

Agriculture & Cocoa Production Trends in Ghana

**Production, GDP Contribution, and Export
Performance**

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Introduction

- Agriculture remains a major contributor to Ghana's economy.
- Cocoa is Ghana's leading agricultural export and a major source of foreign exchange.

This presents the analysis of the:

- Trends in production of cocoa vs. maize, rice, and yam
- Agriculture's contribution to GDP
- Export dynamics and revenue fluctuations

Objectives

- 1. Track production of cocoa relative to maize, rice, and yam**
 - 2. Explore agriculture's contribution to GDP, with focus on cocoa**
 - 3. Study cocoa export trends and revenue fluctuations over time**
 - 4. Provide statistical confirmation through Correlation Tests and Regression.**
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Production Trends

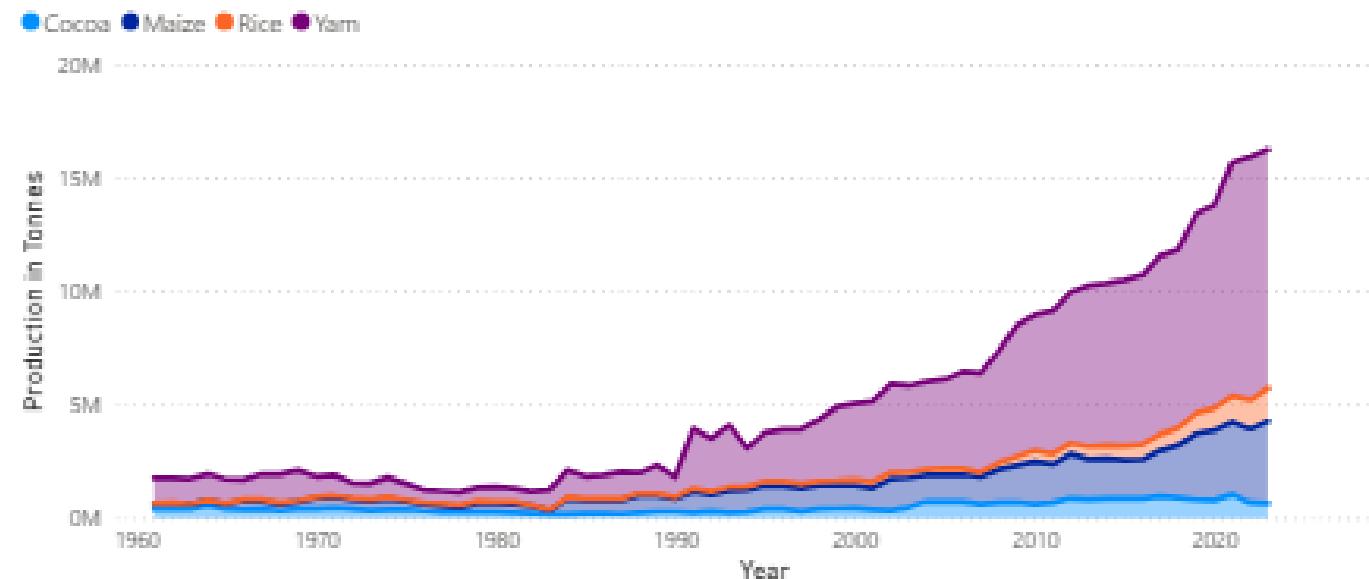
Data Source: FAOSTAT Website

Units: Metric Tonnes

Time Coverage: 1961-2023

Production of Cocoa vs. Maize, Rice and Yam in Ghana

Cocoa, Maize, Rice and Yam Production in Ghana (1961-2023)

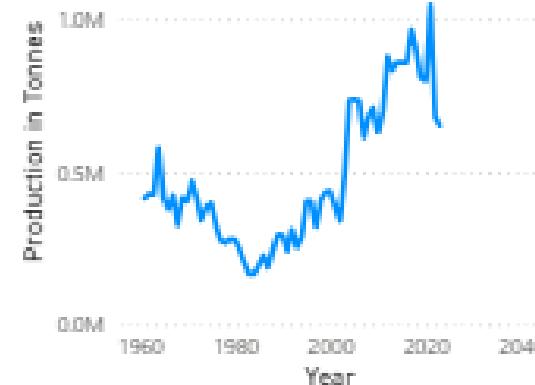


Select Year(s)

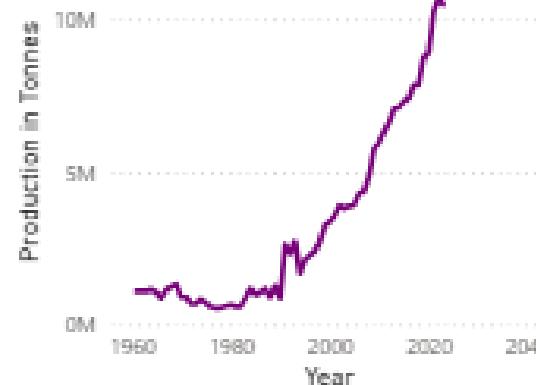
1961	1963	1965	1967	1969	1971	1973
1962	1964	1966	1968	1970	1972	1974

Year	Cocoa	Maize	Rice	Yam
1961	415,200.00	226,000.00	30,400.00	1,100,000.00
1962	428,100.00	220,000.00	31,000.00	1,100,000.00
1963	427,800.00	182,889.00	32,514.00	1,099,000.00
1964	580,500.00	172,728.00	42,877.00	1,153,000.00
1965	415,800.00	209,001.00	32,615.00	1,055,000.00
1966	381,100.00	402,100.00	38,000.00	874,000.00
1967	477,500.00	343,817.00	57,727.00	1,122,000.00
Total	30,331,960.40	65,796,211.39	17,479,318.45	203,858,957.69

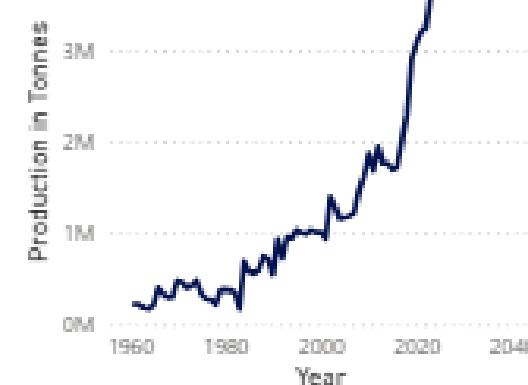
Cocoa Production (1961-2023)



