



# Wheat Value Chain in Garmser District, Helmand Province, Afghanistan

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Received 05 May 2026; Accepted 28 June 2026; Available online 30 June 2026

**Abstract:** This study was conducted in 2025 in Garmser district, Helmand Province under the title of the wheat value chain. The objectives of the research were to determine wheat production, identify available facilities in the wheat processing sector, and analyze wheat marketing. For this purpose, Garmser district was purposively selected, and (210) farmers along with (7) processing factories were randomly chosen. Data were collected through questionnaires and interviews. The findings of the study revealed that the average wheat production for small, medium, and large farms was 2,120.4 kg, 4,636 kg, and 8,135.1 kg, respectively. The annual flour production of processing factories was found to be 848,250 kg. The study identified two main wheat marketing channels: (1) producers and consumers, and (2) producers, wholesalers, retailers, and consumers. The study concludes that wheat production in Garmser district shows significant variation across farm sizes, with larger farms achieving substantially higher output, indicating the importance of farm scale and resource availability in improving productivity. Additionally, the presence of processing facilities with considerable flour production capacity highlights the district's potential for value addition within the wheat value chain. Furthermore, the analysis of marketing channels reveals a relatively simple structure dominated by direct sales and intermediary-based distribution, suggesting opportunities to improve market efficiency, reduce costs, and enhance farmers' share of final consumer prices through better market linkages and infrastructure development.

**Keywords:** Marketing, Production, Processing, Wheat

## 1. Introduction

Wheat (*Triticum aestivum* L.) is among the most widely cultivated and economically significant cereal crops worldwide. It serves as a primary food source for a large proportion of the global population, providing essential nutrients such as carbohydrates, proteins, vitamins, and minerals. The demand for wheat continues to rise due to rapid population growth, urbanization, and changing dietary preferences. Consequently, understanding and strengthening the wheat value chain is crucial for ensuring food security, promoting sustainable agricultural practices, and enhancing the overall efficiency and competitiveness of the wheat sector. Global population projections indicate that the world's population may reach approximately 10 billion by 2050, leading to a substantial increase in wheat demand, estimated at about 1.7% annually. Therefore, developing effective strategies to meet this growing demand will remain a major policy and agricultural challenge throughout the twenty-first century (Vitale et al., 2020; Gupta et al., 2025).

Wheat cultivation began approximately 10,000 years ago during the Neolithic Revolution, a period marked by the transition from hunting and gathering to settled agriculture and systematic land management. The first domesticated wheat species were diploid einkorn wheat (genotype AA) and tetraploid emmer wheat (genotype AABB), both of which are believed to have originated in southeastern Turkey based on genetic evidence. The emergence of hexaploid wheat around 9,000 years ago facilitated the expansion of wheat cultivation throughout the Near East. Early cultivated wheat types were primarily landraces derived from wild populations, which farmers selectively propagated over generations, likely favoring plants with superior productivity and agronomic characteristics (Khader et al., 2019).

Wheat is one of the most important staple crops globally and accounts for a significant share of the world's cereal production. It is cultivated across diverse agro-climatic regions, with the United States, China, India, and Russia ranking among the leading wheat-producing countries (Amentae et al., 2017). While wheat is primarily grown for human consumption, it also serves as a valuable resource for livestock feed and various industrial applications. The wheat production system encompasses several interconnected stages, beginning with pre-production activities such as land preparation and seed selection, followed by production processes including crop management, irrigation, monitoring, and harvesting. After harvesting, a series of post-harvest operations—including threshing, cleaning, storage, transportation, and marketing—are carried out to ensure the grain reaches consumers efficiently (Kaplinsky, 2000). Wheat is processed into a wide range of products, from staple foods such as bread, pasta, and noodles to snacks, confectioneries, and beverages. Consumption patterns have evolved over time in response to factors such as population growth, urbanization, income levels, and changing dietary preferences. As global demand for wheat continues to increase, strengthening the efficiency, resilience, and sustainability of the wheat value chain has become essential for meeting future food security requirements.

