ISSN: 2756-2700
Discoveries in Agriculture and Food Sciences; Vol. 14 No. 06 (2026) (17-37)
https://doi.org/10.14738/dafs.1406.12456

Effects of Market Contracts on Agroecological Implementation Intensity in Cocoa (*Theobroma cacao* L.) Production Systems: Evidence from Smallholder Farmers in the Mbam and Kim Division, Cameroon

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Abstract: Market contracts are increasingly used to channel sustainability standards to smallholder cocoa farmers, yet their effect on agroecological practice is poorly documented. This study assessed how formal written market contracts (MCs) influence the intensity of agroecological implementation among smallholder cocoa (*Theobroma cacao* L.) farmers in the Mbam and Kim Division, Cameroon. A household survey of 120 farmers in four villages combined purposive, village-stratified and snowball sampling; 61 farmers held written contracts and 59 did not. Implementation was measured with a weighted Agroecological Implementation Index (AEII), scored from 0 to 4 across seven selected principles defined by the High Level Panel of Experts (HLPE). Contract farmers had larger farms and more formal education. They scored higher on soil health ($t = 4.98$, $p < 0.001$) and input reduction ($t = 3.23$, $p = 0.002$), but not on biodiversity, synergy, economic diversification, recycling or social equity. The mean AEII was 1.56 for contract farmers and 1.14 for non-contract farmers ($p < 0.001$); both groups remained at the level of partial adoption. Qualitative evidence indicated that cooperative–private partnerships with certification clauses and training were the contract type most likely to drive auditable practices. The absence of a price premium for sustainably produced cocoa was the main barrier to wider uptake. Contracts can support a fuller agroecological transition only if they are redesigned to reward equity, fair remuneration and farmer-centred knowledge systems.

Keywords: smallholder farmers, certification schemes, producer cooperatives, sustainability transition, agroecology intensity, agroecology implementation

INTRODUCTION

The global demand for cocoa beans and its by-products such as chocolates and cocoa butter has been on a constant rise over the last 15 years [1]. Cocoa (*Theobroma cacao* L.) is one of the main export crops in Africa contributing to employment and gross domestic product (GDP) [2]. Cameroon is Central Africa's leading cocoa producer, the fourth largest in Africa and the sixth largest in the world [3]. Cocoa was Cameroon's second most valuable export commodity in 2017, after crude petroleum (29.8% of total exports), at about US$ 403 million or 14.8% of total exports [4].

However, this sector faces constraints such as low productivity, low bean quality, low social and management practices and volatile prices that depress farmer incomes [5–7].

Moreover, Cameroonian cocoa is not certified for quality and sustainability, which leads to price discounts on international markets [8]. This is further aggravated by farmers' preference for quick sales over quality improvements and their vulnerability to exploitation by middlemen [9, 10]. The demand for sustainable consumption is increasing in commodity importing regions such as the European Union (EU), which imports 60% of the world's cocoa mainly from Africa [11, 12]. The urgency for tackling these challenges thus is exacerbated.

To meet quality standards, the cocoa sector increasingly faces demands for sustainability [9]. The question is no longer whether to leave the burden of technical change to cocoa farmers alone, but how to make incremental changes at different levels of the sociotechnical system [13]. Agroecological practices respond to these challenges; they are characterised by biodiversity, ecological balance, economic leverage and social equity [14–16]. Agroecology offers a way of responding to the rising demand for food in such a way that no one is left behind [17].

In the Mbam and Kim Division of Cameroon, a surge in programmes and projects has sought to promote agroecological practices and to facilitate shifts away from conventional farming. Despite these initiatives, institutional support and growing national interest in agroecological transition, and despite the documented success of resource-conserving agriculture in other contexts [18], the implementation of agroecological practices among cocoa smallholders in the division, and more broadly across Cameroon, remains low. The constraints include barriers to market access, financial constraints, gaps in technical knowledge and persistent power asymmetries within cocoa supply chains [19, 20]. Farmers enter into several types of contract to sell their cocoa, but the effects of these agreements on sustainable practices are not well understood.

The Food and Agriculture Organization of the United Nations (FAO) defines contract farming as an agreement between a buyer, who sets the terms of quality and price, and a farmer, who agrees to supply the product at a future date [21]. Contractual relations between wholesalers and producers have a major influence on the efficiency and profitability of agricultural supply chains [22]. Previous studies [23–25] tend to treat contract farming and the adoption of agroecological practices separately, or to conflate contract design with contextual factors, and quantitative studies that control for heterogeneous effects remain limited [26–28]. In addition, there is no empirical evidence on how specific contract features influence the intensity of agroecological implementation among smallholders in the Mbam and Kim Division.

This study therefore examines the relationship between market contract characteristics and the intensity of agroecological implementation among smallholder cocoa farmers in the Mbam and Kim Division. Its specific objectives were to (i) characterise farmers with and without formal written market contracts (MCs); (ii) identify the contractual arrangements governing cocoa marketing in the area; (iii) compare the intensity of agroecological implementation, measured with a weighted Agroecological Implementation Index (AEII), between farmers with and without MCs; and (iv) identify the barriers to fuller agroecological implementation. We hypothesised that farmers with MCs implement agroecological principles more intensively than farmers without. By linking contract features to agroecological outcomes, the study provides evidence to inform more effective contract models for sustainable cocoa systems in Cameroon and contributes to the agricultural science literature on market institutions and sustainability transitions.

MATERIALS AND METHODS

Study Area

This research was conducted in the Mbam and Kim Division, located in the Centre Region of Cameroon (Figure 1), a major cocoa-producing area. The site was selected for three reasons: its importance in cocoa production, the presence of an agroecological living laboratory, and a high concentration of stakeholders involved in promoting sustainable agriculture. Within the division, two subdivisions, Mbangassina and Ntui, were chosen, and four villages were purposively selected for the survey.

The Mbam and Kim Division is one of the ten divisions of the Centre Region. It lies in the northern part of the region, bordering the Adamaoua Region to the north, and is bounded by the Mbam River to the west and south and by the Sanaga River to the east. It comprises several subdivisions, including Mbangassina, Ngambè-Tikar, Ngoro, Ntui and Yoko. It is located approximately 120 km north of Yaoundé, the capital of Cameroon, at 4°26′51″ N and 11°37′32″ E. The climate is of the Guinean sub-equatorial type [29].

