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Print ISSN: [3006-2497](#) Online ISSN: [3006-2500](#)Platform & Workflow by: [Open Journal Systems](#)<https://doi.org/10.5281/zenodo.17842130>**Wheat Production and Consumption Gap: A Case Study of Baluchistan Province****Imam Ud din Palal (Corresponding Author)**

Department of Agricultural Economics, Sindh Agriculture University, Tando jam, Pakistan

[imamrazaimamraza7@gmail.com](mailto:imamrazaimamraza7@gmail.com)**Muhammad Zohaib**

University Institute of Management Sciences, PMAS Arid Agriculture University Rawalpindi

**Shahab Khan**

Department of Public Administration, Islamia University of Bahawalpur, Pakistan

**Ali Mustafa**

Department of Agricultural Economics, Sindh Agriculture University, Tando jam, Pakistan

**Nisar Ahmed Jokhio**

Department of Plant Breeding and Genetics, Sindh Agriculture University, Tando jam, Pakistan

**ABSTRACT**

*Wheat is the most widely grown cereal crop worldwide, supplying nearly 20% of global dietary calories and protein, and thus plays a critical role in international food security. In Pakistan, wheat contributes more than 60% of daily caloric intake and is indispensable for household and national food stability. Within this context, Baluchistan, the country's largest but sparsely populated province faces a persistent wheat production and consumption imbalance. To evaluate whether Balochistan's wheat production meets its consumption requirements, identify high-yielding districts, and propose policy measures to narrow the gap, This study uses secondary data from the Pakistan Bureau of Statistics (PBS, 2022), Crop Reporting Services Baluchistan (CRSB, 2022), and international agricultural databases to estimate provincial wheat supply and demand. Results indicate that Balochistan's annual requirement was 1.85 million tonnes (based on the per capita benchmark of 124 kg/year), while production was only 1.52 million tonnes, creating a deficit of 0.33 million tonnes. Per capita availability stood at 102 kg, significantly below the national average and global standards. District-level analysis highlights Naseerabad and Jaffarabad as relatively high-yielding areas, whereas rain-fed districts remain constrained by scarce irrigation and climate variability. The province's reliance on inter-provincial transfers, coupled with post-harvest losses, underscores its vulnerability to food insecurity. Strengthening irrigation systems, adopting climate-resilient varieties, improving storage infrastructure, and reducing post-harvest losses are essential to bridging the production consumption gap and ensuring sustainable food security in Baluchistan.*

**Keywords:** *Wheat production, consumption gap, Baluchistan food security, climate resilience.*

**Introduction**

Wheat (*Triticum aestivum* L.) is the most widely cultivated cereal crop in the world and a cornerstone of global food security. It provides nearly 20% of the world's dietary calories and protein intake, making it indispensable for the nutritional well-being of billions (Shiferaw et al., 2013). In recent years, global wheat production has reached record levels, with 785 million tonnes produced in 2022–23, ranking it as the second highest in history (FAO, 2023). However, rising population growth, dietary diversification, and climate change-induced stresses such as extreme heat, droughts, and hydrological variability continue to place significant pressure on

wheat supply stability (Ray et al., 2013; Lesk et al., 2016). These challenges intensify demand–supply imbalances, particularly in developing countries that rely heavily on wheat imports to ensure food security (IGC, 2024).

At the national level, Pakistan stands among the top ten wheat-producing countries globally, cultivating between 27–31 million tonnes annually (GOP, 2024). Despite this, the country faces recurring wheat shortfalls due to structural yield gaps, climate variability, and post-harvest losses (Malik et al., 2021; Manzoor et al., 2021). Wheat contributes more than 60% of daily caloric intake in Pakistan, and with per capita consumption averaging 124 kg per year, the nation’s dependence on this single staple heightens vulnerability to production shocks and market volatility (USDA/FAS, 2020; Ahmad et al., 2020). Policy interventions—such as price supports, imports, and exports—often aim to address supply gaps but have been criticized for creating further instability in domestic markets (Rana, 2020; IFPRI, 2024).

