Climate change adaptation in relation to livestock and livelihood in West Africa

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Outline of the presentation

- Background on livestock production systems in West Africa - features, changes, challenges and opportunities
- Impacts of climate change on livestock & livelihoods – general & specific
- Adaptation strategies at community level
- ILRI work on climate change adaptation
- Conclusion
Highlights of livestock sector in West Africa

- 80 million poor livestock keepers – 47% of West Africa’s population (14% of the World total)
- 80% in mixed crop livestock systems
- Production of livestock products increasing slowly (2.5%/annum)
- High imports of livestock products especially milk
- Smallholders produce at least 50% of the regions’ domestic livestock products
- Multiple production objectives
- Low external-inputs
Challenges to livestock production in West Africa

- Low productive potential of local breeds
- Seasonal feed scarcity and low quality
- Declining grazing areas and problem of access to water
- Low and declining soil fertility / land degradation
- Climatic change and variability e.g. drought
- Institutional and policy-related constraints
- Diseases – trypanosomosis in sub-humid/humid zones
- Market access
Drivers of change in livestock production systems in West Africa

- Rapid population growth
  - Expansion of cultivated land into marginal land
  - Fragmentation of grazing areas (restricted animal mobility)
  - Increase in livestock population
- Economic growth
  - Increase in demand for animal products
  - Shift in livestock ownership pattern
  - Increasing importance of urban agriculture
- Climate change and variability
  - Occupational diversification
  - Sedentarization of pastoralists
Key questions on climate change adaptation relating to livestock

- What type of livestock management is suited to changing climate and where?
- Which animals (species & breed) should be kept in which areas and what are the trade-offs?
- Which animal diseases should we focus on?
- How can we add value to existing livestock-based adaptation strategies?
Specific impacts of climate change on livestock production – what we know

- Decline in livestock productivity
- Decline in forage resources
- Problem of access to water
- Restricted livestock mobility
- Conflict over natural resource use
- Fluctuations in livestock market prices
- Animal diseases (emerging and re-emerging)
- Species and breed of livestock that can be kept e.g. shift in livestock species from cattle to small ruminants in Sahelian countries as a result of droughts
Livestock demographic trend in Niger (source: FAO stats)
Features of adaptation to climate change at community level

- Large variety of adaptation strategies, context-specific and dynamic
- Adaptation strategies are often integral part of current livelihood systems
- Often a mixture of available livelihood options (crop, livestock, off-farm activities etc)
- Benefits are highly localised
- Focus on short-term adaptation (reactive)
- Depends mainly on indigenous knowledge and social safety nets
- Often inadequate in event of severe climatic shocks e.g. prolonged droughts
A large global community is working on climate change issues across sectors and disciplines:

- Inventories of greenhouse gases (EPA, IPCC, RIVM)
- Climate prediction and modelling (universities/research centres)
- Adaptation options (FAO, NGOs, CGIAR centres, universities, industry, private sector)

Livestock issues in developing countries are not well articulated or well studied
ILRI’s work on climate change adaptation

- Framework for climate change adaptation work:
  - Analytical and diagnostic studies
    - Identifying hotspots of climate change and vulnerability
    - Vulnerability assessment to identify intervention options
    - Climate change scenarios and assessing ex-ante adaptive responses and impacts on livestock communities and ecosystems
  - Test feasibility of promising adaptation options, support design and formulation of adaptation strategy
    - Assess feasibility of index based livestock insurance (IBLI) for large populations facing covariate risks linked to climate change
    - Identify institutional arrangement to deliver livestock insurance product to the poor, particularly women
    - Build capacity of research and non-research actors
ILRI’s work on climate change adaptation

- Support implementation of adaptation projects
  - Pilot testing of adaptation interventions eg. IBLI
  - Results based monitoring and evaluation, focusing on what works, what does not work, and why, lessons learned and issues for scaling up
ILRI study on mapping vulnerability to climate change
Data at different scales: country, province, 18 km²

Natural capital
- Crop suitability (FAO, GLC2000)
- Soil degradation (GLASOD)
- Water availability (FAO Water Atlas)

Physical capital
- Market access (ILRI)

Social capital
- Human poverty index (HDR)
- Governance (World Bank)

Human capital
- Stunting (FAO, CIESIN)
- Infant mortality (CIESIN)
- Wasting (CIESIN)
- Public health expenditure (HDR)
- Malaria risk (MARA)
- HIV/AIDS prevalence (HDR)

Financial capital
- Agriculture as % of GDP (World Bank)
- Imports vs Exports (World Bank)

14 Indicators used
Quartiles of the overall vulnerability indicator
Mapped at systems level within each country. Quartile 1, “less vulnerable”; quartile 4, “more vulnerable”
Synthesis of hot-spots
MRA, mixed rainfed arid-semiarid systems | LGA, rangeland arid-semiarid systems