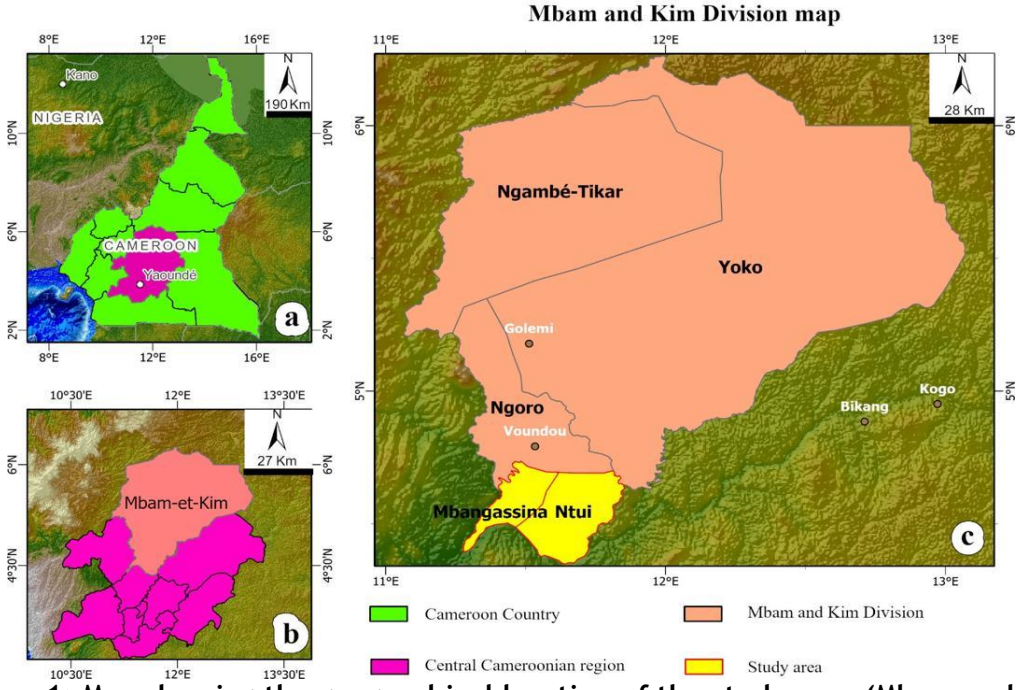


Figure 1: Map showing the geographical location of the study area (Mbam and Kim Division, Centre Region, Cameroon).

Sampling Design and Data Collection

Primary and secondary data were used. Secondary data were drawn from peer-reviewed literature, institutional reports and online repositories to establish the theoretical and contextual basis on contract farming, market contracts and agroecological principles. Primary data were collected through field-based household surveys in the Mbam and Kim Division in February 2025. A multi-stage sampling approach was used: four villages were purposively selected in two subdivisions (Table 1), farmers were stratified by village, and snowball sampling was then used to expand the sample, with each respondent referring additional cocoa farmers. The final sample comprised 120 farmers.

Table 1: Distribution of survey respondents by sub-division and village

Sub-division	Village	Number of survey respondents (n)	Percentage (%)
Ntui	Biakoa	35	29.2
	Ntui centre	24	20.0
Mbangassina	Goura	26	21.7
	Talba	35	29.2
	Total	120	100.0

Note: Source: authors' field survey, 2025.

Inclusion criteria required participants to cultivate cocoa as a primary cash crop; farmers with incomplete records were excluded. A semi-structured questionnaire was administered to smallholders engaged in formal written market contracts and to smallholders without such contracts. The survey captured qualitative and quantitative data and was supplemented by direct observation. Because contracts are private agreements between two parties, it was difficult to access the contract documents physically. Ethics approval and consent procedures are described in the declarations.

Respondent Groups

Respondents were classified into two mutually exclusive groups according to contractual status: market-contract (MC) farmers, defined by formal written agreements with buyers, and non-contract (NC) farmers, who sell through traditional market channels. Of the 120 respondents, 61 were MC farmers and 59 were NC farmers (Table 2).

Table 2: Distribution of respondents by contractual status

Category	N
MC farmers	61
NC farmers	59
Total	120

Note: MC, market-contract farmers (formal written agreements with buyers); NC, non-contract farmers. Source: authors' field survey, 2025.

Agroecological Implementation Index (AEII)

Agroecological Principles and Indicators

Agroecological implementation intensity was evaluated across the seven core agroecological principles of the High Level Panel of Experts on Food Security and Nutrition (HLPE) [30] (Table 3). Each principle was operationalised through specific, observable practices recorded in the survey instrument, which enabled comparison of agroecological implementation between the two farmer groups. Implementation was quantified with a weighted composite index adapted from Gliessman [15] and FAO [31]. The approach was also inspired by the Tool for Agroecology Performance Evaluation (TAPE), a field-based tool developed by FAO for evaluating agroecological performance. Each principle was operationalised through field-validated indicators (Table 4) scored from 0 to 3, except social equity, which was scored 0 or 1.

Table 3: selected agroecological principles from HLPE and their descriptions

HLPE Principle	HLPE Description
Biodiversity	Maintain and enhance diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm and landscape scales
Soil health	Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity
Synergy	Enhance positive ecological interaction, synergy, integration and complementarity among the elements of agroecosystem (animal; crops, trees, soil and water)
Economic diversification	Diversity on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers
Input reduction	Reduce or eliminate dependency on purchased inputs and increase self-sufficiency
Recycling	Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass
Social values (equity)	Build food systems based on gender equity of local communities

Note: HLPE, High Level Panel of Experts on Food Security and Nutrition. Source: [30].

Weighting Rationale

Weights were assigned through consultation with local experts (Table 4).

Table 4: Indicators, scoring scales and weights used to compute the Agroecological Implementation Index (AEII)

AE Principle	Indicator	Scoring scale	Weight	Justification
Biodiversity	Number of tree/crop varieties (agroforestry, alley cropping)	0 (monocropping) to 3 (high diversity)	20%	Ecosystem foundation
Soil health	Use of compost/cover crops/bio/organic-inputs,	0 (none) to 3 (regular application)	20%	Yield sustainability
Synergy	Level of crop-livestock integration	0 (none) to 3 (mostly integrated)	15%	System resilience
Economic diversification	Number of distinct income-generating activities	0 (none) to 3 (≥3 activities)	10%	Risk mitigation
Input reduction	Level of chemical inputs replaced by: Bio/organic input/Biological control	0 (all chemical) to 3 (most bio)	15%	Pollution reduction
Recycling	Level of farm residues recycled	0 (no residue recycled) to 3 (most residues recycled)	15%	Circular economy
Social values (equity)	Gender inclusion in decision making and contract negotiations	0 (male-only) to 1 (mixed-gender)	5%	Justice imperative

Note: AE, agroecological. Source: authors' compilation, based on research analysis.

Ecological impact received the highest weights (soil health and biodiversity, 20% each), reflecting core agroecological requirements for ecosystem functioning [16]. Socio-economic dimensions received lower weights (economic diversification, 10%; social equity, 5%), in line with the FAO 10 Elements of Agroecology [31], which balance ecological and social dimensions and are essential for equitable transitions [15, 30]. The process-based principles with measurable, system-integrated effects (input reduction, recycling and synergy) each received 15%, on grounds of practical feasibility.

Computation of the AEII

For each farmer *j*, the AEII was computed as (Equation 1):

$$\mathrm{AEII}_j = \frac{4}{S_{\max}} \sum_{i=1}^{n} s_{ij} w_i \quad (1)$$

where s_{ij} is the score of farmer *j* for principle *i*, w_i is the weight of principle *i* (Table 4), $n = 7$ is the number of principles and S_{max} is the maximum possible weighted score, i.e. the sum of the highest achievable score for each principle multiplied by its weight (Equation 2):

$$S_{\max} = \sum_{i=1}^{n} s_i^{\max} w_i \quad (2)$$

For the seven principles, S_{max} = (3 × 0.20) + (3 × 0.20) + (3 × 0.15) + (3 × 0.10) + (3 × 0.15) + (3 × 0.15) + (1 × 0.05) = 2.90. The factor $4/S_{max}$ standardises the index to a 4-point scale. The contribution of principle *i* to the AEII of farmer *j* is its principle index (Equation 3), so that the AEII is the sum of the seven principle indices:

$$I_{ij} = \frac{4}{S_{\max}} s_{ij} w_i \quad (3)$$

Implementation levels were defined as Level 0 (no implementation),

- Level 1 (partial implementation with range score),
- Level 2 (moderate implementation),
- Level 3 (high implementation) and
- Level 4 (full implementation).

