Afghan International Journal of Science (AIJS)

Publisher: Afghan International Islamic University

Website: https://aijs.aiiu.edu.af

e-ISSN: 3134-5859

Growth and Instability in Area, Production, and Productivity of Apple in Afghanistan

Sebghatullah Samim[1*], Mohammad Ismail Hashime[2]

[1,2] Afghan International Islamic University, Department of Agricultural Economics and Rural Development, Faculty of Agriculture, Kabul, Afghanistan

Abstract

This study addresses the lack of empirical evidence on the growth, instability, and export performance of apple production in Afghanistan by examining changes in area, production, and productivity from 2011 to 2023, with a focus on the major apple-producing provinces. The objective was to estimate growth rates, assess instability, and analyze export trends. The study used secondary data from NSIA (2023) and applied a semi-log functional form to estimate compound growth rates, while instability was measured using the Cuddy-Della Valle Index (CDVI). The results revealed positive growth in area, production, and productivity across most provinces, except for a decline in area in Kabul (-1.42%). Higher growth rates were observed in Maidan Wardak, Ghazni, and Paktia provinces. Instability analysis showed low variability in Kabul, moderate in Maidan Wardak, and high in Ghazni and Paktia. Furthermore, trend analysis from 2009 to 2023, with projections to 2026, indicated increasing production but a relatively low export share, suggesting a gap between production potential and export performance. The study highlights the need for improved export strategies and policy intervention.

Keywords: Apple Exports, Area, CAGR, Instability, Production, Productivity

Article History

Published: June 30, 2026

Accepted: May 17, 2026

Revised: April 1, 2026

Received: January 3, 2026

Cite as: Samim, S., & Hashime, M. I. (2026). Growth and Instability in Area, Production, and Productivity of Apple in Afghanistan. *Afghan International Journal of Science 2*(2), 182-192. DOI: https://doi.org/10.66546/aijs.v2i2.22

Introduction

Apple (Malus domestica) is one of the most popular fruit crops grown in temperate regions worldwide (FAOSTAT, 2023). Globally, apples are among the most important fruit crops and are widely cultivated for their nutritional and economic value (FAOSTAT, 2023). It is believed that apples originated in Central Asia and later spread to Asia Minor, Europe, and other regions of the world (Juniper et al., 1998). Apple is a temperate-climate fruit native to many parts of Europe and Asia, with its origin traced to Central Asia (Mohammad et al., 2020). China and the United States of America (USA) are among the world's leading apple-producing countries (FAOSTAT, 2023). The climatic conditions in Afghanistan are favorable for the production of high-quality fruits, with full sunlight, cold winters, and warm summers, which are suitable for temperate fruit cultivation (Yaqubi & Bekirerol, 2019).

Email: sebghatsamim21@gmail.com (Corresponding Author)

Link to the Article: https://aijs.aiiu.edu.af/index.php/aijs/article/view/22

Agriculture plays a crucial role in Afghanistan's economic growth, with around 80% of rural families depending on it as their primary source of income. According to the National Statistics and Information Authority (NSIA, 2023), agriculture and related sectors contributed significantly to the country's GDP in 2023. Fruits are increasingly important both globally and nationally because of their nutritional value, economic contribution, and environmentally friendly production systems (FAO, 2023). However, the production and marketing systems of fruits in Afghanistan remain underdeveloped, despite growing demand driven by urbanization, increased income, and consumer awareness.

Apple is a highly popular fruit in Afghanistan, and its cultivation is well suited to the country's agro-climatic conditions. Afghan apples can maintain freshness for up to seven months under cold storage conditions (GAIN, 2013). According to the Ministry of Agriculture, Irrigation and Livestock (MAIL, 2023), major apple-producing provinces include Maidan Wardak, Ghazni, Kabul, and Paktia.

According to the horticulture census conducted in 2007, the total area under apple orchards in Afghanistan was 7,000 hectares, with a production of 54,770 tons and an average yield of 7.8 tons per hectare. Recent data from NSIA (2023) indicate that the apple cultivation area increased to 31,228 hectares, with production reaching 323,963 tons and an average yield of 10.4 tons per hectare. The major apple-producing provinces include Maidan Wardak, Ghazni, Kabul, and Paktia, with Maidan Wardak ranking first in both area and production (Akbari et al., 2016).