Global wheat demand is projected to reach approximately 840 million tonnes by 2050, compared to the current production level of about 642 million tonnes. Meeting this increasing demand will require significant improvements in productivity while utilizing fewer land, water, and other agricultural resources. Achieving this goal will depend on advances in genetic improvement, physiological research, and agronomic practices, particularly through the adoption of resource-conserving technologies. Furthermore, precision breeding aimed at enhancing varietal adaptability and resilience, along with innovative approaches for climate change monitoring and crop modeling to generate accurate yield forecasts, will play a crucial role in ensuring future wheat production meets global food requirements (Sharma et al., 2015).

According to the Food and Agriculture Organization (FAO), increasing wheat productivity has the potential to improve rural livelihoods, create employment opportunities in the agricultural sector, and contribute to poverty reduction in Afghanistan (Chabot & Dorosh, 2007). Wheat output can be enhanced through several approaches, including the expansion of production resources, the adoption of improved technologies, and the more efficient utilization of existing inputs (Shikur, 2022). However, strategies that rely on increasing key resources such as land, water, and capital, or introducing new technologies, often encounter economic, environmental, and institutional constraints. Consequently, improving the productivity and efficiency of existing production inputs represents the most practical and sustainable pathway for achieving the desired growth in wheat production (Sardar Shahraki et al., 2018; Radmand et al., 2026).

One of the most effective approaches to increasing agricultural productivity, particularly in wheat production, is the efficient use of existing technologies and innovations (Duveiller et al., 2007; Radmand et al., 2026). Nevertheless, the adoption of modern agricultural technologies in developing countries such as Afghanistan remains limited due to factors including farmers' lack of awareness and technical knowledge, dependence on traditional farming methods, and various institutional and infrastructural constraints. As a result, improving production efficiency and optimizing the use of available resources has emerged as a practical and cost-effective strategy for enhancing agricultural performance (Chabot & Dorosh, 2007). Increasing the productivity of production inputs is essential for enabling the agricultural sector to satisfy the growing demand for food while supporting broader economic development objectives. However, the achievement of these goals has been impeded by several challenges, including low input efficiency, inadequate farm management practices, resource misallocation, and the continued reliance on conventional farming systems. Addressing these constraints is critical for improving agricultural productivity and ensuring sustainable growth within the sector (Tavva et al., 2017; Radmand et al., 2026).

In Afghanistan, the efficient and sustainable utilization of agricultural resources, coupled with improvements in productivity across all agricultural activities, is crucial for enhancing farm profitability and overall sector performance (Poole et al., 2022). Considering the country's rapidly growing population, the substantial contribution of agriculture to the national economy, the large proportion of the workforce engaged in farming, and the strategic importance of achieving self-sufficiency in key crops such as wheat, addressing agricultural productivity challenges has become increasingly important (Raoufi et al., 2024). Furthermore, efforts to increase domestic wheat production and avoid declines in crop yields have encouraged the extensive use of agricultural inputs, particularly chemical fertilizers and pesticides. In many cases, these inputs are applied without adequate consideration of their short- and long-term environmental consequences. Limited farmer awareness, insufficient attention to environmental sustainability, and the inefficient management of production inputs have constrained both the quantitative and qualitative development of agriculture. These challenges

have contributed to declining soil fertility, environmental degradation, and increased vulnerability of agricultural production systems (Hashimi et al., 2020).

## 2. Materials and Method

The methodology of this study was designed to examine wheat production and related processing activities in Garmsir District of Helmand Province during 2025 year. A quantitative and qualitative research approach was employed, and the district was purposively selected because of its high level of wheat cultivation. Ten villages, including Asadullah Khan, Haji Anwar, Haji Abdul Ahmad, Mohammad Agha, Haji Khoday Nazar Khan, Haji Nafs, Mir Hamza, Sardar Kalay, Haji Amir, and Kharkoh, were randomly selected from the study area. Additionally, 210 farmers and 7 processing factories were randomly selected as respondents. For the purpose of primary data collection, a cross-sectional design was employed. The study relied on both primary and secondary sources of data. Primary data were gathered through questionnaires and interviews, whereas secondary data were collected from national and international journals.

