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DEXIPM GRAPEVINE, A MULTIPLE CRITERIA MODEL FOR SUSTAINABILITY ASSESSMENT OF GRAPEVINE CROP PROTECTION STRATEGIES 28

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Viticulture is characterized by a high use of pesticides compared to other crop industries (Gary et al., 2010), which generates concerns for human health and quality of the environment. Yet the use of pesticides, and other variables of economic importance such as yield, vary a lot among regions and farms within the same region (Meziere et al, 2009). A thorough analysis of the economic, social and environmental dimensions of sustainability is then needed to assess and compare existing cropping systems or prototypes of innovative ones. To this end, DEXiPM, a qualitative multi-criteria assessment tool (Pelzer et al, 2013), was adapted to grapevine. A strong interaction with the first users (members of the FP7 Pure project from France, Germany and Italy) has brought to significant modifications, mainly on the economic and environmental branches. The working group has detailed some aspects of the grapevine management such as soil cover and choice of crop protection products.These changes have been validated by assessing some case studies.

A regards the *economic sustainability*, the *selling price* considers the expected yield (that may be linked to geographical indications), the certification of specific cultivation practices and the existence of marketing strategies. The specific case of biocontrol products is considered: they are included in the *production cost* but not in the environmental assessment.

In the *social sustainability* branch, few criteria have been modified, such as the *risk of contamination by mycotoxines* and the *risk of pesticide residues*.

The three components of the *environmental sustainability* have been adapted: *resource use*, *environmental quality* and *biodiversity*. A major change is that the period of cover cropping and percentage of soil covered have been introduced as they relate to a number of criteria: *water use*, *pesticide leaching*, *nitrate leaching*, *compaction risk*, *runoff risk* and *soil organic matter*. *Pesticide ecotoxicity* is assessed with the TFI of a list of highly toxic products. The *energy consumption* criterion has been adapted to include cultivation practices specific to viticulture. The *organic matter* is assessed in relation to specific *organic amendments* used in viticulture, *vine shoot management* and *soil cover*. At last biodiversity has been adapted for both the flora (by considering cover crops, flower strips and hedges) and fauna (by considering the *natural enemies in the phyllosphere and pollinators*.

As a result, the number of attributes of the DEXiPM model for viticulture has been reduced by 10% compared to the arable crop version.

The assessment of contrasted strategies of crop protection provides evidence that specific features of vineyard management have been captured in the new version of DEXiPM for grapevine.