



Editorial: Adaptive Farming Sustainability Practices: Fundamentals to Advances

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Editorial on the Research Topic

Adaptive Farming Sustainability Practices: Fundamentals to Advances

Adaptive farming practices play a major role in sustainable food production systems, maximizing food production and minimizing the negative impact on the rapidly growing human population. Unfortunately, the global agricultural production system is under threat due to soil degradation, meanwhile imbalanced use of agrochemicals in agriculture has had a negative impact on soil, agriculture, and environmental sustainability. Crop productivity is negatively affected due to climate change. Therefore, the integration of suitable adaptive farming practices under changing climatic scenarios along with judicious use of input interventions is of paramount importance to feed the rapidly growing global population. Consequently, the wide adoption of various adaptive, specific farming practices such as laser land leveling, timely seeding, crop diversification, use of efficient microbes, crop modeling, organic management, precision agriculture, tillage and crop residue management, site-specific input management, the inclusion of pulses in the cropping system, direct seeding of rice, sustainable intensification, and others is imperative to cope with such adverse situations.

Throughout the last decade, the background against which farmers administer their farms has changed rapidly, regularly, and repeatedly, with little caution. Most importantly, climate change effects caused serious cascading consequences for people, infrastructure, and the environment. Further, remarkable price fluctuations of agricultural commodities, stricter food quality requirements than in the past, new environmental regulations, the debate surrounding genetically engineered crops, demand for energy crops, and consequences of the financial crash led to ambiguity concerning future threats and potentials toward food security. During such a disordered period, a singular focus on efficient production is no longer adequate. Farmers require to be able to handle unforeseen situations and adapt to innovative smart solutions to tackle the issues (Dubey et al., 2019).

There are multiple strategies that strengthen the adaptive competence of a farm, contributing to poverty reduction, food security, and agricultural development. We can learn through experimenting with natural resource management, agriculturally important microorganisms, and primers for enhancing seed establishment and monitoring its outcomes. Other strategies include the integration and judicious management of crops and livestock, ensuring a flexible farm organization to increase the options for diversified activities by the farmers, and diversifying to

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spread risk and generate buffers (Colin and Crawford, 2000; Boody and DeVore, 2006; Brodt et al., 2011).

Different factors are responsible for attaining global food security while building food system resilience such as (i) the adaptability of the agricultural system against adverse conditions,

(ii) the availability of sufficient and nutritive food (from poor to rich), (iii) accessibility of required resources to fulfill dietary preferences and nutritional demands, and (iv) affordability of food by one and all (Dubey et al., 2019). Adaptive farming practices are crucial to fulfill the food requirement of the rapidly



growing human population and also for meeting the Sustainable Development Goals framed by the United Nations (UN-SDGs) as the 2030 agenda for sustainable development (**Figure 1**).

There is a strong need to orchestrate activities around the following:

- **Policy commitment**—Supporting and seeking to achieve international climate change commitments and national adaptation priorities.
- **Climate risk appraisal**—Facilitating the systematic use of climate risk information when planning investments to increase resilience.
- **Knowledge management**—Enhancing the documentation and dissemination of knowledge on diversified multifaceted approaches.
- **Smallholder empowerment**—Strengthening the participation and ownership of smallholder farmers in decision-making processes.
- **Technological advancement**—Advancing technologies for the governance and management of climate-sensitive natural resources.

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Executing the above approaches could broaden the approach to farming and permit farmers to switch options according to the circumstances faced. These options do not rely solely on the farm itself, but also on the capability of the farmer to capitalize peripheral resources and employ them in combined actions. Implementing these strategies comes at a cost, highlighting the fact that farmers need to understand and accept expected trade-offs between efficiency and adaptability (Brodth et al., 2006; Oberč and Arroyo Schnell, 2020). Overall, adaptive farming practices are essential for maintaining a sustainable food production system under adverse climatic conditions. Upon mastering the art of meeting challenges, farmers can ensure the sustainability of their farm for the future.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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