Despite the growing importance of apple production in Afghanistan, there is a lack of comprehensive studies examining growth trends, instability, and export performance across major producing provinces. Existing studies mainly focus on production levels without adequately addressing variability and long-term growth patterns.

To assess variability, long-term trends were removed from time-series data by estimating detrended production based on detrended area and yield. The coefficient of variation (CV) and the Cuddy-Della Valle Index (CDVI) were used to measure instability more accurately.

Therefore, the specific objectives of this study are to estimate the growth rates of area, production, and productivity of apples in Afghanistan; to analyze instability in these parameters across major provinces; and to examine trends in apple production and the export share.

Methods and Materials

Data Sources

This study was carried out in Afghanistan in 2025, using time-series data on apple cultivation area, production, and productivity. It examined key variables, including growth, Instability, percent change over the two periods (initial and final trinomial moving averages), and the coefficient of determination for cultivated area, production, and productivity.

Compound Annual Growth Rate (CAGR)

To analyze the data, we used the Compound Annual Growth Rate (CAGR) and the magnitude of variability (instability) analysis, as well as the Coefficient of Variation (CV) and the Cuddy-Della Valle Index (CDVI).

Compound Annual Growth Rate (CAGR) is usually estimated by fitting a semi-log trend equation.

$$Y = ae^{bti} \quad (1)$$

Taking ln of both sides, then translating into log-linear form as shown below.

$$\ln(Y) = \ln(a) + bti \quad (2)$$

$$\ln(Y) = \mathrm{a} + bti \quad (3)$$

Where,

a = ln(a)= intercept/ constant

Y= Quantity of fruits production, area and productivity (dependent variable)

b = growth rate on a ratio scale, and when multiplied by 100, it expresses percentage growth. or regression coefficient of y on x or t.

'a' and 'b' are the parameters to be estimated

ti= Time/ year (independent variable)

i= years from 2011 to 2023

ln= natural log of the variable

(Veena, 1996) and (Singh & Rani, 2013)

The Ordinary Least Squares (OLS) approach was used to estimate equation (1). After estimating the model using OLS, the original parameter a was retrieved by taking the exponential of the intercept.

We used this formula also for Compound Annual Growth Rate, when the slope coefficient (b) measures the instantaneous rate of growth.

$$CAGR(r) = (Antilog\ of\ b - 1)\ x\ 100 \quad (4)$$

Where,

r = compound growth rate

b = the estimated coefficient from the regression of log values over time

The significance of the regression coefficient was tested using a 't' test as defined below

$$t = \frac{bi}{SE(bi)} \quad (5)$$

Where,

bi = Regression coefficient

SE(bi) = Standard error of the regression coefficient

The standard error of the regression coefficient was used to test its significance with a 't' statistic

(Verma & Mishra, 2022).

Instability

To measure the magnitude of variability in apple area, production, and productivity, the coefficient of variation (CV) and the Cuddy-Della Valle index were used.

$$CV = (\frac{\text{Standard Deviation}}{\text{Mean}}) \times 100 \quad (6)$$

Where CV is the coefficient of variation (%) that was used as a measure of instability

Cuddy-Della Valle Index (CDVI), developed by Cuddy and Valle (1978), measures instability in time series data characterized by trend (Anjum & Madhulika, 2018).

$$CDVI = CV \times \sqrt{1 - R^2} \quad (7)$$

Where CV is the coefficient of variation in percentage, and the R^2 is the coefficient of determination from time trend regression adjusted by the number of degrees of freedom.

Moreover, to find the coefficient of determination, the model is:

$$R^2 = (1 - \frac{\text{ESS}}{\text{TSS}}) \times 100 \quad (8)$$

(Anjum & Madhulika, 2018)

Findings

From 2011 to 2023, the apple cultivated area in Afghanistan and selected areas per provinces Kabul, Maidan Wardak, Ghazni, and Paktia indicated a notable change in growth trends, instability, and consistency.

