Journal of Natural Science Review

Vol. 2, Special Issue, 2024
https://kujnsr.com
e-ISSN: 3006-7804

Performance of Agriculture Export Commodities from Afghanistan to World

Ayaz Khan Naseri[1], Khan Mohammad Ahmadzai[2] and Ghulam Honaryar[3]

[1, 2, 3]Department of Agricultural Economics and Extension, Faculty of Agriculture, Kabul University

✉Email: nasariayaz@gmail.com (corresponding author)

ABSTRACT

This study delves into the symmetric comparative advantage of agricultural products in Afghanistan using the Balassa index from 2011 to 2021 and Cuddy-Della Valle's formula to measure instability in time series data from 2008 to 2022. The study focuses on eight agricultural product groups, with cereals, dairy products, and tobacco having a negative comparative advantage. However, the study finds that Afghanistan can focus on producing fruits, pulses, nuts, and textiles due to their positive symmetric comparative advantage over time. The study also finds that India, Iran, and other countries have a higher instability index than Pakistan in terms of agricultural export commodities from Afghanistan. The findings suggest that Afghanistan should accelerate export promotion policies, increase participation in regional trade, and improve product quality to be competitive in regional and international markets. Additionally, there is high instability in agricultural exports to India, Iran, and other countries, urging Afghanistan to take steps for smoother agricultural exports to improve its economic position.

ARTICLE INFO

Article history:
Received: May 23, 2024
Revised: June 11, 2024
Accepted: Nov 03, 2024

Keywords:
Balassa index; Instability index; RCA; SRCA

To cite this article: Nasiri , A. K. ., Ahmadzai, K. M., & Honaryar, G. 2024. (2024). Performance of Agriculture Export Commodities from Afghanistan to World. *Journal of Natural Science Review*, *2*(Special Issue), 486–494. https://doi.org/10.62810/jnsr.v2iSpecial.Issue.148

Link to this article: https://kujnsr.com/JNSR/article/view/148

Introduction

Trade plays a significant role in economic development. Classical and neo-classical economists attach special importance to foreign trade and call it the engine of economic growth. It is also one of the most direct forms of global and regional economic cooperation (Akram et al., 2014). Trade has two components: export and import. Always try to reduce the gap between these two directions to improve the balance of payments. This is done by increasing exports or decreasing imports. The export performance of agricultural products is an important source of foreign exchange income, the driver of product diversity, and the improvement of farm income.

For this reason, the export component has always attracted the attention of policymakers (Suresh et al. 2016). The implementation of the export development policy is preferred over the import substitution policy due to its superiority in terms of optimal allocation of production resources, increasing efficiency, and improving product quality. It encourages competition and increases the competitiveness of products (Karimi, 2013). The desired strategy examines the export position of various products in the target markets and their prioritization. However, determining product priorities among different markets at each region's level requires using a set of information. The required information is determined based on knowing the relative advantage and its ratio with competitors, priority of products, and target markets (Deepak, 2008). Since exports are one of the important indicators of any country's growth, developing countries need to speed up the export of goods.

Afghanistan is also one of the developing countries, where the export of the agricultural sector has a high impact on the growth of the country's economy. In 2021, the top exports of Afghanistan were gold, grapes, tropical fruits, raw cotton, and nuts, which received 419 million US$, 197 million US$, 164 million US$, 159 million US$, and 140 million US$, respectively (OECD, 2021). Export performance remained strong in the first two months of 2023, reaching 0.3 billion US$-16 percent higher than in the same period in 2022. Export growth during January–February 2023 can be attributed primarily to an increase in exports of food by 7 percent, coal by 19 percent, and textiles by 84 percent, which consist of 59 percent, 20 percent, and 15 percent of overall exports, respectively (Worldbank, 2023). Due to increased imports over exports, Afghanistan's trade deficit has led to macroeconomic instability, impacting interest rates, currency depreciation, inflation, foreign exchange flows, and the domestic economy's collapse. The trade balance is influenced by the performance of export goods, which can increase their value compared to imports in competition with other countries' products. However, these exports must be mature or specialized to compete in foreign markets. The trade deficit negatively impacts Afghanistan's economy, employment, and overall economic stability. The study identifies commercial products as a crucial factor in improving macroeconomic indicators, particularly in addressing the trade deficit, emphasizing the importance of exports in enhancing trade specialization. Therefore, the present study focuses on the following specific objectives;

1. To identify the export priorities of agricultural commodities by using the Balassa index
2. To identify the stable markets for agricultural commodities by using the instability index.
3. To suggest appropriate policy measures to promote exports of agricultural commodities from the country.

