Demystifying the Forest Revenue and Policy Spillovers in the Utilization of Softwoods in Nepal

Resham B. Dangi

Investigating forest revenue sources, timber auction rules, the spillover effects of trade policies on wood product demand, and import and export trends, this paper explores the influence of sectoral policies on the utilization of softwoods. Acknowledging the relative advantages of veneer and plywood exports, it suggests taking promotional measures to enhance the supply of required input products in partnership with other national policies. Analyzing wood product export trends, drawing on the authors' professional experience, raises doubts about the export competitiveness of hardwoods. It concludes by suggesting that concerned authorities revisit the cost centers of hardwood production, adopting a transparent mechanism and ensuring ownership of outcomes.

Keywords: Forest revenue, Softwoods, Spillover effects, Timber auctions, Trade policy

Forest owners expect a return from two productive assets, physical land and biological resources. However, in some typical cases, forest land and biomass may belong to two different owners per contractual arrangements, such as community-based forest management (CBFM), which is one example. In the CBFM, forest users do not hold rights to the land but have rights to access, extract, and sell forest products (biomass). The government reserves the right to regulate CBFM as a legitimate landowner through the management contracts. As long as CBFM maintains forest functions, forest health, and follows approved forest operational plans, forest agencies limit their role to technical support and practice less regulation. In this paper, the term forest owner is used interchangeably to imply all types of forests, such as CBFM, government-managed forests (GMF), and private forest (PF).

The Forest Act 2019 and Forest Regulation 2022 envisage the forest revenue-generating sources into four categories: forest areas used for extraction activities, green activities, environmental services, and non-forest uses (permanent conversion) (GoN, 2015; 2022). Forest product extraction activities are a significant source of royalty revenue, but leased forests for rent-and-use are scarce, and their royalty contribution is negligible.

Another emerging revenue source is payment for environmental services (PES), which generates revenue as a new market mechanism. One such source is the forest carbon trade, which pays for carbon sequestration services through Reduced Emissions from Deforestation and Forest Degradation (REDD+) frameworks. The Government of Nepal (GoN) and the World Bank's Forest Carbon Partnership Facility (FCPF) signed an agreement on 24 February 2021, unlocking up to US\$45 million to mitigate carbon emissions from deforestation and forest degradation through 2025 (World Bank, 2021).

National media of Nepal, including Republica, Rising Nepal Daily, ShareSansar, and Radio Nepal, reported, quoting the REDD Implementation center under the Ministry of Forests and Environment (MoFE), totaling NRs 1.06 billion equivalent for sequestering 2.4 million tons of carbon from 2018 to 2024 to be disbursed in October 2024 (myRepublica, 2024; ShareSansar, 2024). The last royalty source category includes compensatory payments for accessing rights to use forest land for other purposes, as per the agreed terms and conditions, proponents compensate for biodiversity and ecosystem loss.

Forest owners collect royalty fees for issuing extraction permits and leasing their forest lands

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Nepal Forest Service (Retired). Email: reshamdangi@gmail.com

under a rent-and-use arrangement. This paper skips the discussion on royalty revenues in protected areas and further narrows to formal trade-related wood and non-wood products. Informally traded and directly consumed goods, for free, are beyond the scope. Furthermore, it tightens the discussion in timber auctions and rent redistribution, confining it to the forest area used for extraction activities, and excludes the rest.

Besides royalty revenue, the government collects revenues from taxes, levies, and service charges, which are often misquoted as royalty revenues. One researcher estimates annual NRs of 19.49-38.99 billion royalty contribution from forests (NFA, 2011, p. 19), and another claims NRs of 300 billion from sustainable management of CBFM, GMF, and PF (Pokhrel, 2022, p. 223). In one presentation at the national policy dialogue organized by MoFE/FAO/ FECOFUN/ RECOFTC in 2024, the potential for forest royalty collection was estimated at an annual NRs 28 billion.

Such wide-ranging estimates imply that authors often project forest revenue by multiplying the estimated annual allowable timber harvest (AAH) of accessible forests by expected market prices. The author doubts overestimation due to a false assumption that all forests have the potential to contribute timber royalty revenues. Since more than eighty percent of accessible forests fall under CBFM and PF regimes, which generate tax revenue (VAT) but not royalty revenues, the author doubts the relevance of such projected figures in policy dialogues.