Within Pakistan, Balochistan holds a unique position. Despite being the largest province by area, it contributes only 5–6% of national wheat output due to its arid climate, water scarcity, and reliance on groundwater and rain-fed systems (Kakar et al., 2012). Using an estimated population of 14.9 million, the province requires about 1.85 million tonnes annually, based on the national benchmark of 124 kg per capita consumption (PBS, 2022; CRSB, 2022). Yet, reported production in 2022–23 was only 1.52 million tonnes, leaving a deficit of 0.33 million tonnes (GOP, 2023). This translates into a per capita wheat availability of 102 kg, far below the national average of 127 kg, and considerably below the global dietary norm (FAO, 2023). The gap compels Balochistan to rely heavily on inter-provincial imports, primarily from Punjab and Sindh (Hanif et al., 2019).

District-level disparities further complicate the issue. Fertile and irrigated areas such as Naseerabad and Jaffarabad achieve yields above 3,000 kg/ha, whereas rain-fed and water-scarce districts like Zhob and Khuzdar lag significantly (Akbar et al., 2019; Shah et al., 2024). Studies have consistently shown that irrigation access, adoption of improved seed varieties, and climate resilience are key determinants of productivity in the province (Kakar et al., 2019; Rehman et al., 2021). However, poor storage, limited mechanization, and post-harvest losses further reduce the effective supply (Hussain et al., 2018; Sheahan & Oehmke, 2024).

Given these challenges, the present study seeks to address the persistent wheat production–consumption gap in Baluchistan. Specifically, it aims to estimate provincial wheat demand and supply, compare district-level yields, identify high-yielding areas, and quantify the production deficit. By situating the province’s challenges in the broader national and global wheat economy, this research highlights the vulnerability of Baluchistan to food insecurity and underscores the urgent need for climate-resilient, water-efficient, and technologically supported interventions. The study also identifies a critical research gap: while Pakistan’s wheat dynamics are well-documented, provincial-level analyses of Baluchistan remain limited, especially regarding district-wise productivity, irrigation constraints, and post-harvest inefficiencies.

Thus, this research not only contributes to understanding wheat supply–demand dynamics in Baluchistan but also provides evidence-based insights for policymakers to strengthen food security in Pakistan’s most resource-constrained province.

### **3. Methodology**

The methodology section outlines the approaches and sources of information used to estimate wheat production, consumption requirements, and the production–consumption gap in Baluchistan. It ensures that the calculations are based on reliable and standard datasets.

#### **Data Sources:**

**Department of Statistics, Baluchistan** for provincial-level demographic and agricultural data.

Pakistan Bureau of Statistics (PBS) Agricultural Statistics for official crop production figures and related agricultural indicators.

**FAO and USDA reports** – for international benchmarks and comparative references on wheat consumption and production standards.

**Calculations:**

(using Population = 14.9 million, requirement = 124 kg/person/year):

$$\text{Per capita availability (kg/year)} = \frac{\text{Total provincial wheat production (tonnes)}}{\text{Provincial population}} \times 1000$$

**Requirement**

$14,900,000 \times 124 = 1,847,600,000 \text{ kg} = 1,847,600 \text{ tonnes} = 1.8476 \text{ million tonnes}$

This represents the total annual wheat requirement of the population of Baluchistan based on the average per-capita consumption of 124 kg.

**Production (given)**

1.52 million tonnes = 1,520,000 tonnes

This is the officially reported wheat production for the province in the same period.

**Deficit**

$1,847,600 - 1,520,000 = 327,600 \text{ tonnes} = 0.3276 \text{ million tonnes}$

This shows the shortfall between production and requirement, indicating that local output is insufficient to meet consumption needs.

**Per Capita Availability (from Production)**

Based on a total wheat production of 1.52 million tonnes and a population of 14.9 million people, the per capita availability is:

$1.52 \text{ million tonnes} / 14.9 \text{ million people} = 0.102 \text{ tonnes/person/year} = 102 \text{ kg/person/year}$

This indicates that the actual wheat available per person in Balochistan is 102 kg per year, which is below the required level of 124 kg per person per year.

