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A Descriptive Characterization of Agricultural Producer Price Dynamics in Ecuadorian Open Administrative Records (2016–2026)

Caracterización descriptiva de la dinámica de los precios al productor agrícola en los registros administrativos abiertos de Ecuador (2016–2026)

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Abstract

Agricultural producer price monitoring provides essential market intelligence for food security and rural policy planning in developing economies. This study presents a descriptive characterization of the official open administrative record maintained by the Ecuadorian Ministry of Agriculture and Livestock (MAG) from January 2016 through June 2026 (N = 16,748). Data quality auditing confirmed 100 % completeness and validity across all attributes with zero sentinel values. Spatial analysis indicates that price monitoring is concentrated in key agro-logistical hubs, led by Santo Domingo de los Tsáchilas (1,472 records, 8.79 %) and Cotopaxi (1,209 records, 7.22 %). Commodity profiling shows that cocoa varieties in dried almond presentation represent 17.00 % (2,848 records) of the registry; the registry-wide annual mean price rose from historical baselines ($\bar{x} \approx 0.77$–0.98 USD/kg in 2016–2021) to 1.90 USD/kg in 2024 and 1.85 USD/kg in 2025, a shift for which cocoa itself was the main driver, its own mean price reaching 6.76 USD/kg in 2024. An interactive dashboard was deployed to facilitate multi-commodity spatial queries for public decision-makers. These findings highlight the utility of open administrative records while delineating methodological boundaries regarding farm-level profitability and microdata granularity.

Keywords: *agricultural prices; producer price monitoring; administrative data; descriptive analytics; open government data; commodity price dynamics; Ecuador.*

Resumen

El monitoreo de los precios agrícolas al productor proporciona información de mercado esencial para la seguridad alimentaria y la planificación de políticas rurales en economías en desarrollo. Este estudio presenta una caracterización descriptiva del registro administrativo abierto oficial mantenido por el Ministerio de Agricultura y Ganadería (MAG) de Ecuador desde enero de 2016 hasta junio de 2026 (N = 16.748). La auditoría de calidad de los datos confirmó una integridad y validez del 100 % en todos los atributos, sin presencia de valores centinela. El análisis espacial indica que el monitoreo de precios se concentra en nodos agrologísticos clave, encabezados por Santo Domingo de los Tsáchilas (1.472 registros, 8,79 %) y Cotopaxi (1.209 registros, 7,22 %). El perfil de los productos muestra que las variedades de

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cacao en presentación de almendra seca representan el 17,00 % (2.848 registros) del registro; el precio medio anual general aumentó desde niveles base históricos ($\bar{x} \approx 0{,}77$–$0{,}98$ USD/kg entre 2016 y 2021) hasta 1,90 USD/kg en 2024 y 1,85 USD/kg en 2025, cambio impulsado principalmente por el cacao, cuyo precio medio alcanzó los 6,76 USD/kg en 2024. Se implementó un panel interactivo para facilitar consultas espaciales de múltiples productos a los responsables de la toma de decisiones públicas. Estos hallazgos destacan la utilidad de los registros administrativos abiertos, al tiempo que delimitan las fronteras metodológicas en cuanto a la rentabilidad a nivel de finca y la granularidad de los microdatos.

Palabras clave: precios agrícolas; monitoreo de precios al productor; datos administrativos; análisis descriptivo; datos abiertos gubernamentales; dinámica de precios de productos básicos; Ecuador.

1. Introduction

Agricultural production constitutes a foundational pillar of Ecuador's socioeconomic structure, contributing significantly to national gross domestic product, rural employment, and domestic food security [1]. Territorial rural development dynamics shape the organizational capacity of agricultural regions, wherein agricultural commercialization patterns play a vital role across Latin America [13]. Furthermore, strategic institutional frameworks and public agricultural initiatives provide the foundational infrastructure for monitoring market integration [11]. In developing economies, agricultural commodity prices at the farm gate exhibit substantial spatial and temporal volatility driven by agroecological conditions, logistics constraints, and market friction [2]. Systematic monitoring of producer prices provides critical intelligence for rural producers, supply chain intermediaries, and policymaking bodies to detect structural distortions and coordinate market interventions.

Previous empirical literature on agricultural economics in Latin America has primarily addressed price transmission along retail and wholesale channels and commodity market integration [3,12], while comparable evidence from other developing regions documents the vulnerability of smallholders to external macroeconomic shocks [4]. However, existing studies often rely on short-term cross-sectional surveys or sample-based estimations, leaving open administrative records underutilized for long-term descriptive audits across multi-crop portfolios.

A critical gap remains in the comprehensive characterization of historical open data registries generated by public agricultural oversight institutions in Ecuador. Specifically, there is limited empirical documentation assessing the administrative continuity, territorial coverage, and commodity concentration across longitudinal open databases spanning multiple presidential administrations and economic transitions.

