Journal of Agricultural Science and Technology (2025) Vol. 27 (3): 575-588

Effects of Agricultural Trade Policy on Afghanistan's Food Security

Ayaz Khan Naseri[1, 2], Naser Shahnoushi[1], Arash Dourandish[3]*, Zahra Nematollahi[4] and Zahra Kiani-Feyzabad[3]

ABSTRACT

This study conducted an assessment to gauge the impact of reducing agricultural tariffs across diverse scenarios on both food security and macroeconomic variables in Afghanistan. Utilizing a computable general equilibrium model and Afghanistan's social accounting matrix data, the study simulated reductions in tariffs at 80%, 60%, 40%, 20%, and a complete removal (100%) of tariffs (full liberalization). The findings unveiled a progressive uptick in imports and household consumption of key staples like cereals, fruits, vegetables, and livestock. Crucially, this surge in household purchasing power spurred a heightened demand for food items, consequently, bolstering food security and contributing positively to the overall health of the households and society. Therefore, advocating for targeted initiatives aimed at eliminating tariffs on agricultural products emerges as an imperative step, given their tangible impact on enhancing food security and uplifting societal well-being.

Keywords: Computable General Equilibrium model, Household consumption, Social Accounting Matrix, Tariff.

INTRODUCTION

Trade is a vibrant driver of economic growth and a key form of global and regional economic cooperation. Trade liberalization improves economic and social aspects like living standards and life expectancy (Hemat *et al*., 2023). Trade policies, influenced by various transmission mechanisms, can have distinct effects on economic agents, including tariffs, which influence trade, production, consumption behavior, and the welfare of trading partners and the nations imposing them (Amiti *et al*., 2019). Nearly all economists agree that tariffs have a detrimental shock on economic growth and welfare, whereas free trade and the removal of trade barriers have a beneficial brunt (Initiative on Global Markets, 2016). Tariffs drive demand for domestically produced alternatives by creating a gap between domestic and global costs. Furthermore, an unbalanced tariff system distorts incentives for production and consumption, making it harder for trade partners to realize the benefits of their comparative advantages. Thus, when proper complementary policies such as macroeconomic, social, and labor market reforms are implemented alongside a nondiscriminatory tariff liberalization, then,

[1] Department of Agricultural Economics, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Islamic Republic of Iran.

[2] Department of Agricultural Economics and Extension, Faculty of Agriculture, Kabul University, Kabul, Afghanistan.

[3] Department of Agricultural Economics, Faculty of Agriculture, College of Agriculture and Natural Resources, University of Tehran, Karaj, Islamic Republic of Iran.

[4] Department of Nature Engineering, Shirvan Faculty of Agriculture, University of Bojnord, Shirvan, Islamic Republic of Iran.

* Corresponding author; e-mail: dourandish@ut.ac.ir

if nations impose trade restrictions, tariffs drive up costs and reallocate resources from reasonably efficient to less efficient economic endeavors. It is important to remember that many other policy instruments, other than tariffs, have the potential to impose trade barriers that function similarly to tariffs. These policies increase the cost of products for consumers while decreasing output and employment. Tariffs, in particular, can do this through a number of different means. One potential is that producers and consumers will pay more, as a result of the tariff. Tariffs have the potential to increase the cost of materials and parts, which raises the price of items that employ those inputs and lowers production from the private sector (Arinze and Odior, 2023). A primary goal of the link between nations is the partial or full removal of tariff rates, which were delved into in several studies (Akram *et al*., 2014). Afghanistan has a history of bilateral and multilateral agreements, including membership in the South Asian Association for Regional Cooperation (SAARC). In 2006, the SAARC association signed the South Asian Free Trade Area (SAFTA) to reduce tariffs to 20% by 2007 and zero by 2012 (Nejati *et al*., 2021; SAARC, 2020). Recently, Iran and Afghanistan signed five economic cooperation agreements related to transportation, civil aviation, mining, and free trade zones (Boltuc, 2023). As well, the Afghanistan-Pakistan Trade and Transit Agreement (APTTA), signed in 2010, aimed at enhancing economic integration (Younus and Mustafa, 2021). Despite several agreements, Afghanistan's $4,458 million trade imbalance in 2021 is a major worry due to its heavy reliance on international aid. In the same year, Afghanistan's exports increased by 9.4%, with dry and fresh fruits accounting for 39.1% of total exports. However, the total import of goods declined by 18.8% due to the collapse of the Afghan government, economic contraction, and reduced power consumption (Hemat *et al*., 2023). The country is facing a severe food insecurity crisis, with 44.6% of its population struggling to access enough food due to a combination of climatic, political, and economic shocks (FAO, 2023; IPC, 2023; CSO, 2018). This has caused Afghanistan to rank 109 out of 121 countries in the world in terms of hunger (Global Hunger Index, 2022). Agriculture, which accounts for 25% of Afghanistan's GDP, is vigorous for food security. The domestic food supply cannot fulfill the food demands of the people. As a result, the country relies heavily on imports from neighboring countries to meet its domestic food demands (World Bank, 2020). Rendering the data obtained from the National Statistics and Information Authority (NSIA, 2021), total exports and imports were recoded as US$ 1509.2 million and US$ 6776.8 million, respectively, in 2019. Also, the information from FAO and the World Bank noted that the share of the agricultural sector in the country's total imports was 66% in 2022. Among the agricultural sectors, cereals account for the highest share (13%) of the total agricultural imports, followed by fruits, vegetables, and livestock products. Notably, cereals, constituting a substantial 73% of Afghanistan's calorie consumption, bear significant weight in the nation's food security. About 6.5 thousand tons of cereals are produced in Afghanistan, and the share of wheat is about 5 thousand tons. As well, wheat is the staple food in the country; out of 3.097 thousand tons of cereal imports, about 3 thousand tons belong to wheat. A large number of countries use diverse policy tools to achieve food security. Afghanistan usually imposes import tariffs to regulate the import of various goods, including heavy machinery, automobiles, textiles, and food items. The highest tariff rates are imposed, with rates ranging from 35 to 50% for vehicles and salt, followed by furniture, fruits, nuts, processed marble, and carpets, with rates of 25% (World Bank, 2012).

