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A QUALITATIVE ANALYSIS OF COCONUT OIL SUPPLY CHAIN COMPLIANCE WITH EU REGULATORY REQUIREMENTS: EVIDENCE FROM INDONESIA WITH COMPARATIVE REFERENCE TO VIETNAM

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ABSTRACT

This study examines how coconut oil producers and exporters in Indonesia and Vietnam adapt to European Union (EU) regulatory requirements and the implications of compliance for market access and export competitiveness. The study focuses on food safety and quality requirements, sustainability standards, traceability, and the EU Deforestation Regulation (EUDR). A qualitative-dominant research design was employed through systematic document analysis, secondary statistical data, and a primary interview with the founder of Heaven Coconut Global.

The findings indicate that Indonesia and Vietnam face substantial structural compliance gaps, particularly in farmer-level digital traceability, certification coverage, documentation, and coordinated national compliance infrastructure. Indonesia recorded higher coconut oil production than Vietnam, with 646,000 tonnes compared with 182,000 tonnes in 2023, but greater production capacity does not automatically translate into stronger compliance readiness. The case of Heaven Coconut Global further demonstrates that regulatory awareness remains ahead of operational implementation, requiring investment in digital infrastructure, supplier engagement, and institutional support.

Compliance with sustainability and traceability requirements is increasingly important for accessing higher-value and processed coconut oil segments in the EU. Therefore, regulatory compliance functions not only as a market-access requirement but also as a strategic determinant of long-term export competitiveness. Coordinated efforts among exporters, smallholders, governments, and relevant institutions are essential to overcome structural compliance barriers and strengthen Indonesia's and Vietnam's positioning in the European market.

Keywords: coconut oil, EU regulations, EUDR, traceability, export competitiveness

INTRODUCTION

Coconut oil is an important tropical agricultural commodity with significant applications in food consumption, household use, cosmetics, personal care, pharmaceuticals, and oleochemical industries. Its production is concentrated in tropical regions, particularly Southeast Asia, where Indonesia and Vietnam benefit from suitable climatic and soil conditions for coconut cultivation. According to the Food and Agriculture Organization (FAO), Southeast Asia remains one of the major contributors to global coconut and coconut oil production. Meanwhile, the European Union (EU) is highly dependent on imports because coconut palms cannot be cultivated in Europe, creating a strategic relationship between European demand and producing countries such as Indonesia and Vietnam (*The European Market Potential for Coconut Oil | CBI*, 2025).

The European coconut oil market continues to provide opportunities for producing countries due to sustained demand from food manufacturing, natural cosmetics, and plant-based dairy substitutes. Europe is the largest importing region for coconut oil worldwide, accounting for more than 40% of global imports, while EU coconut-oil imports reached approximately 745,000 tonnes in 2022 (CBI, 2025). Although imports declined to around 662,000 tonnes in 2023, long-term consumption remains relevant across several industrial sectors (CBI, 2025). Furthermore, the market has shifted toward processed and value-added products, with processed coconut oil increasing from approximately one-third of EU imports in 2019 to 46% in 2023. This development creates opportunities for producers capable of improving processing and accessing higher-value market segments (CBI, 2025).

Indonesia holds an important position within this supply chain. In 2023, Indonesian coconut oil production reached 646,000 tonnes, making Indonesia the world's second-largest coconut oil producer and an important supplier to international markets, including Europe (FAO,

2023; CBI, 2025). Vietnam produces a smaller volume than Indonesia but is an increasingly relevant supplier of coconut-based products, supported by traditional processors and emerging modern oil-extraction facilities (*Entering the European Market for Coconut Oil | CBI*, 2025). Vietnam is also considered a developing supplier with potential for greater integration into the EU market as demand for diversified and high-quality sources increases (IUCN, 2022).

Despite these opportunities, access to the European market is increasingly influenced by stringent requirements concerning food safety, contaminant limits, traceability, and sustainability. These requirements include quality-control systems such as HACCP and certifications such as Organic and Fairtrade, which are increasingly important to European buyers (CBI, 2025). At the production level, a significant proportion of coconut production in Indonesia and Vietnam remains based on smallholder systems. Such structures may face limitations in digital tools, formal traceability systems, and quality-management frameworks, creating difficulties in meeting international export standards (Prasetyo, 2025b; B&Company, 2025).

The regulatory challenge becomes particularly important in the context of the EU Deforestation Regulation (EUDR), which establishes due diligence requirements concerning deforestation-free production, legal production, and traceability to the plot of land from which relevant raw materials originate (Deloitte, 2024). However, an important distinction must be made because coconut oil is not currently included among the seven commodities listed in Annex I of the EUDR. The regulation currently covers cattle, cocoa, coffee, palm oil, soya, wood, and rubber, together with products derived from these commodities. Nevertheless, this study examines coconut oil within the EUDR context because the European Commission retains powers to expand Annex I, EU buyers may voluntarily apply EUDR-equivalent due diligence to non-listed commodities, and other EU regulatory instruments impose sustainability and traceability obligations that are structurally comparable to EUDR requirements.

Accordingly, EUDR-level compliance in this study is understood as an anticipatory strategic obligation and emerging market-access condition, rather than a current *de jure* requirement for coconut oil under the existing Annex I coverage. This distinction is important for accurately assessing the position of Indonesian and Vietnamese coconut oil supply chains while recognizing the possibility of evolving EU regulatory and buyer requirements.