Statistics and Data Analysis

Qualitative data were analysed by thematic coding, which involved creating categories, identifying themes and recognising patterns of relationships. Quantitative data were entered as continuous variables. Descriptive statistics (frequencies, means and standard deviations) characterised the sample and compared the two groups.

Differences in means between MC and NC farmers (socio-demographic variables, principle scores and the AEII) were tested with two-tailed independent-samples *t*-tests (degrees of freedom, df = 118). Equality of variances was assessed with Levene's test (Table 8). Exact *p*-values are reported. Differences were considered statistically significant at $p <$

0.05, and results with $0.05 \leq p < 0.10$ are described as marginally significant. Mean differences are expressed as MC minus NC. Effect sizes are reported as Cohen's *d*, calculated from the *t* statistic as $d = |t|\sqrt{(1/n_{MC} + 1/n_{NC})}$, and the overall AEII difference is accompanied by a 95% confidence interval. Only farmers with complete records were retained, so no missing data were imputed. Analyses were performed using STATA version 14.

Table 5: Overall Agroecological Implementation Index (AEII) of NC and MC farmers

Category	AEII mean	F	Sig.	t	Mean difference (MC − NC)	SD
NC farmers	1.139	0.003	0.956	4.50	0.421	0.509
MC farmers	1.559					0.513

Note: AEII, Agroecological Implementation Index (0–4 scale); SD, standard deviation. *F* and Sig. are from Levene's test for equality of variances; *t* is from the independent-samples *t*-test (df = 118, $p < 0.001$). Mean difference = MC − NC. Source: authors' compilation, based on analysis.

RESULTS

Socio-demographic Characteristics of Respondents

The sample showed a pronounced gender imbalance, with 98.3% of respondents male with only 1.7% female participation. This disparity may be attributed to the perception of cocoa as predominantly a male-oriented crop within the study area. A higher proportion of MC farmers than NC farmers were married (73.8% vs. 61.0%; Figure 2). Educational attainment also differed between the groups: 37.7% of MC farmers had primary and 52.5% secondary education, and only 4.9% had no formal education, compared with 15.5% of NC farmers with no formal schooling (Figure 3). Institutional membership was reported as the main gateway to formal contracts. Access to credit was reported by 43.5% of MC farmers and 27.3% of NC farmers (Figure 4).

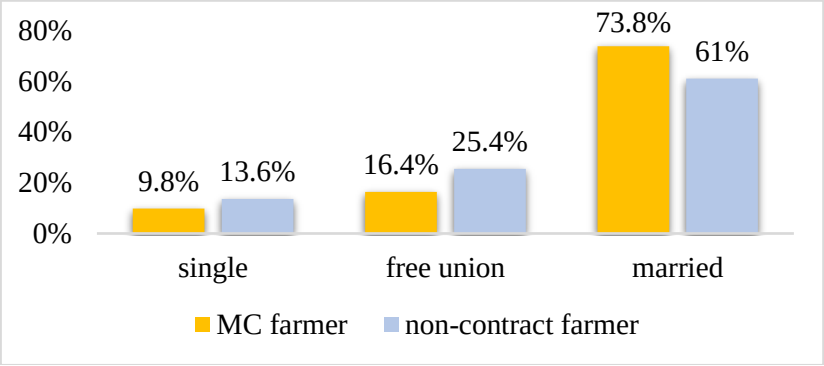


Figure 2: Marital status of non-contract (NC) and market-contract (MC) farmers (share of farmers in each group).

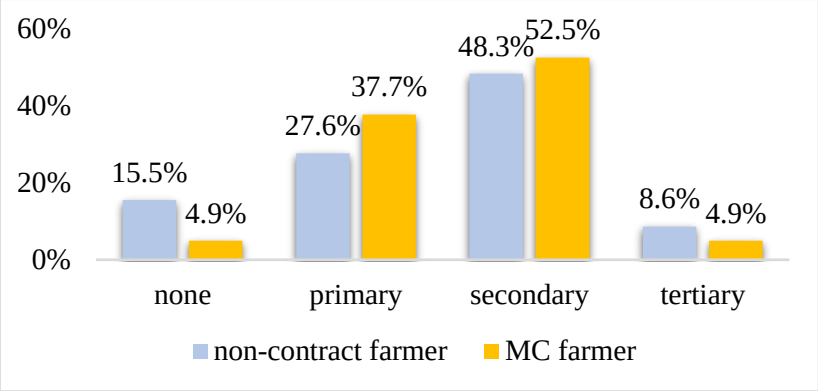


Figure 3: Educational level of non-contract (NC) and market-contract (MC) farmers (share of farmers in each group).

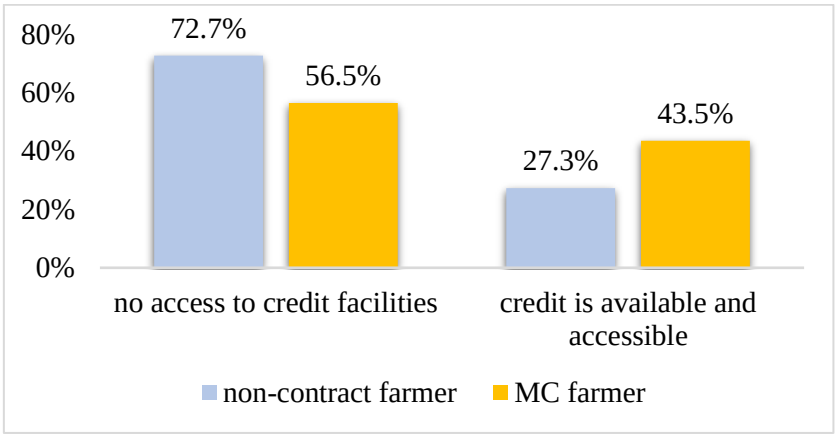


Figure 4: Access to credit among non-contract (NC) and market-contract (MC) farmers (share of farmers in each group).

MC farmers operated larger farms than NC farmers (7.24 hectares (ha) vs. 4.82 ha; $t = 2.71$, $p = 0.008$, Cohen's $d = 0.49$) and had marginally more farming experience (22.59 vs. 18.22 years; $t = 1.90$, $p = 0.060$, Cohen's $d = 0.35$; Table 5). There were no significant differences in age or household size (Table 5).

Table 6: Comparison of socio-demographic characteristics of non-contract (NC) and market-contract (MC) farmers

	NC farmers (n = 59)	MC farmers (n = 61)	Mean difference (MC − NC)	t	p
Age (years)	49.78	48.62	−1.16	−0.48	0.632
Household size (persons)	7.29	8.33	1.04	1.26	0.210
Farming experience (years)	18.22	22.59	4.37	1.90	0.060
Farm area (ha)	4.82	7.24	2.42	2.71	0.008

Note: NC, non-contract; MC, market-contract; ha, hectare. Mean difference = MC − NC. The *p*-values are two-tailed, from independent-samples *t*-tests (df = 118), and were computed from the reported *t* statistics. Source: authors' field survey, 2025.

