57th EAAP Annual Meeting, Antalya, Turkey, September 17-20, 2006

Session L15.3

Advances in decision support concepts and tools
for managing towards sustainability

Evaluation of animal production sustainability with IDEA in the Mediterranean context.

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Abstract

The IDEA (Indicateurs de Durabilité des Exploitations Agricoles, or Farm Sustainability Indicators) method has been implemented for sustainability assessment of small ruminant production systems in Lebanon, and dairy cows farming systems in Algeria. This method is based on 40 indicators representing the agro-ecological, socio-territorial and economic dimensions of the farming system's sustainability. In the context of the Lebanese small ruminant pastoral or agro-pastoral systems, 3 indicators have been omitted (stocking density, N balance, financial autonomy) and 9 have been adapted by modification of the scores (1 for diversity , 2 for space organisation, 3 for farming practices, 1 for quality of products, 1 for employment and services, and economical efficiency). For zero-grazing dairy cows in Mitidja, where conditions are closer to those observed in systems for which IDEA has been designed, modifications concern 8 indicators. Difficulties to compute indicators arose from: i) unavailability or uncertainty of information such as those related to fertilisation, pesticide use, or economical data, ii) different scales for local references such as land surface, or iii) land use in pastoral systems.

This presentation shows the approach used for adapting the method to these contexts, while keeping its ability to fit the criteria of assessment methods, namely sensibility, specificity, robustness. A typology of systems according to their sustainability is presented.

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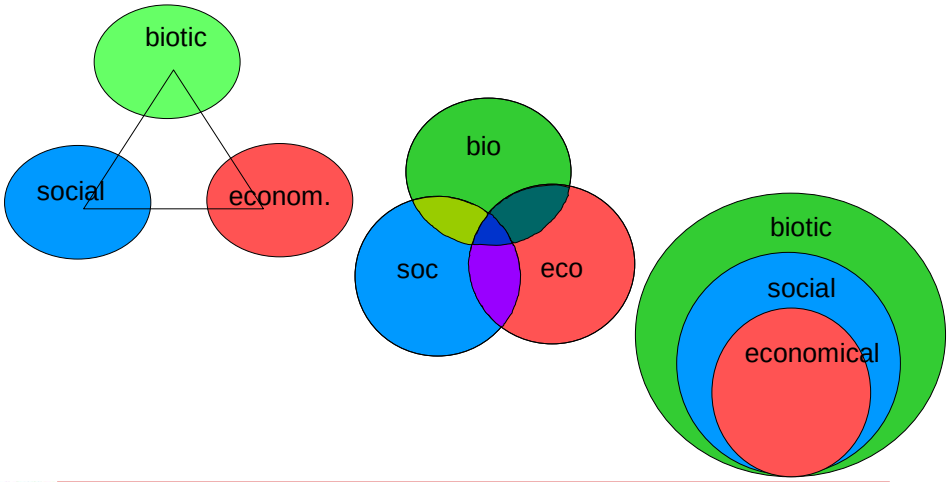
Introduction

- Why assessing sustainability
  - Diagnosis
  - Comparison/reference (group, objective)
  - Dynamics of systems
  - Quality sign (label)
  - Responses (managers, decision makers)

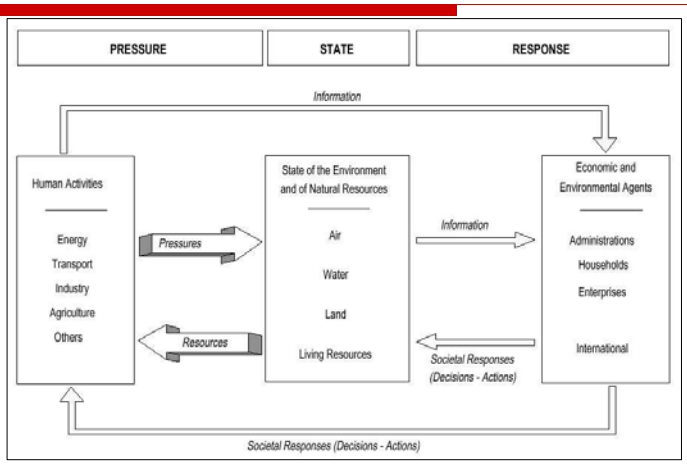
Sustainability representations



Indicators

- An indicator quantifies and simplifies phenomena and helps us understand complex realities
- Represent:
  - State (how, present)
  - Pressure (why, past)
  - Response (what, future)

