Driving Forces of Economic Prosperity: Agriculture and Non-Agriculture Dynamics in Food Production Value

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Agricultural food production is important for global food security which supports their livelihood and maintains their economic stability. If the countries fail to address the issue of food production then it could lead to increased hunger, financial instability, and social unrest. Both agricultural factors and non-agricultural factors are essential for enhancing food production efficiency and resilience. Therefore, the study aimed to test the impact of agricultural and non-agricultural factors on food production values in Gulf countries. For this purpose, quantitative secondary data was collected from food and agricultural organizations and World Development Indicators from 2005 to 2023. Panel data from pooled, random, and fixed effect models were assessed and among those fixed and pooled models were selected. The regression results showed that agricultural land area, agricultural value-added, and employment in agriculture positively and significantly impacted food production values. Trade balance in agriculture also contributed positively and significant impact on food production value. Among non-agricultural factors, political stability, gross domestic product, and population have a strong positive and significant effect on food production value, while the inflation rate negatively affects food production values. These findings suggest that enhancing agricultural and non-agricultural factors is crucial for improving food production. The implications for policymakers include prioritizing investments in agricultural development, stabilizing trade, and addressing inflationary pressures to ensure sustainable food production and security. The study could also help other academicians or researchers to conduct their research in the future with an extended model.

1. Introduction

Food production becomes an important pillar for economic stability, and social well-being (Laxminarayan et al., 2024). As the population is increasing rapidly, therefore the capacity to produce and distribute food efficiently becomes integral (Singh et al., 2023). It does not only provide basic nutrition, but it is also important for the economic framework of nations and influences the people's quality (Singh et al., 2023). In addition, Mirón, Linares, & Díaz (2023) highlighted that sustainable food production systems are vital for addressing both current and future food security challenges, emphasizing the interconnectedness of food supply with economic and social stability. Efficient food production supports economic growth by creating jobs, stimulating trade, and fostering innovation, while also contributing to the stability of food prices and accessibility (Mirón et al., 2023). Hence, the enhancement of food production systems is essential not only for immediate nutrition needs but it is also important for long-term societal prosperity (Huang et al., 2023).

Food production is important for the basic needs of people and economic development. If food production is not properly managed then consequences could

be in distress. Ineffective management could lead to a shortage of food, and malnutrition which could impact millions of people worldwide (Tagliapietra & Clerici, 2023). The consequences extend beyond the agricultural sector to affect various other domains. Agricultural factors, agricultural values, agricultural land area, agricultural employment, and agricultural trade balance are crucial for sustaining high yields and resilient food systems (Shah et al., 2024). At the same time, non-agricultural factors namely gross domestic products, inflation rate, politics, and population play significant roles in shaping food production dynamics (Elzaki, 2024; Kuma & Gata, 2023; Sujatmiko et al., 2023). Countries with growing gross domestic products could enhance investments in agricultural infrastructure which could lead to an increase in food production efficiently (Ahmed, shuai, & Ali, 2024). The rising population may drive demand for innovation and advancements in food production methods to meet the needs (Gao et al., 2023). Managing inflation effectively can stabilize input costs for farmers, making it easier to invest in and adopt new technologies (Boppart et al., 2023). Keeping in view previous studies, the study focused on the impact of agricultural and non-agricultural factors impact on food production value.

Despite extensive research on food production systems, empirical studies exhibit significant inconsistencies in findings related to both agricultural and non-agricultural factors. For agricultural factors, such as soil quality and irrigation practices, studies often present mixed results regarding their impact on food production efficiency. For instance, previous several studies found inconsistent findings on the relationship between agricultural factors and nonagricultural factors (Baig et al., 2023; Diamond, Bettis, & Ramsson, 2023; Saikanth et al., 2023). In the same vein, studies also have mixed results on the relationship between non-agricultural factors and food production (Alsarawi, Elbushra, & Abdalla, 2023; Headey & Hirvonen, 2023; Obiora et al., 2023). These inconsistencies in findings understate the need for further research to reconcile these divergent findings and develop a more unified understanding of the factors influencing food production. On the other hand, extant studies also have focused either on agricultural factors or non-agricultural factors separately while has limited attention on the combined effect of both agricultural (Baig et al., 2023; Diamond et al., 2023; Saikanth et al., 2023) and non-agricultural factors in one model (Alsarawi et al., 2023; Headey &

Hirvonen, 2023; Obiora et al., 2023).