To address this gap, this study conducts a descriptive investigation of the official producer price registry maintained by the Ecuadorian Ministry of Agriculture and Livestock (MAG) covering the period from January 2016 to June 2026 [5]. This article systematically profiles the dataset's structural completeness and validity, maps territorial monitoring coverage across all 23 mainland provinces in the nominal MAG catalog, characterizes the long-term price trajectory of key agricultural commodities, and discusses the institutional applications and constraints of administrative monitoring data for public policy formulation.

2. Materials and Methods

To structure the study under an observational descriptive design, the methodological process was organized into an end-to-end analytical pipeline ranging from open registry ingestion to modeling and analytical deployment. The architecture of this data pipeline is synthesized in Figure 1.

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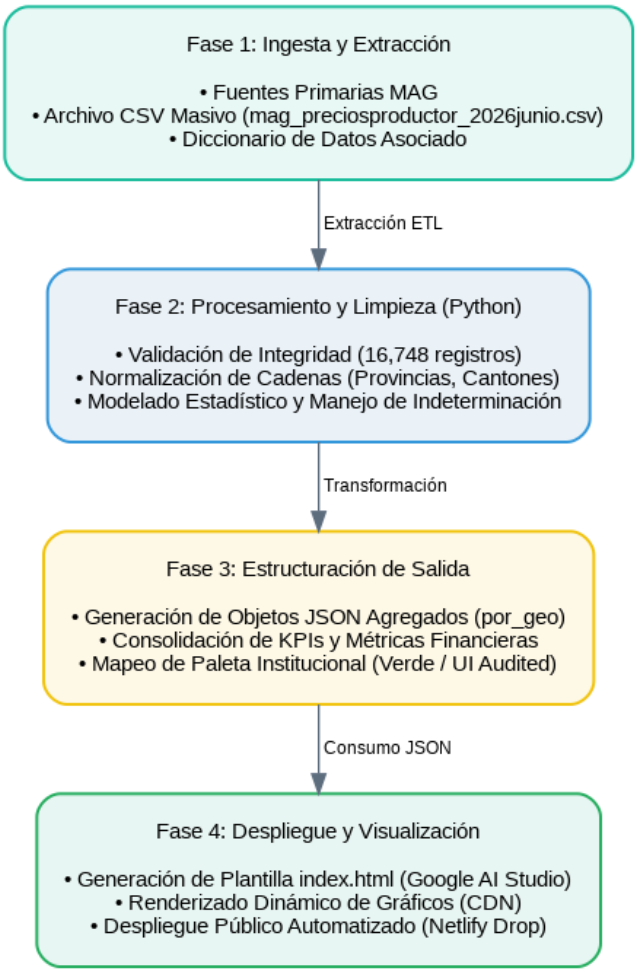

Figura 1. *Analytical pipeline architecture and data processing workflow for MAG open administrative records. Fuente: Elaboración propia a partir de registros administrativos del MAG (corte de datos: 2026Junio); diagrama elaborado el 26 de agosto de 2026.*

2.1. Dataset Provenance and Description

This study analyzes the official open administrative record entitled Precios productor ponderados nacionales (MAG_PreciosProductor_2026Junio), published by the Ecuadorian Ministry of Agriculture and Livestock (MAG) through the National Open Data Portal (https://www.datosabiertos.gob.ec/) [5], wich is cross-referenced with official ministerial statistical bulletins [10]. Complementary food price anomalies and regional surveillance parameters draw methodological alignment from international agricultural monitoring standards established for developing economies [9]. The dataset compiles monthly producer-level weighted prices for agricultural commodities gathered through continuous field surveillance across mainland Ecuador. The analyzed corpus encompasses a 126-month longitudinal window spanning from January 2016 through June 2026, comprising exactly N = 16,748 monthly provincial weighted-price records across 7 structured attributes: year (PP_ANIO), month (PP_MES), province (DPA_PROVINCIA), agricultural commodity (PP_PRODUCTO), commercial presentation unit (PP_UNIDAD), weighted price per unit in USD (PP_PONDERADO_USD), and standardized weighted price per kilogram in USD (PP_PONDERADO_USD_KG).

