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Integrating water quality and environmental flows: implications for agriculture

As freshwater is increasingly recognised as a critical limiting resource for economic, social and environmental health, methods that allow concurrently for knowledge exchange, constructive debate, stakeholder engagement, economic evaluation and environmental protection will be of particular value. A method for quantifying the water quality aspects of environmental flows is presented here in the context the potentially competing needs of agricultural irrigation and water resource protection.

Environmental flows are internationally used as management tool for achieving the dual goals of water resource use and aquatic ecosystem protection. In many instances irrigation and the aquatic ecosystem are seen a primary competitors for water flow, and agriculture as a major water user and source of pollution and aquatic ecosystem degradation. However, the agricultural sector has considerable social and economic value, and frequently attracts political leverage. How can the environmental conservation and agricultural sectors engage constructively to optimise water resource use and protection in a catchment?

We suggest an integrated approach based on strategic adaptive management. A catchment is assessed and the “stressor-response” environmental flow and water quality method applied. The results are discussed in a series of interactions between stakeholders, water resource users, managers and specialists. Scenarios for the catchment are evaluated and quantified and descriptive resource quality objectives agreed upon. A management strategy is developed and implemented; a monitoring programme provided feedback on meeting objectives and, when necessary the planning is revisited if objectives are not met.

We present case studies from South Africa and Australia where the questions of irrigation and river salinisation are addressed in this way.

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