The main problem therefore concerns the gap between EU regulatory expectations and the capacity of coconut oil producers and exporters in Indonesia and Vietnam to adapt their production, processing, traceability, and sustainability practices. Smallholder-based supply chains face particular challenges related to documentation, geolocation data, digital traceability, certification, and compliance costs (AgTech Navigator, 2025). Although Vietnam has increasingly adopted technology to improve agricultural standards, gaps remain in traceability implementation and certification coverage, particularly among small and medium-sized producers (AgTech Navigator, 2025; B&Company, 2025). These conditions create uncertainty regarding the ability of exporters in both countries to meet evolving EU market expectations.

Therefore, this study aims to examine how coconut oil producers and exporters in Indonesia and Vietnam adapt their production, processing, and traceability practices to European Union regulatory requirements, particularly the EUDR, and to assess the implications of compliance for their access to and positioning within the European coconut oil market. Specifically, the study identifies the principal EU requirements, assesses compliance levels and structural gaps in smallholder-based supply chains, analyzes the influence of compliance on access to higher-value and processed market segments, and develops recommendations for strengthening compliance and export competitiveness.

THEORETICAL FRAMEWORK AND FORMULATION OF HYPOTHESES

Conceptual Background of Coconut Oil as an Agricultural Commodity

Coconut oil is a tropical agricultural commodity that forms part of the broader vegetable oils market and serves multiple end-use industries, including food manufacturing, cosmetics, pharmaceuticals, and oleochemicals. Unlike temperate oil crops, coconut production is geographically concentrated in tropical regions, particularly Southeast Asia, where climatic conditions support year-round cultivation. As a result, the global coconut oil market is structurally characterised by a high degree of dependence on a limited number of producing countries (FAO, 2023).

From a theoretical perspective, coconut oil can be understood within the framework of global agricultural commodity chains, where production, processing, and consumption are spatially separated. Producing countries supply raw materials and semi-processed products, while importing regions, such as the European Union dominate downstream consumption and value-added applications. This structure creates asymmetries in market power and regulatory influence, with importing regions often setting standards that exporting countries must follow to maintain market access (Ponte, 2019).

Coconut Oil Value Chain

The coconut oil value chain encompasses a sequence of activities that transform raw coconuts into consumable oil products for domestic and international markets. The chain begins with primary production, followed by processing, certification, distribution, and final consumption. Understanding this value chain is essential for analysing how regulatory requirements and sustainability standards affect coconut oil exporters in Indonesia and Vietnam.

Primary production in both Indonesia and Vietnam is largely dominated by smallholder farmers managing relatively small plots of land. These farmers supply fresh coconuts to traders, cooperatives, or processing facilities, often through informal marketing channels. While smallholder-based systems play an important role in rural livelihoods, they also contribute to fragmented supply chains, which complicate quality control, traceability, and compliance with international standards (CBI, 2025a).

Processing constitutes a critical stage of the coconut oil value chain. A common processing pathway involves drying coconuts into copra, which is then pressed to extract crude coconut oil. More advanced processing stages produce refined, bleached, and deodorised (RBD) coconut oil or virgin coconut oil, which meet stricter quality requirements and are targeted at higher-value market segments. These downstream activities require capital investment, technical expertise, and formal quality management systems, making them less accessible to small-scale producers (CBI, 2025b).

Certification, packaging, and export represent the final stages of the value chain. Export-oriented firms must comply with food safety standards, sustainability requirements, and traceability obligations imposed by importing markets. In the EU context, these requirements increasingly determine access to premium market segments. As a result, value creation in the coconut oil chain tends to be concentrated in downstream processing and certified products, rather than in primary production (CBI, 2025a; Ponte, 2019).

Global and European Market for Coconut Oil

Globally, coconut oil demand has remained relatively stable, supported by its functional properties and wide range of applications. While coconut oil competes with other vegetable oils, such as palm oil and sunflower oil, it maintains a distinct market position due to its suitability for food, cosmetic, and oleochemical uses. Demand growth has been particularly notable in value-added segments, including natural cosmetics and plant-based food products (CBI, 2025).

The European Union represents one of the largest import markets for coconut oil worldwide. Since coconut palms cannot be cultivated in Europe, the EU is fully dependent on imports to meet domestic demand. According to trade data, Europe accounts for more than 40% of global coconut oil imports, reflecting strong industrial demand across multiple sectors (CBI, 2025). This dependence gives the EU significant influence over production practices and standards in exporting countries.

Indonesia holds a strong position in the EU coconut oil market due to its large production capacity and diversified processing sector. Vietnam, while contributing a smaller share, is emerging as a relevant supplier as investments in processing and quality upgrading increase. For both countries, access to the EU market is shaped not only by price competitiveness but also by compliance with regulatory and sustainability requirements, which increasingly influence sourcing decisions by European buyers (CBI, 2025).

European Union Regulatory Framework for Coconut Oil Imports

The EU regulatory framework governing coconut oil imports operates across three interconnected pillars, each of which functions, in global value chain terms, as a governance instrument that restructures competitive advantage within the supply chain (Ponte, 2019; Gereffi & Lee, 2016). Mandatory food safety requirements under the EU General Food Law establish a baseline compliance threshold; voluntary but market-critical sustainability certifications create

differentiated access to premium market segments; and EUDR-equivalent due diligence obligations, either directly applicable or anticipated, impose documentation standards that reach upstream to primary production. For smallholder-dominated supply chains such as those of Indonesia and Vietnam, each pillar imposes asymmetric compliance burdens, with structural barriers concentrated at the producer level rather than at the level of the exporting firm (Henson & Humphrey, 2010; Kersting & Wollni, 2012). The following sub-sections outline the theoretical significance of each pillar; detailed regulatory analysis is presented in Chapter IV.