Table 1 revealed that the intercept (b_0) and growth coefficient (b_1) were estimated as follows for the apple orchard area. Kabul recorded b_0 of (2080.3 ha) with b_1 of (-0.014), indicating a slight decline in area over time. In contrast, Maidan Wardak had b_0 of (2042.3 ha) and b_1 of (0.11), reflecting a remarkable positive growth trend. Ghazni and Paktia also indicated increasing trends with b_0 of (392.3 ha), b_1 of (0.19), and b_0 of (169.6 ha) with b_1 of (0.16), respectively. At the national level, Afghanistan demonstrated a strong growth pattern in apple area with b_0 of (8140.6 ha) and b_1 of (0.120).

Maidan Wardak province recorded the largest apple cultivation area, with a mean of (5,200.9 ha) per year. It experienced a (178.44%) change over the two periods (initial and final 3 years), supported by a strong CAGR of (12.53%), and a high R^2 value of (0.85), indicating a strong trend fit. However, there was moderate instability in growth, remaining at (16.57%).

Conversely, Ghazni showed even greater instability, with a CDVI of 29.54%, indicating high fluctuations in area expansion. Despite this, the CAGR for the area in this province was high at 21.84%, and the R^2 of 0.78 indicates a strong upward trend. Although Paktia was smaller in scale, with a mean of 664.6 hectares, it displayed the highest relative change in area over two periods at 616.33%. Furthermore, the Cuddy-Della Valle Index (CDVI) of 42.87% confirms this high level of instability. However, the relatively high Compound Annual Growth Rate (CAGR) of 18.32% and the R^2 value of 0.62 suggest that despite the fluctuations, there was a consistent upward trend over time.

At the national level, Afghanistan's apple area had a mean of 21,022.1 hectares per year and a change over the period of 12.4%. The country displayed a moderate CAGR of 12.81% and a strong R^2 of 0.89, confirming a clear and consistent increasing trend in apple cultivation. The national CDVI was 13.66%, suggesting relatively stable growth compared to individual provinces.

Based on the exponential trend models applied to apple orchard area, the projected value of apple cultivated area in Kabul province is expected to decrease slightly to 1,662.8 hectares, reflecting a negative trend. In contrast, Maidan Wardak, Ghazni, and Paktia are expected to record substantial increases, reaching 11,870.7 ha, 8,202.1 ha, and 2,195.2 ha, respectively. At the national level, Afghanistan's total apple orchard area is forecasted to extend to 55,526.7 ha by the year 2026, highlighting an overall positive trend.

Table 1: *CAGR and instability in area of Apple in top four provinces and Afghanistan during 2011 to 2023*

Particulars		b_0	b_1	Mean	Change over two periods (initial & final 3 years) (%)	SD	CAGR	R^2	CDVI	Projected value
Area (hectare)	Kabul	2080.3	-0.014	1899.6	-7.86	240.42	-1.42	0.42	9.64	1662.8
	Maidan Wardak	2042.3	0.11	5200.9	178.44	2226.4	12.53**	0.85	16.57	11870.7
	Ghazni	392.3	0.19	2083.6	489.82	1312.5	21.84**	0.78	29.59	8202.1
	Paktia	169.66	0.16	694.6	616.33	503.5	18.31**	0.62	42.87	2195.2
	Afghanistan	8140.6	0.12	21022	223.98	8662.5	12.81**	0.89	13.66	55526.7

Note: ** indicates significance at the 5% confidence level.

Source of the data: National Statistical Information Authority (2023).

Table 2 revealed apple production and indicated significant variation in these key producing provinces. There was a positive trend regarding apple production across all regions of the country.

In Kabul province, the coefficient of the independent variable (b_1) was 0.041 tons, with b_0 of 11,209.1, suggesting modest growth. Maidan Wardak had a significant upward trend, with b_0 of 11,383.03 tons and b_1 of 0.18. Ghazni and Paktia also showed increasing trends, with b_0 of

3,032.17 tons and b_1 of 0.22, and b_0 of 1,137.37 tons and b_1 of 0.21, respectively. The overall trend for Afghanistan's total apple production was also strongly positive, with a b_0 (intercept) of 51,314.08 tons and b_1 of 0.158, indicating considerable growth at the national level.

The average annual production of apples in Maidan Wardak province was 54,195.15 tons, with a growth rate of 20.59% and a strong coefficient of determination (R^2) of 0.89, indicating a good model fit.