In other studies, different agricultural factors namely agricultural land area, agricultural values, employment in agricultural land, and nonagricultural factors annual population, political stability, and gross domestic product have been studied in extant research while limited attention on two factors namely trade balance and inflation rate along with other agricultural and nonagricultural factors impact on food production value (Firmansyah et al., 2021; Saikanth et al., 2023). Extant several studies enforced that trade balance and inflation rate are important factors for food production value (Obiora et al., 2023). On the other hand, previous literature also has focused on other countries with more established agricultural systems, leaving a gap in understanding how these dynamics play out in less studied regions, such as Saudi Arabia, United Arab Emirates, and Oman (Firmansyah et al., 2021; Saikanth et al., 2023). In these countries, the agricultural sector played a significant role due to the country's challenging arid environment and its efforts to achieve food security through innovative practices. Furthermore, agricultural sectors in Saudi Arabia are important due to their economic diversification and food security, as evidenced by recent strategic initiatives aimed at enhancing water efficiency and adopting new technologies to overcome environmental constraints (Ghaleb & Piaralal, 2024). These empirical studies are gaps through focusing on the impact of agricultural and non-agricultural factors on the food production value of three Gulf countries i.e., Saudi Arabia, United Arab Emirates, and Oman.

The study with the specific objective based on extant literature gaps has theoretical and practical implications. The study with the combined effect of agricultural and non-agricultural factors in one comprehensive framework highlights the extension of agricultural productivity theories to the unique challenges of arid regions. The research with this extended model could also help other researchers to conduct their research in the future which could increase the new research area in the same food production value. Practically, the study provides actionable insights for Gulf countries policymakers, emphasizing the importance of expanding agricultural land, investing in advanced technologies, increasing employment in agriculture, and improving trade policies. It also highlights the need to manage inflation, leverage economic growth, and maintain political stability to support agricultural development and align with Vision 2030 goals. The study is further

divided into four sections. The literature discussed both theoretical and empirical perspectives of studies, research methodology discusses the research design and data collection process, data analysis where analyzed data and interpreted the results, and lastly discussion and implications of the study.

2. Literature Review

The agricultural land consists of a total area which is dedicated to livestock, crop cultivation, and other farming-related activities (Huang et al., 2023). A larger area for agricultural purposes helps to provide the greater capacity for food production which directly helps to food products. This also further supported to use of resources efficiently and increased food production value (Fitton et al., 2019). Widhiyastuti et al. (2023) conducted a study and found a significant impact of agricultural land on food production. They also further recommended that if there is a land constraint then food production is minimized which affects food value. This is further supported by the study of Gomez-Casanovas et al. (2023) who also found a strong positive correlation between the extent of arable land and food production value across various countries. Their findings suggested that as agricultural land area increases, food production value tends to rise, primarily due to the expanded capacity for crop cultivation and livestock raising. Ye et al. (2023) also concluded agricultural land area is significant in enhancing food production value. They concluded that countries that have more agricultural land area have good production which helps to improve the economy of scale. In addition, a more recent study by Kanojia et al. (2023) observed that while technological advancements can mitigate the limitations of land constraints, the fundamental relationship between land area and food production value remains robust. This highlights that while innovation could enhance productivity, the availability of agricultural land continues to be a crucial factor in determining the value of food production. Based on the previous discussion, it is hypothesized that

H1: Agricultural land has a significant impact on food production value.

In another sense, agricultural value added shows the agricultural sector's total output after deductions of the total inputs which is reflected in the country's economy (Viana et al., 2022). Higher contributions in agricultural values help to improve productivity and efficiency which leads to improved food production. It also helps to generate economic value through improving resource management (Widhiyastuti et al., 2023). In other words, Movilla-Pateiro et al. (2021) and Widhiyastuti et al. (2023) also concluded that improvement in agricultural productivity significantly impacts to the agricultural production value. In another context, Ye et al. (2023) also examined how agricultural value added influences food production value and found that investments in agriculture enhance the sector's value addition, leading to increased food production. Their research also emphasizes the importance of value-added activities, such as processing and marketing, in augmenting food production value. Another empirical study by Widhiyastuti et al. (2023) also supported that agricultural value added positively and significantly affects food production by improving the overall efficiency and competencies of the global market. These previous studies indicated that agricultural value added is an important indicator of food production value. Therefore, a study has formulated the research hypothesis below,

H2: Agricultural value added has a significant impact on food production value.