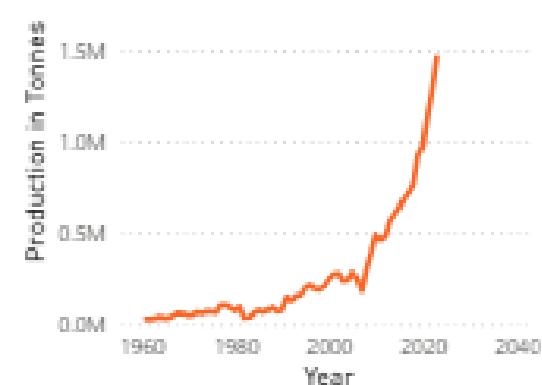
Yam Production (1961-2023)



Maize Production (1961-2023)

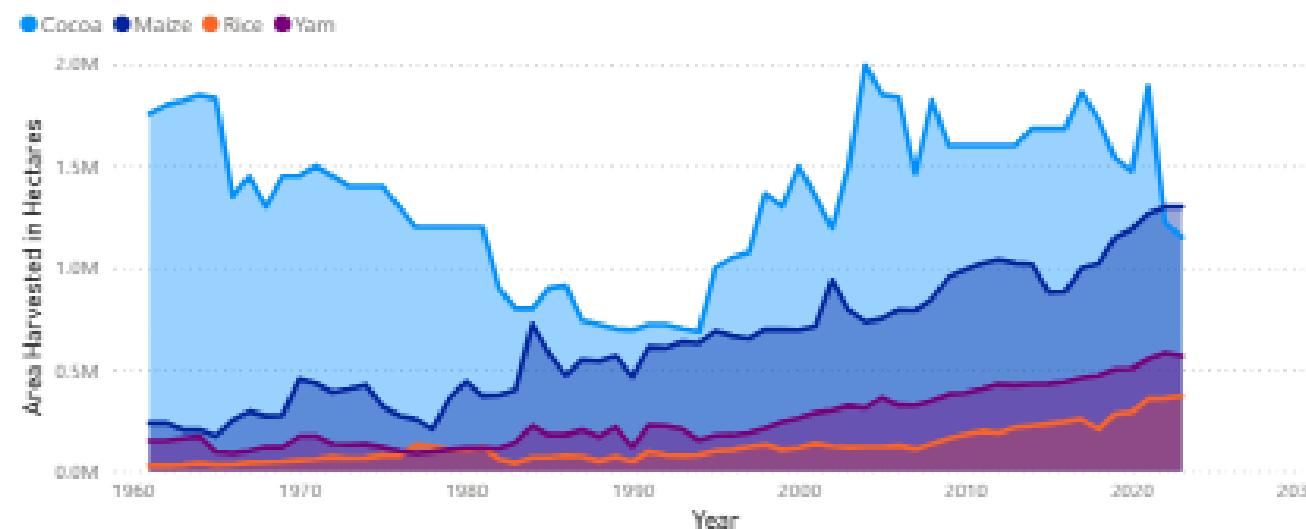


Rice Production (1961-2023)



Area Harvested of Cocoa vs. Maize, Rice & Yam (Ghana)

Area Harvested of Cocoa, Maize, Rice and Yam in Hectares (1961-2023)

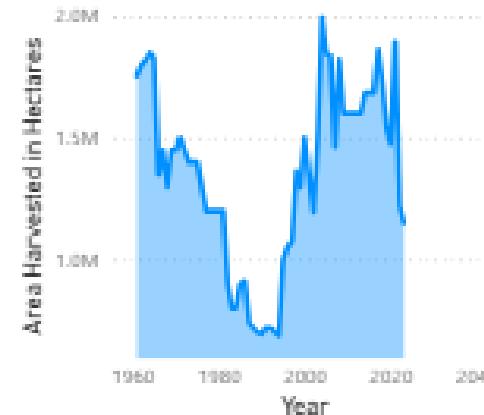


Select Year(s)

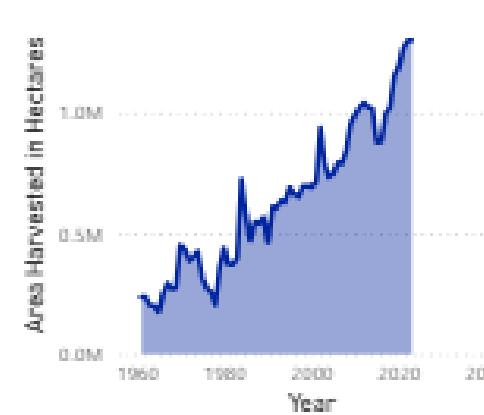
1961	1963	1965	1967	1969	1971
1962	1964	1966	1968	1970	1972

year	Sum of cocoa	Sum of maize	Sum of rice	Sum of yam
1961	1756000	237000	27518	150000
1962	1800000	237000	28000	150000
1963	1820000	202340	32374	162000
1964	1848000	202340	42653	171000
1965	1830000	173277	32306	95000
1966	1350000	250900	33000	87000
1967	1450000	294600	43705	99000
Total	84726740	40117496	7697767	15760612

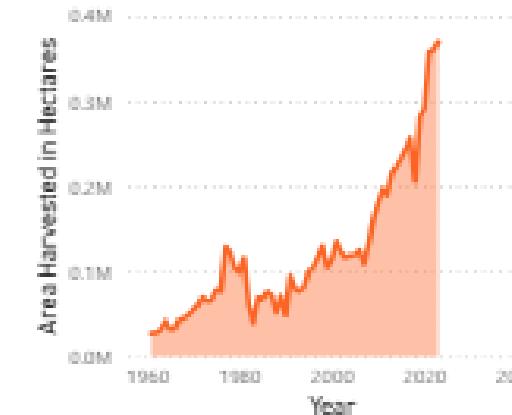
Area Harvested of Cocoa (1961-2023)



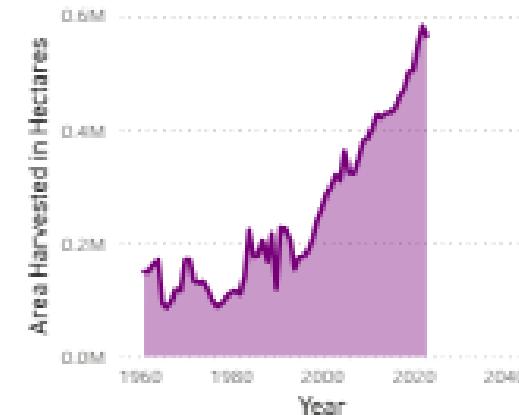
Area Harvested of Maize (1961-2023)



Area Harvested of Rice (1961-2023)

