Adaptability of small ruminant farming facing global change. A north south analysis in Mediterranean (France/ Egypt).

EAAP 2013

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ANR- 10-CEPL-002 ELVULMED CEP&S 2010
GLOBAL CONTEXT
Hypothesis on the roles of livestock faced to global change

- Main common changes
  - Population and urbanization growth in the coastal zones
  - Uncertainty on rainfall can be exacerbated with climatic changes (Christensen et al)?

- Livestock at the regional level in interaction with natural resources in PACA:
  - Use of rangelands and marginal lands, maintaining activities and landscapes: increasing ecosystems resilience (biodiversity, fire hazards), natural resource management
Global change and vulnerability → PACA

1. Demographic contrast (coast/hinterland)
2. Landscape management
3. Biodiversity, fire hazards
4. Market
5. Climatic change?
Hypothesis on the roles of livestock faced to global change

- **Main common changes**
  - Population and urbanization growth in the coastal zones
  - Uncertainty on rainfall $\rightarrow$ can be exacerbated with climatic changes (Christensen et al)?

- **Main role of livestock at the regional level in interaction with natural resources:**
  - Use of rangelands and marginal lands, maintaining activities and landscapes increasing ecosystems resilience (biodiversity, fire hazards), natural resource management.

- **Livestock at the household level in NWCZ:**
  - Significant contribution in food security and livelihood improvement
  - Livestock: creation of links between families, communities and regions through transhumance and migration $\rightarrow$ social capital (protection, insurance, cement between the Mediterranean cities and its hinterlands)
Global change and vulnerability → North Coastal zone

1. Climatic change → Drought events
2. Demography → Urbanization
3. Market change at regional/local levels
4. Tourism and migration → employment, land pressure and access, market dev.
5. Biodiversity
Objectives....

- Different roles at different levels
- How to assess the role of livestock in adaptation process on these two contrasted zones?
Some points to be highlighted

- Adaptation toward uncertainty instead of adaptation to a known future

- Analysis articulating short term/long term, multiscales, multidisciplinarity

- Vulnerability and Resilience are major concepts to address adaptive capacity
A general framework to analyse adaptive capacities/ resilience/vulnerability

Robustness of agro ecological system

From Frazer 2007, Dong 2011
Alternative livelihood options

- understanding the differential capability of rural families to cope with crises such as droughts (close to vulnerability concept) and understanding strategies of families to adapt

- focuses attention on the assets of rural people, and how different patterns of asset holding (land, stock, food stores, savings etc.) can make big differences to the ability of families to withstand shocks.
4 types of assets are recorded

- The **financial capital** that covers all resources including savings or borrowing;

- The **physical productive assets** such as land, agricultural equipment, livestock (structure, composition, health), household assets (housing, transportation, ..) that constitute stores of value and therefore savings in the event of external shocks;

- The **human capital** refers to the personal resources such as education, training, health, nutrition, housing;

- And finally, **social capital** refers to social resources.
Mains variables (assets) affecting adaptation (strategies)

- Social
- Family
- Livestock
- Land
- House
- Physical assets
- Social capital

Diagram showing the relationships between these variables on a 2D plot.
Main elements determining robustness:
- Diversity of farms, his renewal
- Consistency between farming activities and resources availability
- Contribution in maintaining resilience of ecosystems

Multi scale analysis: farm and local scale.
- Local meaning sensitive toward social network (community) and farming systems definition
The farm diversity and his renewal (agrarian diagnosis, ex post analysis at local scale)

Main elements to characterize the system:

- Physical resources the system rely on and main practices
- Social insertion (network)
- Integration in economy (market, public policies)
A special interest on describing co-evolution between the farming systems and land use/land cover changes.
Institution axis (1)

- Implementation of policies at different scales: from national (or supra for EU.), regional, local level
- Market organisation for livestock products, access to these market for producers

Analysis are dealing with:

- Governing mechanism (actors involved: livestock farmers)
- Translation, adaptation of rules operated at each level
- Regulations operated (access for farmers to resources)
In our situation applied relatively to question pointed out through analysis about other axes (agro-system robustness mainly). As example for Provence region:

- Implementation of European environmental policy and land use (access to resources, innovation concerning farming know-how)
- Settlement of young farmers and renewing of diversity
- Choices operated for segmentation of products in marketing channels: emerging marketing channels, commitments with diverse farming systems.
SOME RESULTS
Classification of families in rain-fed (From Sidi Barani to Marsa Matrouh)

