Tropical and Subtropical Agroecosystems

SHORT NOTE [NOTA CORTA]

SOCIAL INDICATORS FOR EVALUATING SUSTAINABILITY OF GOAT LIVESTOCK FARMS: METHODOLOGICAL APPROACH

[INDICADORES SOCIALES PARA LA EVALUACIÓN DE LA SOSTENIBILIDAD DE FINCAS CAPRINAS: ENFOQUE METODOLÓGICO]

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SUMMARY

Currently, sustainability is an objective for any economic activity or development process. Many studies with theoretical reflections relating to the concept of sustainability exist, but few methodological contributions adequately quantify and evaluate the level of sustainability of agraricultural systems, specifically with respect to small ruminant. The level of sustainability of these systems should be estimated taking into account not only economic and environmental aspects, but also social ones. Despite its importance to the functioning of agraricultural systems, the social dimension has been little addressed, and is frequently ignored in studies of this nature. Then, the objective of this study is to carry out methodological reflections based on identification and quantification of social indicators applied to goat livestock farms. Furthermore, this study forms part of a broader comparative study on sustainable development of animal systems in Andalusia (Spain) and Chiapas (Mexico), in which economic, environmental, and social indicators are used in an integrated manner. The methodology used to obtain indicators is based on the authors´ knowledge of the functioning of goat livestock systems, focus groups and opinions of experts in the field, and revision of the available bibliography. As a result of the study, we propose a group of indicators made up of several variables based on the logical-mathematical principals of different scales of measurement as well as on multicriteria analysis. The social indicators proposed refer to several themes: *i) multi-functionality*; *ii) membership in professional associations*; *iii) implication for local life; iv) social well-being (quality of life, especially that related to work)*; and v) *continuity of the goats livestock activity.*

Key words: social indicators, sustainability, goat production.

INTRODUCTION

Small ruminants livestock systems represent one of the most important agricultural activity in various areas of the world playing a fundamental role, other than economic, such as ecological, environmental and cultural (Zervas et al., 1996, Calatrava and Sayadi, 2006). Today the term sustainability tends to refer to a balanced relationship among environmental, socio-cultural and economic aspects. The balanced relationship among these areas is the objective of the sustainability. Many studies with theoretical reflections relating to the concept of sustainability exist, but few methodological contributions to quantify and evaluate adequately the level of sustainability of agricultural systems, specifically with respect to small ruminant. In previous works, a preliminary analysis was made of the using of FAO-CIHEAM indicators and also adopting the method posed by Masera et al. (1999) to evaluate sustainability of small ruminant farms (Nahed et al., 2006a and 2006b). This proposal, which focused on technical-economic indicators - those covered by the FAO-CIHEAM method - was limited in terms of environmental and social indicators. Then, in the 6th FAO_CIHEAM seminar for the small ruminants network held in Ponte de Lima (Portugal), the authors have submitted a list of *environmental indicators* adapted to goat systems (Nahed et al., 2007). These indicators are grouped in

categories up to a total of 8: *(i) Agricultural practices; (ii) Soil; (iii) Water; (iv) Landscape; (v) Energy; (vi) Residues; (vii) Animal welfare; and (viii) Biodiversity*.
The objective of this study is to carry out methodological reflections based on identification and quantification of *social indicators* applied to goat livestock farms. The main result is a list of social indicators adapted to goat systems in the Mediterranean European areas, obtained through compared analysis of various methodologies, that supplementing the others two lists of indicators presented so far by the authors, in relation to economic and environmental components of sustainability (Nahed et al. 2006b; Nahed et al., 2007). And then, economic, environmental, and social indicators will be used jointly in an integrated manner.

MATERIALS AND METHODOLOGY

The methodology used to obtain indicators is based on the authors´ knowledge of the functioning of goat livestock systems, focus groups and opinions of experts in the field, and revision of the available bibliography.
First, a broad list of social indicators was elaborated, composed of by a simple (direct) or complex (indirect or integrating) indicators. This list of indicators and the correspondent dummy variables to be evaluated and quantified were discussed among academics knowledgeable of the topic, as well as from knowledge and experience on the theme, and was improved by consulting experts acquainted with the management of social indicators.
Complex indicators are made up of different variables, individually characterized as positive (yes = 1) or negative (no = 0), according to the presence or absence of the variables, and are estimated using the sum of the values 1 and 0, divided by the number of variables making up the indicator. After drawing up an initial list, the indicators were contrasted in the field in a group of farm goats. Following the completion of these testing, modifications were made to improve these indicators. However, complex indicators proposed in this paper, need to be validated by experts of the FAO-CIHEAM Observatory in order to formulate a global proposal which also includes those technical-economic and environmental indicators. After validation, the indicators of the global list will be classified according to sustainability attribute: productivity, stability, reliability and resilience, adaptability, equitability and independence (Conway 1985, 1987 and 1993), using, as a general guide, the MESMIS methodology (Masera et al., 1999) adapted to evaluate sustainability of animal production systems in the European Mediterranean areas (Alemán et al., 2005; Nahed et al., 2006a).

