

# Innovations in Pakistan's agriculture

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## Introduction

Agriculture sector holds immense significance for Pakistan economy as it is contributing 22.9% towards GDP and 37.4% in employment generation (Economic Survey of Pakistan, 2022-23). Ali et al. (2020) examined that agriculture trade significantly contributes towards economic growth of Pakistan. The agricultural sector not only ensures food security and provides raw material for the industrial sector, but also a key source of foreign exchange earnings for the country.

**Table 1: Agriculture sector performance**

Description	2018-19	2019-20	2020-21	2021-22	2022-23
Agriculture growth	0.94	3.91	3.52	4.27	1.55
Contribution to GDP	22.4	23.5	23.0	22.6	22.9

Source: Economic Survey of Pakistan 2022-23

Table 1 explains the performance of the agriculture sectors during the last few years. Agriculture growth was 0.94% in fiscal year 2018-19 which increased to 4.27% in 2021-22. However, a decrease in agriculture growth is observed during 2022-23. The contribution of agriculture sector towards GDP was 22.4% in 2018-19 which increased slightly to 22.9% in 2022-23.

**Table 2: Production of major crops**

Crop	2018-19	2019-20	2020-21	2021-22	2022-23
Cotton (000 bales)	9,861	9,148	7,064	8,329	4,910
Sugarcane (000 tonnes)	67,174	66,380	81,009	88,651	91,111
Rice (000 tonnes)	7,202	7,414	8,420	9,323	7,322
Maize (000 tonnes)	6,826	7,883	8,940	9,525	10,183
Wheat (000 tonnes)	24,349	25,248	27,464	26,208	27,634

Source: Economic Survey of Pakistan 2022-23

Table 2 indicates the production of major crop of Pakistan over last five years. The production of cotton decreased significantly whereas the production of other crops increased during the period.

**Table 3: Agriculture exports (\$ Million)**

<b>Crop</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-22</b>	<b>2022-23</b>
<b>Food group</b>	<b>4,361</b>	<b>4,394</b>	<b>5,416</b>	<b>5,023</b>
Rice	2,176	2,041	2,513	2,149
Fruits	432	480	477	283
Vegetables	299	320	310	300

*Source: Pakistan Bureau of Statistics*

Total food group exports of Pakistan decreased from \$ 5,416 million in 2021-22 to \$ 5,023 million in 2022-23 (Table 3). Rice is the major export in the food group. Some of the major export destinations for rice exports include China, UAE, Afghanistan, Kenya and Malaysia. Qayyum and Nigar (2020) pointed out that there exists further potential of increasing agriculture trade between China and Pakistan. Atif et al. (2016) also emphasized the same analysis that agriculture exports of Pakistan are still less than the potential for which effective measures are required to achieve higher agriculture production and increasing the export volume.

The above discussion reflects the need for innovative solutions and adapting modern methods to increase the agriculture production. Ahmed and Javed (2016) emphasized that the development and diffusion of modern technology is important in increasing agriculture productivity in Pakistan. Chandio et al. (2016) also pointed out that the intervention by the government in the sub-sectors of agriculture through introducing innovative agriculture technologies are useful in enhancing the share of sub-sectors in the overall agriculture GDP.

### **Challenges in agriculture sector**

Farmers in Pakistan are using soil for growing crops without caring enough for replenishing due to which quality of soil has depleted and exhausted causing lower productivity. Due to lack of access to financial resources, Majority of the farmers remain unable to use better quality of inputs including adoption on modern agricultural techniques and technologies.

Research centers at provincial level are not playing an active part in providing training and guidelines to farmers. This also forces the farmers to keep on using outdated agricultural practices without adopting the innovative methods to increase the production. The investment and funding allocated towards these research and development activities are also not appropriate to deal with the growing challenges in the agriculture sector. Lack of infrastructure including limited storage facilities are also the key factors contributing to poor productivity levels in agriculture sector of Pakistan.

### **Public sector initiatives**

To promote innovation in the agriculture sector of Pakistan, various efforts have been made in the recent past with the support of different stakeholders. The Government of Pakistan introduced 'Green Pakistan Initiative' under the newly formulated Special

Investment Facilitation Council (SIFC) through which modern agriculture technologies will be promoted to bring the green revolution in the agriculture sector of Pakistan<sup>1</sup>. It is expected that the initiative will bring forth a paradigm shift in land management and agriculture development. National Food Security Policy, Vision 2025 are some of the other measures from the federal government to achieve food security and Sustainable Development Goal 2 in Pakistan<sup>2</sup>. Under National Food Security Policy, the government is focusing on increasing the productivity of major crops, reducing the yield gaps and ensuring farm profitability for the sustainability of the agriculture sector, providing indicative prices for sustainable production, improving the institutional infrastructure for provision of agriculture service providers, and initiating various training and structural adjustment schemes.

