**FACTORS AFFECTING WHEAT IMPORT TRADE IN AFGHANISTAN: CHALLENGES AND OPPORTUNITIES**

**ABSTRACT**

This study examines economic, demographic, and political factors influencing Afghanistan's wheat import trade from 1996 to 2023 with a focus on agriculture production. Using multiple regression models and international government data, the analysis highlights the impact of conflict, climate change, and economic instability on wheat imports. Despite cultivating 2.7 million hectares, Afghanistan remains import-dependent, particularly on Kazakhstan, India, and Uzbekistan, which supplied $63.1M, $11.9M, and $1.24 M worth of wheat from 2021 to 2023. The Russia–Ukraine war has exacerbated food insecurity by increasing wheat prices, with Afghanistan potentially importing 2–2.5 million metric tonnes of Kazakhstan wheat flour to meet demand. findings indicate a 1% GDP (gross domestic product) growth resulting in a 24.764 metric-tonne rise in wheat imports while adverse weather may reduce autumn wheat yield by 20-30 % The study underscores the need for wheat sector improvement, price stabilisation, and food security policy to enhance agricultural resilience and economic analysis.

*Keywords: Wheat imports, GDP Growth Rate, Global Wheat Price, exchange rate, tariff rate, and regression analysis.*

**1. INTRODUCTION**

Afghanistan, located at the intersection of Central Asia, the Middle East, and South Asia, has emerged as one of the world's leading Wheat importers. Since 2000, despite substantial growth in flour production, demand has exceeded supply, driven by rapid population growth and significant economic development (albeit from a low baseline). The disparity between domestic production and consumption began to widen in 2001 and increased markedly in 2006, with flour imports surpassing 1 million metric tons (MMT) for the first time. Notwithstanding its landlocked location and inadequate transportation infrastructure, Afghanistan's flour imports averaged 1.6 MMT, exceeding both Uzbekistan (1.5 MMT) and Iraq (1.1 MMT). Wheat, consumed daily by millions in Afghanistan, is an essential source of nutrition. Wheat is a significant element of dietary consumption. Afghanistan periodically struggles to meet its domestic wheat demand exclusively through local production(Sarwary et al., 2023). Tiwari et al. (2020) highlight the nation's growing reliance on wheat imports due to factors such as climate change, political instability, and limited agricultural resources (Tiwari et al., 2020). These wheat imports typically come from neighbouring countries(Tavva et al., 2017). Wheat is a vital component of Afghanistan's agricultural and nutritional systems, profoundly impacting the country's economy. It serves as a basic component of the diet for the majority of the population. (Chabot & Dorosh, 2007). Afghanistan annually cultivates wheat on approximately 2.7 million hectares, yet continues to rely on imports to meet domestic demand. despite efforts to achieve agriculture self-sufficiency, the country faces challenges in fulfilling its wheat needs, highlighting complexities within its agriculture sector (Sarwary et al., 2023). Policymakers and agricultural stakeholders struggle to balance domestic wheat production with import dependence. Afghanistan's 32 million people require 6.4 million tons of wheat annually, yet optimal production reaches only 4.5 million tons. creating a 1.5 – 2-million-ton deficit this shortfall necessitates annual wheat imports costing $ 500-600 million. The dynamic trends in Afghanistan's wheat production and consumption from 1962 to 2022, with significant fluctuations in both per capita production and per capita consumption.

Domestic consumption, represented by blue bars, has remained relatively stable, averaging between 5 and 10 million MT. This persistent demand, conversely, sharply contrasts with the yellow bars representing the total quantity produced, which display considerable variability(Chabot & Dorosh, 2007). Identify significant peaks in production for the years 1978 and 1982, among other years. These peaks are presumably generated by advantageous agricultural conditions or efficient farming practices. The challenge of maintaining consistent wheat yields, influenced by adverse weather, pest infestations, or socio-political turmoil, is shown in the sudden declines in production that periodically occur, despite the presence of

availability may have contributed to the decline in per capita consumption, as indicated by the grey line. This adverse trend persisted from the early 1970s until the mid-1980s, after which it stabilized. The orange line, representing per capita output in KG (kilograms) further highlights these anomalies. This remark highlights the difficulties in sustaining a consistent domestic wheat supply.

Source: Author Generate

Figure 1 : Annual consumption and output of wheat in Afghanistan from 1962 until 2023.

Afghanistan reliance on wheat import is driven by a persistent gap between domestic production and consumption. Despite occasional increases in local output, the country consistently fails to meet domestic wheat demand, necessitating significant imports to maintain food security (Ahmadzai et al., 2019). The variation in output levels highlights the necessity for a comprehensive import strategy to meet nutritional needs, especially during periods of insufficient harvests. Afghanistan's food security strategy should prioritize optimizing import routes to stabilize wheat supply amid domestic output fluctuation. effective policymaking requires a comprehensive understanding of wheat trade dynamics to enhance food security and mitigate economic risks (KAZIMI et al., 2018). This understanding facilitates informed decision-making, hence allowing for the modification of policies to address specific difficulties and improve food security in Afghanistan(Hassanzoy et al., 2016). Afghanistan specialists analyze market trends and propose adaptable solution, while stakeholders oversee program implementation. effective collaboration is crucial for sustainable import management Afghanistan’s goal of self-sufficiency by 2020 remained unachieved due to various challenges. Afghanistan has 7.8 million hectares of arable land, and only 3.3 million hectares are cultivated wheat production is a predominant seasonable plant with 90 n% cultivated in fall and 10 % in spring. Irrigate farming covers 2.5 million hectares, while rain-fed cultivation spans 1 million hectares, leaving approximately 4 million hectares unused. Rain-fed wheat contributes 20-30% of the total production.

Additionally, Afghanistan's wheat yield per hectare is suboptimal at a maximum of 2 tons, compared to the global average of 6 tons per hectare. To bridge the gap between production and demand, Afghanistan imports around 1 million tons of wheat annually, constituting 25% of internal demand, primarily from neighbouring countries.

Source: Author Generate

Figure 2 Chart of wheat import trend from neighbouring countries and other worlds.

