

## Research Article

# IMPACT OF INFORMAL QUALITY STANDARDS ON THE MARKETING OF NON-TIMBER FOREST PRODUCTS: CASE OF WILD MANGO (*Irvingia Gabonensis*) AND DJANSANG (*Ricinodendron Heudelotii*)

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### ABSTRACT

Non-timber forest products (NTFP), such as wild mango and djansang, are essential to the income of rural communities in Central Africa, particularly in Cameroon. However, their marketing is complicated by informal quality standards imposed by buyers, disrupting the market and the distribution of profits. A study conducted between January and June 2024 among 250 producers and various market actors reveals that buyers apply strict criteria regarding drying, cleanliness, taste, aroma, and harvest timing. Compliant products can see their prices increase by 30%, while non-compliant ones risk being excluded from the formal market. Smallholders, especially women and indigenous Baka producers, struggle to meet these criteria due to a lack of equipment and unfavorable climatic conditions. The absence of standardization and the arbitrary enforcement of standards exacerbate information asymmetry, limiting producers' access to lucrative markets. To promote fairer marketing, the study recommends establishing concerted standards, strengthening producers' processing and storage capacities, enhancing the value of NTFP through local certifications, and involving NGOs and public institutions more in defining and disseminating the standards.

**Keywords:** Non-timber forest products, quality standards, wild mango, djansang, marketing, enhancement.

### INTRODUCTION

The impact of informal quality standards represents a significant challenge for Non-Timber Forest Products (NTFPs) in Central Africa and Cameroon, as these standards, often defined unilaterally by buyers, reinforce inequalities in the value chain and significantly influence market structuring and economic opportunities for small producers [1]. In this context, NTFPs serve a crucial role in the economies of local and indigenous communities, providing essential sources of income and contributing to food security [2]. The exploitation of NTFPs allows rural households to diversify their economic activities, decreasing their reliance on cash crops and wage labor income [3]. As renewable resources, NTFPs also play a role in promoting sustainable forest management practices while supporting the rural economy through the marketing of both raw and processed products [4].

Among these products, wild mango (*Irvingia gabonensis*) and djansang (*Ricinodendron heudelotii*) occupy a central place in local markets. Both are highly regarded for their nutritional qualities and multiple uses, leading to increasing demand at national and international levels [5]. The harvesting and processing of wild mango can generate direct income for local communities and facilitate wealth redistribution through sustainable traditional practices [6]. Djansang stands out as a flagship product in local markets, contributing significantly to rural livelihoods. This trade fosters economic resilience based on equity and sustainable natural resource management, thereby enhancing the agri-food and cosmetic industries' interest in

these NTFPs, which stimulates their integration into more structured value chains [7]. However, the marketing of these products is heavily influenced by informal quality standards that condition market access and price setting [8]. Informal standards evolve in response to market expectations but often lack transparency, enabling established actors to shape their interpretation to their advantage [9]. By distorting trade dynamics in favor of larger companies, these standards marginalize small competitors who may lack the resources to adapt quickly [6]. Such informal barriers prevent small producers from accessing the same opportunities as larger entities, particularly during crises where these challenges are exacerbated [3]. The subjective nature of these standards frequently escapes regulatory scrutiny, placing small producers at a disadvantage, as large corporations can manipulate these standards to align with their strategic objectives [10]. Informal standards, therefore, entrench the dominance of larger firms, restricting the diversity of the entrepreneurial ecosystem and perpetuating environments of inequality [11]. These analyses converge on a common sentiment that informal quality standards pose numerous challenges for producers regarding pricing, market access, and benefit distribution, thus representing a significant threat to the sustainability of wild mango and djansang through potential overexploitation and resource degradation.

Consequently, a pivotal question emerges: What is the effect of informal quality standards on the marketing of wild mango and djansang? This study aims to (1) analyze the informal quality criteria applied to wild mango and djansang; (2) assess their impacts on producers, prices, and marketing; and (3) propose recommendations for better regulation of these standards. By addressing these questions, this research contributes essential insights into the market dynamics of NTFPs and the challenges associated with standardizing their quality.

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## METHODOLOGY

### Study site

Data was collected on the outskirts of the Lobéké National Park (LNP), in the Moloundou district, East Cameroon region (Figure 1). This park, covering an area of 217,854 hectares, is part of the Tri-National of the Sangha (TNS), along with the Dzangha-Ndoki parks (CAR) and Nouabalé-Ndoki (Congo). The localities of Mambelé, Salapoumbe La Vie, Yenga Tengue, Banana, and Guilili were selected for the study of informal quality standards. Surveys were conducted in Yokadouma, Batouri, Bertoua, Yaoundé, and Douala to trace the value chain of wild mango and djansang.