EU Food Safety and Quality Requirements

Food safety represents the foundation of EU regulations governing coconut oil imports. Under the EU General Food Law, imported food products must be safe for consumption and traceable throughout the supply chain. Exporters are expected to implement food safety management systems, such as Hazard Analysis and Critical Control Points (HACCP), to identify and mitigate risks during processing and handling (CBI, 2025b).

In addition to general food safety rules, coconut oil imports must comply with quality standards related to contaminants and residues. These requirements are particularly relevant for copra-based coconut oil, where improper drying and storage can increase the risk of contamination. As a result, European buyers often require exporters to demonstrate consistent quality assurance procedures before establishing long-term trade relationships (CBI, 2025a).

Voluntary certifications, such as organic and Fairtrade certification, further shape market access in the EU. Although not legally mandatory, these certifications are increasingly demanded in higher-value market segments. Academic research suggests that compliance with private standards often requires institutional upgrading and coordination across supply chains, particularly in smallholder-dominated production systems (Henson & Humphrey, 2010).

Sustainability and Environmental Requirements

Sustainability considerations have become increasingly integrated into EU trade and agricultural policies. Environmental protection, climate change mitigation, and responsible sourcing are central objectives guiding the regulation of imported agricultural commodities. Tropical products such as coconut oil are subject to heightened scrutiny due to concerns related to land-use change and biodiversity loss (OECD, 2020).

From a theoretical standpoint, sustainability standards can be understood as regulatory instruments that reshape comparative advantage. While such standards aim to promote positive environmental outcomes, they also impose additional compliance costs on producers in developing countries. Studies have shown that smallholder-based supply chains often face greater challenges in adapting to sustainability-driven requirements due to limited access to capital, technology, and institutional support (Ponte, 2019).

In the coconut oil sector, sustainability requirements increasingly overlap with traceability obligations. European buyers seek assurance that coconut oil is produced in an environmentally responsible manner, which necessitates greater transparency across supply chains. This trend places pressure on exporters in Indonesia and Vietnam to improve data collection, monitoring, and coordination with upstream producers.

The EU Deforestation Regulation (EUDR)

The EU Deforestation Regulation (EUDR, Regulation EU 2023/1115) represents a significant development in the way the European Union governs agricultural imports with sustainability implications. The regulation was introduced to address concerns related to deforestation and forest degradation linked to global commodity supply chains. Under the EUDR, operators placing listed commodities on the EU market must demonstrate that their products are deforestation-free, legally produced, and traceable to their place of origin. The commodities explicitly covered under Annex I of the regulation are: cattle, cocoa, coffee, palm oil, soya, wood, and rubber. Coconut oil is not currently listed as a covered commodity under the EUDR. Nevertheless, the regulation is directly relevant to the coconut oil sector in three respects: the Commission holds delegated powers to extend Annex I coverage to additional commodities through implementing acts (Article 34); major European buyers are proactively applying EUDR-equivalent standards to non-listed commodities as part of voluntary sustainability sourcing commitments (CBI, 2025); shaping EU agri-food trade norms across commodity categories (Deloitte, 2024). This study

therefore analyses EUDR compliance as an anticipatory strategic obligation for coconut oil exporters, grounded in a credible risk of formal inclusion and in the de facto market-access influence the regulation already exerts through buyer requirements and sustainability governance norms (OECD, 2020).

For coconut oil exporters in Indonesia and Vietnam, meeting these requirements presents practical challenges. Coconut production in both countries is largely based on smallholder farming systems, where formal land documentation and digital record-keeping are often limited. As a result, exporters frequently need to invest additional resources in farmer mapping, data collection, and supply chain coordination in order to comply with EUDR requirements (AgTech Navigator, 2025; B&Company, 2025).

At the same time, compliance with the EUDR may also offer opportunities for exporters. Firms that are able to demonstrate traceability and environmental compliance may strengthen their credibility with European buyers and improve their access to the EU market. In this respect, the EUDR not only imposes regulatory obligations but also influences competitive dynamics within the coconut oil supply chain.

Traceability and Competitiveness in Coconut Oil Supply Chains

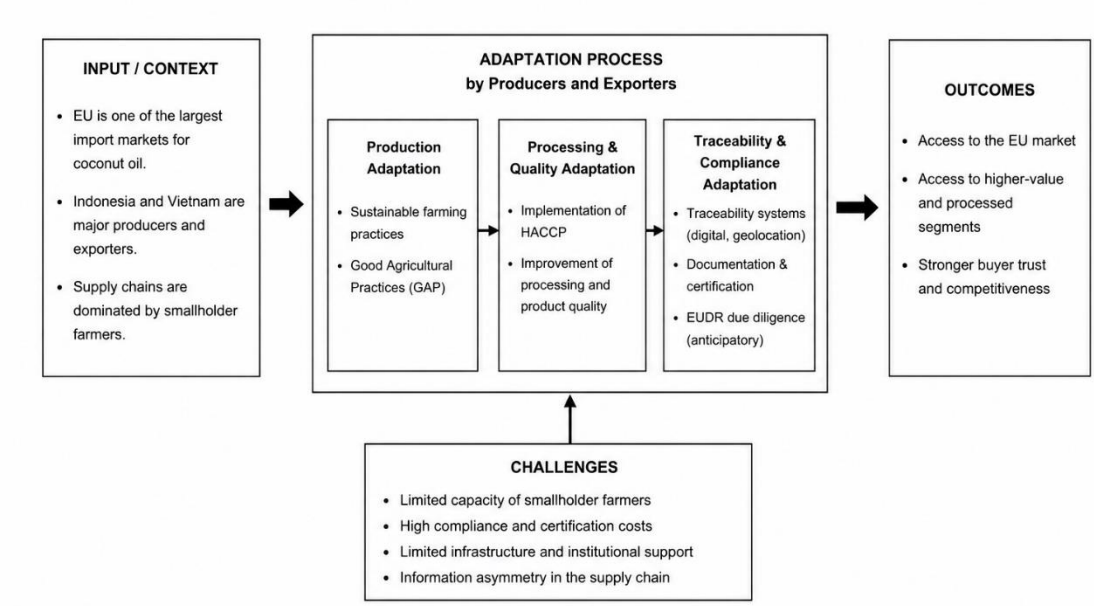
Traceability plays a central role in enabling compliance with EU regulatory and sustainability requirements. In agricultural supply chains, traceability refers to the ability to track products and their attributes throughout the production and distribution process. Effective traceability systems enhance transparency, support risk management, and facilitate compliance with regulatory obligations (Aung & Chang, 2014).