<table>
<thead>
<tr>
<th>Possibly severe LGP loss (&gt;20% to 2050)</th>
<th>Highest vulnerability quartile (4)</th>
<th>Second-highest vulnerability quartile (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Some MRA systems in Sahel</td>
<td>• MRA, LGA systems in large parts of Sahel</td>
<td></td>
</tr>
<tr>
<td>• Mixed rainfed and highland perennial systems in Great Lakes region of E Africa</td>
<td>• Livestock systems and some mixed systems in parts of E and southern Africa</td>
<td></td>
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<tr>
<td>• LGA systems in parts of E Africa</td>
<td>• Coastal systems in E and parts of southern Africa</td>
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<tr>
<th>Possibly moderate LGP loss (5-20% to 2050)</th>
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<td>• Mixed systems in parts of E Africa</td>
<td>• Coastal systems of parts of W Africa</td>
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<td>• Tree crop systems in parts of W Africa</td>
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<td></td>
<td>• Forest-based systems in central Africa</td>
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<td></td>
<td>• Root-based and root-mixed systems in south central Africa</td>
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Use such information as one input to evaluating trade-offs (e.g., numbers of poor versus density of poor) in relation to specific development criteria
Adaptation strategies of agro-pastoral communities - Local perception on droughts in Niger (ILRI, 2008)

<table>
<thead>
<tr>
<th>Site</th>
<th>Trend</th>
<th>Vulnerability</th>
<th>Vulnerable groups</th>
<th>Comments</th>
</tr>
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<tr>
<td>- Fakara</td>
<td>Increased</td>
<td>High</td>
<td>Children and elderly people, and those without livestock</td>
<td>Incidence has increased in the last decade</td>
</tr>
<tr>
<td>- Gabi</td>
<td>More frequent</td>
<td>High</td>
<td>Children and elderly people, poor households, and those without livestock</td>
<td>Abrupt cessation of rains and insufficient rainfall occurs nearly once in every 4 years since 1998</td>
</tr>
<tr>
<td>- Zermou</td>
<td>Very frequent</td>
<td>High</td>
<td>All households but those without livestock are more vulnerable</td>
<td>Incidence has increased significantly in the last two decades</td>
</tr>
</tbody>
</table>
Adaptation strategies of agro-pastoral communities in response to droughts in Niger (ILRI, 2008)

- **Crop-based households**
  - Plant drought resistant crops & cultivars
  - Use short cycle crop species & cultivars
  - Plant in widely dispersed fields
  - Pursue intricate re-seeding calendars
  - Send more family members on migration
  - Collect and eat wild plants and animals

- **Livestock-based households**
  - Sell animals to buy cereals
  - Invest in multiple livestock species
  - Entrust animals to other herders to maximize herd dispersal
  - Moving animals to maximize access to pastures
  - Send more family members on migration
  - Assistance from family/close relations
Community actions and external assistance for future preparedness (ILRI, 2008)

<table>
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<tr>
<th>Site</th>
<th>Community action</th>
<th>External assistance</th>
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| Fakara | - Expansion of cultivated land  
- Application of fertilizers  
- Adoption of improved crop varieties and those tolerant to drought  
- Reclamation of degraded land  
- Off season farming especially vegetable production.  
- Migration | - Agricultural inputs such as fertilizer, seed, pesticide  
- Establishment of input shops and grain bank  
- Provision of wells for off season farming |
| Gabi   | - Expansion of cultivated land  
- Sending more family members on migration                                           | - Agricultural inputs- fertilizers, improved seeds  
- Feed supplements and veterinary drugs  
- Establishment of cereals bank  
- Protection of rangelands from being cultivated  
- Better access to credit  
- Training in income generating activities |
| Zermou | - Expansion of cultivated land  
- Sending more family members on migration  
- Off season farming | - Distribution of improved cattle breeds by the government or NGOs  
- Agricultural inputs – fertilizers, seeds  
- Establishment of inputs shops |
Adaptation strategies of agro-pastoral communities in response to droughts in Niger (ILRI, 2008)

Diagram showing the relationship between grain, livestock, feed, grain bank, and livestock feed bank. The graph illustrates the price trends and supply patterns throughout the year, with peaks and troughs indicating changes in availability and demand.
Animal Diseases and Climate Change

- Major global changes in the distribution of vector-borne diseases to new “warmer” habitats (blue tongue of sheep in Europe, “highland” malaria in Africa)

- Climate is an important but not the only driver of change in disease distribution (population, intensification of systems)
Tsetse Distribution and Climate Change

Model predictions for changes in tsetse distribution to 2030 from current distributions for morsitans (left), fusca (centre) and palpalis (right) tsetse groups as a result of changes in length of growing period.

McDermott et al. (2001), revised 2005
Conclusion

- Livestock represent the major stores of wealth that are mobilized in response to climatic shocks e.g. shocks
- Adaptation strategies in response to climate change at community level involves a mixture of livelihood options.
- Activities needed to enhance adaptive capacity of rural communities are essentially the same as those required for sustainable development.
- Adaptation strategies are often location-specific and recommendation domains of limited scale
- Adaptation to climate change need to be considered in the context of other significant drivers of change
International Livestock Research Institute

Better lives through livestock
Animal agriculture to reduce poverty, hunger and environmental degradation in developing countries

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