Ghazni recorded a mean production of 21,918 tons, with a significant CAGR of 25.61% and a moderate trend fit (R^2) of 0.58. Production was highly unstable, as shown by a CDVI of 51.84%. Similarly, Paktia revealed the greatest change over the initial and final periods at 1,372.02%, with an impressive CAGR of 25.68% and mean production of 9,069.08 tons. Despite growth, variation was extreme at 63.54%, reflecting major fluctuations in output.

In comparison, Kabul had relatively lower average production (15,726.5 tons) than Maidan Wardak and Ghazni, and a low growth rate (4.22%), with a weak coefficient of determination (0.33) and instability of 25.67% in production.

Afghanistan's average apple production was 184,913.54 tons per year, with annual growth of 17.21% and relatively low variation of 12.01%. This shows that while variation existed, the overall trend was consistent and strongly supported by a high coefficient of determination (95%).

Table 2: *CAGR and instability in production of Apple in top four provinces and Afghanistan during 2011 to 2023*

Particulars		b_0	b_1	Mean	Change over two periods (initial & final 3 years) (%)	SD	CAGR	R^2	CDVI	Projected value
Production (tons)	Kabul	11209.1	0.04	15726.5	49.42	4966.4	4.22**	0.33	25.77	21600.7
	Maidan Wardak	11383.0	0.18	54195.1	440.34	34368.4	20.59**	0.89	21.01	202700.4
	Ghazni	3032.17	0.22	21918.1	739.99	17621.1	25.61**	0.58	51.84	102440.1
	Paktia	1137.37	0.21	9870.0	1372.02	9531	25.68**	0.64	63.54	32743.96
	Afghanistan	51314.0	0.15	184913	356.9	99387.14	17.21**	0.95	12.01	642880.5

Note: ** indicates significance at the 5% confidence level.
Source of the data: National Statistical Information Authority (2023).

In terms of apple productivity, the regression results also reflected positive improvements. For Kabul province, the intercept (b_0) was 5.37 tons/ha, and the coefficient (b_1) was 0.055, while Maidan Wardak recorded b_0 of 5.57 tons/ha and b_1 of 0.069, indicating a significant productivity increase. The growth rate in Ghazni province was lower, with b_0 = 7.72 tons/ha and b_1 = 0.030. Paktia also showed moderate progress, with b_0 of 6.70 tons/ha and b_1 of 0.060. The national trend for Afghanistan showed steady growth in apple productivity, with b_0 = 6.30 tons/ha and b_1 = 0.038.

Average productivity in Maidan Wardak province was 9.47 tons/ha, growing steadily at 7.17% and with low variation (14.09%), and showing a good trend fit (R^2) of 0.77, indicating relatively reliable growth. The mean productivity in Kabul province was 8.35 tons/ha, with a 5.73% increase but higher variability (23.74%), suggesting visible year-to-year variation.

Paktia recorded the highest average productivity at 11.02 tons/ha, with a CAGR of 6.22%, though the variability was high (CDVI of 31.15%), and the trend fit was moderate (R^2 of 0.35). Ghazni followed with 10.05 tons/ha mean productivity and a CAGR of 3.09%, but also had considerable variation (CDVI of 32.07%).

At the national level, Afghanistan had an average productivity of 8.38 tons/ha, showing modest growth (CAGR of 3.90%), low variability (10.89%), and high trend reliability (R^2 of 65%). The low variation of 10.89% also reflects overall stability.

The forecasted values for productivity in Kabul are 12.94 tons/ha, Maidan Wardak 15.68 tons/ha, Ghazni 12.47 tons/ha, and Paktia 16.4 tons/ha, all suggesting improvements in yield efficiency. Apple productivity also improved notably, particularly in Paktia (95.54%), Maidan Wardak (90.93%), and Kabul (62.22%), showing the effect of better climatic conditions and variety improvement.

Table 3: *CAGR and instability in productivity of Apple in top four provinces and Afghanistan during 2011 to 2023*

	Particulars	b_0	b_1	Mean	Change over two periods(initial & final 3, years) (%)	SD	CAGR	R^2	CDVI	Projected value
Productivity	Kabul	5.37	0.055	8.35	62.22	2.8	5.73**	0.49	23.74	12.94
	MaidanWardak	5.57	0.069	9.48	90.93	2.78	7.17**	0.77	14.09	15.68
	Ghazni	7.72	0.030	10.05	43.03	3.45	3.09**	0.11	32.07	12.47
	Paktia	6.70	0.060	11.02	95.54	4.25	6.22**	0.35	31.15	16.4
	Afghanistan	6.30	0.038	8.38	41.25	1.54	3.90**	0.65	10.89	11.57

Note: ** indicates significance at the 5% confidence level.
Source of the data: National Statistical Information Authority (2023).

