Postharvest assessment of the avocado supply chain in Kenya

A study from the Kuehne Climate Center, with guidance and inputs from the Wageningen University & Research, informing the Life-Links Kenya-Avocado application

Nairobi, December 2025

Avocado farm in Murang'a county, Kenya

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Kenya's avocado industry has expanded rapidly over the past decade. Between 2013 and 2023, production grew at a compound annual growth rate (CAGR) of around 12%, reaching more than 540,000 tons, while exports grew even faster, at a CAGR of approximately 17%. Kenya is now the largest avocado producer in Africa and ranks among the top six producers globally, after Mexico, Colombia, the Dominican Republic, Peru, and Indonesia. Although exports still account for less than one quarter of total output, avocados have become Kenya's most exported fruit by value. Europe is the main destination, absorbing about 60% of exports, yet Kenyan avocados are often perceived by European importers as a secondary or "filler" origin rather than a primary source, due to concerns over quality consistency, supply reliability, and relatively limited volumes compared with leading exporters such as Peru.

Postharvest losses in Kenya's avocado export supply chain are estimated at 13–33%, and can exceed 40% in some cases. In 2023, Kenya exported approximately 123,000 tons of avocados valued at USD 141 million; applying these loss rates implies export losses of roughly 18,000–61,000 tons, equivalent to USD 21–69 million. Evidence from multiple studies shows that losses are concentrated early in the chain, particularly during harvesting and the first-mile segment between farm and packhouse. Indicative loss ranges are 7–20% during harvesting, 3–22% between farm and collection point, 5–13% between collection point and packhouse, and 2–12% during post-packhouse distribution. Most losses therefore occur within Kenya, at the first mile, before fruit enters controlled handling environments. They are driven by poor harvesting and handling practices, long collection times, limited aggregation and storage capacity, and inadequate transport conditions.

These challenges are most pronounced among smallholder farmers, who account for about 70% of total production, and are particularly evident in the emerging avocado regions of western Kenya, compared with the more established central counties. Western counties face poorer road access and limited postharvest infrastructure, resulting in a longer and weaker first-mile. Interview estimates indicate that 10–75% of farmers, depending on the county, are considered remote and unable to work directly with exporters, relying instead on aggregators and informal collection points with weaker handling and quality control. Addressing first-mile challenges in these areas is therefore critical to sustaining production growth, improving export reliability, and strengthening Kenya's position in international markets.

The assessment identifies two interventions to strengthen first-mile performance. Aggregation centers, managed by cooperatives or farmer groups, can improve collection, handling, and short-term storage conditions by providing shaded, ventilated spaces, while also serving as crate banks and training hubs. A crate-management company, operating as a shared logistics service, can ensure access to affordable, reusable plastic crates through rental or leasing models, replacing the widespread use of sacks that damage fruit and reduce quality. Together, these interventions can improve farmgate prices for farmers, increase volumes and quality consistency for exporters, and enhance Kenya's reliability as a supply origin for European importers

Life-Links context and next steps

This assessment forms part of the Life-Links Kenya–Avocado application, developed under Life-Links, an initiative supported by the Kuehne Climate Center that aims to strengthen the resilience of global supply chains in the face of climate change. The Kenya–Avocado application focuses on improving the resilience of the avocado supply chain between Kenya and Europe through interventions at the first mile, where climate-related stresses are expected to amplify existing vulnerabilities. More frequent

extreme rainfall, higher temperatures, and increased weather variability are likely to further disrupt harvesting, storage, and transport, leading to higher postharvest losses.

Following this assessment, next steps include the selection of suitable partners (starting with cooperatives and exporters), the conduct of feasibility and business-case analyses for each intervention tailored to partner contexts, and the mobilization of financing to support investment and scaling.

While the proposed interventions aim to strengthen the first mile of the Kenya–Europe avocado supply chain and enhance resilience to climate risks, they also carry important development implications. For smallholder farmers in particular, export markets remain a key pathway to higher incomes, as farmgate prices for export-grade avocados are significantly higher than those available in local markets. Strengthening the first mile is therefore not only a supply-chain priority, but also a broader development objective with direct implications for livelihoods and inclusive growth.