### Data collection

#### Survey targets

The survey was conducted with 250 producers to assess their practices and constraints. Additionally, 10 merchants involved in the sale of Non-Timber Forest Products (NTFPs) were included in the study to analyze distribution channels. Furthermore, 60 intermediate buyers specializing in the purchase of wild mango and 40 others in the purchase of Djansang were interviewed to understand their sourcing strategies. Next, 15 wholesalers operating in Yokadouma, Batouri, and Bertoua were consulted to examine the buying and pricing mechanisms.

Finally, at the national level, 10 exporters based in Douala and 10 others in Yaoundé were included to identify the quality criteria required in the international market. This approach allows for a better understanding of the gaps between the expectations of different stakeholders and local production practices.

### Survey targets

The data sources include interviews with producers and traders, as well as field surveys with wholesalers and exporters. Consulting transaction records and commercial invoices provides factual elements on price trends. An analysis of price trends in regional and international markets allows for the contextualization of these variations. The data collection period encompasses annual monitoring over the past five years (2020-2024), which helps identify seasonal and structural market fluctuations. The results provide a solid foundation for analyzing the impacts of quality criteria on the marketing of NTFPs.

#### Recording quality criteria and their impact on the marketing of NTFPs

The study adopts a qualitative and quantitative approach to examine the quality criteria applied to NTFPs. Data were collected from producers, traders, and exporters to understand the specific requirements of different markets. The qualitative analysis highlights the perceptions of stakeholders and the strategies they develop in response to imposed standards. Meanwhile, the quantitative approach assesses the impact of these criteria on pricing and marketing dynamics.

#### Data analysis

The discursive analysis showed how informal quality standards are imposed on producers without transparent criteria, thus reinforcing their economic vulnerability. By examining stakeholder testimonies, it revealed informational asymmetries where buyers hold the power to evaluate products without clear justification. The sociolinguistic analysis allowed for the deciphering of linguistic strategies used to legitimize these practices, notably through justifications such as the buyers' "experience." Finally, the critical discourse analysis highlighted how these informal standards contribute to the capture of added value at the expense of producers, thus illustrating the power dynamics in the NTFP marketing chain.

Regarding the analysis of economic dynamics in the marketing of NTFPs, price evolution was evaluated. The study compares NTFP prices over several years to detect trends and variations influenced by supply, demand, and market fluctuations. This analysis identifies periods of high product valuation and those where producers suffer a decrease in income. The impact of buyer requirements is also examined: the study analyzes how imposed quality criteria influence price discrepancies, particularly regarding drying, cleanliness, and packaging of NTFPs. It also highlights negotiation strategies that often disadvantage producers, thus reducing their pricing power. Finally, the economic and social consequences are analyzed: the impact on producers' incomes is examined to understand how these requirements shape their standard of living and their ability to invest in their production. The data analysis combines a discursive approach to inequalities and a study of economic dynamics. It highlights power relations and the impact of quality criteria on prices.

## RESULTS

### Identification of informal quality standards

#### Identification and relevance of global informal quality criteria applicable to djansang by intermediate buyers

The informal quality criteria applied to Djansang by intermediate buyers consist of a combination of objective and subjective

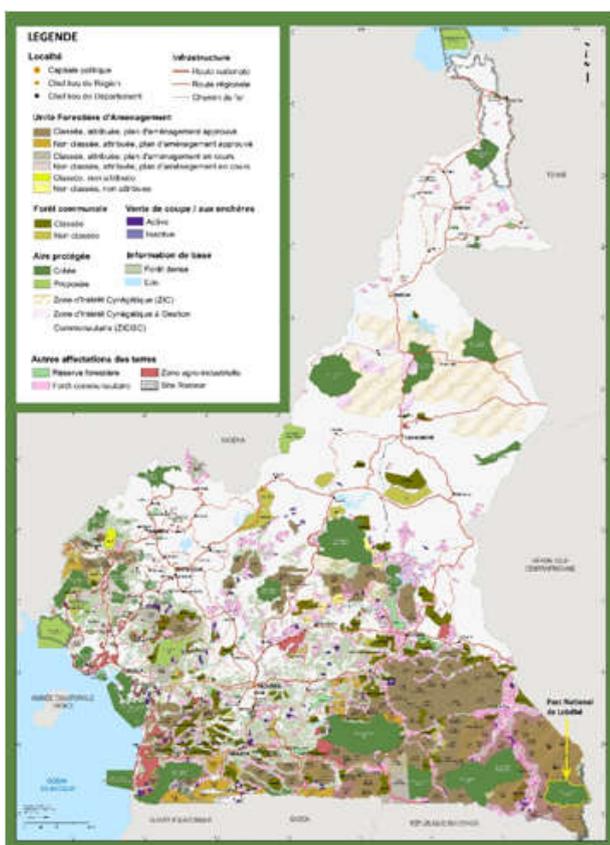


Figure 1. Location of Lobéké National Park in the forest area of Cameroon.

parameters, which directly influence the remuneration of producers. Drying and cleanliness are relevant criteria, as they affect the preservation and market quality of the product (Table 1).

