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Editorial

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# -AGROSCAPES-New Technologies, Differentiated Land Use Management and Productive Systems as the Future of Farm Land

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For thousands of years, men have been converting natural landscapes into farmland and pastures. The projected growth of human population for 9 billion people in approximately 30 years and the increasing species decline, reaching unprecedented levels, faced future agriculture with a difficult challenge, directly connected to the need to produce more and better food in less land. This fact is particularly important in a period when the maintenance of natural areas 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 comprehensive socioeconomic value.

However, even if this vision is increasingly acknowledged, the allocation of land to natural uses, especially agricultural one, continues to be seen, as a funding dependent strategy, which entails economic opportunity costs to producers, translating effective sustainable agriculture delivery on an activity progressively dependent on the relevance of the benefits introduced by such measures, considering essentially the economic balance between costs and profits.

These facts, coupled to the need 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 ecosystem, highlight the need to envision the use of new technologies on different productive systems assessing their impact both in environmental, economic and social aspects (Ponisio and Ehrlich, 2016; and Pywell., *et al.* 2015).

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, conservation agriculture, among others, continue to be ambiguous, 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.

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, on different agroscapes, comparing among other issues the ecosystem services granted by traditional farming systems vs. the ones associated to sustainable and agroecological 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 agroscapes.

Nevertheless, this is not a recent problem and current researches present substantial evidence that support the fact that ecosystem services are directly related to agricultural intensification, and that intensification if developed according to specific ecologic principles constitutes a feasible option for increasing productivity, while maintaining ecosystem service provision and reducing negative externalities. In fact, agroecological intensification (AEI) constitute, alongside with other important farm management systems, as is the case of precision agriculture (PA), important techniques and technologies to highlight the relevance of integrating specific ecological principles and biodiversity management procedures into agroscape management, while optimizing inputs to maximize yields (Kelly., *et al*. 2017 and Kremen., *et al.* 2012), considering the use of robotics and sensors, drones, advanced GPS and GNSS (Global Navigation Satellite Systems), IofT, weather modelling and customized application of inputs to mitigate the application of crucial elements like water and/or fertilizers (Kremen., *et al.* 2012). If implemented correctly these techniques 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.

In this scenario, it urges to calculate economic outcome and impact of implementing such technologies, while identifying areas prone to change to and from agricultural production in order to secure enough high-quality agricultural production to meet demand; conserve biodiversity and manage natural resources; and improve human health and well-being (Parmentier, 2014). It is necessary to struggle against the idea that only monocultures can be highly productive, highlighting the fact that biodiversity can provide a partial substitute for many costly agricultural inputs, such as fertilizers, pesticides, imported pollinators, and irrigation (Isbell., *et al*. 2017; Lechenet., *et al.* 2017), increasing substantially the resilience of agroscapes.

We need to reinvent agriculture both in ecologic, economic and social terms. We need to transform agroscapes in sustainable productive areas able to totally fulfil their potential, helping to preserve/maintain soil organic matter, water infiltration, pest and/or disease control, scenic beauty, etc. etc.

Ecologically, they need to support biodiversity, assuring important ecosystem services, while managing natural resources and sustaining productivity, avoiding infringement onto the environment, while maintaining their natural beauty;

Economically, they need to provide income to rural communities, contributing to enhance product value throughout the value chain; and Socially they need to be seen as a crucial element of everyday life, able to contribute to increase life quality, providing food, feed, fuel and shelter, fostering healthy populations, helping agroscapes to realize their full development potential.

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