Contractual Relationships in Cocoa Market Linkages

Three formal contractual arrangements governed market relationships between MC farmers and buyers in the study area (Table 6): farmer–cooperative contracts, cooperative–private partnerships and direct contracts with Licence Buying Companies (LBCs). Informal relationships with intermediaries or informal buyers, referred to as *coxeurs*, also exist, but this study concentrated on formal agreements.

Table 7: Distribution of formal contractual arrangements between farmers and buyers

Contractual relationship	Percentage (%)
Farmer–cooperative	47.5
Cooperative–private partnership	32.9
Direct contract with LBC	19.6

Note: LBC, licence buying company. Percentages refer to the three contractual arrangements and sum to 100%. Source: authors' compilation, based on analysis.

Farmer–cooperative Contracts

A significant segment of cocoa farmers (47.5%) operate under cooperative-mediated contracts. In this model, farmers register as formal members, signing cooperative-drafted agreements that grant them access to collective benefits, including joint marketing of their produce. The primary motivation cited by farmers for joining cooperatives is to secure a guaranteed market channel for their cocoa. These cooperatives typically publish daily price bulletins on boards to inform members of real-time market rates. Supplementary benefits include access to production credit, agricultural inputs, and training in good agricultural practices. Notably, these contracts do not impose the mandatory adoption of specific farming techniques. While training on good agricultural practices is sometimes offered by cooperatives, systematic follow-up and enforcement are reported to be low. Additional social incentives, such as educational support through tuition payment schemes, were mentioned by several respondents, highlighting a secondary benefit for household human capital development. However, the sustainability of these contractual relationships is threatened by significant operational deficiencies. A substantial proportion of farmers expressed dissatisfaction with cooperative governance, citing discriminatory practices in resource allocation, opaque decision-making processes, the inconsistent delivery of promised benefits and a lack of transparency in cooperative management. These grievances have led to threatened membership withdrawals, and some farmers under cooperative contracts reported resorting to informal buyers (*coxeurs*) when in need of immediate cash.

Cooperative–private Partnerships

A distinct and significant governance model, encompassing 32.9% of surveyed farmers, is characterized by formal partnerships linking cocoa farmer cooperatives with private sector actors, primarily international cocoa bean traders. This framework operates through a tripartite certification chain in which private buyers establish partnerships with international certification bodies. The main certification entities identified in the study included a private trader affiliated with Rainforest Alliance and the cocoa processor and

chocolate manufacturer Barry Callebaut. These organizations set sustainability standards. Through contracted pilot projects between these private buyers and certification entities, the buyers, in turn, implement these standards in the field offering affiliated cooperatives and their members technical support, agricultural inputs, premium benefits and guaranteed market access in exchange for compliance. Upon verification, farmers receive certification, which establishes a formalized and durable commercial relationship. This structure serves as the primary pathway for the adoption of externally-defined sustainable agricultural practices. The governance is cooperative-managed but heavily influenced by buyer requirements, involving joint decision-making on implementation. Farmers enter this system by signing detailed engagement forms with specific contractual clauses, mandating adherence to prescribed practices, sustainability priorities (e.g., deforestation bans, agroforestry practices), regulated input dosages, and labor standards. A notable operational stipulation implemented by a private company identified in the study area was a maximum purchase limit per hectare (900 kg ha^{-1}), with any surplus harvest not accepted by this company, directly impacting farm-level planning and revenue.

Farmers identified several challenges that threaten the efficacy and equity of this model: long paperwork and engagement documents that they found too burdensome, the failure of previous certification schemes, which discouraged many farmers from engaging in this contract type, and a lack of awareness of these initiatives among many farmers.

Direct Contracts with License Buying Companies

The direct contracting model between individual cocoa farmers and LBCs represents a minority pathway, with only 19.6% of surveyed farmers engaged in this arrangement. Participation in this model was typically confined to individual farmers not in cooperatives with larger production volumes and those located in close geographical proximity to a LBC warehouse, facilitating logistics. The limited prevalence was also attributed to the structural and economic challenges most smallholders face in forging and maintaining independent commercial relationships. Notably, farmers opting for direct MCs with LBCs often held negative perceptions of Producer Organizations (POs), describing them as inefficient, corrupt, or unprofitable as a significant driver for their choice. Others cited specific negative past experiences with cooperatives, such as chronic payment delays, as their reason for withdrawal. Despite these barriers, the primary incentive sustaining direct LBC relationships is financial. Farmers consistently emphasised that timely payments and, critically, access to pre-financing or credit during periods of low liquidity are pivotal.

Implementation of Agroecological Principles by Contract Status

Table 7 shows a varied association between formal MCs and the adoption of agroecological principles. Biodiversity was the most commonly implemented principle among all farmers, with only a small, non-significant difference between those with and without contracts (t = 1.54, p = 0.126, Cohen's d = 0.28). For MC farmers, adoption was often linked to compliance with external standards such as the EU deforestation regulations or certification-scheme clauses requiring agroforestry practices. Other farmers attributed their biodiversity activities to personal choice or traditional knowledge rather than external incentives, citing perceived benefits such as additional income and improved farm productivity.

In contrast, MC farmers scored significantly higher on soil health (t = 4.98, p < 0.001; mean difference = 0.72; Cohen's d = 0.91) and on input reduction (t = 3.23, p = 0.002; mean difference = 0.46; Cohen's d = 0.59), the latter indicating lower use of chemical inputs. Farmers associated these outcomes with contractual mandates for applying organic matter, restrictions on agrochemicals and related training provided through sustainability projects or certification programmes. Some farmers also cited personal negative health experiences from applying homologated chemical inputs as a reason for reducing chemical use. However, certification support had disappeared in some cases owing to inadequate feedback and follow-up from auditors.

For the other principles, differences were small and not significant (Table 7). MC farmers scored slightly higher on recycling (t = 1.64, p = 0.104, Cohen's d = 0.30), but the practice remained limited overall because of a widespread lack of knowledge on repurposing farm waste. Some farmers had been trained on the composition of biological fertilisers such as compost but cited the laborious nature of turning waste in the pit as a barrier to adoption, and expressed a preference for easy and rapid input practices. There was no significant difference in social equity, measured as female participation in contract negotiations (t = 0.63, p = 0.528, Cohen's d = 0.12), nor in synergy (t = −0.21, p = 0.833) or economic diversification (t = 0.45, p = 0.653). Most respondents claimed there were no gender gaps in production, stating that women were involved in cocoa farming through inheritance, sometimes from deceased husbands, or through their own land; this perception contrasts with the measured lack of women's participation in formal market processes.

