



Opinion

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- Agroscares - Are Alternative Productive Systems the Future of Farm Land?



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Abbreviations: AEI: Agro-Ecological Intensification; OF: Organic Farming; PA: Precision Agriculture; CSA: Climate Smart Agriculture; ES: Ecosystem Services

Opinion

The projected growth of human population for 9 billion people in approximately 30 years coupled with the increasing environmental impacts arising from intensive agricultural practices, which reached unprecedented levels in recent years, faced future agriculture with a difficult challenge, directly connected to the need to produce more and better food in less land [1]. This fact is particularly important in a period when natural landscape preservation within agricultural landscapes is increasingly viewed as a crucial component of agricultural sustainability, guaranteeing habitat and support to wildlife populations that provide essential ecosystem services with a gradually comprehensive socioeconomic value. These facts, attached to the necessity to produce food in an increasingly sustainable manner, not only in terms of crop efficiency, but also in terms of land use and biodiversity conservation in natural ecosystems, emphasise the need to assess the possibility to use new technologies on different productive systems evaluating their impact both in environmental, economic and social terms [2].

While agricultural principles associated to sustainability are generally advocated as important procedures to increase production, contributing for protecting the environment, the combined effects of several important agricultural management/productive systems as is the case of agro-ecological intensification (AEI); organic farming (OF); precision agriculture (PA); climate smart agriculture (CSA), is still poorly addressed. Moreover, though there are numerous important techniques

and technologies that highlight the relevance of integrating ecological principles into agroscape management, enabling the optimization of inputs, maximizing yields, much is still to do at this level.

It is clear that the use of sensors, drones, global navigation satellite systems, precision irrigation supported by mobile devices, variable rate and depth seeding, weather and nutrient modelling, advanced GPS guided machinery and customized application of inputs to mitigate the application of crucial elements like water and/or fertilizers, can assure important ecosystem benefits as the mitigation of on farm pollution and the reduction of water consumption, while reducing input costs, maximizing yields, reducing dependency on external inputs, and sustaining or enhancing ecosystem services (ES) [3-5].

In this scenario one of the main challenges faced by the agricultural sector is to simultaneously: guarantee sufficient quality agrarian production to meet demand; whilst contributing to conserve natural landscapes, manage natural resources and improve human health and well-being in agroscares. In this regard, it becomes vital to understand, how these processes and different farming management typologies and intensities influence sustainability of local and adjacent ecosystems [6], how plant diversity affect the sustainability of different agroscares [7], comparing among other issues the ecosystem services granted by traditional farming systems vs. the ones associated to sustainable and agro-ecological management systems.

Such information can help guide decision-makers considering how best to implement sustainable agriculture systems considering not only economic aspects but also the multi-functional ability of such productive systems, so that both agricultural yield and ecosystem service delivery can be maintained or increased on agroscares, since even if it is true that the last decades brought with them new ways of producing, concepts such as smart agriculture, precision agriculture, sustainable agriculture, organic farming, and conservation agriculture, continue to be abstruse, representing, for several agricultural stakeholders and enterprises, simply an environmentally friendly imprint, rather than a comprehensive and sustainable process able to mitigate the negative impacts of agricultural practices, on ecological and even aesthetic aspect, while maximizing yields [8-11].

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