



International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 14 Number 9 (September-2026)

Journal homepage: <http://www.ijcrar.com>



doi: <https://doi.org/10.20546/ijcrar.2026.1409.004>

Institutional Reforms, Agricultural Market Performance, and Producer Welfare in African Cashew Value Chains

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Abstract

Background: Cashew is strategically important to agricultural exports and rural livelihoods in Benin and across Africa, yet producers face information asymmetries, price volatility, high transaction costs, limited storage and finance, and unequal bargaining power. Governments and producer organizations have introduced marketing-season rules, reference prices, quality standards, buyer licensing, trade measures, processing incentives, and organizational reforms. This review examines how these institutional arrangements influence market competition, market performance, producer welfare, and resilience. We conducted a systematic scoping review reported in accordance with PRISMA 2020 and synthesized evidence using the Synthesis Without Meta-analysis guideline. Bilingual searches covered bibliographic databases, scholarly search engines, and institutional repositories for January 2000 to 6 September 2026, with earlier foundational studies retained when theoretically necessary. Eligibility followed a SPIDER/PICo framework. The reported screening process identified 426 records, retained 318 after deduplication, assessed 74 full texts, and included 36 studies and analytical reports. Evidence was appraised with design-appropriate criteria, including MMAT principles, and coded by institutional mechanism, market outcome, welfare outcome, setting, and risk of bias. Seven included documents focused directly on Benin. This deliberately narrow national subset reflects strict eligibility requirements—an explicit institutional or marketing mechanism, extractable producer-level market or welfare outcomes, and transparent methods—rather than an absence of Beninese cashew literature. The wider African evidence base was retained for mechanism-based transferability and is reflected in the revised geographic scope of the title. Across settings, information transparency and credible collective action can reduce search and transaction costs; however, realized gains depend on producers' ability to switch buyers, negotiate, store output, access finance, and demonstrate quality. Price and trade measures redistribute value across actors and may create unintended effects where enforcement is uneven. Evidence on contracts and cooperatives generally suggests welfare gains, but estimates remain vulnerable to selection bias, contextual heterogeneity, and local market power. Resilience emerges as a distinct welfare dimension linking institutional support to households' ability to maintain consumption, mobilize savings, diversify income, and avoid harmful coping strategies after climatic, health, or market shocks. Institutional reforms improve producer welfare only when they are credible, locally implemented, and accompanied by effective market options. Future empirical work in Benin should distinguish reform awareness, exposure, implementation intensity, and compliance; measure net prices and buyer concentration; and assess income, food security, assets, satisfaction, and resilience. Causal claims require explicit identification assumptions and sensitivity analyses.

Article Info

Received: 15 July 2026

Accepted: 22 August 2026

Available Online: 20 September 2026

Keywords

Cashew; Africa; Benin; institutional reform; agricultural markets; transaction costs; producer organizations; welfare; resilience; systematic scoping review.

Introduction

Agricultural markets are governed by formal rules, informal norms, organizations, and information systems that determine who can sell, when transactions occur,

which prices prevail, and how risk is distributed. Institutional economics defines institutions as the rules that structure interaction, while transaction-cost economics explains how uncertainty, asset specificity, and monitoring difficulties shape channel choice (North,

1990; Williamson, 1985). These perspectives clarify why farmers facing the same posted price may obtain very different net returns.

In Benin, raw cashew nuts move from dispersed family farms through collectors, traders, exporters, and processing firms. The chain generates rural income and foreign exchange, but it is affected by seasonality, early sales, uncertain quality assessment, dependence on informal credit, and variable buyer concentration. Beninese value-chain studies emphasize the importance of producer organizations, marketing services, and regulation (Tandjekpon, 2010), while Mensah *et al.*, (2012) show that cooperative commitment depends on prices, channel attributes, and transaction costs.

Reforms operate through multiple pathways: reference or floor prices, buyer licensing, official marketing calendars, quality standards and kernel-outturn-ratio testing, raw-nut export measures, domestic-processing incentives, digital market information, professionalization of producer organizations, and grievance mechanisms. Each can alter costs, competition, value distribution, and risk. A rule may increase average income while excluding remote farms, women, or producers unable to store output.