Table 8: Mean scores of individual agroecological principles for NC and MC farmers

AE principle	Category	Mean score	t	p	Mean difference (MC − NC)
Biodiversity	NC	2.44	1.54	0.126	0.248
	MC	2.69			
Soil health	NC	0.47	4.98	<0.001	0.722
	MC	1.20			
Synergy	NC	0.20	−0.21	0.833	−0.023
	MC	0.18			
Economic diversification	NC	0.85	0.45	0.653	0.054
	MC	0.90			
Input reduction	NC	0.44	3.23	0.002	0.461
	MC	0.90			
Recycling	NC	0.36	1.64	0.104	0.251
	MC	0.61			
Social equity	NC	0.15	0.63	0.528	0.044
	MC	0.20			

Note: Principle scores range from 0 to 3 (social equity: 0 to 1). NC, non-contract; MC, market-contract. Mean difference = MC − NC; t and p are from two-tailed independent-samples t-tests (df = 118). Source: authors' compilation, based on analysis.

Overall Agroecological Implementation Intensity

MC farmers had a higher mean AEII than NC farmers (1.559 ± 0.513 vs. 1.139 ± 0.509; Table 8). The mean difference of 0.421 (95% confidence interval 0.236–0.605) was statistically

significant (t = 4.50, p < 0.001, Cohen's d = 0.82), and Levene's test did not indicate unequal variances (F = 0.003, p = 0.956).

Despite this difference, both groups remained at a low level of implementation: mean AEII values of 1.14 and 1.56 on the 0–4 scale correspond to partial adoption (Level 1) as defined in Section 2.4.3. Some farmers reported having been trained in sustainable cocoa practices but eventually abandoned them. They cited a lack of price differentiation between conventionally and sustainably produced cocoa, which made a system requiring more time and effort economically unrewarding. Respondents also noted that hired labour is widely used on cocoa farms in the study area and that hired labourers often make production decisions that may not align with sustainable practices.

Among MC farmers, some had AEII scores of about 3, indicating high implementation (Level 3) approaching full adoption. In addition to the external support (training and education) they receive from various partners, these farmers reported a personal commitment to these practices and additional knowledge of sustainable farming methods. They expressed willingness to share their expertise with other farmers if given the opportunity, but also raised concerns about price differentiation and the need for appropriate monitoring mechanisms as barriers to broader adoption.

DISCUSSION

Our analysis reveals that participation in formal MCs is not a neutral process but is systematically filtered by a profile of socio-demographic advantage. Access to contracts is mediated by three interconnected forms of capital: human capital (basic education), social capital (cooperative membership), and physical capital (larger farm size). This triad enables farmers to meet the administrative, quality, and volume requirements of formal buyers. The larger farms and longer experience of MC farmers are consistent with transaction cost economics, which holds that buyers favour producers who can ensure volume consistency and absorb quality-related risks, and the higher share of married MC farmers suggests that contract schemes may favour households with more stable labour arrangements for meeting production quotas [32]. The associated, though limited, improvement in credit access for MC farmers underscores how contractual linkages can enhance financial inclusion, likely by leveraging future harvests as collateral and reducing lender risk [33–35].

The near-total male dominance of the sample, locally justified by the perception of cocoa as a male-dominated cash crop, aligns with established literature on gendered agricultural roles [36, 37] and with a previous study in the South-West Region of Cameroon, where up to 97% of the cocoa farmers surveyed were male [38].

The association with agroecological transition is fundamentally shaped by the type of contractual relationship. The cooperative-mediated contract offers collective bargaining but is frequently crippled by governance failures such as opaque decision-making and delayed payments. These shortcomings erode trust and push farmers towards informal buyers (*coxeurs*) for immediate cash, stalling investment in complex sustainable practices, in line with previous findings [39–41]. Farmers' preference for immediate liquidity from informal buyers over deferred contractual payments highlights a critical trade-off driven by acute cash-flow needs [42]. According to Nkouedjo *et al*. [43], the most significant factor is

that *coxeurs* provide pre-financing and pay at the moment of purchase, which is usually not the case for LBCs, cooperatives or exporters.

The governance problems reported by farmers align with research indicating that cocoa farmers often have limited agency in decision-making within formalised structures [44], while a significant portion of the sector remains informal [11]. The resulting threats of membership withdrawal reflect a critical tension between the theoretical efficiencies of collective action and persistent governance challenges on the ground [45]. Small-scale producers often find it easier to access informal production finance from local traders than from formal institutions [46], and farmers actively seek market intelligence from peers and alternative buyers to compare prices, a practice that informs contract renegotiation or defection [47]. The presence of *coxeurs* occurs within a context of insufficient market regulation [48, 49], in which they supply essential credit services but simultaneously constrain farmers to market their cocoa at depressed prices [43]. While formal contracts through cooperatives offer structured benefits, they can also reduce smallholder agency by limiting market flexibility [11]. Without institutional reforms that enhance accountability, transparency and genuine member participation in oversight, cooperative-mediated contracts risk perpetuating existing inequities rather than alleviating them; governance structures are needed that balance the efficiency of collective action with the flexibility and responsiveness required to retain farmer loyalty and promote equitable development.

The cooperative–private partnership model aligns with the multi-stakeholder partnership framework, in which complex sustainability goals require coordinated action across institutional domains [50]. It confirms that such contracts can facilitate access to high-quality inputs for producer organisations [51] and highlights the organising role of cooperatives in market linkage [52, 53]. Farmers who adhere to production standards defined by certification schemes, encompassing good agricultural practices and other contributing factors (training, improved access to extension services and credit), benefit from a positive profit margin difference [54–56], and participation in farmer-based groups favours the adoption of cocoa certification. However, this model is administratively burdensome, narrowly focused on input substitution and vulnerable to the withdrawal of external support. Its rigid, formal nature also clashes with smallholders' preference for the flexibility of informal market relationships, a key reason why farmers may avoid binding agreements [46]. Its success is therefore contingent on addressing transparency, adaptability, trust and administrative feasibility at the farmer level.

Direct sales to LBCs prioritise autonomy and immediate liquidity but appear to provide no structured support for sustainability, and may therefore reinforce conventional methods. Farmers who deal directly with LBCs sometimes benefit from services such as affordable transportation, where the LBC rents its vehicles at a subsidised rate [43], and a study in Ghana revealed that LBCs apply quality control practices and have a high propensity to use indigenous knowledge to ensure cocoa quality [57]. For the vast majority of smallholders, however, high transaction costs related to logistics, individual contract negotiations and securing reliable market access render direct sales economically unviable [24], and the absence of an intermediary amplifies quality control challenges, discouraging LBCs from relying on fragmented direct procurement [58]. Direct financial support, in the form of timely payment and pre-financing, stabilises household cash flow, mitigates production risks and enables investment in inputs and farm improvements [59]; such financial security helps cultivate stable, long-term relationships that enhance production

consistency and supply reliability for the buyer. This dynamic aligns with the broader understanding that tailored financial mechanisms are essential for integrating smallholders into formal value chains by reducing entry barriers and supporting productivity gains [53].

We further illuminate the incomplete and hybrid nature of formalisation. The persistence of oral agreements, even within some cooperative structures [11], and the fact that most MC farmers still lack credit, reveal that a signed contract is not an insurance policy. It does not automatically resolve deeper market failures such as borrower aversion, institutional mistrust or a scarcity of rural financial services. Informality within the marketing chain can also be seen as a by-product of the liberalisation of the cocoa sector [60]. Consequently, formal MCs function less as a transformative tool for broad-based development and more as a specific mechanism for capital penetration [61].