Indicators



source: OECD 1993

Presentation of the IDEA method

- Indicateurs de Durabilité des Exploitations Agricoles (IDEA)

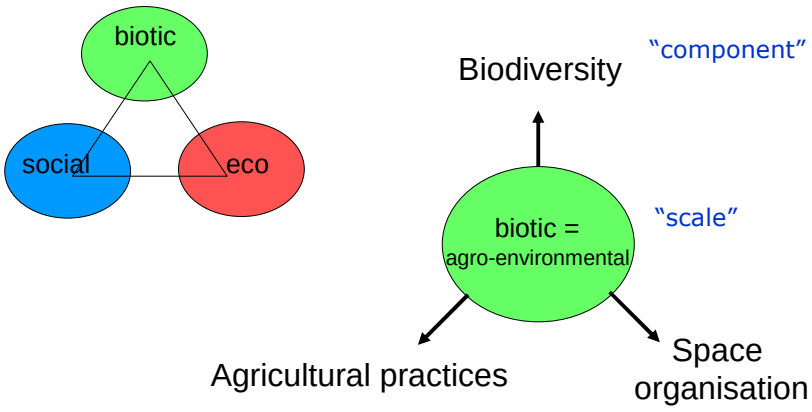
  =

- Farm Sustainability Indicators

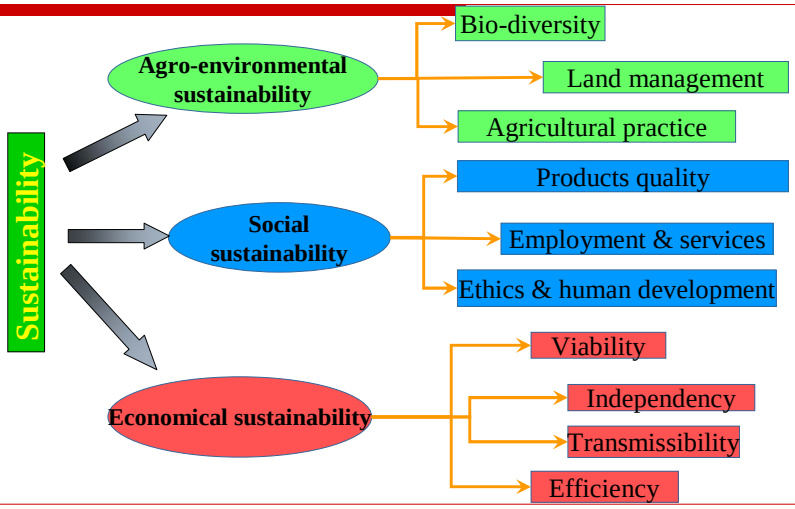
Presentation of the method

- Objectives (16):
  - Consistency
  - Adaptability
  - Biodiversity
  - Non-renewable resources management
  - Soils preservation
  - Water preservation/management
  - Atmosphere preservation
  - Landscape preservation
  - Product quality
  - Quality of life
  - Ethics
  - Local development
  - Citizenship
  - Human development
  - Employment
  - Animal welfare

Presentation of the method



Presentation of the method



Presentation of the method: agro-environmental scale

Components	Indicators	Maximum values	
Diversity	Diversity of annual or temporary crops	13	Maximum total of 33 sustainability units
	Diversity of perennial crops	13	
	Diversity of associated vegetation	5	
	Animal diversity	13	
	Enhancement and conservation of genetic heritage	6	
Organisation of space	Cropping patterns	10	Maximum total of 33 sustainability units
	Dimension of fields	6	
	Organic matter management	6	
	Ecological buffer zones	12	
	Measures to protect the natural heritage	4	
	Stocking rate	5	
	Fodder area management	3	
Farming practices	Fertilisation	10	Maximum total of 34 sustainability units
	Effluent processing	10	
	Pesticides and veterinary products	10	
	Animal well-being	3	
	Soil resource protection	5	
	Water resource protection	4	
	Energy dependence	8	
	Grand total	100	

source: Zahm et al. 2006 (after Vilain 2003)