**Table 1. Typology of informal quality criteria applicable to Djansang**

Criteria	Description
Drying	The seeds must be thoroughly dried to avoid moisture that can cause mold and reduce shelf life.
Cleanliness	The seeds must be free of any residue (shells, dust, sand, pieces of pulp).
Size of seeds	Larger seeds are often preferred on the market because they are easier to process.
Appearance of the seeds	The seeds must be uniform in color and texture, without spots or deformities.
Absence of mold	The seeds must show no signs of mold or fermentation, which could indicate poor storage.
Extraction mode	The method of separating the seeds from their hull must be clean and not damage the integrity of the almonds.
Smell and taste	The djansang must have a natural smell and taste, without traces of rancidity or foreign odors (smoke, humidity).
Oil content	A good oil content is an indicator of quality; seeds that are too dry or too old may lose this characteristic.

In contrast, smell, taste, and oil content, while often mentioned by buyers, remain subjective and difficult to measure in a standardized way, opening the door to arbitrary pricing practices (Table 1). Furthermore, the emphasis on the size and uniformity of the seeds seems unjustified at the village level, where weight should be the main criterion, as size does not affect the flavor or use of the product.

#### **Identification and relevance of informal quality criteria applicable to wild mango (*Irvingia gabonensis*) by Buyers**

The informal quality criteria applied to wild mango, such as the consistency of the kernel, taste, aroma, and seed size, are subjective and often established to benefit intermediary buyers (Table 2). In the absence of formal standards, these requirements can lead to a decrease in prices, to the detriment of local producers. Furthermore, these criteria vary according to the preferences of the buyers, creating uncertainty for producers regarding the valuation of their harvest.

**Table 2. Typology of informal quality criteria for wild mango.**

Criteria	Description
Drying	Almonds must be well dried to prevent fermentation and rapid deterioration.
Cleanliness	Seeds must be free from impurities such as soil, plant debris, or pulp residues.
Seed size	Larger and more uniform seeds are more valued as they facilitate crushing and grinding.
Appearance of the seeds	The color of the almonds should be uniform, without black spots or signs of rot.
Absence of mold	Any presence of fungi or mold can make the almonds unfit for consumption.
Consistency of the almond	The almonds should be firm and crunchy, not soft or rubbery, which could indicate poor storage.
Mode of preservation	Almonds should be stored in a dry, ventilated place to prevent rancidity and loss of quality.
Taste and aroma	A good quality wild mango is recognized by its slightly bitter taste and characteristic smell, without signs of spoilage.

#### **Effectiveness of the main informal quality standards influencing prices and acceptability of djansang**

The informal quality standards applied to djansang play a central role in structuring the market and enhancing the value of the product. Drying and cleanliness (43.4%) are key criteria that ensure optimal preservation and ease of use for processors and consumers (Table 3). In fact, inadequately dried or poorly cleaned djansang is more susceptible to mold, which limits its attractiveness and marketability. The appearance of the seeds and the absence of mold (36.95%) strongly influence the perception of product quality, thereby conditioning purchase decisions (Table 3).

**Table 3. Most influential quality criteria and levers for improving the marketing of djansang.**

Criteria	N° of Buyers	Prop. (%)	Impact on Price and Acceptability
Drying	13	21.00 %	Optimal drying prevents product deterioration and extends its shelf life.
Cleanliness	12	20.33 %	Buyers seek a product free from impurities (sand, husks, and insects) to avoid costly sorting.
Grain size	2	4.00%	Larger grains are often preferred for processing, although this criterion is less decisive.
Grain appearance	12	20.45 %	Well-formed grains without dark spots or stains are better rated in the market.
Absence of mold	11	18.43 %	The presence of mold significantly reduces the product's value, indicating poor preservation.
Firmness of the almond	4	6.00%	A firm and uniform almond is appreciated by processors and traders.
Storage method	3	5.00%	Adequate storage (absence of humidity and contamination) is essential for maintaining quality.
Taste and aroma	3	4.79%	A natural flavor and good aroma enhance demand, especially for culinary and cosmetic uses.

In the villages of Mambele, Salapoumbe, Yenga Tengue, Banana, and Guillili, buyers prioritize visually healthy seeds that are free from mold to ensure optimal resale to processors and exporters. The size of the seeds (9.65%), although secondary, is valued for ensuring a certain uniformity, particularly in more demanding markets where product standardization is sought (Table 3). From a commercial perspective, these informal standards promote market segmentation and price optimization. Well-dried and clean djansang can be sold for 30% to 50% more than a lower-quality product, thus illustrating the direct impact of these criteria on the profitability of producers.