In smallholder-based coconut oil supply chains, implementing traceability remains challenging due to fragmented production, limited digital infrastructure, and high coordination costs. However, recent technological developments, including digital traceability platforms and geolocation tools, offer potential pathways for improving compliance and strengthening market access (AgTech Navigator, 2025).

Theoretical literature on global value chains suggests that compliance with regulatory standards can influence a firm's ability to upgrade and capture value. Exporters that align production practices with regulatory expectations are more likely to access higher-value market segments, while those unable to adapt risk exclusion from key markets such as the EU (Ponte, 2019).

Conceptual Model

Figure 1 Conceptual Frameowrk



Based on the reviewed literature, this study conceptualises the relationship between EU regulatory requirements, traceability, and export competitiveness in the coconut oil sector. EU regulations, including food safety standards, sustainability requirements, and the EUDR, shape the compliance obligations faced by exporters. These obligations necessitate adaptations in production, processing, and traceability systems, particularly in smallholder-based supply chains.

The conceptual framework of this research links regulatory compliance to market access and competitiveness in the EU coconut oil market. Exporters that successfully adapt to regulatory requirements are better positioned to access high-value market segments, while those that fail to comply may face declining competitiveness and reduced market opportunities.

RESEARCH METHODOLOGY

Research Design

This study adopts a qualitative-dominant research design with secondary statistical contextualisation. The design combines systematic document analysis, descriptive quantitative illustration, and primary interview evidence. This approach is considered appropriate because the research focuses primarily on regulatory interpretation, institutional processes, and firm-level compliance strategies, while secondary numerical data are used to provide an empirical context for the qualitative findings (Yin, 2018). The qualitative component represents the main analytical strand, whereas the quantitative component has a supporting and contextualising role.

The qualitative analysis examines EU regulatory requirements, sustainability standards, and traceability obligations affecting coconut oil exports through regulatory documents, policy frameworks, industry reports, and primary interview evidence. Meanwhile, secondary production and trade statistics obtained from FAOSTAT and CBI are analysed descriptively to illustrate production scale and market trends. The integration of different forms of evidence is intended to strengthen the analysis through data triangulation. Therefore, the study does not treat the qualitative and quantitative components as equal methodological strands, but rather places quantitative information within a primarily qualitative research framework (Creswell & Plano Clark, 2018; Bowen, 2009; Yin, 2018).

Research Approach

This research follows a qualitative-dominant approach with integrated secondary statistical contextualisation. The main analytical activity involves examining EU regulatory frameworks, policy documents, and industry reports concerning coconut oil exports and market access. Secondary statistical information, particularly coconut production data from FAOSTAT and EU import trends from CBI, is used to describe the economic scale and market trajectory within which compliance decisions are made. These data provide empirical grounding for the qualitative interpretation without constituting an independent quantitative analytical strand (Yin, 2018).

The use of a qualitative-dominant approach is also supported by the exploratory nature of the research. The regulatory environment surrounding sustainability and traceability requirements is relatively recent and continuously evolving, making document analysis and stakeholder interviews appropriate for understanding how producers and exporters interpret and respond to these requirements. The approach allows relevant analytical themes to emerge from the collected evidence rather than relying on statistical hypothesis testing (Elo & Kyngäs, 2008).

Data Collection

Data collection was conducted using authoritative and publicly available sources and was supplemented by primary interview evidence. Qualitative data were collected through systematic document analysis of regulatory texts, policy documents, and industry reports relevant to the coconut oil sector and the European Union market. Particular attention was given to EU regulations and official publications issued by the European Commission concerning food safety, sustainability, and the EU Deforestation Regulation (EUDR).

Additional qualitative information was obtained from market and compliance reports published by the Centre for the Promotion of Imports from Developing Countries (CBI). Reports from AgTech Navigator, B&Company, and Deloitte were also examined to identify traceability challenges and compliance strategies within smallholder-based supply chains. Documents were selected based on their relevance to the research objectives, the credibility of the issuing institution,

and their publication date, allowing the analysis to reflect current regulatory conditions and market expectations.

Quantitative data were collected to support and contextualise the qualitative findings. The primary statistical source was FAOSTAT, particularly information on coconut production volumes in Indonesia and Vietnam. Trade-related indicators, including export volumes, import values, and the role of the European Union as a destination market, were obtained from datasets referenced in CBI market reports. These statistics were used to illustrate general market trends rather than to test specific hypotheses.