Presentation of the method: socio-territorial scale

Components	Indicators	Maximum values	
Quality of the products and land	Quality of foodstuffs produced	12	Maximum total of 33 sustainability units
	Enhancement of buildings and landscape heritage	7	
	Processing of non-organic waste	6	
	Accessibility of space	4	
	Social involvement	9	
Employment and services	Short trade	5	Maximum total of 33 sustainability units
	Services, multi-activities	5	
	Contribution to employment	11	
	Collective work	9	
	Probable farm sustainability	3	
Ethics and human development	Contribution to world food balance	10	Maximum total of 34 sustainability units
	Training	7	
	Labour intensity	7	
	Quality of life	6	
	Isolation	3	
	Reception, hygiene and safety	6	
	Grand total	**100**	

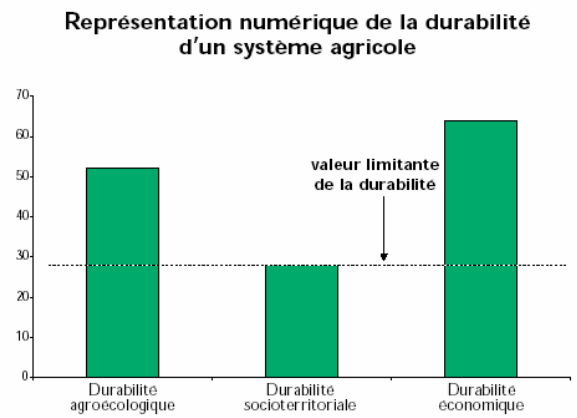
source: Zahm et al. 2006 (after Vilain 2003)

Presentation of the method: economical scale

Components	N°	Indicators	Maximum Values	
Economic viability	C1	Available income per worker in relation to national legal minimum wage	20	maximum 30 units
	C2	Economic specialisation rate	10	
Independence	C3	Financial autonomy	15	25 units
	C4	Reliance on direct subsidies from CAP and indirect economic impact of milk and sugar quotas	10	
Transferability	C5	Operating capital (not taking account value of land)	20	20 units
Efficiency	C6	Operating expenses as a proportion of production value	25	25 units
Total			**100**	

source: Zahm et al. 2006 (after Vilain 2003)

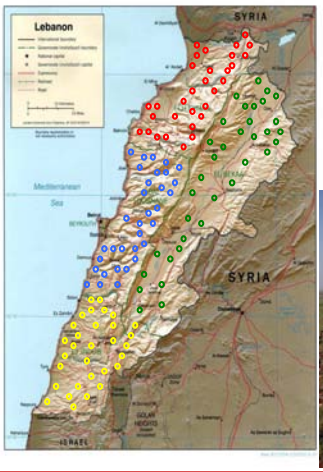
Presentation of the method



Adaptation of the method to the Mediterranean contexts

- Climatic conditions
- Roughage scarcity
- Dependence on importations
- Importance of pastoral systems
- Specific references

Small ruminant systems in Lebanon



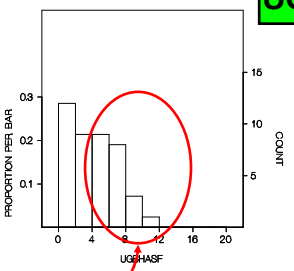
Dairy farms in Algeria

Modifications to the original IDEA method for Algerian dairy farms:

Indicators	Vilain 2003		Bekhouche 2005	
A5 Cropping patterns	No crop > 20% of surface	8	No crop > 20% of surface	8
	25% :	7	30%	7
	30% :	6	40%	6
	35% :	5	50%	5
	40% :	4	60%	4
	45% :	3	70%	3
	50% :	2	80%	2
	+ de 50%	0	+80%	0
	If mixted crop :	2	If mixted crop :	2
A6 Dimension of fields	No field greater than :		No field greater than :	
	6ha :	6	0ha :	-2
	8ha :	5	3ha :	6
	10ha :	4	8ha :	5
	12ha :	3	15ha :	4
	14ha :	2	20ha :	3
	16ha :	1	>21ha :	1
	If mean size <=8ha :	2	If mean size <10,5ha	2
A9 Stocking rate	Stocking rate		Stocking rate	
	< à 0.5 UGB/ha SFP	2	0 to 1 UGB	2
	0.5 to 1.4 UGB/ha SFP	5	1 to 3 UGB	5
	1.4 to 1.8 UGB/ha SFP	3	3 to 8 UGB	3
	1.8 to 2 UGB/ha SFP	1	> 8 UGB	0
	> 2 UGB/ha FFP	0		

Modifications to the original IDEA method for Algerian dairy farms:

UGB / SFP

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 0  335699
 1H 012689
 2  1122368
 3M 49
 4  01489
 5  4666
 6H 0336
 7  2568
 8  00
 9  5
10
11  2
```

> 3UGB/ha SFP

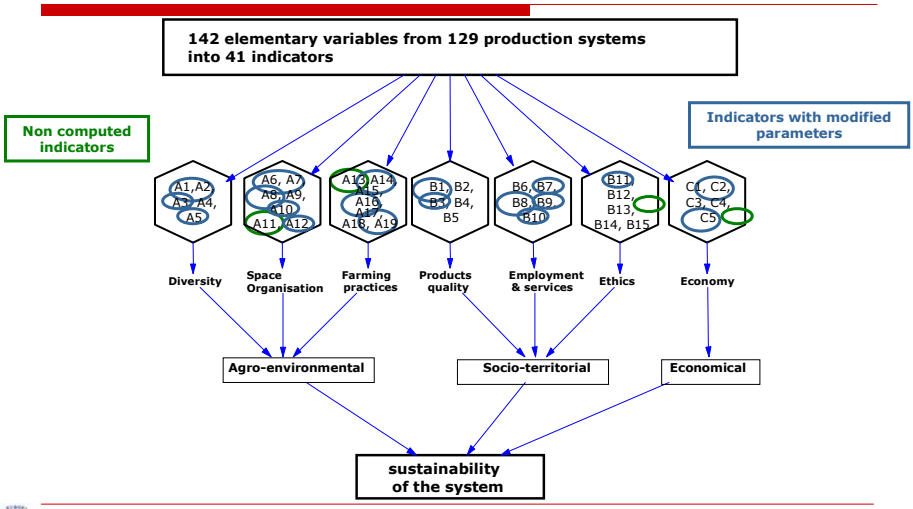
> 3UGB/ha SFP
29expl

Moy 4.11 UGB / ha SFP
Min 0.3 UGB / ha SFP
Max 11.2 UGB / ha SFP

Modifications to the original IDEA method for Algerian dairy farms:

- Agro-environmental scale:
  - Cropping patterns
  - Dimension of fields
  - Stocking density
  - Animal welfare
  - Soil protection
  - Irrigation
- Socio-territorial scale:
  - Contribution to employment
- Economic scale:
  - Economic specialisation
  - Transferability

Adaptations for Lebanese small ruminants systems



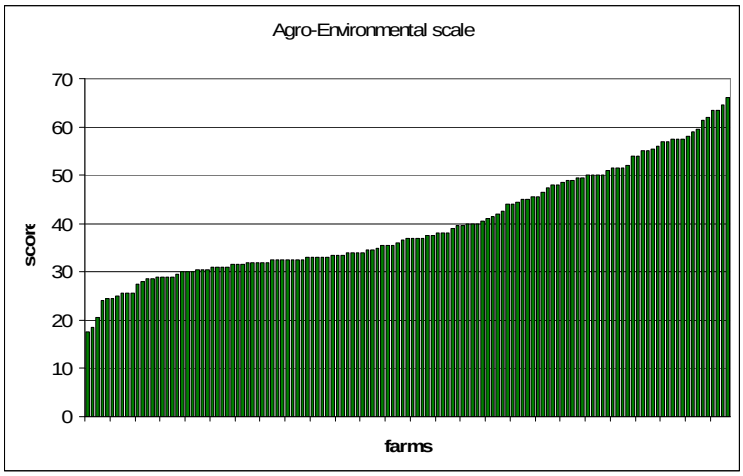
Adaptations for Lebanese small ruminants systems

- The scales and weighting have been changed for 36 indicators as a function of local specificities