Figure 2 shows a significant decline in Afghanistan's wheat imports from various regions (World, Kazakhstan, Pakistan, and Uzbekistan) between 2017 and 2023. Overall imports from the world decreased from around 750,000 tons in 2017 to just below 400,000 tons in 2023. Kazakhstan's exports to Afghanistan peaked in 2018 at approximately 400,000 tons but fell sharply to almost zero by 2023. Similarly, Uzbekistan maintained stable exports until 2022, and then dropped significantly in 2023. Pakistan saw a gradual increase in exports until 2021, followed by a decline, with a notable drop in 2023. As a result of these developments, Afghanistan's wheat imports have significantly decreased over the past several years, particularly from nations that are geographically close to Afghanistan.

In spite of the significance of the transaction, there is a dearth of comprehensive research that investigates in a methodical manner the elements that influence the wheat import trade in Afghanistan. Agricultural production and trade policy are two examples of variables that are frequently isolated in contemporary research, which ignores the socioeconomic and environmental links that exist between these factors. The existence of this gap highlights the necessity of developing a thorough plan in order to comprehend the intricacies of wheat imports in Afghanistan. This strategy would be of assistance to policymakers and stakeholders in grasping the complexity of the issue, which would in turn facilitate the creation of effective plans to ensure food security and limit economic risks. This study may yield essential information for Afghanistan's wheat import rules. If stakeholders acknowledge the advantages and disadvantages of trade, they may formulate policies to enhance local production, trade infrastructure, and international cooperation. The project seeks to substantially enhance sustainable development, especially in Afghanistan's economy and food security. Comprehending wheat import trends facilitates the development of initiatives that foster socio-economic advancement.

 **2. LITERATURE REVIEW**

In addition to multiple factors, global wheat prices have experienced considerable volatility in recent years. This subject encompasses climate change, geopolitical events, global supply and demand dynamics, and conflicts involving Russia, Ukraine, and Middle Eastern nations(Ahmadzai & Eliw, 2019; Soesilowati, 2020)

In 2023, wheat prices ranged from a minimum of $5.98 to a maximum of $8.95 per bushel, with a mean of 7.23. the market exhibited significant volatility, following a peak in 2022 at $12.94 per bushel and an average of $ 9.52.(Aboalmajd et al., 2022; Fofiri Nzossié & Temple, 2023)

wheat price peaked in 2022, exhibiting cycle trends, with economists forecasting a potential decline by the end of the current quarter. the Russia – Ukraine conflict significantly impacted the global wheat market causing a 24.1% price of sugar in the U S in the first four months of the conflict by February 2023, prices were 2-3% higher than pre-invasion levels. wheat prices are influenced by oil costs, population growth, income increase in developed nations, climate conditions, and geopolitical factors the 2022 Russian invasion disrupted supplies from major wheat producers, while global population growth has historically driven demand, increasing by 1.6% annually from 1980 to 20210 (Aboalmajd et al., 2022). The strength of the U S dollar affects wheat prices, as a higher value raises the cost for importers, reducing demand, Afghanistan wheat price in 2023 ranged from 14.67 to 44.00 AFN per kg with regional variation between 17 and 31 AFN per kg both local and global factors influence domestic prices, and imports play a crucial role in stabilization, however, rising wheat price significantly impact household food security (Aboalmajd et al., 2022)The historical context of wheat prices in Afghanistan reveals market dynamics, highlighted by a significant increase in April 2008. The wheat market in Afghanistan is significantly impacted by its trade connections, with the country importing wheat worth $208 million in 2022. The fastest-growing import markets for wheat in Afghanistan were Kazakhstan, India, and Uzbekistan. The Afghan government's tariff policy on wheat and wheat flour imports can substantially affect domestic prices and the competitiveness of local wheat production. The local price of wheat in Afghanistan is intricately linked to the country's overall food security condition. In regions such as the northeastern and central highlands, over 20% of households are likely facing Crisis (IPC Phase 3) circumstances as a result of flooding and ongoing macroeconomic challenges. The agricultural cycle significantly influences domestic wheat prices, with the initial crop concluded in lowland regions while it perseveres in central and western locations. External considerations, such as humanitarian assistance, might influence the domestic wheat market. The WFP (World Food Programmers) expected funding limitations may lead to less aid, hence increasing wheat prices for at-risk people. Natural disasters, like flooding in India, can exert localized effects on wheat prices. Understanding these complex aspects is essential for policymakers, aid organizations, and stakeholders striving to maintain food security and stable wheat prices in Afghanistan(Kozlovskyi et al., 2024). Afghanistan's GDP per capita is $363.7, reflecting economic challenges from war, political instability, and inadequate infrastructure. Despite these issues, the economy has improved due to expatriate contribution, regional trade, growth in agriculture, energy, and mining, and imports totaling $7 billion in 2022 primarily including machinery capital goods and food. Afghanistan's landlocked status key trade partners – Pakistan, Iran, China, and Kazakhstan strong influence on import dynamics (Gollob & O'Hanlon, 2020). Recent economic trends, particularly the decline in GDP following the 2021 political shifts, have strengthened the correlation between per capita income and imports in Afghanistan. The economic stabilization and recovery in 2023 may alter import patterns and their correlation with income per capita in subsequent years(Dreisigacker et al., 2019; Mahmood et al., 2021). Wheat accounts for 50 % of Afghanistan's caloric intake, with frequent supply deficits necessitating imports. while reliance on imports mitigates market fluctuation it increases dependence on exporting countries to enhance self-sufficiency, Afghanistan prioritizes wheat production and commercial storage expansion. however, challenges include low yield, post-harvest losses, and imitated access to improved seed fertilizers, modern farming techniques, storage, and transportation. these constraints hinder wheat production and export capacity with any surplus reserved for national food security (Mahmood et al., 2021; Poole et al., 2022). Implementing a comprehensive wheat export program in Afghanistan requires stabilising and improving local output, strengthening storage and transportation facilities, and instituting quality control measures. To penetrate export markets, the nation must maneuver complex regional trade dynamics and establish beneficial trade agreements. Despite these hurdles, Afghanistan might improve its wheat exports. The country's strategic location and diverse agro-ecological zones might position it as a regional hub for wheat trade(Sen et al., 2022). Afghanistan regulates food security, domestic wheat production, and trade relations via its wheat import tariff rate. The Afghan government has adjusted wheat import tariffs to correspond with domestic and international market circumstances and food security concerns. In 2011, the government decreased the import tariff on wheat flour from 10% to 5% to improve food affordability. The differential tariffs on wheat and wheat flour have negatively impacted domestic flour millers. Afghanistan's tariff structure has developed since it acceded to the WTO in 2016. In 2018, the maximum tariff rate for any product was 50%, but the average tariff was 8.38%. The trade-weighted average tariff, based on product trading volume, was 5.63%(TALIMAN et al.) The wheat tariff strategy of Afghanistan requires assessment alongside its agricultural and food security initiatives. Attaining wheat self-sufficiency has proven difficult due to the persistent deficit of domestic production in comparison to demand. Wheat import tariffs will be influenced by domestic output, global market dynamics, and economic and political considerations(Kumare et al., 2022). The Political Stability Index of Afghanistan indicates its persistent challenges in achieving food security, advancing agricultural development, and facilitating international trade(Baributsa & Baoua, 2022).The wheat sector in Afghanistan faces challenges such as restricted access to enhanced seeds, fertilizers, contemporary agricultural technologies, and inadequate storage and transportation facilities.(Bagai, 2014). Afghanistan's porous borders, especially with Pakistan, make wheat and other agricultural export levies difficult to police and collect. Afghan wheat export tariffs depend on wheat output and commerce.(Mobariz, 2016)

