



GALLUP PAKISTAN ANALYSIS OF AGRICULTURAL CENSUS 2024

Irrigation and Cropping



PRESS RELEASE

Gallup Pakistan Analysis of Agricultural Census 2024

Punjab Balances Canals and Tube-Wells, Sindh Stuck to Canals – Wheat Tops Cropped Area in 2024 Census

Islamabad, August 25th, 2025

Gallup Pakistan, as part of its Big Data Analysis initiative, is examining the irrigation methods and cropping patterns revealed in the *7th Agricultural Census 2024*, the country's first **Integrated Digital Count** of agriculture, conducted by the Pakistan Bureau of Statistics (PBS).

What is the Big Data Analysis Series by Gallup?

Gallup Pakistan's Big Data series was started by Bilal I Gilani, Executive Director of Gallup Pakistan. Bilal explains the rationale of the series: *"The usual complaint from academics and policy makers is that Pakistan does not have data availability. Our experience negates that. Pakistan has lots of data, but it is not available in a usable form and not widely accessible. At Gallup we plan to bridge this gap in terms of accessibility and use of data. The Gallup Big Data series has earlier worked with data sets such as [PSLM](#), [Labour Force Survey](#), and [Economic Survey reports](#) as well as [National Census Reports](#) and [Election Commission Data sets](#). The current series is using the [Global Burden of Disease dataset](#), which provides a variety of health-related statistics. We hope that these series are useful, and we welcome both feedback as well as possible collaborations as we create a public good in the form of useful data sets in Pakistan."*

What data points this current edition covers:

This release focuses on two critical agricultural aspects: **modes of irrigation** and **cropping patterns**, both nationally and provincially. Understanding these helps in shaping policies for water management, climate resilience, and food security. The figures come directly from the Agricultural Census 2024.

GALLUP PAKISTAN

ANALYSIS OF AGRICULTURAL CENSUS 2024

National Irrigation Profile

Canal irrigation remains the largest single source, covering **33.74%** of irrigated land, followed by tube-well irrigation at **26.44%**, combined canal + tube-well systems at **20.89%**, and other sources such as wells and tanks at **18.93%**.



Canal
Irrigation

33.74%



Tube-well
Irrigation

26.44%

Provincial Irrigation Differences:

Sindh relies heavily on Canals

68.43%



Balochistan's main source is tube-wells

42.85%



Punjab shows a balanced mix of canals (35.21%), tube-wells (29.47%), and combined systems (25.06%),



Khyber Pakhtunkhwa has the highest proportion of "Other" irrigation sources

43.73%



National Cropping Patterns:



37.12%

Wheat dominates with 37.12% of cropped area nationwide



14.05%

Following cotton with 14.05% of cropped area nationwide



13.46%

Followed by rice with 13.46% of cropped area nationwide



10.18%

Fodder with 10.18% of cropped area nationwide

Sugarcane (6.91%), and a range of other crops making up 18.28%.

Provincial Cropping Patterns:

Khyber Pakhtunkhwa allocates nearly half of its cropped area to wheat (**46.77%**) while Punjab and Sindh dedicate significant shares to both cotton and rice. Balochistan stands out with **12.07%** of land under fruits and vegetables, alongside high shares for wheat (**41.23%**) and fodder (**13.54%**).



Water-Intensive Crops Concentration:

Punjab and **Sindh's** substantial cotton and rice shares highlight dependence on water-intensive crops, posing sustainability challenges amid increasing water scarcity.

Policy Implications:

The mix of irrigation methods and crop choices underscores the need for efficient water management technologies, crop diversification, and targeted provincial strategies to address differing agricultural realities.

Key Findings:

1. **National Irrigation Profile:** Canal irrigation remains the largest single source, covering 33.74% of irrigated land, followed by tube-well irrigation at 26.44%, combined canal + tube-well systems at 20.89%, and other sources such as wells and tanks at 18.93%.
2. **Provincial Irrigation Differences:** Sindh relies heavily on canals (68.43%), while Balochistan's main source is tube-wells (42.85%). Punjab shows a balanced mix of canals (35.21%), tube-wells (29.47%), and combined systems (25.06%), whereas Khyber Pakhtunkhwa has the highest proportion of "Other" irrigation sources at 43.73%.
3. **National Cropping Patterns:** Wheat dominates with 37.12% of cropped area nationwide, followed by cotton (14.05%), rice (13.46%), fodder (10.18%), sugarcane (6.91%), and a range of other crops making up 18.28%.
4. **Provincial Cropping Patterns:** Khyber Pakhtunkhwa allocates nearly half of its cropped area to wheat (46.77%), while Punjab and Sindh dedicate significant shares to both cotton and rice. Balochistan stands out with 12.07% of land under fruits and vegetables, alongside high shares for wheat (41.23%) and fodder (13.54%).
5. **Water-Intensive Crops Concentration:** Punjab and Sindh's substantial cotton and rice shares highlight dependence on water-intensive crops, posing sustainability challenges amid increasing water scarcity.
6. **Policy Implications:** The mix of irrigation methods and crop choices underscores the need for efficient water management technologies, crop diversification, and targeted provincial strategies to address differing agricultural realities.

