



Boosting Agriculture: Pakistan's Pursuit of Global Competitiveness

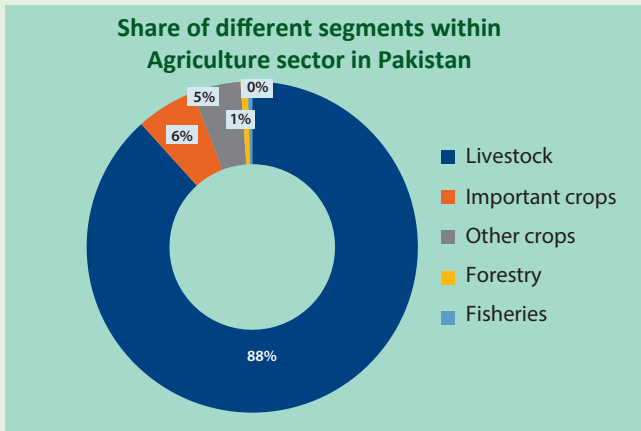
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Preamble

Pakistan's agriculture sector stands as the largest in the national economy, contributing around 24% to the country's GDP and employing 37.4% of its workforce. It also serves as Pakistan's primary source of foreign exchange earnings. During FY 2024, the agriculture sector witnessed robust growth of 6.25 percent. The major subsectors of Pakistan's agriculture include crops, livestock, fisheries, and forestry, each making varying contributions to both the agriculture sector and the national economy. These subsectors contribute significantly to both the country's GDP and agricultural value addition, as illustrated in the table below:

Sector	Share in GDP (%)	Share in Agriculture Value Addition (%)
Critical Crops	4.97	20.67
Other Crops	3.25	13.51
Livestock	14.63	60.84
Fisheries	0.31	1.30
Forestry	0.56	2.33

Figure 1: Share of different segments within Agriculture Sector in Pakistan



In the FY 2024, Pakistan's agriculture sector expanded by 6.25%, driven by significant growth in cotton, rice, and wheat production. Cotton output soared by 108.2% to 10.22 million bales, rice production increased by

34.8% to 9.87 million tonnes, and wheat production rose by 11.6% to 31.44 million tonnes. However, there was a slight decline in sugarcane and maize production. Other crops showed a modest recovery of 0.90%, with notable increases in fruits, vegetables, and pulses. The cotton ginning industry also experienced substantial growth, with a 47.23% increase attributed to the strong cotton harvest.

Agriculture Indicators: Tale of Pakistan

The tale of Pakistan's agricultural indicators is complex yet vital, reflecting the nation's economic backbone and its population's livelihoods. These indicators encompass various aspects of agricultural productivity, sustainability, and resilience, providing insights into the sector's performance and its contribution to food security and economic growth.

Key agriculture indicators in Pakistan include:

- Crop Production Index:** This indicator measures the relative change in the volume of crop production over time, reflecting trends in agricultural productivity and output. During the period from 2018 to 2020, Pakistan's crop production index was lower compared to countries such as China, India, Brazil, and Russia. Although there was an improvement from 2021 to 2022, the index remains comparatively low, indicating lower production of major crops compared to these countries.

Crop Production Index (CPI)					
	2018	2019	2020	2021	2022
Pakistan	99.7	100.3	105.1	113.4	104.1
China	104.4	107.8	107.9	109.8	111.9
India	110.8	112.3	115.7	120.6	123.3
Brazil	109.9	112.2	116.6	115.4	115.9
Russia	103.6	111.5	112.8	111.4	133.7

Table 1: Crop Production Index insight of 5 years [Source: World Bank]

- 2) Food Production Index:** The food production index tracks changes in the quantity of food produced in Pakistan over time, encompassing both crops and livestock. It provides a comprehensive view of the nation's food availability and self-sufficiency, highlighting areas of surplus or deficit in food production. Over the past five years, Pakistan has improved its food production index, showing year-on-year increases. Pakistan remains competitive among other countries, but its food production index is lower than that of India and Russia. With Pakistan's population increasing by 1.98% from 2021 to 2022, enhancing the food production index is crucial to meeting the needs of the growing population.

Food Production Index (FPI)					
	2018	2019	2020	2021	2022
Pakistan	106.4	109.8	116	121.4	122.4
China	103.4	104.3	105.5	109.9	111.8
India	114.2	116.3	120.1	126.1	127.8
Brazil	107.5	109.1	112	112.1	113.8
Russia	104.7	110	112	111.6	126.4

Table 2: Food Production Index overview of 5 years [Source: World Bank]

- 3) Livestock Production Index:** Livestock is a vital component of Pakistan's agriculture sector, playing a crucial role in rural livelihoods, food security, and export earnings. The livestock production index tracks trends in livestock production, encompassing meat, milk, and poultry, offering insights into the sector's performance and economic contribution. Pakistan's LPI has shown a steady increase from 2018 to 2022, with a notable jump from 120.9 in 2021 to 125.3 in 2022. This signifies accelerated production in dairy and poultry products.