Our analysis also indicates that MCs are associated with agroecological transition primarily as tools for compliance-based environmental standardisation. They serve as powerful levers for standardising specific input-substitution practices, notably reducing agrochemical use and promoting soil amendments enforced through clauses, prohibited-substance lists and audit requirements, especially in the cooperative–private partnerships. However, this effect does not extend to the systemic, holistic tenets of agroecology. The marginal difference in biodiversity between MC and NC farmers points to an important nuance. While external regulations such as the EU Deforestation Regulation (EUDR) and certification schemes create baseline pressure for adoption, the high scores among non-contract farmers indicate that biodiversity practices, particularly agroforestry, are also valued for intrinsic benefits such as additional income, indigenous knowledge and pest management. This suggests that agroforestry may be a convergence point where market demands and farmer rationality align, making it a prime entry point for deeper agroecological engagement; agroforestry systems can offer a high return on labour compared with monocultures [62]. Another concerning finding is the persistent null result for social equity. The data indicate that contracts in their current form do not address, and may inadvertently cement, existing gender disparities in decision-making and benefit-sharing. The reported local perception that women are already involved masks underlying inequities in land ownership, contract negotiation and control over premium income. This highlights the need to sensitise women in the locality to engage in this system and the need for gender-intentional contract design that actively restructures opportunities and rights [63].

The reported decline of certification schemes in some areas owing to a lack of follow-up and feedback exposes a fragility in the sustainability governance model and serves as a cautionary tale. It demonstrates that contractual agroecology is vulnerable to the withdrawal of external support, risking the reversal of gains in technical agroecological principles. For agroecology to be fully realised, contracts must be redesigned to incentivise the holistic nature of agroecology, ecological complexity and livelihood buffers, and robust, farmer-centred institutions and knowledge systems are needed that can sustain practices beyond the lifespan of specific projects or buyer requirements. Farmers also need to be informed about new practices before adopting them. The higher AEII among MC farmers is likely mediated through formal contractual clauses, access to buyer-supported technical guidance and economic premiums, which create a structured pathway for ecological compliance. This contrasts with critical studies of contract farming, such as Martiniello *et*

al. [64], who documented the dispossessive effects of sugarcane contracts in Uganda, suggesting that the outcomes of contractual arrangements are highly context-specific.

The persistently low absolute scores for both groups reveal systemic limitations. The widespread partial adoption (low AEII scores) aligns with the concept of conditional sustainability [35], in which contracts establish baseline ecological standards but fail to ensure comprehensive transitions without complementary interventions. Key barriers identified include limited training and sensitisation, inadequate access to bio-inputs and other sustainable inputs (seeds, fertilisers, pesticides), a poor understanding of the negative externalities of conventional farming, and the complicating role of hired labour, whose decisions may not prioritise sustainability. A critical economic disincentive was highlighted by farmers who abandoned practices learned in training because of the lack of price differentiation for sustainably produced cocoa, which made the extra effort economically unrewarding. This is supported by previous literature indicating that the absence of a significant quality premium encourages cocoa farmers' sales to informal buyers [38, 43, 65]. Therefore, while market contracts are a significant positive lever, their ability to foster a full agroecological transition is contingent upon redesigning contracts to address these entrenched economic, educational and structural barriers.

This study has several limitations. The design is cross-sectional and the sample (120 farmers in four villages) was drawn by purposive, village-stratified and snowball sampling, so the results cannot be generalised to all cocoa farmers in Cameroon. Farmers were not randomly assigned to contracts, and MC farmers differed from NC farmers in farm size, education and access to credit; the group comparisons are bivariate and do not control for these differences, so the differences in AEII should be read as associations rather than causal effects of contracts. The sample was almost entirely male (98.3%), which limits inference on gender dimensions. The AEII relies on indicators scored from farmer reports and on weights set through expert consultation, and the contract documents themselves could not be examined. The comparison of contract types is qualitative: AEII scores were not compared across the three contractual arrangements.

CONCLUSIONS

Cocoa farmers with formal written market contracts differ from those without in scale, education and institutional affiliation: they operate larger farms, have more formal education and are more often affiliated with producer organisations. Contract participation was associated with higher overall implementation of agroecological principles (mean AEII 1.56 vs. 1.14), driven by soil health and input reduction, but not with biodiversity, synergy, economic diversification, recycling or social equity, and both groups remained at the level of partial adoption. Qualitative evidence indicates that outcomes depend on the contractual type: cooperative–private certification partnerships were the most effective in driving compliance with specific, auditable environmental practices, owing to their clauses, institutional support and training, whereas cooperative-mediated contracts and direct sales to LBCs offered little structured support for agroecology. Contracts therefore operate as instruments of conditional, compliance-based sustainability rather than of systemic agroecological transformation. Partial adoption was constrained by shortages of bio-inputs, gaps in technical knowledge on local bio-input formulation, governance deficiencies, payment delays, inflexible standards and, above all, the lack of an economic incentive, as

the market premium for differentiated, quality cocoa has eroded in favour of bulk commodity.

Moving the cocoa sector towards systemic agroecological practice therefore requires two complementary actions. First, contractual frameworks should be redesigned to be more equitable and responsive: reforming cooperative governance for greater transparency, guaranteeing timely payments and developing incentives that reward environmental stewardship and quality beyond bulk volume. Second, support systems that exist independently of any single buyer should be built, through investment in effective extension services, farmer-to-farmer education networks and reliable supply chains for organic inputs. Contractual terms should explicitly connect environmental and social benefits to clear, tangible and reliable economic gains for cocoa farmers. Future research should use larger, probability-based samples and multivariate or longitudinal designs to separate the effect of contracts from farmer self-selection, and should compare agroecological implementation quantitatively across contract types.

DECLARATIONS

Ethics, consent and safety. The study was approved by the Institute of Agricultural Research for Development, Yaoundé Cameroon. All participants gave their informed consent before taking part in the survey. They were told the purpose of the study, that participation was voluntary, that they could withdraw at any time, and that their responses would be kept confidential and used for research purposes only

Data availability. The data supporting the findings of this study are available in Excel format. They can be obtained from the corresponding author on reasonable request

Conflicts of interest. The authors declare that they have no conflict of interest, financial or non-financial

Funding. This work was supported by the CANALLS project, funded by the European Union under Grant Agreement No. 101083653.

Author contributions ; Hamamata Hawa Garba: Conceptualisation, Investigation, Formal analysis, Data curation, Writing original draft, Writing review & editing. Herve Alain Napi Wouapi: writing review & editing, review original draft . André Nso Ngang: review & editing. Woin Gam Aristide: Investigation, Data curation. Guimjeu Dogmo Duperin Landry: Investigation, Data curation. Tata Ijang Precillia: Supervision, review & editing. Manu Ibrahim Nformi: Supervision, review & editing.

Use of generative AI: During the preparation of this manuscript, the authors used Claude (Anthropic, Claude Sonnet 5.5) to assist with language editing. The authors reviewed and edited all content and take full responsibility for the final manuscript

Acknowledgements. The authors extend their sincere appreciation to all participating farmers and cooperatives for their invaluable contribution to this survey. We are also grateful to the Institute of Agricultural Research for Development (IRAD) for hosting the research design and providing essential institutional support.

Preprint: None

Funding: This work was supported by the CANALLS project Funded by the European Union under GA no.101083653

REFERENCES

[1] Suh, N. N., & Molua, E. L. (2022). Cocoa production under climate variability and farm management challenges: Some farmers' perspective. *Journal of Agriculture and Food Research*, 8, 100282.