RESULTS AND DISCUSSION

As the result of this study, a group of social indicators was proposed to evaluate the sustainability of livestock farms. The social indicators proposed deal with several issues: i) Multi-functionality (multi-activity of producers, maintenance of the craft tradition on the transformation of the products, and searching for new marketing channels, among others); ii) Membership in professional associations and level of participation; iii) Implication on local social activities; iv) Social welfare (especially related with working issues); and v) Continuity of the goats livestock activity (possibilities for continuation of the farm, farmer's age, adaptation to innovations, educational and agricultural training levels).

1. Multifunctionality. This group of indicators is composed by: (i) *Economic diversity and diversification*: a complex indicator that assesses other activities carried out by the farmer on his farm: other livestock species, agricultural crops, forestry, hunting and rural tourism activities. This indicator also evaluates other economic activities carried out by the farmer outside the farm. (ii) *Maintaining tradition in processing milk*: this indicator assesses the fact of transforming raw material in some traditional products. (iii) *Marketing capability*: saling milk to local artesanal cheese-makers or a livestock cooperative; or his elaborated products. (iv) *Quality acknowledgment products*: this indicator assesses if the productions have any official certification of quality and if the products have received any awards or at least being recognized by the local community for their quality; (v) *Letting the farm for leisure time*: this is an indicator complex designed to meet the possibilities offered by the farm to be used for non-agricultural uses: agro tourism, hunting, sport activities, open days, which contributed to the maintenance of roads and the preservation of the traditional architectural heritage; (vi) *Employment generation*: this indicator evaluates the structure and type of manpower (El Aich and Waterhouse, 1999; Reseau d'Agriculture Durable, 2001).

2. Associationism. The *Associationism* index is used to measure the membership to professional associations related to goat activities (breeders' association, cooperative), and the degree of involvement in the activities of these associations. The level of this indicator will be higher if the farmer belongs to professional associations, being active within them, or working as a staff (Gonzálvez Pérez, 2001; Vilain, 2008).

3. Farmers implications in local life. This indicator assesses the level of participation of farmer in local social activities, both socially and economically speaking, includes: (i) *Participation in social activities*

that is the active involvement of farmer in any non-professional social organization (sport, cultural or political activities), as a membership or a staff. (ii) *Participation in the local economic life:* a complex indicator that gets positive appreciation in case the farmer lived in an urban area and made his purchases in local shops, participating actively in their economy (Vilain, 2008).

4. **Social welfare**. This index assesses welfare, both in working matters and some other aspects linked to daily life. The working welfare is a complex indicator that takes into account: (i) the *Perception that the farmer has about his work*, (ii) the *Perception of his income*, (iii) the *Possibility to have time for leisure*, (iv) the *Length of the workday* and finally (v) the *Reasons why he become a farmer* (because inherited the farm, or it is a profitable activity, or because he likes this activity). Other aspects affecting social welfare can be mentioned: (i) the *Difficulty of access and the distance to the exploitation* (ii) the *Cooperation with other farmers* (iii) the *Satisfaction and access to agricultural and livestock services* and finally (iv) the *Access to other social services* (schools, health centres, roads, etc.) (Reseau d'Agriculture Durable, 2001; Gonzálvez, 2001; Murillo et al., 2004).

5. Continuity of activity. One of the major problems that the goat sector has, especially in less developed areas, is the lack of skilled labour and generational relay. The low quality of life (Castel et al., 2007) and the short appreciation that this activity has for the whole society (Calatrava and Sayadi, 1999) are also a problem. This is a complex indicator composed by: (i) the *Continuity of farm in the medium term*, by the actual farmer or his family (ii) the *Age of the farmer*; (iii) the *Ownership situation*; (iv) the *Degree of adaptation to changes in the sector* (institutional and technological innovations) and finally (v) *Training*, a complex indicator including the education level, training courses, etc (Vilain, 2008; Mas de Noguera, 2003).

CONCLUSIONS

Some considerations must be taken into account the social component of the sustainability for the small ruminant farms, most of them located in less favoured regions. The most significant social indicators proposed here are: multi-functionality, the degree of associationism, the implication of farmers in local life, their working and social welfare, and the possibility to continue with their activity.