Livestock Production Index (LPI)					
	2018	2019	2020	2021	2022
Pakistan	108.4	112.6	116.7	120.9	125.3
China	100.6	97.1	98.4	108.1	109.5
India	117.8	124.4	128.1	135.3	132.5
Brazil	104.6	107	107.6	108.6	112.2
Russia	106.1	107.9	110.9	111.8	116.9

Table 3: Livestock Production Index overview of 5 years [Source: World Bank]

- 4) Land Use for Agriculture:** Land use for agriculture significantly affects productivity. Monitoring changes in cultivated areas reveals trends in output and productivity. Increased agricultural land can boost production and food security, while decreases may indicate urbanization or land degradation. In

Pakistan, however, the land allocated for agriculture is comparatively lower than in China, India, Brazil, and Russia. Despite an increase in agricultural land area over the past five years, Pakistan's allocation remains inadequate to meet the needs of its expanding population. China, Brazil, and Russia allocate the highest proportions of land to agriculture, followed by India.

Land use for Agriculture (in hectares)					
	2019	2020	2021	2022	2023
Pakistan	37,301,116	37,497,264	37,694,796	37,889,704	38,096,384
China	538,296,960	542,251,000	546,204,900	550,158,700	554,112,900
India	179,020,960	179,025,550	179,027,780	179,031,970	179,036,140
Brazil	257,077,170	261,150,900	261,682,130	262,736,060	263,977,630
Russia	216,249,000	216,249,000	216,249,000	216,249,000	216,249,000

Table 4: Land Use for Agriculture summary of 5 years [Source: Our World in Data]

- 5) Water Use Efficiency:** Water use efficiency is vital for Pakistan's agriculture due to water scarcity. This measure tracks water used per unit of crop output, indicating potential for water-saving technologies. Agriculture consumes over 90% of Pakistan's freshwater, but mismanagement results in nearly 50% wastage. Insufficient water threatens food security in this agriculture-based economy. To address this, efficient irrigation methods, such as drip irrigation, and the adoption of water-saving crop varieties are essential to ensure long-term food security.
- 6) Crop Diversification:** Crop diversification is crucial for climate resilience, reducing production risks, and boosting farmers' incomes in Pakistan. It measures the variety of crops grown, highlighting opportunities to introduce new crops and value-added products for sustainability and profitability. Diversifying crops beyond staples like wheat and rice helps manage significant post-harvest losses in fruits and vegetables, estimated at 35-40%, by offering a strategic approach to agricultural production.
- 7) Agricultural Exports and Imports:** Monitoring agricultural exports and imports reveals Pakistan's global market integration, trade balance, and competitiveness. This indicator is divided into imports and exports. Over five years, Pakistan's imports have accelerated, while exports lag behind. Despite being an agricultural economy, Pakistan relies heavily on imports, more so than other agricultural economies, indicating a growing dependence despite efforts to enhance its own agricultural sector.

Agricultural raw materials imports (% of merchandise imports)					
	2018	2019	2020	2021	2022
Pakistan	4.4	4.2	5.9	5.2	5.6
China	3.6	3.2	2.9	2.7	2.7
India	1.7	1.9	1.6	1.6	1.7
Brazil	1.1	1	1.1	1	0.9
Russia	1	0.9	0.9	1	0

Table 5: Overview of Agricultural raw material imports (% of merchandise imports) [Source: World Bank]

In terms of exports, Pakistan's statistics are moderate but lag behind Brazil's. Compared to China and India, Pakistan's percentage of raw material exports is relatively higher. Overall, Pakistan's statistics indicate a substantial agricultural sector with potential for significant involvement in international agricultural trade. However, as of 2022, agricultural trade constitutes a relatively small portion of Pakistan's total merchandise trade globally.

Agricultural raw materials exports (% of merchandise exports)					
	2018	2019	2020	2021	2022
Pakistan	1	1	1.9	1.9	1.8
China	0.4	0.4	0.3	0.3	0.4
India	1.6	1.1	1.3	1.5	0.9
Brazil	5.4	5.8	5.7	4.8	4.7
Russia	2.2	2.1	2.5	2.3	0

Table 6: Overview of Agricultural raw material exports (% of merchandise exports) – [Source: World Bank]

Food Security Situation in Pakistan

Pakistan is grappling with significant food security challenges, as 36.9% of its population faces food insecurity and 18.3% experience severe food crises. The country's Global Hunger Index score has steadily worsened, reaching 26.6 in 2023, ranking Pakistan 102nd out of 121 countries.