- The computing modalities have been modified for 21 indicators
- 4 indicators have not been computed (2 for lack of data: fertilisation and stocking density, 2 for non pertinence (!?): hygiene & security, and financial autonomy)

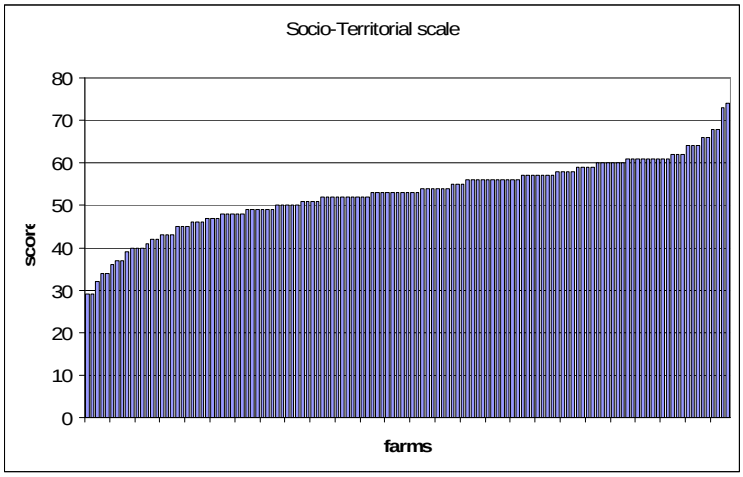
Evaluation of the method

- Indicators criteria
  - Reflect values, future vision
  - Actionable
  - Measurable (data collected)
  - Valid (measures what it is supposed to)
  - Reliable (consistency of measures)
  - Sensitivity
  - Robustness
  - Non redundancy

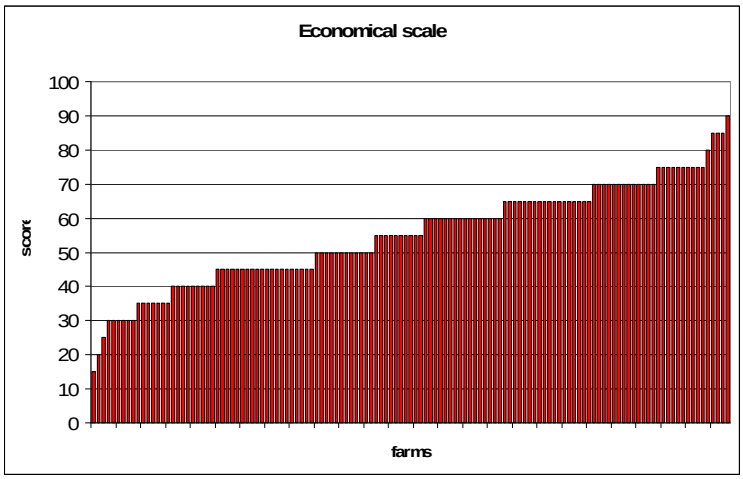
Evaluation of the method: sensitivity (small ruminants in Lebanon)



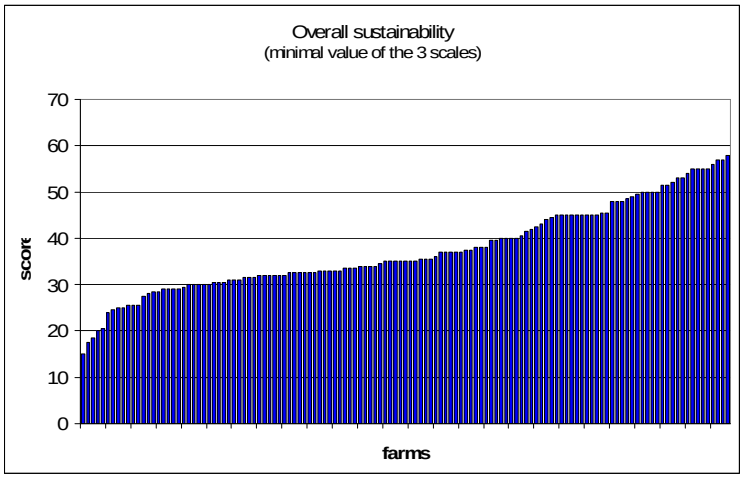
Evaluation of the method : sensitivity (small ruminants in Lebanon)



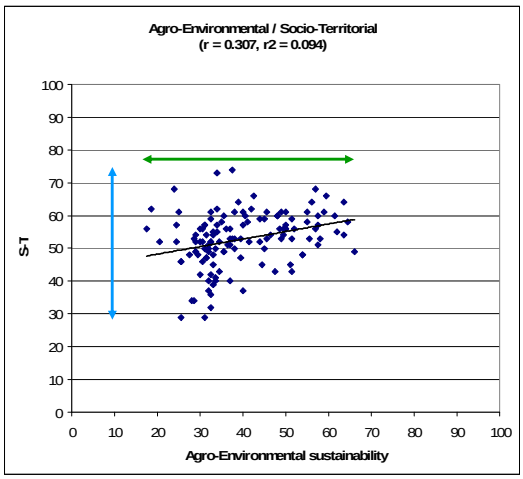
Evaluation of the method : sensitivity (small ruminants in Lebanon)



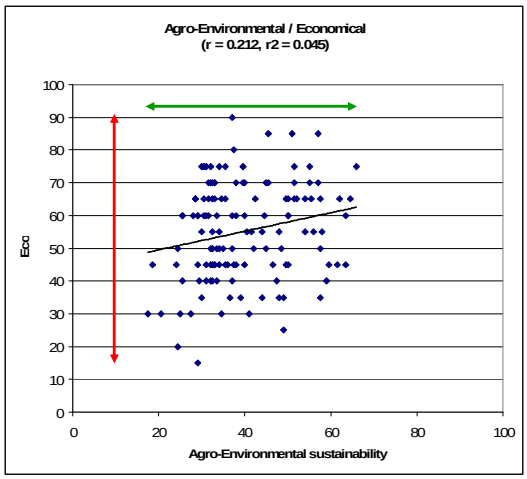