The article is divided into four chapters: the first, which covers the purpose and need of the work; the second, which includes a review of the literature; the third, which covers the study methodology and data collection; the fourth, which addresses the findings; and the final, which offers closing thoughts.

Literature Review

A recent strand of studies has explored the export performance of agricultural commodities, using a Balassa index to identify agricultural goods with high index values. Regarding the study gap, it should be inferred that no study has been done in Afghanistan until now to embrace the Balassa index within the agricultural domain, so this chapter evaluates only international literature. Smith (2005) investigated the comparative advantage of seven products in Ireland. Namely, these products are food and live animals, beverages and tobacco, raw materials, mineral fuels, animal and vegetable oils, manufactured goods, transport equipment, and various machinery. The study results revealed that in 2002 Ireland was only viable in the two sectors of food, live animals, and manufactured goods. Ashrafi et al. (2006) studied the comparative advantage of Iran's raisin production and export using RSCA. The results of this study indicate that Iran had a comparative advantage in the export of raisins from 1961 to 2001. Anoueh Tekeh (2006) examined the RCA of Iran's apple exports from 1995 to 1999. The study results showed Iran had a comparative advantage concerning the apple product during the study period. Karbasi and Piri (2007) evaluated the export performance of apricot production using the RCA and SRCA indices. The study found that Iran had a comparative advantage in apricot production from 1994 to 2000. However, between 2000 and 2005, this advantage was lost due to a significant decrease in apricot exports.

Serin and Civan (2008) used RCA and CEP[1] indices to evaluate the revealed comparative advantage of three products: tomato, fruit juice, and olive oil in Turkey. The study results showed that Turkey had a high comparative advantage in the European market in exporting olive oil and fruit juice. Still, it lacked such an advantage in the European tomato market. Bano (2011) studied the export growth of kiwi in New Zealand by using RCA. The paper's results displayed that New Zealand had a strong Kiwi export advantage from 1984 to 2009. Meghana et al. (2023) investigated the economic analysis of the trade performance of groundnut exports from India. The study showed that India had an RCA greater than 1, which means that India enjoyed a comparative advantage in the export of groundnuts from 2011 to 2020. This is supported by the fact that the positive value of RSCA ranged from 0.10 to 0.52. Gustrinazul et al. (2023) studied the export competitiveness analysis of pepper commodities in the international market. The study results displayed that Indonesian, Vietnamese, and Brazilian peppers had a comparative advantage with more than 1 RCA index, which means they had strong competitiveness in the international market. Fahrul et al. (2023) studied the analysis of Indonesian palm oil. The study's objective was to analyze the level of competitiveness of Indonesian palm oil exports in the Asian and European markets. The estimated results showed that Indonesian palm oil products had a comparative advantage of more than 1 from 2014 to 2020. Pires and Chandran (2023) evaluated the competitiveness and stability of export specialization in agricultural trade. The study's main objective is to

[1] Comparative Export Performance

analyze India's export competitiveness of agricultural goods and examine the pattern of stability of the specialization of agricultural exports. The study found that India had weakened with a fall in the RCA of farm exports from 1991 to 2020.

Materials and Methods

As stated in the previous chapters, this study aims to determine the export performance of agricultural products. Secondary data on exports from 2011 to 2021 have been compiled from the Food and Agriculture Organization to achieve the abovementioned goal. The data were analyzed using functional analysis.

Balassa Index

Balassa 1965 obtained the comparative advantage index by dividing a nation's share of exports of a specific product by the total exports of agricultural products produced by the region under study. This index is used to identify whether that product has a comparative advantage for export. This is defined as the comparative advantage in trade of major agricultural commodities that has been worked out using the Balassa Index estimated as per Equation (1).

$$RCA_i^a = \frac{X_i^a / X_i^e}{X_w^a / X_w^e} \qquad (1)$$

Where, RCA_i^a Is the revealed comparative advantage of the ith country for the a^{th} commodity?

X_i^a Is the total export value of a^{th} commodity, for example, Cereal, by the exporting country ith.