## 3. Results

### 3.1 General Information of the Respondents:

The findings show that the educational level of farmers in Garmsir District was generally low, and some farmers had not received any formal education (Figure. 1). Regarding age distribution, the number of farmers aged 20–30 years was 69, those aged 30–40 years were also 69, farmers aged 40–50 years numbered 64, and only 8 respondents were in the 50–60 age group (Figure. 2). In terms of wheat market information, a local market was available, and the main buyers were rural residents. Furthermore, the wheat fields were irrigated through canal water.

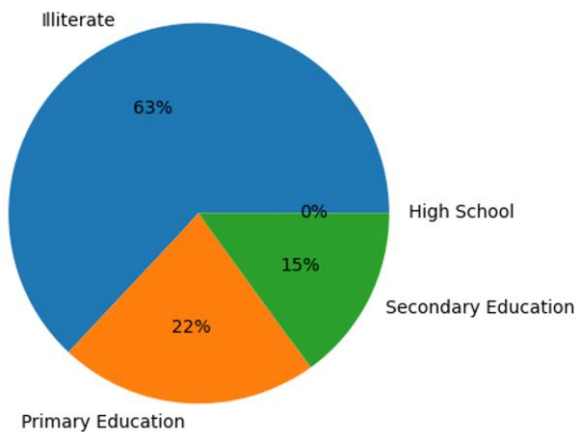


Fig. 1: Education Level of Farmers

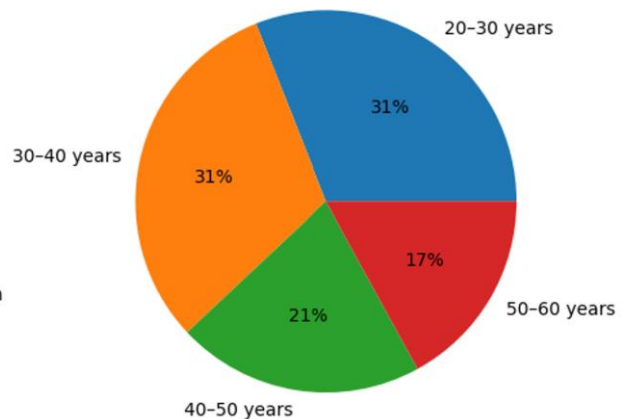


Fig. 2: Age Distribution of Farmers

### 3.2 Production of Small-Scale Wheat Farms:

Small-scale wheat farms covered a total area of 158 jerib, with individual farm sizes ranging from 1 to 3 jerib (1 Jerib is equal to 0.2 ha). A total of 70 farmers were included in this category. The total wheat production amounted to 148,434 kg. The average production per farm was 2,120.4 kg, and the average yield per jerib was 939.45 kg. The highest yield was 4,770 kg, while the lowest yield was 850 kg (Table 1).

**Table 1: Production of Small Wheat Farms (Kilograms)**

No.	Farm Category	Number of Farmers	Average Yield (kg)	Total Production Yield (kg)			
				Yield 1	Yield 2	Yield 3	Yield 4
1	Small Farms	70	2,120.4 kg	4050	1125	2700	1575
				4770	3375	1350	2025
				1800	1350	2700	1867
				2700	1900	3150	3015
				4100	980	2250	2925
				1100	1710	1035	4725
				1800	1580	1800	3240
				1200	3150	2385	938
				1320	1125	1800	2700
				880	2250	4725	2700
					2250	2700	2754
					1800	1575	1575
					2250	2700	1260
					2250	1230	1450
					880	1305	3150
					900	1125	1125
					900	2925	2970
	2025	850	1800				
	1800	3015	2250				
	900	1250	3600				

Source: Field survey data.

**3.3 Production of Medium-Scale Wheat Farms:**

Medium-scale wheat farms covered a total area of 338 jeribs, with individual farm sizes ranging from 3 to 6 jeribs (1 Jerib is equal to 0.2 ha). A total of 70 farmers were included in this category. The total wheat production amounted to 324,530 kg. The average production per farm was 4,636 Kg, and the average yield per jerib was 960.1 kg. The highest yield was 7,850 kg, whereas the lowest yield was 900 kg (Table 2).

