

Editorial: optimizing the delivery of multiple ecosystem goods and services in ag...

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Editorial on the Research Topic

Optimizing the Delivery of Multiple Ecosystem Goods and Services in Agricultural Systems

Agricultural land is subjected to a variety of societal pressures, as demands for food, animal feed, and biomass production increase, with an added requirement to simultaneously maintain natural areas, and mitigate climatic and environmental impacts globally ([Tilman et al., 2002](#) ; [Pretty, 2008](#) ; [Wang and Swallow, 2016](#)). The biotic elements of agricultural systems interact with the abiotic environment to generate a number of ecosystem functions that offer services benefiting humans across many scales of time and space ([Swinton et al., 2007](#) ; [Power, 2010](#)). The intensification of agriculture, particularly of that founded on fossil-fuel derived inputs, generally reduces biodiversity, including soil biodiversity ([Tsiafouli et al., 2015](#)) and impacts negatively upon a number of regulating and supporting ecosystem services ([Zhang et al., 2007](#)). There is a global need toward achieving sustainable agricultural systems, highlighted also in the UNs' Sustainable Development Goals, where among their targets they state that by 2030 we should globally “ *ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality* ” ([UN-DESA/DSD, 2014](#)).

There is hence an evident need for management regimes that enhance both agricultural production and the provision of multiple ecosystem services. The <https://assignbuster.com/editorial-optimizing-the-delivery-of-multiple-ecosystem-goods-and-services-in-agricultural-systems/>

articles of this Research Topic enhance our knowledge of how management practices applied to agricultural systems affect the delivery of multiple ecosystem services and how trade-offs between provisioning, regulating, and supporting ecosystem services can be handled both above- and below-ground, and across multiple scales of space and time. They also show the diversity of topics that need to be considered within the framework of ecosystem services delivered by agricultural systems, from knowledge on basic concepts and newly-proposed frameworks (§1), to a focus on specific ecosystem types such as grasslands and high nature-value farmlands (§2), pollinator habitats (§3), and soil habitats (§4).

Conceptual and Methodological Frameworks—Integrating Human-induced, Biotic, and Abiotic Processes Across Scales

Although the knowledge on management practices and their impacts on the biotic and abiotic components of agricultural landscapes are widely studied, application-oriented and targeted theoretical and methodological frameworks, keep emerging (e. g., [Therond et al., 2017](#)). Such frameworks are developed and assessed across a range of spatio-temporal scales to ensure their validity. For instance, [Tscharntke et al. \(2005\)](#) have highlighted the importance of the landscape-scale approach to investigating effects of agricultural management practices. The series of conceptual and application-oriented articles presented in this Research Topic show how configuration of agricultural land at landscape spatial scales is linked to the optimization of ecosystem service delivery. Starting with a conceptual discussion paper, Ekroos et al. redirect the debate on what is the best practice between “ land sparing” and “ land sharing,” to a new cross-scale assessment to improve

the management of transformed landscapes. They argue that in order to ensure that agricultural systems are able to maximize yields while maintaining a series of ecosystem benefits, a multiple-scale land-sparing practice is required. They propose to apply this larger scale approach either within groups of collaborating farms or at a regional level, while taking into account the trade-offs among scales.

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