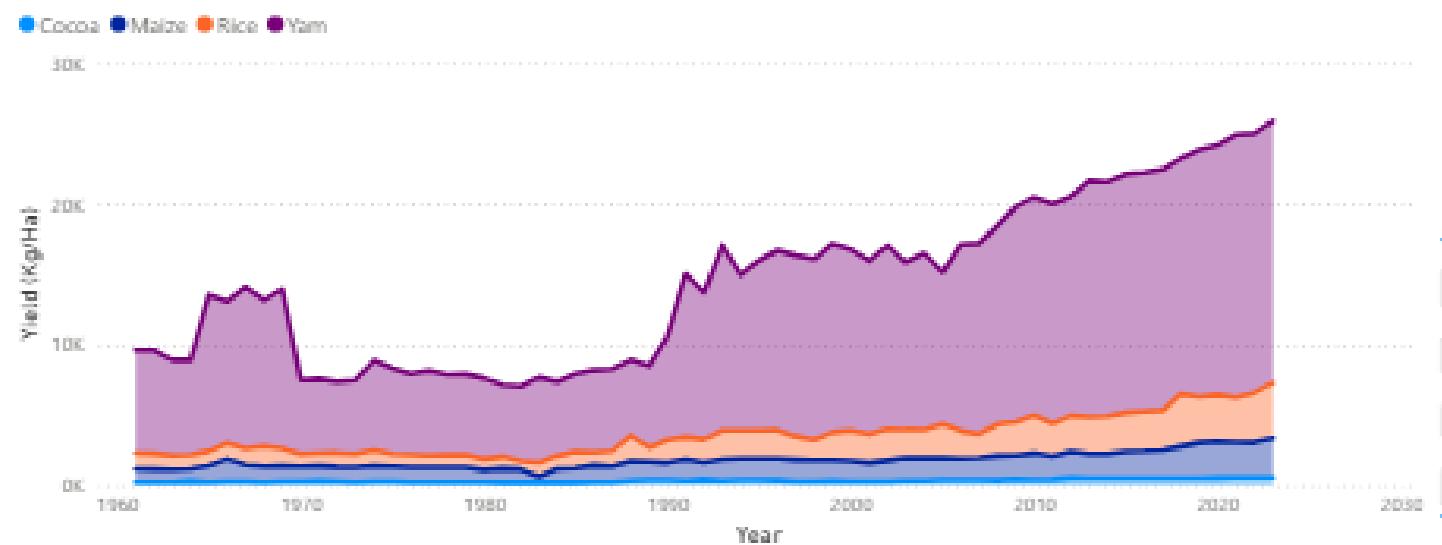


Area Harvested of Yam (1961-2023)



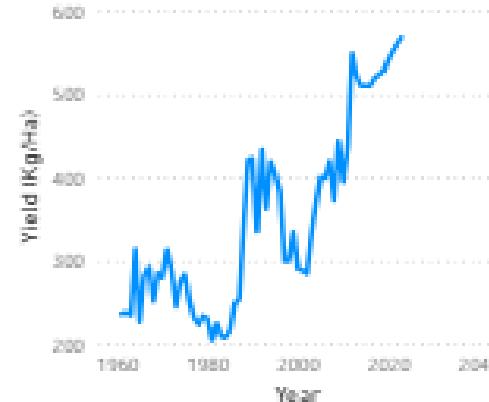
Yield Per Hectare of Cocoa vs. Maize, Rice & Yam

Yield Per Hectare of Cocoa, Maize, Rice and Yam (1961-2023)

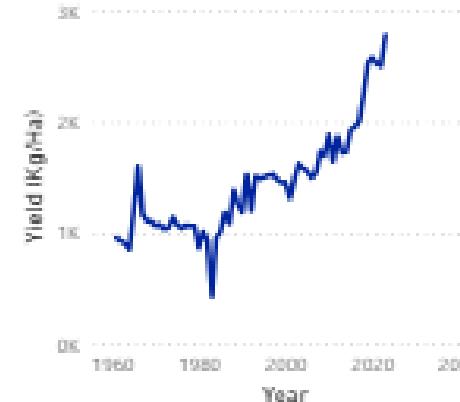


Select Year(s)					
	1961	1963	1965	1967	1969
	1962	1964	1966	1968	1970
Year	Cocoa	Maize	Rice	Yam	
1961	236.40	953.60	1,104.70	7,333.30	
1962	237.80	928.30	1,107.10	7,333.30	
1963	235.10	903.90	1,004.30	6,784.00	
1964	314.10	853.70	1,005.30	6,742.70	
1965	227.20	1,206.20	1,009.60	11,105.30	
1966	282.30	1,602.60	1,151.50	10,046.00	
1967	292.10	1,164.00	1,197.30	11,452.50	
1968	251.50	1,108.90	1,428.70	10,386.60	
Total	22,075.30	90,496.60	111,584.40	689,522.70	