Nepal has historical records of standing tree auctions. The Government of Nepal (GoN) endorsed the sixth five-year plan, leading forest agencies to transition to post-harvest (Tiwari, 2000, p. 139). This transition occurred when the GoN was practicing protectionist and inward-looking trade policies, and domestic industries were in their infancy (Khatri, 2018). In the late 1980s, the government adopted a strategic policy to foster local resource-based industries (Aryal et al., 2014), and timber auctions fully transitioned to post-harvest auctions by enforcing Forest Regulation 1995 (GoN, 2015).

Nepal transitioned to a liberal economy in the early 1990s, which accelerated trade liberalization, facilitated the mobilization of foreign direct investment (FDI), and expanded public infrastructure. The FDI finance enabled the GoN to expedite rural infrastructure development; however, delays in site clearance extended the project duration, and forest agencies were blamed for increasing project costs. The post-harvest auctions did not align with the construction schedule and portrayed forest agencies as anti-development in the public eye. This situation persisted due to a lack of separate standards for infrastructure development in the Forest Regulation 1995.

The increasing conversion of national forests for infrastructure development increased pressure to expedite tree removal, which DoF responded to by reinstating standing tree auctions in forest product (timber/firewood) collection, sales, and distribution guidelines in 2000, explicitly for development projects. This guideline empowered District Forest Officers (DFOs) to expedite tree removal, elaborating on the process in provision 14 under section 5 (DoF, 2014).

Responding to the earthquake-led timber demand shock in 2015, DoF drafted new forest product collection and sales-distribution guidelines in late 2015. Elaborating on standing tree auctions in provision 19 under section 4 (DoF, 2016), guidelines allowed for the execution of standing tree auctions based on *stumpage value* for softwood species, with a threshold of 200 trees per harvesting plot.

DoF had envisaged that it would enhance softwood utilization, and DFO staff would become burden-free by shifting the risks to merchants. However, it did not progress as expected, suggesting that weak governing systems hindered the utilization of softwoods. If softwood utilization were a technical issue, then forest agencies could have attempted to pilot and learn from practicing standing tree auctions in accordance with the directives.

To avoid the risk of losing the commercial value of softwood harvests in GMF and CBFM, they are inclined towards hardwoods. As a result, PF contributed to filling softwood supply gaps and dominating the softwood market, as well as national forests in the hardwood market (Dangi, 2025a). At the outset, this paper aims to explore the potential of pre-harvest auctions in GMF and CBFM, concluding with a set of policy measures to enhance softwood production.

Materials and methods

This study employs a qualitative research approach to evaluate prevailing timber auction standards and forest taxes, integrating insights from observations, a systematic literature review, and informal

consultations with forestry professionals and timber merchants to understand the issues about production costs and timber auctions. The author has used professional experience and training background to synthesize the findings of the literature review and insights from key informants, employing an expert judgment methodology.

Although formal surveys or statistical tools were not used, the author argues that the proposed methodology was consistent with expert-based methods and advocates for the merits of this methodology in interpreting under-documented phenomena. There was limited information available about experiences with standing tree auctions in Nepal, and the author contends that the adopted methods are justifiable.

The literature review included scholarly journals, policy documents, the Forest Act/ Regulations, and relevant textbooks on forest economics. While searching relevant literature, the author used keywords such as forest revenue, forest royalty, stump value of forest, and forest rent, preferably from developing countries. This study presents a literature review on four key themes: production potentials, forest taxes and fees, forest revenue sources, and royalty enforcement, which are highlighted in the introductory paragraphs.

The author consulted reports published by government agencies to collect information about timber production, revenue collection, royalty rates, and foreign trade statistics. Synthesizing findings on policy and practices, the author categorized them into regulatory, operational, and strategic shortcomings by examining the literature review findings and key informant observations, integrating these with the author's own observations. Moreover, the author applied the above-stated methodological tool, drawing on over thirty years of professional experience in the forestry sector, and adopted safety measures to normalize biases of informant observations by triangulating them with secondary literature and policy documents.

Results

Forest revenue sources

The value of the national forest comprises physical resources and growing biomass. The biomass value is appraised for stock values, whereas inherent characteristics and alternative uses determine the values of land resources. Governments impose three categories of taxes on forests in one place or another:

income taxes, property taxes or their substitutes, and severance taxes (FAO, 2003). Others suggest two broad classes of forest taxes: harvest taxes and property taxes (Amacher et al., 2009).