#### **Effectiveness of the main informal quality standards influencing prices and acceptability of wild mango**

The informal quality standards applied to wild mango play a crucial role in market structuring and price setting. Drying and cleanliness (41.33%) are the dominant criteria, ensuring better product preservation and facilitating its marketing (Table 4). Similarly, the appearance of the seeds and the absence of mold (38.88%) strongly influence quality perception, with buyers favoring visually healthy fruits to optimize their resale. Furthermore, elements such as the consistency of the pulp, the method of preservation, and the taste/aroma (15.79%) add qualitative value, although they remain secondary in price setting (Table 4).

The size of the seeds (4%), although less decisive, can be a selection criterion for certain demanding market segments. From a commercial standpoint, these criteria directly influence the competitiveness of wild mangoes in local and international markets. To be honest, well-dried and clean mango can sell for 25 to 45% more than a poorly prepared product, demonstrating the importance of a rigorous mastery of processing techniques (Table 4). In the villages of Mambele, Salapoumbe La Vie, Yenga Tengue, Banana, and Guillili, buyers seek a homogeneous product free from mold to ensure optimal resale to processors and exporters.

**Table 4. Most influential quality criteria and levers to improve the marketing of wild mango.**

Criteria	N° of Buyers	Prop. (%)	Impact on price and acceptability
Drying	13	21.00%	Optimal drying prevents product deterioration and extends its shelf life.
Cleanliness	12	20.33%	Buyers seek a product free from impurities (sand, bark, insects) to avoid costly sorting.
Grain Size	2	4.00%	Larger grains are often preferred for processing, although this criterion is less decisive.
Grain Appearance	12	20.45%	Well-formed grains without cracks or dark spots are better rated in the market.
Absence of Mold	11	18.43%	The presence of mold significantly reduces the product's value, indicating poor conservation.
Consistency of the Almond	4	6.00%	A firm and uniform almond is appreciated by processors and traders.
Storage Method	3	5.00%	Proper storage (absence of humidity and contamination) is essential to maintain quality.
Taste and Aroma	3	4.79%	A natural flavor and good aroma increase demand, especially for culinary and cosmetic uses.

### Informal standards and product evaluation strategies by intermediaries

#### *The commercial justification of quality standards by intermediaries*

Intermediary buyers play a central role in defining the informal standards applied to NTFPs. Qualitative data show how quality criteria are applied subjectively and sometimes manipulated to justify lower prices. *"We only buy well-dried djansang because our clients demand it. If it contains moisture, it will mold during storage, and we will be the only ones to suffer the losses."* This statement from an intermediary buyer illustrates a causal justification where the drying requirement is presented as a constraint dictated by the market, thereby exempting the intermediary from any responsibility for imposing these standards.

The use of the future tense \_of certainty (*"it will mold," "we will be the only ones to suffer"*) dramatizes the consequences of non-compliance with standards, legitimizing increased vigilance and, implicitly, greater pressure on producers. The exclusive use of the pronoun *"we"* (*"we only buy," "we will be the only ones to suffer the losses"*) positions intermediaries as potential victims, thus obscuring the difficulties faced by producers in conforming to these often opaque criteria. Beyond the simple transmission of a quality criterion, this discourse

reveals a power relationship: under the guise of market rationality, the buyer imposes economic constraints on producers while avoiding discussion of the margins they gain by artificially lowering prices under the pretext of commercial risk.

#### *The size of seeds as a negotiation lever*

In the trade of Djansang seeds, intermediary buyers often justify their negotiation practices with subjective criteria: *"For us, the size of the seeds is essential. The larger they are, the more valuable they are. If the seeds are too small, we negotiate the price down."* This statement from an intermediary buyer is based on a comparative structure that directly links the size of the seeds to their economic value, suggesting an implicit market rule where *"the bigger, the better."* The use of the present tense of general truth (*"the size of the seeds is essential," "we negotiate the price down"*) reinforces the idea that this practice is a fixed and unavoidable rule, masking the arbitrariness it may contain. The use of the collective pronoun *"we"* (*"For us," "we negotiate"*) positions buyers as a homogeneous group, thus legitimizing a collective norm imposed on producers without the possibility of discussion. Finally, this data reveals a relationship of domination: by unilaterally determining the value of products, intermediaries exert asymmetrical negotiating power that allows them to reduce prices under the guise of *"objective"* criteria, often to the detriment of producers.

#### *Ambivalence in quality standards during negotiation*

In the trade of Djansang seeds, intermediary buyers often have to balance the need to guarantee quality with the risk of abusing their negotiating power: *"Sometimes, we use strict criteria to ensure we get the best product. But it is true that some buyers exaggerate and even refuse to pay a good price by claiming a bad smell or insufficient drying."* This statement relies on a contrastive structure introduced by *"however,"* highlighting the tension between the need to ensure quality and the abuse of these criteria by some actors. The use of the pronoun *"we"* legitimizes the application of standards by presenting them as a rational requirement, while the shift to *"some buyers"* creates a distinction between acceptable practices and opportunistic deviations. The use of the verb *"to pretend"* introduces a veiled critique, suggesting that these criteria are not always applied honestly but sometimes distorted to justify an artificial reduction in prices. Finally, this observation reveals a complex power dynamic: while intermediaries acknowledge the existence of abuses, they minimize their role in this negotiation asymmetry, shifting responsibility to other actors to preserve their legitimacy.