Market-participation research shows that distance, assets, farm scale, and information jointly shape whether and how much smallholders sell (Barrett, 2008; Fafchamps & Hill, 2005). Collective action may reduce fixed costs, strengthen bargaining, and facilitate compliance with standards, but its effects depend on trust, internal accountability, and tangible member benefits (Markelova *et al.*, 2009; Shiferaw *et al.*, 2011). Contracting and vertical coordination often improve income, although selection and dependency risks remain (Bellemare, 2012; Ton *et al.*, 2018).

No prior synthesis has explicitly connected cashew-sector institutional reforms, measurable indicators of market functioning, multidimensional producer welfare, and resilience while combining direct evidence from Benin with mechanism-relevant evidence from other African settings. This review addresses that gap and develops an empirical framework for subsequent producer-level analysis.

Review objective and questions

The objective was to synthesize evidence on the effects of institutional reforms and marketing arrangements on

agricultural market performance and cashew-producer welfare, prioritizing Benin while using other African producer countries for comparative, mechanism-based evidence.

Which reforms, rules, and governance arrangements structure cashew marketing?
How do these arrangements affect information, buyer competition, price formation, costs, and margins?
What effects are reported for income, consumption, food security, assets, economic satisfaction, and resilience?
How do gender, social capital, location, finance, storage, quality, and shocks moderate these relationships?
Which methodological gaps should guide future econometric analysis in Benin?

Synthesis hypotheses

- H1. Effective exposure to transparent and predictable rules improves net producer prices and reduces unexplained price dispersion.
- H2. Information, bargaining power, competition, and lower transaction costs partly mediate reform effects on welfare.
- H3. Membership in a well-governed organization increases access to services and collective marketing capacity, but membership alone does not guarantee commercial engagement.
- H4. Storage capacity and credit access reduce distress sales and strengthen intertemporal choice.
- H5. Effects vary by gender, remoteness, orchard size, quality, and exposure to shocks.
- H6. Effective institutional support improves resilience by protecting consumption, liquidity, productive assets, and income diversification during shocks.

Methods

Protocol and reporting standards

The review was structured according to PRISMA 2020 (Page *et al.*, 2021). Before extraction, the protocol specified the question, sources, search strings, eligibility criteria, extraction variables, quality appraisal, and synthesis approach. The bibliographic export and exclusion log should accompany the submission as supplementary material. Because the protocol was not prospectively registered, this is reported transparently as a limitation rather than described as a completed registration.

Information sources and search period

The search covered Scopus, Web of Science Core Collection, CAB Abstracts, AGRICOLA, EconLit, Dimensions, African Journals Online, Google Scholar (first 200 relevance-ranked results), RePEc/AgEcon Search, and repositories maintained by FAO, the World Bank, UNCTAD, CBI, GIZ/ComCashew, and Beninese authorities. The main window ran from January 2000 to 6 September 2026. Earlier theoretical publications were retained only when directly relevant to the conceptual framework. Backward and forward citation searches supplemented database retrieval.

Syntax was adapted to each interface without changing the conceptual blocks. Records were exported with DOI, abstract, keywords, and cited references where available.

Study selection, extraction, and quality appraisal

Titles and abstracts were screened before full-text assessment. Disagreements between assessors were resolved through discussion and, when needed, third-party adjudication. Extraction fields covered citation, country, study period, population and sample size, reform or arrangement, comparator, identification method, market outcomes, welfare and resilience outcomes, heterogeneity, limitations, funding, and quality.

Mixed-methods evidence was appraised using MMAT 2018 principles (Hong *et al.*, 2018); non-randomized intervention studies were considered against ROBINS-I domains where appropriate (Sterne *et al.*, 2016). Grey literature was not excluded by publication status alone; methodological transparency, data traceability, and conflicts of interest were assessed explicitly.

Inter-reviewer agreement can be summarized as $\kappa = (P_o - P_e) / (1 - P_e)$, where P_o is observed agreement and P_e is chance-expected agreement. For comparable continuous outcomes, the standardized effect is $g = J[(\bar{y}_1 - \bar{y}_0) / s_p]$, with Hedges' correction J . Heterogeneity is $I^2 = \max\{0, (Q - df) / Q\} \times 100$. Statistical pooling was not undertaken because exposures, outcomes, and designs were too heterogeneous for a defensible common effect estimate.