Pakistan's Global Hunger Index					
	2019	2020	2021	2022	2023
Rank	94	88	92	99	102
Score	32.6	24.6	24.7	26.1	26.6

Table 7: Pakistan's trend of 5 years of GHI (Global Hunger Index) - Source: GHI

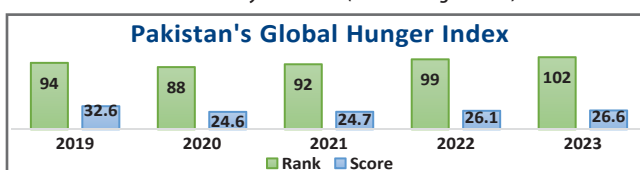


Figure 2: Rank and Score of Pakistan during five years in Global Hunger Index

Despite its substantial agricultural potential, Pakistan annually imports US\$10 billion worth of agricultural products, driven by factors such as climate change, population growth, and rural-to-urban migration. The severe floods in 2022 and other economic challenges have compounded these issues, particularly impacting wheat production, a staple crop. IPC Acute Food Insecurity analysis forecasts that 32% of the population in 43 vulnerable districts across Baluchistan, Khyber Pakhtunkhwa, and Sindh will face severe food insecurity from November 2023 to January 2024, necessitating immediate intervention.

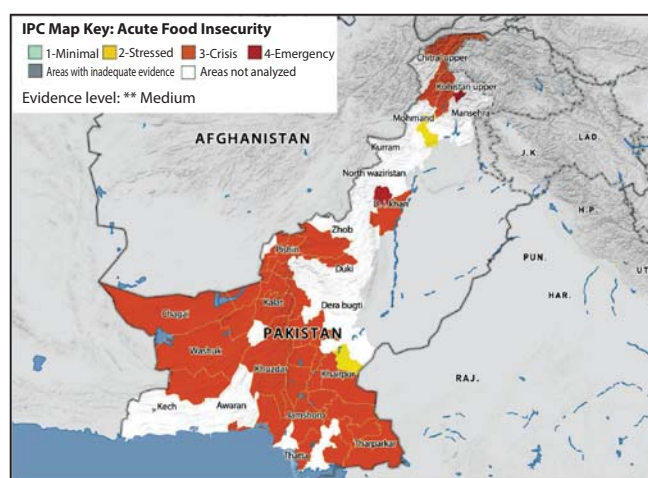


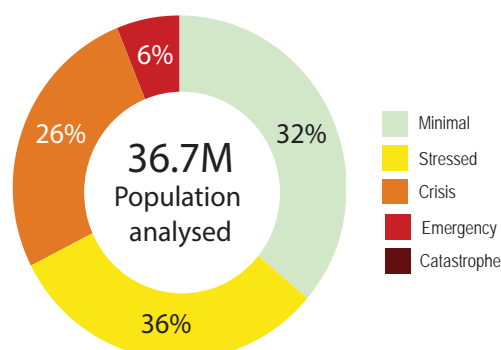
Figure 3: Projected Acute Food Insecurity (November 2023-January 2024) - Graphical representation
Source: IPC-Integrated Food Security Phase Classification



Projected Acute Food Insecurity Situation November 2023 - January 2024

11.8M

Between November 2023 and January 2024, the situation is expected to deteriorate, with around 11.8 million people likely to experience high levels of acute food insecurity (IPC Phase 3 or above).



32 percent of the population of 36.7 million will likely be in IPC Phase 3 or above.

Figure 4: Projected Acute Food Insecurity Situation [Source: IPC]

To enhance food security, Pakistan must transition to climate-smart agriculture, bolster investment in agricultural research and development, upgrade rural infrastructure, and reallocate agricultural subsidies. Achieving this requires a comprehensive approach involving coordinated efforts across government levels to effectively address food insecurity in the country.

Learning from the World: How Pakistan Can Grow



Brazil has significantly enhanced its agricultural productivity through substantial annual investments totaling US\$3-3.5 billion. The government contributes over US\$2 billion, complemented by more than US\$800 million from the private sector and US\$100 million from private equity and venture capital firms.

A key focus of Brazil's agricultural strategy is research, spearheaded by Embrapa, which prioritizes Sustainable Agriculture Innovation (SAI). Embrapa's initiatives include integrated crop-livestock-forestry systems, reduced tillage farming techniques, and nitrogen fixation in soybeans, among others. The private sector accounts for approximately 30% of the funding dedicated to innovation efforts.

In the realm of agricultural technology startups, Brazil showcases advancements in hydroponics, supported by companies like BeGreen and Pink Farms. However, funding for these startups is comparatively lower than in larger markets such as India. Brazil also excels in environmental sustainability, investing US\$200-300 million annually in SAI initiatives and implementing the Low Carbon Agriculture Program (ABC Plan) since 2010.



