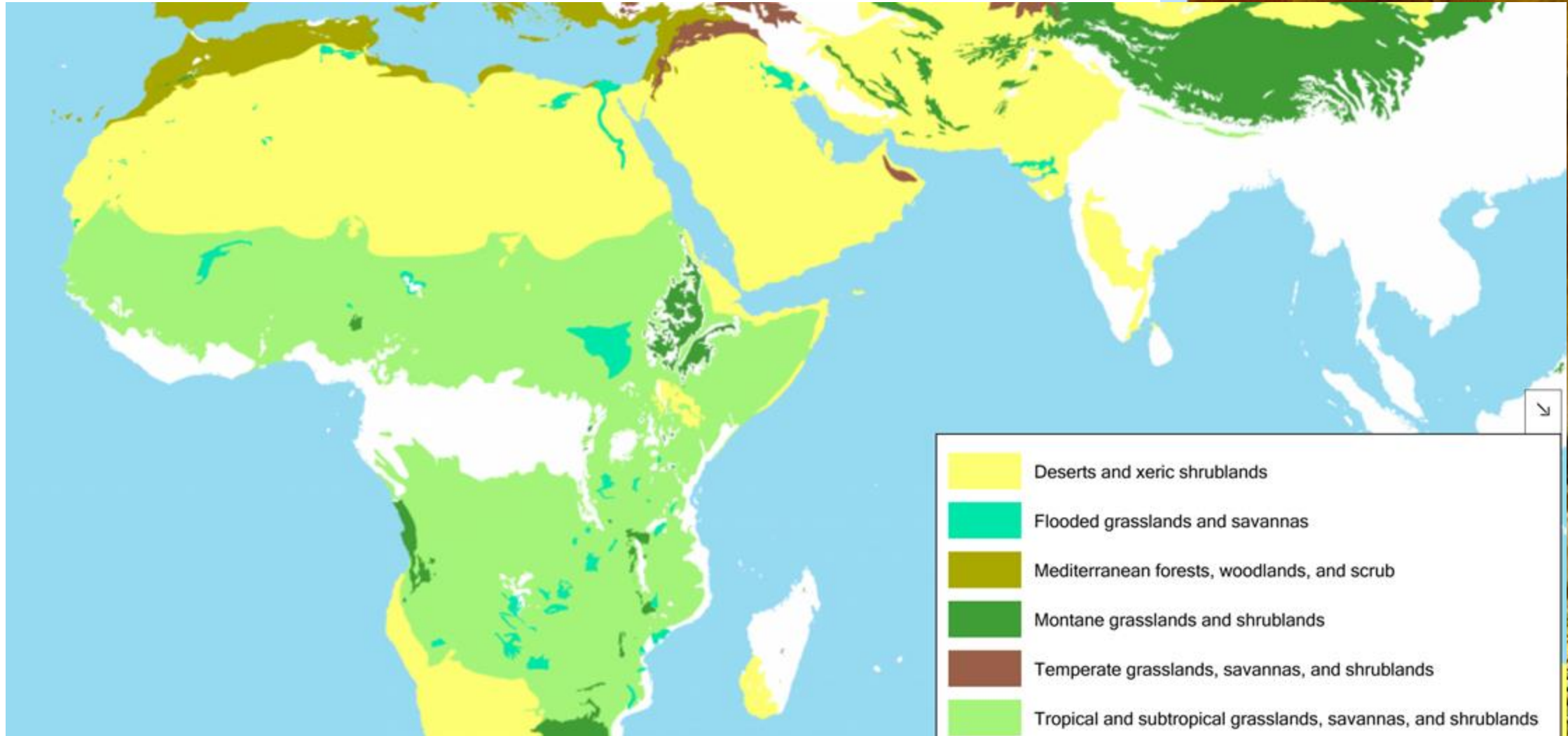