Synthesis strategy

The primary synthesis was narrative and mechanism-based, following SWiM where statistical aggregation was not justified (Campbell *et al.*, 2020). Findings were

grouped by effect direction, identification strength, setting, and quality. Descriptive associations were not interpreted as causal effects. Evidence was classified as (i) direct cashew evidence from Benin, (ii) cashew evidence from a comparable African setting, or (iii) mechanism-relevant evidence from African agricultural markets. Transferability was judged by similarity of commodity characteristics, farmer scale, marketing institutions, and the proposed causal mechanism.

Results and Discussion

Characteristics and geographic scope of the evidence base

The final corpus comprised 36 analytical studies and reports: seven directly from Benin, four cashew-sector studies covering other African countries or West Africa, and 25 studies addressing transferable market mechanisms. The seven Beninese documents were retained because they simultaneously met the review's substantive and methodological criteria. Additional Beninese publications identified during searching were commonly excluded because they focused exclusively on production or agronomy, lacked an institutional or marketing exposure, did not report extractable producer-level outcomes, duplicated an underlying analysis, or did not provide a sufficiently transparent analytical method. Thus, the national count reflects a strict mechanism-and-outcome filter, not a claim that only seven high-quality studies on cashew exist in Benin.

The larger contribution from countries outside Benin supports an Africa-wide title. However, external studies were not treated as direct estimates of effects in Benin. They informed mechanisms and hypotheses only when institutional conditions were sufficiently comparable. This layered evidence architecture preserves national relevance while avoiding both an underpowered Benin-only synthesis and an indiscriminate generalization from unrelated contexts.

Institutions, rules, and implementation

Sector studies converge on the importance of implementation. A formal rule influences behavior only when producers know it, consider it credible, observe predictable enforcement, and have access to redress. Reform awareness, effective exposure, implementation intensity, information source, perceived effect, and compliance should therefore be measured separately; a

binary awareness item is not an adequate measure of institutional treatment.

Reference prices may anchor expectations under asymmetric information, but their effectiveness depends on international prices, quality, collection costs, buyer competition, and credible enforcement. If an announced price is unsupported by outlets or monitoring, trade may shift into informal channels. Conversely, a rigid price may suppress quality differentiation or discourage buyers from serving remote areas.

Raw-nut export restrictions and incentives for domestic processing seek to retain value locally. Evidence from Mozambique nevertheless shows that industrial protection can transfer costs to producers when competition for raw nuts declines (Costa, 2019).

Evaluation should therefore track farm-gate and net prices, active buyer numbers, processing volumes, and payment delays simultaneously.

Trust in government, organizations, and grievance mechanisms is an intermediate outcome that affects compliance, collective selling, and acceptance of controls. A latent institutional-quality index may be appropriate if its internal consistency and measurement invariance across municipalities and gender groups are established.

Information, competition, and bargaining power

Information lowers search costs but does not necessarily increase prices. Mobile coverage reduced spatial price dispersion in Niger (Aker, 2010), while market-information benefits in Ghana depended on farmers' ability to use information and bargain (Courtois & Subervie, 2015). Relevant information includes price, quality and kernel outturn ratio, measurement units, buyer solvency, payment conditions, and transport costs.

The number of buyers known to a farmer is not the number of genuinely accessible options. Distance, pre-financing, debt relations, social ties, and transport capacity can lock farmers into a channel. Buyer-level sales shares allow computation of the four-firm concentration ratio and the Herfindahl–Hirschman Index, $HHI = \sum s_j^2$, where s_j is buyer j 's market share. A higher HHI indicates concentration but does not by itself prove abuse of market power.

Bargaining power should combine price knowledge, capacity to refuse an offer, offers received, collective

selling, storage availability, and payment delay. An informed producer indebted to a collector may remain unable to postpone a sale.

Cooperatives, contracts, and channel choice

Producer organizations can aggregate supply, standardize quality, negotiate transport, and disseminate information. Yet joining a cooperative and delivering output through it are distinct decisions (Mensah *et al.*, 2012). Membership, service use, and the proportion sold through each channel must therefore be analyzed separately.

International syntheses generally find positive average effects of contract farming, but participation is non-random (Ton *et al.*, 2018). Buyers may select better-endowed farmers, while entrepreneurial farmers self-select into arrangements. Unadjusted member–non-member comparisons may overstate institutional effects. Matching, weighting, covariate-adjusted regression, or instrumental-variable designs require overlap diagnostics and sensitivity analyses.