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2.2. Data Quality Audit: Completeness and Validity

To prevent analytical distortion arising from unverified administrative registries, completeness and validity were evaluated independently prior to statistical processing. Column completeness C(v) quantifies the proportion of non-null cells across variable v:

$$C(v) = \frac{|\{x \in v : x \neq \emptyset\}|}{N} \qquad (1)$$

Validity V(v) adjusts completeness by penalizing sentinel filling values, uninformative placeholders, and default system encodings (S):

$$V(v) = \frac{|\{x \in v : x \neq \emptyset \wedge x \notin S\}|}{N} \quad (2)$$

A dictionary of sentinel masks was systematically screened against all text and numeric fields, including standard placeholders (NO_APLICA, SIN_DATO, S/N, NO ESPECIFICA, DESCONOCIDO, NINGUNO, -, --, N/A, NULL, 9999, and default dates 1900-01-01). The audit confirmed C(v) = 1.000 and V(v) = 1.000 across all 7 columns, indicating zero missing values and zero masked sentinel records in the official release. Consequently, no filtering or record exclusion for data-quality reasons was required: the statistical analyses reported in Sections 3 and 4.1–4.2 are computed over the full population of 16,748 observations. This is independent of the separate, visualization-layer territorial restriction applied only to the interactive dashboard (Section 4.3) and documented in Section 4.4.

2.3. Analytical Framework and Descriptive Design

This study adheres to an observational descriptive research design. The analytical procedure focuses on characterizing:

1. Spatial distribution and monitoring intensity: Computing the absolute frequency (np) and relative concentration (fp = np / N) of administrative surveillance across the 23 administrative provinces recorded in the nominal MAG catalog.

2. Commodity profiling: Evaluating portfolio diversity across the 110 tracked agricultural products, with particular focus on dominant commercial lines such as cocoa (Theobroma cacao) varieties and staple tubers.

3. Longitudinal price dynamics: Characterizing price trajectories per kilogram using parametric central tendency and dispersion metrics:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} \qquad (3)$$

accompanied by sample standard deviation:

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} \qquad (4)$$

as well as median and interquartile measures to account for positive skewness in commodity valuation.

2.4. Ethical Safeguards and Granularity

In accordance with open data privacy guidelines, data aggregation is strictly maintained at the provincial geographic scale (DPA_PROVINCIA). The dataset contains no individual producer identifiers, parcel geolocation coordinates, or microdata attributable to specific rural households, precluding re-identification risks.

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2.5. Neutrosophic Set Framework and Time-Series Decomposition

To address the limitations of point-estimate reporting in open administrative records, this study introduces a neutrosophic set framework. Each provincial commodity cell is evaluated across three dimensions normalized to unity $(T + I + F = 1)$, representing Truth (T, for sufficiency of observations where n>=3 and low internal dispersion), Indeterminacy (I, capturing price uncertainty driven by sparse monthly sampling and elevated within-cell price dispersion, the only sources of uncertainty observable in the 7-attribute schema described in Section 2.1), and Falsehood (F, accounting for sentinel values or out-of-range anomalies). The standard weighted price is thus generalized into a neutrosophic interval $P_{inf} = max(0, \bar{x} - s \cdot I)$ $P_{sup} = \bar{x} + s \cdot I$ with a non-negativity constraint enforced on the lower bound to guarantee economically valid, non-negative prices; interval amplitude directly exposes market fragmentation and unrepresentative point averages. Additionally, temporal series for export commodities and domestic staples are decomposed using centered 12-month moving averages to isolate structural trends from seasonal components.

3. Results

3.1. Overview and Quality Profile

The analyzed database comprises 16,748 validated monthly records collected across the 23 Ecuadorian provinces of the nominal MAG catalog between January 2016 and June 2026. Across the entire sample, the standardized weighted price per kilogram exhibits an overall mean of $\bar{x}$ = 1.05 USD/kg (s = 2.34 USD/kg) and a median of 0.53 USD/kg (Q1–Q3 = [0.29, 1.41] USD/kg; IQR = 1.12 USD/kg), spanning from a minimum of 0.03 USD/kg to a maximum of 250.53 USD/kg.

3.2. Territorial Monitoring Distribution

Surveillance effort varies across geographic jurisdictions. As detailed in Table 1, the province of Santo Domingo de los Tsáchilas accounts for the highest monitoring density with 1,472 observations (8.79 % of the national total; mean price $\bar{x}$ = 0.84 USD/kg), followed by Cotopaxi with 1,209 records (7.22 %; $\bar{x}$ = 1.13 USD/kg) and Guayas with 980 records (5.85 %; $\bar{x}$ = 1.11 USD/kg). The top five provinces collectively represent 33.28 % (5,574 records) of all administrative price captures.

Table 1. Territorial distribution of agricultural producer price monitoring (Top 10 provinces, 2016–2026).