The increasing interconnectedness of global markets and financial systems has led to countries adopting more open trade policies for economic and strategic reasons. Over the last two decades, Afghanistan's

trade relations with neighboring countries, particularly Pakistan, have elicited mixed reactions. The implementation of the current agriculture import tariff rates (6.12% as an average) has increased market size and met commodity needs, but it has also led to a significant trade deficit and over-reliance on exporting primary products. The Afghan government, despite its 25% GDP share and agricultural advantage, has not taken any significant steps to stimulate investment in this sector. As a result, the country's unsustainable policies have led to an increase in food insecurity. Keeping in mind that food security encompasses food availability, food accessibility, utilization, stability, food agency, and sustainability as proposed by the High-Level Panel of Experts (FAO, 2021). Among these, food availability and food accessibility are the two essential dimensions of achieving food security and other variables are closely connected with them. The availability of food is a function of domestic production, imports, foreign aid, and food stocks. Also, food accessibility is influenced by food prices and household income (Smith *et al*., 2000). Increased income boosts purchasing power, reduces price variation vulnerability, and, ultimately leads to food security for individuals (Laborde *et al*., 2013; Maetz, 2013). This study aims to assess the shock of bringing down agricultural tariffs on food security's two major dimensions, such as food availability and accessibility and macroeconomic indicators, by utilizing the computable general equilibrium model. So far, no domestic study has been done to utilize this model within the agricultural trade. Thus, this analysis intends to fill this gap, take cognizance of these limitations, and use a computable general equilibrium model in estimating and subsequent analysis of the consequences of import tariff dwindling in Afghanistan. The insights will help develop clearer, more practical, and sustainable concepts and models in the future.

A strand of studies is focusing on understanding the economic influence of trade liberalization in the agricultural sector. Many studies use the computable general equilibrium model to judge the impression of import tariff declines. However, no domestic study has practiced the Computable General Equilibrium (CGE) model in agricultural trade, so, this chapter reviews the global literature. Heidari *et al*. (2015) considered the shock of reducing agricultural tariffs on macroeconomic variables using the computable general equilibrium model. The study discovered that a 50% drop in tariffs augmented social welfare and resource allocation efficiency in the agricultural sector and agricultural products. However, upraised demand for skilled and unskilled labor and capital led to higher production factor prices, while the full goal of agricultural tariffs reduced welfare. The efficient allocation of obstacles to welfare became negative, resulting in a lack of resource re-allocation and a decline in welfare. Reducing tariffs on the agricultural sector diminished industrial production to a small extent. Elgaili *et al*. (2015) investigated the impact of wheat import tariff changes on Sudan's GDP, wheat imports, sorghum exports, and domestic production. They invented that falling wheat tariffs leads to enlarged wheat imports, improving GDP, balance of trade, and investment. However, private consumption drops due to cut imports and the domestic output of other agricultural commodities. The study recommends encouraging innovation in the convenience and fast food industries to curb wheat consumption and supporting investment in irrigated agriculture for stable wheat production. Paseban *et al*. (2010) utilized a general equilibrium model to analyze the shock wave of tariff rate falls on the Iranian agricultural sector and their relationship with the global economy. They examined two scenarios: a gradual reduction in tariffs and a unification of import duties. The first scenario displayed a slow surge in imports, dwindled exports, diminished employment, augmented commodity supply, and improved household consumption of

agricultural products. The second scenario exhibited a drop in imports, augmented exports, increased employment, and declined product supply, resulting in reduced household consumption. Peter (2014) scrutinized how agricultural trade liberalization impacts poverty and inequality in Indonesia and Thailand. The results of this study indicated that, in any country with trade liberalization in agriculture, the upsurge in welfare is less than in the case where trade liberalization takes place in general. Also, with unilateral liberalization, domestic prices will fall. In Indonesia, the wages of unskilled laborers are moderated, while in Thailand, this effect is negligible. Because in Indonesia the trend towards unskilled labor is higher, the result of the liberalization of agriculture in both countries is that it reduces urban poverty and rises poverty in rural areas.

Arinze and Odior (2023) conducted a study on the influence of import tariff changes on household welfare in Nigeria using a static computable general equilibrium model. The study examined the shocks of tariff rate reductions, which augmented real income and consumption volume, and surges, which negatively affected welfare. The study utilized four scenarios: a 50 and 20% diminution, a 50 and 100% growth, and simulations based on the annual growth rate of import tariff rates. Results depicted that diminutions in tariff rates positively impressed household welfare, while intensifications had unfavorable effects. The study also found inverse relationships between income and consumption volume.