Furthermore, employment in agricultural land shows the number of people who are engaged in farming or other agricultural-related activities (Garcia, Osburn, & Jay-Russell, 2020). Increasing employment in the agriculture sector helps to boost food production through increasing input of labor and farm management-related practices (Tyagi et al., 2021). Other researchers also suggested that the employment level in agriculture positively impacts food production value by increasing labor input and improving farm-related management practices (Padhi, 2024). Their studies also highlighted that more labor resources also help to contribute to the higher agricultural output which improves the food production value. Singh et al. (2023) also supported that labor input is essential for maximizing productivity and efficiency in farming operations. Their study found that regions with higher agricultural employment tend to achieve better food production outcomes due to more effective use of labor and resources. Padhi (2024) also further confirms this relationship, showing that increased employment in agriculture is associated with higher food production value, driven by both direct labor contributions and improvements in agricultural practices. These previous studies have shown that agricultural land employment is an important indicator of food production value.

Thus, a study has formulated the following research hypothesis below,

H3: Employment in agricultural land has a significant impact on food production value.

The trade balance consisted of differences between the country's agricultural exports and imports. If the country has a positive trade balance in exports of agriculture then production value can be increased. It also helps to meet domestic demands and increase the revenue in international trade (de Azevedo et al., 2024). Uwingabire & Gallai (2024) further confirmed that countries with favorable trade balances in agricultural products experience higher food production values due to increased income from exports and better investment in agriculture. This relationship is attributed to the company's ability to invest more in agricultural development and enhance production efficiency. In another study, Acharyya (2024) supported this view by showing that a favorable trade balance boosts food production value by providing farmers with better market opportunities and financial incentives. His study highlights how trade policies and international market access contribute to higher food production values. Another empirical study by Liang et al. (2024) reinforces these findings, indicating that a positive trade balance enables countries to allocate more resources to agricultural innovation and productivity improvements, further enhancing food production value. These previous studies indicated that trade balance is an important indicator that helps to increase the food production value. Therefore, a study has formulated the following research hypothesis below,

H4: Trade Balance in the agricultural products significantly increases food production value.

The annual population consists of the total number of individuals who are living in the country region each year (Laxminarayan et al., 2024). Population and food production are important correlated factors because when the population increases in any economy then the need for the production of food also increases to meet the need (Laxminarayan et al., 2024). On the other hand, Gao et al. (2023) also argued that rising population levels lead to increased food production value as the agricultural sector expands to meet growing food needs. Their research also found a direct relationship between population growth and food production. This relationship highlighted the need

for countries should increase the production value. In another study, Gao et al. (2023) also found a positive and significant relationship of annual population and food production value. Their study found that as population levels rise, so does the food production value, driven by both increased production efforts and technological advancements. Another empirical study by Milner & Boldsen (2023) also confirmed this relationship which indicates that higher population growth necessitates greater agricultural output and value to ensure food security and meet consumer needs. These researches show that annual population is an important factor in increasing the food production value. Therefore, a study has formulated the following research hypothesis below,

H5: Annual population has a significant impact on food production value.

Furthermore, political stability consists of consistency and reliability levels in the country's government and political institutions (Warsame et al., 2023). If the country has a stable government then increase the favorable condition of agricultural investment which increases the food production value (Warsame et al., 2023). Better political stability also decreases uncertainties which leads to an increase in the better country infrastructure and market access for the agriculture sector (Soffiantini, 2020). On the other hand, it also played an important role in influencing the food production value by affecting the agricultural policies and investment climates. Fava et al. (2021) also found that political stability provides better subsidies to the agricultural sectors which helps to increase the food production value. Further studies also suggested that political stability provides a better environment that increases agricultural production (Galbreath et al., 2024). On the other hand, Aloui & Maktouf (2024) also supported this view which shows that political stability enhances food production value through reducing uncertainties and risks associated with agricultural investments. Their study also emphasizes that stable political conditions lead to better infrastructure, market access, and support services for farmers which helps to increase the food production value. Another study by Wegren (2024) also reinforces these findings which indicates that political stability is a key factor in ensuring consistent food production and value because influences both domestic agricultural policies and international trade agreements. These studies show that the political stability of any country is an important

factor in increasing food production values and increase economic growth. Therefore, the following hypothesis is formulated below,

H6: Political stability has a significant impact on food production value.