The study also incorporated a primary interview with Abel, Founder of Heaven Coconut Global, to obtain firm-level information concerning operational practices and compliance within the coconut oil supply chain. The interview was conducted with the participant's informed consent, and the participant permitted the use of the responses for academic research purposes.

Data Sources

The research draws upon four principal categories of data sources. First, international organisations, particularly the Food and Agriculture Organization (FAO), provide agricultural production statistics. Second, European Union institutions, especially the European Commission, provide official regulatory texts and policy documents. Third, market and industry organisations, including CBI, AgTech Navigator, B&Company, and Deloitte, provide information concerning market access, sustainability, and compliance. Finally, academic literature consisting of peer-reviewed articles and books provides theoretical perspectives on global value chains, sustainability standards, and agri-food trade. The use of multiple sources supports data triangulation and enhances the reliability of the findings (Yin, 2018).

Data Analysis

The qualitative data were analysed using qualitative content analysis. The analysis involved systematically examining textual information to identify recurring themes, concepts, and patterns relevant to the research objectives. Three principal analytical areas were emphasised: EU regulatory requirements, traceability and compliance mechanisms, and implications for export competitiveness. An inductive approach was applied so that themes could emerge from the collected data rather than being imposed through predetermined categories. This approach is suitable for exploratory research concerning the regulatory impacts on the coconut oil value chain (Elo & Kyngäs, 2008).

Quantitative data were analysed using descriptive statistical techniques. Production and trade data were summarised to identify trends in coconut oil output and EU import patterns. The resulting trends were then used to contextualise the qualitative findings and demonstrate the economic relevance of regulatory developments. The quantitative analysis was not intended to test statistical hypotheses, but to provide empirical background for the interpretation of qualitative evidence.

The integration of qualitative and quantitative findings was conducted during the interpretation stage. Regulatory insights obtained from qualitative analysis were compared with observed market trends to assess whether regulatory developments corresponded with changes in trade patterns or market positioning. This integration provides greater explanatory depth while maintaining the qualitative-dominant character of the research design (Bowen, 2009; Yin, 2018).

Scope and Limitations

The study focuses on the coconut oil sector in Indonesia and Vietnam, with the European Union as the destination market because of its regulatory influence and importance as a major coconut oil importer. Indonesia is examined at both sectoral and firm levels, supported by primary interview evidence from Heaven Coconut Global. Vietnam, in contrast, is examined exclusively through secondary sources. This creates an asymmetric comparison because direct firm-level evidence is available only for Indonesia.

The study also has limitations related to the availability and nature of the evidence. The single Indonesian firm case limits the generalisability of the firm-level findings, particularly when applied to the broader Vietnamese coconut sector. In addition, the relatively recent nature of the EUDR means that its full effects on coconut oil trade may not yet be observable. Despite these limitations, the qualitative-dominant design supported by secondary statistical contextualisation

provides a structured basis for analysing regulatory requirements, compliance challenges, and their implications for export competitiveness.

RESULT AND DISCUSSION

Overview of Data Sources

This chapter presents the analysis of data collected to address the research questions. The analysis integrates three interconnected categories of evidence: qualitative regulatory and industry documentation, secondary descriptive statistics on production and trade, and primary interview data. The combination of these sources provides a multi-source understanding of compliance challenges within coconut oil supply chains in Indonesia and Vietnam. However, the firm-level evidence is limited to one Indonesian exporter whose current primary product is desiccated coconut, which represents an important boundary of the case analysis (Yin, 2018).

The qualitative evidence consists of regulatory documents issued by the European Commission, market access reports from the Centre for the Promotion of Imports from Developing Countries (CBI, 2025), and compliance analyses from Deloitte (2024), AgTech Navigator (2025), and B&Company (2025). These sources were examined to identify the nature, scope, and implications of EU regulatory requirements for coconut oil exporters in developing countries. Document analysis was conducted systematically, following Bowen (2009), who established that policy and industry documents can provide relevant qualitative evidence when direct primary access is limited.

The quantitative component uses secondary data from the Food and Agriculture Organization of the United Nations (FAO, 2023) and CBI (2025). The data include coconut oil production in Indonesia and Vietnam, EU coconut oil import volumes, and the development of processed coconut oil imports. Indonesia recorded production of 646,000 tonnes in 2023, while Vietnam recorded 182,000 tonnes. EU coconut oil imports reached approximately 745,000 tonnes in 2022 before declining to around 662,000 tonnes in 2023. Meanwhile, the share of processed coconut oil increased from approximately one-third of EU imports in 2019 to 46 percent in 2023 (CBI, 2025). These figures are analysed descriptively to provide context for the qualitative findings (Yin, 2018). Primary qualitative evidence was obtained through a structured interview with Abel, Founder of Heaven Coconut Global, conducted on 21 April 2026. The interview addressed supply chain configuration, regulatory awareness and EUDR compliance, sustainability practices, collaboration and support needs, and perceptions of competitiveness (Abel, personal communication, April 21, 2026). The interview provides a firm-level perspective that complements the broader regulatory and industry evidence.

Analysis of EU Regulatory Requirements

The European Union applies comprehensive regulatory requirements within the agri-food trade system (Henson & Humphrey, 2010). For coconut oil exporters from Indonesia and Vietnam, the main areas of concern consist of food safety and quality requirements, sustainability and environmental standards, and the EU Deforestation Regulation. These requirements are interconnected through documentation, traceability, certification, and due diligence obligations (European Commission, 2023; CBI, 2025; Deloitte, 2024).