Trend in the Export Share of Apple Production in Afghanistan

The graph below illustrates the trend analysis of apple exports and total apple production in Afghanistan from 2009 to 2023, along with projected values up to 2026 using exponential models. The total production figure shows a general upward trend over the years, starting at 72,860 tons in 2009 and peaking at 323,963 tons in 2023. This increase indicates a significant expansion in apple cultivation and possibly favorable climate conditions.

Export volumes have fluctuated significantly over the years. Initial export figures were relatively low, with only 9,366 tons exported in 2009. However, there was a notable increase in 2015, when exports rose to 32,400 tons, marking a critical year for the industry. The highest export volume recorded was 62,422 tons in 2023, suggesting growing international demand for Afghan apples.

The percentage of exports relative to total production offers insights into market dynamics. In 2009, exports accounted for 9,366 tons (12.88%) of total production, but this share has varied over the years. A significant increase occurred in 2012, when the export share rose to 24,418 tons (34.88%), and in 2015, when the export share was 32,400 tons (36.10%), indicating peaks in export activity relative to production levels. Conversely, the years 2010 and 2014 saw lower export shares, at 2.44% and 4.73%, respectively, which may reflect market conditions affecting export capabilities.

The high R^2 value indicates a very strong correlation, suggesting that approximately 93.76% of the variation in production is explained by the model. Despite the higher exponential growth rate in exports (0.196) compared to production (0.142), the absolute volume of exports remains significantly lower than production.

The forecast suggests a continued rise in both production and exports through 2026, but without a proportional increase in export share unless interventions are made to enhance export capacity. According to the exponential model, the export share will be 89,233 tons in 2025-26, which indicates a low portion of the total estimated production.

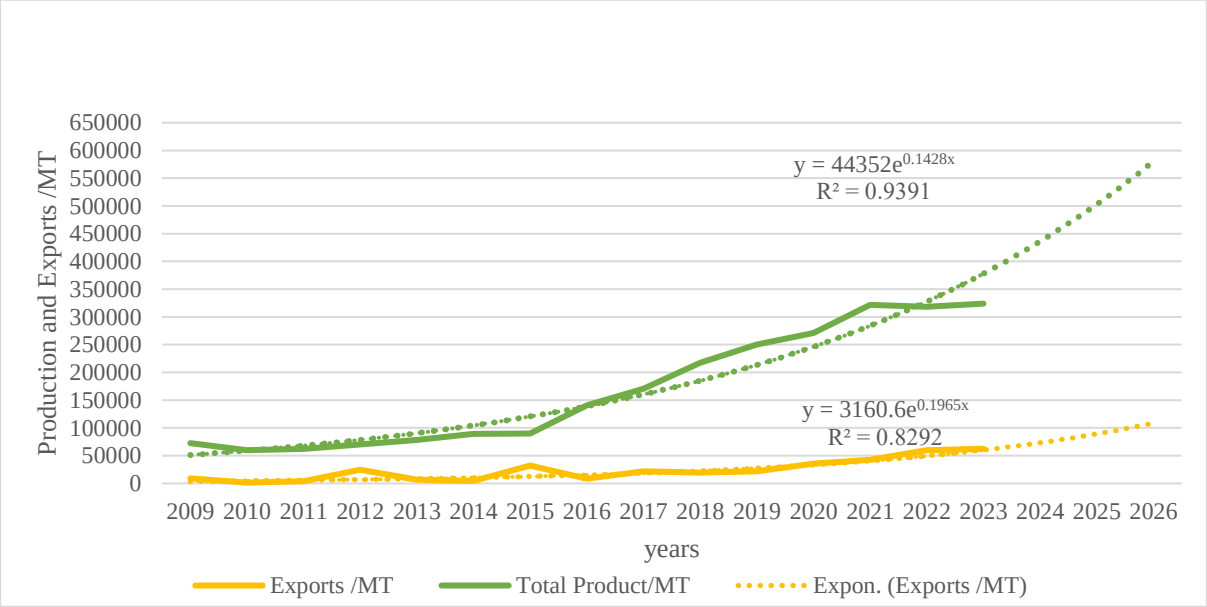

Figure 1. Export share in total apple production
Source: Customs and Revenue Department (CRD) of Afghanistan and (MAIL) 2023.