The Punjab government formulated a three-year plan in 2017 to introduce new techniques in agriculture sector for increasing per acre yield and enhancing the economic conditions of farmer in the region<sup>3</sup>. Installing the ultra-modern technology of Solar Drip Sprinkler Irrigation system in Punjab was the key feature of the program through which better and effective utilization of available irrigation water aimed to utilized to promote agriculture productivity. The program promoted the modern and profitable farming in the region while ensuring the productivity and decreasing the expenditures. Besides, the program also helped the farmers in better utilization of fertilizers and pesticides along with saving the water.

An agreement has been made between Turkey and Sindh Agriculture University to initiate numerous projects related to modern agriculture<sup>4</sup>. Turkey will assist to establish a modern greenhouse and drone technology project at the university.

The extensive efforts of Balochistan Agriculture department brought 69,670 acres of barren into cultivation<sup>5</sup>. The measured increased the production and ensured the food security in the region. The distribution of high yielding seeds of wheat, rice, oil, seed, sunflower and sesame on subsidized rate, installation of green tunnels and construction of water courses and water storage tanks were key interventions which helped to resolve challenges faced by farmers and increasing the production level. 150 green tunnels were connected to solar energy which agriculture production in the region. A development plan for water resources, livestock and agriculture is launched by the government of Balochistan with the support of International Organisation for Agriculture Development in 18 districts of the province<sup>6</sup>. 30,000 tube well in Balochistan province will be transferred

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<sup>1</sup> See <https://southasiajournal.net/green-pakistan-initiative-a-step-to-agricultural-revolution-in-pakistan/>

<sup>2</sup> See <https://dailytimes.com.pk/1148597/food-insecurity-on-the-rise-2/>

<sup>3</sup> See <https://fp.brecorder.com/2017/04/20170405164303/>

<sup>4</sup> See <https://www.hortidaily.com/article/9527556/turkey-and-sindh-ag-university-to-collaborate-on-modern-agriculture-projects/>

<sup>5</sup> See <https://www.nation.com.pk/29-Aug-2021/balochistan-govt-brings-69-670-acres-barren-land-under-cultivation>

<sup>6</sup> See <https://tribune.com.pk/story/2391653/agri-development-project-launched-in-18-districts>

to solar energy in a phased manner which will help in overcoming the energy crisis and ensures water supply without interruption.

The government of Khyber Pakhtunkhwa with the support of U.S Embassy and United Nations Development Programme (UNDP) Pakistan established four Agriculture Training Centers in the province for capacity building of farmers<sup>7</sup>. The centers will assist in improving the skills of farmers to cultivate alternative crops. The training will also include skill-building sessions on timely land preparation, planting, weeding, irrigation, harvesting, storage, and marketing. Besides, training centers with the usage of modern technologies will help farmers to improve, exchange and utilize information regarding various aspects of farming.

To overcome the agricultural credit limitations, the government allocated PKR 5 billion in budget 2023 to provide concessional loans for supporting the agriculture industry. The loans benefited the farmers to overcome the financial constraints and do expenditures for production purposes. Besides, the Prime Minister's Youth Business and Agriculture Loan Scheme will also provide easy loans to small and medium scale farmers. The government intends to offer low-interest loans to small farmers with the collaboration of provincial governments as well.

### **Initiatives from other stakeholders**

'Digital Dera' is an initiative to empower farmers with digital agriculture solutions and to develop small villages. Agriculture community network project in the form 'Digital Dera' was initiated in Pakpattan region of Punjab through which more than 1,500 farmers in the rural region are being assisted to seek solutions to farming challenges and learn regarding the modern agriculture technology and services<sup>8</sup>. Digital Dera is combining revolutionary technologies and benefiting the farmers by enhancing the productivity of crops. Besides, the initiative has developed the digital agriculture community network while empowering the farmers through efficient use of resources.

BaKhabar Kissan is another digital hub for agriculture which introduces modern advancements in technology and farming to develop a digital ecosystem. The initiative aims to offer farmers the tools required to enhance productivity, decrease waste and increase sustainability while ensuring the highest standards of quality and safety<sup>9</sup>. The products and services designed by BaKhabar Kissan are supporting farmers to make well-informed decisions and improving productivity and efficiency. Agriculture and livestock advisory, connecting farmers to agriculture experts, and provision of drone

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<sup>7</sup> See <https://www.undp.org/pakistan/press-releases/four-agriculture-training-centers-established-khyber-pakhtunkhwa-including-merged-districts>

<sup>8</sup> See <https://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=19062>

<sup>9</sup> See <https://bkk.ag/>

services are some of the major products and services through which BaKhabar Kissan is practically benefiting the farmers.

United States Agency for International Development (USAID) supported Electronic Beam (E-Beam) irradiation facility which helps in reducing post-harvest food losses because of spoilage and deterioration in quality<sup>10</sup>. Technology is also helpful in increasing the shelf life of foods and market access.