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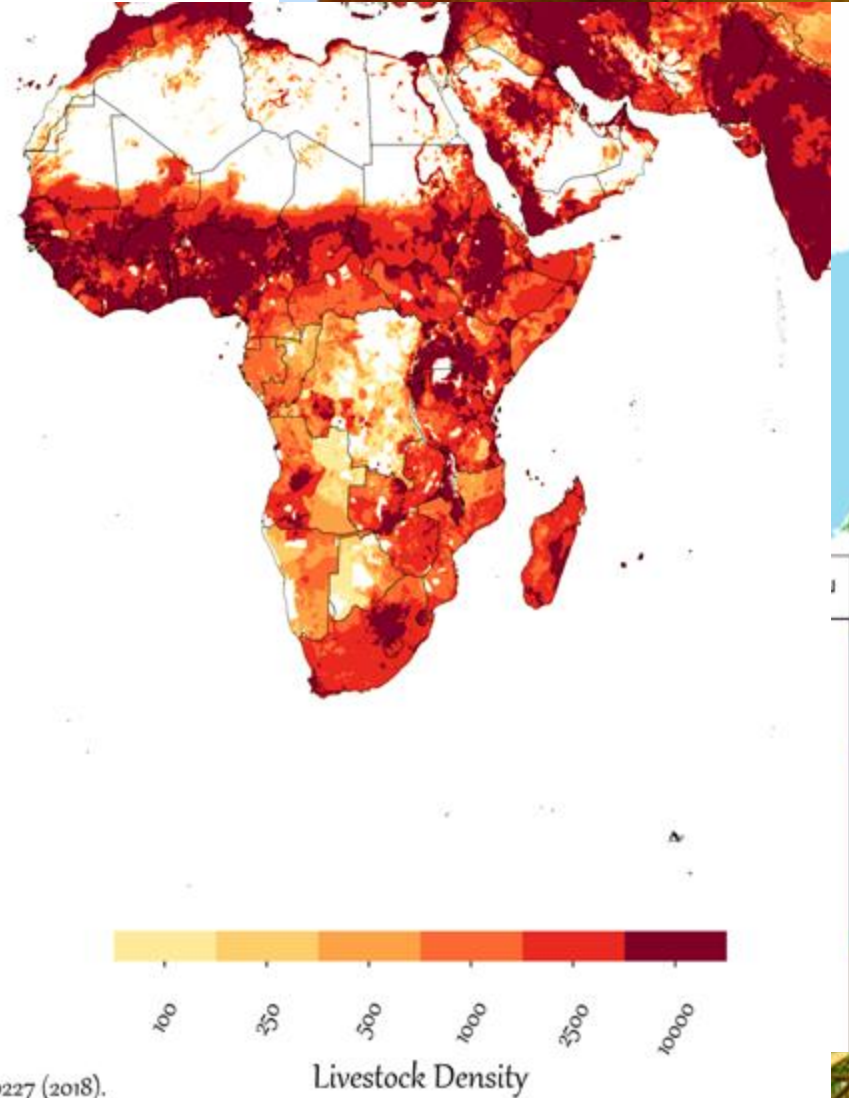