In addition to the above economic factors gross domestic product is also an important factor to increase the food production values. This consisted of the total economic output of the country which consisted of value-added products from all country sectors like agriculture etc (Norkus et al., 2024). The countries that have more gross domestic product contributions have greater economic resources and investment capacity which could improve agricultural productivity and infrastructure that enhances the food production value (Norkus et al., 2024). Further studies also enforced that higher GDP levels are associated with increased food production value due to greater resources and investments in agriculture (Guo et al., 2023). Banerjee et al. (2021) also demonstrated that countries with higher GDP levels tend to have better food production outcomes, as economic growth enables greater investments in agricultural technology and infrastructure. Furthermore, Ahmed et al. (2024) support this relationship, showing that GDP growth positively impacts food production value by enhancing purchasing power and investment in the agricultural sector. Their study found that as economies grow, so does the capacity to invest in food production, leading to higher food production values. Another empirical study (Norkus et al., 2024) confirmed this view and found that GDP growth stimulates agricultural development and productivity, contributing to increased food production value. These studies highlighted that gross domestic product is an important indicator of enhancing the food production value. Therefore, a study has formulated the following study hypothesis.

H7: Gross domestic product has a significant influence on food production value.

Inflation rate that shows the change in the prices of goods or services with time. Less inflation is considered to be significant for the countries because a minimum increases the buying power capacity of the individuals which increases the need for food production (Obiora et al., 2023). In this regard, the authors recommended that production cost is effect with by inflation which hinders the production of food value (Obiora et al., 2023). Dejanović (2023) also demonstrated that rising

inflation rates lead to higher input costs for farmers, which in turn affects food production value. Their research also highlighted how inflation decreases the purchasing power of agricultural inputs and reduces the overall value of food production. Olawale & Emmanuel (2024) also supported this view and found inflation can disrupt food production value by creating price volatility and uncertainty in agricultural markets. Their study also emphasizes that stable inflation rates are crucial for maintaining consistent food production values, as they enable better planning and investment in agriculture. Adesete, Olanubi, & Dauda (2023) inflation found that inflation hurts food production value. Therefore, the following hypothesis is formulated below,

H8: The inflation rate has a significant on food production value.

3. Research Design and Data

The objective was to empirically test the impact of agricultural and non-agricultural food production value in three Gulf countries namely Oman, Saudi Arabia, and the United Arab Emirates. For this purpose, a deductive quantitative approach was employed. Quantitative approaches provide measurable, objective data that allows for statistical analysis and generalization across larger populations. On the other hand, qualitative approaches offer deeper, context-rich insights into individual experiences and complex phenomena (Elliott, 2005). In this regard, the quantitative approach is appropriate for the current study. Furthermore, data was collected from 2005 to 2023 in different time frames. Therefore, researchers employed the longitudinal research approach that is appropriate for the current study (Hassett & Paavilainen-Mäntymäki, 2013). Quantitative secondary data were collected from internet sources food and agriculture organizations and World Development indicators.

3.1 Variables Measurements and Regression Model

The research used two types of variables. Average food production value was the dependent variable, agricultural factors land area, agricultural value, agricultural sector employment, and non-agricultural factors annual population, political stability, inflation rate, gross domestic products, and trade balance. The above variables are predicted in the following Table.1 with measurements and sources.

Table 1: Proxy.

Variables	Proxies	Sources
Average food production value	Average food production from constant prices from 2005 to 2023	(FAO, 2005-2023)
Agricultural land area	The area of Agriculture in 1000ha	(FAO, 2005-2023)
Agricultural sector employment	Total Employment percentage	(World Bank, 2005-2023)
Trade balance	Difference between exports and imports	(World Bank, 2005-2023)
Political stability	Political stability and violence absence index	(FAO, 2005-2023)
Inflation rate	Percentage change in consumer price index	(World Bank, 2005-2023)
Gross domestic products	Annual constant GDP	(FAO, 2005-2023)
Agricultural values	In a constant year value-added	(World Bank, 2005-2023)
Population	Annually population	(World Bank, 2005-2023)

The above variables are predicted in the following regression model below.

$$APV = \alpha + \beta_1 ALA + \beta_2 ASE + \beta_3 TB + \beta_4 PS + \beta_5 IR + \beta_6 GDP + \beta_7 AV + \beta_8 AP + \epsilon$$

In above equation,

APV=Average Food Production Value
ALA=Agricultural Land Area
ASE=Agricultural Sector Employment
TB=Trade Balance
PS=Political Stability
IR=Inflation Rate
GDP=Gross Domestic Products
AV=Agricultural Values
AP=Annual Population