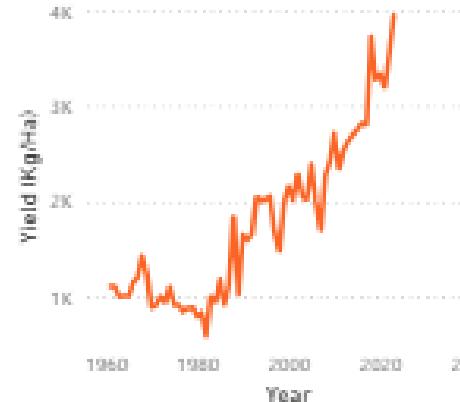
Yield Per Hectare of Cacao



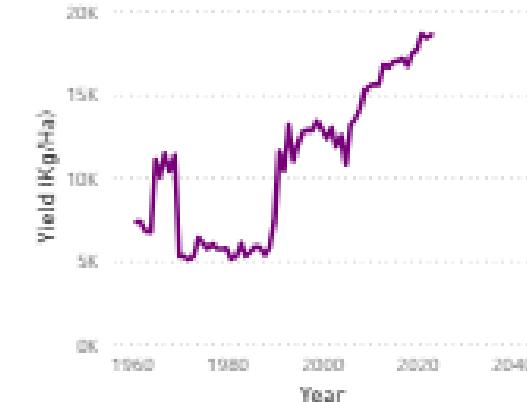
Yield Per Hectare of Malt



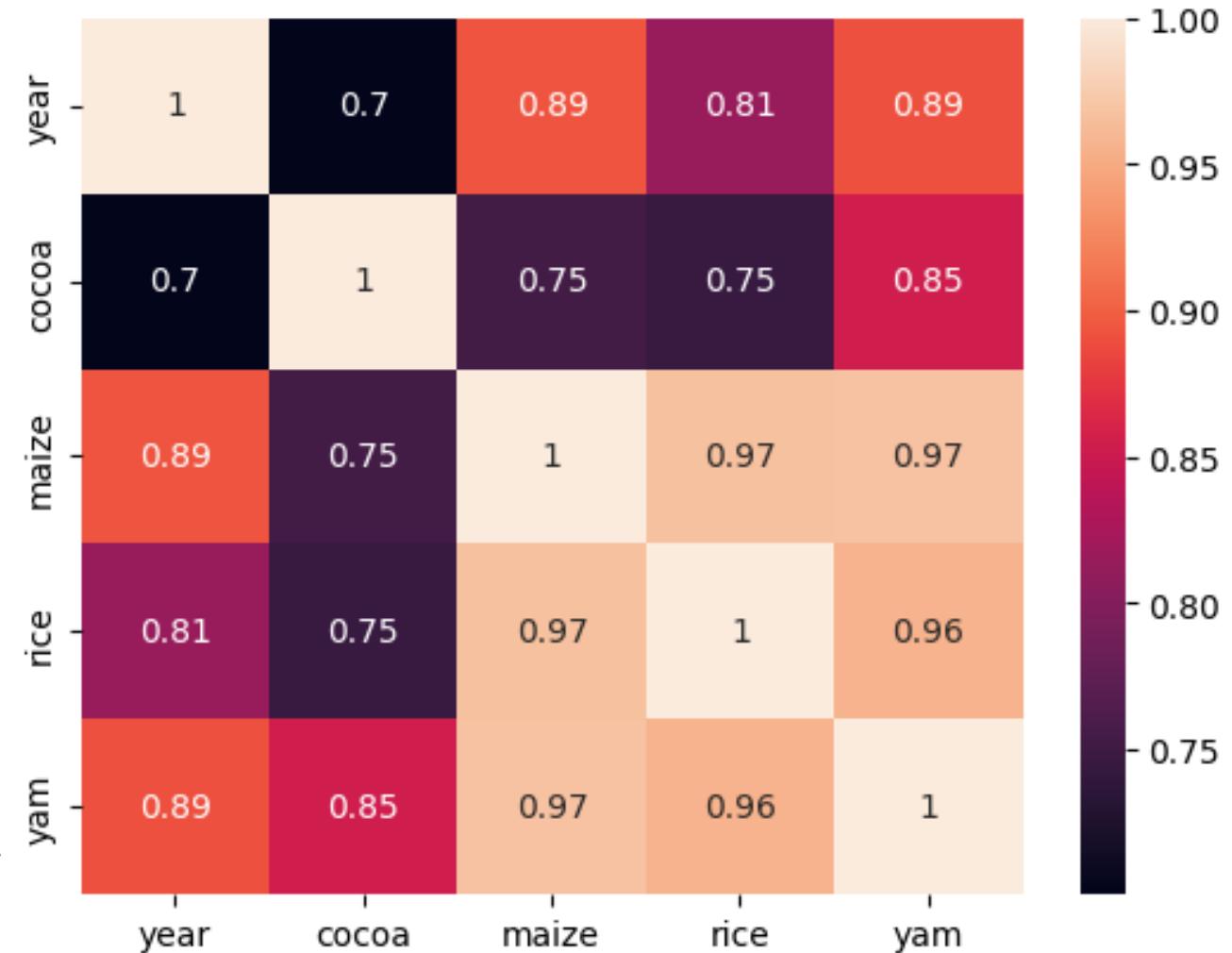
Yield Per Hectare of Maize



Yield Per Hectare of Yam



Correlation tests (Production Volume)



Summary of Insights

- **Year vs. Maize & Yam (0.89 each)**

Strong positive correlation suggests maize and yam production have consistently increased over time.

- **Year vs. Rice (0.81)**

Rice production has also grown steadily, though slightly less than maize and yam.

- **Year vs. Cocoa (0.70)**

Cocoa shows moderate growth over time, indicating a less aggressive upward trend compared to staple crops.

- **Maize vs. Rice & Yam (0.97 each)**

Near-perfect correlation implies these crops are likely cultivated or harvested under similar conditions or policies.

Summary of Insights (Cont'd)

- **Rice vs. Yam (0.96)**

Strong alignment in production patterns, possibly due to shared seasonal or geographic factors.

- **Cocoa vs. Yam (0.85)**

Cocoa and yam show a notable relationship, hinting at overlapping agricultural zones or investment strategies.

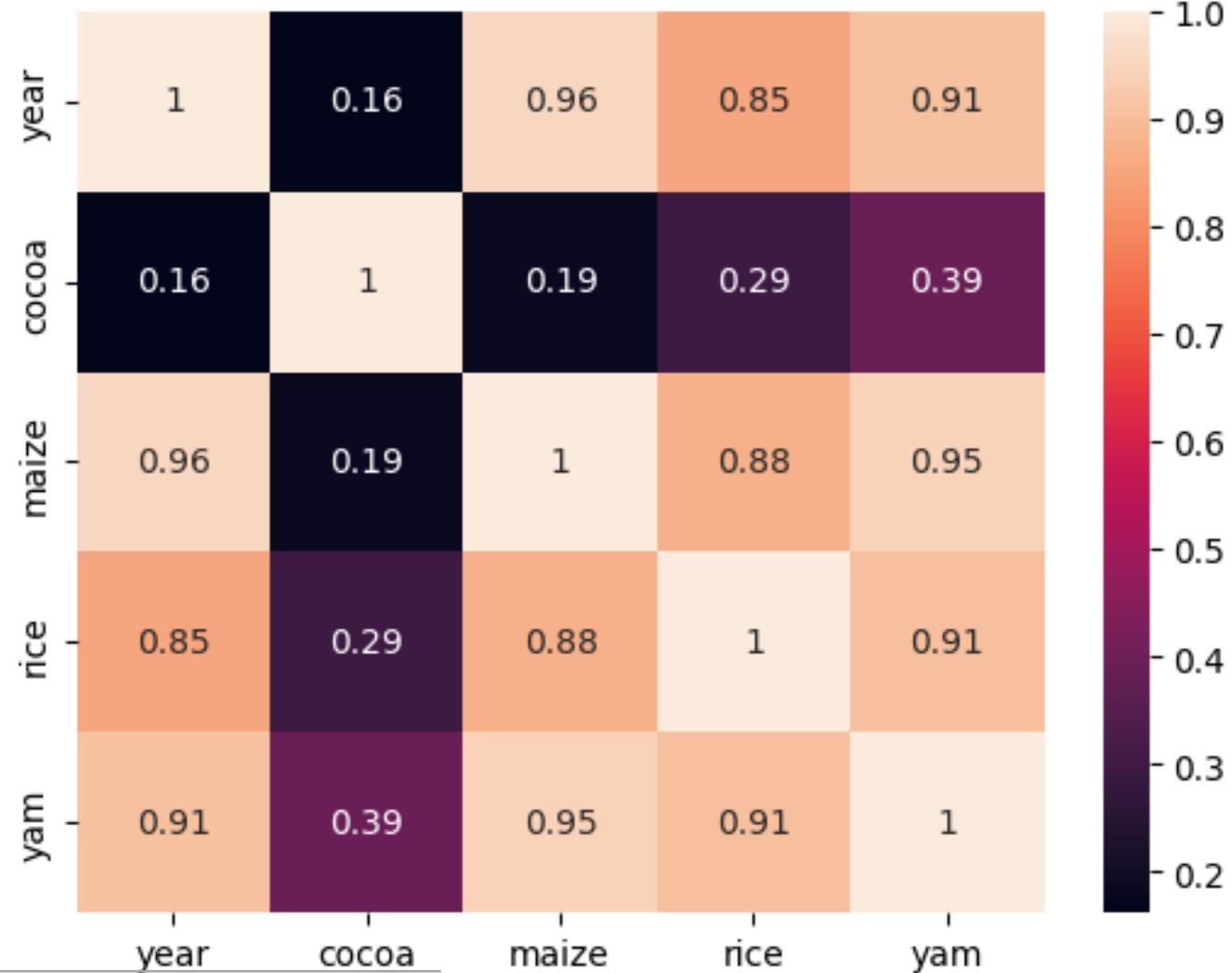
- **Cocoa vs. Maize & Rice (0.75 each)**

