AGRIDE-c, a conceptual model for the estimation of flood damage to crops

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Flood damage to the agricultural sector is often neglected in current risk assessments, or only evaluated using simple approaches, due to both a lack of data for the derivation of more detailed models and the perception that losses in rural areas are expected to be much lower compared to those in urban areas. Nevertheless, historical events show that damage to agriculture cannot be underestimated, above when risk mitigation actions include the restoration of floodplains or the construction of retention basins.

This study focuses on the development of AGRIDE-c (AGRiculture DamagE model for Crops), a conceptual model for the estimation of flood damage to crops and their implications for farmers. After a critical analysis of existing methods, an expert-based model has been developed on the basis of all available knowledge on flood damage mechanisms derived from the literature and consultation with experts. The main strength of the model is represented by the integration of physical damage assessment with the evaluation of its economic consequences on farmers' gross product in a single and consistent tool. AGRIDE-c can be used to guide the flood damage assessment process in different geographical and economic contexts. In this study, the model application is presented for the Po Plain, Northern Italy, demonstrating the usability of AGRIDE-c and supplying a useful tool for the estimation of flood damage to crops in the investigated context. The development and implementation of the model highlighted that a thorough understanding and modelling of damage mechanisms to crops allows for more comprehensive cost-benefit analyses of flood risk mitigation actions, and is a powerful tool to orient farmers' choices towards more resilient cultivation practices.