Following the Forest Regulation 2022, forest products are categorized into three main groups: wood (including timber and fuelwood), non-timber forest products (NTFPs), and other miscellaneous products. The GoN collects royalty revenue from the GMF and, to a lesser extent, from the collaborative forests (CoF), as outlined in Schedules 6, 7, and 8 (GoN, 2022). Referring to the verdict of the Supreme Court bench of India, led by Chief Justice DY Chandrachud, the royalty revenue is distinct from tax revenue (Bawa, 2024), which considers royalty as a financial obligation of resource-extracting contractors. Therefore, this paper presents forest revenue in three categories: royalty, tax, and non-tax.

The royalty revenue sources refer to product extraction activities. The 13% value-added tax (VAT) on sales value denotes tax revenue, while PES and compensatory payments represent non-tax revenue. Since the Constitution of Nepal includes the use of natural resources in the concurrent power list (Schedule 9) and VAT in federal power (Schedule 5), it empowers the federal government to collect royalties and VAT revenues, respectively. The State (Provincial) governments collect non-tax revenue (Schedule 6), following constitutional provisions (MoLJPA, 2020).

Timber auctioning practices

There are widely varying estimates for Nepal's timber production potential, ranging from 2.89 to 25.8 million m³ per year (NFA, 2011; Magrath et al., 2013; DFRS, 2015, cited in MSFP, 2016; World Bank, 2019). One study quoting (Subedi et al., 2014) claims that timber supply could be increased to at least 1.66 million m³ annually just by employing a conservative harvesting scenario while it could go up to 9.18 million m³ under an optimistic scenario (Jayasawal & Bishwokarma, 2016; Pp. 2), and another study claims annual production of 3 million m³ timber from 1.3 million ha forests (Rai, 2022, p. 228). Another study estimates an annual production of 2.9 million m³ of timber, of which 1.7 million m³ would be available in the formal market (Dangi, 2024).

In forestry literature, the value of a standing tree is the stumpage value that a potential harvester must be willing to pay to purchase harvesting rights. In other words, this is the residual value left after deducting

associated production costs from the revenue received at the processing unit. Under the Forest Regulation 2022, there are two types of timber auctioning provisions, and any factors that influence revenue and cost change the stumpage value determined by owners in both cases.

Pre-harvest auctions

This method was once a dominant practice in the Teria region. It continued till the early seventies, but little information is available about its extent and implications. To overcome the under-reported phenomenon, the author relied on key informants, retired forest officers, timber merchants from the eastern region, and independent forestry experts. The author presents below a summary of synthesized information to maintain anonymity.

A forest officer, who was heavily involved in standing tree harvesting activities in eastern Terai, particularly in Morang and Jhapa districts, recollected that the Ministry of Forests (MoF) used to play a dominant role in managing standing tree auctions. Indian merchants used to purchase harvesting permission from the ministry by paying upfront revenue for the permitted quantity. If the total harvest volume exceeded the licensed quota, merchants had to pay an additional revenue for the difference. Such practices continued till the late seventies, particularly in establishing tea estates in the Eastern Terai and planned settlements in the western Terai.

The GoN adopted industry-supporting trade policies, which created opportunities for local merchants to participate in timber auctions. When local participation in timber auctions increased, it weakened the monopoly power of Indian merchants but elevated public complaints alleging corruption. However, it is acknowledged that Indian merchants were efficient in utilizing softwoods in the veneer, matchsticks, paper, and pulp-making industries in nearby Indian cities, and successfully avoided the risk of losing commercial value.

In standing tree auctions, a prospective buyer must quote bid prices (P) above the predetermined stumpage price and purchase harvest permits for appraised timber volume (q) by paying upfront revenue equivalent to (P×q). Therefore, the buyer extracts all possible positive returns to cover the upfront amount and ensure a fair return from investment in labor and capital. Moreover, if the appraisal document underestimates the volumes, it risks harvesting high-value commercial trees and

leaving low-value commercial trees uncut in the forests. The buyer adopts this strategy to avoid paying the difference for harvesting low-value timber that exceeds the appraised volume. Therefore, an accurate volume estimation of standing trees is crucial in encouraging timber buyers to harvest trees until a positive net value is achieved within the harvesting permits.