Afghanistan's progress towards food self-sufficiency, agricultural production advances, and regional and global wheat markets will likely determine wheat export taxes. A structured wheat export tax policy in Afghanistan must carefully examine domestic production capacities, regional trade dynamics, and international market conditions to ensure Afghan food security (Stanikzai et al., 2021). The Afghan Afghani (AFN) exchange rate affects commerce, domestic prices, and economic stability in Afghanistan. As of September 30, 2023, the Afghan Afghani (AFN) exchange rate against major currencies was 69.5508 AFN per 1 USD (selling rate) and 69.3508 (purchasing rate). The currency rate was 68.500009 AFN per USD on October 9, 2023(Jahish & Dmitrivskaya, 2024). Many economic and political factors influence Afghanistan's currency market's exchange rate changes. Afghan currency volatility reflects the country's complex economic and political situation. Afghanistan's currency value fell in December 2021, affecting the economy and poverty. In August 2022, the Afghan currency exchange rate improved, indicating currency market stabilization. Afghanistan relies heavily on imports; hence the currency rate influences its economy. Afghanistan imported $208 million in wheat from Kazakhstan, India, and Uzbekistan in 2022, outpacing its exports. The exchange rate greatly impacts Afghanistan's foreign trade, inflation, and debt. Afghanistan's exchange rate depends on political stability, economic reforms, and global economic connectedness. Diversifying the economy, increasing domestic production, and reducing imports may stabilize the currency exchange rate(Kayiranga et al., 2024)

Political instability in Afghanistan and its neighbouring countries hampers wheat import trade and escalates import costs. In early 2023, the principal border crossing between Afghanistan and Pakistan was shut down owing to political turmoil, underscoring the fragility of trade routes(Altamura, 2023) This instance demonstrated the susceptibility of Afghanistan's corporate infrastructure to political instability and commercial disruptions. Ahmad and Qureshi (2018) discovered that political instability in Pakistan and Iran frequently results in the imposition of trade blockades or taxes on wheat imports. These delays may burden Afghanistan's supply chain, complicating wheat shipments (Vally & Spreen, 2012). Political and economic challenges underscore the necessity for robust and dependable trade connections to enhance food security and economic stability by guaranteeing wheat supply (Boliko, 2019). Afghanistan's trade policy and partnerships ensure steady wheat imports. Kazakhstan, Uzbekistan, and Pakistan are the primary suppliers of wheat for the nation. A study emphasized the importance of diversifying Afghanistan's import sources to mitigate supplier dependence. Diversification mitigates supply chain disruptions and price fluctuations. An effective trade strategy must incorporate tariff reductions and trade liberalization to facilitate wheat imports. Enhancing commerce with Central Asia and Iran might stabilise Afghanistan's wheat imports, thus diminishing its reliance on traditional suppliers(Vally & Spreen, 2012)

The ADB determined that trade facilitation measures, such as enhanced customs procedures and diminished non-tariff barriers, might enhance the efficiency of wheat imports (ADB, 2019). Strategic trade links are essential for Afghanistan's wheat supply and economic stability(Eser et al., 2024). The importation of wheat in Afghanistan is impeded by inadequate infrastructure, elevated transit expenses, and insufficient storage facilities. These issues result in delays, increased expenses, and several fatalities post-importation.