**Limitations:**

No field surveys: analysis based solely on secondary data.

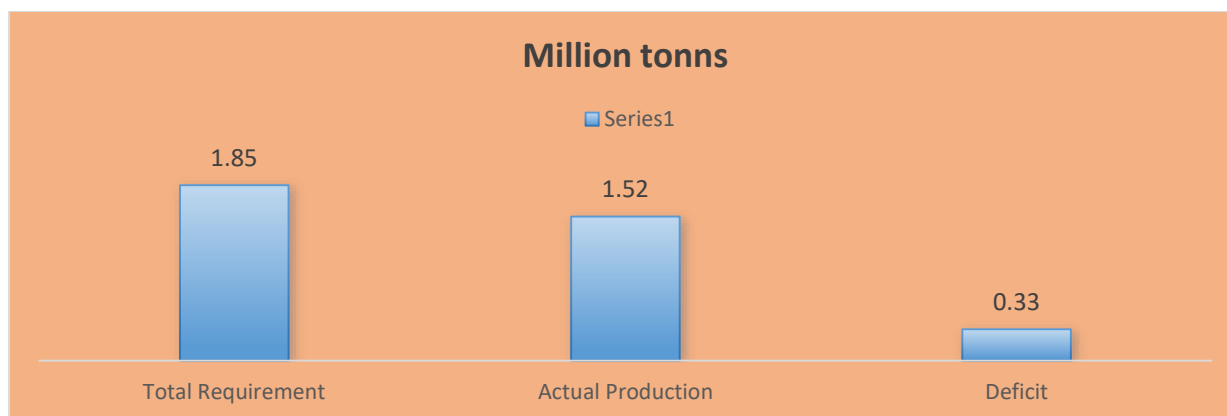
Consumption standard fixed at 124 kg without accounting for dietary diversity.

**Results:**

**Table-4.1 Wheat Balance Sheet Baluchistan**

Indicator	Value	Unit
Population	14.9	million persons
Per Capita Requirement	124	kg/year
Total Requirement	1.85	million tonnes
Actual Production	1.52	million tonnes
Deficit	0.33	million tonnes
Per Capita Availability	102	kg/year

This Table shows that Balochistan, with a population of 14.9 million, requires 1.85 million tonnes of wheat annually based on a per capita need of 124 kg. However, actual production is only 1.52 million tonnes, resulting in a deficit of 0.33 million tonnes. Consequently, per capita wheat availability is just 102 kg per year, well below the required level.

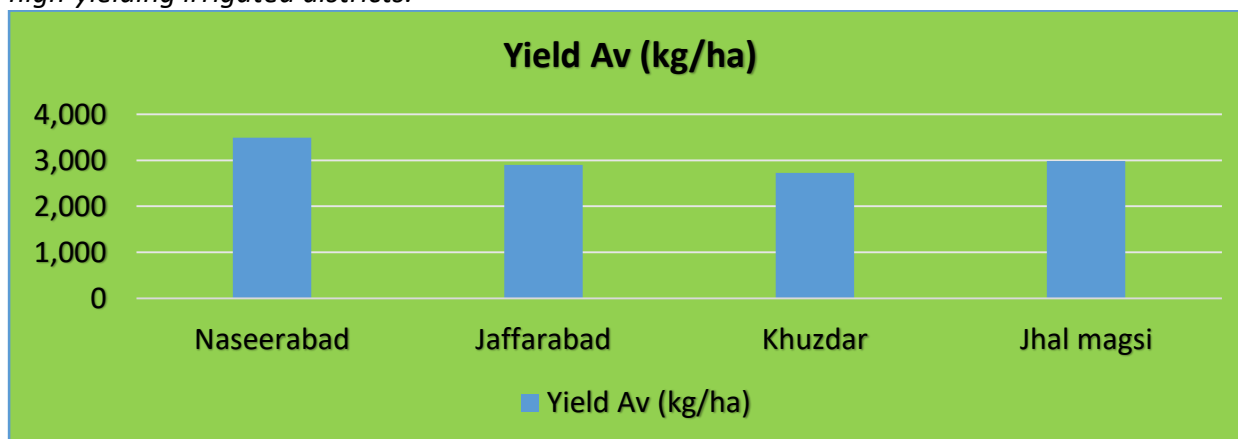


**Figure.1:** Comparison between Balochistan's wheat requirement and actual production showing a deficit of 0.33 million tonnes.