#### *The hierarchical transmission of quality standards*

In the trade of Djansang seeds, intermediaries often find themselves caught between the expectations of producers and the demands of the international market: *"We impose certain standards on producers, but it is also because exporters and processors impose these requirements on us. For example, a poorly cleaned djansang is difficult to sell on the international market."* This statement is organized around a justificatory structure: the intermediary acknowledges their role in imposing standards but immediately relativizes it by placing it within a descending chain of obligations. The introduction of the specific example *"a poorly cleaned djansang"* gives an appearance of objectivity and reinforces the idea that these standards are dictated by commercial constraints and not by a desire for exploitation. The use of the collective pronoun *"we"* includes intermediaries in a constraining system, where they are not only actors but also subordinate to export requirements. However, this discourse masks a more nuanced reality: by positioning themselves

as mere executors, intermediaries evade their negotiating power and the adaptation of criteria according to their own economic interests.

## Negotiating power of intermediaries and impact on the establishment of standards

### *The economic constraint on producers in the face of standards*

Intermediaries, in a dominant position within the supply chain, impose often opaque quality criteria that directly influence producers' incomes. By playing on perceptions of quality and applying arbitrary price reductions, they reinforce their negotiating power. This statement from a producer helps to understand the economic constraint producers face regarding informal quality standards: *"If our djansang has some mold, the buyer rejects it or lowers the price by 30%. Even if the overall quality remains good, we have to accept, otherwise they buy elsewhere."* – Producer, Guiliili.

The structure of this sentence relies on an implicit opposition between the perceived quality of the product and the arbitrariness of the market: the phrase *"even if the overall quality remains good"* highlights the disagreement between the producer's assessment and that of the buyer. The use of the verb *"rejects"* and the alternative *"or lowers the price by 30%"* illuminates a power dynamic, where the producer is imposed conditions without the possibility of negotiation. The use of the present tense of general truth (*"we have to accept"*) reflects a systematic constraint rather than an isolated case, reinforcing the idea of economic dependence of producers on buyers. Finally, the implicit threat in *"otherwise they buy elsewhere"* reveals a market structured in favor of intermediaries, where competition among producers prevents any collective claim and stabilization of prices.

### *Manipulation of quality criteria and power asymmetry*

In the trade of Djansang seeds, producers often face practices that reflect a disbalanced power dynamic. *"Buyers look at Djansang seeds one by one, and if they find too many small seeds, they say it's a batch of poor quality and offer us half the usual price."* – Baka Producer, Mambele. This statement highlights an arbitrary selection process where buyers apply meticulous control to justify a devaluation of the product. The alternation between observation and judgment (*"look at the seeds" / "say it's a batch of poor quality"*) illustrates how standards are subjectively shaped to maximize buyers' advantage. The use of the habitual present tense (*"look," "say," "offer"*) suggests a common and systematic practice, reinforcing the idea of an unequal power relationship. Finally, the drastic price reduction (*"half the usual price"*) reveals a coercive negotiation strategy, where the precariousness of producers forces them to accept unfair conditions without a viable alternative.

### *Opportunistic flexibility of quality standards*

The opportunistic flexibility of informal quality standards refers to intermediaries' ability to adjust their requirements based on economic contexts, particularly by playing on the abundance or scarcity of products. This allows buyers to maximize their profits by modifying quality criteria, often to the detriment of producers, who are forced to adapt to these unpredictable fluctuations. This opportunistic flexibility is articulated as follows through a producer: *"Standards change according to the seasons. During the high season, they always find faults to pay us less, while in times of scarcity, the same quality becomes acceptable."* – Producer, Salapoumbe la Vie.

In this statement, the speaker uses a temporal opposition marked by *"high season"* and *"period of scarcity,"* highlighting the flexibility of quality criteria imposed by buyers according to the time of year. The use of the verb *"find"* in the present indicative, combined with *"always,"* suggests that manipulating criteria is a systematic and recurring practice of buyers during the high season, further reinforcing the idea of opportunistic exploitation. The phrase *"find faults"* implies an active search for flaws, demonstrating buyers' willingness to justify a price reduction. Conversely, in *"period of scarcity,"* the speaker emphasizes the disparity by stating that *"the same quality becomes acceptable,"* shedding light on the absence of consistent objective criteria. The use of *"becoming"* in the present indicative accentuates the abrupt transition of requirements, reinforcing the asymmetry in the relationship between producers and buyers. The pronoun *"they"* refers to buyers collectively, generalizing their behavior without distinction.

### *Producers' adaptability to intermediaries' requirements*

The results of the table below show a strong adaptability of producers to intermediaries' requirements, often under the constraint of unequal negotiating power. Nearly 80% of producers have extended the drying time to avoid having their products rejected or underpaid, while 64% have had to strengthen seed sorting to meet imposed size standards (Table 5).

