
Overall announced budget: 492753 €

Coordinator Véronique Alary, CIRAD/ICARDA, Morocco

ARIMNet & ARIMNet2 meeting – 14-16 March 2016, Lisbon, Portugal
CONSORTIUM
(Partners, skills, added value of transnational cooperation)

- **Partner 1 (Coordinator)**: CIRAD-SELMET. The research unit SELMET is dedicated to Mediterranean and tropical livestock systems with skills in system approaches and co-conception in LS and methodological tools attached.

- **Partner 2**: IAV Hassan II; one of the leading institution of agricultural science research and teaching in Morocco.

- **Partner 3**: APRI/ ARC; Its multiple experimental stations, field knowledge and cumulative data on animal performances over the country constitute inestimable research knowledge to design and assess sustainable innovation in the field of animal system.

- **Partner 4**: National Institute of Agronomic Research brings together INRA researchers and SupAgro teachers. The team developed multidisciplinary approaches of the Livestock FS in French Mediterranean area

- **Partner 5**: Institut de Recherche pour le Développement with specific approaches in the assessment of socio-ecological sustainability (co viability).
PROJECT OBJECTIVES

Objective 1
- To identify efficient crop-livestock systems in the Mediterranean context in order to make a better use of water, soil, crop residues, rangeland forages, etc. (resource use efficiency) and to increase their production (to meet the rising local demand) or/and to reduce their costs (socio-economic efficiency).

Objective 2
- To evaluate their adaptive capacity, vulnerability and flexibility in the face of current stresses and changes.
  - To assess their socio-ecological co-viability and resilience with regard to demographic growth and in a historical perspective.
  ➜ To develop future priorities for livestock development in the Med. context

Objective 3
- Strengthening of synergies and scientific collaborations between the partners given the interdisciplinary nature of it
SCIENTIFIC APPROACH

Data collecting methods
- From the agrarian diagnostic at the territorial level to deep follow-ups at the level of livestock systems, passing through family farm surveys and narrative approaches;

Efficiency assessment
- Social assessment: labour and land efficiency; coordination at territorial level;
- Economic assessment: micro-economic indicators at farm level (net income; profit)
- Environmental assessment: 1) Ecological Network Analysis (ENA) to quantify the fluxes between crop and livestock compartments over of a gradient of C&L integration; 2) Efficiency, productivity and resilience indicators based on land and nitrogen management;

Vulnerability, Adaptation and resilience
- Livelihood approach: assets and diversification
- Adaptation: based on historical and transversal approach of farms and their environment
- Resilience: social dimension of adaptive co-management of ecosystems and landscapes (rules of users)
STAKEHOLDERS’ INVOLVEMENT

- Involvement of the research teams; share of experiences and approaches during workshops or trainings;

- Participation of land holders and development agencies in the field work in Egypt

- In the Haut-Atlas: partnerships with ORMVAO and IAV in Morocco and IRD and CIRAD in France (research and development institutes) ➔ expected output: pact of socio-ecological resilience

- Maintenance of historical partnerships with pastoral agencies in French sites and development of news with local representatives involved in territorial development (crop & livestock)
ACHIEVEMENTS / INNOVATION

WP2: Global context for livestock

- Three research sites have been conducted: bibliography review of past or on-going projects in France, farm survey on 175 farmers in Egypt with a family story, territorial approach in Morocco

- Identification of models of typical farms in each location

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All these approaches stressed the function of biomass preservation of livestock in the Mediterranean context at different scales. For instance:

- In Egypt: relevance of biomass recycling through forage for animal feeding and use of manure on forage crops and grasslands at farm and regional scale;
- In France: relevance of biomass recycling mainly at farm level BUT at territory scale, role of forage crops (alfalfa, leys) in rotation for agronomic purposes (for crop farmers), feed for livestock farmers + stakes of landscape and biodiversity purposes.
ACHIEVEMENTS / INNOVATION

WP4: Assessment of the adaptive capacity to changes

- Highlighting the differential roles of social, spatial and temporal coordination in the adaptive process of the systems along a agro-ecological gradient of integration (figure at right);

- the successful experiences are highly dependent on livestock activities for cash funding and soil preservation and, more generally, they are dependent on the diversification.

<table>
<thead>
<tr>
<th>Models</th>
<th>Cereal plateau</th>
<th>Agro-sylvo-pastoral system</th>
<th>Plain/Mountain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of relations</td>
<td>Neighbor</td>
<td>Inter-individual</td>
<td>Multi-actors</td>
</tr>
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<td>Mode of coordination</td>
<td>Proximity</td>
<td>Mutual agreement</td>
<td>Collective action</td>
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<td>Temporal coordination</td>
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<td>Spatial coordination</td>
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<tr>
<td>Social coordination</td>
<td>+++</td>
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Figure 4. Adaptive capacities of systems based on coordination models (South of France, Master thesis, 2015)
ACHIEVEMENTS / INNOVATION

WP5: Socio-ecological sustainability

The analysis of the territorial system based on the characterization of the farming systems and their interactions in link with the space and social organization put in evidence the specific roles of rules of users in the territorial management.

(In progress)
KEY PUBLICATIONS & PRODUCTS


• Aboul naga et al. Opportunities and challenges of diversified crop-livestock systems in small scale farms in West Delta New reclaimed lands, Egypt (in preparation)
RESULTS’ VALORISATION & DISSEMINATION

Master degree

- Sannito Y. 2013. Feed availability and its relationship to cattle dietary rations and milk yield
- Ghabiyl Y. 2014. Managing work constraints in mixed crop/livestock farms
- Daburon A. 2013. dairy farming systems in greater cairo. Montpellier University

Doctorate and Post-doctorate


Data base and cartography and Website and Others

- Farm databases; qualitative and quantitative follow-ups
RESULTS’ VALORISATION & DISSEMINATION

Communications (8 communications+2 in preparation)+ project workshops…


2 communications proposed at EAAP, 2016.

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DIFFICULTIES FACED & WAYS TO OVERCOME THEM

- Financial difficulty in Morocco and Egypt: no available fund in Egypt; heavy administrative process to get the operational funds in Morocco. Ways to overcome it:
  - constitute a pool of funds out of the countries that gather all the country contributions and that is managed in the same way for all countries;
  - Provide seed money for some joint research activities within selected projects.

- Important social and political changes in Mediterranean make difficult prospective

- Strong differentiation of previous knowledge on field situations brake in the comparative analysis between the three locations
NEXT STEPS

(Consortium & project sustainability; Planned collaborative R&I activities)

Case-study analysis

- Morocco: PhD student who works on the specific roles of rules of users in the territorial management
- France: In-depth analysis of a collective action to support Crop-Livestock Integration at long distance; Assessment of the impacts of the CLI on livestock services/functions at territory scale, through a modelling approach;
- Egypt: data analysis on the crop-livestock by-monthly follow-up + farm data analysis

Planned collaborative R&I activities

- Some common indicators related to labor, net income and biomass comparing analyses will be developed in future scientific papers.
- Due to the variety of databases in each case study we propose to develop a metadata base that will give the main description of the contents of each country database.
- Further collaborative research projects on the adaptive capacity of these systems facing global changes.
Thank you for your attention!

Dry highlands, France

Plain of Gharb, Morocco

New reclaimed lands, Egypt