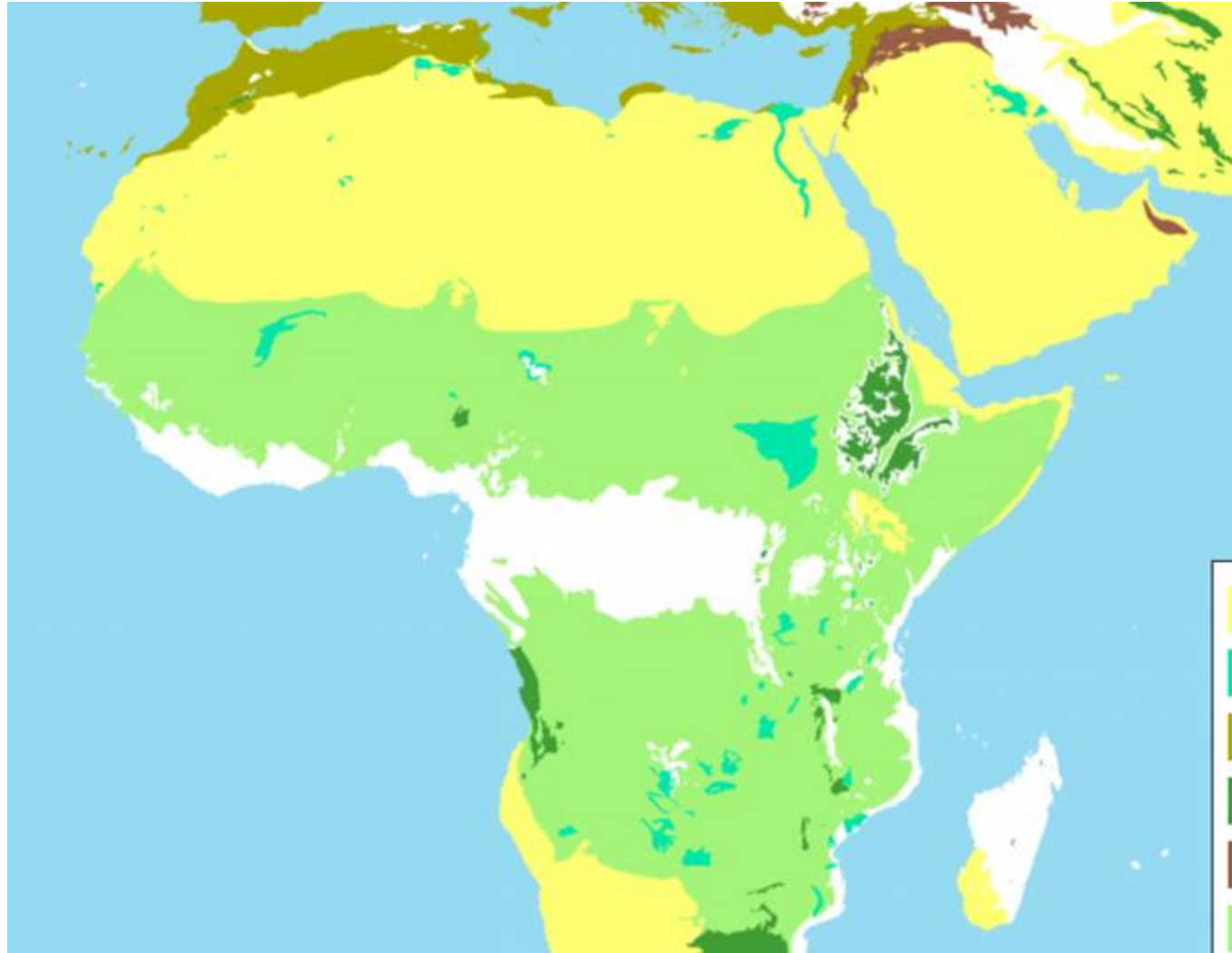
Rangeland map