Discussion

Among all apple-producing provinces in Afghanistan, the four leading provinces, Maidan Wardak, Kabul, Ghazni, and Paktia, play a significant role in the national apple production system. Together, these provinces account for about 52% of total apple production and occupy nearly 45.5% of the total orchard area (NSIA, 2023). This indicates relatively higher efficiency and productivity in these provinces, particularly in terms of yield per hectare rather than only area expansion.

Maidan Wardak province emerged as the leading contributor to national apple production. It not only produced the highest quantity of apples during 2011 to 2023 but also demonstrated greater production stability than other provinces. The coefficient of variation (CV) for apple production in Maidan Wardak was relatively low, indicating lower fluctuations and more consistent output. This stability may be attributed to better orchard management practices, favorable agro-ecological conditions, and improved access to inputs and extension services. Wardak et al. (2024) also reported that Maidan Wardak had the highest share in apple cultivation area (29.05%) and production (29.31%) during 2007–2013.

In contrast, Kabul province showed relatively lower average production and weaker growth performance compared to Wardak and Ghazni, with a low coefficient of determination. Although Kabul exhibited low variability, its negative CAGR (-1.42%) indicates a declining trend in cultivated area, suggesting structural challenges in apple farming. The decline in apple cultivation area in Kabul can be linked to factors such as drought, insecurity, limited land availability, financial constraints, and unfavorable market conditions (DAIL, 2024). This highlights the need for targeted interventions to stabilize and revive apple production in the province.

At the same time, Ghazni and Paktia provinces demonstrated high growth rates in both area and production but were characterized by high instability and greater fluctuations over time. This suggests that their growth is less consistent and more vulnerable to external shocks such as climate variability and market uncertainties. In Ghazni, despite high growth in area and production, productivity increased at a relatively slower rate (43.03%), indicating that output expansion was driven more by area expansion rather than improvements in yield efficiency.

At the national level, the results indicate a general improvement in productivity and efficiency in apple production. The expected increase in average productivity to 11.57 tons/ha reflects gradual adoption of improved farming practices, better input use, and enhanced orchard management. However, regional disparities in growth and instability suggest unequal development across provinces, requiring region-specific strategies.

The findings also reveal a mismatch between increasing production and relatively low export performance. Although apple production has increased significantly, the share of exports remains limited. Multiple interconnected factors, including production trends, infrastructure, trade policies, market access, and security conditions, influence export performance. Rahimi and Artukoğlu (2023) identified key constraints, including limited access to international markets, inadequate working capital, poor road infrastructure, a lack of cold storage facilities, and inefficient transportation systems.

It is noteworthy that in 2023–24, dry and fresh fruits accounted for 36.3% of Afghanistan's total exports, indicating their importance in the national economy. Despite a higher exponential growth rate in apple exports (0.196) compared to production (0.142), the absolute export volume remains low, suggesting that only a small proportion of total production is exported. This implies that improving export infrastructure, strengthening value chains, and enhancing market linkages are essential to fully utilizing production potential.

Overall, the study suggests that while apple production in Afghanistan is expanding, sustainable growth requires reducing instability, improving productivity efficiency, and addressing structural constraints in marketing and exports through effective policy support.

Conclusion

This study assessed the growth and instability in the area, production, and productivity of apples across four major provinces of Afghanistan: Maidan Wardak, Ghazni, Paktia, and Kabul during the period 2011–2023. The findings indicate an overall positive growth trend in apple

