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HOW TO EVALUATE SUITABILITY OF GLOBAL TOOLS FOR FARM LEVEL SUSTAINABILITY ASSESSMENT?

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ABSTRACT

The importance of promoting sustainable agriculture is vital, as well as the means that enable measurement and evaluation of this sustainability. For this study, five systems also called tools, were selected for being capable of estimating environmental sustainability at farm level, namely: MESMIS, SAFA, IDEA, APOIA-NovoRural and FESLM, culminating in the understanding that reasonable comparison of suitability of these systems happens when the criteria are previously established and discussed. In this case, the following criteria were adopted for evaluating the above-mentioned tools: concept of sustainability, objective, target audience, flexibility, adaptability and systemic approach. It could be noticed that these systems keep their focus on the individual farmer when it comes to target audience, however, the biggest divergences among them were in regards to the other defined criteria, actually because each of them shapes their concept of sustainability towards what they propose to analyze and disseminate. Another point to be highlighted is the flexibility of each system, as there are systems that can be shaped according to the each investigated environment. However, this trend is sometimes easier when it comes to extrapolating and comparing data, but it also makes it difficult to compare different contexts when placing these data in a series.

Key words: Rural Development; Sustainability Indicators; Agribusiness Management

INTRODUCTION

Labelling a farm as “sustainable” or “unsustainable” is a complex and high responsibility deed, as it involves considering various characteristics related to the environment and the context in which the farm is inserted. In this sense, the role of systems or tools that propose to diagnose and evaluate production systems is reinforced, taking into account sustainable development. In this way, with the use of these systems, it may be possible to monitor the progress of the implementation of sustainable actions in rural areas.

As there is a good perception of the importance of such analyzes, tools or systems grouping sustainability indicators have been developed to this end in several countries, serving as instruments to control social and environmental impacts, to communicate information, and to encourage behavior and cultural changes. Due to its importance for supporting decision making, the use of tools containing sustainability indicators has been considered a very important aspect in the promotion of a sustainable society and agriculture. However, sustainable development indicators are numerous and cover different levels and scales. Thus, identifying and comparing appropriate sustainability assessment systems or tools, based on scope, focus and operability, pointing out similarities and differences between them, becomes a currently important contribution to the sustainability analyzes of Brazilian agribusiness.

Therefore, purpose of this research was to select sustainability analysis systems applied in empirical studies on agribusiness at national and international level in the period from 2010 to 2019 and

published in scientific or technical literature. And from this selection, to carry out a comparative assessment based on pre-established criteria to highlight the similarities and divergences between these systems or tools.

MATERIAL AND METHODS

A comparative method was used, which consists of investigating and explaining facts according to their similarities and differences. In this method, two or more approaches of a similar nature are confronted in order to know what is common for both. “Comparing similarities and divergences, the importance between groups can be better explained” (FACHIN, 2011).

The initial research explored scientific databases such as: Web of Sciences, Science Direct, Scielo, Scopus, Redalyc, DOAJ and CAPES, using the keywords: environmental and agricultural sustainability indicators, farm and environment sustainability assessment, programs, software, methods, systems or tools for farm sustainability assessment and with this, 17 systems composed of indicators capable of assessing agricultural sustainability were identified. All of them had technical-scientific support, were created, sponsored or used by institutions with a solid reputation in the context of sustainability assessments, and these systems are capable of assessing environmental impacts and qualifying agricultural properties within some degree or sustainability score.

The criterion adopted to select some of these systems for a more detailed analysis was to pick the most cited and mentioned in scientific articles in the period from 2010 to 2019. Thus, the selected systems are described in Table 1.

Table 1. Description of the five most cited or mentioned sustainability assessment systems selected as potentially suitable for farm level assessments.

System	Initials	Country	Total Citations
<i>Marco para la Evaluación de Sistemas de Manejo de recursos naturales incorporando Indicadores de Sustentabilidad (Maserá, Astier, López-Ridaura, 2000)</i>	MESMIS	Mexico	329
<i>Sustainability Assessment of Food and Agriculture systems (FAO, 2014)</i>	SAFA	United Nations	39
<i>Indicateurs de Durabilité des Exploitations Agricoles (VILAIN, 1999)</i>	IDEA	France	27
System APOIA – NovoRural (Rodrigues e Campanhola, 2003)	APOIA-NovoRural	Brazil	23
<i>Framework for the Evaluation of Sustainable Land Management (Dumanski e Smyth, 1995)</i>	FESLM	United Nations	21

Having these systems described in Table 2 selected and described, we proceeded to the second stage of this research, which was based on an exploratory-qualitative approach, performing the comparison between the five systems that assess environmental sustainability based on selected criteria.