- Rangelands cover more than 50% of Africa
- Hundreds of millions of hectares unsuitable for cropping

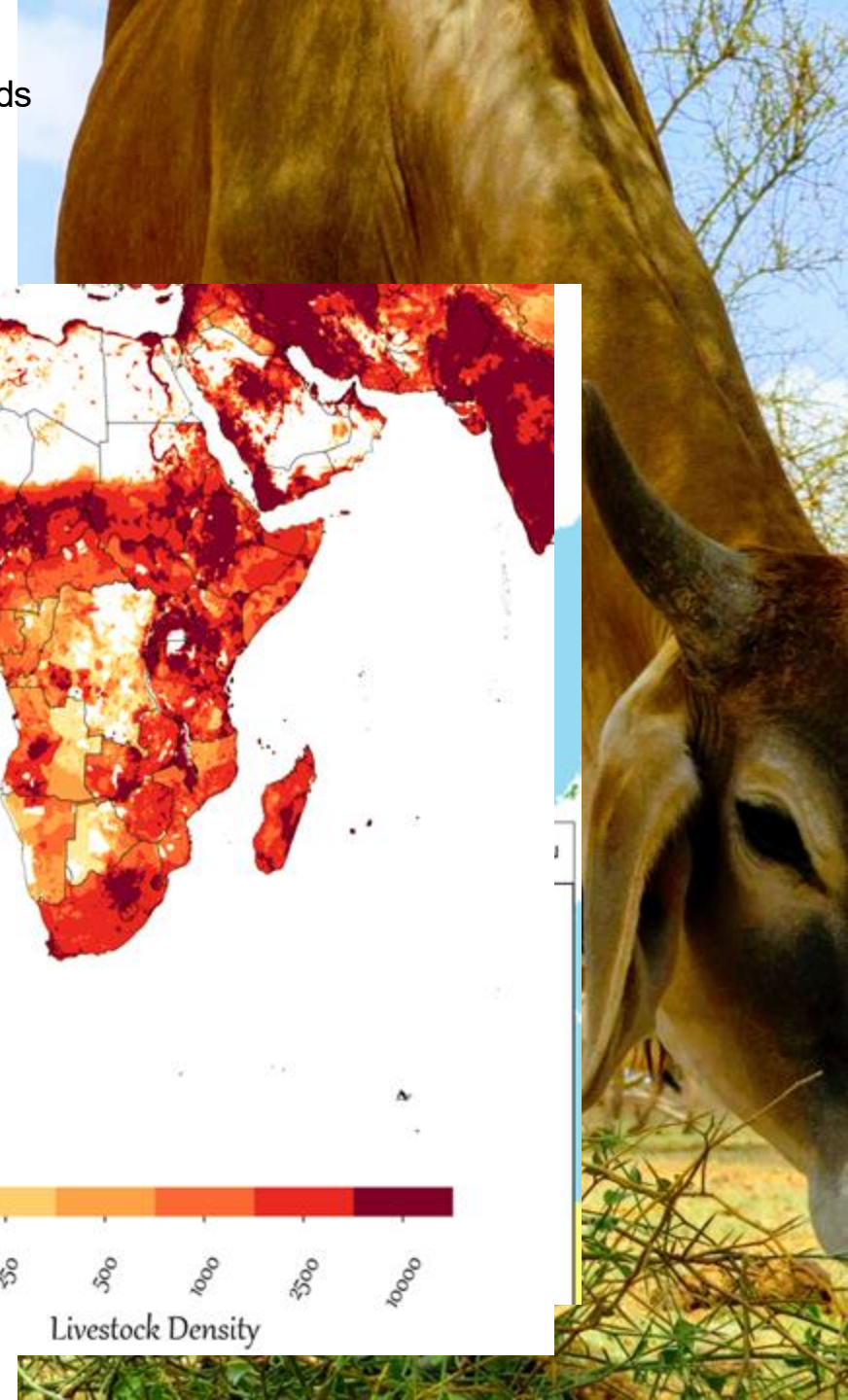


Rangelands map

- Support millions of pastoral and agro-pastoral households
- Major contributors to meat and milk production



0227 (2018).



Pastoralism

1. Natural vegetation

Livestock rely primarily on spontaneous vegetation.

2. Mobility

Mobility allows animals to track highly variable resources.

3. Commons

Resources are often shared and collectively managed.