**Table 5. Attempt to quantify the adaptation of producers to the requirements of intermediaries.**

Improvement criteria	N° of concerned Producers	Prop. (%)
Prolonged drying to avoid rejection	195	78%
More rigorous sorting to eliminate small grains	160	64%
Improved storage to avoid mold	133	53%
Adoption of specific techniques requested by buyers (e.g., sun drying)	103	41%
Modification of harvest periods to avoid waste	88	35%

The addition of specific storage methods to prevent mold concerns more than half of the producers (53%), highlighting pressure on the preservation of NTFPs. Furthermore, 41% of producers have adopted specific techniques, sometimes costly, without assurance of a better selling price. Finally, 35% of producers have modified their harvesting periods to adapt to purchasing criteria, a constraint that can have repercussions on their agricultural organization and overall profitability.

### **Effects of informal standards on producers' income**

Informal standards directly influence pricing, often to the detriment of producers. Information asymmetry increases their vulnerability to buyers who impose fluctuating criteria to reduce acquisition costs.

### *Producers' adaptability to intermediaries' requirements*

Table 6 highlights the influence of quality criteria on pricing. Products that meet informal standards (sorting, drying, cleanliness) sell for an average of 40 to 60% more than those of lower quality. This difference reflects the hierarchy of requirements based on supply chains, where national and international markets impose stricter standards, while local markets tolerate more variability.

**Table 6. Impact of compliance with informal standards on prices.**

Product	Criteria met	Price paid (Fcf/kg)	Relative difference (%)
Djansang	Dried, sorted, clean	2500	50%
Djansang	Not sorted, with impurities	1700	Base
Wild Mango	Dried, without impurities	1800	40%
Wild Mango	Poorly dried, with impurities	1200	Base
Moabi	Sorted and well preserved	3000	60%
Moabi	Not sorted, poorly stored	1900	Base

### **An asymmetry of information to the detriment of producers**

Producers of NTFPs do not have precise information on the true evaluation criteria applied at the end of the chain. This opacity allows intermediaries to set subjective requirements that are not governed by official regulations. Intermediary buyers often exploit producers' ignorance by imposing quality criteria that do not always align with the expectations of end consumers. The account of producer Jean-Baptiste from Banana illustrates this situation well: *"Last year, I dried my djansang for more than ten days as I was taught. However, the buyer said my seeds were still too wet and lowered the price. When I asked him how he checked this, he just smiled and told me it was experience that spoke."*

This data highlights an asymmetry of information and power between sellers and buyers. Certainly, the temporal opposition marked by *"Last year"* and *"However"* reflects a dissonance between learning the norms and their arbitrary application by the buyer. The use of the past tense (*"I dried," "I was taught"*) underscores a conscious effort to adapt to market expectations, in contrast to the vague attitude of the buyer. The absence of objective criteria is emphasized by the producer's question, to which the buyer responds with an evasion (*"he just smiled"*), referring to a subjective and unchallengeable justification (*"it was experience that spoke"*). This narrative structure highlights an unequal power dynamic where producers find themselves at the mercy of subjective evaluations that directly influence their income, thus reinforcing their dependence on buyers and their economic insecurity. It especially illustrates the precariousness of producers in the face of informal norms unilaterally dictated by buyers. In any case, despite the apparent adherence to drying instructions, the final decision rests on an arbitrary judgment without objective and verifiable criteria.

### **The appropriation of added value and artificially lowered prices**

Value intermediaries, taking advantage of the monopoly on purchasing in certain isolated areas, use informal standards to justify price reductions, sometimes without real basis. The power dynamics are in their favor, as producers have few alternatives for direct marketing. Awa, a producer in Salapoumbe, reveals: *"The buyer told me that my mango seeds were too small and that this affected their quality. Yet, it's the same variety I've always sold! But this time, he refused to pay the usual price and gave me almost 40% less. I had no choice; otherwise, I would go home with my sack"*.

This data illustrates the vulnerability of producers to the arbitrary fluctuations of quality criteria imposed by buyers. The statement *"it's the same variety I've always sold"* reflects the misunderstanding and

helplessness of the producer in the face of a standard that seems to evolve according to market interests rather than on objective grounds. The mention of the reduction of *"almost 40% less"* highlights the direct economic impact of these decisions on the producer's income, who finds themselves trapped in an unbalanced commercial relationship. Finally, the expression *"I had no choice; otherwise, I would go home with my sack"* emphasizes the pressure endured: without viable alternatives or bargaining power, the producer is forced to accept unfair conditions, thus revealing a dynamic of dependency and structural exploitation in the value chain of NTFPs.