If there are issues with species-level biodiversity conservation, the regulatory agencies reserve the right to impose additional standards for harvesting (such as retaining mother trees and a diameter threshold) to ensure regeneration. Moreover, it protects forest owners and forestry professionals from the risk of losing commercial value if harvested timber remains stockpiled under the sun and rain in log yards, and it shifts those risks to timber buyers.

If standing tree auctions were effective and efficient, high-position holding forest professionals would have tried to reestablish them in the consecutive forest regulations, because they were aware of the pros and cons of standing tree auctions. Since it received little attention in consecutive harvesting standards, the author doubts their effective execution. Therefore, a systematic analysis may help to answer why consecutive regulations provided a limited scope for standing tree auctions.

Post-harvest timber auctions

In this timber-selling method, tree owners harvest timber and sell raw logs from the log depots. Owners employ labor for harvesting and deliver activities, and sell logs in accordance with Rule 25 of the Forest Regulation 2022. The labor cost occupies the largest share (63%), followed by transportation (37%), in the tree felling, sectioning, and transport to the sales depot (Kanel et al., 2012). Only wood-based industries or firms can participate in such auctions, and Rule 27 restricts them from reselling without adding primary value. No such preconditions prevail in CBFM if logs are sold to their users. While selling logs to non-users, they must determine post-harvest stumpage fees and collect extraction costs separately from timber buyers.

While selling, the owners estimate the stumpage fee (P) and disclose the unit extraction cost (Hc) for the selling quantity (q). The owner asks buyers to reimburse extraction costs (Hc×q) separately. Buyers own timber (q) by paying the owner the price (P×q) as revenue. The profit for timber buyers depends on margins between the prices received at the sawmill

gate and the cost incurred in the contract award and delivery. If harvested logs remain stockpiled in log depots for an extended period, tree owners risk losing commercial value.

The harvested logs in GMF and CBFM comprise hardwoods of high commercial value. Such skewedness risks over-matured and dead softwoods from being underutilized. The skewed harvesting in GMF and CBFM indicates that the risks outweigh their profit margin, suggesting a weak governance system that hinders them from optimizing the utilization of softwoods. The domination of the softwood market by PF suggests that profit margins outweigh the risks for landowners. According to key informants from the timber industry, they mobilize petty contractors and middlemen to harvest logs in PF and deliver them to the industry gate.

Any factors that undervalue harvested logs risk reducing the size of available rent and expected profit. Using inaccurate log-scaling methods (like the Hoppus formula) risks undervaluing volume, enabling log buyers to purchase them by paying less. Such practices allow buyers to generate additional profit due to scaling errors. If producers pay labor and transportation costs based on the volume estimated by such methods, they incur lower costs and create equivalent surplus value. Therefore, scaling error risks the producers and the government losing revenue, including that of the CF and PF owners, which is elaborated in length elsewhere (Dangi, 2025b). Furthermore, if regulatory agencies play dual roles, regulating and selling functions, the risk of influencing stumpage fees by manipulating timber appraisal records and log grading is high. A similar risk may also prevail in CBFM when it involves selling to non-users.

Policy spillovers

One study estimates that the projected timber demand for 2020 was 3.7 million m³ (Kanel et al., 2012), with the import contribution one-fourth (World Bank, 2019). The domestic timber supply contracted in 2020 due to an administrative investigation into scientific forest management in CF, which increased timber imports in 2020. The demand contracted in 2021 due to the COVID-19 pandemic. The contraction in construction and furniture-making activities during the COVID outbreak further tapered it, leading to less than one-third contribution (Dangi, 2024). The foreign trade statistics (FTS) of the customs office for the year 2024/25 confirm that the trend of imports of wood–based construction materials has

declined, making the import contribution even less (DoC, 2025).

The construction industry experienced high growth during the post-earthquake reconstruction period (2015-2020). The credit for such growth goes to the increased financial support from donor-funded and public-funded investments in the maintenance and reconstruction of earthquake-damaged physical infrastructure in 2015. The increased investment had boosted the production and supply of construction materials. Noticing supply gaps for construction timber, the Industrial Promotion Board awarded a license to prefabricated house manufacturers to produce alternative raw materials for the construction industry. Since then, it has gained popularity in the construction industry in Nepal (TKP, 2015).