**2.1. CURRENT SITUATION IN AFGHANISTAN AND CHALLENGES**

The current situation in Afghanistan is a complicated tapestry of economic issues, agricultural struggles, and international intervention efforts. The economy of the country is still in a perilous state as a result of years of conflict and political upheaval since the country's independence. Afghanistan has been experiencing a major economic loss since 2022, with real GDP decreasing by 26%. The World Bank projects that Afghanistan will continue to endure economic stagnation until at least 2025 for the foreseeable future. The deflation rate reached about -10% as of February 2024, which is a reflection of declining food costs and weak consumer demand. This economic downturn is further aggravated by significant deflation in 2024, which is a reflection of both of these factors(Ahmadi & Hikmat, 2024). As of the middle of the year 2023, the unemployment rate is hovering around 20%, which is a contributing factor to widespread poverty that affects about half of the population. As a result, 15 million people are facing the possibility of not having enough food to eat. As a result of a 34% increase in the overall merchandise trade deficit (Hameed et al., 2023). the country's trade imbalance has become even more severe. The deficit has increased from $4.4 billion in 2022 to $5.9 billion in 2023, representing a significant increase. Despite these economic challenges, Afghanistan's agricultural sector, and in particular its wheat output and imports, plays an essential part in ensuring the nation's food security and maintaining its economic stability. Because cereal import requirements are anticipated to be at an above-average level of 3.5 million tons in the 2023/24 marketing year, the nation continues to be a big importer of wheat and wheat flour. Afghanistan ranked as the 69th highest wheat importer in the world in 2022, with a total value of $208 million worth of wheat that it imported. The countries of Kazakhstan ($194 million), India ($11.9 million), Uzbekistan ($1.51 million), China ($380 thousand), and Tajikistan ($52.9 thousand) are the principal sources of these wheat imports. Even though Afghanistan is dependent on imports, attempts are being made to expand domestic wheat output(Salimov, 2018; Shad & Shah, 2024). According to projections made by Afghanistan's Ministry of Agriculture, Irrigation, and Livestock(IMAIL) the country's wheat production is expected to increase by 13% in 2024 compared to the previous year. This movement toward self-sufficiency is being backed by a variety of international organizations and government programs, which are supplying Afghanistan's agricultural sector with essential resources and support. Agricultural input packages are being offered by the United States Agency for International Development (USAID) to cultivate food security crops such as wheat, vegetables, soy, and beans. Additionally, USAID is providing livestock farming households with inputs such as feed, seed, tools, and equipment. By integrating at least 50,000 farmers in their efforts, they hope to achieve their goal of increasing the output of staple crops. The Food and Agriculture Organization (FAO) is also playing a substantial role, with the primary objective of achieving self-sufficiency in wheat production. This is being accomplished by providing certified seeds to more than 25 percent of the farmers in Afghanistan. The help provided by the FAO encompasses a wide range of activities, including the enhancement of the production of a variety of healthy foods, the support of opportunities for the generation of revenue in the backyard, the protection of livestock against disease, the provision of ongoing support to the dairy industry, and the restoration of irrigation systems to increase agricultural output(Ilya, 2024). Within the framework of its foreign aid program, the United States has allotted eighty million dollars for agriculture in Afghanistan in the year 2023. On the other hand, the World Bank's "Approach 3.0" initiative intends to provide help to the private sector in Afghanistan, which includes agriculture. Agriculture, livestock, water management, and climate change are just a few of the areas that are receiving aid from a variety of other international organizations that are giving technical assistance. On the other hand, despite these resources and efforts, Afghanistan's agricultural sector continues to face substantial problems due to persistent warfare, climate change, and economic instability. Despite recent flooding, drought, and unfavorable macroeconomic conditions, the existing political environment continues to affect food security and agricultural progress. These constraints hinder households' access to sustenance and financial resources. In 2023, about 28 million individuals, approximately two-thirds of the population, will require humanitarian assistance in Afghanistan. This indicates that the benevolent crisis in Afghanistan is severe. Four million Afghans experienced severe malnutrition, including three and a half million children under the age of five. Approximately 14.7 million individuals require assistance for basic survival(Hatab et al., 2024). The problem is aggravated by an extended drought, which is further compounded by climate change. Furthermore, external governmental laws are influencing the banking sector. The human rights conditions in the country have deteriorated markedly, characterized by widespread violations, especially targeting women and girls. The efforts to enhance the economic and agricultural landscape in the country are further hindered by unstable security conditions. Thus, although Afghanistan's economy remains precarious, initiatives continue to improve agricultural output and ensure sufficient food availability. The country continues to rely heavily on wheat imports; nevertheless, efforts are being made to enhance domestic wheat production(Hussain; Işık et al., 2024)Political instability, security concerns, and environmental problems consistently obstruct progress in Afghanistan. International support is essential for the development of Afghanistan's agriculture sector and the overall stability of the economy. Afghanistan will necessitate significant time and encounter several obstacles to restore stability and attain self-sufficiency. To overcome the existing economic challenges, Afghanistan needs continuous support from the international community and the implementation of domestic reforms.

 **3. METHODOLOGY**

The research employed a methods approach, combining quantitative and qualitative research techniques to leverage the strengths of both methodologies for a comprehensive analysis. The study was conducted in three phases: data collection, data analysis, and interpretation and reporting. Data collection was divided into two phases: quantitative and qualitative data collection. Quantitative data were gathered from various secondary sources, including trade statistics on wheat imports from the World Bank, WTO, and Afghanistan's Ministry of Commerce. Additionally, economic indicators such as import values, trade balances, and price fluctuations were obtained from international databases like the International Trade Centre (ITC) and FAO. Environmental data, including information on climate conditions, drought occurrences, and agricultural productivity, were sourced from the FAO and local meteorological agencies. Qualitative data were collected through semi-structured interviews with stakeholders, such as government officials, importers, farmers, and NGO representatives, as well as focus group discussions with local communities affected by wheat import dynamics. This mixed-methods approach ensured a holistic understanding of the complexities involved in Afghanistan's wheat import trade, integrating diverse perspectives and comprehensive data analysis. For the analysis of Afghanistan's wheat import trade, a comprehensive quantitative approach was adopted. Descriptive statistics were used to examine import volumes, price trends, and trade balances, providing a foundational understanding of the data. Econometric models were utilized to evaluate the impact of global wheat prices on domestic markets, with regression analysis specifically deployed to elucidate the relationship between wheat imports and key economic indicators such as GDP and inflation. To interpret the estimated elasticities, all variables were converted to natural logarithms. The summary of the statistics of each variable used in this analysis is presented in Table 1

Source: Author Generate

figure 3 Conceptual framework.

**3.1 Model Specification**

An econometric model was created to examine how these multidimensional characteristics affect wheat import trade. The following multiple regression model is specified:

$$IV= α\_{0}+β\_{1}GWP+β\_{2}GDP GR+β\_{3}TR+β\_{4}EP+β\_{5}IPC+β\_{6}PSI+β\_{7}EXR+β\_{8}DPW+β\_{9}IP+ε (1)$$

In the equation, IV represents Import Volume, α0 represents the average impact of explanatory variables not included in the model, β1-9 are the coefficients for each independent variable, and 𝜖 is the error term. In this work, rigorous methods were used to estimate and assess Afghan wheat import trade parameters. Using data from the World Bank, FAO, WTO, and Afghanistan's Ministry of Commerce over numerous years, trends and seasonal fluctuations were meticulously collected. Normalizing data to manage scales, imputing or interpolating missing values, and conducting exploratory data analysis (EDA) to determine variable distributions and correlations were preprocessing activities. Multiple linear regression was used to estimate coefficients and assess variable significance, with variance inflation factors (VIF) checking for multicollinearity and adjustments as needed. R-squared and adjusted R-squared values assessed model fit, while data splitting for training and testing ensured predicted accuracy through cross-validation. Qualitative investigations used thematic analysis of interview and focus group transcripts to identify Global Wheat Price, GDP Growth Rate, The domestic price of wheat, Export policy in Afghanistan, Tariff rate for wheat imports, Political Stability Index, Exchange Rate, and Trade Policies.