Valera *et al*. (2024) delved into the effect of border tariffs on the price of staple cereals in developing countries. The study scrutinizes the influence of abolition of border tariffs on staple cereal prices in 27 countries and 8 regions. The results illustrated that when border tariffs were removed, cereal prices were projected to fall in several countries, with a more pronounced decline for wheat in Kenya and Japan, other cereal grains in South Korea, and all staples in Nepal. The study emphasizes the need for additional policy measures to ensure food security and welfare for buyers who heavily depend on staple food prices for their livelihoods. The authors also consider the counter effects of tariff reductions on price-reducing outcomes.

Ramakrishna *et al*. (2023) delved into the dynamic impact of bringing down import tariffs on macroeconomic variables in Ethiopia. They utilized a recursive dynamic computable general equilibrium model. Results displayed that a 95% tariff reduction depressingly affects macroeconomic variables and leads to long-term fiscal unsustainability. Joint reform has better impacts on major macroeconomic variables but slightly adverse ramification on household income and consumption. The study highlights the need for careful consideration of tariff reduction strategies in Ethiopia.

Adhikary *et al*. (2022) conducted a study on the economic response of free trade agreements on the agriculture sector in Nepal. They implemented a CGE model to examine the economic shocks of eliminating 50% of non-tariff measures and 100% of tariffs for the agricultural sector. The study realized that the removal of 50% of NTMs and 100% of tariffs led to a drop in commodity imports and a rise in exports in the South Asian Free Trade Area and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation. The findings could help policymakers understand strategic concerns, update tariffs, and implement necessary modifications to enhance Nepal's economic strength.

Elahi *et al*. (2020) scrutinized the economic fallout of the Iran-Eurasia free trade agreement using the CGE approach and Social Accounting Matrix (SAM) 2011. They examined four scenarios, including a 50 or 100% cut in tariffs for industrial and agricultural sectors and a 50% tariff concession for one sector. The study revealed that a 50% tariff concession fueled industry expansion and increased consumption and welfare levels in Iran,

while a 100% concession would lead to more expansion and improved welfare. Policymakers recommend a joint financial mechanism, trade database, business visas, and Eurasian Chamber of Commerce Joint Council for optimal results.

Beckman (2021) assessed reforming market access in agricultural trade through tariff removal and a Trade Facilitation Agreement in Uruguay. The report estimates potential gains in global trade and welfare from two trade reform scenarios: eliminating agricultural tariffs and reducing trade costs through the TFA. The findings portray that reducing trade costs through the TFA could rise trade value by 7.27%, while removing agricultural tariffs could lead to an even larger rise in trade value of 11.09%. These gains would improve households' consumption in each scenario.

Joyson *et al*. (2022) delved into the China's import potential for beef, corn, pork, and wheat. China is a major importer of agricultural products, but nontariff measures prevent its imports from growing. Domestic prices for these commodities are significantly higher than foreign prices, with beef (58%), corn (64%), pork (213%), and wheat (42%). Removing these price wedges could lead to more imports, increased sales for the United States' producers, and lower food prices for Chinese consumers.

Nesongano (2022) explored the result of trade liberalization on the Zimbabwean economy. Using a static CGE model with 2013 as the base period, the study originated that trade liberalization cheapen import prices, leading to lower domestic production and lower prices for consumers. Industries heavily dependent on exports and imported goods also benefit from trade liberalization. However, the decline in pricing will result in a 1.7% drop in unskilled workers' wage rates and a 0.3% gain for competent workers. To offset income losses, export-oriented industries should enhance output, raising labor demand and resulting in pay rate hikes.

MATERIALS AND METHODS

This research employed a standardized Computable General Equilibrium (CGE) model developed by the International Food Policy Research Institute (Lofgren *et al*., 2002). The CGE model is a nonlinear model that aims to understand the dynamics of supply, demand, and pricing across the economy by examining the interplay among various markets. It is designed for a small and open economy, assuming perfect competition, full employment, and constant returns to scale. However, it has limitations, such as being used for a single period and modeling a single country, ignoring benefits provided by savings, leisure, and public goods, and lacking financial and capital markets for trading financial goods. The model is classified into dynamic and static models, with dynamic models explaining the process of adjusting capital stock and converting investment into capital stock. In Afghanistan, the static, CGE model is used due to data limitations, but it is more adaptable to the characteristics of developing countries and has been widely used in policy analysis. The model's wisdom foundations and optimization of household and firm behavior are crucial features, but it requires little data for good relationships between economic sectors. The model adopted a Social Accounting Matrix (SAM) curated by the Biruni Institute in 2018 as its primary database. Data was extracted from sources like the National Statistics and Information Authority, the Afghanistan Living Conditions Survey, Ministry of Finance Fiscal Bulletins, and the EORA MRIO database. Elasticity values from prior literature were incorporated into the calibration process to estimate the shift and share parameters of the constant elasticity of substitution and the constant elasticity of transformation functions. Assuredly, the transfer elasticity for cereals, fruits, vegetables, livestock, forestry, and opium were computed at 0.9 (Saeednia *et al*. 2022), and Armington elasticity with different rates for these goods were estimated by Kafaei and Miri in 2011. The SAM encompasses distinct segments such as producers,

commodity markets, factor markets, households, government, and the global economy. Within this matrix, activity and commodity accounts are further categorized into cereals, fruits, vegetables, livestock, forestry, opium, industry, and services. Furthermore, the production factors included in this SAM comprise labor and capital accounts, as outlined in Table 1.