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Human asset</th>
<th>Land asset</th>
<th>Livestock asset</th>
<th>Non-agricultural jobs</th>
<th>Social asset</th>
<th>Monetary poverty (per capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most vulnerable (profile 1)</td>
<td>18 mb</td>
<td>Rainfed: 12 F Wadi: 3 f. Pasture: 6 F. Trees: 122</td>
<td>Ewe/goat: 45 Camel: 11</td>
<td>occasional</td>
<td>Weak social link</td>
<td>Solve pb.</td>
</tr>
<tr>
<td>Highly vulnerable (profile 4)</td>
<td>22 mb</td>
<td>Rainfed: 7 F Wadi: 3 f. Pasture: 1.5 F. Trees: 73</td>
<td>Ewe/goat: 17 Gov job</td>
<td></td>
<td>Strong tribal link</td>
<td>-&gt; loan</td>
</tr>
<tr>
<td>Less vulnerable (profile 2)</td>
<td>23 mb</td>
<td>Rainfed: 20 F Wadi: 10 f. Pasture: 8 F. Trees: 327</td>
<td>Ewe/goat: 53 Gov job/business</td>
<td></td>
<td>Strong tribal link</td>
<td></td>
</tr>
<tr>
<td>Least vulnerable (profile 3)</td>
<td>24 mb</td>
<td>Rainfed: 103 F Wadi: 23 f. Pasture: 110 F. Trees: 735</td>
<td>Ewe/goat: 256 Camel: 12 Gov. job</td>
<td></td>
<td>Strong link with tribe and MRMP</td>
<td></td>
</tr>
</tbody>
</table>
Results: livelihoods and agro-systems in Egypt (2)

Profile 1. Most vulnerable with very weak tribal links
Profile 2. Less vulnerable with only tribal links
Profile 3. Least vulnerable with strong out and in-tribal links
Profile 4. Highly vulnerable with strong social tribal links

Average data points for different indicators such as family members, head education, etc.
### Results: Livelihoods and Agro-Systems in Egypt (1)

#### Abilities for families to find outside farming jobs according agro systems

<table>
<thead>
<tr>
<th>Item</th>
<th>Zone</th>
<th>Public employee</th>
<th>Private employee</th>
<th>Occasional worker</th>
<th>Agricultural worker</th>
<th>Private business</th>
<th>Job in tourist industry</th>
<th>migration to Libya (declared)</th>
<th>Shepherd</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain-fed zone</td>
<td></td>
<td>29%</td>
<td>18%</td>
<td>11%</td>
<td>13%</td>
<td>9%</td>
<td>1%</td>
<td>7%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>New reclaimed land</td>
<td></td>
<td>21%</td>
<td>21%</td>
<td>7%</td>
<td>7%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Siwa</td>
<td></td>
<td>13%</td>
<td>3%</td>
<td>13%</td>
<td>33%</td>
<td>3%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
</tr>
</tbody>
</table>

#### Income from livestock, income from crops, off-farm income, family income, and per capita income (US$)

<table>
<thead>
<tr>
<th>Zone</th>
<th>Income from livestock</th>
<th>Income from crops</th>
<th>Off farm income</th>
<th>Annual family income US$</th>
<th>Per capita income (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain-fed zone</td>
<td>40%</td>
<td>45%</td>
<td>15%</td>
<td>14,262.43</td>
<td>1.85</td>
</tr>
<tr>
<td>New reclaimed land</td>
<td>62%</td>
<td>30%</td>
<td>8%</td>
<td>23,596.75</td>
<td>3.32</td>
</tr>
<tr>
<td>Siwa oasis</td>
<td>28%</td>
<td>49%</td>
<td>23%</td>
<td>9,669.26</td>
<td>1.70</td>
</tr>
</tbody>
</table>
Robustness of A. E. S. and institutions (C.S. in Provence)

Differentiating and renewing systems
Robustness of A. E. S. and institutions (C.S. in Provence)

Related changes in land use/land cover (1980- to day)

- Winter moving of flocks for new farmers looking for forage
- Summer moving of flocks to get subsidies alpine grasslands
- Mobility to face problems of access to land or to get subsidies
- New encroachment on rangeland
- North oriented slopes “definitively” converted in forest
Robustness of A. E. S. and institutions (C.S. in Provence)

Main changes observed in farming systems

- A huge increase of flock size and specialization of systems during 1990’s

- Renewing diversity: some new systems appears along time mainly depending on settlement of new comers into farming (1980’s)

- Present PAC support increases vulnerability of new comers (land tenure)

- Increased use of grazed forage resources outside the area due to summer and/or winter mobility of flocks (adaptation)
Robustness of A. E. S. and institutions (C.S. in Provence)

- Subsidies and regulation concerning land tenure encouraged flock increasing, mobility and released pressure on local rangelands.

  Forage availability is reduced on these areas and homogenization of landscape becomes problem regarding fire hazards and environment.

- Decreasing of farmers number and increasing of their mobility limit commitment with social expectations and as response lower concernment of local actors toward livestock farmers.
DISCUSSIONS
Reducing consistency between farming systems and local resources

Local spécialisation reducing alt. opportunities

Livestock farmers set aside of institutions

Reducing consistency between farming systems and local resources

...Need to be confronted to a set of contrasted situations...

As a discussion (1)

an holistic way to describe dynamics of adaptability/vulnerability of local farming systems?

An other case study
Main challenges for further research…

- integrate family, territorial and extra territorial scales (with different time scale) in a pertinent research approach…
- combine/integrate historical, anthropological, socioeconomic, geographic and agronomy approaches to elaborate pertinent scenarios of adaptation…

Usefullness to increase local adaptive capacities

- To help local actors to maintain adaptability toward uncertain future, need to be tested in participatory research as a way to promote forecasting
...Thank you...

And be sure that livestock remains at the core of adaptive process for rural society in the Mediterranean.