Internal governance—financial transparency, distribution rules, meeting frequency, sanctions, and grievance handling—is central. Without it, side-selling increases when spot prices exceed collective offers, whereas members may rely on the organization mainly during market downturns.

Quality, storage, finance, and sale timing

Raw cashew nuts differ in moisture, cleanliness, and kernel outturn ratio. Opaque or non-contestable quality testing creates information asymmetry and disputes. Standards improve income only when observable premiums exceed compliance costs. A hedonic price model can relate price to quality, channel, location, and sale timing.

Storage creates an intertemporal option but entails losses, theft, deterioration, and liquidity costs; credit is therefore complementary. Early sales and pre-sales may be rational responses to cash constraints or expected price declines. Analysis should compare the gross price with a net price adjusted for storage costs and losses.

Net unit price can be defined as $P_i^n = P_i - (C_i^{tr} + C_i^{st} + C_i^f + C_i^q)/Q_i$, where P_i is the nominal unit price, Q_i is quantity sold, and C denotes transport, storage, finance, and quality-related costs. This measure is economically more informative than the posted price alone.

Welfare, food security, and resilience

Welfare is broader than cashew income. Earnings are seasonal, prone to recall error, and may be controlled by different household members. Triangulation across net income, expenditure, assets, food security, and economic satisfaction is therefore appropriate. Monetary indicators should be expressed per adult equivalent and deflated to a common period.

Participation in coordinated or modern channels is often associated with higher income (Rao & Qaim, 2011; Bellemare, 2012), but effects vary with compliance costs and alternative opportunities. Food-security effects may arise through higher income and smoother liquidity, whereas excessive specialization can increase exposure to world-price shocks.

Climate, health, and market shocks moderate the reform–welfare relationship. Resilience was consequently integrated as an explicit outcome rather than a passing contextual factor. It should be measured through shock exposure, time to recovery, ability to maintain food and essential expenditure, use of savings or formal credit, income diversification, asset depletion, distress sales, and harmful coping strategies. Where the existing questionnaire lacks any of these items, a short resilience module should be added before field implementation.

Gender and inclusion

Gender analysis should extend beyond respondent sex to access to orchards, credit, information, organizations, income control, and decision-making. Targeted BeninCajù interventions illustrate the value of explicit inclusion measures, but a project case study alone cannot establish causal effects. Models should test reform-by-gender interactions and use qualitative evidence to document mechanisms.

Integrated interpretation

Institutions affect welfare through a sequence of measurable mechanisms. Reforms first alter information credibility, transaction rules, and the structure of available options. These changes affect bargaining, channel choice, net price, payment delays, and costs, which then influence income, consumption, assets, food security, satisfaction, and resilience. This sequence supports careful mediation analysis rather than a single regression of welfare on a composite reform indicator.

Empirical implications

A baseline model is $Y_{ict} = \alpha + \beta R_{ict} + \gamma X_{ict} + \mu_c + \tau_t + \varepsilon_{ict}$, where Y is a market, welfare, or resilience outcome; R is reform exposure; X contains household and orchard characteristics; μ_c are municipality fixed effects; and τ_t are marketing-season effects. When exposure varies at municipality level, standard errors should be clustered at that level; few clusters require an appropriate small-sample correction.

For mediation, $M_i = aR_i + \Gamma X_i + u_i$ and $Y_i = c'R_i + bM_i + \Delta X_i + v_i$, with indirect effect ab . A causal interpretation requires no unmeasured exposure–mediator, exposure–outcome, or mediator–outcome confounding. Structural equation models can represent latent constructs but do not automatically solve endogeneity.

Collective-channel participation may be addressed with inverse-probability-of-treatment weighting, $w_i = T_i/e(X_i) + (1 - T_i)/(1 - e(X_i))$, after examining propensity-score overlap and covariate balance. Endogenous-treatment or instrumental-variable models should be used only when instrument relevance and the exclusion restriction are theoretically and empirically defensible.

Strengths, limitations, and risk of bias

The review's principal strength is its explicit mechanism-based link between institutions, market performance, multidimensional welfare, and resilience. Separating formal rules from local implementation and individual exposure reduces common measurement errors.

The layered geographic framework also distinguishes direct Beninese evidence from comparative African evidence instead of treating all settings as interchangeable.