Province	Records (n)	Share (%)	Mean Price (USD/kg)
Santo Domingo de los Tsáchilas	1,472	8.79	0.84
Cotopaxi	1,209	7.22	1.13
Guayas	980	5.85	1.11
Los Ríos	960	5.73	0.87
Bolívar	953	5.69	1.18
Chimborazo	951	5.68	0.80

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Manabí	932	5.56	1.23
Tungurahua	846	5.05	0.93
Pichincha	813	4.85	0.72
Carchi	754	4.50	0.51

3.3. Commodity Composition and Price Benchmarks

A total of 110 distinct agricultural commodities are tracked in the registry. Cocoa (Theobroma cacao) in dried almond presentation constitutes the dominant product group, accumulating 2,848 records (17.00 % of the dataset), distributed across Cacao CCN51 Almendra Seca (1,300 records, 7.76 %; $\bar{x}$ = 2.75 USD/kg, median = 2.04 USD/kg), Cacao Mezclado Almendra Seca (908 records, 5.42 %; $\bar{x}$ = 3.02 USD/kg, median = 2.12 USD/kg), and Cacao Fino de Aroma Almendra Seca (640 records, 3.82 %; $\bar{x}$ = 2.27 USD/kg, median = 1.96 USD/kg). Staple domestic food crops follow in observation frequency, led by Papa Superchola (807 records, 4.82 %; $\bar{x}$ = 0.39 USD/kg) and Mora (666 records, 3.98 %; $\bar{x}$ = 1.33 USD/kg), as shown in Table 2.

Table 2. Product monitoring frequency and price benchmarks for leading commodities.

Commodity	Records (n)	Share (%)	Mean (USD/kg)	Median (USD/kg)
Cacao CCN51 Almendra Seca	1,300	7.76	2.75	2.04
Cacao Mezclado Almendra Seca	908	5.42	3.02	2.12
Papa Superchola	807	4.82	0.39	0.36
Mora	666	3.98	1.33	1.09
Cacao Fino de Aroma Almendra Seca	640	3.82	2.27	1.96
Maracuyá	624	3.73	0.41	0.37
Palma de Aceite	611	3.65	0.14	0.13
Tomate Riñón de Invernadero	595	3.55	0.49	0.48
Frutilla	533	3.18	1.30	1.32
Yuca	432	2.58	0.23	0.18

3.4. Longitudinal Trajectory (2016–2026)

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Annual record volume remained consistent from 2016 to 2021 (averaging 1,823 records annually), experienced an administrative contraction in 2022 (746 records, 4.45 %), and resumed full reporting between 2023 and 2025 (1,482 records average). As documented in Table 3, annual mean prices remained stable between 0.77 USD/kg and 0.98 USD/kg from 2016 to 2021, rose to 1.90 USD/kg in 2024 and 1.85 USD/kg in 2025, and reached 1.21 USD/kg during the first half of 2026.

Table 3. Longitudinal summary of producer price records and annual price levels (2016–2026).

Year	Records (n)	Share (%)	Mean (USD/kg)	Median (USD/kg)	Std Dev (USD/kg)
2016	1,845	11.02	0.90	0.48	0.89
2017	1,874	11.19	0.77	0.50	0.67
2018	1,809	10.80	0.81	0.47	0.78
2019	1,833	10.94	0.98	0.51	5.88
2020	1,769	10.56	0.80	0.46	0.74
2021	1,807	10.79	0.78	0.47	0.73
2022	746	4.45	0.88	0.51	0.85
2023	1,542	9.21	1.02	0.57	1.02
2024	1,416	8.45	1.90	0.63	2.50
2025	1,488	8.88	1.85	0.64	2.35
2026*	619	3.70	1.21	0.59	1.42

**Note: 2026 data covers the partial period January–June.*

3.5. Neutrosophic Price Intervals and Longitudinal Decomposition

The application of the neutrosophic set framework to the N = 16,748 validated monthly records reveals that point-estimate averages in open administrative records can conceal high market fragmentation. Specifically, evaluation of interval amplitudes identified extreme indeterminacy in export and specialty lines, led by Piña Md-2 in Santo Domingo de los Tsáchilas (mean price 2.37 USD/kg with an interval amplitude of 24.81 USD, I = 0.55) and Cacao CCN51 in Esmeraldas and Guayas (amplitudes exceeding 2.45 USD, I = 0.55, consistent with elevated within-cell price dispersion and sparse monthly sampling at the farm gate. Furthermore, longitudinal time-series decomposition contrasting export commodities against domestic food staples confirms a structural divergence in volatility regimes. While Papa Superchola exhibited a rigid and stable domestic price trend averaging 0.39 USD/kg with a low seasonal standard deviation (σ= 0.09), Cacao CCN51 displayed a significantly higher average trend of 1.82 USD/kg accompanied by severe seasonal and cyclical dispersion ($\sigma\sigma$= 1.13). This quantitative contrast is consistent with farm-gate price surges being associated with the asymmetric transmission of international commodity market fluctuations rather than with internal production shocks, in line with the observational descriptive scope of this study.