The technical support provided by the NRA to the furniture makers in rural villages created opportunities to utilize softwoods in furniture making. Consequently, the establishment of small and medium-sized sawmills, plywood, veneer, and furniture-making industries increased during the reconstruction phase to respond to consistent market demand. The GoN's decision to reduce the distance for establishing forest-based enterprises from nearby national forests positively contributed to their expansion in rural areas (DoI, n.d., p. 27)

While the earthquake reconstruction phase was nearing completion, the country faced the COVID-19 pandemic, which disrupted economic activities, turning the GDP growth trajectory negative, with demand contraction across consumption, investment, trade, and industrial activity. The manufacturing sector was hard-hit, experiencing a sharp decline due to reduced domestic demand and increased imports (Dhungel & Lamichhane, 2020). Construction projects stalled due to lockdowns and disrupted supply chains, resulting in a significant contraction in investment spending (Khanal et al., 2020). Aggregate demand did not revive throughout the COVID period, resulting in a standstill situation in the country's overall economic activity.

Therefore, the earthquake and pandemic influenced the domestic timber industries in opposite manners; the first had an expansionary effect, and the latter had a contractionary impact. Therefore, during the post-earthquake reconstruction (2015-2020), the timber supply was enhanced, which was contributed to by domestic and imported products. However, it contracted in the post-pandemic period (October 2021 to September 2022). One such study indicates

that growth in the construction and manufacturing sectors during the 2023-2024 period has stagnated (World Bank, 2025), signaling a contraction in demand for these respective sectors.

The Foreign Trade Statistics (FTS) maintained by the Department of Customs (DoC) indicate that export values surpassed import values at customs points, positioning wood products as a net exporter for the last two fiscal years (DoC, 2025). Therefore, Figure 1 below supports the author's earlier argument that imports of wood products (under HS-Codes 4401-4421) surged rapidly during the post-earthquake reconstruction phase to fill the domestic timber supply gap. The contraction of input-product demand by the construction and furniture-making industries during the COVID pandemic period had a contractionary influence on wood-product imports.
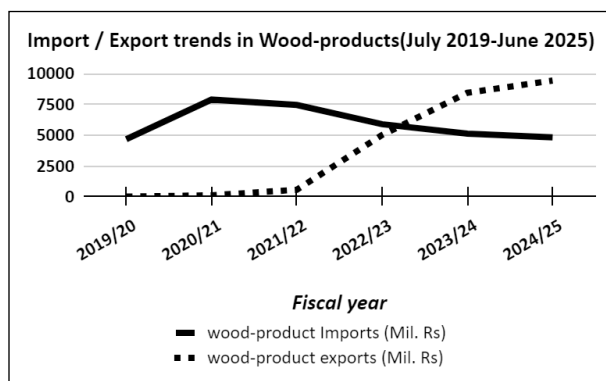

Figure 1: Wood-products import and export trends in the last six years (DoC, 2025)

To respond to the prevailing contractionary input-product demand of the construction and manufacturing sectors, it is suggested that forest owners consider adopting a two-pronged strategy for domestic hardwood and softwood, targeting different marketplaces. The hardwood-based output products can be targeted for a niche market, whereas second-layer processed softwood products target the regional and global marketplaces due to their strong export competitiveness. Furthermore, the production process of carved-wooden door and window panels, marquetry products, and wood-based souvenirs requires high-skilled labor, which is difficult to replace with capital-intensive technology. Considering their competitive advantage of irreplaceability features, it suggests focusing on product differentiation to capture a premium price.

It is worth noting that the veneer and plywood have contributed to reversing the trade balance scenario in the wood product segment, which suggests that their revealed comparative advantages are high.

Despite reduced export duty on logs and sawn timber, their export performance was low due to cost disadvantages, which hinder their export competitiveness.

Discussion

Based on the previous analysis, the author argues here that the current method of projecting forest revenue—by multiplying estimated annual allowable harvests (AAH) by market prices - is likely to result in overestimation. It makes sense because most earnings from community forests (CF) and a large portion from collaborative forests (CoF) are deposited into the users' accounts, and the government does not receive royalty revenues from them. Noting that over eighty percent of accessible forests are under community-based forest management (CBFM) or private ownership, the federal government only receives tax revenue (VAT), not royalty revenue (except partially from CoF).