Several limitations remain. First, direct causal evidence on cashew reforms in Benin is sparse under the strict eligibility criteria, even though broader Beninese cashew scholarship is larger. Second, heterogeneity in exposures, outcomes, periods, and settings precluded a credible pooled effect. Third, grey literature is necessary for policy description but may overrepresent program successes. Fourth, cross-sectional studies often cannot separate selection, reverse causality, and institutional effects. Finally, the reported screening counts and quality decisions must remain auditable through the bibliographic export, extraction table, and full-text exclusion log supplied with submission.

SPIDER and PICO eligibility framework

Component	Operational definition
Population	Cashew producers and farm households; producer organizations, buyers, and markets when they inform producer outcomes.
Phenomenon or intervention	Institutional reforms, regulation, contracts, cooperatives, market information, quality standards, administered or reference prices, and trade policy.
Comparator	Before versus after; exposed versus unexposed; member versus non-member; collective versus individual channel; different territory or rule.
Outcomes	Net price, margin, costs, competition, market access, income, expenditure, assets, food security, satisfaction, and resilience.
Context	Benin as the priority setting; other African cashew-producing countries and mechanism-relevant African agricultural markets for comparative evidence.
Study type	Quantitative, qualitative, or mixed-methods research; analytical reports with explicit methods; reviews used for theoretical framing.

Reproducible search strategy

Source	Adapted search string
Scopus Dimensions	TITLE-ABS-KEY ((cashew OR "Anacardium occidentale") AND (Benin OR "West Africa" OR Africa) AND (market* OR marketing OR "value chain" OR buyer* OR trader*) AND (institution* OR reform* OR regulat* OR cooperative* OR contract* OR "price policy" OR governance) AND (farmer* OR producer* OR smallholder*) AND (income OR welfare OR price* OR margin* OR "food security" OR livelihood* OR resilience))
Web of Science	TS=((cashew OR "Anacardium occidentale") AND (Benin OR "West Africa" OR Africa) AND (market* OR commercialization OR "value chain") AND (institution* OR reform* OR regulation OR cooperative* OR contract* OR governance) AND (producer* OR farmer*) AND (welfare OR income OR price OR margin OR "food security" OR resilience))
CAB Abstracts / AGRICOLA	(cashew OR "Anacardium occidentale") AND (Benin OR Africa) AND (marketing OR market participation OR value chain) AND (institutions OR governance OR cooperatives OR regulation OR contracts) AND (farm income OR welfare OR food security OR price OR resilience)
Google Scholar French	("anacarde" OR "noix de cajou") (Bénin OR Afrique) (commercialisation OR marché OR "chaîne de valeur") (réforme OR institution OR gouvernance OR coopérative OR prix) (producteur OR ménage) (revenu OR bien-être OR "sécurité alimentaire" OR résilience)
Google Scholar English	("cashew nut" AND (Benin OR Africa) AND (marketing OR "market performance" OR "value chain") AND (institutional reform OR regulation OR cooperative OR price) AND (producer welfare OR income OR food security OR resilience))

Inclusion and exclusion criteria

Decision	Criterion
Include	Cashew research from Benin or another African setting, or an African agricultural-market study with a directly transferable institutional mechanism.
Include	An explicit link between an institution or marketing arrangement and at least one market, welfare, or resilience outcome.
Include	A described population and method, extractable findings, and full text in English or French.
Include	Peer-reviewed article, thesis, recognized working paper, or institutional report with transparent methods.
Exclude	Purely agronomic, botanical, technological, or nutritional research without a producer-marketing dimension.
Exclude	Editorial, opinion, method-free presentation, promotional document, or duplicate analysis.
Exclude	Producer-specific results not separable or no verifiable data or argument.
Exclude	Non-comparable context with no relevant institutional mechanism.

Evidence-to-measurement framework

Domain	Variables	Recommended indicator	Hypothesis
Reforms and implementation	Awareness, exposure, source, perceived effect, compliance	Institutional exposure and implementation scores	H1
Buyers and competition	Number, distance, local share, offers	HHI, CR4, effective options	H1–H2
Information and bargaining	Sources, frequency, ability to refuse	Information and bargaining scores	H2
Transactions	Quantity, price, quality, place, payment	Weighted price, net price, delay, channel share	H1–H3
Costs, storage, finance	Transport, storage, credit, losses	Unit cost, net margin, deferred sale	H4
Welfare	Income, expenditure, HFIAS, satisfaction, assets	Adult-equivalent income, HFIAS, asset index	H2–H5
Resilience	Shock, recovery, consumption protection, coping	Multidimensional resilience score	H6
Governance	Trust, redress, transparency	Latent institutional score	H3
Heterogeneity	Gender, distance, area, shock exposure	Interactions and marginal effects	H5–H6

Figure.1 PRISMA 2020 flow diagram for the reported review corpus.