[2] Tham-Agyekum, E. K., Ankuyi, F., Asiedu, P., Juantoa, B., Abourden, G. A., Bakang, J. E. A., & Oduro-Owusu, A. Y. (2024). Cocoa farmers' participation in public and private agricultural extension delivery in Amenfi Central District, Ghana. *International Journal of Humanities Education and Social Sciences*, 3(4), 114.

[3] FAO (2022). FAOSTAT database. Food and Agriculture Organization of the United Nations, Rome. https://www.fao.org/faostat/en/#data/QCL (accessed 10 January 2026).

[4] Shillie, P. N., Balgah, R. A., & Mbufor, E. F. (2024). Weighing benefits in cocoa farming systems: An analysis of profitability in certified and non-certified cocoa farming schemes in Cameroon. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 125(2), 259–269.

[5] Cédric, C. D., Delanot, T. A., Owona, J. M. A., Ndzie, S. O., Nfornkah, B. N., Enongene, K., … & Fobissie, K. (2026). Determinants of cocoa productivity and vulnerability to climate change in Central Cameroon: An in-depth analysis of farmers' perspectives. *Green and Low-Carbon Economy*, 4(1), 76–84.

[6] Ngwang, N. N., & Meliko, M. O. (2021). Profitability analysis of smallholder cocoa production in South West Region of Cameroon. *African Journal of Agricultural Research*, 17(7), 991–997.

[7] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., & Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain.

[8] Mathé, S., Fouepe, F., Hansel, G., Sonfack, M., Temple, L., Abega Ndjana, J., … & Brice, M. (2023). New challenges for innovation support services to improve cocoa quality and sustainability in Cameroon.

[9] Bisseleua, H., & Mathé, S. (2021). Evolutions and innovations in the cocoa supply chain.

[10] Tollens, E. F., & Gilbert, C. L. (2003). Does market liberalisation jeopardise export quality? Cameroonian cocoa, 1988–2000. *Journal of African Economies*, 12(3), 303–342.

[11] Carodenuto, S., Cutler, C., Dieng, S., Adams, M. A., & Thompson, W. (2025). Formalization through contracts: Implications for power in smallholder cocoa supply chains. *Geoforum*, 164, 104323.

[12] Gilbert, C. L. (2024). Cocoa: Origin differentials and the living income differential. *The European Journal of Development Research*, 36(4), 777–802.

[13] Cillo, V., Petruzzelli, A. M., Ardito, L., & Del Giudice, M. (2019). Understanding sustainable innovation: A systematic literature review. *Corporate Social Responsibility and Environmental Management*, 26(5), 1012–1025.

[14] Bhandari, S., Yadav, B., Yadav, P. K., Lahutiya, V., & Koirala, S. (2024). Exploring agroecological approaches for sustainable agriculture and rural development: A comprehensive review. *Asian Journal of Research in Agriculture and Forestry*, 10(1), 79–90. https://doi.org/10.9734/AJRAF/2024/v10i1271

[15] Gliessman, S. (2018). Defining agroecology. *Agroecology and Sustainable Food Systems*, 42(6), 599–600.

[16] Altieri, M. A. (2018). *Agroecology: The Science of Sustainable Agriculture*. CRC Press.

[17] Barrios, E., Gemmill-Herren, B., Bicksler, A., Siliprandi, E., Brathwaite, R., Moller, S., Batello, C., & Tittonell, P. (2020). The 10 Elements of Agroecology: enabling transitions towards sustainable agriculture and food systems through visual narratives. *Ecosystems and People*, 16(1), 230–247.

[18] Pretty, J. N., Noble, A. D., Bossio, D., Dixon, J., Hine, R. E., Penning de Vries, F. W., & Morison, J. I. (2006). Resource-conserving agriculture increases yields in developing countries.

[19] Niggli, U., Sonnevelt, M., & Kummer, S. (2023). Pathways to advance agroecology. *Science and Innovations for Food Systems Transformation*, 341.

[20] Kassam, A. H., Friedrich, T., & Derpsch, R. (2018). Global spread of conservation agriculture. *International Journal of Environmental Studies*. https://doi.org/10.1080/00207233.2018.1494927

[21] Mihailova, M. (2024). Classification of contracts used in agriculture based on literature review. *Bulgarian Journal of Agricultural Economics and Management*, 69(2), 3–20.

[22] Motahari Farimani, N., Bagherzadeh, J., & Mohammadi, S. (2022). Selection of agricultural contract sales models to wholesalers to maximize supply chain profit (an experimental study). *Journal of Relationship Marketing*, 21(2), 81–102.

[23] Mishra, A. K., Kumar, A., Joshi, P. K., D'Souza, A., & Tripathi, G. (2018). How can organic rice be a boon to smallholders? Evidence from contract farming in India. *Food Policy*, 75, 147–157.

[24] Key, N., & Runsten, D. (1999). Contract farming, smallholders, and rural development in Latin America: The organization of agroprocessing firms and the scale of outgrower production. *World Development*, 27(2), 381–401. https://doi.org/10.1016/S0305-750X(98)00144-2

[25] Simmons, P., Winters, P., & Patrick, I. (2005). An analysis of contract farming in East Java, Bali, and Lombok, Indonesia. *Agricultural Economics*, 33, 513–525.

[26] Meemken, E. M., & Bellemare, M. F. (2020). Smallholder farmers and contract farming in developing countries. *Proceedings of the National Academy of Sciences*, 117(1), 259–264.

[27] Bellemare, M. F., & Bloem, J. R. (2018). Does contract farming improve welfare? A review. *World Development*, 112, 259–271. https://doi.org/10.1016/j.worlddev.2018.08.018

[28] Narayanan, S. (2014). Profits from participation in high value agriculture: Evidence of heterogeneous benefits in contract farming schemes in southern India. *Food Policy*, 44, 142–157. https://doi.org/10.1016/j.foodpol.2013.10.010

[29] Tchuikoua, L. B., & Banaga, H. (2016). Contribution des organisations paysannes dans la production des cultures vivrières dans l'arrondissement de Ntui (région du centre du Cameroun). *Revue Canadienne de Géographie Tropicale*, 3(2), 53–65.

[30] High Level Panel of Experts (HLPE) (2019). Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. http://www.fao.org/cfs/cfs-hlpe/en/

[31] FAO (2018). The 10 elements of agroecology: guiding the transition to sustainable food and agricultural systems. Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/3/i9037en/i9037en.pdf

[32] Oya, C. (2012). Contract farming in sub-Saharan Africa: A survey of approaches, debates and issues. *Journal of Agrarian Change*, 12, 1–33. https://doi.org/10.1111/j.1471-0366.2011.00337.x

[33] Bellemare, M. F. (2012). As you sow, so shall you reap: The welfare impacts of contract farming. *World Development*, 40(7), 1418–1434.

[34] Karlan, D., Osei, R., Osei-Akoto, I., & Udry, C. (2014). Agricultural decisions after relaxing credit and risk constraints. *The Quarterly Journal of Economics*, 129(2), 597–652.