China has undergone a comprehensive transformation in its agriculture sector, leveraging advanced technologies such as IoT, big data, and the BeiDou Navigation Satellite System. These innovations have revolutionized farming practices, enabling precise resource management and maximizing yields. With a mechanization rate surpassing 73%, China has significantly reduced dependency on manual labor in crop cultivation and harvesting.

Furthermore, extensive agricultural research efforts have led to the introduction of new species and crop varieties, bolstering market competitiveness and ensuring food security. Supportive government policies, including minimum price guarantees and expanded insurance

coverage, are reinforced by substantial financial allocations for disaster relief and farmer support.

Under the 14th Five-Year Plan, China prioritizes food security, quality improvement, and rural infrastructure development, outlining a strategic roadmap for sustainable agricultural growth. Notably, peri-urban greenhouse farming exemplifies China's forward-thinking approach, emphasizing efficient resource utilization and environmental sustainability. Collaborative initiatives with adjacent industries, such as utilizing waste for irrigation and energy production, underscore China's commitment to holistic and integrated agricultural development.



India is advancing its agriculture sector to bolster food security through strategic initiatives focusing on horticulture, modern technologies, mechanization,

exports, nutrition, and empowering small farmers, driving economic growth.

A significant transformation is seen in cotton production since the introduction of Bt cotton in 2002, which dramatically increased output to make India the world's largest cotton producer by 2014–15. Bt cotton now covers over 90% of India's cotton area, saving on imports and boosting exports of raw cotton and yarn, estimated at US\$84.7 billion since its inception.

India is also embracing cutting-edge technologies like AI, blockchain, remote sensing, robots, and drones through the Digital Agriculture Mission. These innovations enhance efficiency, productivity, and sustainability in agriculture and dairy farming. Mobile technology and cameras enable precise management of crop irrigation, fertilizer application, and livestock monitoring. Government support, including initiatives with private enterprises, drives the adoption of advanced technologies, revolutionizing India's agricultural sector to meet increasing food demand.



Russia has implemented advanced agricultural practices to bolster food security and operational efficiency. It integrates digital technologies like IoT sensors

and robotic machinery for tasks such as spraying and harvesting, optimizing agricultural processes. Precision agriculture, facilitated by GPS-enabled sensors and drones, minimizes input use, reduces environmental impact, and enhances crop yields through precise monitoring and treatment applications.

The country also promotes greenhouse automation and closed farming systems, ensuring year-round fresh produce availability using computer-controlled climate and fertigation technologies. Russia focuses on deep processing of agricultural products to extract maximum value from surplus production, employing technologies for grain processing and creating high-value products like feed amino acids.

Regionally specialized production, particularly in the South with its robust infrastructure and port access, drives grain and livestock production efficiencies and export potential. Government initiatives, including the agriculture digitalization program (2018-2025), aim to expand farm machinery fleets, increase fertilizer use, and enhance overall productivity, contributing to significant growth in grain, pork, and poultry production.

Lesson for Pakistan

To enhance its agriculture sector and combat food insecurity, Pakistan can derive valuable insights from the above countries. Learning from these global examples can help Pakistan implement effective strategies tailored to its own agricultural landscape and challenges.

From Brazil:

- Invest in research and development similar to Embrapa to drive sustainable agricultural innovation.
- Support agri-tech start-ups, as Brazil has done successfully with hydroponics.
- Prioritize environmental sustainability, drawing from Brazil's Low Carbon Agriculture Program.

From China:

- Adopt advanced technologies such as IoT and big data to revolutionize farming practices.
- Promote mechanization of agricultural operations to enhance efficiency and productivity.

- Focus on agricultural research to innovate and develop new crop varieties and species.

From India:

- Emphasize horticulture to stimulate sectoral growth.
- Integrate modern technologies like AI and blockchain for agricultural modernization.
- Empower small farmers through initiatives like the Digital Agriculture Mission.

From Russia:

- Implement digital technologies and automation to optimize efficiency and productivity.
- Embrace precision agriculture techniques using GPS-enabled sensors.
- Develop greenhouse automation and closed farming systems to increase fresh produce availability in urban and remote areas.

Conclusion

To effectively address the pressing issue of food security in Pakistan, seamless collaboration between federal and provincial governments is crucial. Adopting a whole-of-government and whole-of-policy approach is essential. The Special Investment Facilitation Council (SIFC) is actively contributing to this agenda by introducing initiatives such as the National Seed Policy & Authority, the Green Corporate Initiative, the Land Information and Management System (LIMS), and the operationalization of EXIM Bank. These efforts emphasize a collective responsibility to ensure food security, highlighting the need for unified action from all levels of government.