Sustainable Development Policy Institute (SDPI) with the support of The Canada Fund for Local Initiatives (CFLI) initiated 'Food Security Hackathon 2023'<sup>11</sup> to seek innovative and sustainable solutions to address food security and promote agriculture sector of Pakistan. Startups from across the country participated in the event and presented their projects through which they are implementing innovative ideas in the agriculture sector. The hackathon was a great opportunity for startups to showcase their projects and ideas where the participants also got an opportunity to meet with sector experts and potential funders.

The report by Pakistan Business Council (2023) reviews that various startups are evolving to provide agri-tech solutions in the agriculture sector of Pakistan. Some of the leading examples include Ricult, which introduced agronomy and profile data to assess affordability of farmers for financial services. Jiya Technologies initiates a platform that provides farm inputs, yield enhancement advisory, farming contract, information on market prices, and support farmers to link with retailers. Similarly, Tazah Technologies brings efficiency in the horticulture value chains.

New renewable energy farming techniques have helped farmers to achieve a significant increase in farm production in Thar, a desert region of Sindh province<sup>12</sup>. Frequent droughts, malnutrition and food insecurity are common in Thar but by using wind solar and wind-powered irrigation, farmers are able to increase the agricultural area and cultivate wheat, cotton, pulses and vegetables. Habib Bank Limited (HBL) provided financing worth PKR 1 billion for solar tube wells which will enable farmers to adopt capital-intensive technologies in an affordable and cost-effective way<sup>13</sup>.

Academic sector is also playing its part to promote innovation in the agriculture sector of Pakistan. Various universities such as NED University of Engineering and Technology, Institute of Business Administration Karachi, Lahore University of Management Sciences have started degree programs in Artificial Intelligence. Besides, University of Agriculture

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<sup>10</sup> See <https://www.cnfa.org/press/usaids-introducing-innovative-technologies-for-the-development-of-pakistans-agriculture-sector/>

<sup>11</sup> See [https://sdpi.org/innovation-for-food-security-and-afghanistan-pakistan-trade-in-agriculture-bridging-ideas-to-action-through-hackathon-and-funding-partnerships/project\\_detail](https://sdpi.org/innovation-for-food-security-and-afghanistan-pakistan-trade-in-agriculture-bridging-ideas-to-action-through-hackathon-and-funding-partnerships/project_detail)

<sup>12</sup> See <https://www.arabnews.pk/node/2266541/pakistan>

<sup>13</sup> See <https://profit.pakistantoday.com.pk/2023/11/20/hbl-finance-rs-1bn-for-solar-tube-wells-to-boost-renewable-energy-in-pakistans-agriculture-sector/>

Faisalabad and other such agricultural universities are working on using AI for crop monitoring and disease detection, which will help in generating optimal solutions.

## **Conclusion**

To introduce innovative solutions and enhancing the agriculture production in Pakistan, the government should allocate funds for research and development program to support innovative methods, technology adoption and sustainable farming practices. Establishing innovation hubs, incubation centers and centers of excellence in different regions are also required to support new ideas and interventions. The government should ensure availability of agricultural machinery at subsidized rates along with providing other inputs such as high-quality seeds and fertilizers. The assessment of quality of fertilizers, pesticides, and insecticide is also essential to enhance productivity.

The policy makers should provide technical and financial support to the farmers in drought prone regions to promote water conservation techniques. This will help to utilize additional areas for agriculture production. Pakistan has untapped export potential in agriculture sector with various trading partners which can be achieved by improving the physical infrastructure and effective implementation of trade agreements. Partnership between different stakeholders can link the domestic stakeholders with global partners which will help in capacity building and implementing the best practices in the agriculture field.

## References

- Ahmed, V. and Javed, A. (2016) National study on agriculture investment in Pakistan. Sustainable Development Policy Institute, Working Paper No. 157.
- Ali, I., Khan, I., Ali, H., Baz, K., Zhang, Q., Khan, A., and Huo, X. (2020). The impact of agriculture trade and exchange rate on economic growth of Pakistan. *Ciência Rural*, Santa Maria, volume .50:4.
- Atif, R., Haiyun, L., and Mahmood, H. (2016). Pakistan's agriculture export, determinants and its potential: An application of stochastic frontier gravity model. *The Journal of International Trade & Economic Development: An International and Comparative Review*.
- Chandio, A. Yuansheng, J., and Mag, H. (2016). Agricultural sub-sectors performance: An analysis of sector-wise share in agriculture GDP of Pakistan. *International Journal of Economic and Finance*, Vol. 8, No. 2.
- GoP. Economic Survey of Pakistan 2022-23. Finance Division, Government of Pakistan.
- Qayyum, U., and Nigar, N. (2020). An empirical analysis of Pakistan's agriculture trade with China: Complementarity or competition? Pakistan Institute of Development Economics, Working Paper No. 2020:23.
- The Pakistan Business Council. (2023). The state of Pakistan's agriculture sector. The Pakistan Business Council.