The standing tree auctions offer upfront revenue for tree owners at a minimal monitoring burden, and a precise merchantable volume estimation forces timber buyers to harvest at a lower risk. In contrast, poor appraisal leads to uncertainty in rent capture where the governing capacity of regulatory agencies is not robust. Therefore, GoN must be proactive in anticipating unintended risks of implementation. Specifically, authorities should critically consider three aspects: (1) precision in merchantable timber appraisal of standing trees, (2) accuracy in measuring harvested timber, and (3) third-party verification of appraisal reports. The second and third are particularly crucial for risk mitigation.

Since post-harvest regulation requires measuring logs at felling sites and log yards, where the risk of tampering with documents and records prevails. The author considers that the prevailing log measurement standard has a systemic error, which has cascading effects through undervaluation and surplus values for timber buyers. To mitigate the identified risks, the author has suggested strategic actions elsewhere (Dangi, 2025b).

The effectiveness of policy measures adopted to enhance the utilization of softwoods hinges on the spillover effects of other national policies, such as housing policy, industrial policy, trade policy, construction policy, fiscal policy, and monetary policy. The protection-oriented trade policy enhanced labor-intensive, resource-based industries, and the consecutive liberal trade policies augmented the

expansion of softwood-based processing industries. Acknowledging the positive spillover effects of expanded wood-based small and medium-sized enterprises (SMEs), it suggests promoting and facilitating the veneer and plywood industries to enhance softwood production.

Analyzing trends in wood product exports paired with prevailing tariff and customs duties, it acknowledges positive spillover effects of reduced customs duty in boosting export of softwood products, and it confirms the competitiveness of plywood and veneer products for export (DoC, 2025). However, it acknowledges that the export volume of sawn timber is lower than anticipated by the author (Dangi, 2024; Dangi, 2025a), which suggests high production costs.

Acknowledging weak governing systems in regulatory agencies, it suggests that there is a need for systematic and evidence-based cost revisions to enforce regulatory measures. Anticipating potential challenges in reducing transaction costs, it suggests revisiting the royalty rate of competitive raw products.

The high-level economic reform committee, led by Mr. Rameshor Khanal, suggests that there is a need to enhance economic opportunities where all sectors can compete equally (Khatiwada, 2025). It concedes prevailing contraction in construction activities, which risks a further decline in hardwood demand. Acknowledging the growing demand for alternative building materials, such as PVC, aluminum, steel, and fiberboard, after the earthquake reconstruction phase, the author anticipates further price falls for hardwoods. The prevailing market scenario signals that stockpiling of hardwoods in log yards is likely to prevail in GMF and CBFM due to high production costs.

Based on the above-stated trade and economy-related indicators, it is less likely that demand for hardwoods would revive immediately, particularly in urban centers, unless they are made available at a lower price and the construction industry recovers to its full potential shortly.

Conclusions

The pre-harvest auction was advantageous over the post-harvest auction in softwoods for upfront financing, risk-free of stockpiling loss, and minimal inspection burdens. The expansion of manufacturing industries, such as veneer, plywood, and furniture-making, has positive spillover effects in enhancing the utilization of softwoods. However, market information is critical in promoting softwood, as stockpiling risks them losing commercial value. Therefore, prompt delivery without stockpiling loss would enhance their utilization, increase revenues, and reduce imports. At the outset, it suggests revisiting the current standards for promoting softwoods.

- Consider revising Forest Rule 2022 to provide scope for pre-harvest auctions by ensuring cross-verification mechanisms from credible authorities for standing timber appraisals.

- Consider adopting standing tree appraisals where manipulative risks and harvesting activity monitoring burdens are high in post-harvest auctions;

- Consider replacing the current log scaling methods with more precise methods.

The reduced export duty has mixed results in promoting the export of domestic timber. The export performance of softwood-based veneer and plywood responded positively to a fair export duty, while hardwoods did not perform well to this policy measure, as expected. At that outset, it suggests considering adopting a two-pronged strategy for domestic hardwood and softwood, targeting different marketplaces. The hardwood-based output products should be targeted for a niche market, whereas second-layer processed softwood products should aim at global marketplaces.

Since higher royalty rates risk increasing harvesting costs, they make them less competitive in the market. It suggests revisiting the royalty rate of competitive products, adopting a transparent mechanism, enhancing their credibility in the public eye, and ensuring ownership of outcomes.

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