**Table 2: Production of Medium Wheat Farms (Kilograms)**

No.	Farm Category	Number of Farmers	Average Yield (kg)	Total Production Yield (kg)			
				Yield 1	Yield 2	Yield 3	Yield 4
1	Medium Farms	70	4,636 kg	3350	2790	3600	5400
				4500	900	5400	7650
				5625	2080	3600	4500
				4500	2250	2340	4500
				4500	5850	900	4500
				3240	7850	4275	4500
				3600	3600	5850	3150
				3600	6750	6400	5175
				3020	3600	5400	5400
				3250	3600	4250	4500
					4600	4600	5600
					4700	4500	5400
					6750	3600	4500
					5600	4150	3960
					3825	5400	6525
					5025	7650	6400
					4500	4500	5050
	4500	6050	4050				
	6300	4600	5625				
	4375	5600	6850				

Source: Field survey data.

**3.4 Production of Large-Scale Wheat Farms:**

Large-scale wheat farms covered a total area of 460 jeribs, with individual farm sizes ranging from 6 to 10 jeribs (1 Jerib is equal to 0.2 ha). A total of 70 farmers were included in this category. The total wheat production reached 569,457 kg. The average production per farm was 8,135.1 kg, and the average yield per jerib was 1,237.9 kg. The highest yield was 18,000 kg, while the lowest yield was 3,600 kg (Table 3).

**Table 3: Production of Large Wheat Farms (Kilograms)**

No.	Farm Category	Number of Farmers	Average Yield (kg)	Total Production Yield (kg)		
				Yield 1	Yield 2	Yield 3
1	Large Farms	70	8,135.1 kg	11700	7650	6750

No.	Farm Category	Number of Farmers	Average Yield (kg)	Total Production Yield (kg)		
				Yield 1	Yield 2	Yield 3
				7425	8100	9000
				6750	13500	7200
				8100	8100	9900
				6300	6750	5850
				10525	6750	6750
				6412	9450	9000
				7560	7200	9450
				5400	3825	4050
				5600	5400	9000
				9450	3600	6975
				5200	9000	9900
				11700	8100	8100
				7425	7200	5760
					7200	18000
					3600	13500
					6300	9450
					7200	9900
					8550	11250
					6300	9000
					4950	12150
					9000	9000
					3600	9000
					13500	5400
					11250	5850
					12600	4050
					9450	7200
					10000	12600

Source: Field survey data.

The findings of the study show that large farms have the highest value, followed by medium farms, while small farms have the lowest value. Qualitatively, this means that as the farm size increases, the overall value also increases. Large farms are likely to have more land, more production capacity, and better opportunities to generate higher output or income. Medium farms are in the middle position, showing better performance than small farms but still much lower than large farms. Small farms have the lowest value, which may be due to limited land, fewer resources, lower production

capacity, and less access to inputs or markets. Overall, the figure suggests a positive relationship between farm size and value, indicating that larger farms contribute more than medium and small farms (Figure. 3).

