

ANALYSING U.S. FOOD IMPORT TRENDS USING STATISTICAL ANALYSIS

A DATA DRIVEN APPROACH TO SUPPLY CHAIN AND
RISK FORECASTING

G R O U P 1

F A T I M A
S U N N Y
D U S H Y A N T
A S H W I N



ANALYTICAL METHODS



Data Collection

U.S. Dataset: Publicly available via
<https://catalog.data.gov/dataset/u-s-food-imports>

Data Preparation

- Datasets cleaned using R libraries (dplyr, tidyr, pandas).
- Separate datasets were created for each category.

Analysis

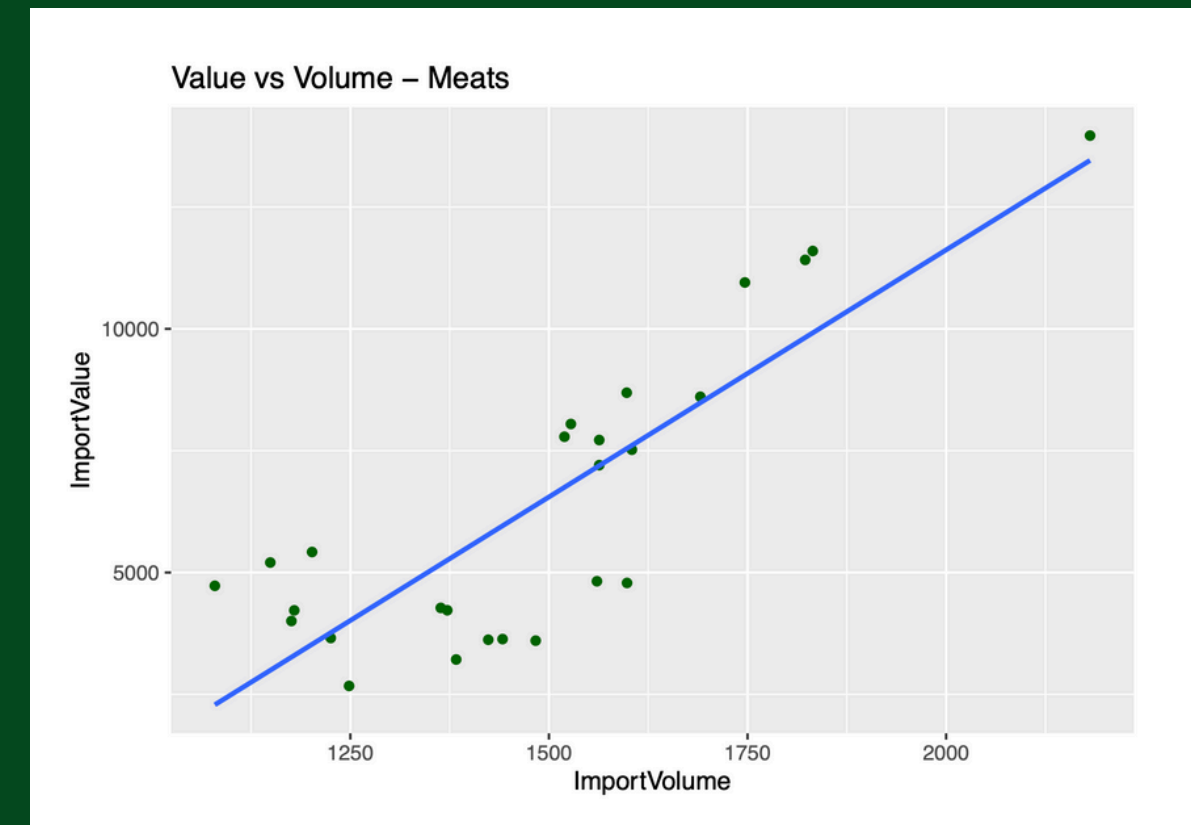
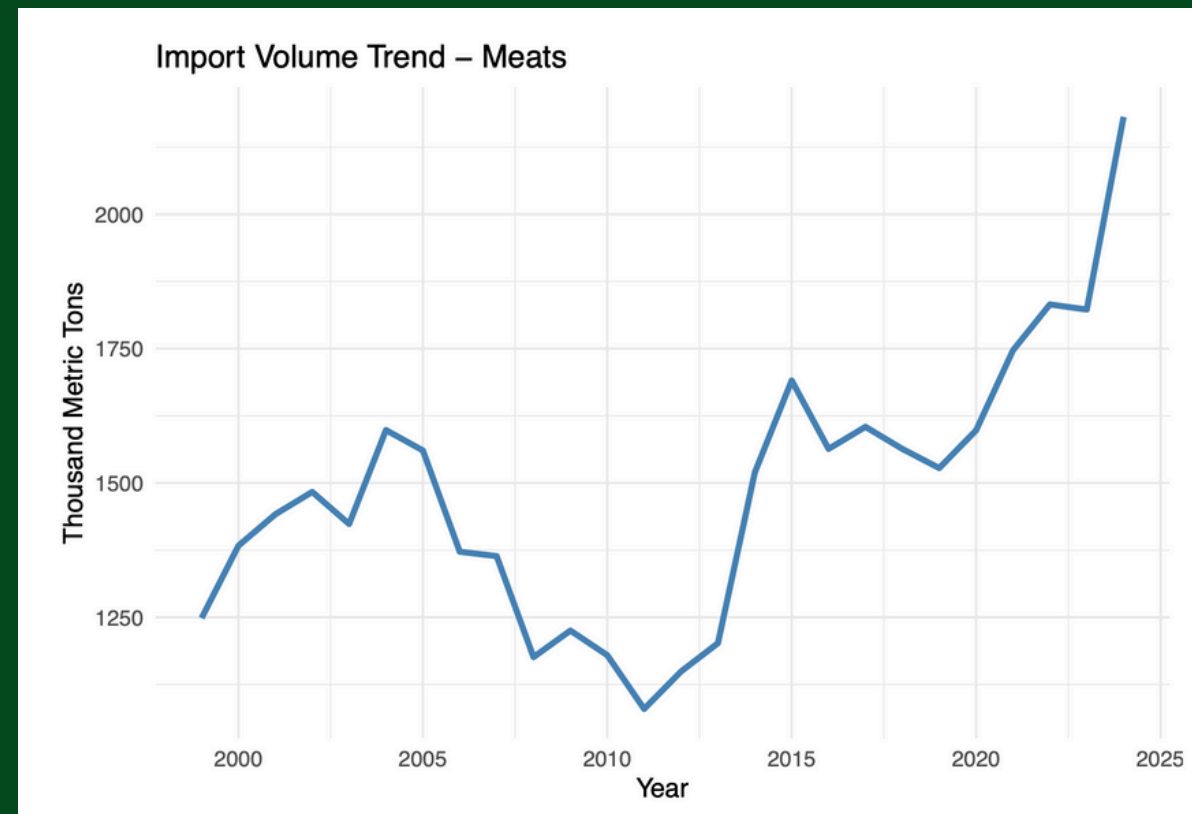
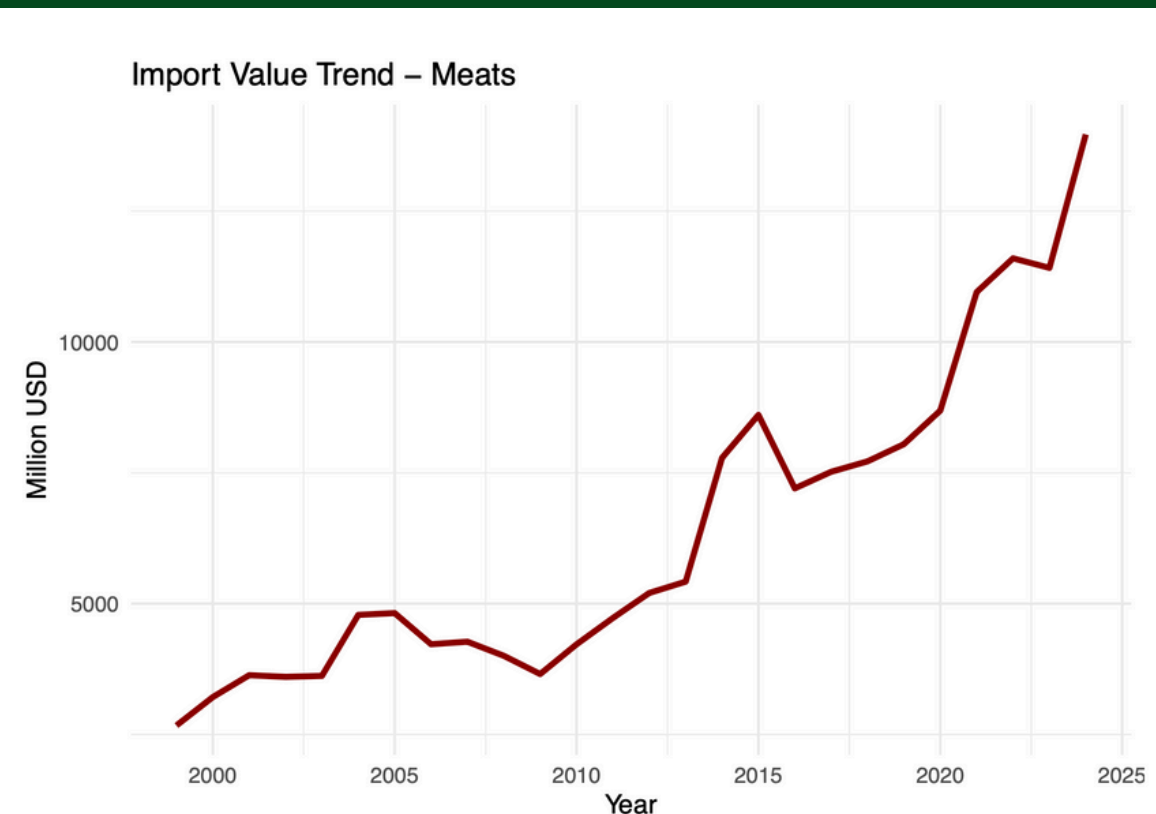
- Time series trends plotted for import value and volume (2000–2025).
- Correlation analysis conducted using Pearson's coefficient.
- Regression-based forecasting to project future trends up to 2030
- Volatility computed as YoY % change in import value.

RESEARCH OBJECTIVES

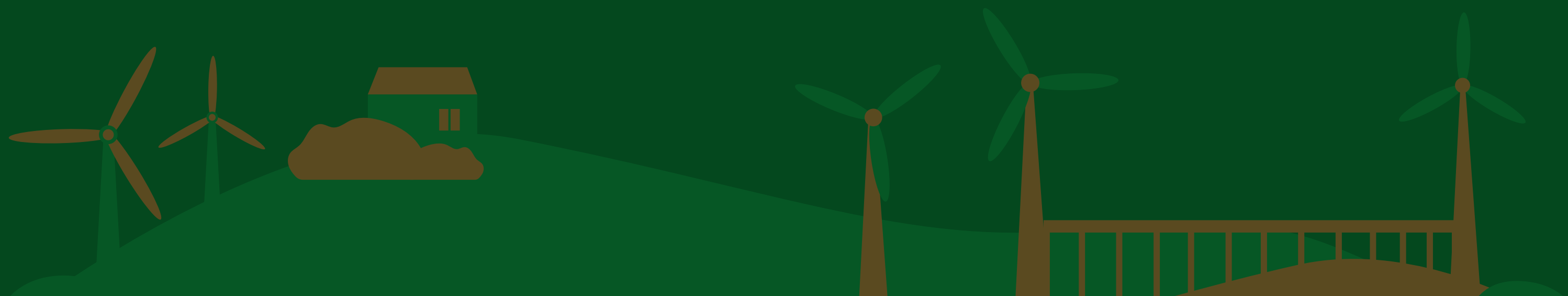
- How have food import volumes and values evolved over time?
- What is the relationship between prices (value/volume) and import volumes?
- Can we forecast future import trends accurately?
- Which food categories show significant volatility?
- What prescriptive actions can enhance supply chain resilience?



MEATS

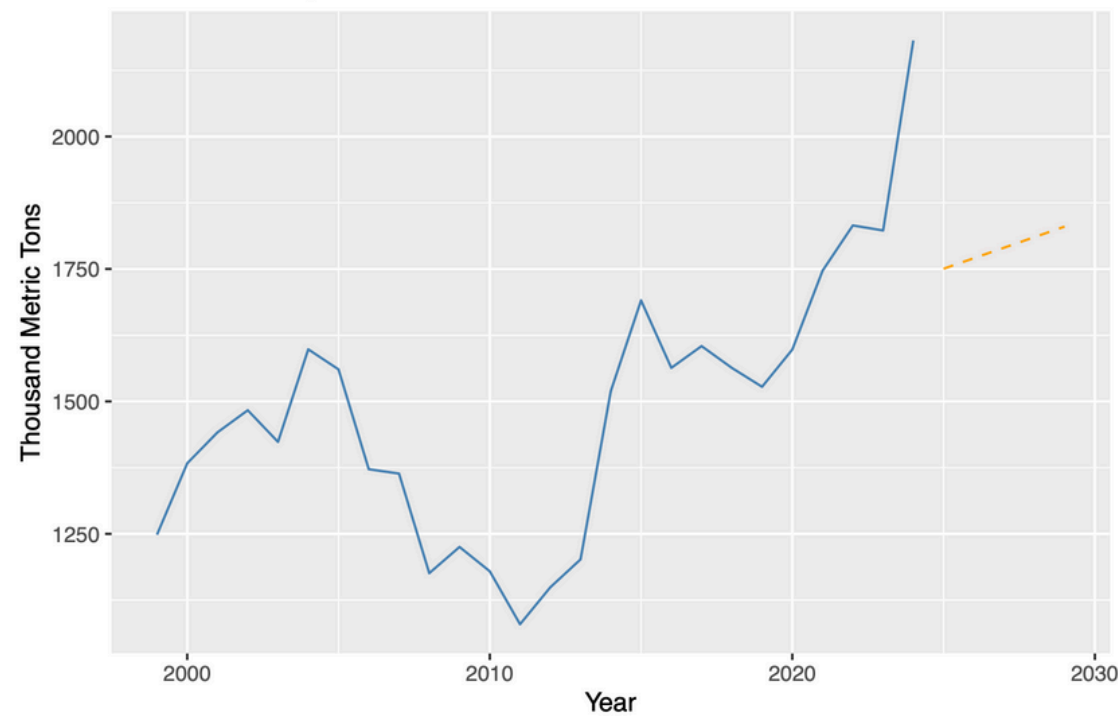


- **Trend Analysis:** Steady growth in both import value and volume from 2000 to 2025.
- **Correlation:** Strong positive correlation ($r = 0.84$) between value and volume.