Moderate correlation suggests cocoa may benefit indirectly from infrastructure or practices supporting staple crops.

Conclusion

The data reveals a tightly linked production ecosystem among maize, rice, and yam, with cocoa showing moderate alignment. Time trends indicate robust growth in staple crops, possibly driven by policy, demand, or climate adaptation. Cocoa's more modest correlation with time and other crops may reflect its distinct agronomic or economic profile.

Correlation Tests (Area Harvested)



Summary of Insights

- **Year vs. Maize (0.96)**

Exceptionally strong correlation indicates maize cultivation area has expanded consistently over time, likely due to its staple status and favourable agronomic policies.

- **Year vs. Yam (0.91)**

Yam also shows a strong upward trend in harvested area, suggesting increasing demand or improved farming techniques.

Summary of Insights (Cont'd)

- **Year vs. Rice (0.85)**

Rice area has grown substantially, though slightly less than maize and yam, possibly reflecting infrastructural or irrigation constraints.

- **Year vs. Cocoa (0.16)**

Very weak correlation implies cocoa's harvested area has remained relatively static or fluctuated independently of time, possibly due to export dependency or land-use limitations.

- **Maize vs. Yam (0.95)**

Near-perfect correlation suggests these crops are often expanded together, possibly in response to similar market or climatic conditions.

Summary of Insights (Cont'd)

- **Maize vs. Rice (0.88)**

Strong alignment in harvested area trends, indicating shared cultivation strategies or complementary cropping systems.

- **Rice vs. Yam (0.91)**

High correlation reinforces the idea of synchronized expansion, likely driven by food security priorities.

Cocoa vs. Yam (0.39)

Weak correlation suggests limited overlap in land allocation or differing cultivation incentives.

Summary of Insights (Cont'd)

- **Cocoa vs. Rice (0.29)**

Low correlation points to distinct agronomic or economic drivers for cocoa compared to rice.

- **Cocoa vs. Maize (0.19)**

Minimal correlation confirms cocoa's harvested area is largely unaffected by trends in staple crop expansion.

Conclusion

The harvested area for maize, yam, and rice has grown in over time, reflecting coordinated agricultural development and food security strategies. Cocoa, however, remains an outlier with weak correlations, indicating its cultivation is shaped by different forces, likely export markets, land tenure systems, or long-term crop cycles. This divergence highlights the need for tailored policy approaches across crop types.

Contribution to GDP

Data Source: Ghana Statistical Service

Variables: Agriculture GDP, Overall (Total) GDP, Cocoa (sub-sector) GDP

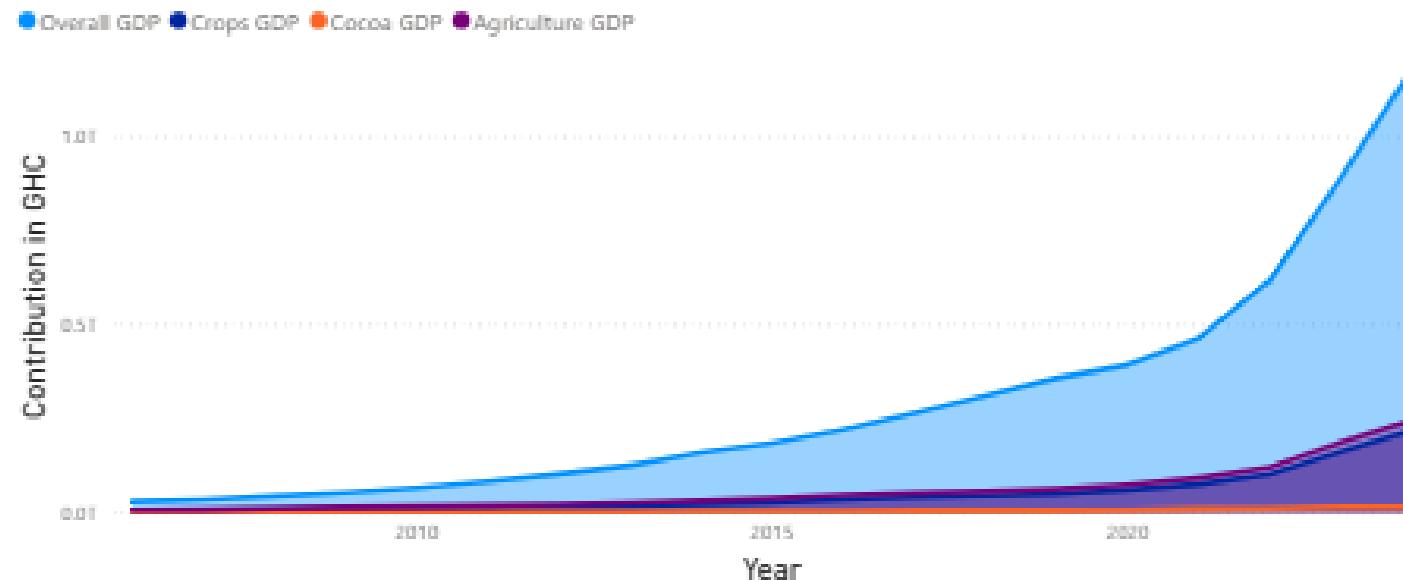
Time Coverage: 2006 – 2024

Units: Ghana Cedis

Contribution of Agriculture, Crops & Cocoa to GDP

Filters

Contribution of Agriculture, Cocoa and Crops to Overall GDP (2006-2024)