In an ongoing study, it is assumed that producers aim to maximize their profits based on the level of technology available to them. According to Figure 1, the technology involved in this operation is a two-step process. At the lowest level of technology, intermediate goods are obtained from a combination of domestic and imported goods through the production function. The resulting composite good is then combined using a value-added Leontief production function.

Model Equations

In this study, the structure of production is calculated as the value added in the form of the Cobb-Douglas function of the two production factors of labor and capital:

$$QI_i = id_i \prod_{f=F} QF_{f,i}^{\propto_{fi}} \quad i \in I \qquad (1)$$

Where, QI_i is structure of production, $QF_{f,i}$ demand factors in activity i, $\propto_{f,i}$ share of factors for value-added and id_i is efficiency parameter in the production function. The amount of demand for production factors (labor and capital) can be obtained from Equation (2), where, PI_i is the Price of production.

$$WF_f = \frac{i_{fi} \cdot PI_i \cdot QI_i}{QF_i} \quad f \in F \quad i \in I \qquad (2)$$

Where, WF_f wages of the f-th factor.

The overall demand comprises both imports and domestic production. Due to imperfect substitution between imports and domestic production, each sector's total demand is based on the constant elasticity of substitution. The function is as follows:

$$QQ_c = iq_c\left(\delta q_c\, QM_c^{-\rho q_c} + (1 - \delta q_c)\, QD_c^{-\rho q_c}\right)^{\frac{-1}{\rho q_c}} \quad c \in C \qquad (3)$$

So, iq_c transfer parameter, δq_c the share parameter, and ρq_c point toward the power of the Armington function.

Table 1. Classification of sets and sub-sets of the model.

Activities/Commodities		Cereals Fruits Vegetables Livestock Forestry Opium Industry Services
Factors of production	Labor Capital	Labor Capital
Institutions	Household Firm Government	Household Firm Direct tax Indirect tax Tariff Subsidies
Saving-investment	Saving-investment	Saving-investment
Rest of world	Rest of world	Rest of world

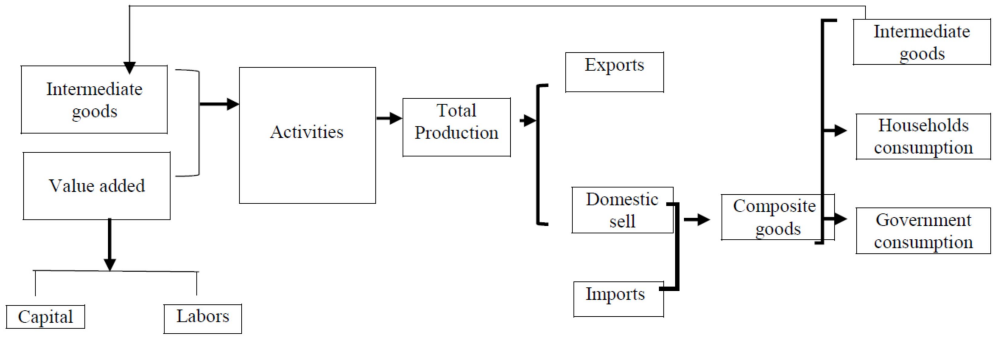

Figure 1. Components of Computable General Equilibrium (CGE) model (Source: Lofgren *et al*. 2002).

Assuming imperfect transfer for export and domestic production, the supply function of total goods for domestic sales and exports is defined as a function of constant elasticity of transformation. The function is as follows:

$$QX_c = it_c \left[\delta t_c\, QE_c^{\rho t_c} + (1 - \delta t_c) QD_c^{\rho t_c}\right]^{\frac{1}{\rho t_c}} \quad c \in C \quad (4$$

So, QX_c is the amount of supply, QE_c is the export amount, QD_c is the amount of domestic products sold in the domestic market, and ρ_c^t indicates the transfer in the CET function.

The consumption pattern of institutions includes household consumption, firm consumption, and government consumption, so, these consumptions are determined based on the following relationships:

$$QH_{ch} = \frac{\beta_{c,h}(1-mps_h)(1-ty_h)YH_h + tr_{row,h}\text{EXR}}{PQ_c} \quad c \in C\ , h \in H \quad (5)$$

$$QFR_{fr} = (1 - mps_{fr})(1 - ty_{fr})YFR_{fr} - \sum_{c\in C} PINT_c(QINT_c) - tr_{row,fr}\text{EXR} \quad (6)$$

$$EG = (1 - mps_g)YG - \sum_{c\in C} PQ_c(QG_c) - \sum_{h\in H} tr_{h,gov} - \sum_{fr\in FR} tr_{fr,gov} - tr_{row,gov}\text{EXR} \quad (7)$$

Where, mps_h is household's marginal propensity to save, ty_h household tax rate, YH household income, $tr_{row,h}$EXR money transfer from the rest of the world to household according to the exchange rate, $tr_{row,fr}$EXR money transfer from the rest of the world to firm, $tr_{h,gov}$ money transfer from household to government, $tr_{row,gov}$EXR money transfer from the rest of the world to government, $\beta_{c,h}$ share of consumption expenditure of the household, $PINT_c$ price of intermediate goods, and PQ_c shows the price of the composite commodity.