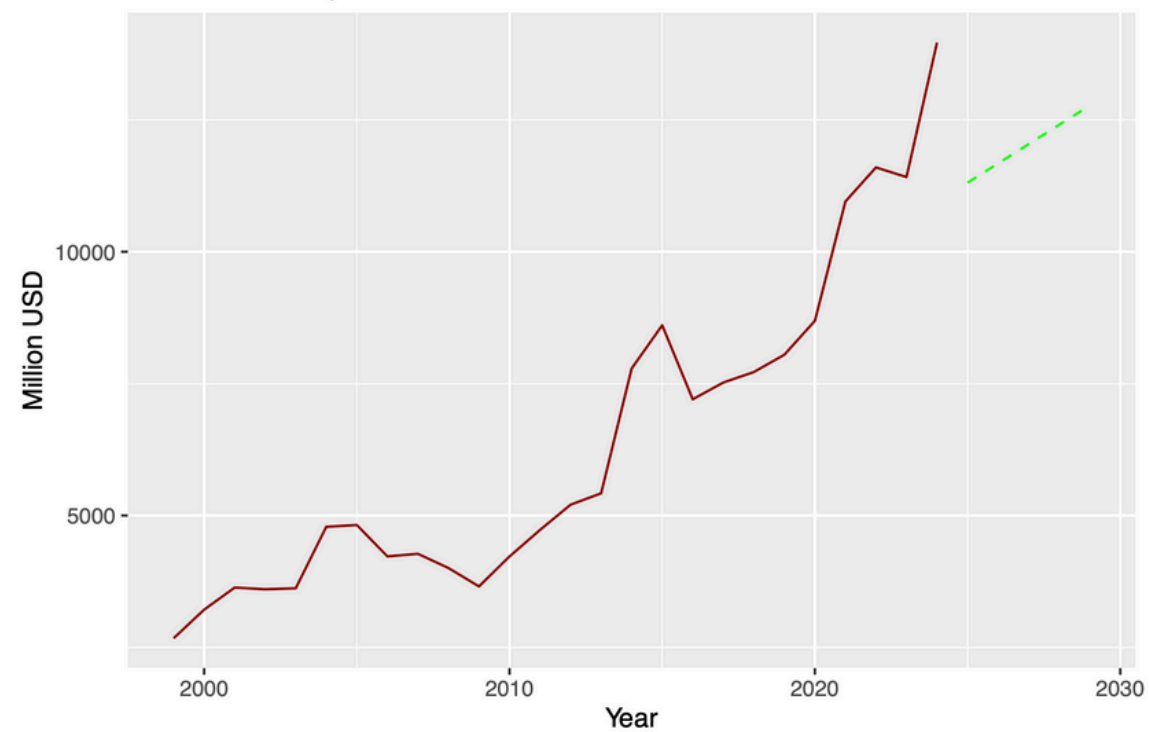


MEATS

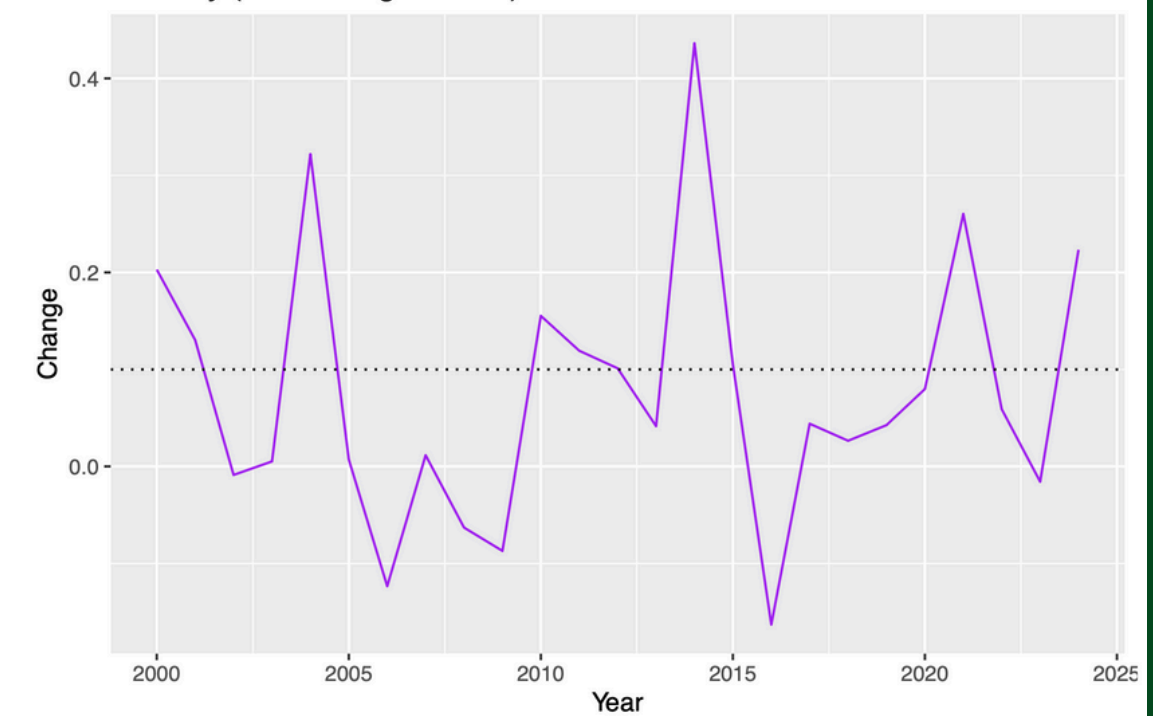
Forecasted Import Volume – Meats



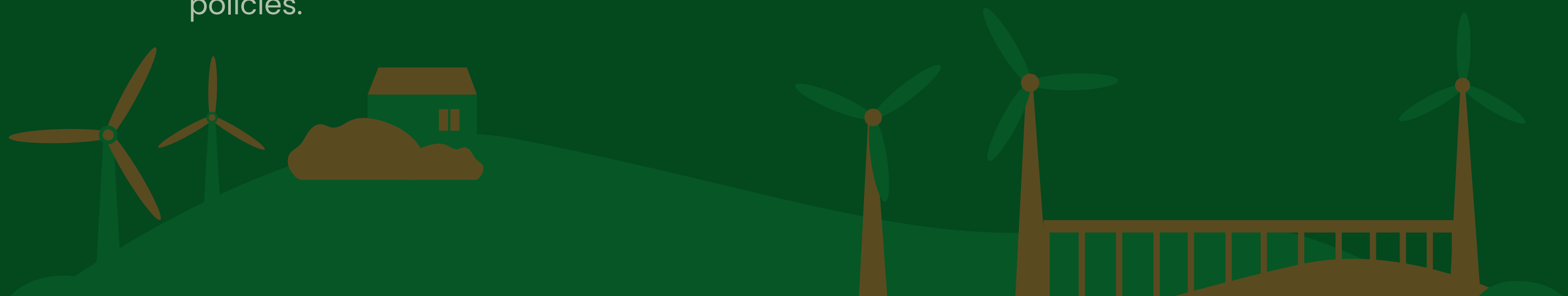
Forecasted Import Value – Meats



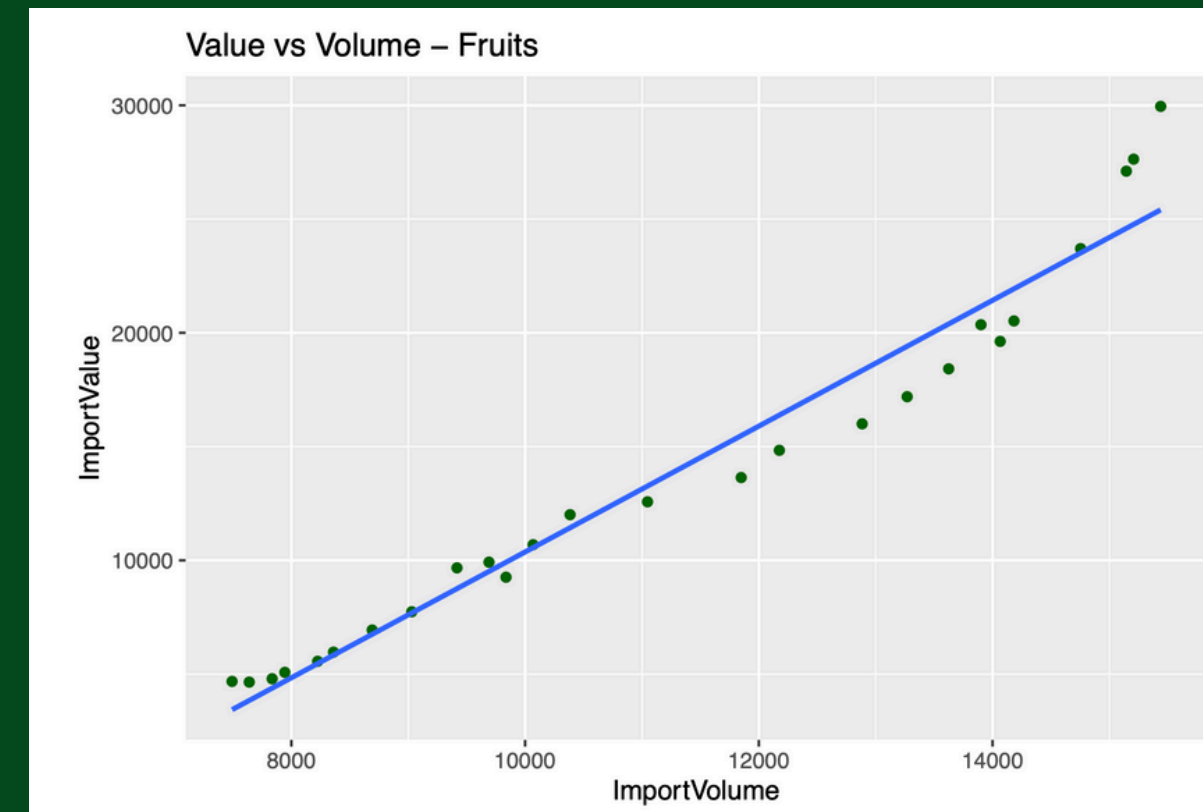
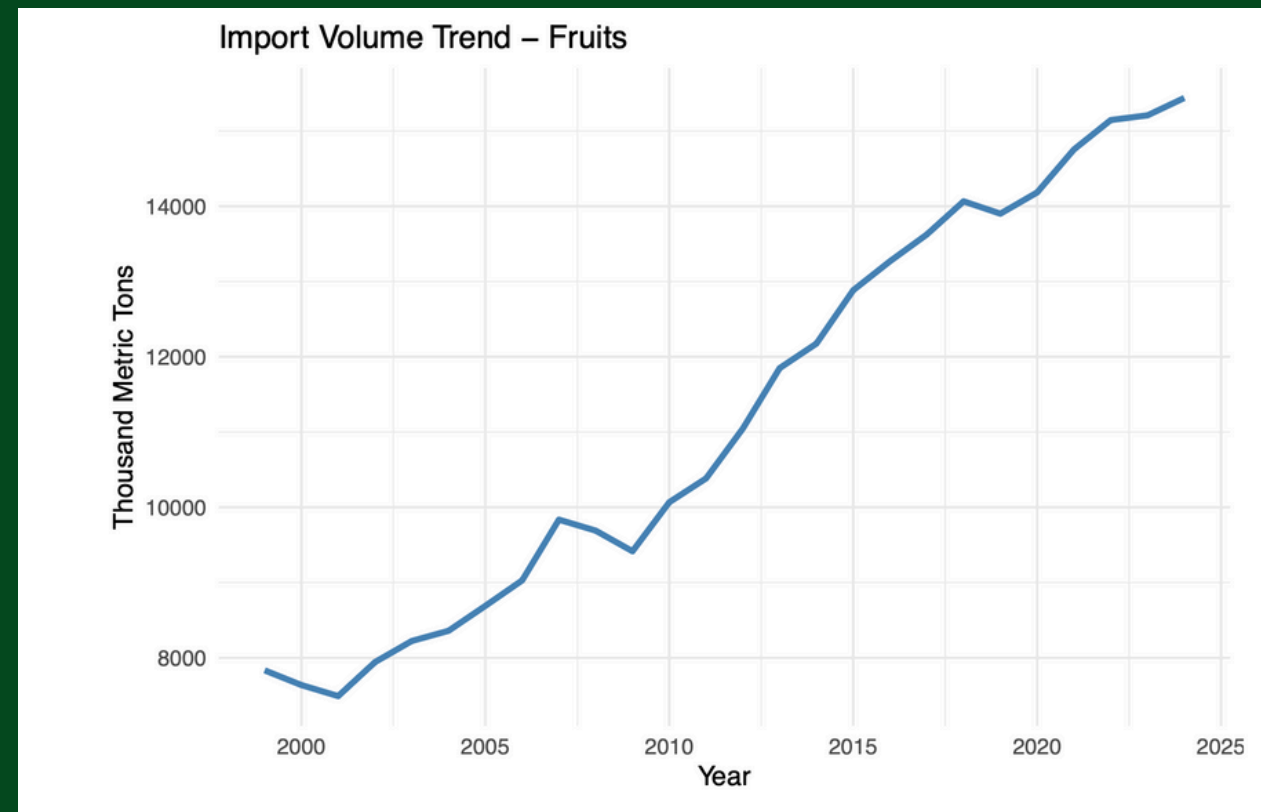
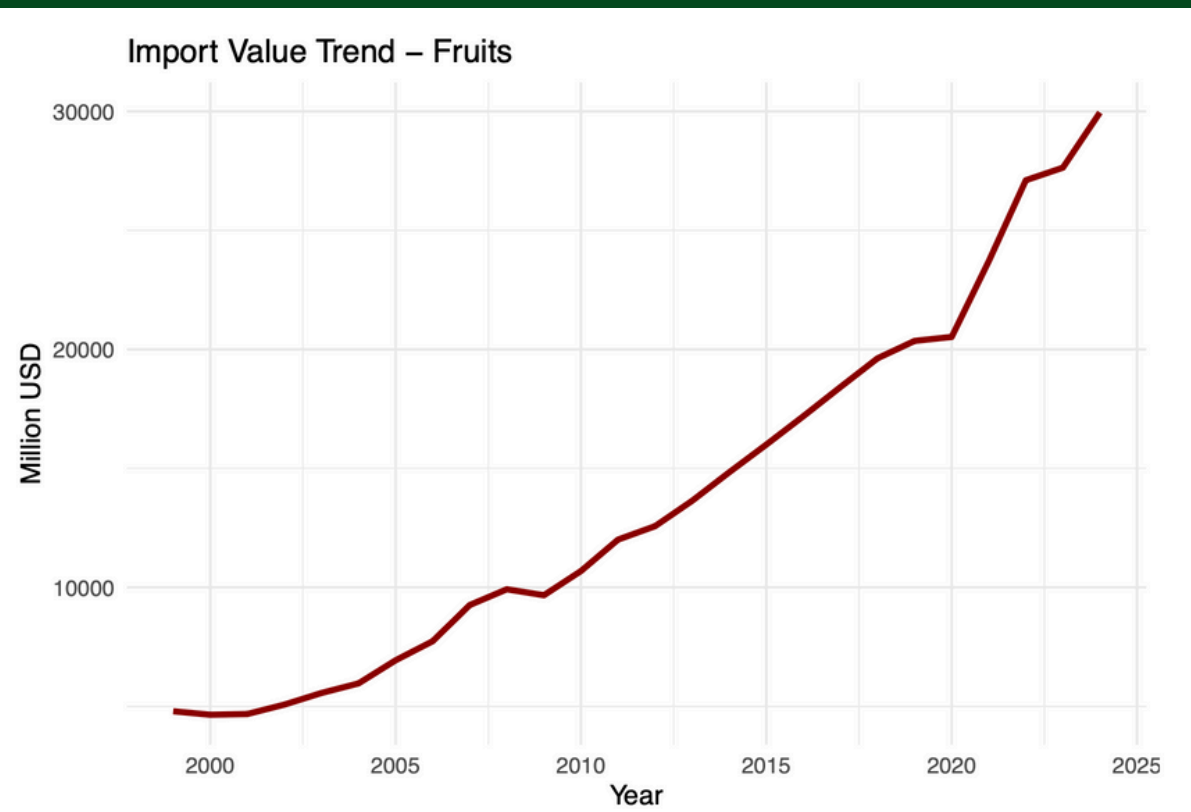
Volatility (YoY Change > 10%) – Meats



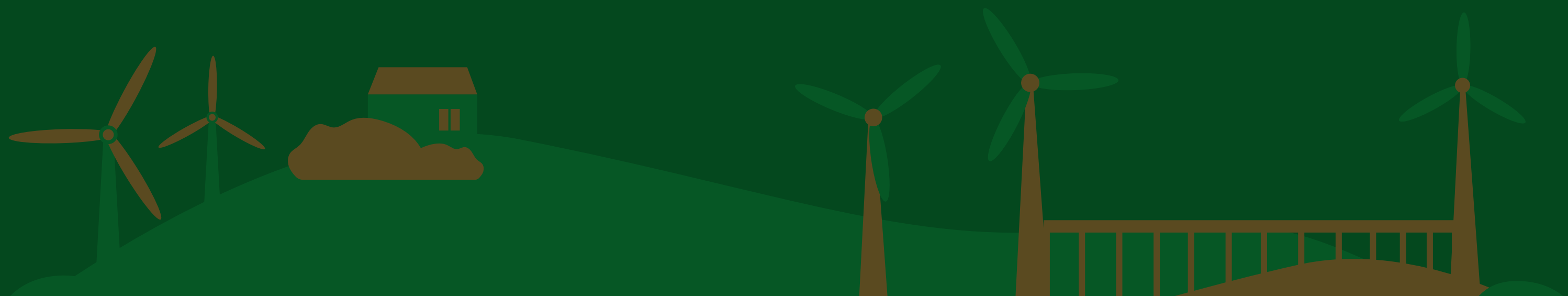
- **Forecast (2026–2030):** Linear growth projected in both metrics.
- **Volatility:** Moderate volatility; years with >10% change suggest need for buffer stocks.
- **Prescriptive Insight:** Diversification and inventory buffering in volatile years.
- **Recommendation:** Optimize import contracts during periods of low global prices and develop buffer stock policies.