Food Safety and Quality Requirements

Food safety represents a fundamental requirement for coconut oil entering the European market. The EU General Food Law establishes the basic principles governing food safety and import controls (European Commission, 2023). Coconut oil must comply with maximum residue and contaminant requirements, including aflatoxins and polycyclic aromatic hydrocarbons, which are particularly relevant to copra-based coconut oil when inappropriate drying practices create contamination risks (CBI, 2025). Exporters are also expected to implement Hazard Analysis and Critical Control Points (HACCP) systems and maintain sufficient documentation to support traceability and product recall when necessary (CBI, 2025). Beyond mandatory requirements, voluntary certifications such as Organic, Fairtrade, and Rainforest Alliance increasingly influence buyer preferences in higher-value market segments (Henson & Humphrey, 2010).

The development of processed coconut oil imports further demonstrates the importance of quality and value-added requirements. CBI (2025) reported that the share of processed coconut oil

in EU imports increased from approximately one-third in 2019 to nearly 46 percent in 2023. This indicates that compliance with quality standards is increasingly connected not only to market entry but also to participation in more valuable market segments (CBI, 2025; Reardon et al., 2009).

Sustainability and Environmental Requirements

Sustainability has become increasingly important within EU trade and agricultural policies through initiatives such as the European Green Deal and the Farm to Fork Strategy (European Commission, 2023). For coconut oil exporters, sustainability requirements are associated with biodiversity protection, responsible sourcing, environmental management, and supply chain transparency (OECD, 2020). These requirements can influence competitive positions within global value chains. Ponte (2019) explained that sustainability-driven standards can restructure comparative advantage because producers must adapt their practices to meet environmental and social expectations. However, smallholder-based supply chains face greater difficulties because of limited financial resources, institutional infrastructure, and technical capacity (Kersting & Wollni, 2012).

The situation is particularly relevant to Indonesia and Vietnam because coconut production relies substantially on smallholder farmers (FAO, 2023; B&Company, 2025). Compliance costs may therefore become a barrier for smaller producers. Feyaerts et al. (2020) demonstrated that limited resources can constrain smallholder participation in certification systems, resulting in the exclusion of farmers who are unable to absorb the associated costs. Consequently, sustainability regulation has a dual character: it can promote environmental improvements while simultaneously creating exclusionary effects for resource-constrained producers (OECD, 2020; Ponte, 2019).

The EU Deforestation Regulation (EUDR)

The EU Deforestation Regulation represents an important development within the broader regulatory environment affecting agricultural exporters. Coconut oil is not currently included among the seven commodities listed in Annex I of Regulation EU 2023/1115. Nevertheless, EUDR remains strategically relevant to coconut oil exporters because of the possibility of future regulatory expansion and the increasing tendency of EU buyers to apply equivalent due diligence expectations to other agricultural commodities (European Commission, 2023; Deloitte, 2024; CBI, 2025). The regulation requires operators dealing with covered commodities to demonstrate that products are deforestation-free, legally produced, and traceable to the specific plot of land where the raw materials originate. For smallholder-based supply chains, this creates substantial challenges because production is geographically fragmented and land documentation and digital records may be incomplete (Lambin et al., 2018; FAO, 2023; AgTech Navigator, 2025).

Compliance also requires investment in farmer mapping, geolocation systems, data management, and legal verification (Deloitte, 2024). AgTech Navigator (2025) reported that digital traceability adoption in Indonesia and Vietnam remains at an early stage. Garrett et al. (2019) further indicated that effective traceability systems require sustained investment and coordination among multiple stakeholders. Nevertheless, traceability can also become a source of competitive advantage. Verifiable supply chain information may strengthen buyer confidence, facilitate access to premium markets, and reduce uncertainty in international transactions (Ponte, 2019; Henson & Humphrey, 2010). Aung and Chang (2014) highlighted that traceability provides reliable information concerning product origin and quality, thereby strengthening trust within supply chain relationships.

Current Compliance Levels in Indonesia and Vietnam

The production baseline provides an important context for comparing the two countries. The following table presents coconut oil production data for Indonesia and Vietnam.

Table 1 Coconut Oil Production: Indonesia and Viet Nam, 2021-2023 (Source: FAO, 2023)

Country	Year	Unit	Production (t)	Flag	Flag Description
Indonesia	2021	t	619,000	A	Official figure
Indonesia	2022	t	666,000	A	Official figure
Indonesia	**2023**	**t**	**646,000**	**A**	**Official figure**

Vietnam	2021	t	181,000	X	Figure from external organisation
Vietnam	2022	t	182,000	X	Figure from external organisation
Vietnam	**2023**	**t**	**182,000**	**X**	**Figure from external organisation**

Note. Flag A = Official figure. Flag X = Figure from external organisation (unofficial). Highlighted rows represent the primary reference year (2023). Source: FAO (2023).

As shown in Table 4.1, Indonesia's production declined slightly from 666,000 tonnes in 2022 to 646,000 tonnes in 2023, while Vietnam maintained stable output at 182,000 tonnes across both years (FAO, 2023). It is methodologically important to note that Indonesia's figures carry Flag A, denoting official government-reported data, whereas Vietnam's figures carry Flag X, indicating data sourced from an external organisation and classified as unofficial by FAOSTAT (FAO, 2023). Indonesia's production data can therefore be cited with greater confidence as a primary official statistic, while Vietnam's figures, though consistent across the observed period, should be treated as indicative estimates subject to revision (FAO, 2023). With these production baselines established, the following sub-sections analyse the compliance contexts of each country in turn.

Indonesia

Indonesia has a substantially larger coconut oil production base than Vietnam, but its extensive smallholder production system creates significant compliance challenges. The fragmented structure of production makes farmer-level traceability, documentation, and certification more difficult to implement, particularly where producers have limited access to digital systems and institutional support (AgTech Navigator, 2025; Deloitte, 2024).

