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Editorial

Agricultural Citizen Science and Sustainable Regional Development

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In the last 70 years, agriculture has evolved from an activity that was traditionally linked to rural areas to a global industry that provides food for the growing world population [1,2]. Agriculture plays a vital role in today' s society from an economic point of view (i.e., through farmer's income, shaping landscapes through land use, etc.) [1,3,4] whereby it contributes to an integrated development in a regional rural economy, through interconnections with other sectors of economic activity [5–8] and by reducing poverty levels [3]. The impact of agriculture on the socio-cultural aspects is also recognized—i.e., the influence of farming practices on the lifestyle of the inhabitants of the area and their local culture [1,7,9,10]. Furthermore, agriculture represents more than a practical economic activity in rural environments; it is considered a way of living, knowing, and creating a distinct region from the urban areas. Thus, farmers are considered holders of knowledge and guardians of traditional practices and natural and cultural heritage in the countryside [1,10]. However, at the same time, agriculture has a strong impact on the environment, resulting from strong impact on the environment, which occurs because of the intensification and expansion of agricultural lands [1,7,11,12]. At the international level, there are concerns regarding the promotion of sustainable agricultural practices that generate a minimal impact on the environment: e.g., agro-ecology and organic agriculture [7,11,13,14]; hydroponically cultivated micro greens [15], as well as the implementation of measures for the conservation and integrated management of agricultural areas that are affected by climate change [11], etc. The importance of applying measures that contribute to the sustainable development of agriculture is closely related to its strategic role in ensuring food safety and security. In recent years, an approach regarding the sustainable intensification of agriculture has been proposed from the perspective of sustainable development. This involves the cultivation of several crops whilst also utilizing a variety of inputs and local practices to produce more diverse and healthy food, thus ensuring the satisfaction of the needs of agricultural communities and regions [16].

At the same time, the discipline of citizen science, which has experienced continuous development in recent years, could significantly contribute to more sustainable development of agriculture, mainly because it includes a rich set of historical examples related to agriculture and food [17]. However, the fields of agriculture and food science fields have not fully benefited from the tools and knowledge generated by citizen science [17,18].

Concerning the economic and social changes registered in rural areas, and the need to implement a sustainable development pattern, the idea of diversifying rural economies was outlined. This context offers the prospect of implementing a new vision for developing the rural space, which is oriented on activities complementary to agriculture and will thus help ensure various economic opportunities for rural communities. For this reason, the diversification of rural economies was one of the prerequisites for developing rural tourism in different countries [6–8].

Taking into account the current context that is marked by significant social and economic changes in rural areas, the importance of this Special Issue aiming to offer new

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perspectives on the role played by citizen science in agriculture is justified, with special attention being paid to the impact on sustainable regional development.

The articles included in this volume are focused on the contribution of agriculture [10,12,14] and human capital [14,19] on sustainable regional development. Additionally, another theme addressed is focused on the analysis of the interconnections of agriculture with other sectors of economic growth that generate multiple positive impacts on regional development [8]. By reporting on case studies from Asia and Europe, the articles provide a complex approach to the themes from the perspective of the varied factors that influence how agriculture is practiced and their impact on regional development in different rural areas. Moreover, some contributions have practical utility by offering solutions related to the practice of sustainable agriculture (e.g., the application of an efficient agro-ecological policy that can the human capital can influenced) [14]. Ma et al., 2023 [14], emphasize that, in the current global context, the promotion of ecological agriculture is necessary. Technology can be a valuable tool the in the development of agriculture, but its contribution must be correlated with policies that protect the environment and maintain the quality of the working areas. In this way, the agro-ecological policies are an important means of promoting the progress of ecological agricultural technology and providing a fundamental guarantee for the ecological development of agriculture. From the opinion of the authors Ma et al., 2023 [14], sustainable agriculture must be based on the correct combination of the three factors in an analytical framework, to explore the impact of human capital on agro-ecological policy and on the progress of green agricultural technology.

Another article presented in the Special Issue illustrates economic importance of agriculture, namely swine breeding, for the life and culture of the communities of a rural area in Romania [10]. In this paper, the specific features of the analyzed communities are highlighted, both socio-economic and cultural, which are strongly influenced by the animal breeding activity. The authors highlight that swine breeding in the study area (Vâlcea County, located in the historical province of Oltenia) is necessary for those communities that provide a significant part of their food. On the other hand, raising pigs is also a local cultural trait, a traditional economic activity that ensures positive effects both at the community level and within the regional economy, even if large-scale pig farms are not very numerous. Local economic and political situations have influenced the the communities' orientation towards improving the animal breeding strategy, an activity that has even become an economic resource [10].

Another example of traditional agricultural activity oil palm cultivation in Indonesia. This culture ensures positive effects, both at the national level and at the regional and local level because palm oil is a top export commodity for this country, which provides the highest income in foreign currency [12]. The study is interesting because it focused on the analysis of the level of sustainability of the oil palm agribusiness practiced on small plantations in Labuhanbatu Regency, located in the northern part of the Sumatra archipelago. Oil palm cultivation provides the main source of livelihood for small farmers [12]. The importance of the study is revealed by the fact that the cultivation of oil palm by small farmers in Labuhanbatu Regency represents a challenge from the point of view of ensuring the balance between the practice of a commercial plantation in a sustainable manner, with a minimal impact on the environment, and obtaining a high economic efficiency, in the context in which just over half of the oil palm plantations (55%) in Indonesia are managed by large private companies [12]. The study results highlight that the multidimensional sustainability of the oil palm culture practiced by small farmers in Labuhanbatu Regency was classified as "quite sustainable", in the sense that the greatest value is given to the economic dimension [12]. Thus, the authors emphasize the fact that the oil palm agribusiness practiced by small farmers needs the support of the interested parties to improve its sustainability status.

The importance of agriculture in the integrated development of a rural economy through the involvement of the local population in agritourism represents the subject of another article within the volume, which is focused on testing the relationship between the positive impacts of peer-to-peer accommodation and the performance of agritourism in the

Eastern Province of the Kingdom of Saudi Arabia [8]. The theoretical implications of this study reflect the advantages of Airbnb accommodation in the sense that they can be used to support rural communities in developing agritourism. On the other hand, this paper emphasizes the economic role of P2P accommodation units and the exchange relations between companies and local communities, which should be helpful to both, especially in the case of rural tourist destinations.

An analysis of the entrepreneurial intentions of graduates of agriculture and food sciences in the Kingdom of Saudi Arabia represents a theme that correlates with the vision of diversification of the national economy conceived by the country's government whose economy is currently totally dependent on the oil industry [19]. The importance of this study reflects the impact of the development vision of the Kingdom of Saudi Arabia, which aims to reduce youth unemployment and encourage entrepreneurship in the near future, on the entrepreneurial intentions of agriculture and food science graduates from three main universities [19]. The most important findings indicate the desire of agricultural and food science graduates interviewed to become entrepreneurs, being willing to accept risks and be proactive in launching new ideas.

In conclusion this Special Issue shows, through various approaches, the role played by agriculture and human capital (including the highly qualified) on sustainable regional development. These varied approaches are correlated with the rapid dynamics of political, economic, and socio-cultural changes apparent in recent years, revealing the importance of the main theme of this Special Issue and the need for it to be re-examined in future research studies.

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