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Recent evolution and expected changes of nutrient loads in a heavily exploited watershed: the Po River, Italy

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Abstract The Po River watershed accounts for about 25% of the total surface and about 40% of the gross domestic product of Italy. Agricultural, industrial and urban development, along with hydromorphological modification of rivers and canals, are responsible for water quality deterioration. Frequent and persistent summer droughts and extreme floods have occurred concurrently in the last two decades, likely as early signals of exacerbation of global change effects. In this contribution we review the evolution of hydrological regime and nutrient loadings in the last three decades, short-term studies (2003–2007) on the effects of persistent drought conditions on river discharge, nutrient loadings and stoichiometry, and salt wedge intrusion. To date, diffuse nitrate contamination has been one of the major threats. We identified and assessed possible nitrogen sources in the watersheds of four tributaries of the Po River (Parma, Mincio, Oglio and Po di Volano) with different livestock pressure, crop production and population densities.

Key words nutrients loadings; nutrient stoichiometry; river discharge; extreme hydrological events; agriculture; livestock