Model Calibration

The calibrated values and model parameters are outlined in Table 2. As can be seen in this table, the import substitution elasticity in the Armington function is inelastic, while the export substitution elasticity in the transformation function is elastic for all agricultural categories. The share and transfer parameters are different in both the Armington and transformation functions for all sub-sectors of agriculture. Since the issue of import and export is not legally relevant in the opium sector, therefore, except for the elasticity parameter in the transformation function, all other parameters of this product are estimated to be zero. The share and transfer parameters of the transformation function for the forestry sector are zero.

Model Simulations

Table 3 outlines the specifics of the diverse scenarios scrutinized in this investigation. These scenarios delineate the reduction percentages of import tariffs by 80, 60, 40, 20, and 100% (full liberalization)

Table 2. Calibrated values and model parameters.

Parameter and Elasticity	Cereals	Fruits	Vegetables	Livestock	Forestry	Opium
Share parameters of imported goods in the Armington function	0.4	0.5	0.5	0.1	0.2	0.0
Share parameter of domestic goods in Armington function	0.6	0.5	0.5	0.9	0.6	0.0
Transfer parameter in Armington function	1.9	2.0	2.2	1.6	1.6	0.0
Share parameter of export goods in the transformation function	0.9	0.8	0.7	1.0	0.0	0.0
Share parameter of domestic goods in the transformation function	0.1	0.2	0.3	0.0	0.0	0.0
Transfer parameter in the transformation function	3.2	2.6	2.1	6.6	0.0	0.0
Armington elasticity substitution parameters	0.5	0.9	0.9	-0.7	0.5	0.0
Elasticity parameter in the transformation function	2.1	2.1	2.1	2.1	1.5	2.1

Source: research estimation.

Table 3. Reducing scenarios of import tariff with codes.

Scenario code	Scenario definitions
Scenario A	80 percent
Scenario B	60 percent
Scenario C	40 percent
Scenario D	20 percent
Scenario E	100 percent

across various agricultural sectors. Each scenario is denoted as follows: Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E. It is worth noting that Afghanistan's current agricultural tariffs lack a sustainable, long-term strategy and are instead contingent upon short-term decisions. As a result, this research undertakes the simulation of agricultural import tariff reductions through the implementation of different scenarios.

RESULTS AND DISCUSSION

The research highlights the relationship between import tariffs in agricultural sectors and macroeconomic indicators. It shows that a decrease in tariffs leads to a decline in domestic production and an increase in imports, but also increases food accessibility. Cereals, which account for 73% of Afghanistan's calorie consumption, are crucial for food security. A reduction in tariffs leads to a surge in cereal imports and a decline in domestic production. This pattern is consistent with other studies that were reviewed in previous chapter, highlighting the shock of tariff adjustments on food production, consumption, and food security. The base year data is estimated on millions of Afghanis for all tables.

Table 5 delineates diverse scenarios of fruits import tariff reduction. Import tariffs brought down on fruits have led to a rise in the volume of imports across all scenarios. Scenarios D and E have demonstrated that fruit imports have augmented by over 41%. This upsurge in imports has resulted in a reduction in food prices. In addition, the table highlights that the decline in food prices has led to an intensification in household consumption.

Table 6 displays that dropping of import tariffs on vegetables significantly influences

Table 4. Impact of cereals import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	118465	-0.223	-1.860	-2.784	-3.714	-3.714
Supply price	0.9995	-0.000	-0.101	-0.153	-0.205	-0.205
Share of labor	44001	-0.272	-2.078	-3.108	-4.138	-4.138
Share of capital	53870	-0.183	-1.684	-2.522	-3.372	-3.372
Household consumption	36813	0.073	0.408	0.612	0.817	0.817
Import	36924	-0.128	0.716	1.064	1.406	1.406
Export	13883	-0.220	-2.539	-3.806	-5.076	-5.076

Source: Research estimation.

Table 5. Impact of fruits import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	88605	-0.404	-3.817	-5.903	-8.131	-8.131
Supply price	0.9998	0.016	-0.028	-0.044	-0.060	-0.060
Share of labor	36729	-0.452	-4.031	-6.217	-8.536	-8.536
Share of capital	44966	-0.364	-3.645	-5.650	-7.804	-7.804
Household consumption	57296	0.095	0.365	0.565	0.779	0.779
Import	14496	2.378	19.402	30.146	41.688	41.688
Export	16493	-0.341	-3.923	-6.066	-8.348	-8.348

Source: Research estimation.

