Evaluation of Agricultural Sustainability by the Mesmis Method: a First Aproach

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Abstract

The term sustainability, today very common in our vocabulary, seems to be the key for the future of the agrarian sector, in the direction of a development of balancing quality, environment, social promotion and, simultaneously, generation of income for the agents who depend on it.

In this regard: How to identify the most sustainable production system? How to design the production model of the future, in the context of sustainability? These questions impose, in the truth, an evaluation or a "comparative measurement" of sustainability, to conclude which is the sustainable system and to allow, in the future, to plan new solutions that must answer to the problems known today.

To this intention Masera *et al.* (2000) point out as main strategies, resulting from the aggregation of some attempts already developed to evaluate the sustainability, the following ones: definition of a list of indicators; use of a composed index; development of a reference system; and the systematic approaches through frameworks of sustainability evaluation.

Among the various strategies elaborated with that finality, one methodology can be stressed: MESMIS - "*Marco para la Evaluación de Sistemas de Manejo de Recursos Naturales Mediante Indicadores de Sustentabilidad*" (Framework for the Evaluation of Natural Resource Management Systems Incorporating Sustainability Indicators). This is the most recent methodology developed for sustainability evaluation, which tries to approach some aspects insufficiently treated in others methodologies, which are arrested with the lack, in all or part, of the integration and quantification of variables and indicators related to the biophysical, economic and social aspects (Masera *et al.*, 2000).

The presentation of this work intends to exemplify the MESMIS methodology using a case study from Northern Portugal and to promote the discussion of some methodological questions in relation to the sustainability evaluation process of the agrarian production systems.

It should be underlined that this work constitutes the first stage in a study to be developed over the next four years and, as such, should understood as a first approach.

Case study of the horticultural sector

The evaluation subject of this study is the horticultural production system of conventional and organic farms, situated in the North of Portugal. The first one corresponds to the reference system for the evaluation, that is, the standard system practised in the region. The other is the alternative system that

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makes use of the technologic and social innovations relative to the reference system which is, in this case, the production system that obeys to the organic production of agricultural products.

To evaluate the comparative sustainability of these systems the MESMIS methodology was applied, which consists of a comparative evaluation of a series of translating indicators of sustainability, whose cycle process integrates six principal steps as visualised in Figure 1.

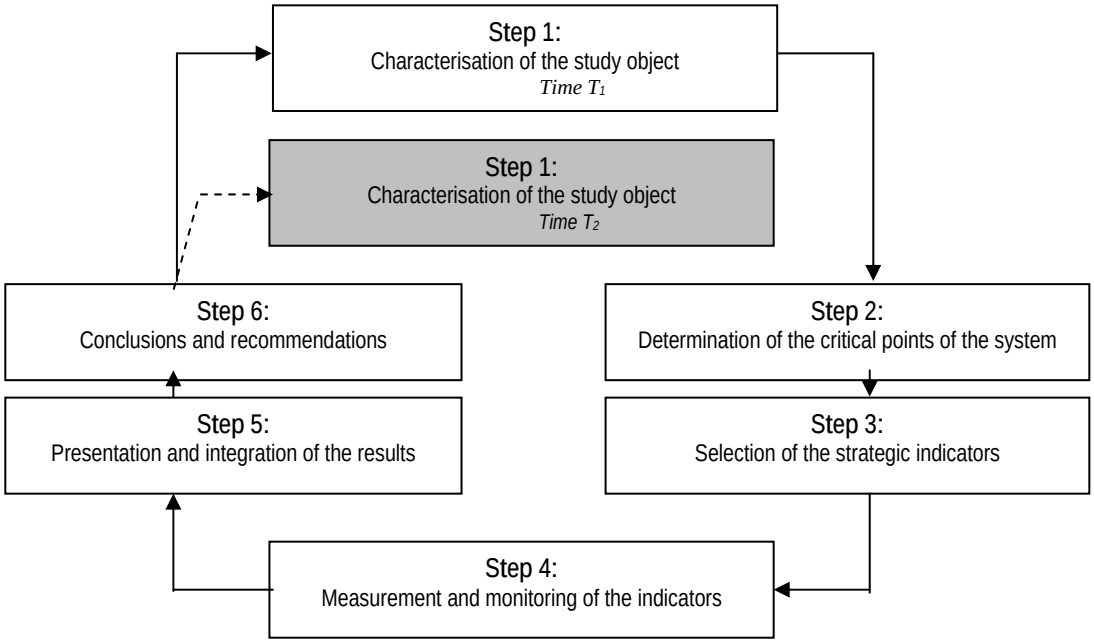

Figure 1. Operative structure of the MESMIS (Masera *et al.*, 2000)