production in Afghanistan, driven mainly by the expansion of cultivated areas, particularly in Wardak, Ghazni, and Paktia. In contrast, Kabul province experienced a decline in cultivated area (-1.42%), although production increased due to improvements in productivity. Based on CAGR results, Maidan Wardak demonstrated the highest and most consistent growth in productivity, reflecting better performance in enhancing output over time. Instability analysis revealed that Kabul had the most stable production pattern, Maidan Wardak showed moderate variability, while Ghazni and Paktia experienced higher instability across area, production, and productivity. Despite these improvements, the overall productivity of apples in Afghanistan remains relatively low compared to global standards, indicating the need for efficiency improvements. Key areas for intervention include improved varieties, better agronomic practices, pest and disease management, and strengthened production and marketing systems, along with enhanced post-harvest handling such as storage, packaging, transportation, and processing. The trend analysis further showed a steady increase in apple production and exports, particularly after 2015. However, the share of exports remains relatively low compared to total production, highlighting a gap between production potential and export performance. In 2023–24, dry and fresh fruits accounted for 36.3% of Afghanistan's total exports, yet apple exports continue to face structural constraints such as limited export infrastructure, trade restrictions, border issues, and restricted access to international markets.

Acknowledgments

I am deeply grateful to my Advisor (Dr. Mohammad Ismail Hashime) for their consistent guidance and constructive feedback. Also, thanks to my co-Advisor (Dr. Hamidullah Younisi) for their valuable guidance. I also extend my appreciation to the National Statistic Information Authority (NSIA) for providing essential data that supported my research.

Author Contribution

- Sebghatullah Samim conducted the entire research, including study design, data collection, data analysis, and manuscript writing.
- Dr. Mohammad Ismail Hashime provided academic guidance, feedback, and supervision throughout the research process.
- All authors reviewed and approved the final version.

References

Akbari, M., Yamaguchi, M., Maejima, T., Otagaki, S., Shiratake, K., & Matsumoto, S. (2016). Apple cultivation and breeding in Afghanistan: S-RNase genotypes and search system for suitable cultivar combination. *International Journal of Agronomy, 2016*, 1–5. https://doi.org/10.1155/2016/3101864

Anjum, S., & Madhulika. (2018). Growth and instability analysis in Indian agriculture. *International Journal of Multidisciplinary Research and Development*, 5(11), 119–125. Link

Food and Agriculture Organization (FAO). (2023). FAOSTAT statistical database. FAO. https://www.fao.org/faostat/

Global Agricultural Information Network (GAIN). (2013). Afghanistan fresh deciduous fruit annual report. United States Department of Agriculture (USDA), Foreign Agricultural Service.

Juniper, B. E., Watkins, R., & Harris, S. A. (1998). The origin of the apple. *Acta Horticulturae, 484*, 27–34. https://doi.org/10.17660/ActaHortic.1998.484.1

Ministry of Agriculture, Irrigation and Livestock. (2024). *Fruits (production, export and imports)*.

Mohammad, S., Padma, R., & Anjugam, M. (2020). Economic analysis of apple production in Kabul province, Afghanistan. *International Journal of Agricultural Sciences*, 10(4), 48–50.

National Statistics and Information Authority. (2023). *Afghanistan agricultural statistics report*. http://www.nsia.gov.af

Rahimi, M. S., & Artukoğlu, M. (2023). A research on the socioeconomic structure and perspectives of agricultural product exporters in Afghanistan. *Anadolu Journal of Agricultural Research, 33*(1), 134–148. https://doi.org/10.18615/anadolu.1310061

Singh, R. P., & Rani, N. (2013). To study growth rate of area, production and productivity of fruit crops in Jharkhand. *Journal of Economic & Social Development, 9*(1), 56–59.

Veena, V. M. (1996). *Growth dimensions of horticulture in Karnataka: An econometric analysis.* Ph.D. Thesis, University of Agricultural Sciences, Dharwad, Karnataka, India.

Verma, H. C., & Mishra, D. (2022). Growth and instability of mango and guava fruit crops of Uttar Pradesh, India. *Journal of Agri Search, 9(1)*, 42–45. https://doi.org/10.21921/jas.v9i01.9891

Wardak, F., Huchaiah, L., Sharif, H., Venkataramana, M. N., & Khalandar, S. (2024). Production trend and export performance of apple from Afghanistan. *International Journal of Agriculture Extension and Social Development, 7*(3b). https://doi.org/10.33545/26180723.2024.v7.i3b.418

Yaqubi, Q., & Bekirerol, A. K. (2019). Fruit production and present situation in Afghanistan. *Turkish Journal of Agriculture–Food Science and Technology*, 7(Special Issue), 14–20.