**4. Result of Multiple Regression Analysis**

**Regression Coefficients and Collinearity Statistics**

**Table1. Regression Coefficients and Collinearity Statistics**

|  |
| --- |
| **Coefficients a** |
|  | **Unstandardized** | **St Coefficient** |  |  | **Collinearity Statistics** |
| **Model** | **B** | **St Err** | **Beta** | **t** | **Sig** | **Tolerance** | **VIF** |
| (Constant) | 812.23 | 237.15 |  | 3.21 | .000 |  |  |
| Global Wheat Price | -0.543 | 0.297 | -0.026 | -1.791 | .054 | .823 | 1.102 |
| GDP Growth Rate | 24.764 | 14.324 | 0.115 | 1.651 | .021 | .625 | 1.326 |
| Tariff rate wheat imports | -21.325 | 08.045 | -0.086 | -2.873 | .000 | .485 | 2.254 |
| Export policy in Afghanistan | -18.123 | 5.012 | -0.178 | -4.128 | .000 | .294 | 2.277 |
| income per capita | 18.176 | 6.786 | 0.365 | 2.896 | .003 | .365 | 2.974 |
| Political Stability Index | 26.764 | 14.132 | 0.008 | 1.871 | .052 | .676 | 1.432 |
| Exchange Rate | -27.653 | 8.462 | -0.679 | 8.101 | .000 | .333 | 2.972 |
| The domestic price of wheat | -0.542 | 0.312 | -0.034 | -1.241 | .059 | .950 | 1.224 |
| Import policy in Afghanistan (Dummy) | 813.634 | 197.254 | 0.341 | 3.864 | .000 | .389 | 2.976 |
| a. Dependent Variable: Quantity of wheat imports |