Newly planted avocado farm in Nyamira County, an illustration of the expansion of avocado production into western Kenya

List of abbreviations

AFA	Agriculture and Food Authority (of Kenya)
AFC	Agricultural Finance Corporation
AfCFTA	African Continental Free Trade Area
CA	Controlled Atmosphere
CAGR	Compound Annual Growth Rate
EPA	(EU–Kenya) Economic Partnership Agreement
EU	European Union
GCP	Gross County Product
HCD	Horticultural Crops Directorate (of Kenya)
KCC	Kuehne Climate Center
KEPHIS	Kenya Plant Health Inspectorate Service
KES	Kenyan Shillings
NGO	Non-Governmental Organization
PHAM	Postharvest Assessment Methodology
PPP	Public-Private Partnerships
SACCO	Savings and Credit Cooperative Organization
SGR	Standard Gauge Railway
SOP	Standard Operating Procedure
SPS	Sanitary and Phytosanitary Standards
USD	United States Dollar
WUR	Wageningen University & Research

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Objective confirmation

Kenya's avocado industry has grown significantly in recent years. Between 2017 and 2022, production nearly doubled, and although exports still account for a relatively small share of total output, Kenya has emerged as one of the world's leading avocado exporters. Approximately 70% of the country's avocados are produced by smallholder farmers. For many of them, the crop has become a pathway to improved livelihoods—earning it the reputation of Kenya's "green gold". The remaining production comes from mid- to large-scale farms, often directly managed by export companies.

Despite the strong growth, Kenya's avocado industry continues to face significant challenges. In Europe—its largest export market—the industry's reputation has been undermined by past concerns over product quality and supply reliability, perceptions that remain widespread today. Compounding this, the Red Sea crisis of the past two years has forced exporters to reroute shipments around the Cape of Good Hope, adding in lead time, risks, and costs, hence reducing overall competitiveness.

Many of the challenges faced by the industry originate at the start of the supply chain—the "first mile", the segment between the farm and the packhouse. This part of the chain covers key postharvest activities such as storage, collection, and transport. The challenges are most pronounced among smallholder farmers, whose farms are often widely dispersed and difficult to access. Although progress has been made in recent years, the situation remains challenging, and climate change is expected to further deepen existing vulnerabilities.

Step 1a: Purpose

This assessment explores challenges at the first mile and identifies interventions to help overcome them. It was developed by the Kuehne Climate Center (KCC) as part of its Life-Links initiative, which aims to strengthen the resilience of global supply chains. Within this initiative, the assessment feeds directly into the Life-Links Kenya–Avocado application, focused on enhancing the resilience of the avocado supply chain between Kenya and Europe. In this context, resilience is understood as the ability to maintain consistent quality and a reliable supply of fruit.

A central objective of this Life-Links application is to support smallholder farmers—who form the backbone of Kenya's avocado sector—so they can maintain and improve their livelihoods despite increasing climate pressures. At the same time, the application considers the needs and perspectives of other supply chain actors, including exporters and importers. Interventions must create value for them too in order to secure their buy-in and ensure long-term sustainability. This balanced, system-wide perspective is core to Life-Links.

While Life-Links focuses on climate risks, it recognizes that real-world vulnerabilities are interconnected and extend beyond climate alone. Accordingly, the assessment adopts a holistic perspective, integrating climate considerations within a broader analysis of postharvest challenges. It follows the Postharvest Assessment Methodology (PHAM), developed by the Wageningen University & Research (WUR)[1], and its structure reflects the sequential PHAM steps. These include a country-level assessment, which describes Kenya's avocado sector, its main challenges, and potential interventions; a company-level assessment, which examines the feasibility of selected interventions at a more granular level; an influence and control analysis, which identifies key stakeholders; and a final outcome step, which synthesizes findings. The assessment draws on a combination of desk research, primarily grey literature, and extensive stakeholder engagement, including interviews with approximately 40 supply chain actors and sector experts (see Appendix 1). In addition, two field visits were conducted in western Kenya to observe first-mile conditions and practices firsthand.

Step 1b: Scope

Because Life-Links focuses on global supply chains, this assessment concentrates on the export segment and does not consider the local markets. Europe was selected not only because of its market significance, but also because Life-Links originated in Europe and seeks to engage and influence supply chain actors operating in the region. Given this export orientation, the assessment primarily focuses on Hass avocados—the dominant variety in international trade due to its longer shelf life and lower susceptibility to physical damage during transport[2].

Within Kenya, the assessment focuses on the western counties, which are increasingly recognized as an emerging hub for avocado production. Key counties include Kisii, Nyamira, Trans Nzoia, Uasin Gishu, and Nandi[3]. Production in this region is expanding rapidly as more trees are being planted, and addressing first-mile challenges will be essential to ensure that this growing output can be efficiently integrated into export supply chains.