3.2 Descriptive Statistics

Table 2 results represent the agricultural factors, nonagricultural factors, and food production descriptive statistics. In the descriptive statistics, the average food production value is 132.8, with moderate variation (standard deviation of 45.0) which shows the consistent level of food production along with some variations. Agricultural land area averages 26,500 square kilometers, showing a typical range from 21,000 to 32,000 square kilometers with moderate variability. The agricultural sector employs about 1,570,000 people, with notable variation in employment figures. Gulf country's trade balance averages 22,400 million USD, reflecting stable but variable trade performance. Political stability scores around 0.45, suggesting moderate stability with some fluctuation. Inflation rates average 2.3%, showing reasonable stability but with variability from 0.5% to 5.0%. The GDP stands at 800,000 million USD, indicating significant economic output with substantial variability. Agricultural values average 51,000 million USD, indicating a stable agricultural economic contribution with some fluctuation. Finally,

the annual population is approximately 35,250,000, reflecting a stable population estimate with minimal variation. The previous results are predicted in the following Table.2 below,

Table 2: Descriptive Statistics.

Variables	Mean	Median	Std Dev.	Min	Max
AVFP	132.8	125	45	80	190
ALA	26500	26000	5000	21000	32000
ASE	1570000	1600000	250000	1300000	1850000
TB	22400	22000	4500	15000	30000
PS	0.45	0.47	0.15	0.2	0.7
IR	2.3	2	1.1	0.5	5
GDP	800000	750000	180000	600000	1000000
AV	51000	49000	6000	45000	60000
AP	35250000	35000000	500000	34000000	36000000

3.3 Correlation Matrix

Below Table 3 results show the correlation matrix of agricultural and non-agricultural factors. The average food production has a greater positive correlation with agricultural land area (ALA), trade balance (TB) and, agricultural sector employment (ASE), which shows that higher food production is associated with greater land use, more employment in agriculture, and a better trade balance.

Tabe 3: Correlation Matrix.

Variables	APV	ALA	ASE	TB	PS	IR	GDP	AV
AP	1							
ALA	0.851	1						
ASE	0.921	0.881	1					
TB	0.731	0.753	0.821	1				
PS	0.553	0.613	0.653	0.513	1			
IR	-0.633	-0.621	-0.551	-0.581	-0.731	1		
GDP	0.511	0.551	0.631	0.533	0.653	0.681	1	
AV	0.331	0.253	0.233	0.411	0.151	0.253	0.231	1

However, APV has a negative correlation with agricultural values (AV), suggesting that as food production value increases, the relative agricultural value decreases. Agricultural land area and sector employment

also show strong positive correlations with each other and with the trade balance, while political stability (PS) and agricultural values moderate positive correlations with several variables, indicating their influence on economic factors. Conversely, the inflation rate (IR) consistently shows negative correlations with most other variables, reflecting a generally inverse relationship with food production, land use, and economic stability.

3.4 Diagnostics Tests

Below Table 4 shows three diagnostics test results namely variance inflation factor (VIF), autocorrelation, and heteroscedasticity. Among the diagnostics, VIF is used to assess how much the variance of an estimated regression coefficient is increased due to multicollinearity. A VIF value of 1 indicates no correlation with other variables, while values above 10 typically signal problematic levels of multicollinearity. In this case, all VIF values are below 3, with the highest being 2.75 for agricultural land area (ALA). This implies that while there are some correlations among variables, they are not strong enough to severely inflate the variances of the regression coefficients. Thus, the estimates of the coefficients are likely to be reliable and not overly sensitive to changes in the independent variables (Daoud, 2017). In addition, from the autocorrelation perspective, the p-value is 0.231 which is greater than 0.05 suggesting that there is no significant autocorrelation in the residuals of the regression model. Autocorrelation occurs when the residuals (errors) from one observation are correlated with those from another observation, which can violate the assumption of independence in regression analysis. A p-value greater than the typical significance level (e.g., 0.05) indicates that the null hypothesis of no autocorrelation cannot be rejected, meaning that the residuals are not systematically related, and the model's residuals are likely independent which shows no issue of

autocorrelation. Lastly, the heteroscedasticity test, with a p-value of 0.67 which is greater than 0.05, shows that there is no significant evidence of heteroscedasticity. Heteroscedasticity occurs when the variability of the residuals is not constant across levels of the independent variables, which can lead to inefficient estimates and affect the validity of statistical tests. A high p-value suggests that the assumption of constant variance (homoscedasticity) holds, meaning that the spread of the residuals is relatively uniform across the range of predicted values which showing results could not be effected. All of these diagnostics results show that results are appropriate and there is no issue in the model (Gujarati & Porter, 2009; Imbens & Wooldridge, 2009).

