P1-08

MASC, a model to assess the sustainability of cropping systems: Taking advantage of feedback from first users

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Introduction

The MASC model has been designed by seven agronomist researchers for the *ex ante* assessment of the sustainability of arable cropping systems (CS). The initial purpose of this model was to select newly designed CS before testing them in field trials. Different users tested MASC in various contexts and commented its use and its usefulness. We recorded comments from these users in order to gain greater insight of their requested needs and in order to improve the model.

Materials and methods

MASC is a qualitative multi-criteria model to assess the sustainability of CS (Sadok et al., 2009). It is based on criteria that are hierarchically organized into a decision tree. These criteria are aggregated in order to assess the three usual dimensions of sustainability (economic, social and environmental). Two types of decision tree. These criteria are aggregated in order to assess the three usual dimensions of sustainability (economic, social and environmental). Two types of criteria can be distinguished in this tree: (i) basic criteria which correspond to the inputs of the model; and (ii) aggregated criteria which are located at a higher level in the hierarchical tree, depending on those at lower levels. Aggregations are based on weights (%) according to utility functions defined by "If-Then" decision rules. After a test of the model in real situations for three years by various users, designers gathered feedback from them by organizing a workshop, sending out a survey, interviewing users and holding a consultation meeting.

Results and discussion

Thanks to its flexibility and its ease of use, MASC was used for much more varied purposes than the one initially planned by the designers. Table 1 presents the initial purpose as well as the new purposes the users came up with.

The feedback also revealed that first users had handled the model in somewhat differently than expected. First, to lead *ex ante* assessment, basic criteria of the MASC model are filled thanks to simple indicators based on the description of planned practices. This feature turned out to be particularly useful because it allowed first users to carry out rather quickly *ex post* assessments where information was easy to come by, thereby enlarging the scope of MASC. Secondly, in over half of the *ex post* assessments, users replaced at least one of the proposed indicators with another available indicator better suited to their context (such as field measurements) indicating assessments, users replaced at least one of the proposed indicators with another available indicator better suited to their context (such as field measurements) indicating the importance of a flexible model. Thirdly, most users modified the set of weights to integrate both local issues and their own perception of sustainability. Users deemed the adaptation of the weights to be an important step in sharing stakeholders' point of view and in involving them in the assessments (Craheix et al. 2012). Moreover, thanks to this investigation, users had the opportunity to suggest that designers could add a set of new criteria to enhance the relevance of the model. Finally, analysis of users' feedback has led to the development of a second

Table 1: *Initial purpose and new purposes the model served*

Purposes of the assessment	Actors implicated*	Ex ante/Ex post	Number of projects
Assessment and selection of CS defined with expert knowledge before testing in situ	E-R-F	Ex ante	6
Diagnostic/Assisting strategic thinking of farmers on the evolution of their CS	E-F	Ex post	4
Diagnostic/communication of results obtained on CS field experiment	E-R	Ex post	5
Assessment of farmers' CS in a prospective approach	E-R	Ex post	1
Identification of barriers to adoption of innovative CS	E-R-F	Ex ante/Ex post	2
Training about the application of the sustainability concept at the CS level	E-F-R-S	Ex ante/Ex post	+10

*E = Extension workers; F = Farmers; R = Researchers; S = Students

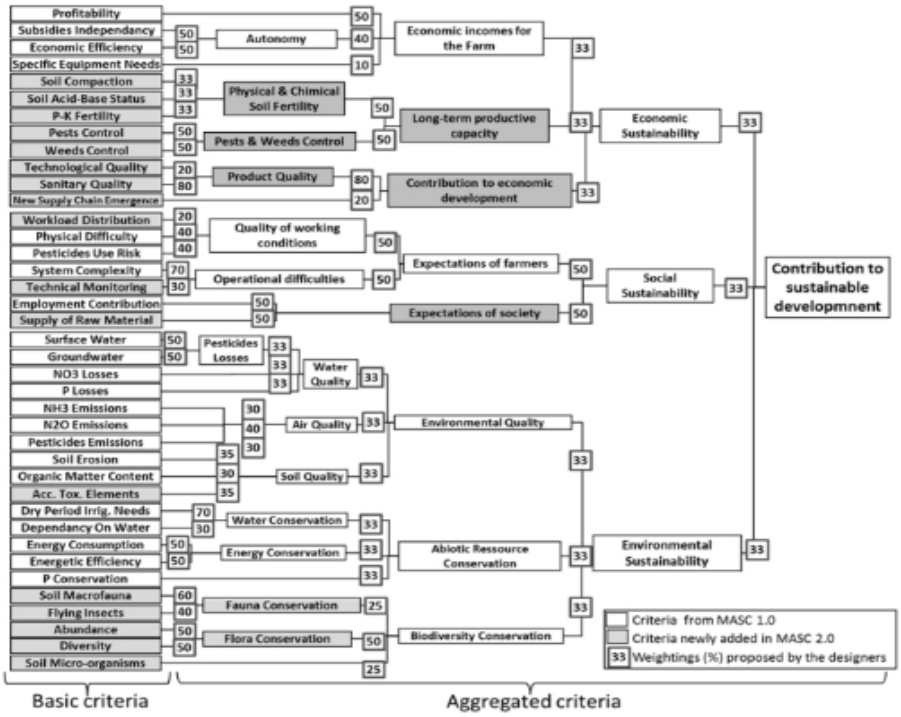

Figure 1: MASC 2.0 : decision tree, proposed weights and new criteria

version of the MASC model (Craheix et al., 2011). The newly designed decision tree is presented in the figure 1.

Conclusions

Analysis of users' feedback played here a key role in the development of the MASC model. The main improvements have involved specifying the domain of validity, extending the range of concerns by adding new criteria, and facilitating adaptations of settings to the local socioeconomic and pedoclimatic context. Through this experience, we highlight the importance of seeking user experience in order to improve an assessment model of sustainability.

References

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