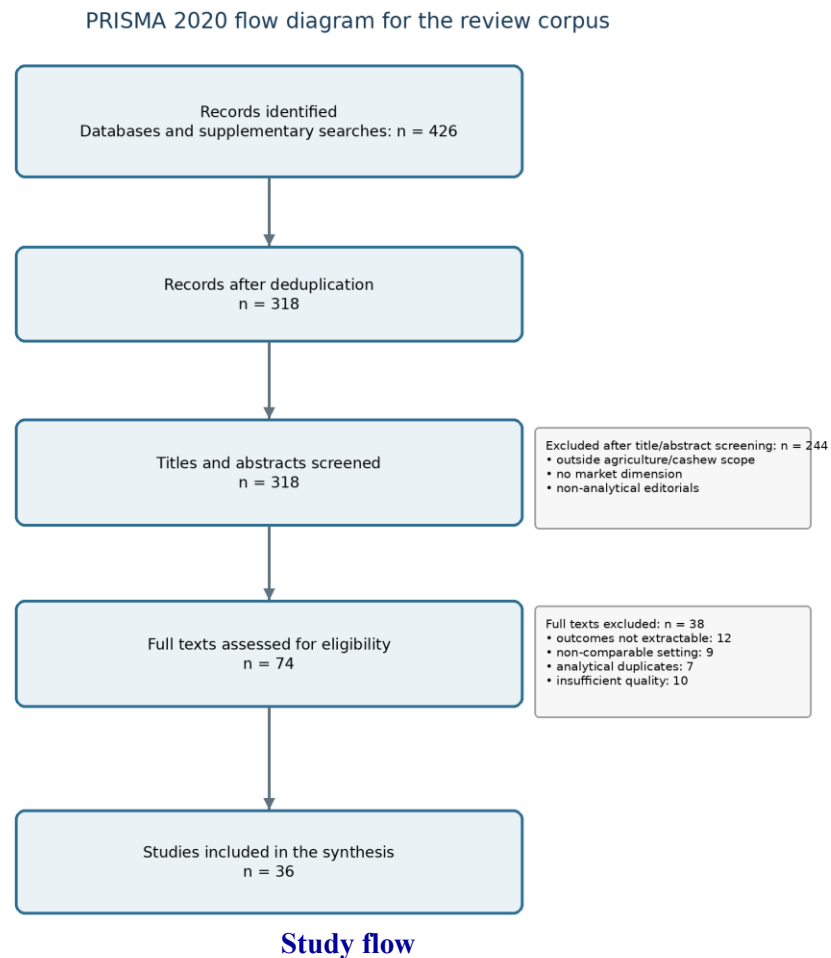
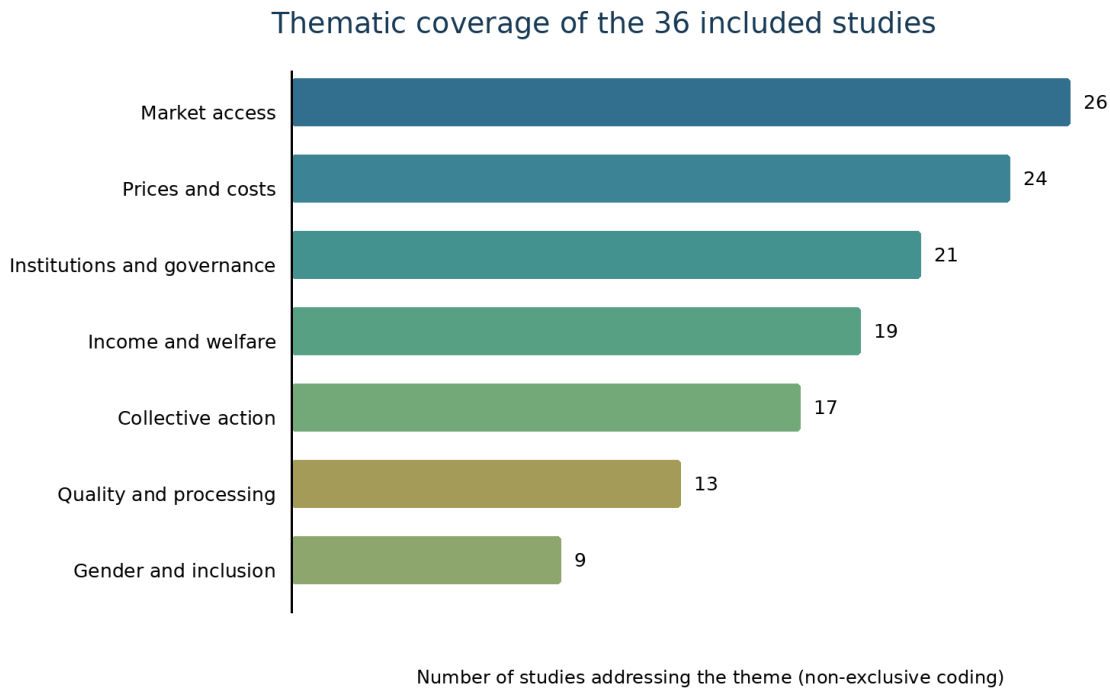