The criteria selected for comparison were defined based on the research by Candido et al. (2015) because it is a study similar on scope, considering tools comparison and these criteria have a greater influence on information extraction, adequacy and applicability at farm level. The criteria were: concept of sustainability, analysis goals, target audience, flexibility, adaptability and systemic approach. Synthesizing and explaining what Candido et al. (2015) mention in their research regarding these criteria, we have:

- Sustainability Concept: the understanding of the sustainability concept ensures coherence to the adopted evaluation method.
- Goal and Target audience: both reveal the concern and focus of each chosen method and with this, achievement of purposes of those involved and benefited with the evaluated object.

- Flexibility and adaptability: each method has its own structure, some flexible, others more rigid, allowing or not adjustments to the place of analysis. These differences interfere in the result of each analysis and both receive specific criticism and support.
- Systemic approach: dealing with environmental or sustainable aspects goes far beyond a simple perception of the natural world, fauna or flora. Systems that assess sustainability need to carry a holistic and systemic characteristic, translating the complexity of their understanding when dealing with and exploring the economic, social and environmental aspects present in all indicators, themes and sub-themes present in the assessment tool. In addition to dealing with all the relations inherent to farm level assessments.

RESULTS AND DISCUSSIONS

Obviously, there is a certain distance between defining a concept of sustainability and putting it consistently into practice. As it can be seen in the table below, of the systems explored in this work, each present their own concept of sustainability, based on principles, attributes and dimensions, defined from studies and values, which despite bearing a lot of similarity between them, they also have individual variations.

Table 2. Comparison of systems for sustainability assessment by given criteria.

CRITERIA	MESMIS	SAFA	IDEA	APOIA	FESLM
Concept of sustainability	It considers seven attributes: productivity; reliability; resilience; stability; adaptability; equity; and self-management or self-dependence.	There are four dimensions: good governance; environmental integrity; economic resilience; social well-being.	Attributes from the quantification of local characteristics related to the environmental, social and economic dimensions.	It considers five dimensions: landscape ecology, the quality of environmental compartments, socio-cultural values, economic values, management and administration.	It relates to sustainable land management, combining technologies, policies and activities with socioeconomic principles, such as: productivity, security, protection, viability and acceptability.
Goal	Assess sustainability of different natural resource management systems on a local scale.	Support implementation of effective sustainability management and communication in the food sector.	Give farmers a sense of rural sustainability by thinking over their agricultural practices.	Propose a general index of the activities' contributions to the sustainability of the analyzed farm.	Directly assist in the planning, in the comparison of alternative forms of land use in a certain period of time.
Target audience	Farmers themselves and farms surroundings.	Public and private organizations.	Educational, development and agricultural agents.	Farmers themselves.	Farmers themselves.
Flexibility and Adaptability	Flexible structure molded from the evaluation of an interdisciplinary team and adaptable to different types of information and production systems analyzed.	It allows to adapt its structure to all contexts and sizes of operations. It values performance, promotes diversity in the implementation of possible means and encourages continuous improvement.	It has a more rigid structure, with well-defined indicators, form of calculation, evaluation criteria and aggregation method, but it is capable of adapting to other contexts depending on the adjustments made to its indicators.	Rigid tool with predefined indicators, however, the method is simple to apply, allowing active participation of farmers and those responsible for the analyzed production system.	It is suitable for any type of land use, however, it maintains its fixed structure of indicators and parameters in the assessment.
Systemic Approach	It proposes the promotion of interaction between the technical, economic, social and environmental dimensions, without a specific number of indicators.	It offers a global holistic framework for assessing sustainability across the food and agriculture chains. They cover 21 themes, 58 subthemes and 116 indicators.	It evaluates from 41 quantified indicators, subdivided into 10 components that analyze the strengths and weaknesses of the production system and identify ways to improve.	Comprises 62 indicators, organized to cover the possible range of environmental effects directly defined as impacts applied in their entirety to any agricultural activity.	It covers the analysis of the land from four fronts of indicators: physical, agronomic, economic and social, totaling 54 indicators.

CONCLUSIONS

It could be noticed that most of the evaluated tools are focused on the individual farmer when it comes to target audience, however, the greatest divergences between them were related to the other criteria considered. It was noticed that each tool shapes its concept of sustainability from what they propose to do and disseminate through their analysis outputs. One must also consider the flexibility of each system, as, as discussed in this work, there are systems that can be shaped according to each investigated environment. However, this trend makes it difficult to compare different contexts when placing these data in series. In other cases, standardization, even if rigid, contributes to extrapolation of results and comparison with other systems.

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