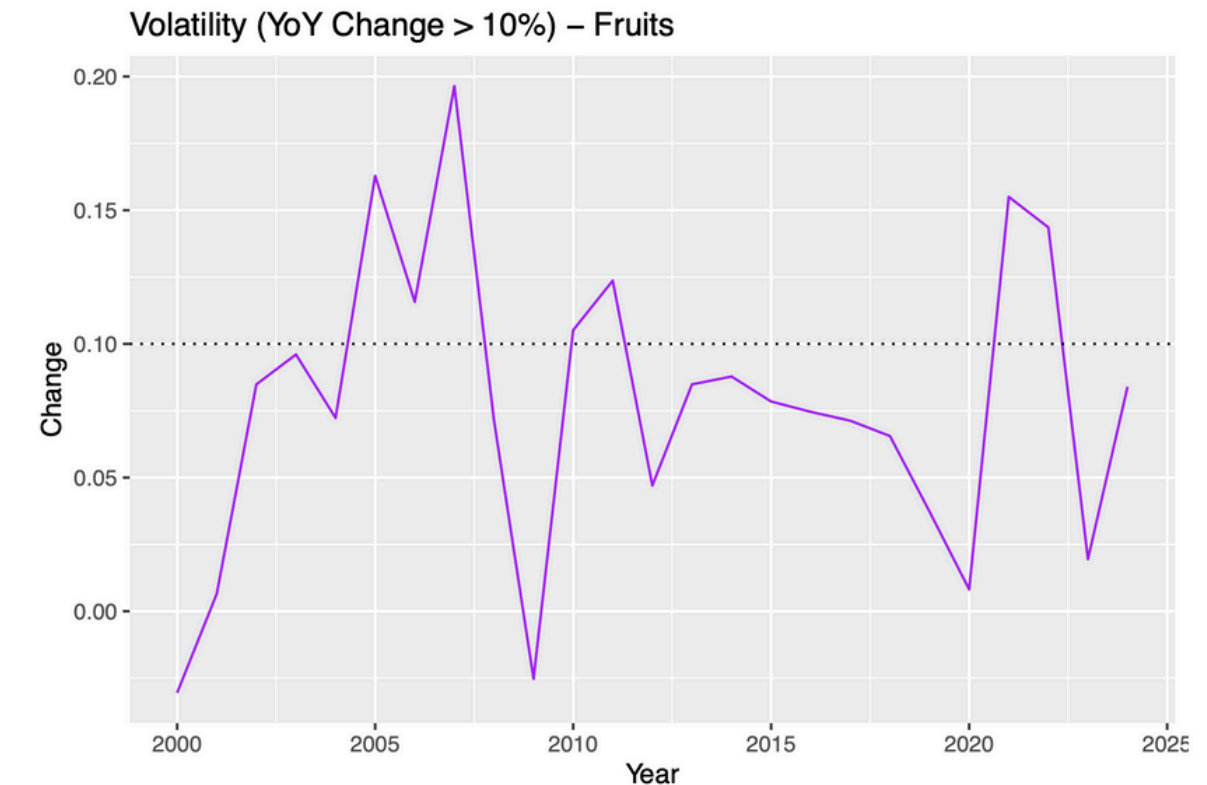
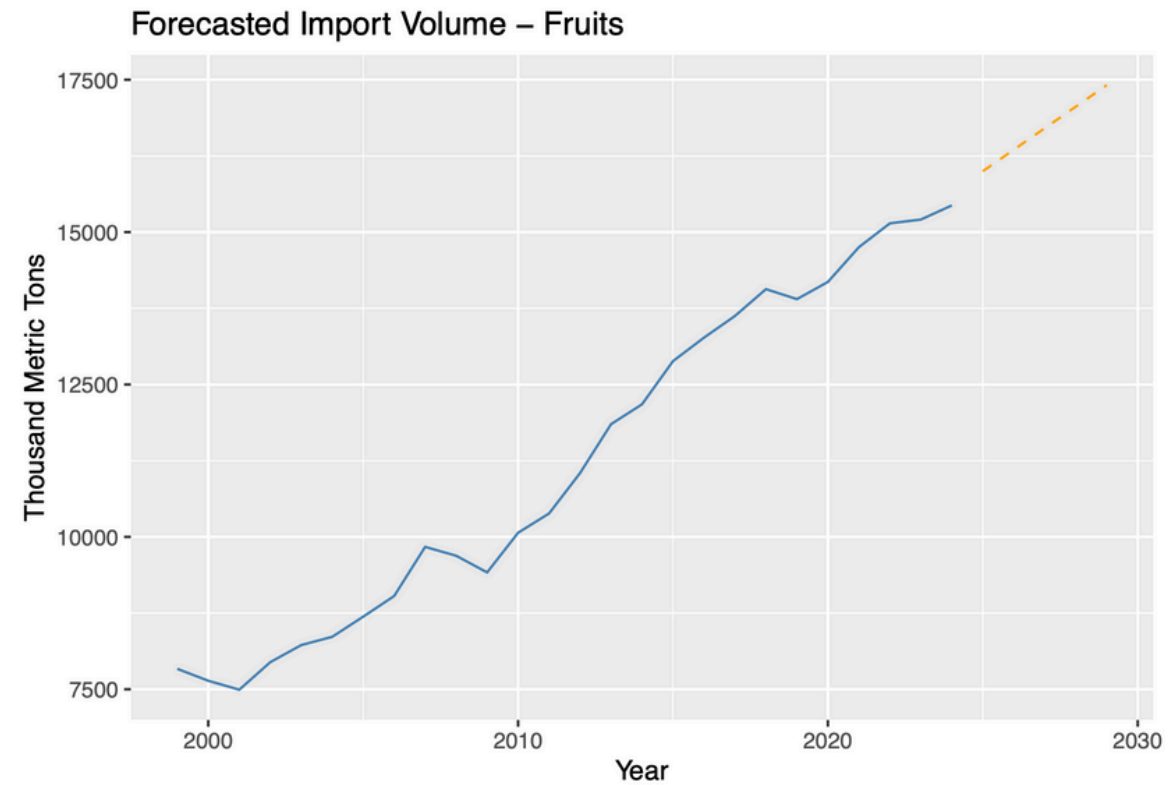
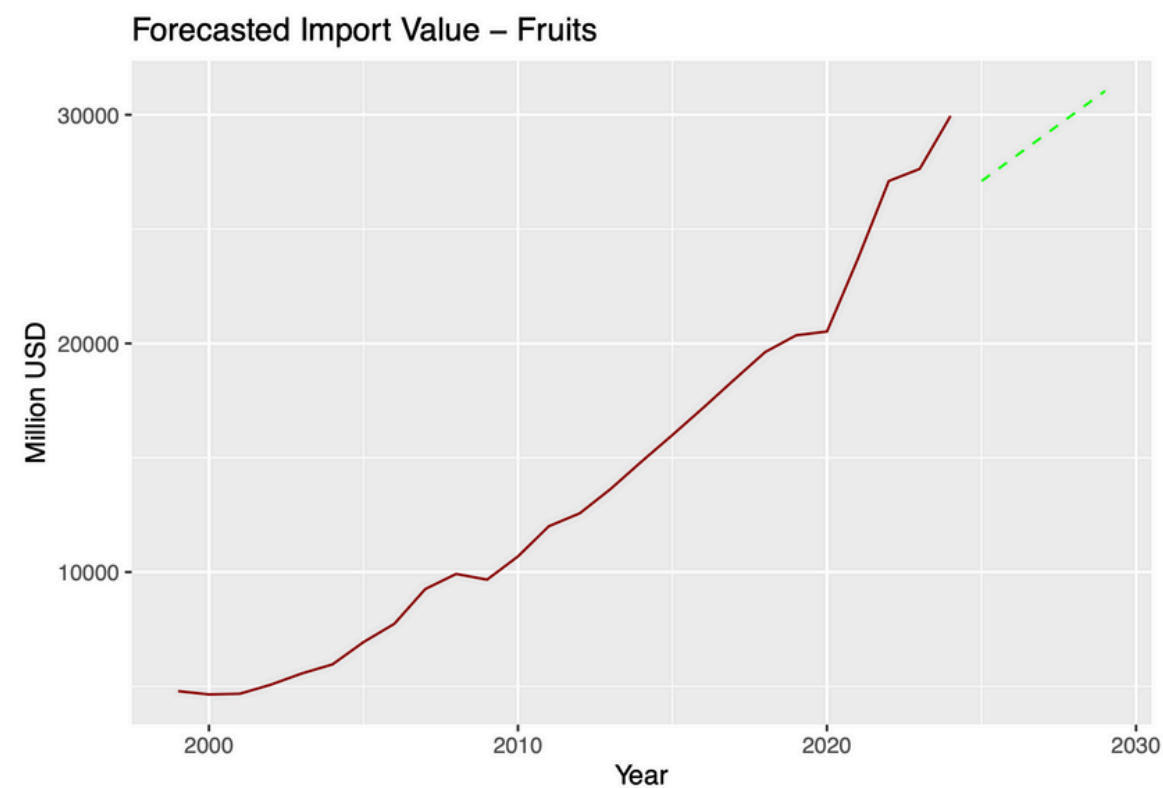
FRUITS



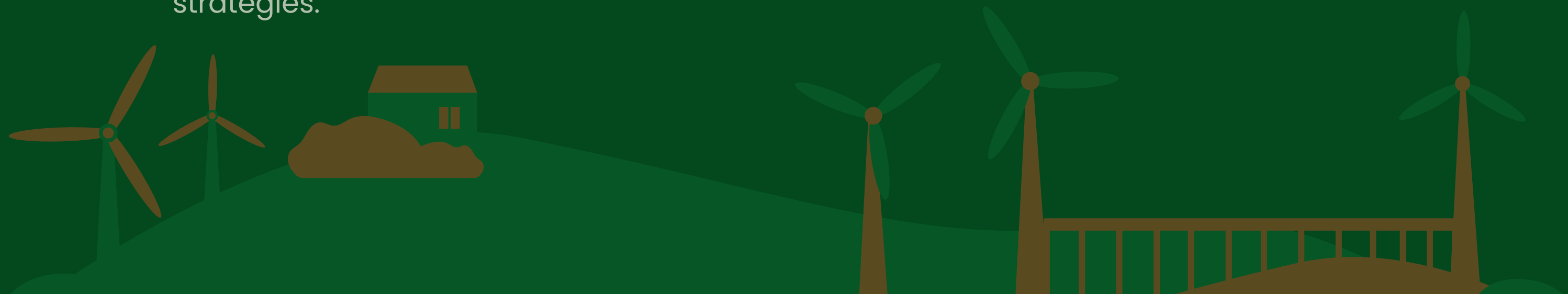
- Trend Analysis: Significant increase in imports, with rising value and volume.
- Correlation: Very strong correlation ($r = 0.98$).



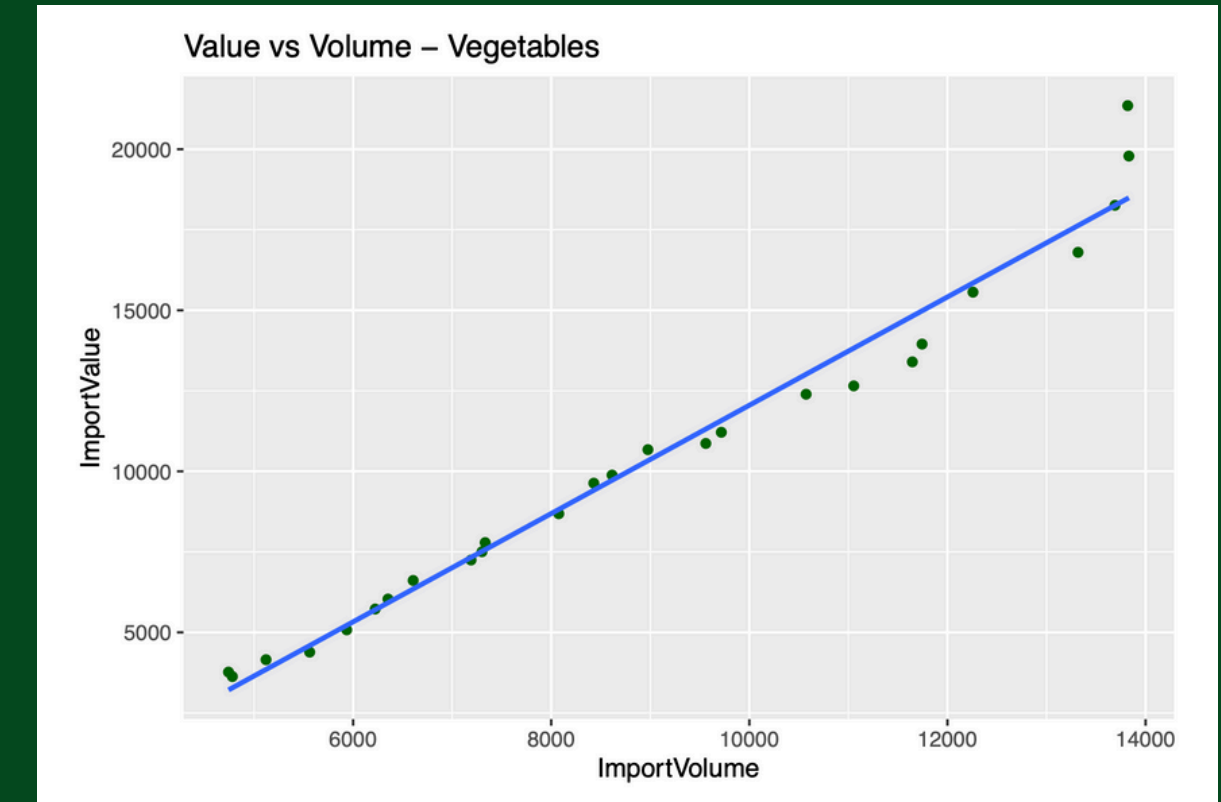
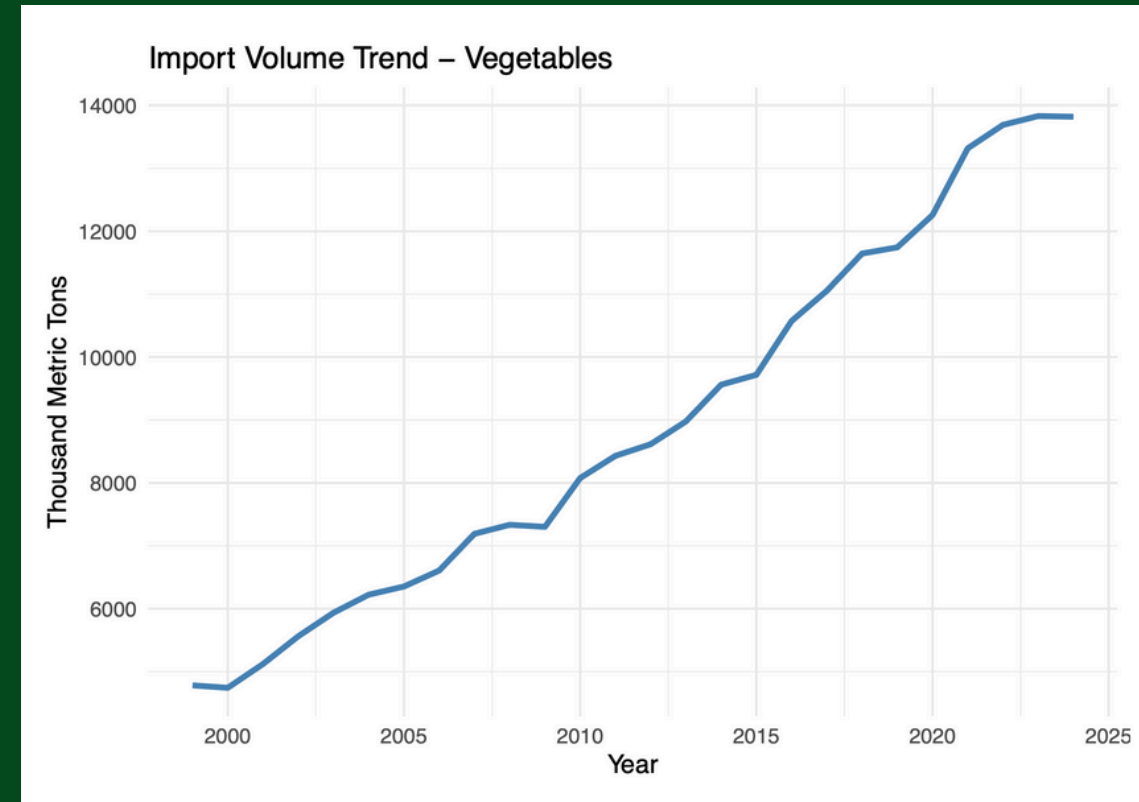
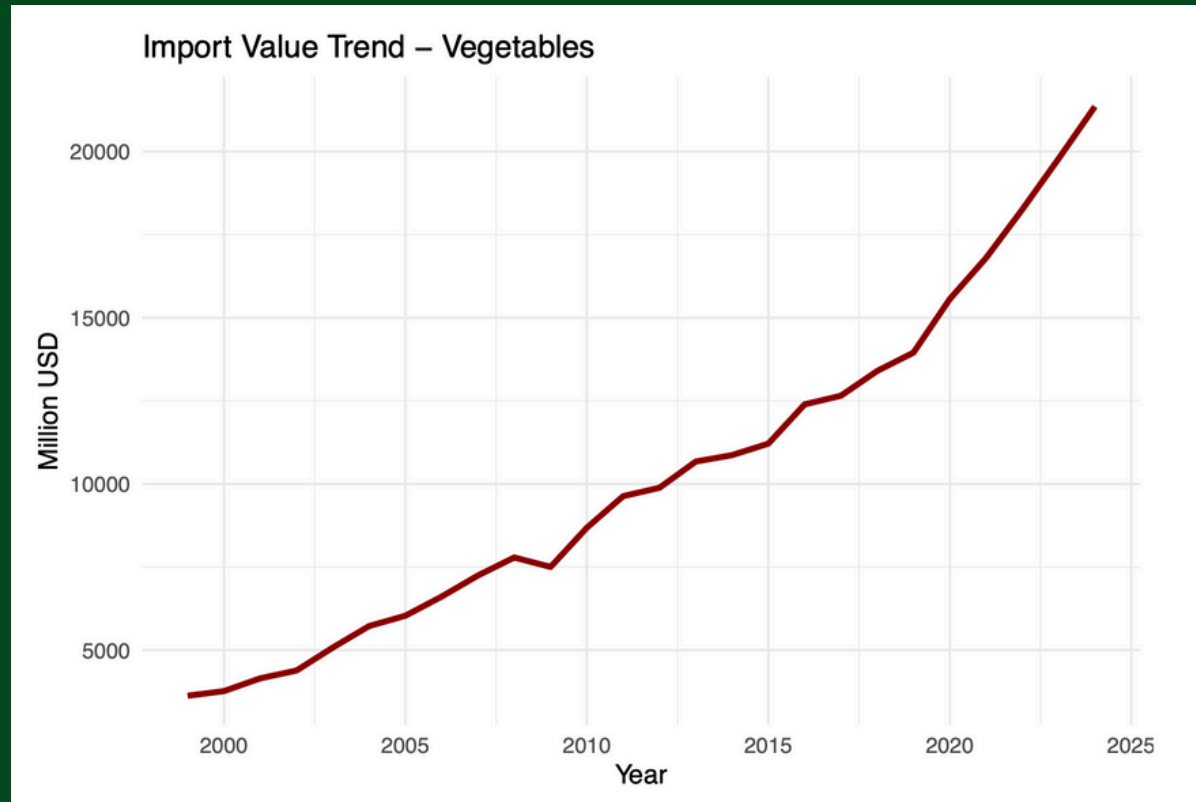
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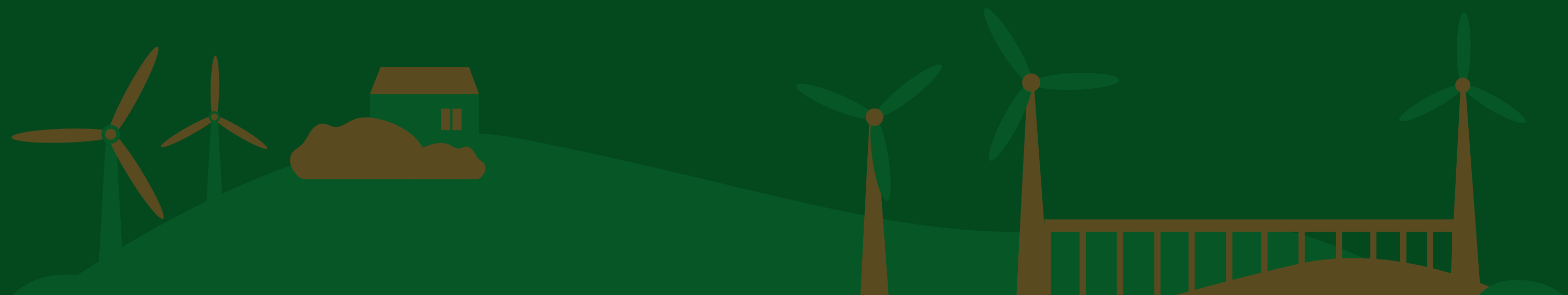
- Forecast (2026–2030): Continued upward trend.
- Volatility: Mild to moderate; spike years exist.
- Prescriptive Insight: Diversify sources and improve trade response strategies.
- Recommendation: Encourage local production of critical fruit types and adopt seasonal stockpiling strategies.