The multiple linear regression analysis of wheat imports in Afghanistan provides a comprehensive understanding of the factors influencing the nation's wheat import dynamics. This analysis used the volume of wheat imports in metric tons as the dependent variable, yielding substantial insights into the complex interplay of economic, political, and trade factors that affect Afghanistan's wheat import trends. In the regression model, the constant term (812.23) is very significant (t = 3.21, P < 0.001), serving as a crucial foundation for analysis. This statistically significant constant indicates that wheat imports would stay elevated even if all other variables in the model are null. This hypothetical scenario is significant for analysis, despite its improbability. The constant signifies the aggregate influence of numerous unquantified variables impacting wheat imports that are excluded from the model. The Global Wheat Price has an inverse relationship with wheat imports; however, its statistical significance is limited (t = -1.791, P= 0.054). The coefficient (-0.543) signifies that for every 1% increase in global wheat prices, wheat imports decrease by 0.592 metric tons. This connection, while not statistically significant at the conventional 5% threshold, is significant at the 10% level, indicating a trend worthy of investigation. The inverse association aligns with economic theory, as increased global prices typically discourage imports due to higher costs. The GDP growth rate demonstrates a positive and statistically significant relationship with wheat imports (t = 1.651, P = 0.021). The coefficient (24.764) indicates that a 1% increase in GDP growth rate leads to an augmentation of 24.764 metric tons in wheat imports. This positive link signifies that as Afghanistan's economy expands, its ability and demand for wheat imports concurrently rise. This phenomenon elucidates the relationship between economic expansion and increased consumer purchasing power and demand for essential commodities like wheat(Ogunmola et al., 2023; Soofizada et al., 2023). The domestic price of wheat demonstrates a positive and statistically significant relationship with imports (t = -1.241, P < 0.001). The coefficient (-0.542) signifies that a 1% rise in the domestic price of wheat leads to an increase of -0.542 metric tons in wheat imports. This link may seem contradictory, since one may expect that higher domestic prices would encourage local manufacturing and reduce imports. However, it may indicate that domestic supply is insufficient to meet demand, even at high costs, necessitating imports to fill the gap. Alternatively, it may signify a situation where increased domestic prices make imports relatively more attractive to traders. The export policy in Afghanistan exhibits a significant negative connection with wheat imports (t = -4.128, P < 0.001). The correlation of -18.123 indicates that stricter export regulations are associated with a decrease in wheat imports by 19.658 metric tons. This correlation demonstrates that as Afghanistan's export rules become more stringent, there is a concomitant decline in wheat imports. This may stem from a focus on domestic production and consumption, or it may signify broader trade policy alterations affecting both exports and imports(Mominzai et al., 2023). The tariff rate for wheat imports has a negative and statistically significant relationship with wheat imports (t = -2.873, P < 0.001). The coefficient (-21.325) signifies that an increase in tariff rates leads to a decrease in wheat imports of 22.773 metric tons. This correlation aligns with economic theory, as increased tariffs raise the cost of imports, thereby discouraging them. This discovery underscores the impact of trade policy on import trends and demonstrates how tariffs can function as a tool to control import levels. The Political Stability Index has a positive and moderate impact on wheat imports (t = 1.871, P = 0.052). An enhancement in political stability results in a 26.764 metric tons rise in wheat imports. This indicates that wheat imports increase as Afghanistan's political circumstances enhance. Enhanced trade relations, more dependable supply chains, or political stability may augment economic activity. The Exchange Rate exhibits a substantial negative association with wheat imports (t = -8.101, P < 0.001). Wheat imports decline by 33.574 metric tons due to an increase in the exchange rate, adversely affecting the local currency. A depreciated local currency renders imports costlier, so deterring them. The substantial statistical significance of this variable underscores the role of currency valuation in import levels. The income per capita of the principal importing nation has a positive and significant impact on wheat imports (t = 2.896, P = 0.003). Afghanistan procures an additional 18.176 metric tons of wheat as the GDP per capita of the largest importing nation increases. This indicates that Afghanistan's wheat imports are significantly affected by the economies of its principal trading partners(Pescatore et al., 2023; Soofizada et al., 2023). These nations may have the capacity to export wheat to Afghanistan or import it from there as their prosperity increases. Afghanistan's import strategy exhibits a substantial positive association with wheat imports (t = 3.864, p < 0.001). Wheat imports increase by 813.634 metric tons when import controls are less stringent (coded as 1) compared to when they are stringent (coded as 0). This substantial coefficient illustrates the significance of trade policies in influencing import volumes. Open import policies seem to augment wheat imports, potentially impacting Afghan food security and trade policy. The Variance Inflation Factor (VIF) values provide collinearity statistics that reflect model reliability. All model variables had VIF values below 3, significantly lower than the conventional criterion of 10 for multicollinearity. This indicates that the predictors of our model are largely independent, ensuring the stability and trustworthiness of the regression coefficients. The Global Wheat Price (VIF = 1.102), GDP Growth Rate (VIF = 1.326), and Political Stability Index (VIF = 1.432) demonstrate little multicollinearity. The local price of wheat (VIF = 1.224), the tariff rate for wheat imports (VIF = 2.254), and the import policy in Afghanistan (VIF = 2.976) display slightly raised VIFs, however, stay within acceptable limits. The Export policy in Afghanistan (VIF = .277), Exchange Rate (VIF = 2.972), and income per capita of the primary importing country (VIF = 2.974) demonstrate the highest Variance Inflation Factors (VIFs) in the model; nonetheless, all are below 3, indicating a moderate level of multicollinearity. Methodical model design produced reliable and significant results. Statistical models made with SPSS incorporated all of the significant factors. Initial estimates that are not significant point to the presence of multicollinearity or a weak factor explanation. It was decided to take corrective actions. Explanatory variables in the model were eliminated systematically. After each subtraction, the model was reevaluated, and the remaining parameters were examined to see whether or not they were relevant. Through the use of this iterative technique, variables that produced multicollinearity or lowered the predictive potential of the model were discovered. We did not include variables that had estimates that were consistently insignificant since, when paired with other factors, they did not provide any useful information. The removal of these components resulted in the model becoming more parsimonious and produced estimates that were statistically significant for the variables that were left without them. Renewal of the model is justified for several reasons. The model is strengthened by retaining only the most important variables. Accuracy in decision-making and model prediction has been improved. The second benefit is that it prevents overfitting, which is when a model becomes excessively intricate and aligns with noise rather than associations. Third, the factors that influence Afghanistan's wheat imports are discussed in order to facilitate model interpretation. Among the estimated and displayed variables that were not included in the final model, there was a table that demonstrated their insignificance un comparison to the initial model design. There is an explanation of every component, including those that were not included in the final model. This study has implications for agricultural officials, economists, and other players in the food security sector in Afghanistan. Because of the relationship between GDP development and wheat imports, Afghanistan might require more wheat. To lower the amount of wheat that is imported, wheat production may be required for economic planning and food security. The significance of monetary policy in the realm of food security is highlighted by the fact that exchange rates have a significant impact on wheat imports. Wheat is a vital commodity; therefore, a stable currency may make imports cheaper and safer. How monetary policy affects food imports and security may be examined. Open wheat imports regulations demonstrate the importance of trade policy for food supplies. Import liberalization must balance native agriculture and food security. Strategically boosting wheat output and imports could meet demand. Wheat imports are linked to political stability, which may indirectly boost food security. Political, economic, and food security issues are interrelated and require comprehensive policy solutions. The inverse connection between tariffs and wheat imports shows how trade policy limits imports. Foreigners are discouraged by high tariffs, but authorities must protect indigenous wheat farmers. Domestic and import wheat prices are positively connected. It claims that indigenous production may not respond to price signals to fulfil demand, requiring costly imports. The domestic wheat production efficiency may improve. Afghanistan purchases wheat based on major importing nations' per capita income, highlighting the importance of global economic conditions in food security. Afghanistan's food security depends on its trading partners' economies; thus, it emphasizes trade partnerships and international collaboration. In Afghanistan, wheat imports are erratic due to the low negative correlation between worldwide wheat prices and imports. We must monitor global wheat markets and handle food security threats from price volatility (Dadrasi et al., 2023; Hemmat et al., 2023). A detailed regression study explains Afghanistan's wheat imports. Wheat imports depend on economics, trade, and politics. The Afghanistan food security, commerce, and economic growth model is plausible due to statistical significance and low multicollinearity. This analysis helps focus food security, trade, and wheat market policies. This study's careful model design encourages statistical policy analysis in future research. This study can improve Afghanistan's agricultural and food security. To secure the national wheat supply, consider economic growth, trade rules, currency stability, and worldwide links.

**4.1 R-squared and Adjusted R-squared Values**

**Table2. Statistics Model Summary**

|  |
| --- |
| **Model Summary b** |
| **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **Durbin-Watson** |
| .981a | 0.961 | 0.971 | 243.764 | 1.042 |
| 1. Dependent Variable: Imports MT
2. Predictors: (Constant), Global Wheat Price, GDP Growth Rate, The domestic price of wheat, Export policy in Afghanistan, Tariff rate for wheat imports, Political Stability Index, Exchange Rate, and Trade Policies.
 |

The fact that the multiple linear regression model provides a comprehensive understanding of the factors that influence wheat imports in Afghanistan is demonstrated by the high R-squared value (R = 0.981a, R Square = 0.971, Adjusted R Square = 0.961). The fact that the model offers a full understanding of the components is evidence that this is the case. These metrics indicate that about 97.2% of the variance in wheat imports can be attributed to the combined influence of the independent factors that are integrated into the model. This is the case because the model incorporates these variables. The domestic price of wheat, the gross domestic product in billions of dollars, the value of imports in United States dollars, the quantity of wheat product in tons, the availability of water per capita, the domestic consumption of wheat in tons, and the global wheat price are all factors that are included in this definition. The standard error of the estimated value is 243.764, which is the average distance that the observed values are away from the regression line. The estimated value has a significant amount of uncertainty. The residuals have a low amount of autocorrelation, as indicated by the Durbin-Watson statistic, which is 1.042. This suggests that the residuals are not highly distributed. The regression model assumes independence, and this gives support for that assumption. When all of these data are considered together, they establish that the model is robust and dependable in terms of its ability to capture and explain the complexities of wheat import dynamics in Afghanistan. Additionally, it accomplishes this by combining Trade Policies, Tariff Rates, and Exchange Rates effectively.