### **Increased economic vulnerability of producers**

The pressure on prices directly affects producers' income, limiting their investment capacity and resilience to climatic or economic uncertainties. Some are forced to accept unfavorable selling conditions or to reduce their production due to lack of profitability. This testimony highlights the discouragement and disillusionment of producers in the face of an opaque and unfavorable evaluation system. Paul, a producer in Guilili, states: *"I have reduced my collection of djansang, because the efforts I make to properly dry and clean my seeds are never good enough for buyers. They always find a problem to lower the price. What's the point of working so hard if I barely earn enough to feed my family?"*

The expression *"The efforts I make (...) are never good enough"* reveals a deep frustration, born from a fluctuating and often arbitrary demand for quality. The statement *"They always find a problem to lower the price"* highlights the power asymmetry between producers and buyers, with the latter exploiting the lack of fixed standards to maximize their profits at the expense of collectors. Finally, the rhetorical question *"What's the point of working so hard if I can barely earn enough to feed my family?"* conveys a sense of economic and social helplessness, illustrating how these business practices undermine the livelihoods of producers and push them away from certain activities, with potential repercussions on the sustainability of the sector.

## **DISCUSSION**

### **Issues related to the lack of official standardization**

The absence of regulation of quality standards in the NTFP sector constitutes a major obstacle for local producers, hindering their access to broader and more lucrative markets. This lack of standardization generates uncertainties and disparities in the assessment of product quality, creating doubts for buyers and barriers for local producers wishing to enter these markets [12]. Furthermore, these regulatory gaps lead to variations in product evaluation, linked to perceived quality and perishability. The inconsistency in the assessment of NTFP quality creates an uneven playing field, where those lacking substantial resources are marginalized, unable to compete with better-equipped competitors who can more easily adapt to market demands. In communities where NTFPs play a crucial role in livelihoods and food security [13], this regulatory gap exacerbates disparities by allowing only those with significant resources and knowledge to take advantage of niche markets, thereby marginalizing small producers. Consequently, they often find themselves in disadvantageous negotiations, with buyers exploiting the absence of standardization to drive prices down under the pretext of variable quality criteria [14]. This situation erodes community cohesion and undermines efforts toward sustainable forest management.

## Marginalization of producers unable to meet quality requirements

The marginalization of producers unable to meet quality standards imposes an additional economic and social burden, exacerbating inequalities within rural communities. According to Yetna [15], the absence of a coherent language policy in Cameroon illustrates the challenges the country faces in its quest for social and economic inclusion. With its 238 language units, Cameroon presents a complex landscape that often complicates communication and the implementation of effective policies. This linguistic diversity exacerbates the difficulties local producers face in accessing the information and resources necessary to improve their quality standards. It is imperative to establish suitable multilingual educational programs that raise producers' awareness of international quality standards while respecting their unique cultural context. This situation creates a vicious cycle of poverty and exclusion that hinders sustainable development. Producers excluded from the market due to inaccessible quality standards often find themselves in a downward spiral where loss of income limits their ability to invest in necessary agricultural and technological improvements [16]. The direct consequence is economic stagnation that affects not only individual families but also weakens the collective economic resilience of rural communities. This economic, social, and cultural marginalization reinforces a persistent cycle of poverty and exclusion. Producers unable to meet quality criteria are often sidelined from lucrative markets, leading to a loss of income that limits their ability to invest in essential improvements such as modern agricultural technologies or advanced ecological practices [17]. The lack of access to profitable markets undermines these producers' opportunities to expand their skills and access better resources, further exacerbating existing inequalities. This lack of access to vital resources is not only an individual hindrance but becomes a community issue, perpetuating economic stagnation that reduces the ability of an entire community to develop sustainably.

## The sociological challenges related to the informality of quality standards in the marketing of NTFPs

The informality of quality standards in the marketing of NTFPs creates significant sociological challenges, notably by exacerbating inequalities and reinforcing asymmetric power relations within value chains. The absence of official regulation of quality criteria fosters a hierarchy where local producers, often marginalized, are forced to comply with demands imposed by intermediary actors such as wholesalers and exporters, with no possibility for negotiation. According to Gavignaud [18], local producers are at the mercy of wholesalers and exporters who dictate production and payment conditions due to a lack of regulations ensuring minimum standards and fair remuneration.

This power imbalance strips producers of their negotiating leverage, forcing them to survive rather than thrive. Such constraints hinder their ability to innovate and keep them trapped in a cycle of stifled potential. Hochedez and Le Gall [19] support this view, arguing that the absence of official regulation on quality criteria exacerbates the challenges faced by local producers. This regulatory void allows intermediaries to impose standards without considering the socio-economic impacts on grassroots producers.

This situation forces producers to yield to the arbitrary dictates motivated by profit from wholesalers and exporters, whose criteria often overlook the nuanced realities faced by these producers [20]. This underscores the need for regulatory reform that emphasizes equitable frameworks and inclusivity in global trade dynamics.