Table 6. Impact of vegetables import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	24661	-13.766	-34.401	-50.917	-65.188	-65.188
Supply price	0.9995	-0.010	-0.119	-0.186	-0.256	-0.256
Share of labor	9523	-13.808	-34.547	-51.080	-65.341	-65.341
Share of capital	11657	-13.732	-34.284	-50.785	-65.064	-65.064
Household consumption	20801	1.189	3.308	5.639	8.466	8.466
Import	8754	24.486	62.824	96.012	127.315	127.315
Export	8023	-13.781	-34.548	-51.088	-65.355	-65.355

Source: Research estimation.

all economic indicators. In all scenarios, the lessening of tariffs led to a significant surge in vegetable imports. Scenarios D and E resulted in over 127% upsurge in vegetable imports, while scenarios C, B, and A exhibited over 8% rise in private consumption. This resulted in a significant reduction in vegetable exports, but also a 50% reduction in labor force and capital employment compared to the base year.

Based on Table 7, it can be observed that the reduction of import tariffs on livestock has similar economic effects as the reduction of tariffs on cereals, fruits, and vegetables. Furthermore, the results indicated that the

Table 7. Impact of livestock import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	55719	-0.583	-2.041	-3.121	-4.249	-4.249
Supply price	1.0000	0.014	-0.027	-0.047	-0.069	-0.069
Share of labor	22933	-0.632	-2.259	-3.444	-4.671	-4.671
Share of capital	28076	-0.544	-1.866	-2.861	-3.909	-3.909
Household consumption	60783	0.301	0.856	1.310	1.786	1.786
Import	15612	3.081	9.947	15.314	20.981	20.981
Export	1572	-0.162	-2.863	-4.536	-6.334	-6.334

Source: Research estimation.

Table 8. Impact of forestry import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	0.000002	-0.000	0.000	-0.000	-0.000	-0.000
Supply price	0.9998	0.018	-0.021	-0.033	-0.046	-0.046
Share of labor	0.000001	-0.000	-0.000	-0.000	-0.000	-0.000
Share of capital	0.000001	0.820	-0.000	-0.000	-0.000	-0.000
Household consumption	16263	-9.364	-30.038	-39.282	-46.443	-46.443
Import	0.0014	25.000	66.667	150.000	400.000	400.000
Export	N/A	N/A	N/A	N/A	N/A	N/A

Source: Research estimation. (N/A): Indicates Not Available data.

import of livestock improved by approximately 21% compared to the base year in scenario D and scenario E. As a result, the supply price dwindled, leading to an upsurge in households' demand for livestock consumption across all scenarios. However, it is essential to note that the diminution in domestic production gradually led to a decline in the level of employment for both labor and capital.

Forestry, a crucial sector of agriculture in Afghanistan's social accounting matrix, includes logging, firewood, and charcoal products. Reducing import tariffs for forestry products leads to increased imports, but decreases household consumption. Scenario D and scenario E depict a 46% decline, followed by scenario C, scenario B, and scenario A. Tariff reduction policies also decrease forest supply product prices across all scenarios.

Afghanistan, the world's largest producer of opium, has been illegally cultivating and trading the opium due to security concerns and internal conflicts. The import and export of opium diminished in all scenarios except for scenario A, which increased the percentage change of all economic variables compared to the base year, except household consumption. Scenarios B, C, D, and E reduced the percentage change of all economic indicators, except household consumption.

CONCLUSIONS

This research examines the response of dropping agricultural tariffs on food security

Table 9. Impact of opium import tariff reduction on macroeconomics indicators.

Macroeconomics indicators	Base value	Percentage change from the base value				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Production	160930	0.669	-0.804	-1.202	-1.603	-1.603
Supply price	0.9995	0.020	-0.108	-0.163	-0.219	-0.219
Share of labor	38106	0.620	-1.024	-1.531	-2.036	-2.036
Share of capital	46652	0.709	-0.626	-0.936	-1.253	-1.253
Household consumption	9344	-0.015	0.103	0.151	0.199	0.199
Import	10569	0.161	-0.521	-0.786	-1.053	-1.053
Export	104108	0.679	-0.857	-1.282	-1.710	-1.710

Source: Research estimation.

in Afghanistan using a General Equilibrium Model (GEC) and the 2018 Social Accounting Matrix (SAM). It focuses on five scenarios, including 80, 60, 40, 20, and 100% reductions in various agricultural sub-sectors, identified as Scenario A through Scenario E. The study's findings reveal a gradual increase in both imports and household consumption of cereals, fruits, vegetables, and livestock. However, this surge in consumption and imports goes hand in hand with decreased supply prices, export quantities, and employment opportunities. This shift implies a heightened availability of food compared to the base year. Given the significant share of household consumption attributed to agricultural sub-sectors, especially cereals, the rise in food imports and the dip in food prices stimulate augmented household demand, subsequently, amplifying purchasing power. This, in turn, augments food security, contributing to enhanced household health and societal well-being. The study's static model, based on 2018 data, can be improved by incorporating time variables to examine policy implementation's effects on variable change over time. However, long-term policies like trade liberalization may yield different results. Also, the labor force is not separated based on skill level, income, or urban or rural group due to time constraints. According to the results of this research, the following policy recommendations are suggested:

- If the aim is to provide food availability through the domestic production of the country, then, the reduction of tariffs, especially the elimination of tariffs on agricultural products, conflicts with food security. In this case, it is recommended that the government support investment in the horizontal and vertical development of irrigated and rainfed agriculture to upsurge the sustainable production of food products.
- If ensuring food security is clearly emphasized by increasing access to food, then, using the potential of free trade can cause a significant improvement in key variables such as increasing imports, reducing commodity prices, and increasing consumption of commodities by households. For this reason, it is recommended to reduce the focus on domestic production to ensure food security and pay more attention to providing food needs through trade.
- Importing food surges access to food, both physically and economically. This leads to

increased technological entry into the agricultural sector, thereby increasing food availability and access. Therefore, the government should focus on trade liberalization.