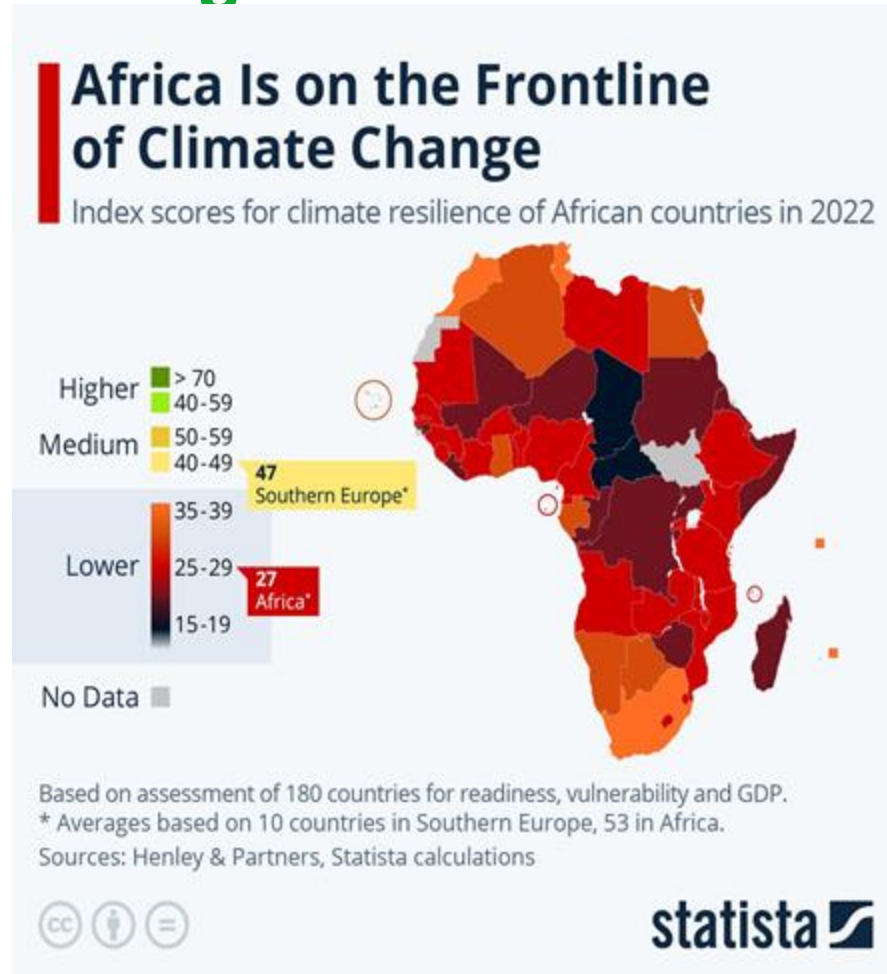
Different systems

- Sylvo-Pastoralism: animals feed on natural vegetation. The animals follow the availability :
 - Following rainfall gradients
 - Following altitudinal gradients
 - Annual species to perennial species (tree)
- Agro- pastoralism
 - Using cropping area as a source of feed
 - Contract between farmers and breeders (feed for fertilization)
 - Feed supplementation

Production goal: Capitalization with some specificity: Aid sheep in Muslim country, milk value chain (camel, cattle or goat milk).



