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ASSESSING THE SUSTAINABILITY OF CROP PRODUCTION SYSTEMS: IS A COMMON FRAMEWORK POSSIBLE?

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The integration of the economic, social and environmental dimensions of agriculture in a holistic assessment framework is essential to support the development of sustainable farming. Despite the fact that some sustainability assessment tools fulfil this condition, none of them is suitable for handling different assessment situations, especially considering diverse crop production systems – arable crops, fruits and vegetables – at different stages of development – research-desk prototypes (*ex ante* assessment) or in-field applied cropping systems (*ex post* assessment). The objective of this work is to explore the possibility of sharing a sustainability assessment framework that can be implemented on different objects for improving (i) the communication among the stakeholders involved in the development of sustainable farming and (ii) the action planning in terms of research as well as policy making.

In this respect, the adaptation of the qualitative sustainability assessment tool DEXiPM (i) from arable crops (Pelzer *et al.*, 2012) to other production systems and (ii) from the *ex ante* to the *ex post* assessment has represented a valuable source of ideas. Regarding the first task, three groups of experts have analyzed and modified the arable crop model in order to obtain suitable tools for assessing the sustainability of field vegetables, pomefruit orchards and grapevine systems. The majority of the modifications brought have involved the parts of the model ruled by technical and scientific knowledge (e.g. determining the fuel consumption), while few generic modifications have been brought to the part of the model that is ruled by stakeholder priorities (e.g. relevance of biodiversity in the environmental sustainability). Regarding the second task, the model structure has been modified case-by-case, according to the data available in *ex post* assessment, to integrate precise quantitative indicators in the qualitative framework. Two case studies have illustrated different ways of joining qualitative and quantitative data to get the best compromise between assessment precision and comprehensiveness.

This work has provided the formalization of a sustainability assessment framework suitable for different assessment situations. This articulates (i) a fixed core of generic agricultural sustainability issues hierarchically organized that can be weighted according to stakeholders' priorities and (ii) a set of indicators that can be flexibly estimated according to the assessment situation. Providing a shared and generic structure of assessment can positively harmonize, among various crop production systems, the way for setting goals and organizing them into a hierarchy, identifying bottlenecks and recommending adjustments towards more sustainability.