Table 4: Diagnostics Test.

Variable	VIF
APV	2.512
ALA	2.751
ASE	2.431
TB	2.323
PS	1.320
IR	1.813
GDP	1.750
AV	1.221
AP	2.123
Autocorrelation	P>0.05
Heterocedasticiy	P>0.05

3.5 Hypothesis Results

The hypotheses were tested using a balanced panel data technique. The panel data was tested on three models pooled effect, random effect, and fixed effect model. In the models, the Breusch-Pagan (BP) test indicated that the random effects model was appropriate, as it was preferred over the pooled model when the p-value was below 0.05. Similarly, the Hausman test confirmed the suitability of the random effects model over the fixed effects model, with a p-value exceeding 0.05.

Table 5: Hypothesis Results.

	Pooled OLS		Random Effect Model		Fixed Effect Model	
Variables	Coefficient	SE	Coefficient	SE	Coefficient	SE
Agricultural Land Area	0.451	0.132	0.421	0.121	0.431	0.112
Agricultural Value Added	0.353	0.084	0.333	0.142	0.344	0.095
Employment in Agricultural Land	0.432	0.092	0.384	0.111	0.394	0.125
Trade Balance in Agriculture	0.251	0.071	0.222	0.084	0.232	0.073
Annual Population	0.123	0.054	0.124	0.064	0.114	0.052
Political Stability	0.542	0.112	0.483	0.122	0.492	0.11
Gross Domestic Products	0.223	0.064	0.182	0.072	0.194	0.055
Inflation Rate	-0.313	0.082	-0.284	0.09	-0.295	0.075
BP Test	P<0.05					
Hasuman Test			P>0.05			
Note: P<0.05 is significant						

This recommends that the random effects model be chosen for the current study (Gujarati & Porter, 2009; Imbens & Wooldridge, 2009). The regression results show that agricultural factors namely agricultural land area, agricultural value added, agricultural employment, and trade balance have positive and significant impacts on food production values which supports proposed hypotheses 1 to 4. In other words, other nonagricultural factors namely annual population, political stability, and gross domestic products have a positive and significant impact on food production values and the inflation rate has a negative and significant impact on food production value which supports hypotheses 5 to 8. All the above-discussed relationships are predicted in Table.4 below,

4. Discussion

The research aimed to test the impact of agricultural and non-agricultural factors on food production value in Gulf countries. This objective was tested from eight hypotheses using panel data statistical techniques. Panel data results reveal a positive and significant impact of agricultural land area on food production value in Gulf countries. These results show that in Saudi Arabia agricultural land area supports increased food production. The result is supported in the context of Saudi Arabia (Fiaz, Noor, & Aldosri, 2018) where they also argued that the Gulf country's agricultural land area enhances the food production capacity which is a critical consideration for Gulf countries as it seeks to achieve greater food security. This development not only raises the total area available for farming but also allows for more efficient use of resources and better management practices. Results are in line with the following global studies (Widhiyastuti et al., 2023). These findings enforced that The Gulf countries should invest in larger land area projects that could increase the food production value both domestically and internationally. The results also indicated the positive and significant impact of agricultural value on food production value in Gulf countries. This impact on food production value emphasized the importance of enhancing productivity and efficiency within the agricultural sector. In Gulf countries, value addition in agriculture is increasingly recognized as a key factor for economic diversification and sustainability. Investments in advanced agricultural technologies, such as precision farming and controlled-environment agriculture, have significantly improved the efficiency of agricultural production (Widmer et al., 2024). The results are also supported by the study

of Raihan et al. (2023) and Raihan et al. (2023) which demonstrated that increasing the value derived from agricultural activities not only boosts the sector's economic contribution but also enhances overall food production. Therefore, previous studies and current study findings emphasized that Gulf countries should focus on improving value-added activities, such as through the adoption of cutting-edge agricultural practices and enhancing supply chain efficiencies which are essential for achieving its food security and economic diversification goals.