4. Applications

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4.1. Interpretation of Monitoring Concentration and Price Dynamics

The empirical findings reveal a marked institutional prioritization in the geographic and product allocation of price surveillance. Santo Domingo de los Tsáchilas concentrates the highest monitoring frequency (1,472 records, 8.79 %), reflecting its strategic role as an agro-logistical hub that consolidates agricultural freight between the Coastal lowlands and Andean highlands. Similarly, the pronounced focus on cocoa varieties (2,848 records for dried almond lines, 17.00 % of the corpus) aligns with the crop's macro-structural significance as one of Ecuador's primary non-oil export commodities, given that specialty cacao value chains and credence attributes represent a core component of Ecuador's agricultural export profile [7].

Furthermore, recent market evaluations emphasize that cocoa supply chains face emerging structural challenges, such as economic vulnerability to international regulatory constraints (e.g., cadmium regulations in major destination markets) [8]. These dynamics illustrate how market integration and price transmission mechanisms operate across domestic and international consumer segments in developing nations [12], while underscoring the broader institutional benefits and challenges associated with the reuse of open administrative data systems in agricultural and environmental management [14].

The longitudinal price trajectory demonstrates relative stability between 2016 and 2021 ($\bar{x} \approx 0.77$–0.98 USD/kg), followed by a sharp appreciation in 2024 ($\bar{x} = 1.90$ USD/kg, s = 2.50 USD/kg) and 2025 ($\bar{x} = 1.85$ USD/kg, s = 2.35 USD/kg). Rather than indicating universal agricultural inflation, this surge coincides with international commodity price shocks in the cocoa sector during 2024–2025, consistent with the price-setting power and transmission dynamics described for cocoa global value chains in other origin countries [6], and with concurrent increases in domestic producer-level pricing.

4.2. Dialogue with Previous Literature

These descriptive observations corroborate earlier agricultural economics literature documenting high price transmission elasticity in export-oriented supply chains compared to domestic food staples [3]. While staple crops like Papa Superchola exhibited minimal interannual price dispersion ($\bar{x} = 0.39$ USD/kg, median = 0.36 USD/kg), tree crops tied to global exchanges displayed high volatility, supporting arguments regarding the asymmetric exposure of domestic producers to international market fluctuations [4].

To transcend the purely descriptive bias of aggregated records and evaluate the structural transmission of agricultural commodity markets, this section contrasts the behavior of export-oriented commodities (represented by cocoa varieties: CCN51, Mixed, and Fine Aroma, n = 2,848) against crops primarily destined for domestic consumption and food security (Superchola potato, cassava, rice, and greenhouse kidney tomato, n = 2,442). The results demonstrate a sharp divergence in volatility regimes between the two sectors. Export commodities recorded a weighted mean price per kilogram of $\bar{x}$= 2.73 USD/kg (s = 1.87, CV = 0.68), coinciding with international supply shocks in global markets during 2024–2025, where the mean price of cocoa escalated to a historical peak of $\bar{x}$ = 6.76 USD/kg in 2024. In direct contrast, the basket of domestic food staples exhibited remarkable structural rigidity and price stability in the local market, averaging $\bar{x}$= 0.37 USD/kg (s = 0.19, CV = 0.52), buffering external macroeconomic fluctuations and consistent with farm-gate inflation observed in national aggregates being associated with the transmission of international commodity markets rather than with a generalized surge in internal production costs, a pattern that this observational descriptive design can document but not causally establish.

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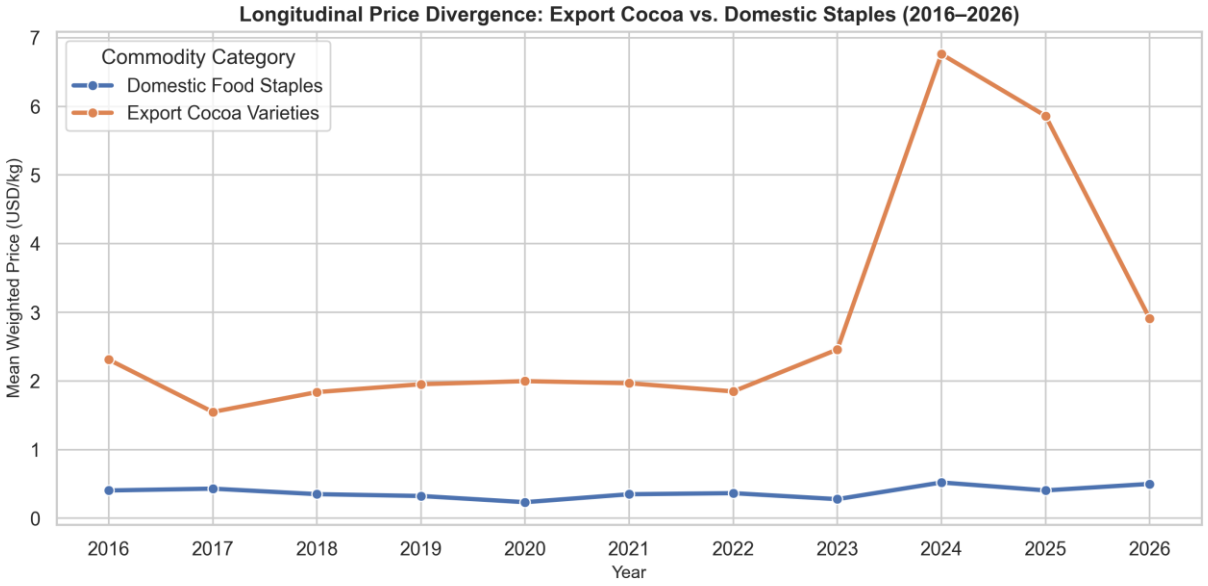