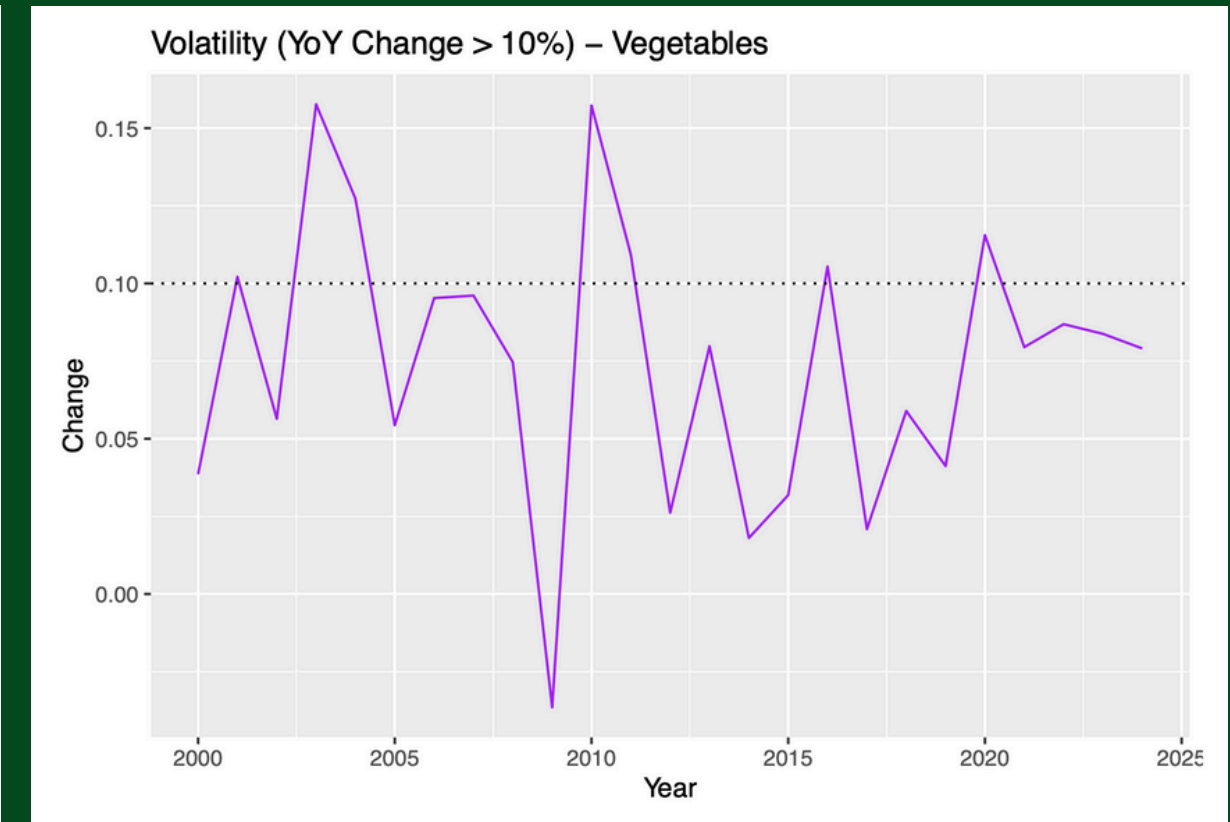
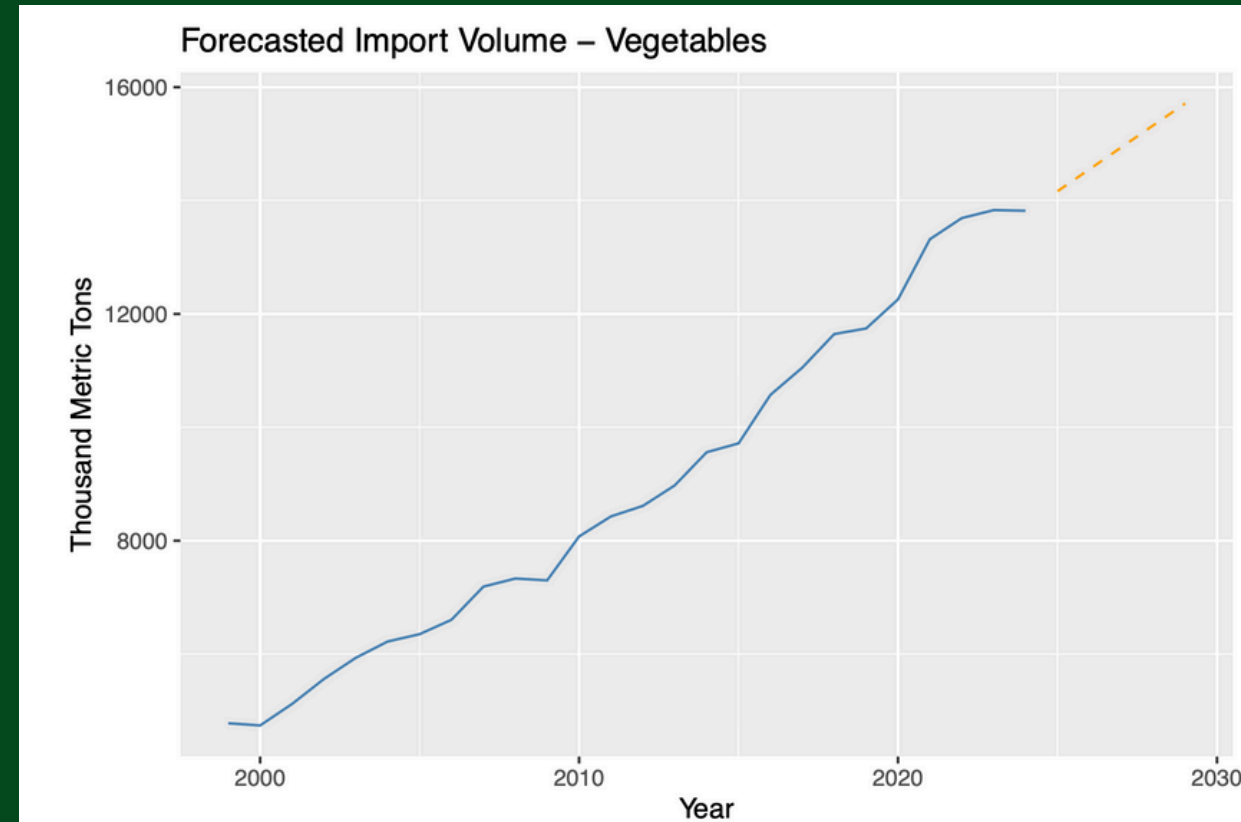
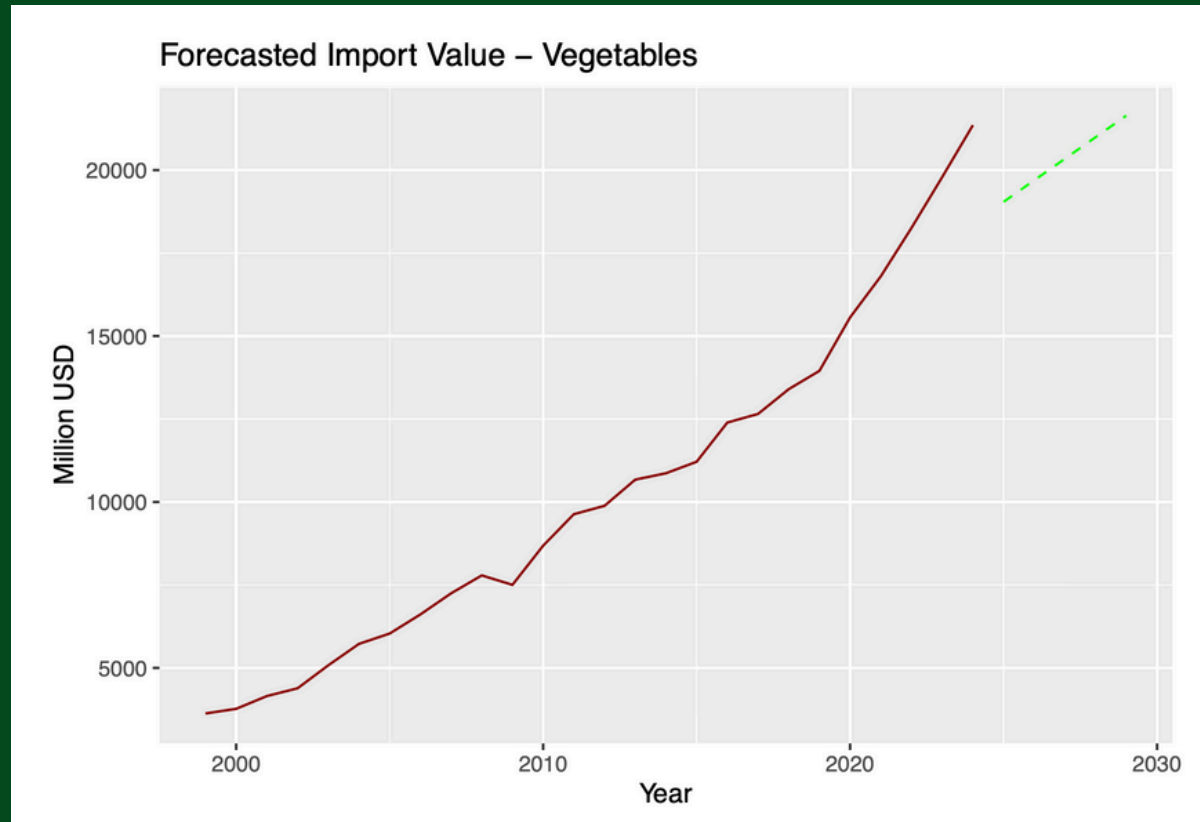
VEGETABLES



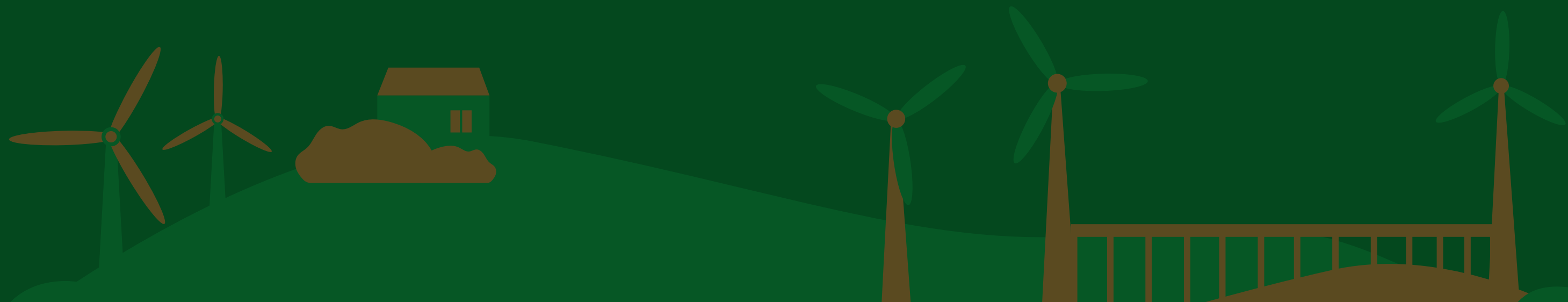
- Trend Analysis: Rapid rise in import volume and value over the years.
- Correlation: Highest observed correlation ($r = 0.99$).