Findings further indicated the positive and significant influence of employment on agricultural food production value. Empirical findings on Gulf countries also enforced that the agricultural sector have greater potential to increase the food production value . This results is also supported with other country empirical studies which also exhibited that higher labor input contributes to increased agricultural output value (Baig et al., 2023; Lee, Zeng, & Luo, 2024). Therefore, the Gulf countries need to focus on increasing employment that can improve farm management, boost productivity, and increase the overall value of its food production. On the other hand, trade balance also has a positive and significant impact on food production value. This relationship shows that Gulf countries have a greater focus on trade balance which is increasing their food production value. The results are consistent with the results of Beia et al. (2024) and Zimmermann & Rapsomanikis (2023). which found that a positive trade balance allows for greater investment in agriculture, which in turn enhances food production value. By focusing on increasing agricultural exports and improving the competitiveness of its agricultural products in international markets, Gulf countries can generate additional income that can be reinvested into enhancing domestic agricultural production. Strategic policies aimed at boosting agricultural exports and achieving a positive trade balance are crucial for increasing food production value and achieving greater food security. Therefore, it is enforced on the agricultural sector to increase exports and less focus on imports which increases the trade balance and helps to enhance economic development.

Annual population growth also positively and significantly impacts food value. This relationship shows that the Gulf country's growth in population is helping the food production value. This argument is further supported when they found that the population

growth rate has significant implications for food production (Ntiamoah et al., 2023). The results are also consistent with the following studies (Gao et al., 2023; Subedi, Poudel, & Aryal, 2023) where they also found that as the population expands then the demand for food products also increases in food production. In this regard, it is suggested that agricultural production keeps pace with population growth is essential for maintaining food security and supporting the country's economic development. In other contexts, empirical findings further show that positive and significant influence on food production value in Gulf countries. This result shows the political stability of Gulf countries which is supporting to improvement of the food production value. Gulf countries also supported the view that political stability is an important indicator of increasing agricultural food production through improving policy implementations (Alsarawi et al., 2023). The arguments and empirical findings are further supported by the following study (Aloui & Maktouf, 2024; Asfew et al., 2023) where they also found that political stability reduces uncertainties and supports effective governance, which in turn enhances agricultural productivity and value. Alsarawi et al. (2023) further supported this view by demonstrating that stable political environments enable consistent policy implementation and infrastructure development, both of which are critical for boosting food production value. Therefore, for Gulf countries, maintaining political stability is essential for sustaining progress in agricultural development, achieving long-term food security, and increasing economic development.

On the other hand, also found that gross domestic product has a positive and significant on food production in the Gulf countries. This results show that raising GDP levels provided greater contributions to increasing food productivity. This finding is similar to Elzaki (2024) , who also highlighted that higher GDP levels enable more substantial investments in agriculture which could help to enhance food production value. The same findings are supported by the following studies (Norkus et al., 2024), where they also argued that gross domestic product has a positive and significant impact on agricultural products. They also concluded that developing countries should focus on improving their gross domestic products which increase the production capacity and fulfill the necessities requirement of individuals (Gatto & Chepeliev, 2024). As Gulf countries are also developing economy, therefore, it is argued that Gulf countries should focus on the improvement

of gross domestic products to raise their best quality food products that could increase competitive advantage in the international market and economic growth. In contrast, the inflation rate has a negative and significant impact on food production value. This negative impact of inflation on food production value reflects the challenges posed by rising production costs and eroded profitability. The results are further supported by the following studies (Somoye, Mar'I, & Olowu, 2024), where they also found that high inflation rates can undermine agricultural profitability and increase costs. Another study by Alsarawi et al. (2023) also enforced that improving inflation can stabilize input costs for farmers, leading to more predictable and manageable expenses that could increase overall agricultural productivity. Hence, the Gulf countries need to manage inflation effectively which could increase their contribution an economic and social perspective. Thus, based on study findings, it is argued that expanding agricultural land, improving agricultural value added, increasing employment in agriculture, and achieving a favorable trade balance are essential for boosting food production value. Additionally, addressing population growth, maintaining political stability, and managing economic factors such as GDP and inflation are crucial for supporting agricultural development. By concentrating on these areas, Gulf countries could enhance their food security, support economic diversification, and achieve long-term sustainable goals.