Figure 2 shows the values obtained for the selected sustainability indicators in the organic case and in relation to the standard farm, in the context of the methodology under consideration.

It is clear that when the standard farm is used as the reference, the organic farm exceeds the index 100 by a substantial margin. The values of the adaptability and equity attributes are very similar in both systems considered, whereas there is a wide disparity for the productivity, stability and autonomy attributes, these being about three times higher for the organic case, compared to the conventional farm.

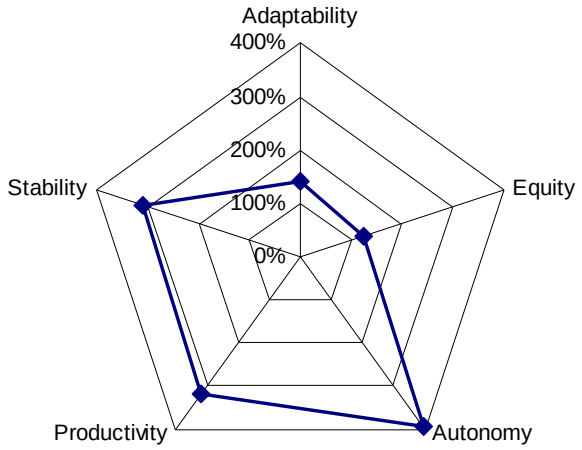

Figure 2. Synthesis of the sustainability evaluation for the organic case compared to the standard case (Reference case = Index 100)

Final considerations

In spite of the recent development of programs about sustainability evaluation, some of its conceptual problems and gaps have originated news methodologies.

An important conclusion in this context is that sustainability evaluation is valid for a specific management system in a specific spatial area and for a determined time period; it necessitates an evaluation team with a multidisciplinary perspective; must focus on relevant aspects of the physic, economic and social context; should be based in procedures and data scientifically valid; and must be based on selection of criteria and indicators which reflected as much the symptoms as the causes (FAO, 1993). In the other hand, sustainability can not be measured *per se*, but rather through the comparison of two or more different systems or analysing the evolution of a system over time (Masera *et al.*, 2000).

The last assumption, developed with the MESMIS methodology, presents great importance and should be underlined. This because, the variations observed in the sustainability evaluation become irrelevant given their identical probability of occurrence in both cases. Using this methodology it is possible to identify, among various systems, the most sustainable one, and this is quite useful to identify the way or direction to reach sustainability. This is, without doubt, the main question related to the development of these evaluation programs.

However, there are many gaps that can be identified in this methodology, making clear the need to corrected and improved it in the future. For example, one of the key-aspects of the MESMIS method consists in the selection of the indicators and in the way to integrate results in a qualitative valuation. Clearly, the way criteria are adopted, to choose indicators and to punctuate results, will condition the final value of sustainability, even if the relative punctuation is the same. Such consideration leads, once more, to emphasise the multidisciplinary character that this methodology must have in its application in order not to underlined one of the aspects in detriment of other.

Finally, from the data used and with the results obtained, it can be conclude that the organic production system case study shows a much more autonomous, productive, stable, well-adapted and equitable management process than the standard production system. Based upon this study, we can also identify the indicators that more heavily condition sustainability in the organic case. Once corrected these indicators, a new production system will originate. This system will also be evaluated in a next phase (by a comparative approach) and, it can be assumed that, in each additional cycle, we will be able to get closer to the ideal sustainable system, in economic, social and environmental all terms, once a multidisciplinary approach is used.

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