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Conceptual approach to assess farm-level sustainability in the Hungarian organic sector

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As so far no farm-level sustainability assessment tool has been adjusted to the Hungarian circumstances which measures all aspects of sustainability our aim was to develop a conceptual framework for adaptation process. Main steps were defined and literature review was conducted. As a result of this SMART was selected as the most suitable assessment tool which will be adapted to the Hungarian needs applying Nominal Group Technique for expert involvement and Propensity Score Matching for farm sample selection.

Keywords: farm level sustainability assessment, Nominal Group Technique, Propensity Score Matching, indicators

1 Introduction

As agriculture generates considerable environmental, economic and social impacts (Cooper at al 2009), there is an ever increasing need to improve the sustainability of agricultural farms. To be able to analyse and measure the improvements of the agricultural sector in this regard, a measurement system is required. There are already attempts in several countries to measure the sustainability of farms. However current sustainability assessment tools are often limited to selected aspects of sustainability. Furthermore results from different tools are difficult to compare since they use different theoretical framework for assessments (Schader et al., 2014a). Attempts were also made in Hungary to measure the sustainability of farms. These assessments were done with the so called Agridiag Green-point System – the adaptation of the French Dialecte assessment tool (Balazs et al., 2014). However economic and social sustainability was not measured and no selection method was applied when selecting test farms. Therefore the results of the evaluated farms are limited only to environmental sustainability and cannot be used to compare the sustainability of organic and conventional farms. This study aims a) to measure the sustainability performance of farms in Hungary across all dimensions and b) to compare the sustainability performance of organic and conventional sector. To reach these goals, we designed a conceptual framework on how to adapt an already existing sustainability assessment tool and how to make farm selection in a way which enables the comparison of the two sectors. The elements of our conceptual framework are presented in this paper.

2 Material and Methods – Conceptual Approach

Our conceptual approach consists of 4 main steps: a) selection of the sustainability assessment tool, b) analysis of indicators and first adaptation, c) indicator development with expert involvement, and d) selection of a farm sampling method.

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Selection of sustainability assessment tool (Step 1)

Firstly, based on the framework presented by Schader et al. (2014a) criteria of tool selection were defined based on the research goals: purpose of the assessment (research, comparison of farms), geographical scope (globally applicability), level of assessment (farm level), sector scope (all farm types with any production lines) and thematic scope (environmental, economic, social). Secondly, a literature survey was conducted to identify the most suitable sustainability assessment approach based on the above parameters.

Analysis of indicators and their first adaptation (Step 2)

Indicators of the selected tool were reviewed and categorized into three groups: indicators non-applicable in Hungary, indicators applicable in Hungary without modification and indicators applicable in Hungary after modification. Indicators which are non-applicable for Hungary were excluded. Where needed they were substituted by locally adapted but similar indicators to avoid a change in assessment results due to the exclusion of indicators. This also ensured that Hungary specific topics/issues important from sustainability point of view are covered, too. The inclusion of these additional indicators into the selected tool was based on a literature review. Indicators where Hungarian regulations did not comply with scoring of the indicator were modified. Indicators which can be applied in Hungary without modification were left untouched.

Indicator development with expert involvement (Step 3)

Expert involvement started with expert selection. The most suitable experts were chosen and grouped according to their geographical and thematic expertise. Attention was paid to have a proper distribution of experts across sustainability themes. Beside expert selection a decision had to be made on which method should be applied for feedback gathering. Priorities were defined as follows: easy-to-use tool, fast and structured feedback gathering, possibility for experts to share their opinion and comment on each other's posts, online sessions instead of face to face meetings.

Selection of farm sampling method (Step 4)

The farm sampling method has a considerable effect on reliability of results. Therefore, for this study a selection method had to be chosen to minimise the bias of sampling. A literature review was conducted to identify the most appropriate method.

3 Results

Step 1: As a result of the *selection process* the farm-level tool SMART was selected. It is currently the only indicator based sustainability analysis and assessment tool, which has a comprehensive thematic scope and was developed in line with the internationally accepted SAFA-Guidelines published by FAO. The latter makes it possible to compare the sustainability performance of different farming systems and farm types. SMART evaluates the four SAFA-dimensions of sustainability: Good Governance, Environmental Integrity, Economic Resilience and Social Well-Being. These are divided up into 21 themes and 58 sub-themes. For each of the sub-themes, an objective is defined which describes ideal conditions in terms of sustainability (FAO, 2014). The degree of achievement of the 58 sub-theme objectives is assessed with 200-300 indicators, which are being applied depending on type of production lines, size and location of the farm.

Step 2: The indicator set of SMART was reviewed by internal experts and during the *first adaptation process* 24 indicators were found to be irrelevant for Hungary and substituted, the scaling of 11 indicators were modified to comply with Hungarian regulations. The rest of the already existing indicators are applicable – without modifications – in Hungary. Above this, 9 new indicator suggestions were added to the indicator list.

Step 3: To *validate the updated indicator list with external experts* and derive indicator weightings, the method called Nominal Group Technique (NGT) was selected. NGT is

a structured process for gathering knowledge from groups. It uses the same basic structure as the Delphi method in a group situation. Opinions are gathered anonymously and presented to the group for discussion (Delbecq et al, 1975; Jeffreys, 2002; Schader et al, 2014b). For each thematic area, a separate group of experts is formed according to their expertise. Criteria for expert selection are defined prior to the selection. Knowledge on SAFA Themes and indicator development, substantial scientific expertise in at least one SAFA area, scientific experience with agricultural systems and the existence of related scientific publications are among the most important selection criteria. The exchange between experts is triggered by bringing up indicators for which experts opinions differ the most. After the discussion, opinions are gathered and analysed a second time. Differences between the expert opinions on the weights of the indicators are used to conduct an uncertainty analysis (Monte-Carlo simulations) of the results of a farm-level assessment with SMART. To be able to run an NGT session online, the web-based project management tool Basecamp was chosen to support the discussion between experts in NGT process. Basecamp allows the experts to comment the available indicators and their weighting online or to make suggestions on new indicators.

Step 4: To select the test farms in Hungary a few parameters (farm size, production lines) were defined and Propensity Score Matching (PSM) was chosen as selection method to identify the sample farms in a country level database. PSM is a statistical method based on the assumption that sample selection bias can be eliminated by conditioning observable variables, and does so by matching each organic farm with one or more non-organic ones with similar observable characteristics (Gitonga et al., 2013).

4 Conclusions

The chosen approach ensures that commonly used and scientifically accepted methods are employed for the indicator development. It also provides a firm basis for assessing the Hungarian organic sector and to gain comparable and meaningful results for further studies.

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