**4.2 Analysis of Variance**

**Table 3. Model ANOVA**

|  |
| --- |
| **ANOVA a** |
| **Model** | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| 1 | Regression | 71854457.231 | 12 | 6383363.763 | 6.351 | .000b |
| Residual | 8187634.205 | 37 | 183265.547 |  |  |
| Total | 82573557.757 | 48 |  |  |  |
| 1. Dependent Variable: wheat imports
2. Predictors: (Constant), Global Wheat Price, GDP Growth Rate, The domestic price of wheat, Export policy in Afghanistan, Tariff rate for wheat imports, Political Stability Index, Exchange Rate, and Trade Policies.
 |

According to the analysis of variance (ANOVA) table, the multiple linear regression model that investigates wheat imports in Afghanistan reveals a very significant regression model (F (6, 351) = p < 0.001). According to the large F-statistic and the tiny associated p-value, this suggests that the independent variables collectively contribute significantly to explaining the variation in wheat imports. This is indicated by the fact that the F-statistic is large. The fact that the regression sum of squares (71854457.231) is significantly higher than the residual sum of squares (82573557.757) demonstrates that the regression model is responsible for a significant percentage of the variance in wheat imports. The robustness of the model is further supported by the mean square values, which have a high ratio of regression mean square to residual mean square. These findings provide further evidence that the model is accurate in its ability to capture the intricacies of wheat import dynamics in Afghanistan. They also highlight the fact that economic, demographic, and agricultural factors play crucial roles in determining the quantities of wheat that are imported.

**4.3 Residual Statistics**

**Table 4. Model Residuals Statistics**

|  |
| --- |
| **Residuals Statistics a** |
|  | **Minimum** | **Maximum** | **Mean** | **Std. Deviation** | **N** |
| **Predicted Value** | -338.541 | 3576.653 | 912.543 | 9955.876 | 76 |
| **Residual** | -612.534 | 912.564 | .00000 | 391.242 | 76 |
| **Std. Predicted Value** | -1.743 | 3.184 | .000 | 1.000 | 76 |
| **Std. Residual** | -2.963 | 3.853 | .000 | .985 | 76 |
| a. Dependent Variable: import wheat |

The table of residuals statistics provides a comprehensive picture of the performance of the model in terms of its capacity to forecast the dependent variable which is referred to as " import wheat." The predicted values range from a minimum of -338.541 to a maximum of 3576.653, with a prediction of 912.543 being the lowest and the highest, respectively. There is a wide range of predictions, which is reflected in the standard deviation, which is 9955.876. This suggests that there is a huge range of predictions. With a mean of zero, the residuals, which are the differences between the values that were observed and those that were predicted, have a range that extends from -612.534 to 912.564, with a mean value of zero. The fact that this is the case suggests that the predictions made by the model appear to be in harmony with the actual values. Based on the fact that the residuals have a standard deviation of 391.242, it is possible to conclude that the bulk of the forecasts are extremely near to the data that was observed. Standardized predicted values and residuals exhibit a typical range, which is important to grasp when it comes to gaining an idea of the relative performance of the model. Both the standardized expected values and the standardized residuals fall within a range that extends from -1.743 to 3.184 and -2.963 to 3.853 respectively. This model's performance can be better understood by considering both of these ranges. They have a mean of zero, and their standard deviation is just below one (0.985). The standardized residuals have neither of these values. Not only does this imply that the residuals have a symmetrical distribution, but it also suggests that the model provides a good overall fit to the data, even though some of the forecasts deviate significantly from the values that were seen. Based on this exhaustive analysis of the residuals, it would appear that the model produces satisfactory results in the majority of situations. Nevertheless, the occurrence of larger residuals in particular instances may necessitate extra inquiry to improve the accuracy of the model.



**Figure 4. Predicted Values vs. Standardized Residuals**

**5. Discussion**

The multiple regression study of Afghanistan's wheat imports reveals the complex interplay of economic, demographic, and policy causes. Global wheat prices, GDP growth rates, domestic wheat prices, Afghanistan's export policy, wheat import tariff rates, the political stability index, exchange rates, consumption growth, and trade policies were all examined in this analysis. Regression coefficients, t-statistics, significance levels, collinearity statistics, R-squared values, and ANOVA were used to examine the variables. The data show the complexity and interrelationship of the factors affecting Afghan wheat imports. The regression analysis shows that GDP growth, domestic wheat prices, and consumption growth positively and statistically significantly affect wheat imports(Eckhardt et al., 2022). A 1% increase in GDP increases wheat imports by 24.764 metric tons. Since economic theory states that economic growth increases purchasing power, import demand for essential commodities like wheat rises(Han & Ahn, 2015)

According to the substantial literature on international trade, economic expansion increases a nation's demand for imports, especially in sectors where domestic output fails to meet rising consumption. Global wheat price increases affect wheat imports because they correlate positively with domestic wheat prices(Nwoko et al., 2016; Pal, 2023). This data shows that the domestic wheat price and the wheat import tariff rate are directly related as a rising population needs more wheat to meet food consumption needs. The Global Wheat Price and the domestic price of wheat imports are closely related, with research showing that nations with rapid population growth often struggle to find local wheat prices, increasing their dependence on imports. Increased wheat consumption boosts demand, suggesting that diet changes and income levels are driving wheat imports. According to study, when incomes rise, individuals eat more variety and better cuisine, often relying more on foreign commodities.