Challenges

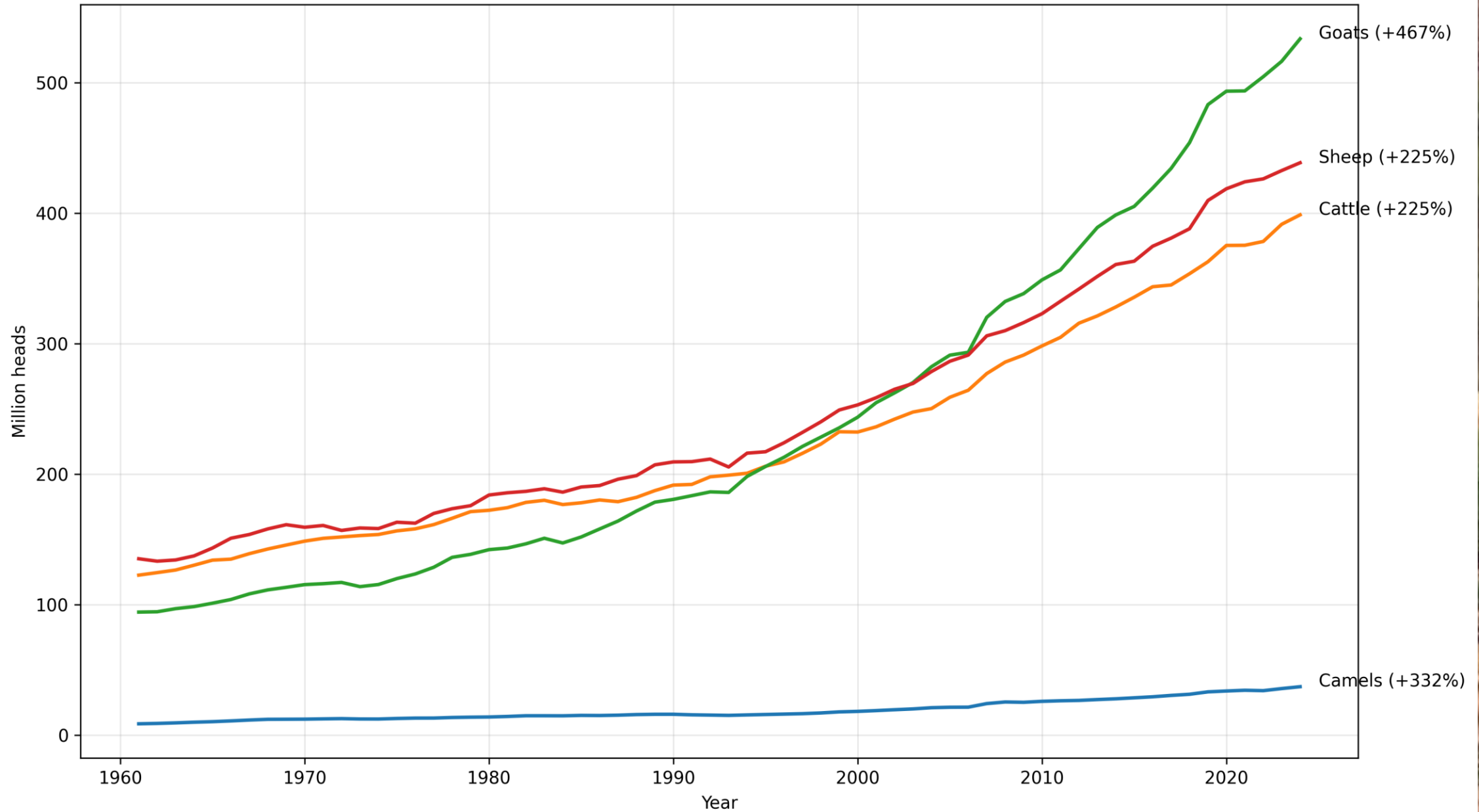


More frequent droughts
Increasing temperatures
Unpredictable rainfall
Impact
Less forage production and stronger seasonal shortages.



Challenges

Evolution of livestock populations in Africa (1961-2024)



Challenges

- Change in land-use diminution of the rangeland area.
 - Increase in cropping areas
 - Increase in protected area
 - Increase of regeneration/replantation



Examples

- Mountain Morocco
- Saharan Camel system
- Sahelian system
- Eastern African system
- Madagascar system



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Northern Morocco: A Mediterranean Mountain Pastoral System

Context

- Mediterranean climate with wet winters and dry summers.
- Mountain landscapes combining forests, rangelands and croplands.

Livestock System

- Predominantly goat and sheep production.
- Extensive grazing on natural vegetation.
- Seasonal mobility along altitudinal gradients.
- Strong crop–livestock integration.

Current Challenges

- Rangeland degradation and shrub encroachment.
- Increasing drought frequency.
- Land-use change and reduction of grazing areas.

Adaptation Strategies

- Feed supplementation and crop residues.
- Agro-sylvo-pastoral integration.
- Rangeland restoration and forest management.



Sahara Livestock Production at the Limits of Aridity

Context

- One of the driest regions on Earth with scarce and unpredictable rainfall.
- Pastoralism enables livestock production where cropping is largely impossible.

Livestock System

- Camel-based systems often associated with sheep and goats.
- Extensive use of natural rangelands and woody vegetation.
- High mobility to access scattered forage and water resources.

Key Adaptations

- Seasonal shifts between herbaceous and woody resources.
- Long-distance movements following rainfall events.
- Camels are highly adapted to heat, drought and poor-quality forage.

Current Challenges

- More frequent and prolonged droughts.
- Expansion of agriculture and infrastructure.
- Reduced mobility corridors.
- Growing dependence on purchased feed



Sahelian Pastoral System

The Sahel experiences a short rainy season (2–4 months) followed by a long dry season. Highly variable rainfall (200–600 mm/year) makes uncertainty a defining feature of pastoral systems.