Finally, because most of Kenya's avocado supply is produced by smallholder farmers—and because first-mile challenges are most acute at this level, rather than among larger, better-resourced commercial farms—the assessment primarily focuses on the smallholder supply chain. In the context of western Kenya, this includes emerging smallholder farmers whose trees are relatively young and who are still establishing themselves within the export system.

Step 2: Alignment with development objectives

As noted earlier, this assessment—and the Life-Links application it informs—aims to strengthen the resilience of the Kenya–Europe avocado supply chain. The focus is on strengthening the first mile of the chain so that value can be maintained, or even increased, at a time when climate change is expected to intensify existing vulnerabilities.

For smallholder farmers in particular, export markets are a critical pathway to higher incomes. Farmgate prices for export-grade avocados are significantly higher than those available in local markets (see Step 3), which is what earned the crop its reputation as Kenya's "green gold". Enabling farmers to meet and sustain export requirements through first-mile interventions therefore has direct livelihood implications. Strengthening the first mile is thus not only a supply chain concern but also a broader development priority.

The objectives of this assessment and the Life-Links application are closely aligned with Kenya's policy ambitions for agriculture transformation and economic development. Two national strategies provide the overarching direction: the Agriculture Sector Transformation and Growth Strategy (ASTGS) 2019–2029, which seeks to modernize and commercialize agriculture as a driver of economic growth, and the Bottom-Up Economic Transformation Agenda (BETA) 2022–2027, which emphasizes inclusive, bottom-up development and highlights agriculture's central economic role[4,5]. In line with these priorities, the National Agricultural Value Chain Development Project (NAVCDP) functions as a major implementation vehicle[6], supporting the shift from subsistence to commercial smallholder farming, with avocados designated as a priority value chain. These national strategies cascade down to the county level, where county governments are developing more targeted strategies and implementing practical initiatives to support the avocado sector growth—such as donating certified seedlings, providing farmer training, investing in cold storage infrastructure, and establishing avocado oil processing plants[6].

Country-level assessment

Step 3: Current situation

Production

Production volumes over time

Avocado production in Kenya has grown rapidly in recent years (see Figure 1), driven mainly by an expansion in the harvested area. Between 2013 and 2023, production volumes increased at a compound annual growth rate (CAGR) of 12%[7]. By 2023, output had reached 542,000 tons.

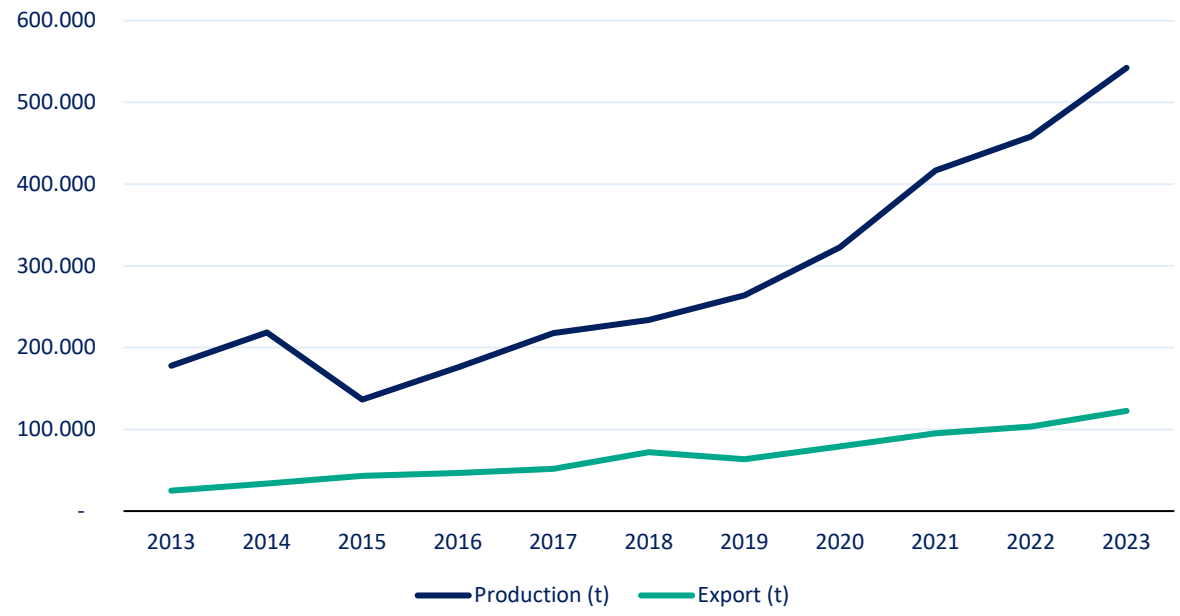

Figure 1: Avocado production and export volumes in Kenya, 2013-2023
Source: FAOSTAT, 2025