[35] Barrett, C. B., Bachke, M. E., Bellemare, M. F., Michelson, H. C., Narayanan, S., & Walker, T. F. (2012). Smallholder participation in contract farming: Comparative evidence from five countries. *World Development*, 40(4), 715–730. https://doi.org/10.1016/j.worlddev.2011.09.006

[36] Barrientos, S. (2014). Gendered global production networks: Analysis of cocoa–chocolate sourcing. *Regional Studies*, 48(5), 791–803.

[37] Kiewisch, E. (2015). Looking within the household: a study on gender, food security, and resilience in cocoa-growing communities. *Gender & Development*, 23(3), 497–513.

[38] Levai, L. D., Meriki, H. D., Adiobo, A., Awa-Mengi, S., Akoachere, J. F. T. K., & Titanji, V. P. (2015). Postharvest practices and farmers' perception of cocoa bean quality in Cameroon. *Agriculture & Food Security*, 4(1), 28.

[39] Van, H., Krumbielg, K., & Tillie, P. (2025). Intermediaries in the West-African cocoa sector: a buyer and producer perspective.

[40] Bagal, M., Belletti, G., & Marescotti, A. (2013). Étude sur le potentiel de commercialisation du cacao du Cameroun en « Indication géographique ». *Rapport d'étude, Lausanne, REDD, Iram*, 26.

[41] Baah, F., Anchirinah, V., Badger, E., Badu, A., & Badu-Yeboah, A. (2012). Examining the cocoa farmer-purchasing clerk relationship in Ghana. *Global Journal of Science Frontier Research Agriculture and Veterinary Sciences*, 12(11).

[42] Ashraf, N., Giné, X., & Karlan, D. (2009). Finding missing markets (and a disturbing epilogue): Evidence from an export crop adoption and marketing intervention in Kenya. *American Journal of Agricultural Economics*, 91(4), 973–990.

[43] Nkouedjo, L. L., Mathé, S., Fon, D. E., Geitzenauer, M., & Manga, A. A. (2020). Cocoa marketing chain in developing countries: How do formal-informal linkages ensure its sustainability in Cameroon? *Geoforum*, 117, 61–70.

[44] Ingram, V., Fedes, V., Yuca, W., & Henk, G. (2018). The impacts of cocoa sustainability initiatives in West Africa. *Sustainability*, 10(11), 4249.

[45] Bijman, J., & Wijers, G. (2019). Exploring the inclusiveness of producer cooperatives. *Current Opinion in Environmental Sustainability*. https://doi.org/10.1016/j.cosust.2019.11.005

[46] Veldwisch, G. J., & Woodhouse, P. (2022). Formal and informal contract farming in Mozambique: Socially embedded relations of agricultural intensification. *Journal of Agrarian Change*, 22(1), 162–178.

[47] Zambou, J. N. T., & Wouapi, H. A. N. (2024). Actors' logics in contract farming: The case of agricultural contractualization in Moungo, Cameroon. *Suds*, 290, 329–339. https://journals.openedition.org/suds/2664

[48] Brown, D., & McGranahan, G. (2016). The urban informal economy, local inclusion and achieving a global green transformation. *Habitat International*, 53, 97–105.

[49] Chen, M. A. (2012). The informal economy: Definitions, theories and policies.

[50] Termeer, C. J. A. M., Toonen, H., Kok, M., & Turnhout, E. (2019). The dynamics of new governance arrangements for sustainable value chains. *Smart Hybridity*, 85.

[51] Fouepe, G. H. F., Folefack, D. P., & Pissie, E. J. N. (2016). Engagements contractuels et performances des organisations de producteurs de maïs à l'Ouest Cameroun. *International Journal of Biological and Chemical Sciences*, 10(2), 793–807.

[52] Coulter, J., Goodland, A., Tallontire, A., & Stringfellow, F. (1999). Marrying farmer cooperation and contract farming for service provision in a liberalizing Sub-Saharan Africa. Natural Resources Perspectives, No. 48. Overseas Development Institute, London. http://www.odi.org.uk/nrp/48.html

[53] Narrod, C., Roy, D., Okello, J., Avendaño, B., Rich, K., & Thorat, A. (2009). Public–private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy*, 34(1), 8–15. https://doi.org/10.1016/j.foodpol.2008.10.005

[54] Soh Wenda, B. D., Nken, H., Takam, H. N. T., Eloundou, C. E., & Fon, D. E. (2024). Rainforest Alliance-UTZ cocoa certification scheme adoption: Determinants and financial implications for cocoa production in the Centre region of Cameroon. *PLOS Sustainability and Transformation*, 3(7), e0000115. https://doi.org/10.1371/journal.pstr.0000115

[55] Jaza, F. A. J., Ngwack, F. S., Muluh, G. A., Geitzenauer, M., & Mathé, S. (2021). A comparative cost-benefit analysis between Fairtrade certified and non-certified cocoa production in the South-West region of Cameroon. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 122(2), 321–333. https://doi.org/10.17170/kobra-202112035151

[56] Ngougheme, R., Kamdem, C. B., Jagoret, P., & Havard, M. (2016). Impact de la certification sur les performances agro-économiques des producteurs de cacao du centre Cameroun. In *2016 Fifth International Conference of the African Association of Agricultural Economists, Addis Ababa, Ethiopia, 23-26 September 2016*, No. 249294.

[57] Owusu Ansah, G., Ofori, F., Pokuah Siaw, L., & Manu, J. (2018). The stake of licence buying companies (LBCs) in the promotion of quality cocoa in Ghana. *Cogent Business & Management*, 5(1). https://doi.org/10.1080/23311975.2018.1560857

[58] Reardon, T., Barrett, C. B., Berdegué, J. A., & Swinnen, J. F. M. (2009). Agrifood industry transformation and small farmers in developing countries. *World Development*, 37, 1717–1727.

[59] Poulton, C., Dorward, A., & Kydd, J. (2010). The future of small farms: New directions for services, institutions, and intermediation. *World Development*, 38(10), 1413–1428.

[60] Sallah, A. (2016). Re-reading the narrative of the informal economy in the context of economic development in sub-Saharan Africa. *International Journal of Social Economics*, 43(10), 1063–1078.

[61] White, B., & Wijaya, H. (2022). What kind of labour regime is contract farming? Contracting and sharecropping in Java compared. *Journal of Agrarian Change*, 22(1), 19–35.

[62] Armengot, L., Barbieri, P., Andres, C., Milz, J., & Schneider, M. (2016). Cacao agroforestry systems have higher return on labor compared to full-sun monocultures. *Agronomy for Sustainable Development*, 36(4), 70.

[63] Bezner Kerr, R., Hickey, C., Lupafya, E., & Dakishoni, L. (2019). Repairing rifts or reproducing inequalities? Agroecology, food sovereignty, and gender justice in Malawi. *The Journal of Peasant Studies*, 46(7), 1499–1518.

[64] Martiniello, G., Owor, A., Bahati, I., & Branch, A. (2022). The fragmented politics of sugarcane contract farming in Uganda. *Journal of Agrarian Change*, 22(1), 77–96.

[65] Lescuyer, G., Boutinot, L., Goglio, P., & Bassanaga, S. (2019). Analyse de la chaîne de valeur du cacao au Cameroun. Rapport pour l'Union Européenne, DG-DEVCO. Value Chain Analysis for Development Project, Report No. VCA4D CTR 2016/375-804.