Livestock System

- Multi-species herds (cattle, sheep and goats)
- Extensive use of communal rangelands
- Seasonal mobility following forage and water availability
- Strong dependence on natural vegetation

Key Adaptations

- Mobility and flexibility rather than resource control
- Dynamic herd management according to climatic conditions
- Seasonal shift from herbaceous to woody resources
- Opportunistic use of crop residues and temporary grazing areas

Current Transformations

- Expansion of croplands and loss of grazing areas
- More frequent droughts
- Increasing sedentarization around boreholes
- Growing reliance on supplementary feeding



Eastern Africa and Horn of Africa

Living with Wildlife in Multi-Use Rangelands

Context

- Vast savannas supporting both wildlife and livestock.
- Mobility enables pastoralists to exploit highly variable resources.

Key Interactions

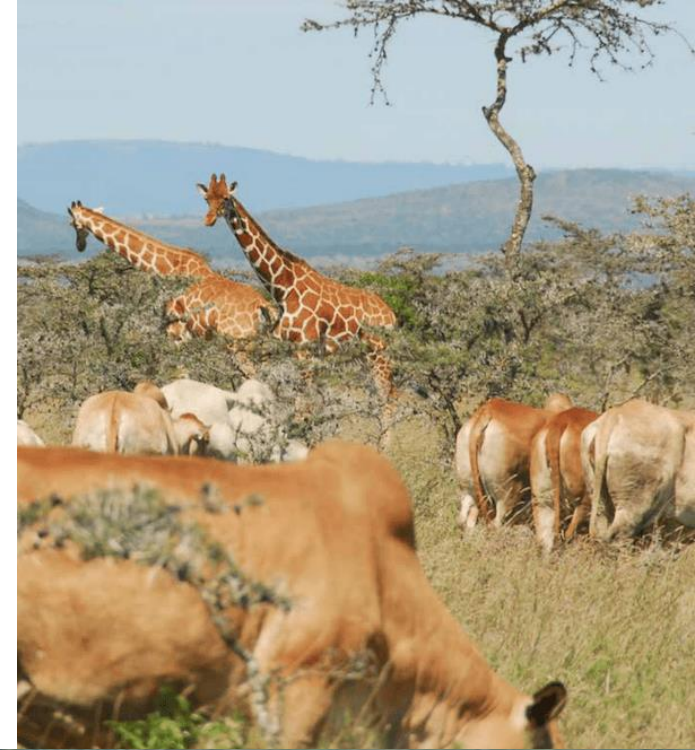
- Shared grazing lands and water points.
- Complementary use of resources by wildlife and livestock.
- High biodiversity within pastoral landscapes.

Main Challenges

- Competition for land and water.
- Disease transmission at the wildlife–livestock interface.
- Predation and loss of mobility corridors.

Opportunities

- Community-based conservation.
- Wildlife tourism and ecosystem services.
- Integrated management of biodiversity and livestock production.



Madagascar

Context

- Extensive grasslands covering large areas of the Central Highlands.
- Strong integration between livestock and crop production systems.

Livestock System

- Cattle-based production systems (zebu).
- Communal grazing on natural rangelands.
- Seasonal use of crop residues and harvested fields.

Current Challenges

- Rangeland degradation and recurrent bushfires.
- Declining forage quality and productivity.
- Increasing pressure from population growth and land conversion.

Adaptation Strategies

- Crop–livestock integration.
- Improved forage management.
- Restoration of degraded rangelands.



Conclusion: What Can Europe Learn from African Pastoral Systems?

Common Challenges

- Increasing climate variability and droughts.
- Competition for land and natural resources.
- Biodiversity conservation alongside livestock production.
- Need for more resilient and low-input farming systems.

Lessons from African Pastoralism

- **Mobility** as a strategy to cope with resource variability.
- **Diversity** of livestock species and forage resources.
- **Flexibility** in herd management and feeding practices.

Research Opportunities

African rangelands provide unique conditions to study:

- Adaptation to extreme climatic variability.
- Livestock–biodiversity interactions.



Thanks for your attention