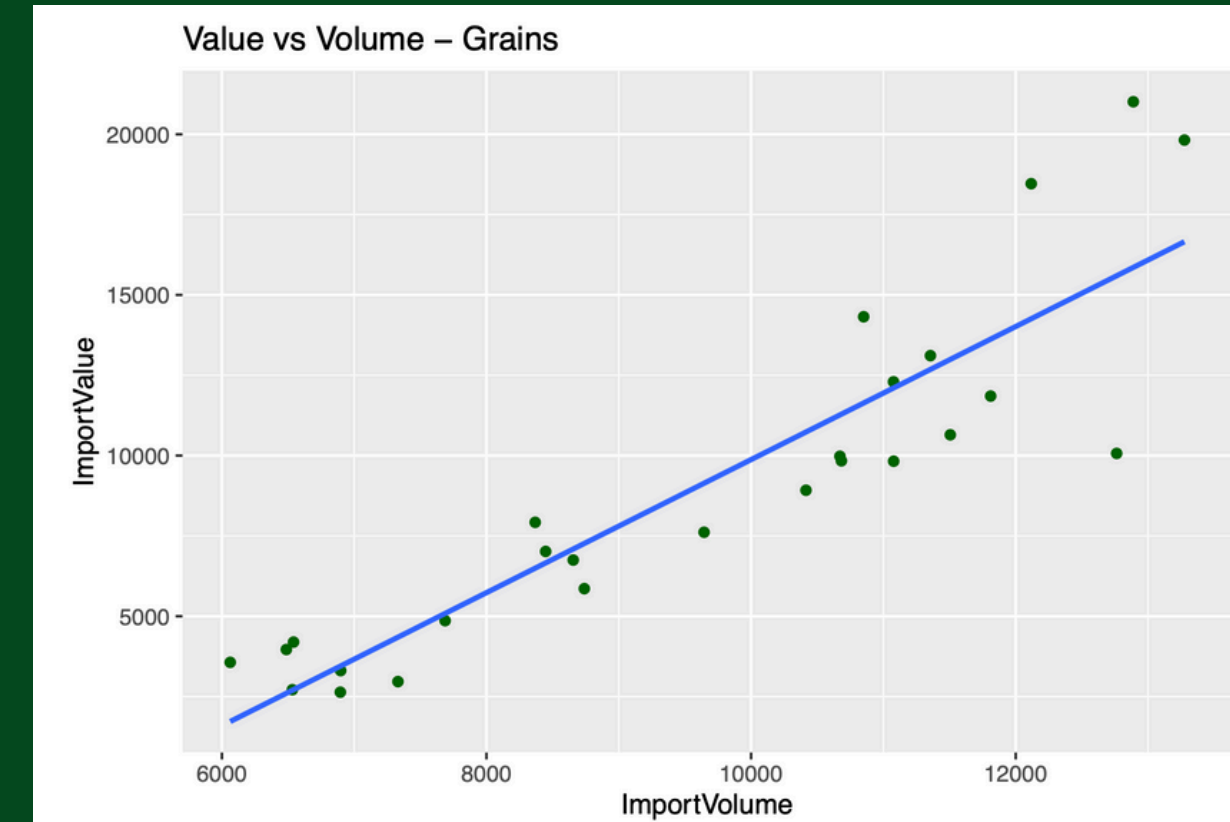
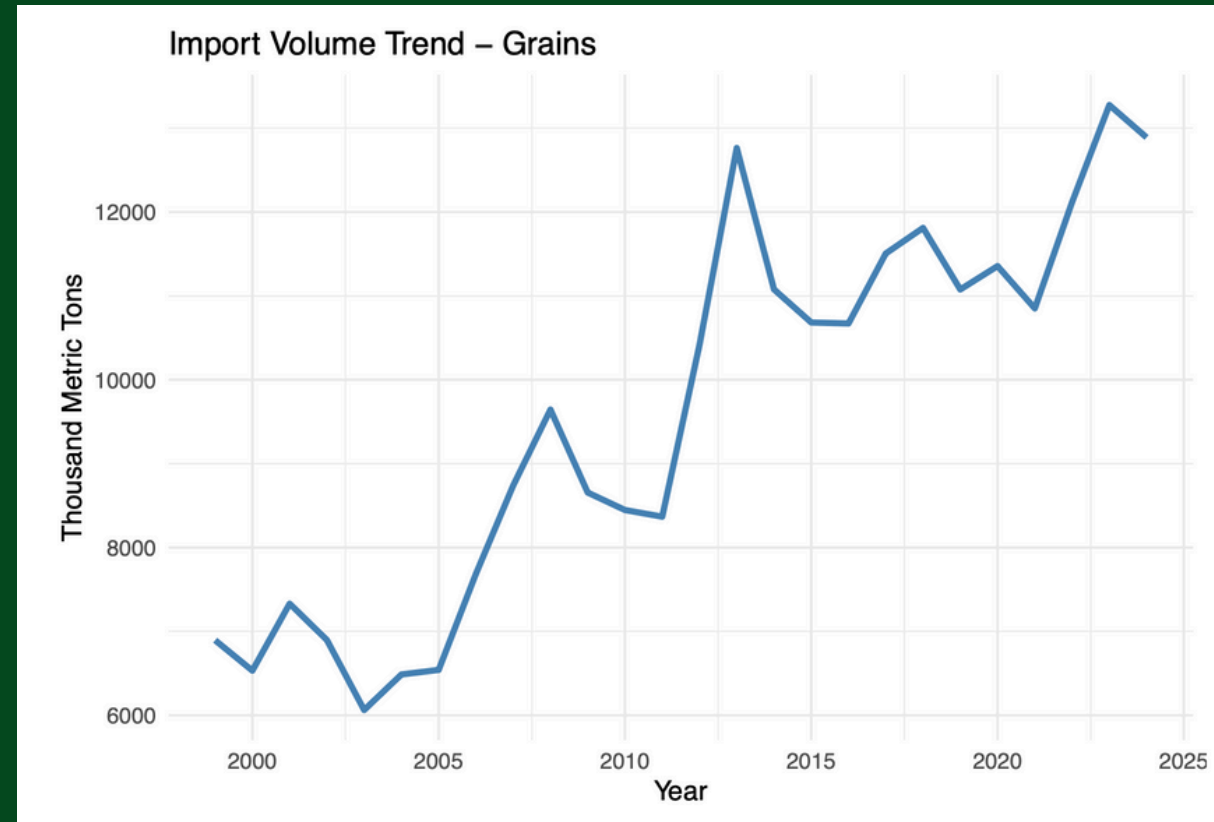
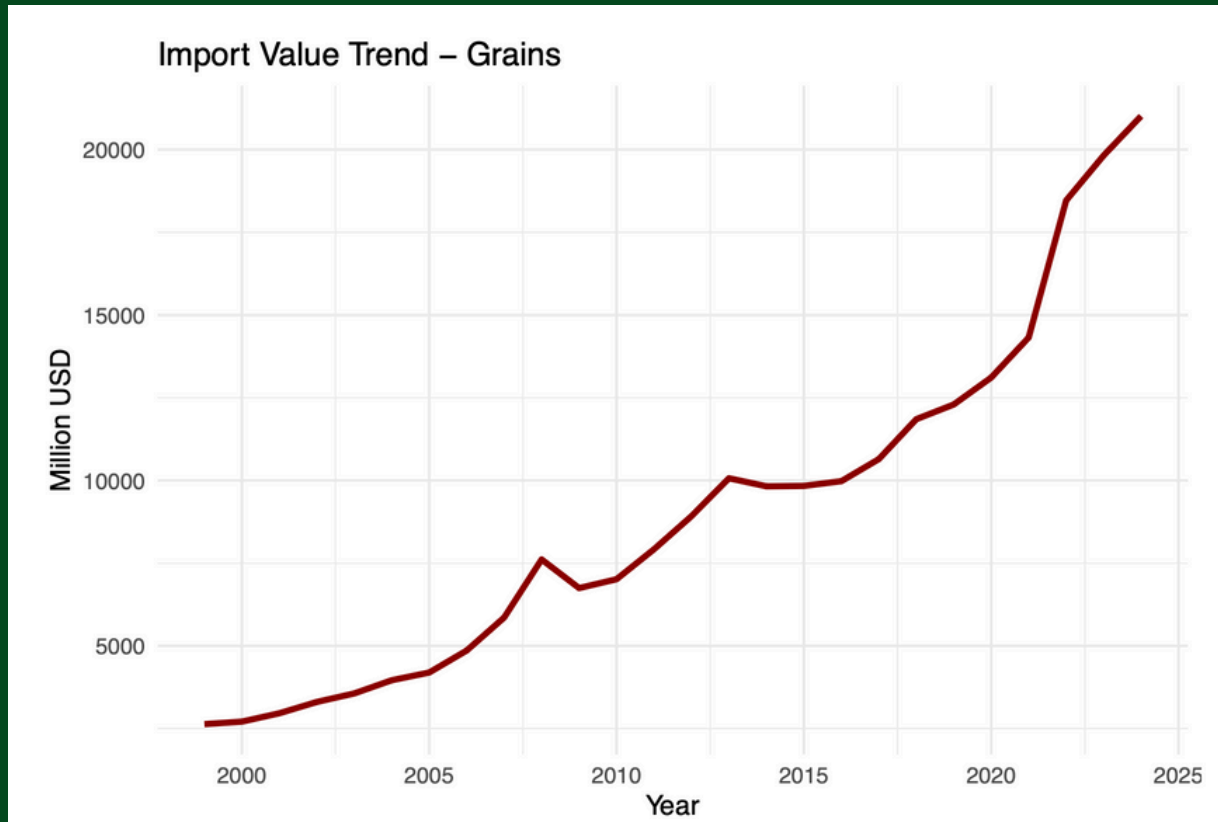
VEGETABLES



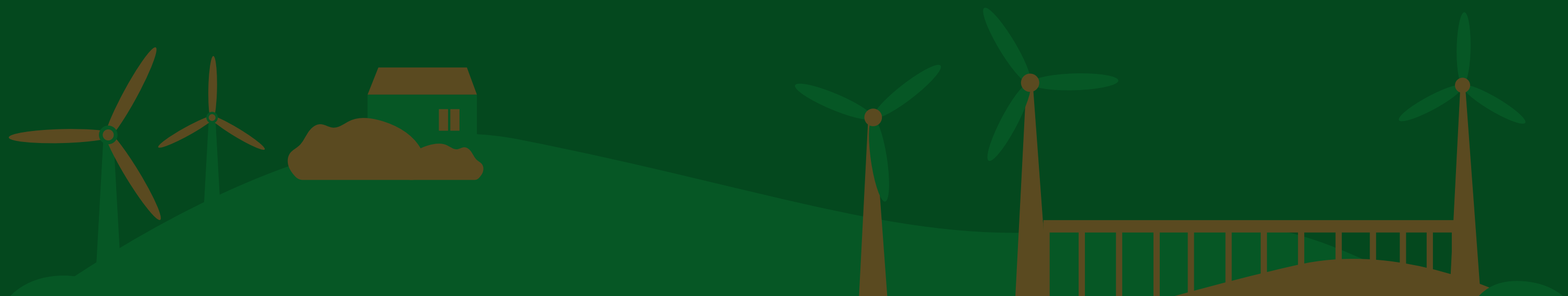
- Forecast (2026–2030): Predictable linear trend.
- Volatility: Lowest volatility across categories.
- Prescriptive Insight: Focus on long-term policy coordination to handle future spikes.
- Recommendation: Support vertical farming and greenhouse initiatives to improve resilience.



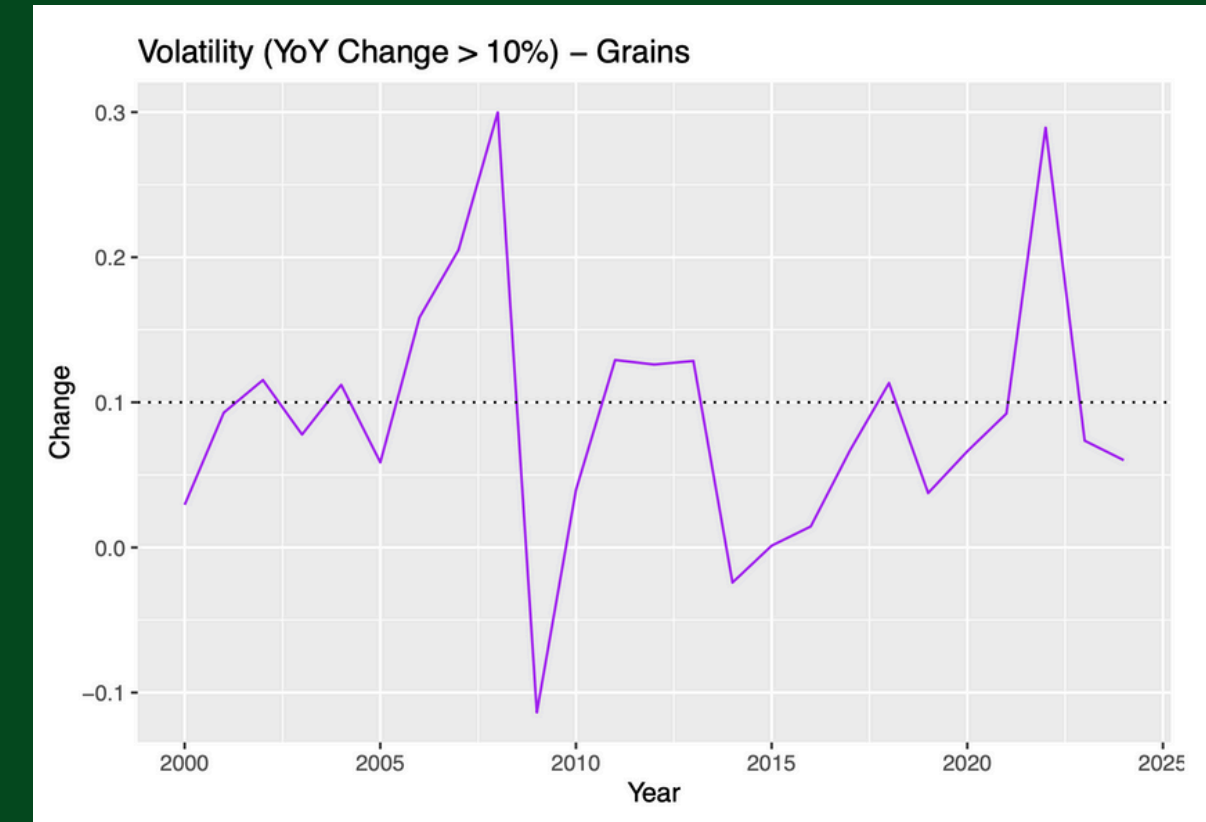
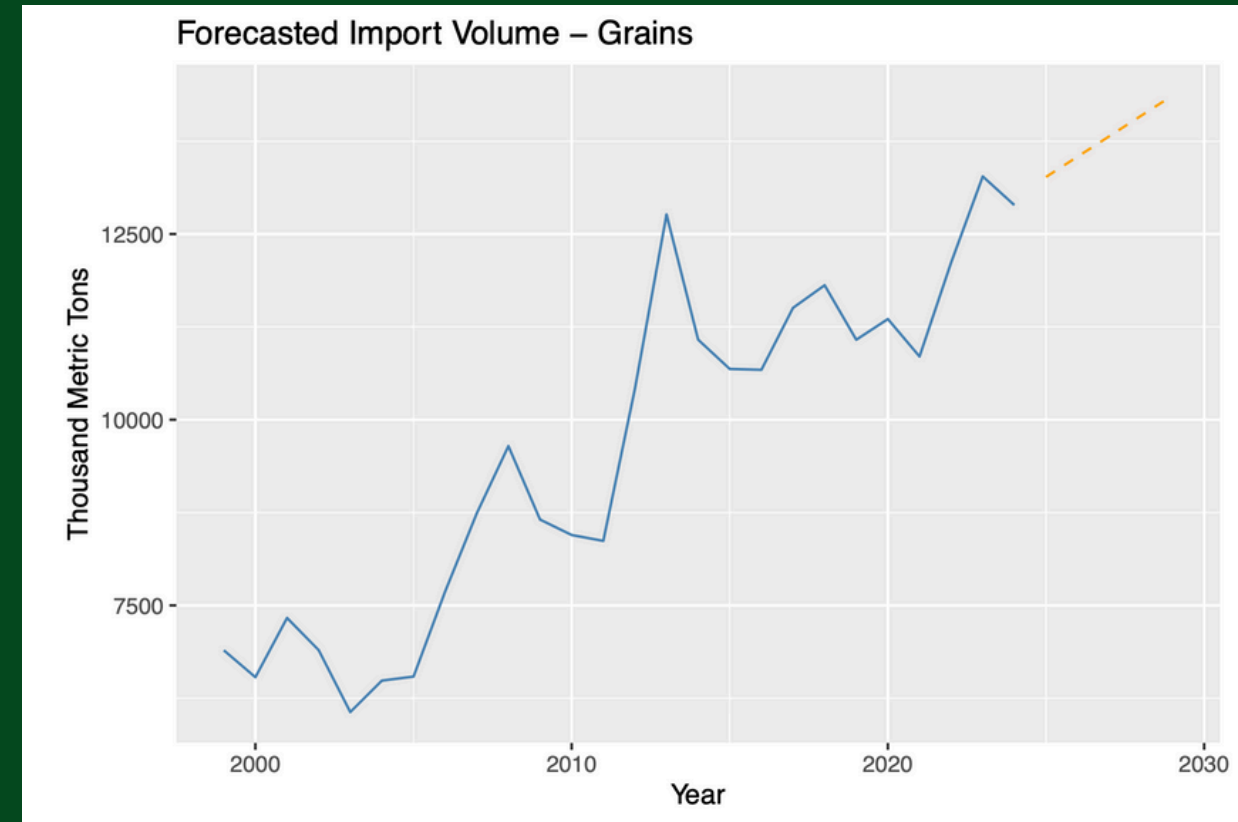
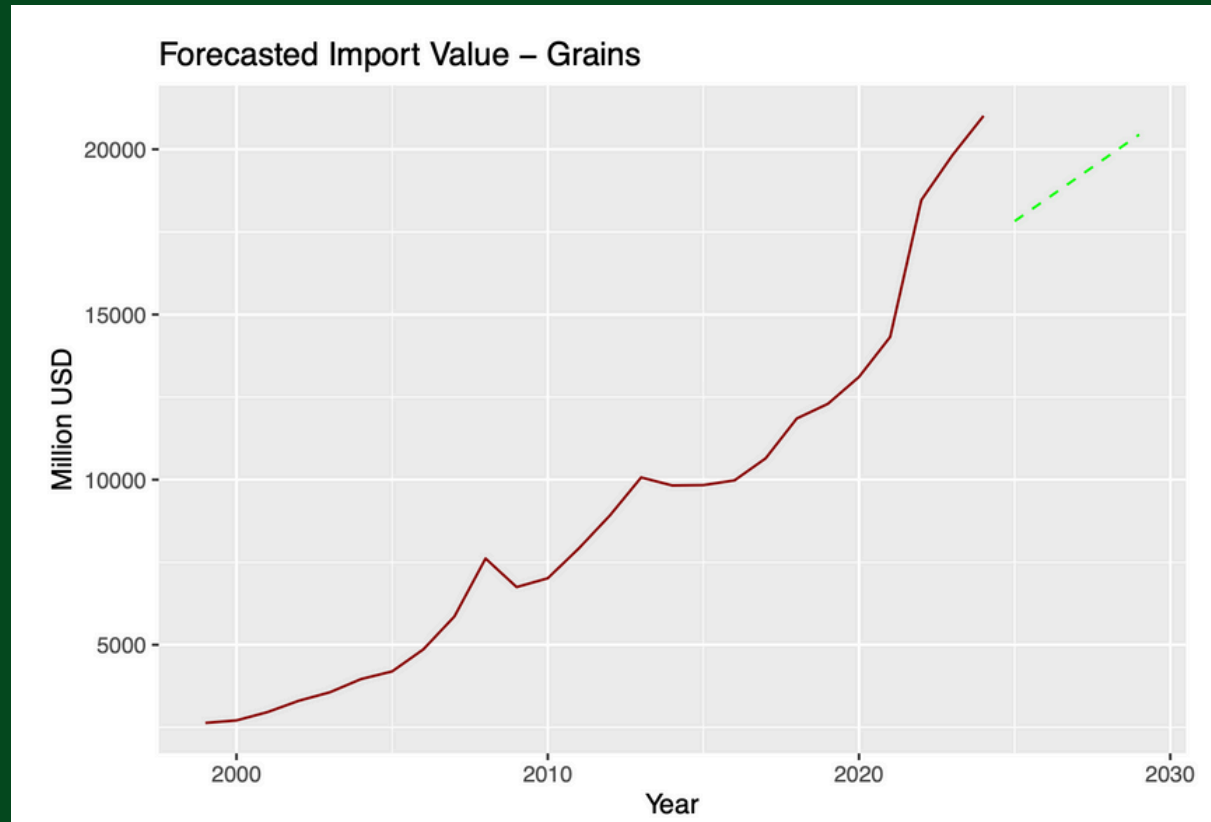
GRAINS