Figura 2. *Longitudinal price divergence between export cocoa varieties and domestic food staples across Ecuador (2016–2026), capturing the structural price escalation of 2024–2025. Fuente: MAG, generado en Python el 22 de agosto de 2026.*

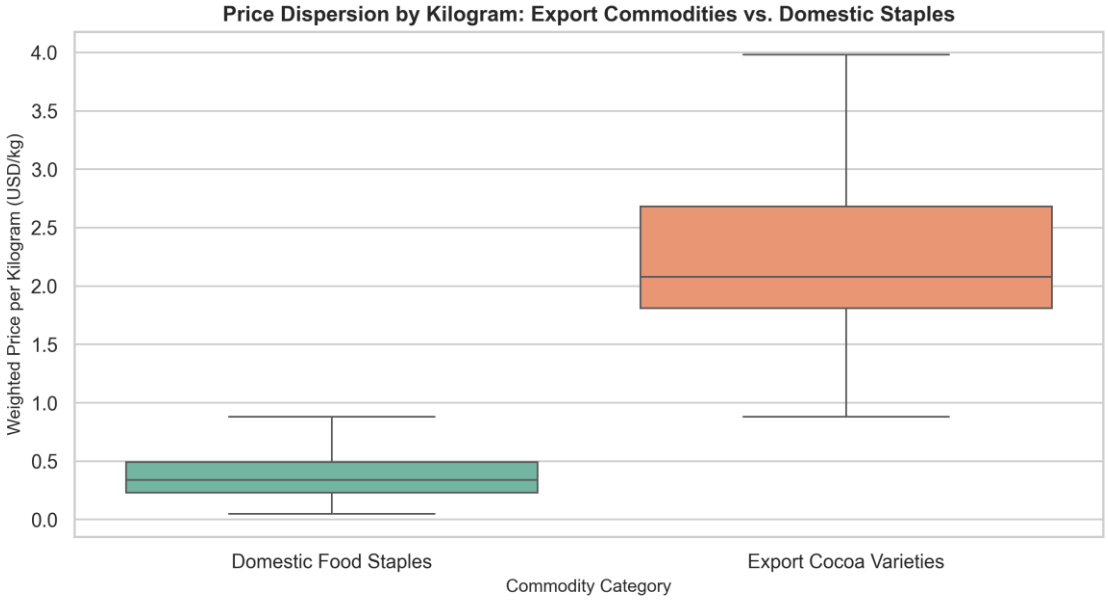

Figura 3. *Price dispersion by kilogram (USD/kg) comparing export commodities against domestic food staples, illustrating price stability in local food crops versus high dispersion in international export lines. Fuente: MAG, generado en Python el 22 de agosto de 2026.*

4.3. Interactive Dashboard Implementation

To translate these longitudinal findings into operational intelligence for agricultural planners and supply chain stakeholders, an interactive web dashboard was constructed and deployed publicly. As illustrated in Figure 4, the dashboard enables dynamic filtering across all 15 provinces, 110 agricultural commodities, and monthly temporal series.

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Unlike static administrative reports, the interactive interface allows decision-makers at the Ministry of Agriculture and Livestock to:

1. Conduct multi-commodity price comparisons across neighboring provincial jurisdictions.
2. Detect seasonal price anomalies in staple food crops to guide timely logistical interventions.
3. Audit monitoring coverage density to identify provinces with historically sparse field surveillance.