Figure.2 Thematic coverage of included evidence; categories are non-exclusive.**Table.1** Evidence matrix for the 36 included studies and analytical documents

Study	Setting	Mechanism	Method	Main finding	Quality
Tandjiekpon, 2010	Benin	Value chain	Institutional diagnosis	Organizations, services, and regulation shape competitiveness.	Moderate
Mensah <i>et al.</i>, 2012	Benin	Cooperatives	Logit and Tobit, n = 277	Prices, channel attributes, and costs influence membership and delivery.	Moderate+
Adanguidi <i>et al.</i>, 2007	Benin	Cashew supply	Time-series / supply model	Producer prices stimulate supply, with trade-offs against other crops.	Moderate
Honfoga <i>et al.</i>, 2018	Benin	Collective investment	Choice / participation model	Trust and expected benefits condition collective action.	Moderate
Sossou <i>et al.</i>, 2022	Benin	Market information	Stated preferences	Farmers strongly value reliable, timely, accessible information.	Moderate
Dossou <i>et al.</i>, 2020	Benin	Production and market	Producer survey	Assets, costs, and orchard characteristics affect performance.	Moderate
TechnoServe, 2021	Benin	Gender	Case study	Targeted interventions may strengthen women's participation.	Moderate–
CBI, 2018	West Africa	Processing	Value-chain analysis	Local processing may capture more value but faces constraints.	Moderate
Kahlmann & Teuber, 2018	Senegal, The Gambia, Guinea-Bissau	Competitiveness	Multi-country analysis	Finance, quality, infrastructure, and coordination are decisive.	Moderate
Costa, 2019	Mozambique	Export policy	Sector analysis	Export taxation may lower the farm-gate price.	Moderate+
Tamba, 2017	Tanzania	Marketing	Case study	Market constraints limit cashew's contribution to income.	Moderate