**Table-4.2 District-wise Wheat Production & Yield**

District	Area Sown (ha)	Production (tonnes)	Yield Av (kg/ha)
Naseerabad	93,252	325,635	3,492
Jaffarabad	73,979	214,540	2,900
Khuzdar	67,000	182,508	2,724
Jhal magsi	58,532	174,680	2,984
Other	250,911	618,879	-
Total	543,674	1516242	-

This Table shows that Balochistan's total wheat area is 543,674 hectares, producing 1.52 million tonnes. Naseerabad has the highest yield (3,492 kg/ha), followed by Jhal Magsi (2,984 kg/ha) and Jaffarabad (2,900 kg/ha). Khuzdar and other districts contribute significantly in area and production but with relatively lower yields. Overall, production is concentrated in a few high-yielding irrigated districts.



**Figure.2:** Graph showing top Wheat-Producing Districts of Balochistan

**Table-4.3: Wheat Deficit and Per Capita Availability Balochistan vs. Pakistan Average**

Region	Per Capita Requirement (kg/year)	Per Capita Availability (kg/year)	Deficit (kg/year)
Balochistan	124	102	22
Pakistan Average	124	127	Surplus: 3

## Discussion

The results show a significant shortfall of 0.33 million tonnes, underscoring Balochistan's dependency on other provinces for wheat. High-yield districts such as Naseerabad and Jaffarabad benefit from strong irrigation access, but rain-fed areas like Zhob perform poorly. Storage losses further reduce effective supply, compounding the deficit. Comparatively, Punjab averages over 3,800 kg/ha consistently, while Balochistan struggles to maintain yields in many districts.

These findings are consistent with Ahmad et al. (2019), who highlighted that wheat productivity in Balochistan lags behind Punjab due to limited irrigation infrastructure and higher climatic risks. Similarly, Khan and Ullah (2021) observed that rain-fed districts across Baluchistan face yield volatility because of irregular rainfall and lack of drought-resistant varieties. The problem of post-harvest storage losses has also been reported by Hussain et al. (2018), estimating that 10–15% of wheat is lost annually in rural storage systems.

In contrast, studies from Punjab (Malik et al., 2020) emphasize how better access to canal irrigation, mechanization, and certified seed adoption contribute to higher and more stable yields. This aligns with our findings that irrigation-dependent districts in Baluchistan perform relatively better.

Moreover, research by FAO (2022) stresses the importance of climate-resilient varieties in arid and semi-arid regions, suggesting that Baluchistan could significantly reduce its production gap through varietal improvement and water-efficient farming practices. Comparable conclusions were drawn by Rehman et al. (2021), who found that introducing heat- and drought-tolerant wheat varieties increased yields by 20–25% in similar agro-climatic conditions of Sindh and southern Punjab.

Thus, the evidence suggests that while Balochistan's wheat shortfall is partly structural (irrigation and storage issues), it is also technological, linked to slower adoption of improved varieties and agronomic practices. Bridging this gap will require a combined strategy of water management, technology adoption, and farmer-level capacity building.

## Conclusion

Balochistan's wheat production remains insufficient to meet its population's needs, with a per capita shortfall of 22 kg/year relative to the recommended benchmark. The persistent deficit highlights systemic issues in production, storage, and distribution that require urgent attention. Without targeted interventions, the province's dependence on wheat imports will continue to pose risks to food security.

## Recommendations and suggestion

Infrastructure: Build modern wheat storage silos to reduce post-harvest losses.

Seeds: Distribute high-yield and climate-resilient wheat varieties.

Water Management: Expand canal irrigation and promote efficient drip systems.

Capacity Building: Train farmers in modern agronomic practices.

Coordination: Strengthen provincial–federal collaboration for timely wheat supply.

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