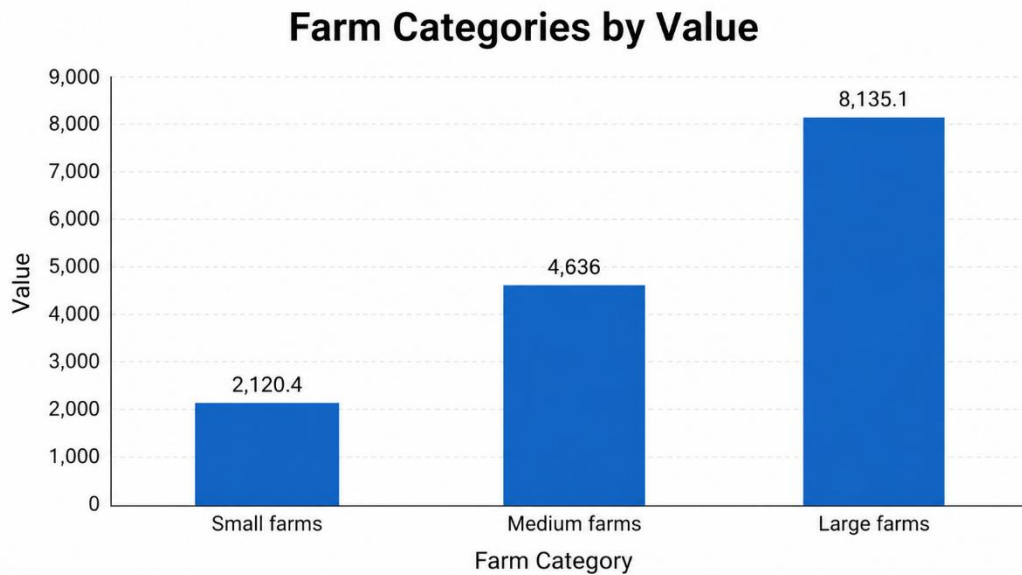


Fig. 3: Farm Categories by value

### 3.5 Wheat Flour Production by Processing Mills:

The findings of the study indicate the wheat flour production quantities of seven flour processing mills. The total wheat flour production of all mills was 848,250 kg, while the average production was approximately 121,178 kg per mill. The results show that Alam Gul recorded the highest wheat flour production, with 486,000 kg, which was significantly higher than the production of the other processing mills. Jan Wali was the second-highest producer, with 135,000 kg. In contrast, Qahar Jan, Ahmadullah, Bakht Mohammad, Mohammad Daud, and Khan Gul produced comparatively lower quantities. Khan Gul recorded the lowest production, with 24,750 kg.

Table 4 shows considerable variation in wheat flour production among the processing mills. This variation may be attributed to differences in mill size, production capacity, labor availability, level of mechanization, and market access. Therefore, the results suggest that production capacity is not equal among flour processing mills, and mills with better resources, management practices, and market linkages are more likely to achieve higher wheat flour output.

Table. 4: Wheat Flour Processing Mills Production

No.	Name of Flour Processing Mill	Flour Production Quantity (kg)	Average (kg)
1	Alam Gul	486,000	121,178
2	Jan Wali	135,000	
3	Qahar Jan	72,000	
4	Ahmadullah	49,500	
5	Bakht Mohammad	43,200	
6	Mohammad Daud	37,800	
7	Khan Gul	24,750	
<b>Total</b>		<b>848,250</b>	

Source: Field survey data.

### 3.6 Wheat Marketing Channels:

Wheat Marketing Channels compares two different pathways through which wheat moves from producers to consumers, along with the number of respondents using each channel. The first channel is a direct system where producers sell straight to consumers without intermediaries, and it is used by 80 respondents; this approach can allow farmers to earn higher profits but requires them to handle marketing and sales themselves. In contrast, the second channel is an indirect and more widely used system, involving producers, wholesalers, and retailers before reaching consumers, with 130 respondents relying on it. This longer chain helps in wider distribution and reduces the burden on farmers, but it also

introduces additional costs and reduces the share of profit received by producers due to the involvement of middlemen. Overall, the research findings shows that although direct selling exists, most respondents prefer the more convenient but less profitable indirect marketing channel (Table 5).

**Table 5: Wheat Marketing Channels**

Marketing Channel	Marketing Channel Characteristics	Number of Respondents
First Channel	Producers — Consumers	80
Second Channel	Producers — Wholesalers — Retailers — Consumers	130

Source: Field survey data.

#### 4. Discussions

The outcomes of this study deliver significant insights into the structure and performance of the wheat value chain in Garmser District, Helmand Province. The results demonstrate a clear relationship between farm size and wheat production, where large-scale farms significantly outperform medium- and small-scale farms in terms of total output and yield per jerib. This positive association between farm size and productivity is consistent with previous studies, which suggest that larger farms tend to have better access to agricultural inputs, improved technologies, and financial resources, leading to higher efficiency and output (Sardar Shahraki et al., 2018; Shikur, 2022). Similarly, Chabot & Dorosh (2007) emphasized that improving input productivity is a key strategy for enhancing wheat production in Afghanistan, particularly where access to resources is unevenly distributed among farmers.

The relatively lower productivity observed among small-scale farmers in the study area may be attributed to limited access to improved seeds, fertilizers, irrigation facilities, and modern farming techniques. This aligns with the findings of (Ahmad et al., 2017; Tavva et al., 2017), who reported that traditional farming practices and inefficient resource utilization are major constraints to agricultural productivity in developing countries. Moreover, institutional challenges, including limited extension services and weak market linkages, further restrict the adoption of modern technologies among smallholders (Duveiller et al., 2007). Therefore, targeted interventions aimed at improving access to inputs, extension services, and training programs could help reduce productivity gaps between farm categories.