X_i^e is the total export value of the commodities by ith country.

X_w^a is the total value of the export of a^{th} commodity by the world.

X_w^e Refers to the total value of all agricultural commodities by world.

The superiority of this index is in considering the status of other export commodities in determining the relative advantage (Vollrath, 1991). This index is known as the Balassa index. The estimated value of the index lies between 0 (zero) and infinity. If the RCA index is less than one, country i does not have RCA in a particular product. The government has a comparative advantage in that area if there is more than one. However, RCA suffers from the problem of asymmetry, as pure RCA is not comparable on both sides of unity. If the index ranges from zero to one, a country is said not to be specialized in a given sector, and if the value of the index ranges from one to infinity, the country is said to be specialized. Hence, the index was made symmetric by Dalum et al. (1988), Laursen (1998), and Widodo (2009), and this modified RCA became the Revealed Symmetric Comparative Advantage (RSCA). The value of RSCA lies between -1 and +1. A modified formula is as follows:

$$RSCA_i^a = \frac{RCA_i^a - 1}{RCA_i^a + 1} \qquad (2)$$

RSCA represents the revealed symmetric comparative advantage the country enjoys for a product when the value is above 0 (zero) and vice versa if the value is below 0 (zero).

Instability index

Instability indexing is an analytical technique to determine the fluctuation in time series data. The instability index formula recommended by Cuddy-Della Valle was applied to calculate instability, which is used as a measure of instability from 2008 to 2022. This method corrects the coefficient of variation if data are scattered around the negative or positive trend line. The Cuddy-Della Valle Index is given as follows:

$$Instability\ index\ i.e \quad \cdot \mathrm{CV}^* = \mathrm{CV}(1 - \mathrm{R}^2)^{0.5}$$

Where coefficient of variation (CV) is defined as the ratio of sample SD to its mean, and R^2 is the corrected coefficient of determination of the log-linear trend function that fits the time series. If the F-test is significant at 5 percent, then the Index is calculated using R^2. When test statistics are not significant or $R^2 < 0$, then CV is chosen to measure the instability index.

Results and Discussion

The Balassa index was used to analyze the revealed comparative advantage (RCA) of specific goods in agricultural trade. The range of the Balassa index was between 0 and infinity, while the comparative advantage would be more than one. For the above reasons, the mentioned index can be easily interpreted into 4 groups: ($0 < RCA \leq 1$) shows no comparative advantage; ($1 < RCA \leq 2$) weak comparative advantage; ($2 < RCA \leq 4$) medium comparative advantage; and ($RCA > 4$) indicates strong comparative advantage.

The Balassa index was calculated in order to compare the export performance of eight agriculture groups, namely cereals, fruits, vegetables, pulses, nuts, dairy products, textile fibers, and tobacco, from 2011 to 2021. Table 1 showed that among eight groups of agricultural products, cereals, dairy products, and tobacco had no comparative advantage. This country can concentrate on producing and exporting fruits, pulses, nuts, and textiles because these products display a comparative advantage of more than 1. Regarding fruits, Afghanistan had a strong RCA of more than 1, ranging from 5.274 to 6.529. This means that Afghanistan enjoyed a comparative advantage in exporting fruits during the study period. This is supported by the positive value of the RSCA, which ranged from 0.681 to 0.734. The RCA for pulses also pointedly ranged from 1.567 to 12.555, which showed a positive value of RSCA sorted from 0.221 to 0.852. The country can focus on the export production of nuts because this product had an index value during the study period. Table 1 revealed that pulses recorded a medium and strong index value ranging from 2.894 to 6.186. The index also shows that Afghanistan enjoyed a comparative advantage in the export of textile fibers, whereas it had no index value for cotton from 2011 to 2021.

