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Humans reclaimed lands in NorthEastern Italy and artificial drainage networks: effects of ∼30 years of Agricultural Surface Water Management

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Agriculture and land-use management has changed drastically in Italy since the end of the Second World War, driven by local but also European agricultural policies. As a result of these changes in farming practices and land use, many drainage networks have changed producing a greater exposure to flooding with a broad range of impacts on society, also because of climate inputs coupling with the human drivers. This study focuses on two main points: which kind of land use and farming changes have been observed in the most recent years (∼30 years)? How do these changes interact with climate and soil conditions? An open challenge to understand how these changes influence the watershed response, is, in fact, to understand if rainfall characteristics and climate have a synergistic effect, if their interaction matters, or to understand what element has the greatest influence on the watershed response connected to agricultural changes. The work is based on a simple model of water infiltration due to soil properties, and a connected evaluation of the distributed surface water storage offered by artificial drainage networks in a study area in Veneto (north-eastern Italy). The analysis shows that economic changes control the development of agro-industrial landscapes, with effects on the hydrological response. However, these changes deeply interact with antecedent soil conditions and climate characteristics. Intense and irregular rainfall events and events with a high recurrence should be expected to be the most critical. The presented outcomes highlight the importance of understanding how agricultural practices can be the driver of or can be used to avoid, or at least mitigate, flooding. The proposed methods can be valuable tools in evaluating the costs and benefits of the management of water in agriculture to inform better policy decision-making.

References

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