- Food imports favorably influence food security by growing availability and accessibility. Therefore, the government should reduce tariff rate fluctuations to prevent food security instability caused by disruptions in imports caused by fluctuating tariff rates. This will ensure households' food security and maintain food security.
- The study reveals that Afghanistan's agricultural sector, which employs 80% of the population, has been depressingly impacted by the lessening of agricultural tariff rates, suggesting the need for government investment to boost employment levels.

REFERENCES

1. Adhikary, G. B., Birur, D. K. and Lal, P. 2022. Can the Free Trade Agreements accelerate Nepal's Path towards Economic Prosperity? An Econometric and CGE Model Based Assessment. *25th Annual Conference on Global Economic Analysis Accelerating Economic Transformation, Diversification and Job Creation June 8-10, 2022,* PP. 1-25. https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=6631
2. Akram, H. W., Ciddikie, D. and Khan, M. A., 2014. India's Trade Relationship with SAFTA Countries: A Review. *J. Indian Res.,* **2(1):** 46-58.
3. Amiti, M., Stephen J., Redding and David, E. 2019. The Impact of the 2018 Tariffs on Prices and Welfare. *J. Econ. Perspect.,* **33(4):** 187-210.
4. Arinze, S. and Odior, E. S. 2023. Implications of Import Tariff Changes on Household Welfare in Nigeria. *Int. J. Dev. Emerg. Econ.,* **11(1):** 54-82.
5. Backmann, J. 2021. Reforming Market Access in Agricultural Trade: Tariff Removal and the Trade Facilitation Agreement. https://ers.usda.gov/sites/default/files/_laserfiche/publications/100866/ERR-280.pdf?v=17297).
6. Boltuc, S. 2023. Exploring Iran-Afghanistan Collaboration: Kabul's Pursuit of Trade Diversification. *Persian Files ISSN 2975-0598*, **19(1).**
7. Central Statistics Organization (Kabul: CSO). 2018. Afghanistan Living Condition Survey 2016-2017 https://www.nsia.gov.af.
8. D'Souza, A. and Jolliffe, D. 2012. Rising Food Prices and Coping Strategies: Household-Level Evidence from Afghanistan. J. Dev. Stud., **48(2)**: 282–299.
9. Elahi, N., Masoumzadeh, E., Kialhosseini, S. Z. and Arabi, S. H. 2020. Regionalism and its Economic Effects on Iran in a Computable General Equilibrium (CGE) Model: A Case Study of the Eurasian Economic Union (EAEU). *Int. Econ. Stud.*, **50(2):** 29-46.
10. Elgaili, E. O., Abdelbagi, E. A. and Salih, A. A. 2015. Economic Impacts of Changes in Wheat's Import Tariff on the Sudanese Economy. *J. Saudi Soc. Agric. Sci.,* **14(1):** 68-75.
11. FAO. 2021. *The White/Wiphala Paper on Indigenous Peoples' Food Systems*. Rome. https://openknowledge.fao.org/handle/20.500.14283/cb4932en
12. FAO. 2023. *Afghanistan: Humanitarian Response Plan*. Rome. https://openknowledge.fao.org/items/dc3d7342-4d18-45bc-b880-197906023c0e
13. FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World*. 260 PP. https://openknowledge.fao.org/server/api/core/bitstreams/67b1e9c7-1a7f-4dc6-a19e-f6472a4ea83a/content