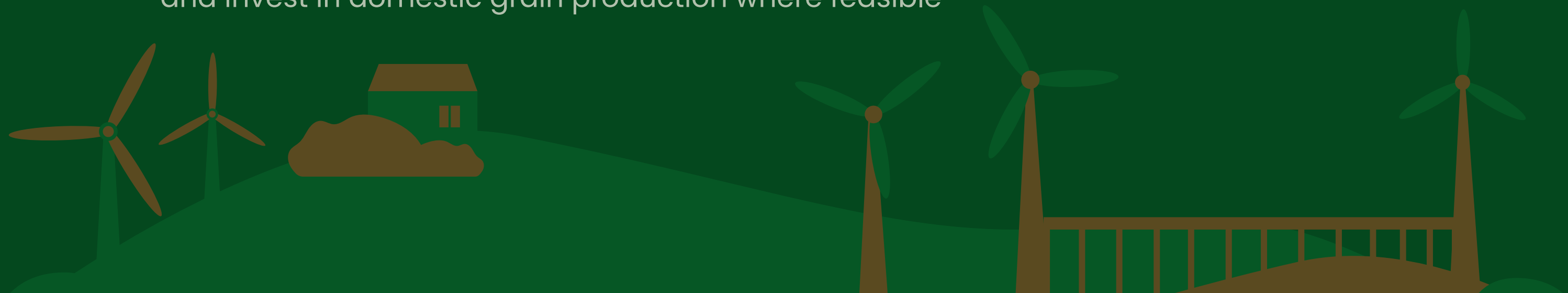
- Trend Analysis: Gradual growth in imports; relatively stable.
- Correlation: Strong ($r = 0.90$).



GRAINS

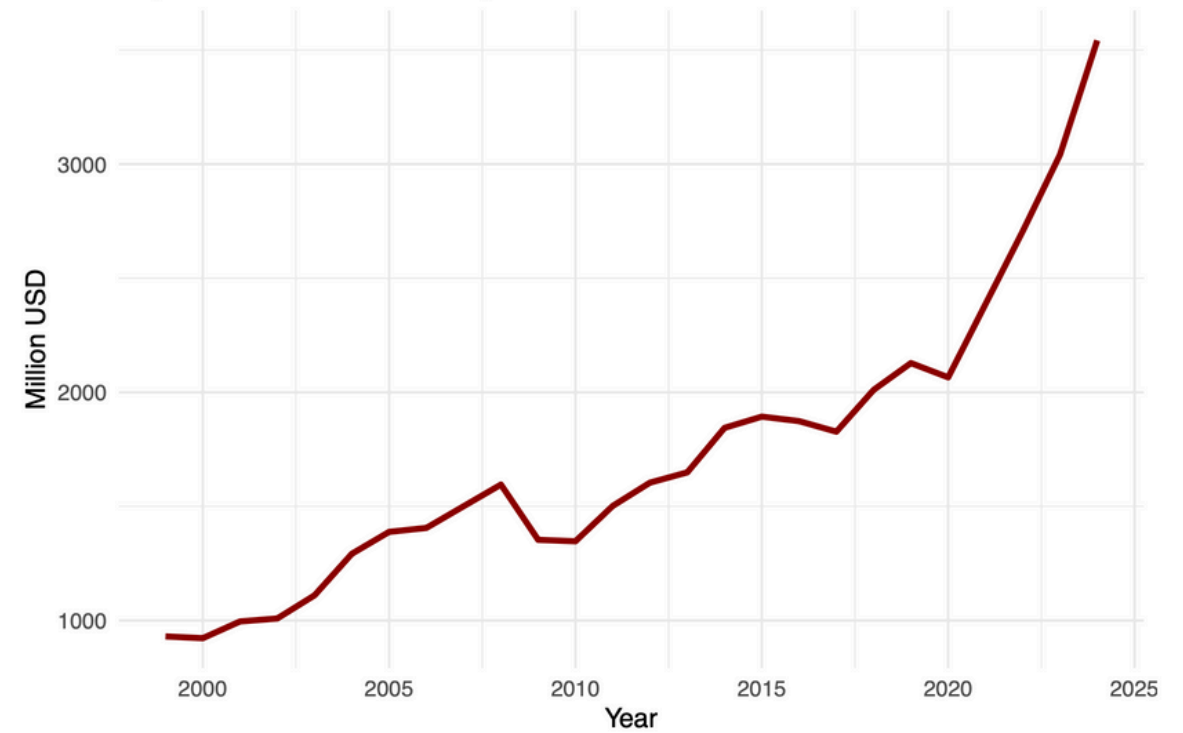


- Forecast (2026–2030): Expected increase continues linearly.
- Volatility: Moderately low volatility.
- Prescriptive Insight: Build redundancy into sourcing strategy.
- Recommendation: Prioritize strategic grain reserves, develop forward contracts during stable price periods and invest in domestic grain production where feasible

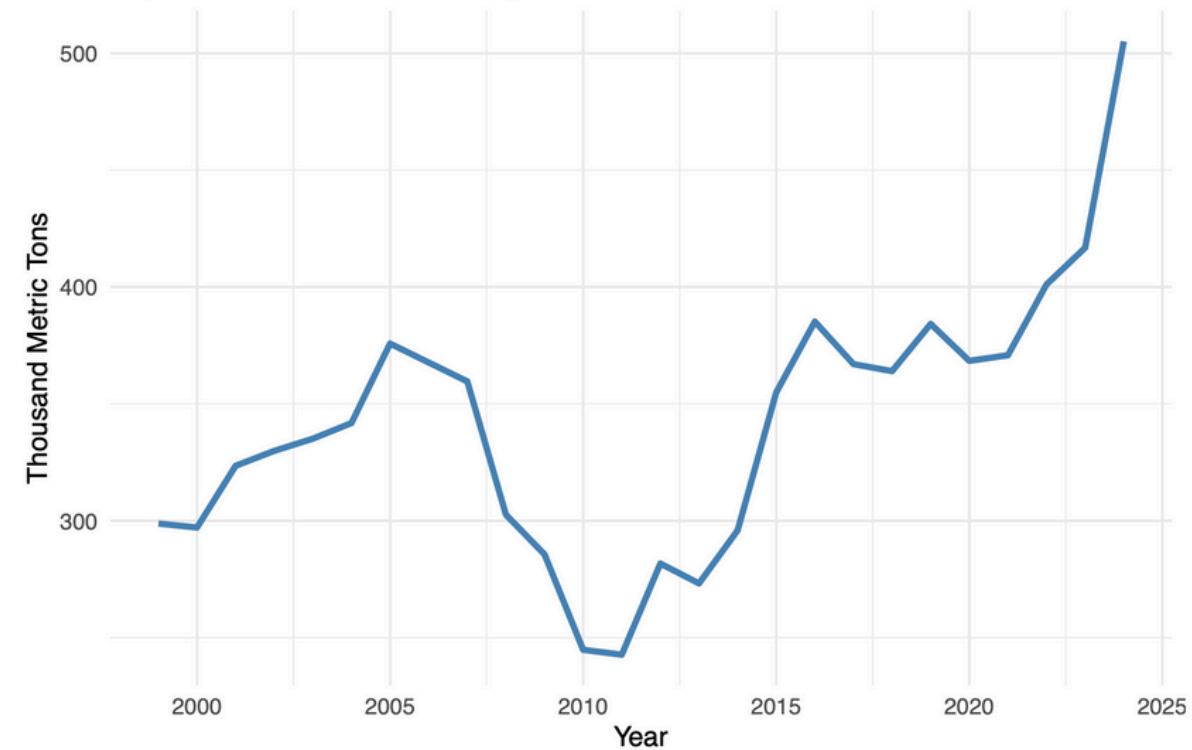


DAIRY

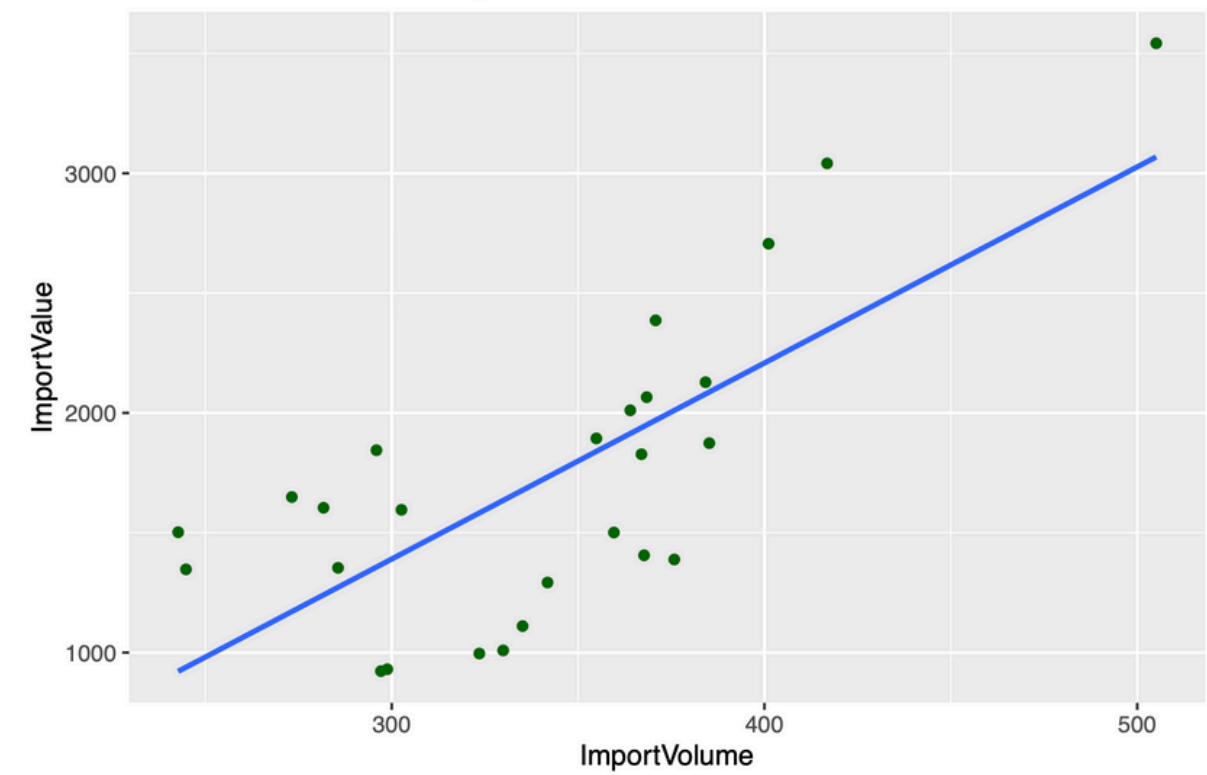
Import Value Trend – Dairy



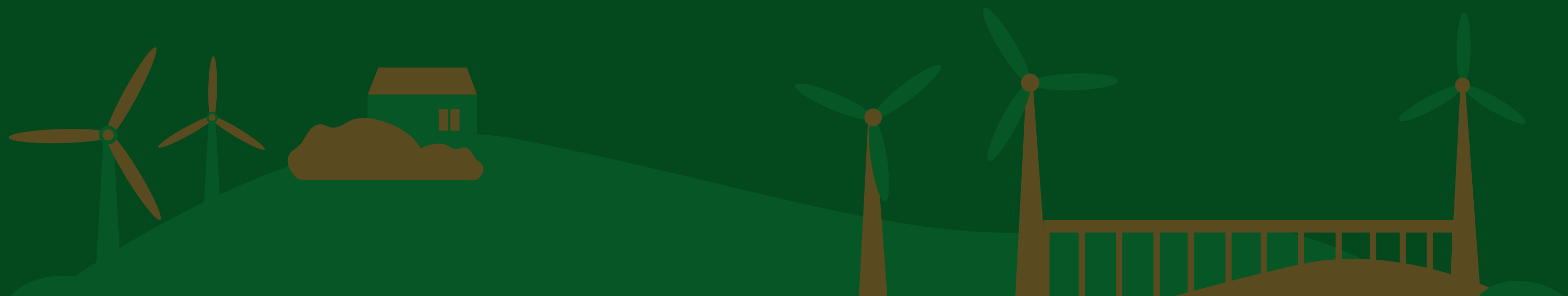
Import Volume Trend – Dairy



Value vs Volume – Dairy

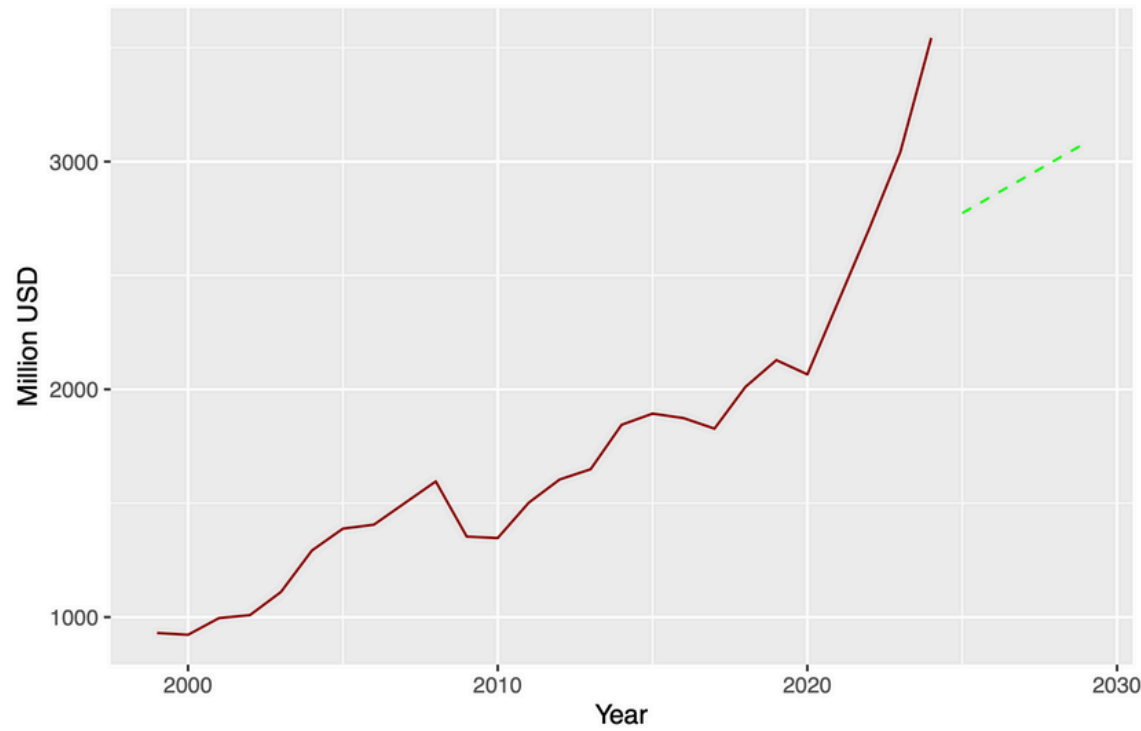


- Trend Analysis: Low volume category but growing.
- Correlation: Moderate ($r = 0.73$).