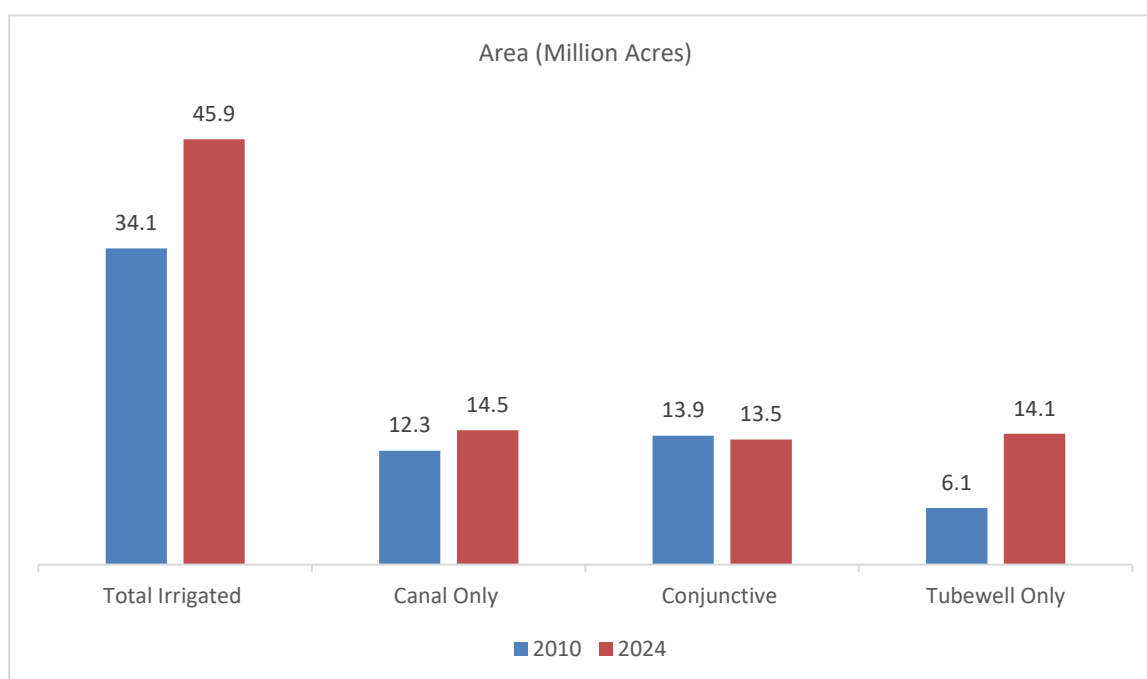
1. Irrigation Landscape in Pakistan

Since the last census in 2010, Pakistan's irrigated area has expanded substantially — from 34.1 million to 45.9 million acres in 2024. Tubewell irrigation has more than doubled (from 6.1 to 14.1 million acres), while conjunctive use of canal, tubewell and pump remains steady at around 13.5 million acres. Canal irrigation has grown modestly, particularly in Sindh. These shifts highlight the increasing role of private groundwater sources in complementing Pakistan's canal system.

i. National Trends

Pakistan's irrigated agriculture has undergone important shifts over the past 14 years:

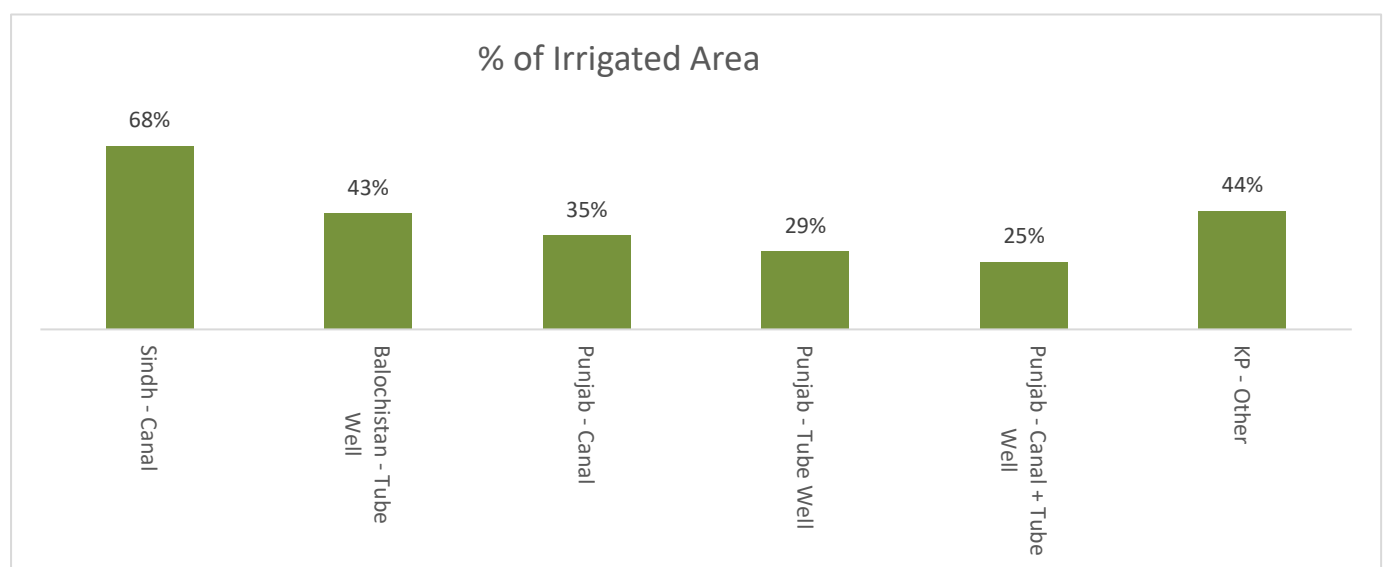
- Total irrigated area expanded from 34.1 million acres (2010) to 45.9 million acres (2024), reflecting a 34% increase.
- Canal-only irrigation rose modestly from 12.3 million → 14.5 million acres.
- Conjunctive irrigation (Canal + Tubewell + Pump) declined slightly from 13.9 million → 13.5 million acres.
- Tubewell-only irrigation nearly doubled, from 6.1 million acres (2010) to 14.1 million acres (2024).



Source: Pakistan Bureau of Statistics, *Agricultural Census 2010 – Pakistan Report* (Table 4.2: “Cultivated Area by Mode of Irrigation”) & *Agricultural Census 2024 – Main Findings* (Table 4.3: “Cultivated Area by Mode of Irrigation”)

Irrigation underpins Pakistan’s agriculture, with the census showing that canals remain dominant nationally — a legacy of extensive surface water infrastructure. However, provincial patterns vary sharply:

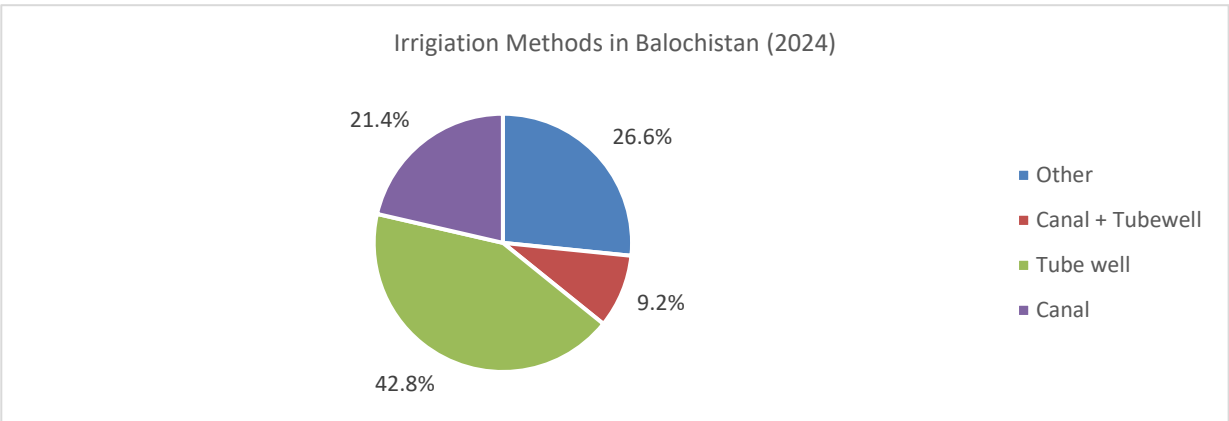
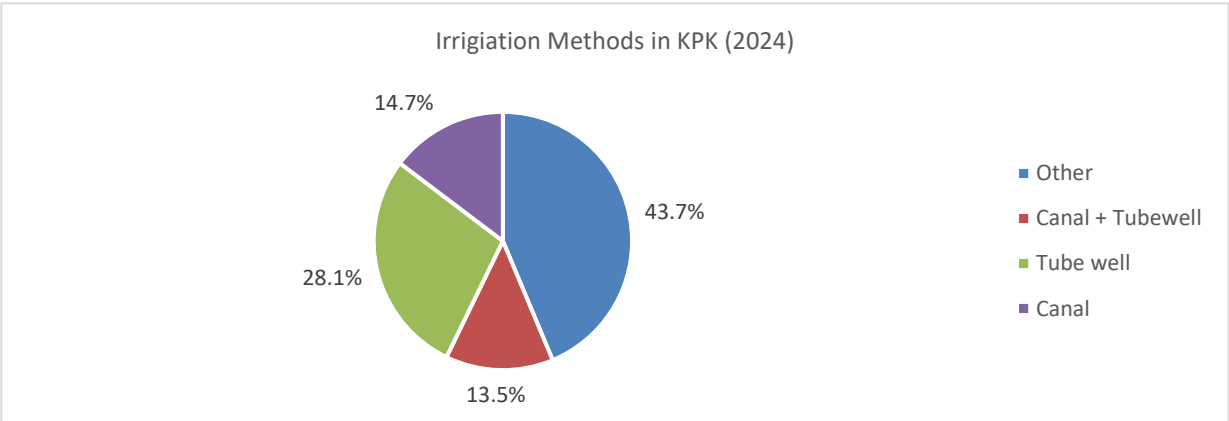
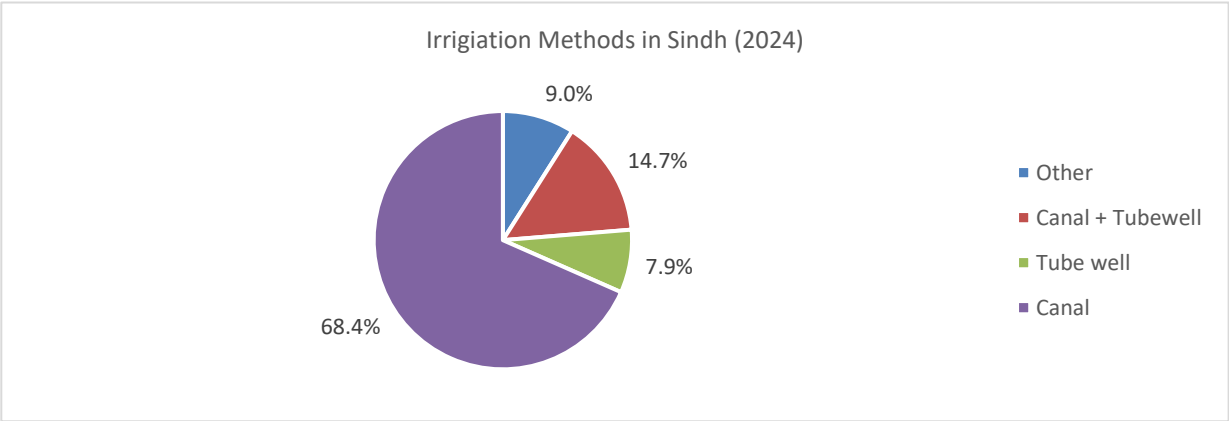
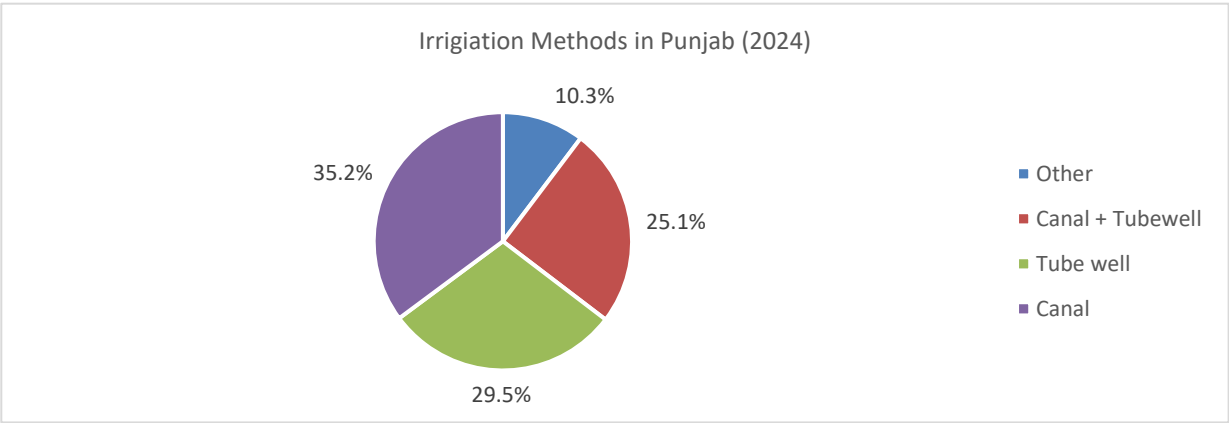
- **Sindh’s 68.43% canal reliance** reflects its location at the lower Indus basin and dependence on controlled river flows.
- **Balochistan’s 42.85% tube-well share** highlights its arid climate and reliance on groundwater extraction.
- **Punjab’s balanced profile** indicates the integration of both canal and groundwater systems, supporting intensive farming.
- **Khyber Pakhtunkhwa’s 43.73% “Other” share** (including lift irrigation, natural springs, and tanks) underscores its unique topography and smaller-scale irrigation practices.



