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Editorial

CERNAS—Current Evolution and Research Novelty in Agricultural Sustainability

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Climate changes have overwhelming impacts on primary production and, consequently, on agricultural and animal farming. Additionally, at present, agriculture still depends strongly on fossil fuels, both for energy and production factors such as synthetized inorganic fertilizers and harmful chemicals like pesticides.

The need to feed the growing world population poses many challenges. Additionally, it is mandatory to reduce environmental impacts to a minimum, maintain healthy ecosystems, and improving soil microbiota as a way of ensuring a promising future for the coming generations. Food security is a major concern of modern times, and different disciplines are devoted to the effective combat to this eminent threat. The work by Necula et al. [1] focuses on the commercialization of food products originating from agricultural farming or mountain activities, highlighting that new consumers, especially after the COVID-19 pandemic and its food systems' impact, tend to attribute a higher value to local and organic food products.

Current changes in the use of land for agricultural purposes in many regions of the globe has an impact on carbon storage, and therefore an improved understanding of this reality is beneficial to comprehend and quantify carbon emissions. Kong et al. [2] suggest that the development of agricultural fields with a high carbon density or, alternatively, the conversion of lands with low carbon density are essential to improve carbon sequestration in the future as a result of cropland transformation.

Livestock production under cover crop systems helps to alleviate compaction so that oxygen and water can sufficiently flow in the soil, adding organic matter, and helping hold soil in place, reducing crusting and protecting against erosion.

The use of organic plant production practices allied to the control of substances used in agriculture also decisively contributes to alleviating the pressure on ecosystems.

The use of animal manure has been a traditional practice to improve the nitrogen content of agricultural soils. However, new developments in this area have been reported lately, namely the use of technologically advanced treatments, like plasma technology, which can improve microbial quality without harming the soil-dwelling organisms [3].

Water is a more and more valuable resource, becoming scarce in many regions of the globe, so that its application in agriculture sometimes has to be highly regulated. In the Mediterranean, this problem is assuming particular relevance, so Valenzuela-Mahecha et al. [4] alert us to the need to establish measures of both a technical as well as a financial nature to enable farmers who deal with irrigation problems cope with this reality. They presented a new index-based drought insurance scheme that will help farmers to deal with the negative economic impacts of the more and more frequent water scarcity events.

Some of the goals of this new decade are to use enhanced sustainable productive methodologies to improve the input/output ratios of primary production, to reduce environmental impacts, and to rely on new innovative technologies.

The need to improve plant production ratios, allied to the reduction in agricultural losses and crop problems, is pivotal to increase the food production of vegetable origin. The work by Fadiji et al. [5] brings some insights into the symbiotic integration of endophytic

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viruses into maize crops, and how diversified agricultural practices can impact their abundance. Not only is the improvement of crop production ratios pivotal, but the conservation of food and agricultural products along the food chain is also essential to diminish the current huge amounts of food not consumed and disposed along the food chain. The use of appropriate packaging or a controlled atmosphere can greatly extend shelf-life and improve food quality [6] while reducing organic waste. The review by Fadiji et al. [7] focuses on the role of nanotechnology in helping cope with food insecurity and minimizing post-harvest losses that have both economic as well as environmental impacts.

The work by Ferrão et al. [8] provides new knowledge about the characterization of hazelnut fruits grown in Portugal, some of them coming from native varieties, which usually are well adapted to the local edaphoclimatic conditions, thus presenting good production ratios while requiring low cultural interventions.

The minimization of agricultural or industrial waste is another of the main goals of sustainability, as established by circular economy principles. The use of agrifood waste in crop fields with the aims to, on the one hand control, weeds and, on the other hand, complement soil nutrients is discussed by Lorenzo et al. [9] as a sustainable option to reduce agricultural residues. The management of weeds through alternative ecological ways is essential in reducing the harmful intensive usage of synthetic chemical weed-controlling substances. As shown by Monteiro and Santos [10], precision weed management assumes a role in more sustainable weed control. Also, concepts of precision agriculture, smart agriculture, and innovative technologies such as nanotechnology, artificial intelligence, genetic modification, or others bring endless possibilities for the intervening actors in agricultural domains to improve crop production, efficiently manage natural resources, and control the ecologic footprint of products and activities [11].

The reutilization of waste, such as that coming from food industrial processing plants, can have important environmental relevance while also providing sources for valuable compounds of possible utilization in diverse industries in the food, pharmaceutical, or cosmetic fields. This is the case in the extraction of polyphenolic compounds from cherry seeds [12]. Also, the use of agricultural or industrial waste of a lignocellulosic nature, such as cherry seeds, can have positive environmental impacts and provide new sources of materials at the same time to obtain more natural polyurethane foams while reducing the use of petroleum-derived ones [13].

Extreme marine environments, like saline areas in coastal zones, can provide new opportunities for the agricultural farming of species especially adapted to these high salt concentrations, like halophyte plants [14]. Due to the effects of global warming, the high salinity of some agricultural environments also brings challenges, as discussed in the review by Shultana et al. [15].

The pivotal role of bees as pollinators is vastly recognized, and many threats are presently having harmful effects on bee colonies, such as the varroa mite (*Varroa destructor*) or the Asian wasp (*Vespa velutina*), which influence the life of bees and threaten entire colonies. The characterization of beekeepers and beekeeping activities helps understand how the beekeepers are coping with the present challenges as a way to also provide more helpful support to this essential activity from ecological as well as agronomic points of view. The work by Guiné et al. [16] presents the characterization of beekeeping in different European countries, highlighting the differences encountered.

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