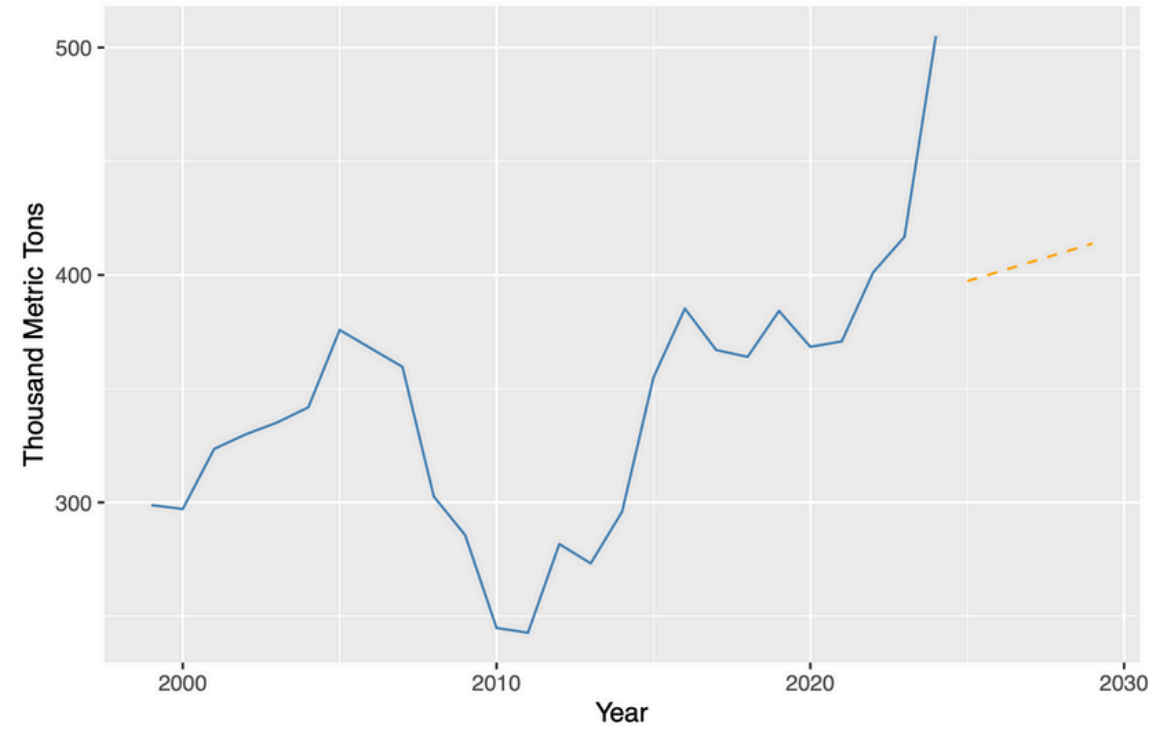


DAIRY

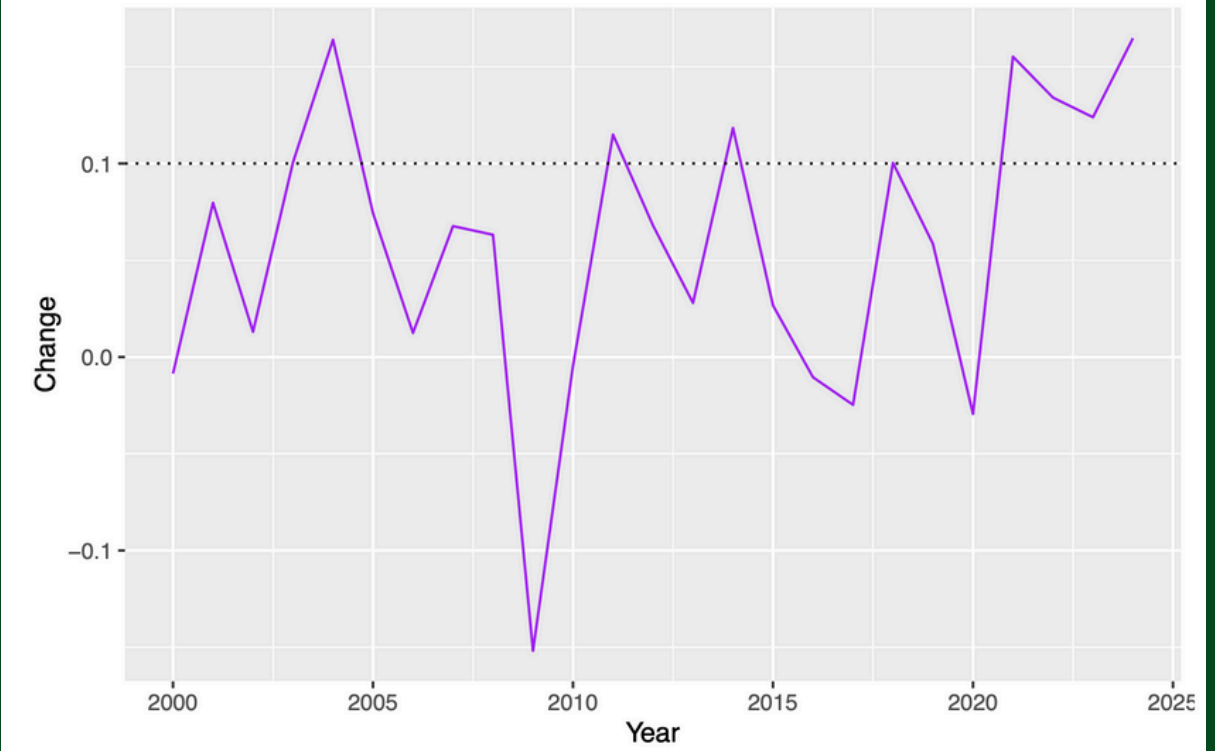
Forecasted Import Value – Dairy



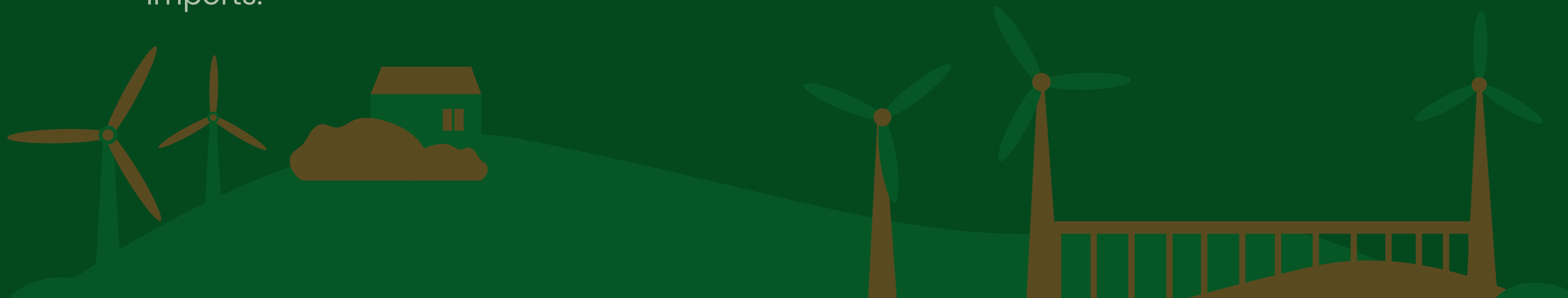
Forecasted Import Volume – Dairy



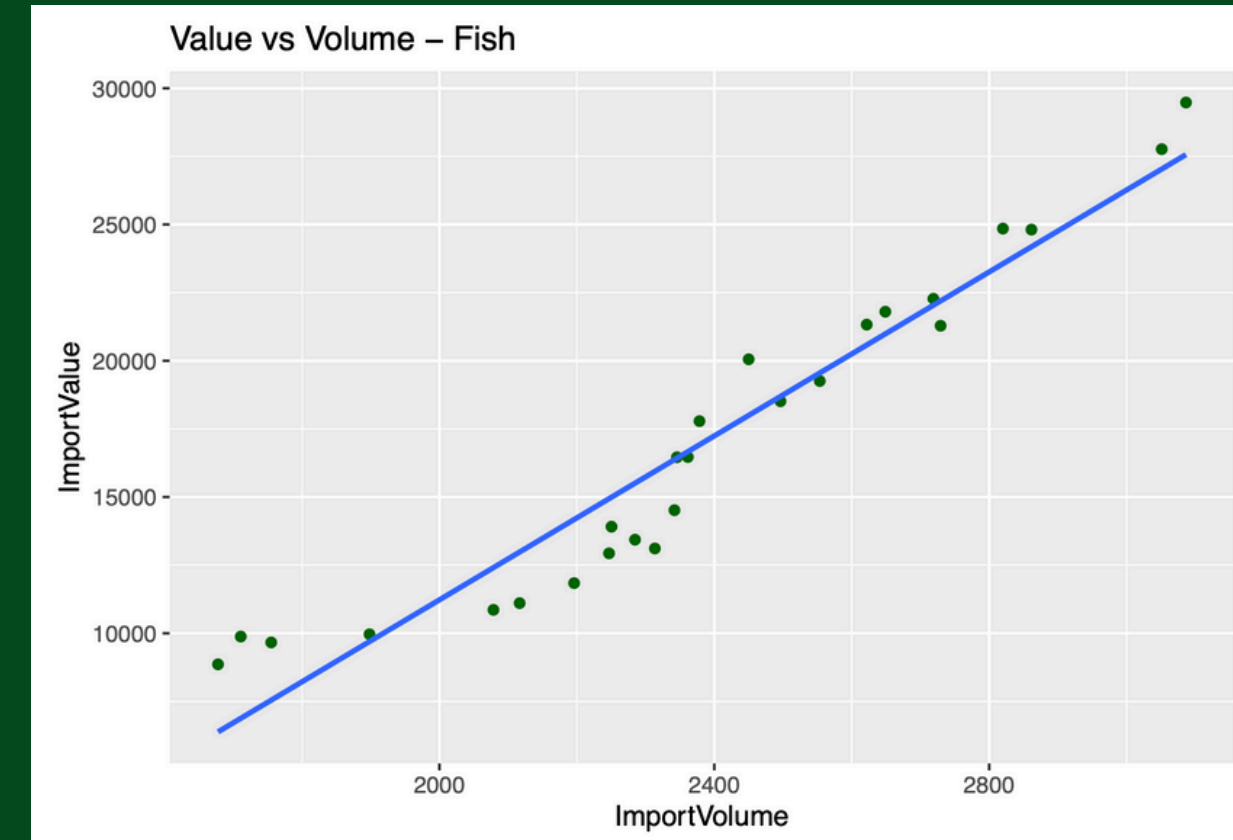
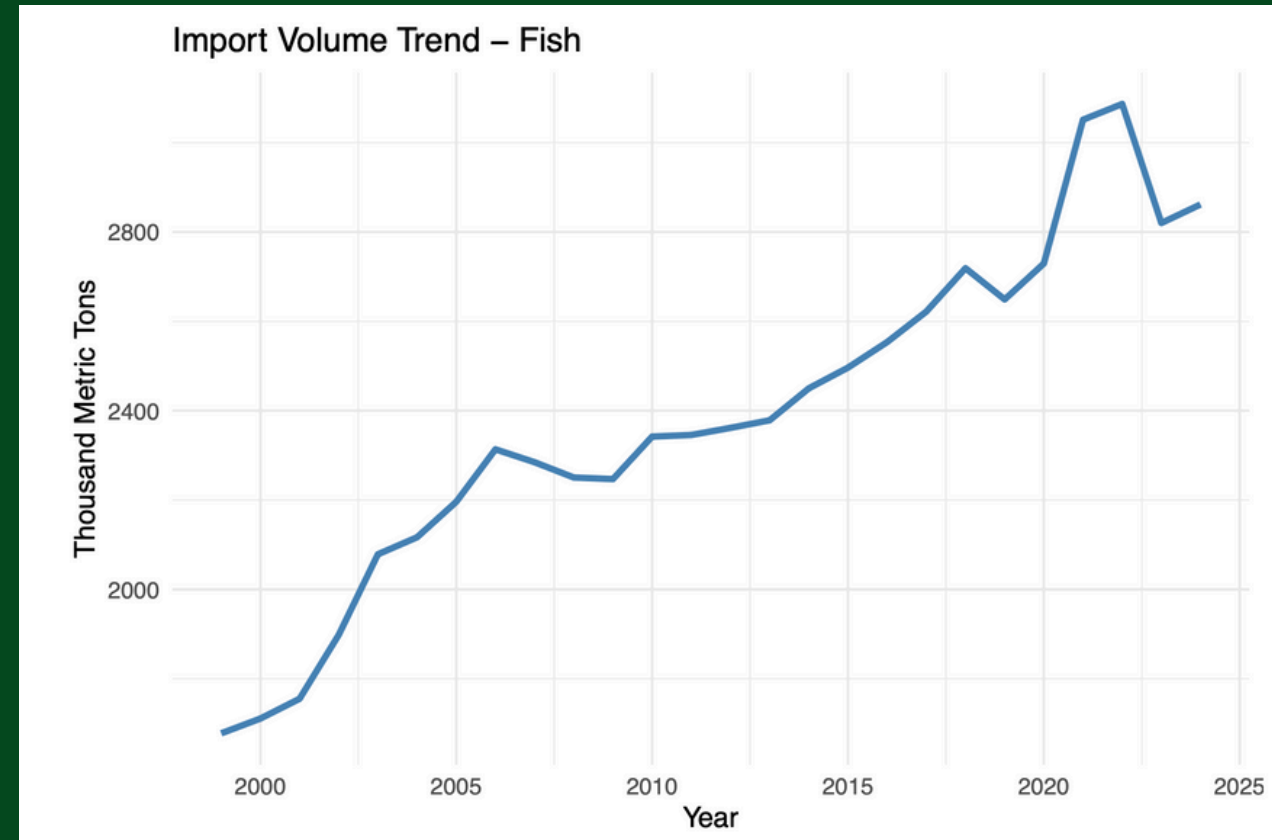
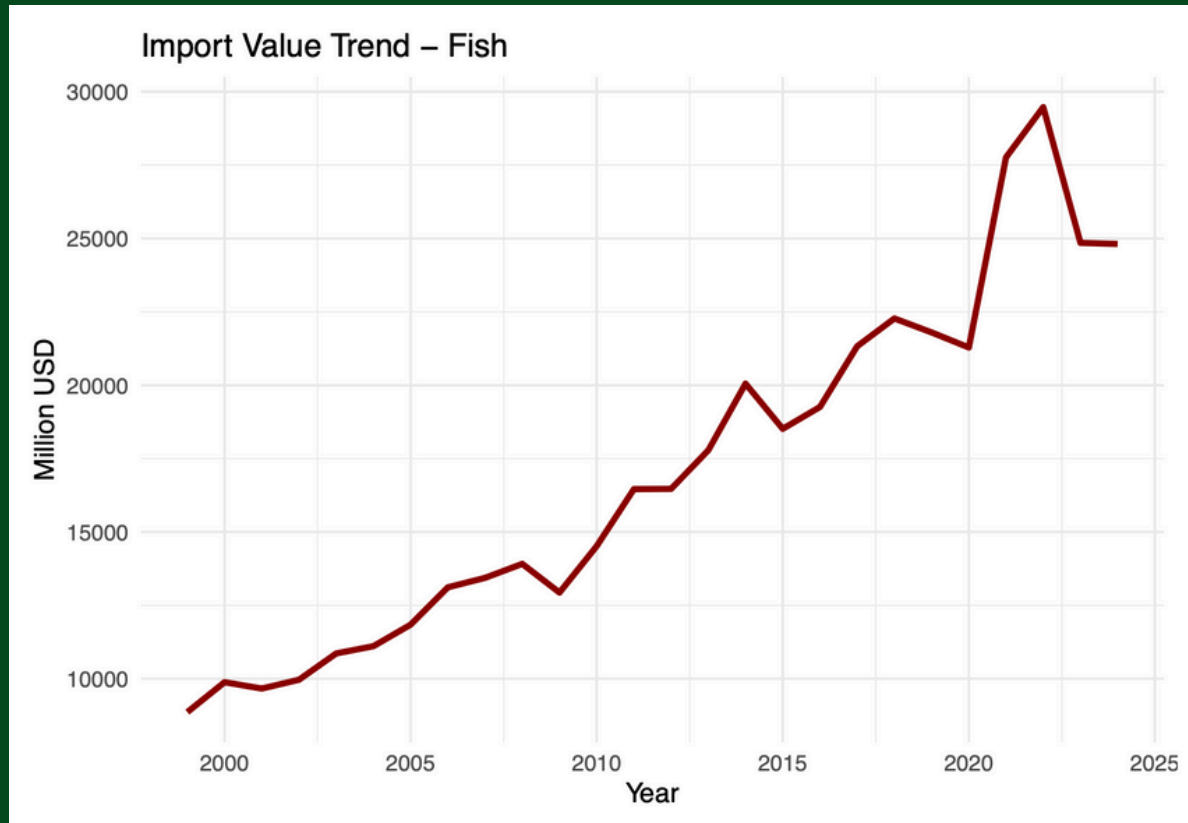
Volatility (YoY Change > 10%) – Dairy