Smallholder farmers also face challenges related to awareness, training, certification costs, and access to extension services (Prasetyo, 2025). These conditions are consistent with Kersting and Wollni (2012), who found that participation in voluntary standards is associated with factors such as farm size, access to credit, and institutional support.

Another challenge is the absence of a national sustainability standard specifically for coconut comparable to the Indonesian Sustainable Palm Oil (ISPO) scheme. As a result, coconut exporters must navigate fragmented private certification systems and bear greater responsibility for their own compliance investment (Prasetyo, 2025; OECD, 2020). This condition reflects the governance challenges identified by Gereffi and Lee (2016), where private actors can increasingly perform standards-setting functions within global value chains.

Vietnam

Vietnam recorded 182,000 tonnes of coconut oil production in 2023, considerably below Indonesia's output (FAO, 2023). Its coconut production is concentrated particularly in the Mekong Delta, where smallholder farmers and informal trading networks remain important components of the supply chain (B&Company, 2025).

The Vietnamese sector faces challenges involving digital traceability, geolocation, land documentation, and certification coverage. Although digital agricultural technologies are increasingly being adopted, their implementation has not yet reached the scale necessary to provide comprehensive traceability across the coconut supply chain (AgTech Navigator, 2025).

Certification adoption also remains relatively limited compared with agricultural sectors where sustainability systems are more established (IUCN, 2022). Consequently, Vietnam and Indonesia share several structural barriers, including fragmented smallholder production, limited traceability infrastructure, and insufficient certification coverage. However, their production scale differs substantially, with Indonesia producing approximately 3.5 times more coconut oil than Vietnam in 2023 (FAO, 2023).

Case Study: Heaven Coconut Global

Heaven Coconut Global is an Indonesian coconut product trading and export company founded by Abel. The company currently focuses primarily on desiccated coconut and does not currently export coconut oil. Therefore, the interview does not represent direct evidence from an active coconut oil exporter. Instead, the company provides prospective firm-level evidence regarding the compliance readiness and challenges that may be encountered when entering the coconut oil export market (Abel, personal communication, April 21, 2026; Yin, 2018).

The company operates through relationships with local farmers and partner processing facilities. Its position as a trading and export intermediary means that compliance depends not only on the company's own practices but also on the capacity of suppliers and processing partners. This creates compliance interdependency throughout the supply chain (Gereffi & Lee, 2016; Deloitte, 2024).

EUDR Awareness and Traceability

The interview indicates that Heaven Coconut Global has a basic understanding of EUDR requirements, particularly regarding raw material traceability, deforestation-free sourcing, and supply chain documentation. However, full implementation remains at an early stage.

> *"Kami memiliki pemahaman dasar mengenai EU Deforestation Regulation (EUDR), khususnya terkait pentingnya traceability bahan baku, kepastian sumber bebas deforestasi, dan dokumentasi rantai pasok. Namun implementasi secara penuh masih dalam tahap pembelajaran dan penyesuaian bersama mitra supplier." (Abel, personal communication, April 21, 2026).*

The statement demonstrates a distinction between regulatory awareness and operational readiness. The company understands the general direction of EUDR requirements but has not yet implemented the full systems necessary to satisfy plot-level due diligence. This condition is consistent with Deloitte (2024), which identified a transitional compliance position among many small and medium enterprises in tropical commodity supply chains. Regarding traceability, the company currently maintains supplier identification, production locations, product batch information, Certificates of Analysis (COA), and product specifications. However, the system does not yet include detailed farmer-level tracking or a digital traceability platform.

> *"Saat ini sistem traceability kami masih bersifat dasar, meliputi identifikasi supplier dan lokasi produksi, batch produk dari pabrik, dan dokumen pendukung seperti COA dan spesifikasi produk. Belum menggunakan sistem digital atau pelacakan hingga tingkat petani secara detail." (Abel, personal communication, April 21, 2026).*

The interview finding indicates that the existing system may support basic commercial transactions but remains below the level required for plot-level traceability. Aung and Chang (2014) emphasised that effective traceability requires structured information throughout the supply chain, including the primary production stage. Therefore, digital farmer-level data collection and stronger integration with processing partners would be necessary for future EU market entry (AgTech Navigator, 2025; Deloitte, 2024).

Sustainability Practices and Competitiveness

Heaven Coconut Global has implemented sustainability practices through its sourcing relationships, including the use of locally sourced raw materials and efforts to maximise coconut utilisation and reduce waste (Abel, personal communication, April 21, 2026). The company also identified potential circular-economy applications, including charcoal and briquette production from coconut shells and animal feed from coconut meal by-products. The interview further indicates that EU requirements are perceived as both a challenge and a potential source of competitive advantage. In the short term, compliance requires additional investment in systems, documentation, and supplier coordination. In the longer term, successful compliance may strengthen the company's position in the EU market (Abel, personal communication, April 21, 2026; Ponte, 2019). The EU market is considered strategically attractive because of its stable demand and high quality standards. This perception corresponds with Ponte (2019), who argued that compliance with premium-market requirements can function as a strategic asset rather than merely a cost. Reardon et al. (2009) similarly associated standards compliance with market upgrading and stronger buyer relationships.

Collaboration and Support Needs

The interview shows that Heaven Coconut Global currently collaborates primarily with manufacturing partners, raw material suppliers, and logistics providers. The company is also open

to future cooperation with NGOs, traceability technology providers, and export-support institutions (Abel, personal communication, April 21, 2026).