## Strategies to strengthen producers' competitiveness

### *Strengthening the competitiveness of NTFP producers: towards adapted local solutions*

Faced with the asymmetry of information that penalizes producers, what alternatives could be considered to rebalance the power dynamics? One possible answer is to promote the integration of local solutions that take into account the realities of producers and local markets. In this context, establishing quality standards tailored to the specificities of products and local contexts appears essential. The aim is to develop quality criteria that respect the capacities and constraints of producers while meeting market expectations. However, developing these standards can be complex and costly, requiring technical expertise and coordination among different stakeholders. Strengthening producers' capacities in processing and conservation techniques can also contribute to improving product quality and enhancing competitiveness in the markets, while preserving local specificities. Nevertheless, the necessary training and technologies may not be accessible to all producers, particularly in isolated or less developed regions.

Moreover, the collective organization of producers would enable them to negotiate prices and standards more equitably, thus limiting the impact of abusive practices by intermediaries. However, coordination among producers can be challenging due to differing interests or a lack of mutual trust. These local solutions could not only improve producers' competitiveness but also allow them to better value their products and increase their incomes. However, enhancing competitiveness may not be sufficient if markets are saturated or if local products fail to differentiate themselves. Valuing products requires effective marketing strategies and a deep understanding of consumer expectations.

### *Towards a suitable certification for non-timber forest products: Drawing inspiration from successful models in agricultural and forestry sectors*

This issue is not unique to NTFPs. Other agricultural sectors have faced similar challenges and have implemented control mechanisms that could inspire tailored solutions. For example, in the cocoa sector, producers benefit from certifications such as Fairtrade and Rainforest Alliance, which impose clear and transparent standards and limit the abuses of intermediate buyers. These certifications provide producers with a better position in the value chain by guaranteeing a minimum price and ensuring fairer remuneration for their products. However, the implementation of such certifications requires resources and appropriate infrastructure, which can pose a challenge for NTFPs, often produced in more isolated or less structured contexts. Furthermore, the certification criteria must be adapted to the specificities of NTFPs to be relevant and accessible to local producers.

Similarly, in the coffee sector, labels such as "Café Direct" or "Utz Certified" ensure product quality while providing producers with more stable remuneration. These models have demonstrated their effectiveness in other agricultural sectors, but their adaptation to NTFPs would require a deep understanding of local dynamics and the specific value chains of these products. If these models have been effective in other agricultural sectors, why not consider similar mechanisms for NTFPs? Establishing a certification adapted to NTFPs could enhance transparency and allow for better valuation of local productions, while improving the competitiveness of producers in the face of the increasing demands of international markets. However, it is crucial to ensure that these certifications are accessible

and beneficial to local producers, taking into account their constraints and capacities.

### **Strengthening the resilience of NTFP producers: Drawing inspiration from agricultural certification mechanisms for better equity**

The experience of agricultural sectors such as cocoa and coffee shows that it is possible to establish control mechanisms that are favorable to producers. These initiatives have demonstrated their ability to strengthen the economic resilience of local communities and to limit the adverse effects of informal standards imposed by intermediaries. If such initiatives were developed for Non-Timber Forest Products (NTFPs), they could offer similar benefits. However, it is crucial to recognize that NTFPs present unique challenges. NTFPs are often harvested in diverse environments and by communities with varying capacities. Thus, the implementation of certifications must be adapted to these specific contexts to be effective and accessible.

A certification-centered approach for products and the transparency of standards could serve as a powerful lever to improve the incomes of NTFP producers. By ensuring clear quality criteria and enhancing the competitiveness of products in the markets, these certifications could ensure a fairer remuneration for producers. However, it is essential that these certifications are designed in collaboration with local communities to ensure they meet their needs and capacities. The establishment of such organizational structures would also strengthen the bargaining power of producers, thereby reducing their vulnerability to price fluctuations. Ultimately, these initiatives could contribute to better valuation of local productions and a sustainable improvement in the living conditions of NTFP producers.

## **CONCLUSIONS**

Informal quality standards, often unilaterally imposed by buyers, represent a major obstacle to the fair valuation of Non-Timber Forest Products (NTFP) produced by producers. These standards, undefined and unstandardized, lead to variations in the assessment of product quality, often to the detriment of producers. As a result, they must adapt to requirements that do not necessarily align with local production realities. This lack of regulation enables intermediaries to exploit the situation, imposing low prices while maximizing their profit margins. The price gaps between producers and other actors in the value chain, such as wholesalers and exporters, widen, leading to increased inequality in the distribution of profits. Without formal mechanisms, producers struggle to assert the quality of their products and obtain fair compensation. The imposition of informal standards directly impacts the competitiveness of producers in both local and international markets. They are often forced to sell at prices lower than their actual value, thus reducing their margins. This situation also leads to the economic marginalization of producers, who lack both negotiating power and the means to comply with these standards without external support. Finally, this dynamic contributes to the impoverishment of producers, whose incomes are often insufficient to improve their long-term economic and social situation.

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