Total GDP by Cocoa

100.94bn
Ghana Cedis

Select Year(s)

2006	2009	2012
2007	2010	2013
2008	2011	2014

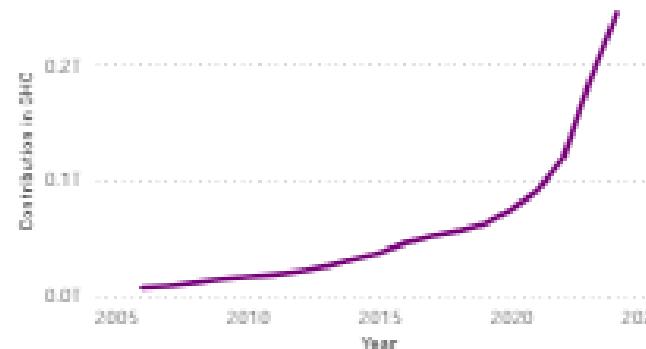
Total GDP by Agriculture

1.12T
Ghana Cedis

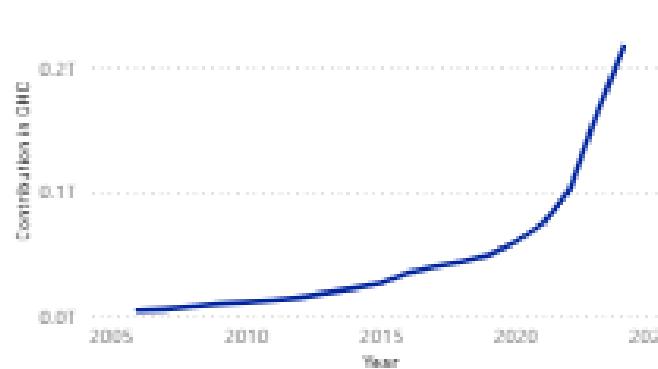
Total GDP by Crops

914.75bn
Ghana Cedis

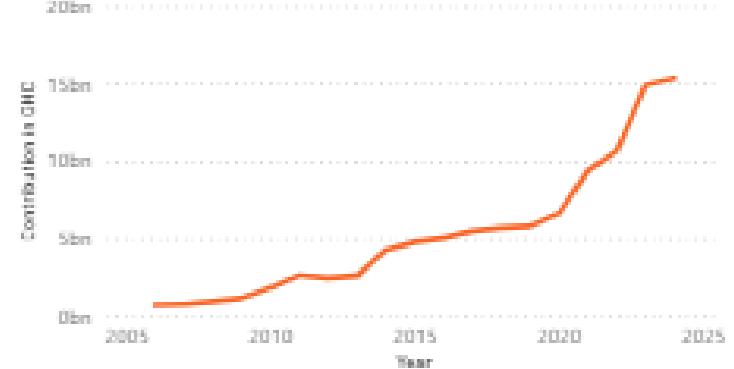
Agriculture Contribution to GDP (2006-2024)



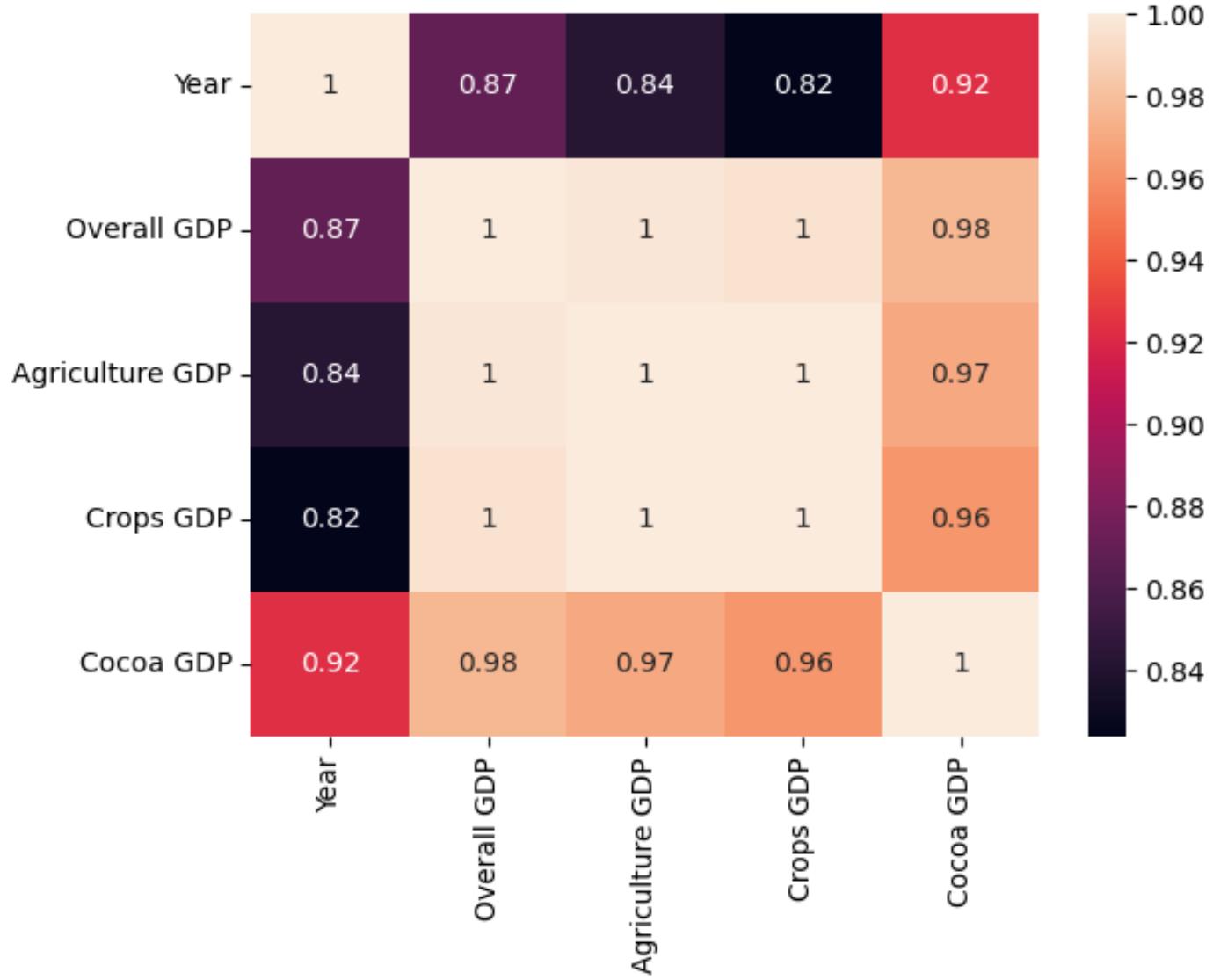
Total Crops Contribution to GDP (2006-2024)



Cocoa's Contribution to GDP (2006-2024)



Correlation tests (GDP Contribution)



Summary of Insights (Correlation Test)

- **Cocoa GDP vs. Year (0.92)**

Strong positive correlation shows cocoa's contribution to GDP has grown steadily over time, reflecting its enduring economic importance and possibly improved global pricing or production efficiency.

