
Why should irrigated agriculture engage in the conservation of soil biodiversity?

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Résumé

Irrigation water use is expected to be constrained as drought frequency increases with climate change. We present a bioeconomic model that illustrates the role of soil biodiversity in agroecosystems and for irrigated agriculture. Soil biodiversity provides an insurance value to irrigating farmers as it enables to transfer water over time and stabilize production. Our results show that different thresholds of risk and inputs costs determine the choice over different farming strategies: irrigated or rainfed and using soil biodiversity conservation practices or not. We show that the optimal levels of soil biodiversity conservation and irrigation water depend on a combination of key hydrological and agronomic factors and depend on economic factors only for a certain value of their costs ratio. The sensitivity of irrigating farmers to price-based regulation is then determined by the ratio of inputs costs, which calls into question the use of prices relative to quota policy instruments to manage both soil biodiversity and water.

Mots-Clés: agriculture, soil biodiversity, bioeconomic modelling, risk and uncertainty, water demand

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