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Editorial

New Challenges and Trends in Agri-Environmental Management: Accomplishing of Sustainable Development Goals

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In recent years, agri-environmental management has entered a transformative period shaped by accelerating global change and a growing demand for sustainable food production systems [1]. Modern agriculture faces unprecedented pressures—from climate extremes and soil degradation to water scarcity and biodiversity decline [2]. In addition to all this, the unclear positions taken by political decision-makers exacerbate these agricultural issues for farmers. This is reflected in the growing number of farmer protests across Europe. These interconnected challenges highlight the urgent need for innovative approaches that can balance agricultural productivity and environmental stewardship. This can be achieved by enabling farmers to plan ahead for their production and management conditions, thereby creating a more balanced approach to agricultural production.

Emerging trends such as precision agriculture, remote sensing-based monitoring, artificial intelligence-driven decision support, and data-intensive resource optimization are reshaping the way agricultural landscapes are managed. At the same time, agroecological and regenerative farming strategies are gaining recognition for their capacity to enhance soil health, strengthen ecosystem services, and build long-term resilience. Together, these technological and ecological pathways offer complementary solutions for reducing environmental impacts while supporting sustainable yields [1,3,4].

Therefore, alongside technological advances, agroecological and regenerative approaches provide ecologically grounded pathways to sustainability. Conservation tillage, organic amendments, crop diversification, and integrated nutrient management have been shown to enhance soil carbon sequestration, promote beneficial soil biota, and strengthen system resilience against climate extremes [3–6]. These practices contribute directly to the improvement of soil structure, water-holding capacity, and nutrient cycling—ecosystem functions crucial for long-term productivity. Recent Hungarian and Central European findings highlight the relevance of such practices for improving soil carbon stocks and supporting climate adaptation in regional agricultural landscapes [3–5].

The United Nations Sustainable Development Goals (SDGs) provide a global framework for addressing these challenges. Agri-environmental management plays a pivotal role in achieving several key SDGs, including Zero Hunger (SDG 2), Clean Water and Sanitation (SDG 6), Responsible Consumption and Production (SDG 12), Climate Action (SDG 13), and Life on Land (SDG 15). Advancements such as improved nutrient management, the circular use of agricultural waste, mitigating greenhouse gas emissions, and protecting water resources demonstrate how agricultural innovation can drive meaningful progress toward sustainable development [6–9].

However, agricultural innovation is inconceivable without systematic research, experimental setups, testing, and developing new approaches. The most urgent task for

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researchers is therefore to find adequate solutions to these challenges at both the local and global levels.

This Special Issue, "New Challenges and Trends in Agri-Environmental Management: Accomplishment of Sustainable Development Goals", brings together cutting-edge research that addresses these pressing topics. The contributions explore a wide range of solutions—including sustainable land use practices, water-efficient irrigation technologies, pollution reduction strategies, climate-resilient farming models, and the valorization of agricultural by-products [10–15]. By presenting both conceptual insights and practical applications, the papers in this issue underline the critical role of integrated, science-driven approaches in shaping the future of sustainable agriculture [10,11]. Collectively, these studies demonstrate the value of interdisciplinary approaches that integrate technological innovation with ecological principles and policy considerations [10–15].

I hope that this collection will inspire further research, foster interdisciplinary dialog, and support policy frameworks that promote resilient, resource-efficient, and environmentally responsible agricultural systems. Achieving the SDGs demands coordinated global action, and the innovations showcased in this Special Issue represent important steps toward a more sustainable and secure agri-environmental future.

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