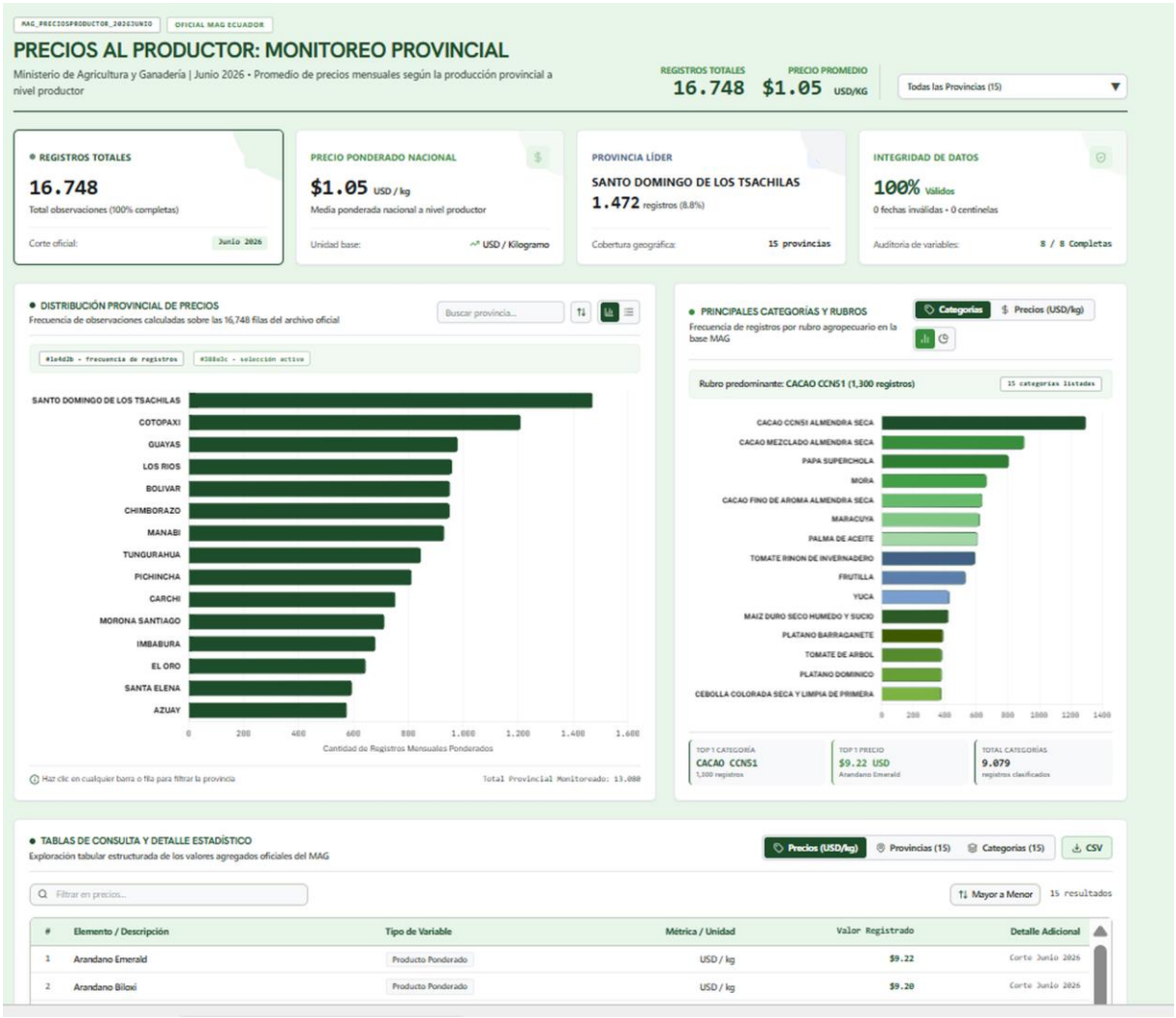

Figura 4. *Interface of the interactive agricultural producer price monitoring dashboard, illustrating provincial filtering and historical commodity trends. (Interactive deployment available at: https://serene-maamoul-225b55.netlify.app/). Fuente: Despliegue en Netlify, publicado el 23 de agosto de 2026.*

4.4. Methodological Limitations and Policy Boundaries

The findings of this study must be interpreted within the specific scope and boundaries of the dataset:

1. Absence of Cost and Profitability Data: The registry captures gross weighted transaction prices at the producer gate but records no information regarding agronomic input costs (fertilizers, seeds, irrigation), labor wages, or post-harvest logistics. Consequently, higher nominal prices cannot be equated with increased net profitability for farming households.

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2. Provincial Granularity: Data are aggregated at the provincial scale (DPA_PROVINCIA), precluding microeconomic analysis at the parish, community, or individual farm level.
3. Absence of Causal Identification: The observational descriptive design documents historical price behavior and monitoring coverage but does not establish causal mechanisms governing price formation.
4. Methodological note on geographic coverage: Although the original administrative schema from MAG comprises the nominal catalog of Ecuador's 23 provinces (N = 16,748 records), the territorial view of the interactive dashboard restricts its visualization to the 15 provinces with continuous monitoring and stable commercial density (n = 13,080 records). The remaining 8 provinces correspond to zones with sporadic records or seasonal gaps, which were excluded from the main comparative charts to prevent analytical distortions, thereby ensuring the integrity and robustness of the model without compromising the global universe processed in the pipeline. This provincial restriction is independent of, and does not contradict, the data-quality audit reported in Section 2.2, which confirmed zero missing or sentinel values across the full 16,748-record population used in the statistical analyses of Sections 3 and 4.1–4.2.