- **Cocoa GDP vs. Overall GDP (0.98)**

Near-perfect correlation indicates cocoa is a major driver of Ghana's total GDP, underscoring its strategic role in national economic performance.

- **Cocoa GDP vs. Agriculture GDP (0.97)**

Cocoa is tightly linked to the agricultural sector, suggesting that fluctuations in cocoa output significantly influence overall agricultural GDP.

Summary of Insights (Correlation Test)

- **Cocoa GDP vs. Crops GDP (0.96)**

High correlation confirms cocoa's central role among crop-based contributions, likely due to its export value and policy prioritization.

Conclusion

Cocoa's GDP contribution is deeply intertwined with Ghana's economic trajectory for both agriculture and overall national output. Its strong correlations across all sectors highlight its status as a cornerstone of economic growth, especially in rural livelihoods and foreign exchange earnings. This reinforces the need for sustained investment in cocoa productivity, climate resilience, and value chain development.

Regression (Agriculture Contribution to GDP)

- **Model Fit (R-squared = 0.996, Adj. R² = 0.995)**

The model explains 99.6% of the variation in Overall GDP using Agriculture GDP alone. This indicates an exceptionally strong linear relationship.

- **F-statistic = 3898, p-value = 1.59e-21**

The model is statistically significant, meaning Agriculture GDP is a highly reliable predictor of Overall GDP.

- **Coefficient for Agriculture GDP = 4.8859**

For every unit increase(Cedis) in Agriculture GDP, Overall GDP increases by approximately 4.89 units(Cedis) This reflects agriculture's strong multiplier effect on the economy.

Regression (Cocoa Contribution to Agric GDP)

- **R-squared = 0.941 (Adj. R² = 0.938)**

Cocoa GDP explains **94%** of the variation in Agriculture GDP.

Cocoa is a dominant and highly reliable predictor of agricultural economic performance.

- **F-statistic = 271.3, p < 0.0001**

The model is statistically significant.

Cocoa GDP has a strong and meaningful impact on Agriculture GDP.

- **Cocoa GDP coefficient = 13.8638 (p < 0.001)**

For every 1 unit(Cedis) increase in Cocoa GDP, Agriculture GDP increases by ≈ 13.86 units (**Cedis**).

Cocoa has a **large multiplier effect**, meaning growth in cocoa strongly boosts the entire agricultural sector

Regression (Conclusion)

- Cocoa GDP is a **powerful and statistically significant driver** of Agriculture GDP in Ghana. The strength of the relationship highlights cocoa's central role in the agricultural economy, reflecting its export value, employment impact, and historical importance.

Export Trends & Revenue

Data Source: FAOSTAT website

Variables: Export Volume, Export Revenue, Cocoa Prices

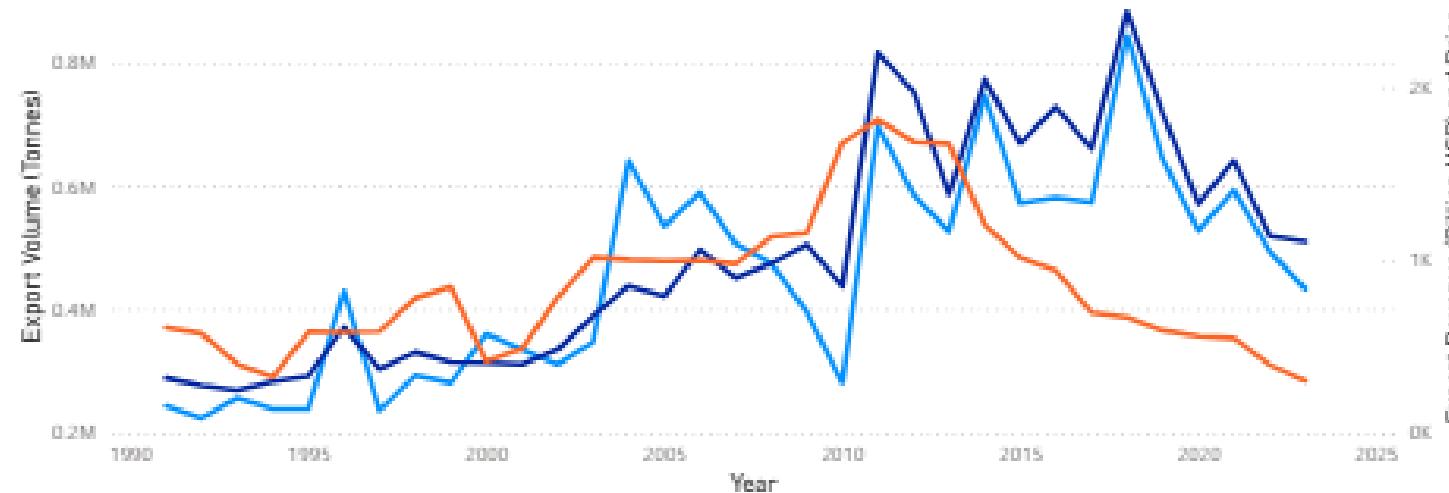
Time Coverage: 1991 – 2023

Units: Metric Tonnes, USD

Ghana's Cocoa Export Trends (1991-2023)

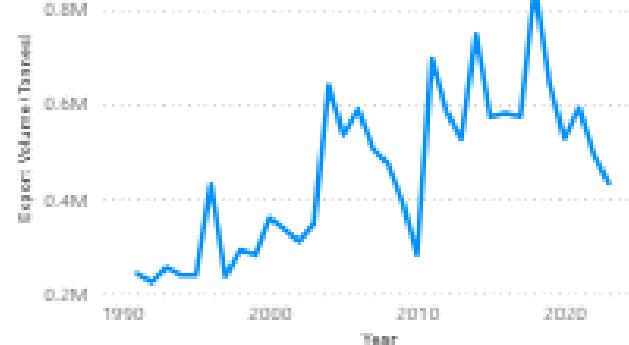
Cocoa Price, Export Volume and Export Revenue (1991-2023)