The study also highlights the role of wheat processing mills in adding value to the wheat value chain. The total flour production of 848,250 kg indicates that processing facilities in Garmser District have significant capacity; however, the wide variation in production levels among mills suggests disparities in resources, infrastructure, and management practices. Mills such as Alam Gul, which recorded the highest output, likely benefit from better mechanization, capital investment, and market access. This observation is supported by value chain analysis literature, which emphasizes that efficient processing and value addition are critical for enhancing competitiveness and profitability in agricultural systems (Kaplinsky, 2000). Strengthening processing capacity and ensuring equitable access to modern milling technologies could improve overall efficiency in the wheat sector.

In terms of marketing, the study identified two main channels: direct sales from producers to consumers and indirect sales involving wholesalers and retailers. The dominance of the second channel indicates that most farmers rely on intermediaries to access markets. While this system facilitates wider distribution and reduces the marketing burden on farmers, it also reduces their share of final profits due to additional transaction costs. This finding is consistent with previous research, which shows that the presence of multiple intermediaries in agricultural markets often leads to inefficiencies and lower producer margins (Amentae et al., 2017). On the other hand, direct marketing channels, although less commonly used, offer higher returns to farmers but require better market access, infrastructure, and marketing skills. The preference for indirect marketing channels in Garmser District may also be influenced by structural challenges such as inadequate transportation systems, lack of organized markets, and limited access to market information. These constraints have been widely reported in Afghanistan's agricultural sector and are known to hinder efficient market participation (Poole et al., 2022; Raoufi et al., 2024). Improving rural infrastructure, establishing organized marketplaces, and enhancing access to real-time market information could help farmers make more informed marketing decisions and increase their bargaining power.

Furthermore, the findings of this study support the broader argument that strengthening the entire value chain—from production to processing and marketing—is essential for achieving sustainable agricultural development. As highlighted by (Gupta et al., 2025) and (Vitale et al., 2020), increasing global demand for wheat requires not only higher production but also more efficient supply chains. In the context of Afghanistan, where agriculture plays a vital role in livelihoods and food security, improving value chain efficiency can contribute to poverty reduction, employment generation, and economic growth.

Overall, this study underscores the need for integrated policy interventions that address production constraints, enhance processing capacity, and improve market efficiency. By focusing on these areas, stakeholders can strengthen the wheat value chain in Garmser District and support the long-term sustainability of the agricultural sector.

## 5. Conclusion

In conclusion, the study reveals that the wheat value chain in Garmser District is characterized by significant disparities in production across farm sizes, uneven processing capacity, and a marketing system largely dependent on intermediaries. Large-scale farms achieve higher productivity due to better access to resources and inputs, while small-scale farmers face constraints that limit their output and efficiency. Although the presence of wheat processing mills indicates considerable potential for value addition, variations in their production levels reflect differences in capacity, technology, and market access. The dominance of indirect marketing channels further reduces farmers' profit margins despite offering wider market reach. Overall, the findings highlight the need for integrated interventions, including improving access to modern agricultural inputs and technologies, strengthening processing infrastructure, enhancing market linkages, and developing efficient and organized marketing systems to increase productivity, profitability, and sustainability of the wheat sector in the study area.

## Acknowledgement

The authors would like to express their gratitude to Helmand and Shaikh Zayed Universities for their support in providing both facilities and financial assistance for this research.

## Conflict of Interest

The authors declare no conflicts of interest.