The social indicators, proposed that have been designed according to the farmer's experience, are operational and functional. These have been adopted taken into account across the technical-economic and environmental indicators proposed formerly by the authors. The whole set of indicators will be integrated in a useful method to measure the small ruminant system sustainability, and, therefore, will allow to help to the viability of this sector.

REFERENCES

Alemán Santillán, T.; Nahed Toral, J.; López Médez, J. 2004. Sostenibilidad y agricultura campesina : La producción agrosilvopastoril en Los Altos de Chiapas (México). *Revista de Agroecología* (Perú), Edición especial, 18-23.

Calatrava, J.; Sayadi, S. 1999. "Agrarian crisis, farming abandonment and social regard for agriculture in depressed mountainous Areas of Southeastern Spain". Comunicación oral. IX European Congress of Agricultural Economists "European Agriculture Facing the 21-st Century in a Global Context". IX European Congress of Agricultural Economists. Varsovia (Polonia). 24 – 28 Agosto.

Calatrava, J.; Sayadi, S. 2006. The role of livestock typical Mediterranean products in sustainable rural development: the case of small ruminant herding in less favoured mountainous areas of South-eastern Spain. In: Ramalho Ribeiro, J., M., C.; Horta, A., E., M.; Mosconi, C.; Rosati, A., (Eds), Animal Production from the Mediterranean, EAAP Publication, 119: 27-39.

Castel, J.M.; Mena, Y.; Ruiz, F.A. 2007. El sector caprino y su contribución al desarrollo rural. En: Agricultura Familiar en España, Fundación Estudios Rurales, Madrid, pp. 246–257.

Conway, G. R. 1985. Agroecosystem analysis for reseach and development. Winrock international, Bangkok.

Conway, G. R. 1987. The properties of agroecosystems. *Agricultural administration*. 24, 95-117.

Conway, G. R. 1993. Sustainable agriculture: the trade-offs with productivity stability and equitability. In: Economic and Ecology. New frontiers and sustainable development. Barbier, E. B. (Edr) Chapman & Hall. London 46-65.

El Aich, A., Waterhouse, A. 1999. Small ruminants in environmental conservation. *Small Rumin. Res*. 34, 271–287.

Gonzálvez Pérez, V. 2001. Evaluación de la sostenibilidad agraria. En La práctica de la

agricultura y ganadería ecológicas. Comité Andaluz de Agricultura Ecológica, pp. 373-398.

Mas de Noguera. 2003. Aproximación a un sistema de indicadores de sostenibilidad para la ganadería ovina en la provincia de Castellón. Noguera Asociación de Desarrollo Rural Cooperativo, Castellón, 74 pp.

Masera, O., Astier, M., López-Ridaura, S. 1999. Sustentabilidad y manejo de recursos naturales. El marco de evaluación MESMIS. Mundi-Prensa, S.A., Gira, IE-UNAM. México, 160 pp.

Murillo, L., Villalobos, L., Sáenz, F., Vargas, B. 2004. Un acercamiento integrado para determinar la sostenibilidad de granjas lecheras de Costa Rica: 1 Desarrollo de una matriz de indicadores, *Livestock Research for Rural Development*, 16(12), http://www.cipav.org.co/lrrd/lrrd16/12/muri16095.htm

Nahed-Toral J., García-Barrios L., Mena Y. and Castel J.M. 2006a. Use of indicators to evaluate sustainability of animal production systems. *Options Méditerranéennes*, Série A. 70, 205-212.

Nahed-Toral. J., Castel J., Mena Y. y Caravaca. F. 2006b .Appraisal of the sustainability of dairy goat systems in Southern Spain according to their degree of intensification. *Livestock Science*. 101, 10-23.

Nahed, J.; Mena, Y.; Ruiz, F.A.; Castel, J.M.; Plascencia, V.H. 2007. Proposal of indicators of sustainability for small ruminant pastoral husbandry. In: VI International Seminar FAO-CIHEAM Network on Sheep and Gotas - Sub Network on Production Systems: Changes in sheep and goat farming systems at the beginning of the 21st**,** Ponte de Lima (Portugal).

Reseau d'Agriculture Durable. 2001. Evaluer la durabilité d'un système de production : approche globale, méthodes et diagnostics, Second editions, Cesson- Sevigne (France), 60 pp.

Vilain, L. 2008. La Méthode IDEA, Third Edition, Éducagri éditions, Paris, 184 pp.

Zervas, G., Fegeros, K.; Papadopoulos, G. 1996 Feeding system of sheep in a mountainous area of Greece. *Small Rumin. Res*. 21, 11-17.

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