The most important support needs identified are regulatory education, integrated traceability systems, government-sponsored training, incentive programmes, and greater standardisation of export compliance procedures. These findings reinforce Markelova et al. (2009), who found that collective action through cooperatives and public-private partnerships can reduce the individual cost of compliance. For smaller exporters, institutional support can therefore become an important mechanism for facilitating regulatory upgrading (OECD, 2020; Gereffi & Lee, 2016).

Integration of Qualitative and Quantitative Findings

The quantitative and qualitative findings complement one another. Production statistics demonstrate the different scale of the coconut oil sectors in Indonesia and Vietnam, while regulatory documents and industry reports explain the compliance challenges associated with smallholder-based production. The interview provides an additional firm-level perspective, demonstrating how regulatory awareness may exist before complete operational implementation (Creswell & Plano Clark, 2018; Yin, 2018).

The findings collectively indicate that the main compliance challenge is not simply the existence of EU regulations, but the capacity of producers and exporters to translate regulatory requirements into operational systems. Smallholder fragmentation, limited digital traceability, certification costs, and insufficient institutional support create barriers to compliance in both countries. At the same time, stronger compliance may provide access to higher-value market segments and strengthen long-term competitiveness (OECD, 2020; Gereffi & Lee, 2016).

Key Findings

The analysis identifies several principal findings. First, EU regulatory requirements create increasingly complex demands involving food safety, sustainability, documentation, and traceability (European Commission, 2023; Deloitte, 2024). Second, fragmented smallholder production constitutes a major structural barrier to comprehensive compliance in Indonesia and Vietnam (Kersting & Wollni, 2012; Feyaerts et al., 2020).

Third, although both countries face similar compliance challenges, Indonesia has a considerably larger production base, providing greater potential capacity for collective compliance investment (FAO, 2023). Fourth, the Heaven Coconut Global case demonstrates a gap between conceptual EUDR awareness and operational traceability readiness. Fifth, digital traceability investment is essential for future market access but may be difficult for smaller firms to finance independently (AgTech Navigator, 2025; Bosona & Gebresenbet, 2013).

Finally, regulatory compliance should not be viewed solely as a cost. Compliance can also provide a basis for market upgrading, stronger buyer relationships, and improved access to premium EU market segments (Ponte, 2019). However, achieving these benefits requires coordinated support from firms, producers, government institutions, and other stakeholders (OECD, 2020; Abel, personal communication, April 21, 2026).

CLOSING

Conclusion

This study concludes that European Union regulatory requirements have significant implications for the market access and competitiveness of coconut oil producers and exporters in Indonesia and Vietnam. The requirements related to food safety and quality, sustainability, certification, traceability, and due diligence create an increasingly complex compliance environment for exporters. Although coconut oil is not currently included in Annex I of the EUDR, the regulation remains strategically relevant because EU buyers increasingly emphasise transparency, sustainability, and traceability within agricultural supply chains. The findings demonstrate that both Indonesia and Vietnam possess substantial production capacity but continue to face structural barriers, particularly fragmented smallholder production, limited farmer-level digital traceability, inadequate certification coverage, and insufficient institutional support. The case of Heaven Coconut Global further illustrates the gap between regulatory awareness and operational implementation, as the company has a basic understanding of EUDR requirements but has not yet implemented detailed farmer-level digital tracking. Therefore, compliance represents

not only an operational challenge but also a strategic opportunity, as exporters that successfully establish verifiable traceability and sustainability practices may strengthen buyer relationships and gain access to higher-value EU market segments. Closing the existing compliance gap requires coordinated efforts involving exporters, farmers, governments, and relevant institutions through investment in digital traceability, regulatory education, certification, and supportive compliance infrastructure.

Limitation

Despite the rigorous methodology, this study acknowledges the following limitations:

1. Limited firm-level evidence: The primary interview involved only Heaven Coconut Global, whose current primary product is desiccated coconut rather than coconut oil. Therefore, the findings represent prospective compliance readiness rather than the direct experience of an active coconut oil exporter.
2. Unequal depth of country-level evidence: Indonesia is supported by both secondary data and primary interview evidence, whereas the analysis of Vietnam relies primarily on secondary sources. This limits the depth of direct comparison between the two countries.
3. Recent development of EUDR: The EUDR is still developing, while coconut oil is not currently included in Annex I. Consequently, some regulatory implications identified in this study remain dependent on future policy developments.
4. Limited measurement of economic effects: This study does not quantitatively measure the financial costs of compliance or statistically examine the relationship between regulatory compliance and export competitiveness.

Suggestion for Future Research

Future studies can expand the findings of this research through several directions:

1. Expand the number of research participants: Future studies should involve more coconut oil producers, exporters, processors, farmers, and other supply-chain actors in Indonesia and Vietnam to provide broader firm-level evidence.
2. Conduct comparative firm-level research: Future research could compare companies with different levels of digital traceability, sustainability certification, and regulatory preparedness to identify factors that support successful compliance.
3. Examine compliance costs: Further research should investigate the financial costs of implementing digital traceability, certification, farmer registration, and other sustainability requirements, particularly for smallholder-based supply chains.
4. Conduct longitudinal research: Future studies should examine how changes in EU regulatory requirements affect market access, compliance investment, export performance, and the competitive positioning of Indonesian and Vietnamese coconut oil exporters over time.
5. Evaluate institutional support: Further research could assess the effectiveness of government programmes, public-private partnerships, and digital traceability initiatives in reducing compliance barriers faced by small and medium-sized exporters.

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