## References

- Ahmad, A., Kumar, D., Mujadidi, N., Rafi, B., & Wasifhy, M. K. (2017). Integrated farming system for Helmand province, Afghanistan. *International Journal of Advanced Education and Research*, 2(5), 62-67. <https://www.alleducationjournal.com/archives/2017/vol2/issue5/2-5-30>.
- Amentae, T. K., Hamo, T. K., Gebresenbet, G., & Ljungberg, D. (2017). Exploring wheat value chain focusing on market performance, post-harvest loss, and supply chain management in Ethiopia: The case of Arsi to Finfinnee market chain. *Journal of Agricultural Science*.
- Chabot, P., & Dorosh, P. A. (2007). Wheat markets, food aid, and food security in Afghanistan. *Food Policy*, 32(3), 334–353. <https://doi.org/10.1016/j.foodpol.2006.07.002>.
- Duveiller, E., Singh, R. P., & Nicol, J. M. (2007). The challenges of maintaining wheat productivity: pests, diseases, and potential epidemics. *Euphytica*, 157(3), 417–430. <https://doi.org/10.1007/s10681-007-9380-z>.
- Gupta, A., Kumar, T., & Kumar, J. (2025). A comprehensive review of wheat (*Triticum aestivum* L.): Challenges and strategy. *International Journal of Agriculture and Food Science*, 7(2), 236–241. <https://doi.org/10.33545/2664844x.2025.v7.i2d.301>.
- Hashimi, R., Matsuura, E., & Komatsuzaki, M. (2020). Effects of Cultivating Rice and Wheat with and without Organic Fertilizer Application on Greenhouse Gas Emissions and Soil Quality in Khost, Afghanistan. *Sustainability*, 12(16), 6508. <https://doi.org/10.3390/su12166508>.
- Kaplinsky, R. (2000). Globalisation and unequalisation: What can be learned from value chain analysis. *Journal of Development Studies*, 37(2), 117–146. <https://doi.org/10.1080/713600071>.
- Khader, B. F. Y., Yigezu, Y. A., Duwayri, M. A., Niane, A. A., & Shideed, K. (2019). Where in the value chain are we losing the most food? The case of wheat in Jordan. *Food Security*, 11(5), 1009–1027.
- Poole, N., Sharma, R., Nemat, O. A., Trenchard, R., Scanlon, A., Davy, C., Ataei, N., Donovan, J., & Bentley, A. R. (2022). Sowing the wheat seeds of Afghanistan's future. *Plants, People, Planet*, 4(5), 423–431. <https://doi.org/10.1002/ppp3.10277>.

- Radmand, H., Rezaei, H., Keramatzadeh, A., & Eshraghi, F. (2026). Productivity analysis of agricultural inputs in wheat cultivation in Afghanistan. *Discover Food*. <https://doi.org/10.1007/s44187-026-00933-w>.
- Raoufi, H., Jafari, H., Sarhadi, W. A., & Salehi, E. (2024). Assessing the impact of climate change on agricultural production in central Afghanistan. *Regional Sustainability*, 5(3), 100156. <https://doi.org/10.1016/j.regsus.2024.100156>.
- Sardar Shahraki, A., Ali Ahmadi, N., & Safdari, M. (2018). A new approach to evaluate the economic efficiency and productivity of agriculture sector: The application of Window Data Envelopment Analysis (WDEA). *Environmental Energy and Economic Research*, 2(3), 145–160.
- Sardar Shahraki, A., Roudbari, M., & Zand, A. (2018). Analysis of factors affecting wheat production efficiency. *Journal of Agricultural Economics*.
- Sharma, I., Tyagi, B. S., Gyanendra Pratap Singh, Venkatesh, K., & Gupta, O. P. (2015). Enhancing wheat production- A global perspective. *Indian Journal of Agricultural Sciences*, 85(1), 03-13. <https://doi.org/10.56093/ijas.v85i1.45935>.
- Shikur, Z. H. (2022). Wheat policy, wheat yield and production in Ethiopia. *Cogent Economics & Finance*, 10(1). <https://doi.org/10.1080/23322039.2022.2079586>.
- Tavva, S., Aw-Hassan, A., Rizvi, J., & Saharawat, Y. S. (2017). Technical efficiency of wheat farmers and options for minimizing yield gaps in Afghanistan. *Outlook on Agriculture*, 46(1), 13–19. <https://doi.org/10.1177/0030727016689632>.
- Vitale, J. D., Vocke, G., & Daryanto, A. (2020). Global wheat trade and food security under climate change. *Global Food Security*, 26, 100420. <https://doi.org/10.1016/j.gfs.2020.100420>.