Evaluation of the method : sensitivity (small ruminants in Lebanon)



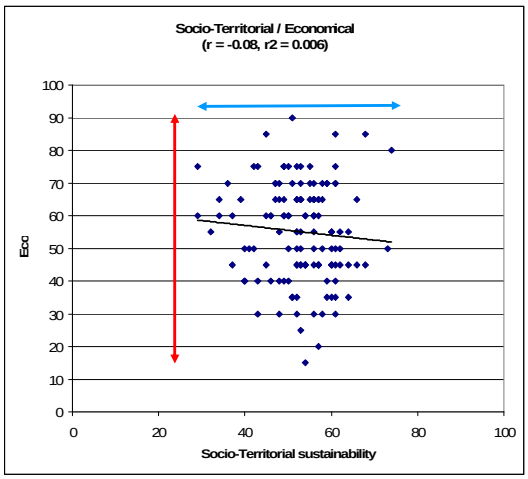
Evaluation of the method: (small ruminants in Lebanon)



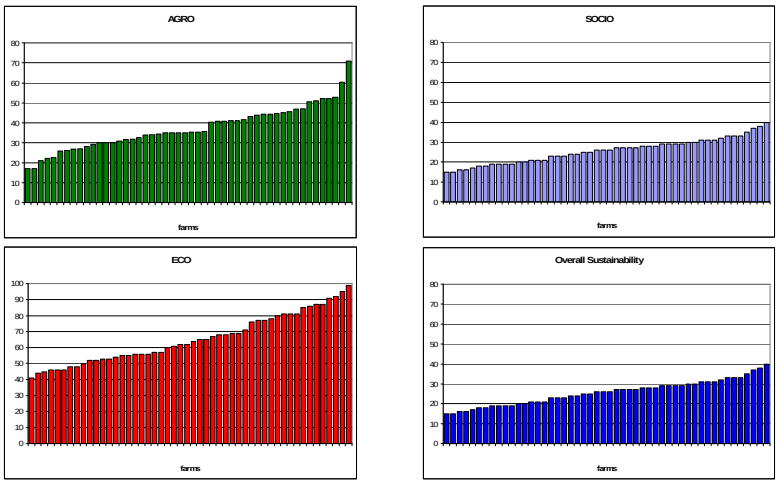
Evaluation of the method (small ruminants in Lebanon)



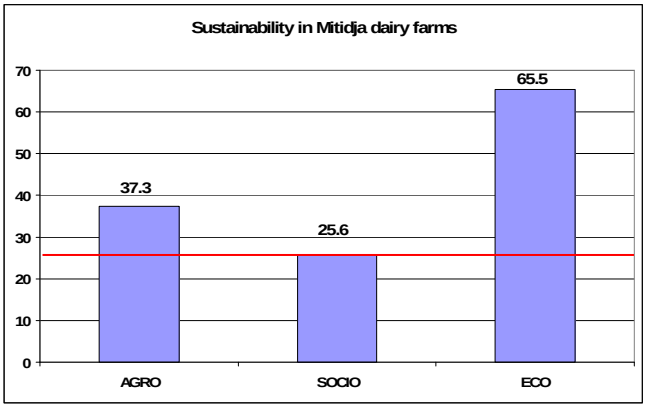
Evaluation of the method (small ruminants in Lebanon)



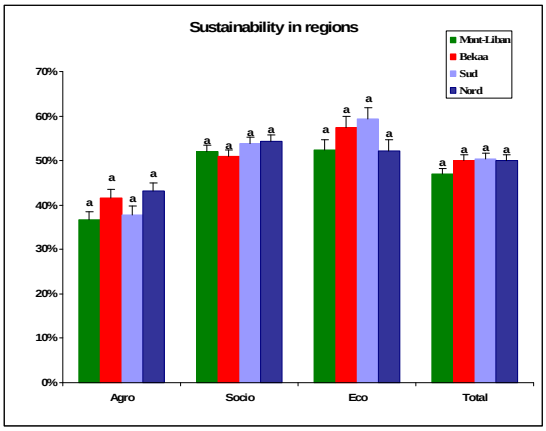
Sustainability in Algerian dairy farms (N. Bekhouche)



Sustainability in Algerian dairy farms (N. Bekhouche)

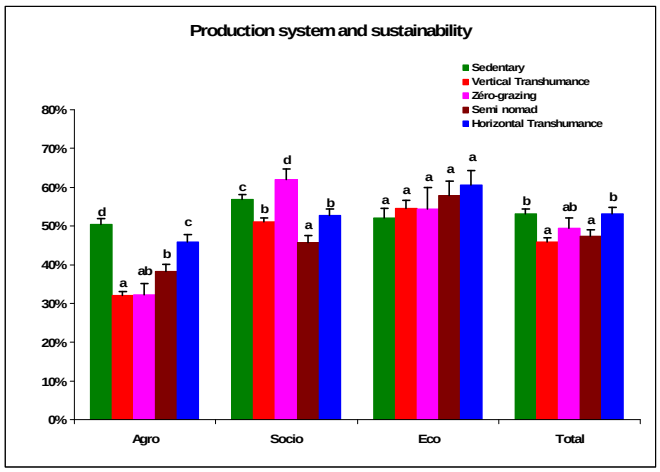


Typology of sustainability (small ruminants in Lebanon)



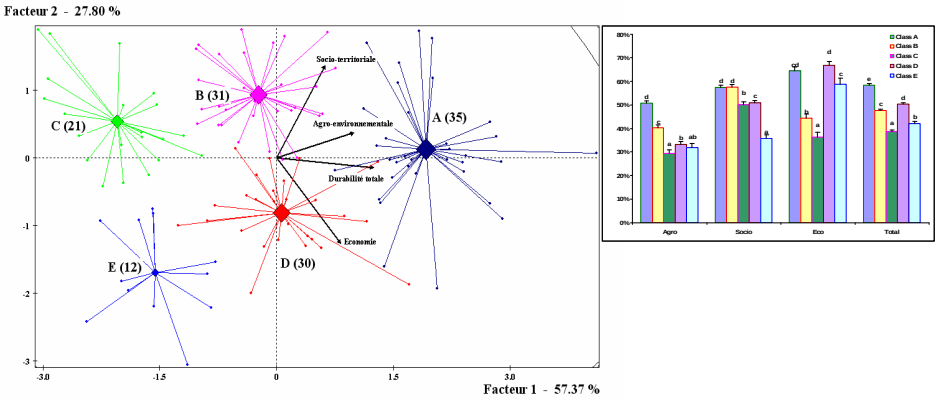
Srour 2006

Typology of sustainability (small ruminants in Lebanon)



Srour 2006

Typology of sustainability (small ruminants in Lebanon)



Srour 2006

Sustainability assessment with IDEA in Mediterranean countries:

- Small ruminants
  - Lebanon, farming system, G. Srour (2006)
  - Algeria, farming system, B. Ziki
  - Lebanon, food chain, R. El Balaa
- Cattle
  - Algeria, farming system, Mitidja, Annaba: N. Bekhouche; Setif: A. Bir; Tizi Ouzou: S. Bouzida.
  - Algeria, territory, Z. Far
  - Algeria, food chain, K. Ouakli
  - Tunisia, farming system, K. Kraiem (*this Meeting, L1.5*)

Conclusions

- Unavailability or uncertainty of some information (fertilisation, pesticide, economic, …)
- Subjectivity of some parameters
- Unavailability of references specific to the situation
- Weighting of indicators as a function of the importance of a factor in the specific situation

Conclusions

- Focus research on sustainability indicators pertinent in semi-arid/arid conditions
- Set up a common assessment tool (for inter-systems or inter-national comparisons)
- Analysis of production systems in relation to sustainability