Source: Pakistan Bureau of Statistics, Agricultural Census 2024 (Main Findings Report)

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These findings raise key questions on water efficiency, equity of distribution, and sustainability. Over-reliance on groundwater in arid areas risks long-term aquifer depletion, while canal-dependent regions face vulnerabilities to climate-induced river flow variability.

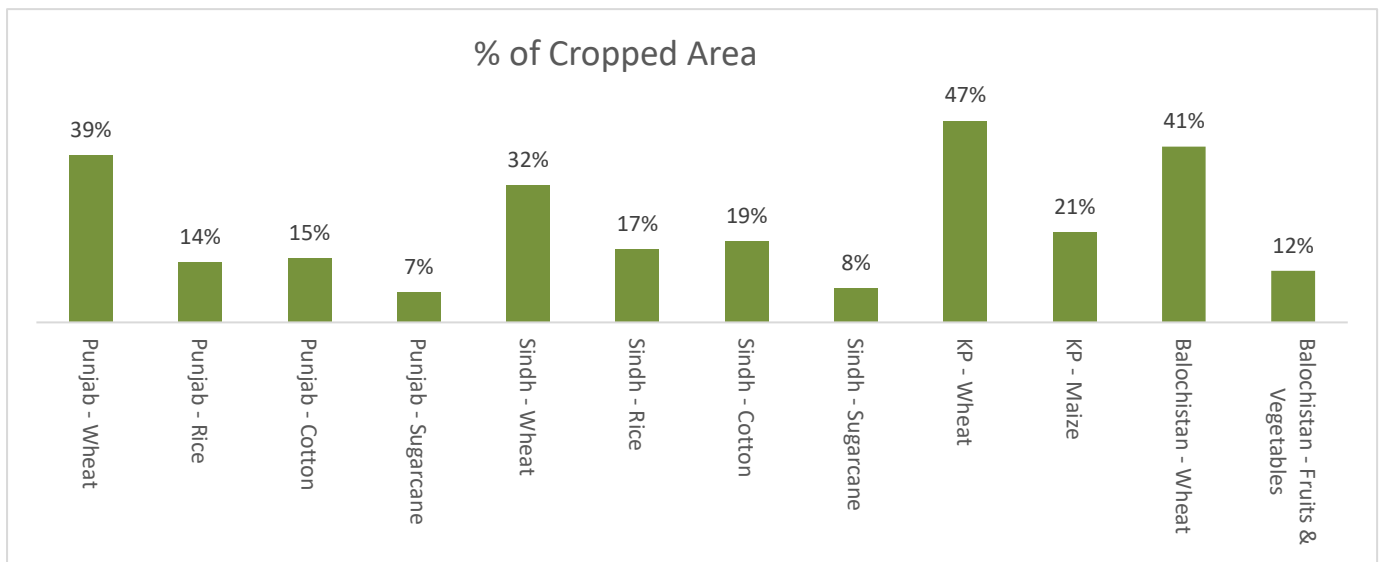


Source: PBS Agricultural Census 2024, Table 4.3

2. Cropping Patterns in Pakistan

The census confirms that wheat is the undisputed leader, occupying more than a third of national cropped area, with significant provincial variations:

- Punjab: Wheat accounts for 38.94% of cropped area, followed by cotton (15.22%), rice (14.05%), and sugarcane (7.16%).
- Sindh: Wheat makes up 32.10% of cropped area, with cotton (18.67%), rice (16.84%), and sugarcane (8.43%) forming the main crops.
- Khyber Pakhtunkhwa: Wheat dominates at 46.77%, followed by maize at 20.86%.
- Balochistan: Wheat comprises 41.23% of cropped area, while fruits and vegetables occupy 12.07%.



Source: Pakistan Bureau of Statistics, Agricultural Census 2024 (Main Findings Report)

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The heavy concentration of wheat and other water-intensive crops in Punjab and Sindh, coupled with their reliance on canals and groundwater, raises sustainability concerns in the face of Pakistan's growing water scarcity. In contrast, Balochistan's inclusion of fruits and vegetables provides a more diversified cropping profile, potentially offering resilience against climate change and market volatility.

3. SWOT Analysis – Irrigation & Cropping Patterns in Pakistan

- **Strengths:**

- Extensive irrigation infrastructure in Punjab and Sindh.
- High wheat cultivation ensuring food security.
- Crop diversity in Balochistan offering resilience.

- **Weaknesses:**

- Heavy dependence on water-intensive crops in Punjab and Sindh.
- Over-reliance on groundwater in Balochistan.
- Fragmented irrigation practices in Khyber Pakhtunkhwa.

- **Opportunities:**

- Promote efficient irrigation technologies (drip, sprinkler).
- Expand less water-intensive, high-value crops.
- Develop provincial water-sharing and crop-planning frameworks.

- **Threats:**

- Climate change altering canal water availability.
- Groundwater depletion in arid provinces.
- Increased competition for water among provinces.

4. Key Recommendations & Actions

- **Modernize Irrigation Systems:** Expand adoption of water-saving technologies.
- **Encourage Crop Diversification:** Reduce wheat-water dependency in high-stress regions.
- **Groundwater Regulation:** Implement provincial-level policies to manage extraction sustainably.
- **Climate Resilience Planning:** Align cropping calendars and irrigation schedules with climate forecasts.
- **Provincial Tailoring:** Design agricultural support programs to match local resource realities.

About the Agriculture Census

The Agriculture Census is Pakistan's most comprehensive and authoritative statistical exercise on farming, land use, and agricultural resources. Conducted by the Pakistan Bureau of Statistics (PBS), it provides policymakers, researchers, and the public with a detailed snapshot of the structure of agriculture across the country. The Census gathers information directly from farming households and institutions, covering critical aspects such as land ownership and tenancy, operational holdings, irrigation practices, cropping patterns, machinery use, livestock, and farm labor.

The 2024 Agriculture Census continues a series of national exercises carried out in earlier decades (including 1960, 1972, 1980, 1990, and 2010), which together create a unique long-term dataset for understanding the evolution of Pakistan's agriculture sector. The Census serves multiple purposes: it provides baseline data for agricultural planning and development; supports evidence-based policy interventions on food security, irrigation, and rural livelihoods; and enables monitoring of progress toward national and international commitments, including the Sustainable Development Goals (SDGs).

This latest round represents an important milestone, as it not only updates the figures after more than a decade but also incorporates methodological improvements. Advances in digital data collection, geographic information systems, and field validation have allowed for more reliable and timely results. The Census thus provides insights not only into how agriculture has changed since 2010 but also into the emerging challenges and opportunities facing farmers today — from climate adaptation to mechanization, diversification, and market access.

Ultimately, the Agriculture Census stands as the foundation for agricultural statistics in Pakistan. Its findings guide ministries and provincial departments in planning irrigation schemes, rural development projects, and farmer support programs. They also serve as a valuable reference for academics, investors, and development partners seeking to understand Pakistan's agrarian economy. By documenting both continuity and change in farm structures, irrigation methods, and cropping practices, the Census underscores the vital role of agriculture in the country's economy and society.

Wish to Contribute to Gallup Big Data Analysis?

Gallup Pakistan is looking for collaboration with researchers to expand the Big Data Analysis project. If you have any ideas, please write to Bilal I Gilani, Project Director, Big Data Analysis at Gallup Pakistan.

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