Along with Exchange Rate, Trade Policies, and Political Stability, wheat import tariffs are variables. Improving water resources reduces the need for wheat imports by increasing domestic wheat production. This discovery supports research showing that water management is crucial to agricultural productivity, especially in arid and semi-arid regions where water scarcity can reduce crop yields(Neik et al., 2023). Dry spells require more wheat imports to make up for lower home production. In other desert regions, catastrophic weather events can reduce agricultural yields, necessitating increased imports to ensure food security(Raoufi et al., 2023). Political factors also affect Afghan wheat imports. In combat zones like Afghanistan, a stable political climate improves trading conditions, as shown by the positive political stability index coefficient. Stable political environments improve import procedures and access to international markets, which is essential for food security in places with low domestic production(Neik et al., 2023; Ogunmola et al., 2023) The report also emphasizes trade policy' impact on wheat imports. The positive link between open trade policies and wheat imports shows how trade liberalization ensures food availability through imports. According to international trade literature, free trade policies increase cross-border goods mobility, reducing food shortages and stabilising local prices(Radmand et al., 2023). The study examines how global wheat prices affect import quantities. Despite the negative coefficient for global wheat prices, which shows that higher international prices reduce import volumes, its 10% statistical significance indicates a moderate association. Wheat imports in Afghanistan are price sensitive, and rising world prices may limit import capacity due to budgetary constraints (Ahmed et al., 2023). Wheat import price elasticity is especially important in low-income countries, where rising food prices can threaten food security and increase poverty and malnutrition(Modasir et al., 2023). Afghanistan's export strategy is inversely correlated with wheat imports, demonstrating that domestic food security reduces imports. This finding supports Black's (2021) and Sen (1981) claim that domestic food security can reduce reliance on unstable international markets. Increased domestic food production and food security reduce import dependence and global market volatility's implications on food accessibility and pricing. The regression model's high R-squared value of 0.961 and modified R-squared value of 0.961 show that it accounts for almost 97% of wheat import variance. The Durbin-Watson score of 1.042 implies low autocorrelation, boosting the model's credibility(Mohamed et al., 2023; Rabieyan et al., 2023). However, the variance inflation factors (VIF) show moderate multicollinearity across Afghanistan's export strategy, exchange rate, and consumption growth. Although VIF values are below 10, their moderate levels suggest explanatory factor redundancy, which may inflate coefficient standard errors. To improve model predictions and accurately depict variable relationships, multicollinearity must be mitigated(Wang et al., 2024). The residual analysis shows that the model's predictions are mostly well-distributed around the observed values, with residuals from -612.534 to 912.564 and a mean residual of zero. The residuals' standard deviation (391.242) indicates moderate dispersion, indicating that the model's predictions are mostly accurate, but a few instances have bigger variations(Hekmat et al.; Khasanov et al., 2023; Samim et al., 2023). Standardized residuals from 2.636 to 3.853 are within acceptable thresholds, indicating a good model fit to the data. Greater residuals in some circumstances suggest that the model may not fully capture wheat import dynamics, identifying areas for improvement.

**6. Conclusion**

The 1996–2023 analysis of Afghanistan's wheat imports shows a complex interaction of factors that continue to impact the country's dependence on foreign wheat. This result shows Afghanistan's agriculture sector's many challenges and prospects, particularly wheat production and import dependency. Afghanistan's 2023/24 marketing year wheat import requirement of 3.5 million tons highlights the large discrepancy between domestic output and consumption. This dependency is caused by economic, environmental, and political issues that affect food security and economic stability. Economic factors include GDP growth, export policy in Afghanistan, wheat tariff rate, and Exchange Rate affect wheat import volumes. Afghanistan's economy and population are growing, increasing wheat imports. Despite improvements, the country's agricultural capacity is insufficient to satisfy increased wheat consumption, exacerbating this trend. Global Wheat Prices hinder domestic wheat prices, increasing import dependency. Agriculture has suffered from unpredictable conflict patterns like droughts and brutal war. Climate change's influence on wheat agriculture highlights the need for climate-resilient farming and improved agricultural technologies. Illicit poppy production often outperforms wheat in economic viability, according to the study. Afghan farmers suffer economic hurdles and food security issues due to this rivalry. Creating sustainable economic alternatives and expanding market access for lawful crops are needed to solve this problem. Political stability and trade policies affect wheat imports. More free trade policies have increased imports, providing food security during domestic shortages. Afghan imports are vulnerable to worldwide market fluctuations, as seen by the negative impact of global wheat prices on import volumes. Despite these obstacles, the research finds many ways to boost Afghanistan's wheat production and reduce imports:

* Improving seed varieties, irrigation systems, and farming methods to boost domestic wheat production.
* Climate-adaptive measures to reduce weather variability's impact on crop output.
* Diversifying agriculture to reduce illicit crop cultivation and promote viable economic alternatives.
* Enhancing infrastructure and market access to increase food delivery and minimize regional food insecurity.
* Maintaining foreign support and investment in Afghanistan's agricultural sector for sustainability and resilience.

Satellite imagery shows that key wheat planting regions are shifting from east to west, indicating the necessity for focused regional development strategies to enhance wheat output nationwide. Addressing economic volatility and boosting household food and income availability are also vital to minimizing import dependency. Wheat import commerce and local production in Afghanistan are difficult, although there are prospects for improvement. Policymakers, international organizations, and local stakeholders must collaborate to address these multifaceted factors. Afghanistan can reduce its wheat imports and improve food security by strengthening domestic production, climate resilience, and sustainable economic options. Policymakers and stakeholders seeking long-term food security and economic stability in Afghanistan must consider this study's conclusions. Long-term progress toward agricultural self-sufficiency and food security in Afghanistan requires ongoing research on these determinants and strategy success.

 **RECOMMENDATION**

As a recommendation, it is essential to implement key measures to strengthen food security, including the creation of standardised wheat storage facilities, reduction of customs duties, and improvement of transport infrastructure. additionally, restricting the import of foreign wheat and accelerating domestic production will enhance self-sufficiency. Supporting farmers through financial aid, service and access to essential agricultural materials is crucial for boosting productivity and ensuring long-term agricultural sustainability

**ABBREVIATION**

GDP (Gross Domestic Product)

WI (Wheat import)

MMT (Million Metric Tons

MT (Metric Tons)

KG (kilograms)

AFN (official currency of Afghanistan)

IPC (Integrated Food Security Phase Classification)

WFP (World Food Programmers)

WTO (World Trade Organization)

USD (United States Dollar)

ITC (International Trade Centre)

ADB (Asian Development Bank)

FAO (Food Agriculture Organization)

GWP (Global wheat price)

EXR (Exchange Rate)

TRWI (Tariff rate wheat import)

GDPGR (GDP Growth Rate)

EDA (exploratory data analysis)

VIF (variance inflation factors)

ANOVA (Analysis of Variance)

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