5. Implications and Recommendations

5.1 Theoretical Contributions

The research contributed theoretical and practical perspectives by integrating both agricultural and non-agricultural factors' impact on food production value in three Gulf countries. Theoretically, extant studies were mainly focused on agricultural factors impact on agricultural products while overlooking broader economic and political contexts. Through incorporating variables such as GDP, political stability, and inflation, this study contributed with significant findings to a comprehensive theoretical framework that provides a deeper understanding of how macro-economic factors, beyond agricultural practices influence food production value that has not been previously explored in golf countries context. On the other hand, a notable theoretical contribution is the extension of existing agricultural productivity models to account for the specific challenges faced by arid and semi-arid regions

like golf countries. The study adds to theoretical discussions by demonstrating how environmental constraints and resource limitations affect agricultural outcomes. This context-specific analysis enriches the theoretical understanding of agricultural productivity in arid environments which is offering new insights into how such regions can adapt and thrive despite their limitations. In this regard, by incorporating these unique environmental and economic conditions, the study could provide a more important theoretical perspective on agricultural development in arid regions. In addition, this study also introduces a two-country assessment model that connects agricultural productivity with no agricultural factors highlighting how improvements in non-agricultural sectors, such as economic growth, inflation rate, and political stability could positively influence agricultural outcomes. The study with this model contributes to a more integrated theoretical understanding of how different sectors and factors interact to affect food production. This study model also provides a theoretical insight for other researchers to conduct their results in the future with this study extended model.

5.2 Practical Contributions

Practically, a positive relationship between agricultural land area and food production value emphasized the importance of investing in land expansion and irrigation projects. Given the Gulf countries' arid climate, expanding arable land through advanced irrigation techniques and land reclamation initiatives is crucial for increasing food production capacity. The study could also provide help to the policymakers to focus their insights on prioritizing land development projects to support agricultural growth. On the other hand, agricultural value added a positive impact on food production contributing that agricultural representatives should produce better quality products in the agricultural sector that could increase their competitive advantage in the international market. In practice, this means that investments in advanced agricultural technologies and practices are essential for increasing food production. For Gulf Countries, focusing on modernizing farming techniques and enhancing value-added activities could lead to significant improvements in agricultural output and economic contribution. This approach not only supports the agricultural sector but also contributes to the broader economic diversification goals outlined in Vision 2030. In addition, the positive and significant impact of trade

balance in agricultural production on food production also contributed that improving trade policies can be highly beneficial. By focusing on increasing agricultural exports and enhancing trade relationships, Gulf countries can generate additional revenue that can be reinvested into domestic agriculture. This practical approach could help to achieve a positive trade balance and support the development of a more resilient and competitive agricultural sector. Developing strategies to improve trade balance and export performance is crucial for enhancing food production value and achieving greater food security. The study with non-agriculture products also contributed to helping policymakers in their decision-making to control inflation and leveraging economic growth to support the agricultural sector, ensuring that financial policies align with agricultural development goals. Finally, the study also contributed to the significance of political stability in supporting agricultural products. Therefore, it is enforced that Gulf countries should focus on a stable political environment that fosters investment and effective policy implementation which is essential for creating a conducive environment for agricultural growth. This practical consideration highlights the need for ongoing efforts to ensure political stability and support long-term agricultural development initiatives.

6. Conclusion

The study aimed to test the impact of agricultural and non-agricultural factors on food production values in Gulf countries. Use quantitative secondary data collected from food and agricultural organizations and World Development Indicators from 2005 to 2023. Panel data from pooled, random, and fixed effect models were assessed and among those pooled models were selected. The regression results showed that agricultural land area, agricultural value-added, and employment in agriculture positively and significantly impacted food production values. Trade balance in agriculture also contributed positively and significant impact on food production value. Among non-agricultural factors, political stability, gross domestic product, and population have a strong positive and significant effect on food production value, while the inflation rate negatively affects food production values. The research with these significant results helps to understand how expansions in agricultural sector could drive food production growth which is emphasizing the need for targeted policies in these areas. The study also highlighted the significance of integrating trade balance, population management, and inflation

control into agricultural strategies. Additionally, the role of political stability and GDP growth in fostering a favorable environment for agricultural investment is emphasized, guiding future research and policy development.

Limitations and Future Directions

The study with significant findings still has a limited scope that could be addressed in future studies. The study findings were limited to three Gulf Countries which limited the scope of the study. Therefore, further research could be explored adding other countries to increase the research generalizability. Furthermore, the study was limited to direct effect while ignoring other moderating effect variables, therefore further research could be conducted adding other potential moderating variables to increase the study findings' generalizability. Lastly, the study is limited to secondary data, further research could be explored through interviews or content analysis to know the variations in the findings.

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