Table 1. Revealed Comparative Advantages of Afghanistan's Agriculture Commodity Groups

Items Years	Cereals	Fruit	Vegetables	Pulses	Nuts	Dairy Products	Textile Fibers	Tobacco
2011	0.000	5.732	1.176	N/A	6.025	0.016	2.316	0.000
2012	0.000	6.384	0.829	N/A	5.378	0.005	6.007	0.000
2013	0.000	5.927	0.708	N/A	6.186	0.003	8.106	0.000
2014	0.021	6.529	0.633	4.448	3.087	0.001	1.322	0.009
2015	0.002	5.619	1.221	8.445	3.699	0.003	2.758	0.006
2016	0.002	5.504	1.387	7.513	3.866	0.001	3.545	0.028
2017	0.031	6.125	1.293	2.302	2.894	0.002	2.014	0.008
2018	0.011	5.983	1.989	12.555	3.233	0.002	3.089	0.002
2019	0.140	5.460	1.622	1.567	3.633	0.001	3.978	0.047
2020	0.036	5.274	1.849	7.581	6.000	0.000	3.899	0.005
2021	0.014	5.903	1.727	6.492	4.490	0.001	10.060	0.046

Source: author estimation. *N/A indicates not available the data.

Table 2. Revealed Symmetric Comparative Advantages of Afghanistan's Agriculture Commodity Groups

Items Years	Cereals	Fruit	Vegetables	Pulses	Nuts	Dairy Products	Textile Fibers	Tobacco
2011	-1.000	0.703	0.081	N/A	0.715	-0.969	0.397	-1.000
2012	-1.000	0.729	-0.094	N/A	0.686	-0.991	0.715	-1.000
2013	-1.000	0.711	-0.171	N/A	0.722	-0.994	0.780	-1.000
2014	-0.959	0.734	-0.224	0.633	0.511	-0.998	0.139	-0.982
2015	-0.996	0.698	0.100	0.788	0.574	-0.994	0.468	-0.989
2016	-0.997	0.692	0.162	0.765	0.589	-0.997	0.560	-0.945
2017	-0.941	0.719	0.128	0.394	0.486	-0.997	0.336	-0.984
2018	-0.979	0.714	0.331	0.852	0.527	-0.996	0.511	-0.997
2019	-0.754	0.690	0.237	0.221	0.568	-0.998	0.598	-0.910
2020	-0.931	0.681	0.298	0.767	0.714	-0.999	0.592	-0.991
2021	-0.973	0.710	0.267	0.733	0.636	-0.999	0.819	-0.913

Source: author estimation

Instability index

The instability index is a simple analytical technique used to determine the fluctuation or instability in any time series of data. The instability was quantified using Cuddy-Della Valle's formula. It can be observed from Table 3 that over the years, there has been a fluctuation in the value and unit value realization of agricultural commodities exported from Afghanistan to India, Iran, Pakistan, and other countries. India, Iran, and other countries had a high instability index compared to Pakistan in the case of agricultural export commodities from Afghanistan.

Table 3. Instability index of agricultural trade of Afghanistan with other countries, 2008 to 2022

Country	Instability of agricultural exports
India	32.26
Iran	32.49
Pakistan	3.85
Other countries	33.07

Source: author estimation

Conclusion

The Balassa index is an indicator used in the export performance of commodities to calculate a certain country's relative advantages and disadvantages in a particular category of commodities, as evidenced by trade flows. This study used the Balassa index for data analysis in agricultural trade**.** This study aims to determine the export priority of Afghanistan's agricultural products and identify and prioritize export markets. The result of the study revealed that fruits, pulses, nuts, and textiles displayed an RCA index value greater than 1 and were supported by a positive value of RSCA. The study also concluded that cereals, dairy products, and tobacco had no comparative advantage during the study period.

On the other hand, the present research also reported that India, Iran, and other countries had a high instability index compared to Pakistan in terms of agricultural export commodities from Afghanistan. The study aimed to assess the RSCA of eight agricultural categories due to time constraints. If the RSCA were evaluated for each agricultural commodity, it would recommend more precise policies for the government and other competent agencies. Based on the obtained results, it is suggested that:

- As shown in the findings of this study, Afghanistan has a strong, medium, and weekly comparative advantage among eight agricultural commodity groups. It should implement export policies, including supporting export-oriented companies in introducing their products as high-quality and desirable products in foreign markets. Also, encourage and promote the selection of insurance policies to protect the exporter against commercial and political risks.
- Afghanistan should stop the export of agricultural commodities with no comparative advantage and focus on exporting more, which have a relatively better position in RCA in a particular commodity.
- Also, there was high instability concerning the export of agricultural commodities from Afghanistan to India, Iran, and other countries. So, Afghanistan should take steps to smooth farm exports with India, Iran, and other countries to reach a better position in its economy.

Conflict of Interest: The author(s) declared no conflict of interest.

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