

Developing Resilient Food Systems: Climate Change, Regenerative Agriculture and Digital Innovation

The agriculture sector in Pakistan, with its strong links to the secondary and tertiary sectors, plays a critical role in promoting economic growth and sustainable livelihoods. In Financial Year 2023-24, the sector grew by 6.25% and contributed 2.38% to the overall economic growth rate (GoP 2024). Despite sluggish growth in other economic sectors, improved crop production - particularly in wheat, rice, and cotton - has boosted exports and increased foreign currency reserves.

However, significant challenges threaten the sector's productivity and sustainability. Biophysical constraints such as soil degradation, salinity, waterlogging, and increasing aridity have reduced land fertility, making traditional farming methods less effective. These issues are compounded by climate change, which has led to erratic precipitation patterns, rising temperatures, and increased vulnerability to floods and droughts, all of which negatively impact crop yields, destroy infrastructure, and disrupt agricultural activities.

The question arises: how sustainable is the rising growth trend in the agriculture sector amid these challenges? Most critically, the severe flooding in recent years, which has caused extensive damage to crops and disrupted food supply chains, highlights the urgent need for climate-resilient strategies. In addition, the country faces a growing population and increasing food security challenges.

Another critical question is how adopting regenerative agriculture can enhance productivity and sustainability, addressing the environmental and climate challenges facing Pakistan's agriculture sector. Transforming food systems through approaches like regenerative agriculture can improve soil health, reduce land degradation, and promote sustainable farming practices. Additionally, exploring how digital technologies can further enhance agricultural productivity is crucial. By addressing technological backwardness and institutional inefficiencies, digital solutions can position the sector at the forefront of economic and social development in Pakistan.

Several areas need urgent policy and development attention, including implementation of digital agriculture services to optimise farming practices and decision-making processes. In particular, improving fertilizer and pesticide use efficiency can help enhance crop yields while minimising environmental impacts. The country's low farm input use efficiency negatively affects soil health, contributing to rising land degradation and desertification. Digital solutions that provide real-time data on soil, weather, and water conditions have the potential to significantly improve farm input efficiency and boost total factor productivity in Pakistan's agriculture sector.

As the global development agenda increasingly recognises the need for long-term, science-based approaches to achieve inclusive and sustainable development, addressing the complex challenges at the intersection of climate change, food security, digital innovation, and sustainable development in agriculture and natural resources becomes crucial. This is especially critical as poverty in Pakistan has risen to 40.1%, pushing an additional seven million people below the poverty line and exacerbating issues related to food security, unemployment and inflation (Memon and Okura 2024).

The proposed plenary, organised jointly with Nestlé Pakistan, will explore opportunities which can help address the intertwined challenges of climate change, food security and sustainable development. The discussion will focus on the following questions:

1. How has climate change affected agriculture in Pakistan? With a burgeoning population, what crises lie ahead if the country does not change the way it produces and consumes food?
2. What regenerative agriculture practices are being followed in Pakistan? What are the best practices from similar economies, and how can these be effectively scaled up for small- and medium-landholding farmers?
3. How can digital transformation address challenges in Pakistan's agriculture sector? What practices are being followed in Pakistan, and what are the best practices from similar economies? What is the future of Artificial Intelligence (AI) in a developing and agrarian country like Pakistan? Can traditional regenerative practices and future technology find a way to work together?
4. In what ways can alliances and partnerships be strengthened to address the policy and legislative challenges in Pakistan to integrate regenerative agriculture and technology?

References

GoP 2024, 'Pakistan Economic Survey 2023-24', Finance Division, Government of Pakistan, <https://finance.gov.pk/survey_2024.html> [Accessed 1 October 2024].

Memon, A. and Okura, Y. 2024, 'Strengthening Pakistan's Readiness for the Next Crisis', *World Bank Blogs*, 28 August, <<https://blogs.worldbank.org/en/endpovertyinsouthasia/strengthening-pakistan-s-readiness-for-the-next-crisis>>.

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