14. Global Hunger Index Report. 2022. *Afghanistan Falls to Sixth Rank.* www.globalhungerindex.org.
15. Heidari, H., Davoudi, N. and Pasha Zanousi, M. 2015. The Effect of Tariff Reduction in Agricultural Sector on Macroeconomic Variables. *Agric. Econ. Dev.,* **3(29):** 308-318. (Persian).
16. Hemat, W., Noori, H., and Raihan, N. 2023. Causal Relationship between Trade Openness and Economic Growth. *Int. J. Appl. Res.,* **9(6):** 100-106.
17. Initiative on Global Markets (IGM). 2016. *Import Duties*. https://www.kentclarkcenter.org
18. Integrated Food Security Phase Classification (IPC). 2023. Acute Malnutrition Analysis. Evidence and Standards for Better Food Security and Nutrition Decisions.
19. Beckman, J., Gale, F., Morgan, S., Sabala, E., Ufer, D., Valcu-Lisman, A., Zeng, W. and Arita, S. 2022. *China's Import Potential for Beef, Corn, Pork, and Wheat*. ERR-310, U.S. Department of Agriculture, Economic Research Service.
20. Kafaei, S. M. A. and Miri, N. 2011. Constant Elasticity of Substitution for Selected Items. *J. Econ. Res.*, **11(3):** 27-42. (in Persian)
21. Laborde, D., Tokgoz, S. and Torero, M. 2013. Long-term Drivers of Food and Nutrition. FOODSECURE Working Paper No. 06, February 2013. file:///C:/Users/Yas/Downloads/06_Laborde%20Tokgoz%20Torero_FNS%20drivers%20(1).pdf
22. Lofgren, H., Lee, H. R., & Robinson, S. 2002. A Standard Computable General Equilibrium (CGE) Model in GAMS (Vol.5). https://www.un.org/en/development/desa/policy/mdg_workshops/training_material/lofgren_lee_and_robinson_2002.pdf).
23. Maetz, M. 2013. Food and Agriculture Organization of the United Nations (FAO). https://www.ipcinfo.org.
24. National Statistics and Information Authority. 2021. Income and Expenditure and Labor Force. *Surveys Report.* https://fscluster.org/afghanistan/document/income-and-expenditure-labor
25. Nejati, M., Bahmani, M., Esfandabadi, S. A. M., and Balaghi Inalo, Y. 2021. The Effects of Trade Liberalization on Agricultural Sector of Eurasian Economic Union and Iran: Multi-Regional Computable General Equilibrium Approach. *Agric. Econ. Dev.*, **29(115):** 123-154. (in Persian)
26. Nesongano, T. 2022. Analysis of the Impact of Trade Liberalization on the Zimbabwean Economy. *Presented during the 25th Annual Conference on Global Economic Analysis, GTAP Virtual Conference,* June 2022. https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=6552
27. Paseban, F. 2017. Analyzing the Effects of Tariff Rates on Economic Variables and Providing an Optimal Tariff System for Sensitive and Specific Agricultural Products. *Agric. Econ. Rural Dev.,* **13:** 83-109.
28. Paseban, F., Pourmoghim, S. J. and Afshari, Z. 2010. Interaction with World Economy and Impacts of Reductions in Tariff Rate on Iranian Agricultural Sector. *Village Dev.*, **13(1):** 83-109. (in Persian)
29. Peter, W. 2014. Agricultural Liberalization, Poverty, and Inequality: Indonesia and Thailand. *J. Asia. Econ.,* **35(3):** 92-106.
30. Ramakrishna, G., Gizaw, B. A. Paramaiah, C. Joseph, R., and Sania, K. 2023. Import Tariff Reduction and Fiscal Sustainability: A Macro-Econometric Modelling for Ethiopia. *Bus. Innov. Econ. Sustain.,* **15(4):** 1-18.
31. SAARC. 2020. Economic Trade and Finance. Retrieved from South Asian Association for Regional Cooperation.
32. Saeednia, A., Parvin, S., Bano, A. A. and Shackeri, A. 2022. The Rate of Unification of Exchange Rate of Value Added of Agriculture Sector in Iran. *Agric. Econ. Dev.*, **118(2):** 1-38. (In Persian)
33. Smith, L. C. Obeid A. E., and Jensen H. H. 2000. The Geography and Causes of Food Insecurity in Developing Countries. *Agric. Econ*., **22(1):** 199-215.

34. World Bank. 2020. Afghanistan Development Update Surviving the Storm. http://hdl.handle.net/10986/34092
35. Valera, H. G. A., Gopalakrishnan, B. N., Chakravarthy, S., Bharathi, S., Balié, J. and Pede, V. O. 2024. The Impacts of Reforming Agricultural Policy Support on Cereal Prices: A CGE Modeling Approach. *J. Econ. Stud.*, **51(1)**: 202-221.
36. Younus, M. and Mustafa, K. 2021. Potential of Preferential Trade Agreement (PTA) between Pakistan and Afghanistan. Report: TDAPTrade Agreements, 79 PP. Retrieved from: https://tdap.gov.pk/wpcontent/

اثرات سیاست تجارت کشاورزی بر امنیت غذایی افغانستان

ایازخان ناصری، ناصر شاهنوشي، آرش دوراندیش، زهرا نعمت الهی، و زهرا کیانی فیض آباد

چکیده

در این پژوهش با استفاده از مدل تعادل عمومی قابل محاسبه و داده‌های ماتریس حسابداری اجتماعی افغانستان، تأثیر کاهش تعرفه‌های کشاورزی در سناریوهای مختلف بر روی متغیرهای امنیت غذایی و اقتصاد کلان در قالب سناریوهای مختلف مورد ارزیابی قرار گرفته است. سناریوها به میزان۸۰%، ٦٠%، ٤٠%، ٢٠% اعمال نرخ تعرفه‌ای سال پایه و همچنین حذف کامل (١٠٠%) تعرفه‌ها (آزادسازی کامل) شبیه‌سازی شده است. یافته‌های مطالعه نشان می‌دهد که با اعمال کاهش نرخ تعرفه به‌ویژه حذف نرخ تعرفه باعث افزایش تدریجی واردات و مصرف خانوارهای محصولات اصلی مانند غلات، میوه‌ها، سبزیجات و دام شده است. مطالعه حاضر نیز می‌افزاید که سیاست حذف جزئی و کامل نرخ تعرفه منجر به افزایش قدرت خرید خانوارها و افزایش تقاضا برای محصولات مواد غذایی شده است که در نتیجه امنیت غذایی را تقویت و به سلامت کلی خانوارها و جامعه کمک کرده است. بنابراین، کاهش نرخ تعرفه به‌ویژه حذف تعرفه محصولات کشاورزی بر افزایش امنیت غذایی و ارتقای رفاه اجتماعی اثر مثبت دارد که باید مورد توجه ادارات ذیصلاح گرفته شود.