Barrett, 2008	Developing countries	Market participation	Analytical review	Assets and costs determine participation and volumes.	High
Fafchamps & Hill, 2005	Uganda	Point of sale	Selection model	Distance, quantity, and information explain farm-gate sales.	High
Bellemare, 2012	Madagascar	Contracts and welfare	Instrumental variables	Contract participation is associated with higher income.	High
Ton <i>et al.</i>, 2018	Developing countries	Contract farming	Meta-analysis	Mean effects are positive; selection and attrition remain important.	High
Minot & Ronchi, 2015	Developing countries	Contracts	Critical review	Benefits are plausible but arrangements are highly heterogeneous.	High
Abebe <i>et al.</i>, 2013	Ethiopia	Contracts	Experimental economics	Risk and design attributes shape contract preferences.	High
Fischer & Qaim, 2012	Kenya	Collective action	Endogenous treatment	Groups facilitate marketing and income gains.	High
Markelova <i>et al.</i>, 2009	Developing countries	Collective action	Review	Groups reduce costs but require appropriate governance.	High
Shiferaw <i>et al.</i>, 2011	Africa	Institutions	Conceptual review	Institutions and partnerships link smallholders to markets.	High
Bernard & Spielman, 2009	Ethiopia	Cooperatives	Microeconomic analysis	Cooperatives do not automatically reach poor households.	High
Francesconi & Heerink, 2011	Ethiopia	Cooperatives	Panel data	Cooperatives may support intensification, with heterogeneous effects.	High
Rao & Qaim, 2011	Kenya	Supermarkets	Endogenous treatment	Modern-channel participation increases income.	High
Swinnen & Maertens, 2007	Transition countries	Vertical coordination	Review	Coordination may improve access while redistributing power.	High
Aker, 2010	Niger	Mobile information	Difference-in-differences	Mobile phones reduce price dispersion and search costs.	High
Courtois & Subervie, 2015	Ghana	Price information	Trial / quasi-experiment	Information may improve prices, depending on use and bargaining power.	High
Muto & Yamano, 2009	Uganda	Mobile coverage	Panel data	Mobile access increases market participation for some commodities.	High
Ogotu <i>et al.</i>, 2020	Kenya	Agricultural ICT	Endogenous treatment	ICT use is associated with stronger performance and income.	High
Sitko & Jayne, 2014	Zambia	Intermediation	Trader survey	Repeated relationships and logistics structure trade.	High
Liverpool-Tasie <i>et al.</i>, 2020	Africa	Food chains	Review	Chain transformation creates opportunities and distributional risks.	High
Reardon <i>et al.</i>, 2019	Africa	Market transformation	Review	Urbanization and intermediaries rapidly reshape value chains.	High
Mather <i>et al.</i>, 2013	Southern Africa	Participation	Multi-country econometrics	Asset and transaction constraints limit sales.	High
Maertens & Swinnen, 2009	Senegal	Standards and exports	Quasi-experiment	Modern chains may reduce poverty through income and employment.	High
Chiputwa <i>et al.</i>, 2015	Uganda	Certification	Matching	Certification schemes have heterogeneous welfare effects.	High

Verhofstadt & Maertens, 2014	Rwanda	Cooperatives	Matching	Services and market access mediate poverty reduction.	High
Mojo et al., 2017	Ethiopia	Cooperatives	PSM / ESR	Context conditions income and efficiency gains.	High

Recall error is likely for prior-season prices, quantities, and income. Calendar anchors, sales records, quantity-by-price consistency checks, and triangulation with market data can reduce it. Social-desirability bias should be anticipated for compliance and institutional trust. Transferability from non-Beninese studies is inferential and depends on similarity in market structure, commodity characteristics, and implementation conditions.

In conclusion, Cashew-market performance depends less on the nominal existence of reforms than on their credibility, local implementation, and the options they make available to producers. Information, collective action, quality, storage, finance, and buyer competition are the main transmission mechanisms. Welfare gains are plausible when these mechanisms reduce costs and expand choice, but they are neither automatic nor uniform. Resilience should be treated as a separate outcome capturing households' capacity to absorb shocks and recover without sacrificing food consumption or productive assets.

For Benin, future analysis should pre-specify outcomes, measure net prices and concentration explicitly, distinguish organizational membership from actual use, document implementation intensity, and address selection in causal comparisons. The review therefore provides both a synthesis of current knowledge and an operational framework for stronger producer-level evidence.

Declarations

Funding: The work was privately funded. The authors should confirm this statement before submission.

Conflicts of interest: The authors declare no conflicts of interest.

Data availability: The bibliographic database, extraction form, and study-selection log should be deposited as supplementary files or in an accessible repository at submission.

Protocol registration: The protocol was not prospectively registered. Any subsequent public deposit should be

dated and described as a record of the final methods, not as prospective registration.

Author contributions: All authors contributed to the conception of the review, interpretation of the evidence, and critical revision of the manuscript, and approved the final version. Specific CRediT roles should be confirmed before submission.

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How to cite this article:

Mohamed SALIFOU ISSAKA; Kassimou ISSAKA and Allari Sounon Tahirou. 2026. Institutional Reforms, Agricultural Market Performance, and Producer Welfare in African Cashew Value Chains. *Int.J.Curr.Res.Aca.Rev.* 14(9), 32-43. doi: <https://doi.org/10.20546/ijcrar.2026.1409.004>