■ Export Volume ■ Export Revenue ■ Price

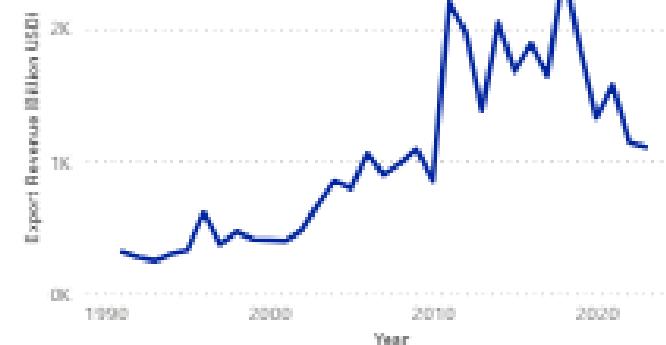


Year	1991	1995	1999	2003	2007	2011
	1992	1996	2000	2004	2008	2012
	1993	1997	2001	2005	2009	2013
	1994	1998	2002	2006	2010	2014

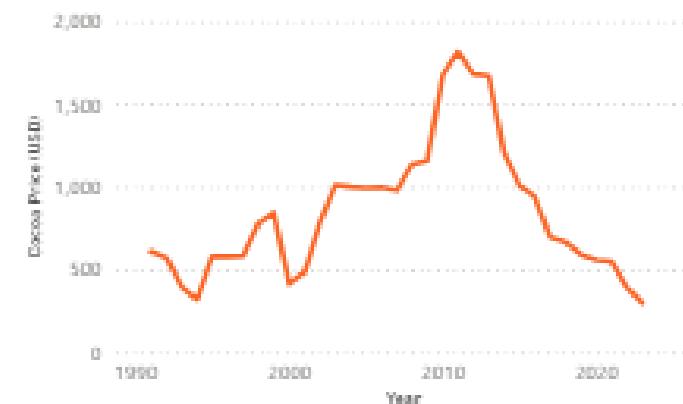
Ghana's Cocoa Export Volume (1991-2023)



Ghana's Cocoa Export Revenue (1991 - 2023)



Cocoa Export Price (1991-2023)



Key Observations and Insights

- **2014 (Higher Volumes / Solid revenue)**

Good weather and increased plantings/new farms (Volta region) helped higher output in the 2014/15 season. COCOBOD/press coverage noted favourable weather and higher purchases that year.

- **2015 (Drop / Weaker than 2014)**

The 2015/16 season was affected by adverse weather patterns (drought or strong harmattan winds in West Africa), which depressed output across the region. ICCO/market outlooks and COCOBOD cite weather as a major factor.

- **2016 (Partial rebound in revenue)**

After the 2015 weather shock, there were partial recoveries; COCOBOD reports note seasonal rebounds, and market outlooks predicted recovery in 2015/16. Also, global price movements supported revenue in parts of the year.

Key Observations and Insights

- **2017 (Decline)**

A combination of continuing farm productivity issues (aging trees, pests/diseases) and soft global prices/grindings in parts of 2016/17 contributed to weaker revenue/volumes. Sector studies highlight pests/disease and old tree stock as chronic causes.

- **2018 (Sharp rise in volume & revenue)**

The 2017/18 season benefited from improved seasonal weather patterns and recovery in supply; COCOBOD and the press reported higher-than-expected purchases and strong output in 2017/18. (Also temporary price support in part of the year.)

- **2019 (Drop again)**

After the 2018 spike, the 2019 season saw weaker volumes and prices in some quarters. COCOBOD/market reports note production variability and price adjustments; producer price changes and policy factors also affected farmer behaviour and flows

Key Observations and Insights

- **2020 (Significant drop in revenue)**
- The COVID-19 pandemic disrupted international demand and operations (COCOBOD and ICCO reported lower grindings and pandemic impacts on the market).
- Cocoa Swollen Shoot Virus (CSSV), ageing/low-productivity farms and seasonal weather problems continued to reduce Ghana's graded purchases in 2019/20
- The demand for cocoa in 2019/20 was impacted by the pandemic. Lockdowns and other pandemic-related restrictions prevented seasonal and out-of-home consumption of chocolate and cocoa products. This resulted in a 2.4% drop in global grindings for the 2019 season.
- **2021 (Partial recovery)**

Recovery efforts (productivity enhancement programs, seedling distribution, and some weather improvements) and a partial rebound in buying were cited; COCOBOD's 2020/21 reporting notes measures to support farmers and purchases. Global market variability also influenced revenue.

Key Observations and Insights

- **2022 (Lower volumes & revenue)**

Structural productivity issues (aging trees, Cocoa Swollen Shoot Virus (CSSV)), erratic weather patterns, and price weakness in some months. Sector reports and analysis continued to emphasize low yields and disease pressure as major headwinds for the 2021/22 seasons.

- **2023 (Lower Volumes, Revenue falls further)**

Continuous supply-side issues, disease (CSSV) effects, and low farm productivity; by 2023, COCOBOD was under increasing financial and marketing strain, which affected payments and incentives; smuggling and illegal cross-border flows began to appear as a material drain on recorded exports. According to Reuters and COCOBOD statements, smuggling and difficulties with financing and payments contributed to significant unreported outflows in 2023/24 (reported later), and these pressures were increasing in 2022/23.

Recommendations

- Invest in improved seedlings, disease-resistant varieties, fertilizer support, and farmer training.
- Promote domestic processing through tax incentives and public-private partnership to stabilize income and reduce export vulnerability and increase GDP contribution.
- Scale irrigation, drought-tolerant varieties, and climate-smart farming to reduce volatility in harvested area and stabilize GDP contributions.
- Increase mechanization, storage facilities, and input subsidies for staple crops because these crops are expanding rapidly and can reduce over-dependence on cocoa.

Recommendations

- Align cocoa policies with broader agricultural strategies (e.g., PFJ, irrigation master plans) because coordinated policies amplify sector-wide growth.
- Reform land tenure, support farm rehabilitation, and incentivize youth participation since cocoa area is not expanding naturally; structural constraints must be addressed.
- Adopt modern data systems (GIS mapping, digital farmer registries) because better data improves forecasting, planning, and policy evaluation.
- Use price stabilization funds, forward contracts, and diversification into niche cocoa (organic, fine-flavour) to protect farmers and stabilizes national revenue.

References

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