

Abstract

Keywords

1. Water for ecosystems—a challenge for agricultural water management
2. Agriculture increases provisioning ecosystem services but reduces other ecosystem services



3. Agricultural water management—past effects on ecosystem services
 - 3.1. Effects on aquatic systems, coastal zones and wetlands
 - 3.2. Effects on terrestrial systems
 - 3.3. Emerging cross-cutting issues



4. Dealing with trade-offs and finding synergies between water for food and other ecosystem services
 - 4.1. Managing water at the field scale: increasing water productivity
 - 4.2. Managing water between upstream and downstream water use
 - 4.3. Managing water in landscapes for increased multifunctionality and resilience



Managing water in agriculture for food production and other ecosystem services


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Abstract

Agricultural systems as well as other ecosystems generate ecosystem services, i.e., societal benefits from ecological processes. These services include, for example, nutrient reduction that leads to water quality improvements in some wetlands and climatic regulation through recycling of precipitation in rain forests. While agriculture has increased 'provisioning' ecosystem services, such as food, fiber and timber production, it has, through time, substantially impacted other ecosystem services. Here we review the trade-offs among ecosystem services that have been generated by agriculture-induced changes to water quality and quantity in downstream aquatic systems, wetlands and terrestrial systems. We highlight emerging issues that need urgent attention in research and policy making. We identify three main strategies by which agricultural water management can deal with these large trade-offs: (a) improving water management practices on agricultural lands, (b) better linkage with management of downstream aquatic ecosystems, and (c) paying more attention to how water can be managed to create multifunctional agro-ecosystems. This can only be done if ecological landscape processes are better understood, and the values of ecosystem services other than food production are also recognized.

Keywords

Ecosystem services; Agro-ecosystem; Multifunctionality; Resilience