4.5. Future Research Directions

Future investigations should integrate open administrative price registries with national agricultural cost surveys (e.g., ESPAC-INEC) and remote-sensing climate data. Such linkages would enable robust econometrics to evaluate the causal impact of climatic anomalies and transport infrastructure investments on farm-gate price resilience.

4.6. Supplementary Dossier and Public Outreach Integration

To fulfill the comprehensive requirements of the analytical project integrating the three operational stages (Data Exploration, Scientific Modeling, and Public Communication), a supplementary dossier was compiled.

4.6.1. Public Diffusion Pieces (Stage 3)

To translate the technical findings of the longitudinal analysis into accessible formats for institutional and social stakeholders, four communication pieces were structured, strictly bounded by the methodological limits of the official registry (gross farm-gate prices without input costs or net profitability):

1. Technical Note for Rural Associations and Producers: "Radiography of Producer Prices in Ecuador: What Ten Years of Official Records Reveal (2016–2026)." An accessible summary detailing the stability observed between 2016 and 2021 versus the 2024–2025 surge driven by export cocoa, with a clear warning regarding production costs.
2. Executive Brief for MAG Decision-Makers: A policy synthesis focusing on the territorial concentration of surveillance in logistics nodes like Santo Domingo de los Tsáchilas (8.79%), the exposure of export crops, and the structural rigidity of domestic staple foods.
3. Visual Summary for Professional Networks: An informational capsule for the analytical community highlighting open records (N = 16,748), neutrosophic sets, and the public Netlify dashboard.
4. Analytical Press Release: An institutional note highlighting how price volatility in Ecuador's agricultural sector responds to international export market transmission rather than internal inflation.

4.6.2. Methodological Reflection and Closing Insights

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The transition across the project stages yielded two fundamental insights:

- What changed in the findings when moving from one stage to the next? During Stage 1, the interactive dashboard identified macro patterns and spatial concentrations. Moving to Stage 2 (scientific article with temporal decomposition and neutrosophic sets) revealed deep market fragmentation, proving that simple averages are insufficient due to quality and moisture dispersions. Finally, Stage 3 required translating this mathematical complexity into outreach formats without losing analytical rigor.
- What initial assumption had to be abandoned along the way? The initial temptation to interpret sharp weighted price increases (such as the 2024–2025 cocoa peak) as an indicator of net profitability and farming household bonanza was categorically discarded. Because the database lacks input, wage, and logistics variables, the study confined its scope strictly to descriptive commercial dynamics, abandoning any inference of net profitability.

5. Conclusions

This study provided a comprehensive descriptive characterization of the open administrative price registry of the Ecuadorian Ministry of Agriculture and Livestock (MAG) across the 2016–2026 period (N = 16,748). The audit confirmed exceptional administrative integrity, with 100 % completeness and validity across all primary attributes without the presence of masked sentinel values. Spatial analysis demonstrated a high concentration of monitoring effort in agro-logistical transport nodes, with Santo Domingo de los Tsáchilas representing 8.79 % (1,472 records) of national price captures. Product profiling revealed that cocoa varieties dominated administrative tracking (17.00 %, 2,848 records for dried almond lines); the registry-wide annual mean price rose to 1.90 USD/kg in 2024 and 1.85 USD/kg in 2025, a shift for which cocoa's own 2024 mean price ($\bar{x}$ = 6.76 USD/kg) was the dominant driver, whereas domestic food staples such as Papa Superchola maintained long-term price stability ($\bar{x}$ = 0.39 USD/kg).

Future work should prioritize linking open producer price registries with micro-level agricultural cost surveys and meteorological registries to evaluate farm-level profitability and climate vulnerability under formal econometric identification designs. Furthermore, establishing automated open-data pipelines for real-time validation will enhance the operational utility of public agricultural intelligence for smallholder farmers and institutional planners.

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Conflicts of Interest: The author declares no conflict of interest.

Data Availability: The dataset analyzed in this study is publicly accessible at the Ecuadorian National Open Data Portal: https://www.datosabiertos.gob.ec/dataset/promedio-de-precios-mensuales-segun-la-produccion-provincial-a-nivel-productor. The interactive analytics dashboard is hosted at https://serene-maamoul-225b55.netlify.app/

Use of AI: Antigravity CLI v2.0 with Gemini 3.7 Flash was utilized for automated dataset verification, statistical aggregation scripting, and document structuring assistance. Data analysis, calculation and verification of all reported quantitative figures, and the drafting of the Results and Applications sections are the sole responsibility of the author. All external references were verified against their primary sources. Date of query: August 19, 2026.

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