Assessing the sustainability of the integrated crop-livestock systems in Lebanon – case study: West Bekaa and Mount Lebanon.

Preliminary results

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Montpellier, September 2015
Outline

1. Objectives
2. Rationale
3. Methodology
4. Achieved work + Preliminary results
5. On-going activities
6. Future activities
1. Objectives

Determine the indicators of sustainability of crop-livestock systems in a Mediterranean country: Lebanon

- Identify the risks/vulnerabilities on the local and regional levels
- Define the adaptation strategies of the various types of farms facing these risks/vulnerabilities
- Build a model based on the indicators and test the different scenarios with local people
2. Rationale

• No previous work on the resilience of farming systems in the country
• The sustainability models used in Lebanon are adapted from the French model IDEA and not created specifically for the Lebanese context
• Interest in studying the resilience of the farming systems in the light of the **long history** and **present situation** of the Lebanese people
How to define resilience?

Resilience is the capacity of a system to recover, reorganize itself and develop after being subject to external stresses and disturbances (Walker et al., 2004)

Past exposures to disturbance are important to build resilience (Holling, 1973; Levin et al., 1998). Hence the ability to learn and adapt plays an important role (Folke et al., 2002).
QUESTION: assess the resilience

What factors are affecting the farms’ resilience?
What indicators to measure this resilience?
What are the different strategies adopted by the farming systems facing their vulnerabilities?
3. METHODOLOGY

- Describe
- Understand
- Model
- Share with local stakeholders

Literature

Survey – data collection

Statistical analyses
Lebanese Republic
Surface area: 10452 sq. km
Population: Apr. 4.4 M

Study area: Apr. 1669 sq.km
Why West Bekaa & Mount Lebanon?

• ESDU projects: focusing on these 2 regions
• Accessibility
• Previous projects: focused on the Northern Bekaa – Aarsal
• Importance of farming systems in both regions and interest in studying them
### Description of the study area
(2 research sites)

#### West Bekaa
- Between the Eastern slopes of Mount Lebanon and the Anti-Lebanon mountains – 1950/700/2814 alt. (mount Hermon)
- 610 - 1352 mm of rain
- Vineyards, vegetables, forage, cereals and fruits orchards
- Table grapes
- Intensive bovine production. Large herds of small ruminants grazing on natural pastures and crop residues

#### Shouf
- Southern Western slopes of Mount Lebanon – 600 to 1950 m alt.
- 600 – 1200 mm of rain
- Olive groves, orchards of figs, apple, peaches
- Small to medium sized bovine farms. Small ruminant herds graze on mountainous pastures
Description of the study area

**West Bekaa**
- Proximity to the Syrian borders
- Linked to large markets in W.B and C.B to sell agricultural crops

**Shouf**
- Presence of the Shouf Cedars Natural Reserve
- Linked to large markets in the costal Shouf to sell agricultural crops
Description of the study area

Central Bekaa

West Bekaa

Animal Feed

Pastures
(Mount Lebanon)

Shouf

Relation between the W.B and Shouf

Achieved work
Winter Pastures – W.B.
Summer Pastures – W.B.

Summer and Winter Pastures during winter – W.B.
Small bovine farms in the Shouf and W.B.
4. Achieved work + Preliminary results

Survey (Jan14-Jan15)

- Selected villages
- Animal husbandry activities
- Key persons and contacts from previous projects
- Direct interviews with the farmers (questionnaires)

Achieved work
4. Achieved work + Preliminary results

Questionnaire

Social data
- Age
- Education
- Family labor
- Outsourced labor
- Other occupation
- Est. of the farm

Farm Activities
- Land tenure and surface
- Composition of the herd
- Pastures use and feed source
- Land use: crops
- Milk value chain

Changes
- Farm activities
- Number of animals
- Milk and crop production
- Pastures
- Market
- Climate

Reasons (Perception of change)

Adaptation

Economic data
- Income of different activities
- Farm expenses
- Contribution of the farm to household income

Achieved work
4. Achieved work + Preliminary results

77 FARMERS in 39 VILLAGES

Farms distribution

- West Bekaa: 58%
- Chouf: 42%

Herds composition

- Bovine: 49%
- Small ruminants only: 47%
- Caprine & ovine: 41%
- Caprine only: 54%
- Ovine only: 5%
- Bovine + SR: 4%
<table>
<thead>
<tr>
<th>PERCEPTION of the FARMERS</th>
<th>ACTION of the FARMERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHANGES</strong></td>
<td><strong>REASONS</strong></td>
</tr>
<tr>
<td><strong>Pastures:</strong> less productivity, loss of some wild plants sp., limited access etc.</td>
<td><strong>Climate change:</strong> decreased precipitations, drought and high temperatures</td>
</tr>
<tr>
<td>Decrease in milk <strong>prices</strong></td>
<td></td>
</tr>
<tr>
<td>Increase in feed <strong>prices</strong> &amp; cost of production</td>
<td>Local and national <strong>policies</strong> regulating access to pastures, milk &amp; feed prices</td>
</tr>
<tr>
<td>Decline in crop and/or milk <strong>production</strong></td>
<td><strong>Market:</strong> less opportunities, monopoly by traders, animal traffic from Syria</td>
</tr>
<tr>
<td>Animal <strong>health:</strong> unknown diseases, decreased fertility and productivity</td>
<td><strong>Political/security</strong> situation, lack of government support</td>
</tr>
</tbody>
</table>

Preliminary results
5. On-going activities

Typology of the systems: Variables selection

- **SOCIAL**
  - Region: 2 types → comparison
  - Herd: 3 types → bovine, caprine, caprine + ovine
  - Activity: 2 types → animal husbandry, animal-crop integrated

- **FARM ASSETS**
- **FARM ACTIVITIES**
- **MILK**

S.R.: use of pastures
Typology of the systems

- FARMS TYPES
- PERCEPTION of CHANGE
- ADAPTATION to CHANGE

On-going
6. Future Activities

- Build the model based on the indicators and factors
- Test the resilience through simulations
- Debate and share (validate) the model through participatory workshops with local stakeholders (farmers, extension officers, agro-engineers, feed suppliers, etc.)
- Adjust the model accordingly
6. Future Activities

- Survey & Data collection
- Literature
- Statistical analyses + typology
- Determining the sustainability indicators
- Building the model
- Test the model and discuss it
Thank you!
REFERENCES