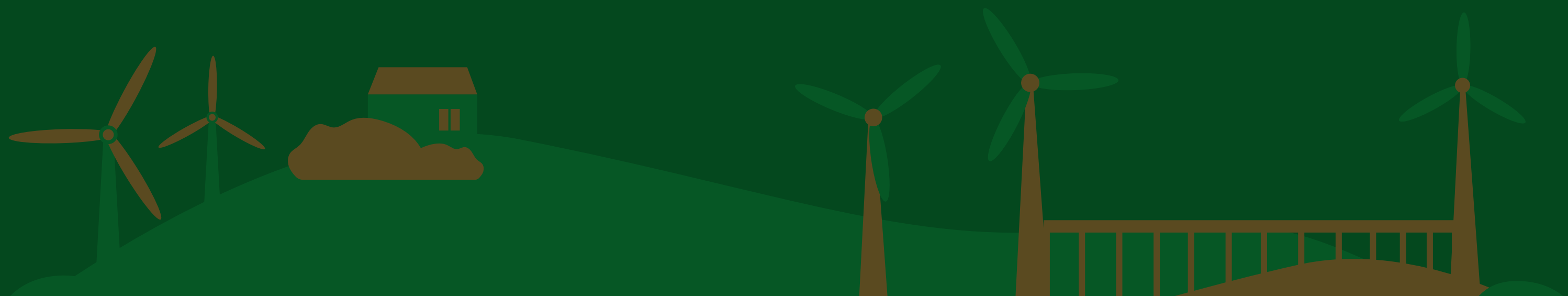
- Forecast (2026–2030): Upward trend likely to continue.
- Volatility: Moderate; fewer outlier years.
- Prescriptive Insight: Encourage localized reserves and policy alignment.
- Recommendation: Invest in cold chain infrastructure and sign long-term trade agreements to stabilize imports.



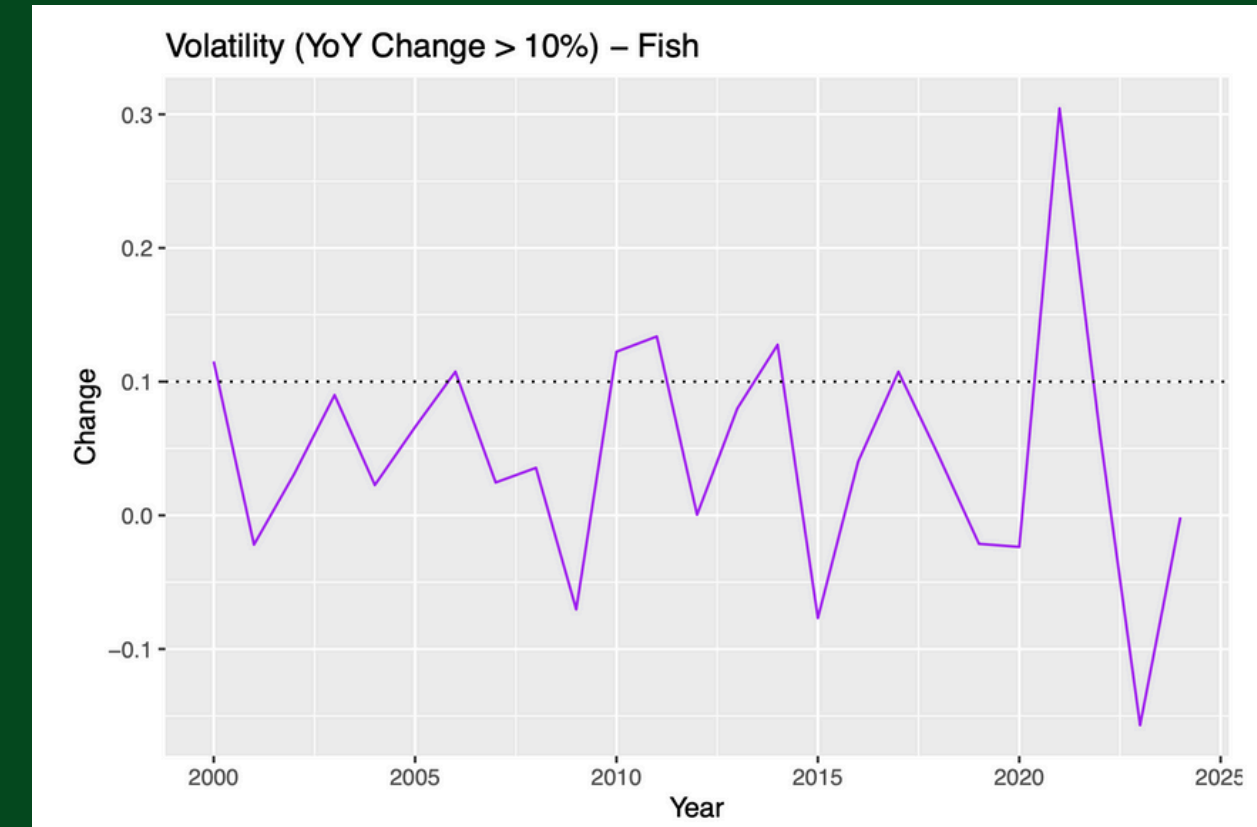
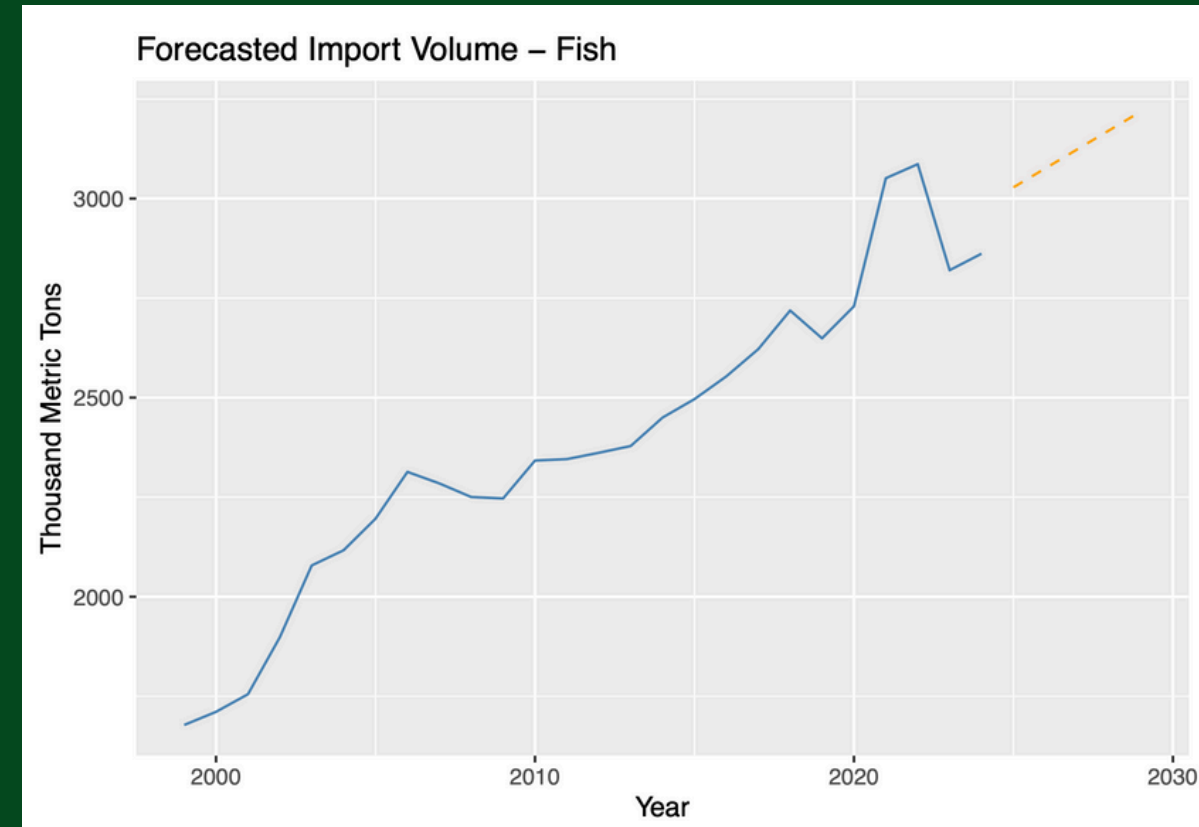
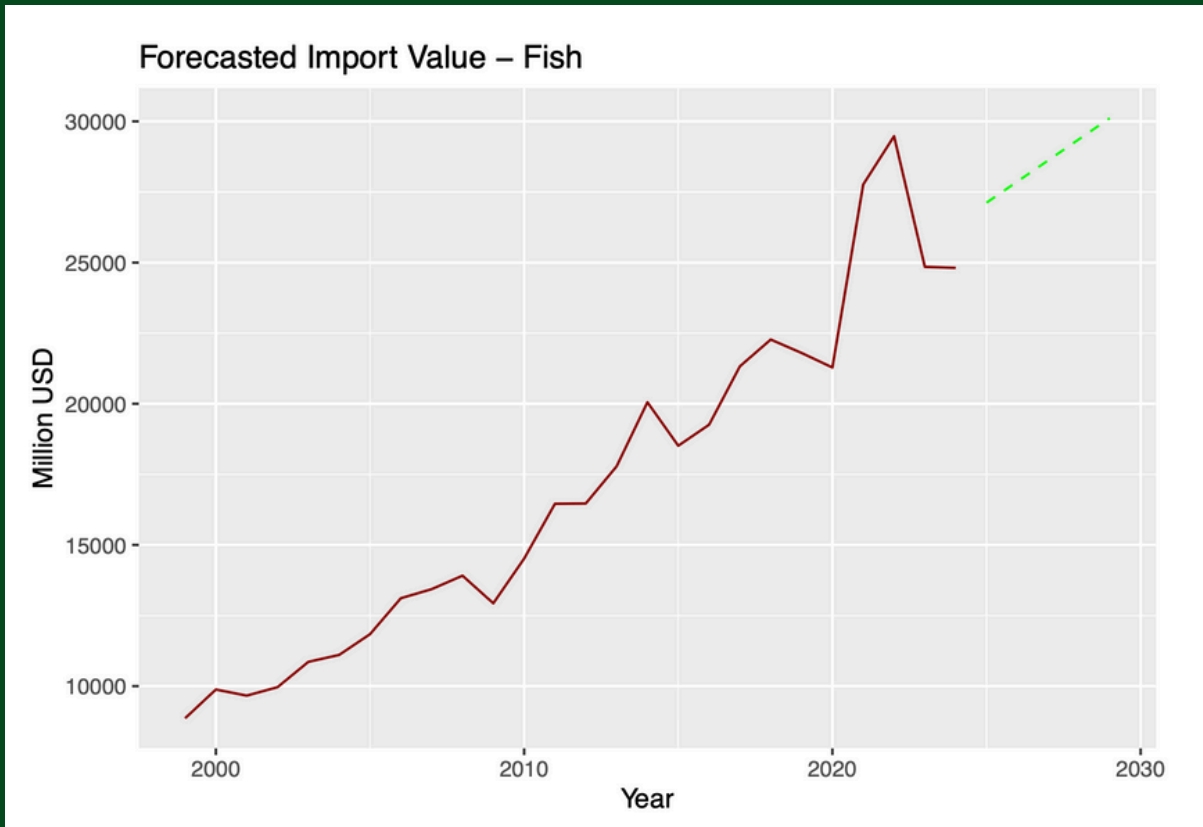
FISH



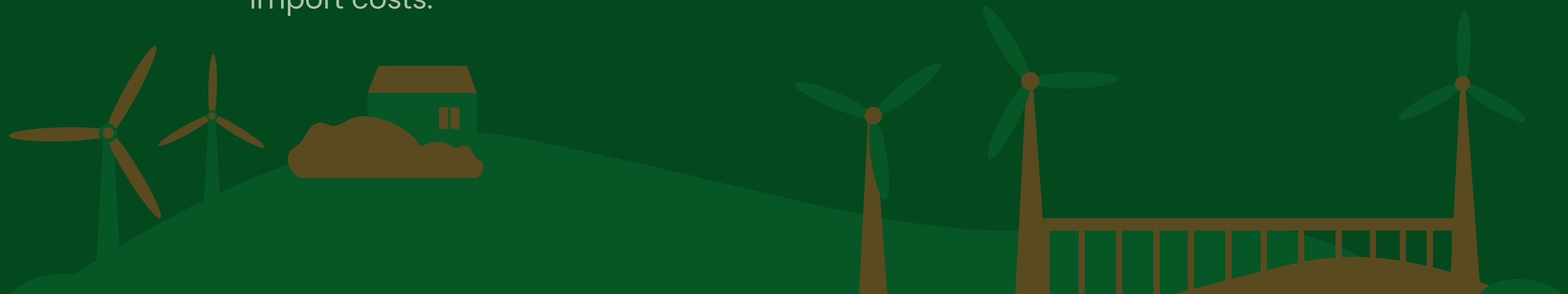
- Trend Analysis: Notable increase in value and volume.
- Correlation: High ($r = 0.96$).



FISH



- Forecast (2026–2030): Continued growth expected.
- Volatility: Highest volatility observed.
- Prescriptive Insight: Strategic stockpiling and supplier diversification are critical.
- Recommendation: Promote sustainable aquaculture domestically to offset rising import costs.



RECOMMENDATIONS



Prescriptive Actions to Improve Food Import Resilience

1. Supply Chain Diversification

- Reduce reliance on limited supplier countries
- Build diverse trade partnerships
- Support local alternatives where possible

2. Inventory Buffering

- Maintain seasonal or strategic reserves
- Use cold/dry storage for high-volatility items
- Apply data-driven policies (e.g., >10% change triggers)

3. Trade Policy Coordination

- Align tariffs and quotas with market trends
- Act on early-warning signals (e.g., sudden import shifts)
- Strengthen bilateral trade agreements

LITERATURE REVIEW

- Southern Ag Today. (2024, August 27). U.S. beef imports: A quick look at recent trends. <https://southernagtoday.org/2024/08/27/u-s-beef-imports-a-quick-look-at-recent-trends/>
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THANK YOU