More recent data show continued growth: production rose to 562,000 tons in 2024, with forecasts indicating an increase to 585,000 tons in 2025[8]. Kenya's Agriculture and Food Authority (AFA) reports even higher figures: 633,000 tons in 2023 and 848,000 tons in 2024[3].

Kenya is now Africa's leading avocado producer—well ahead of Tanzania (190,000 tons)[9], Morocco (119,000 tons) and South Africa (109,000 tons)—and the sixth-largest producer globally—after Mexico, Colombia, Dominican Republic, Peru, and Indonesia (see Figure 2)[7].

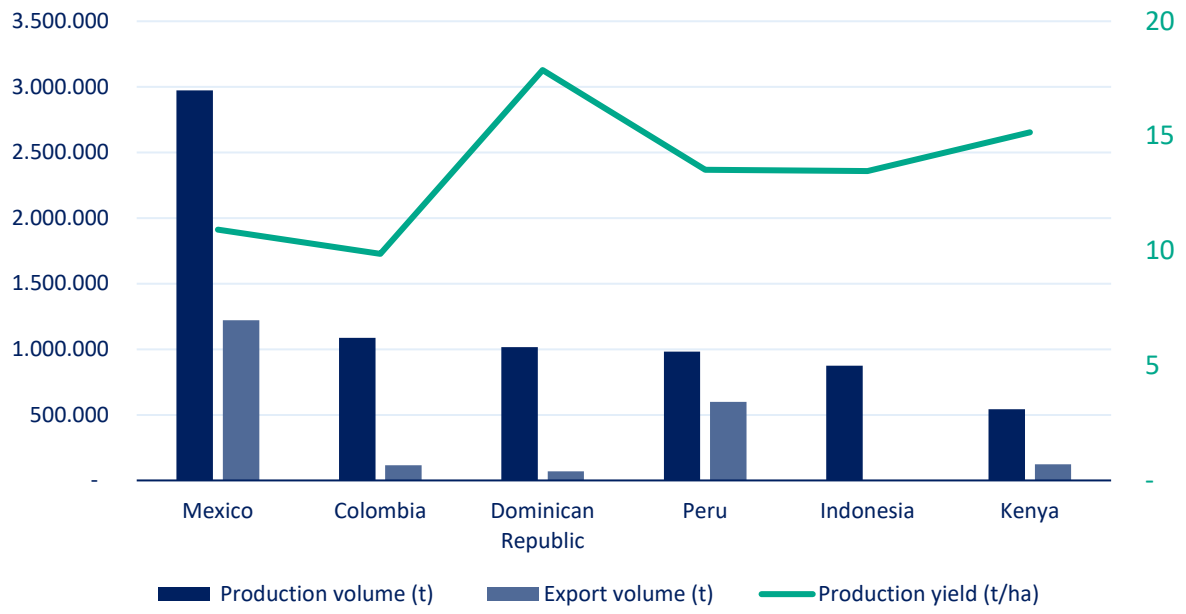

Figure 2: Production and export volumes (2023) and production yield (average 2019-2023) across the six largest avocado producing countries in the world
Source: FAOSTAT, 2025

It is important to note that these figures do not distinguish between avocado varieties. How much of Kenya's production is actually Hass—and therefore suitable for export to Europe—remains uncertain. Kenya grows at least 40 avocado varieties, including Hass, Fuerte, Pinkerton, Jumbo and others. One source suggests that Hass accounts for only about 10% of total production[8], but official data are lacking.

Among Kenya's major fruit crops, avocados currently rank third in production volume, after bananas and mangoes, but second in total value[3]. According to AFA's more optimistic estimates, avocados may have risen to second place by volume in 2024[3].

Production split across the country

More than 30 counties in Kenya engage in avocado farming[8]. The five counties with the largest harvested areas together account for roughly half of the national total, with Murang'a leading by a wide margin at around 20% of the total (see Figure 3). Historically, production was concentrated in Central counties (incl. Murang'a), but in recent years it has steadily expanded into the western counties[6].

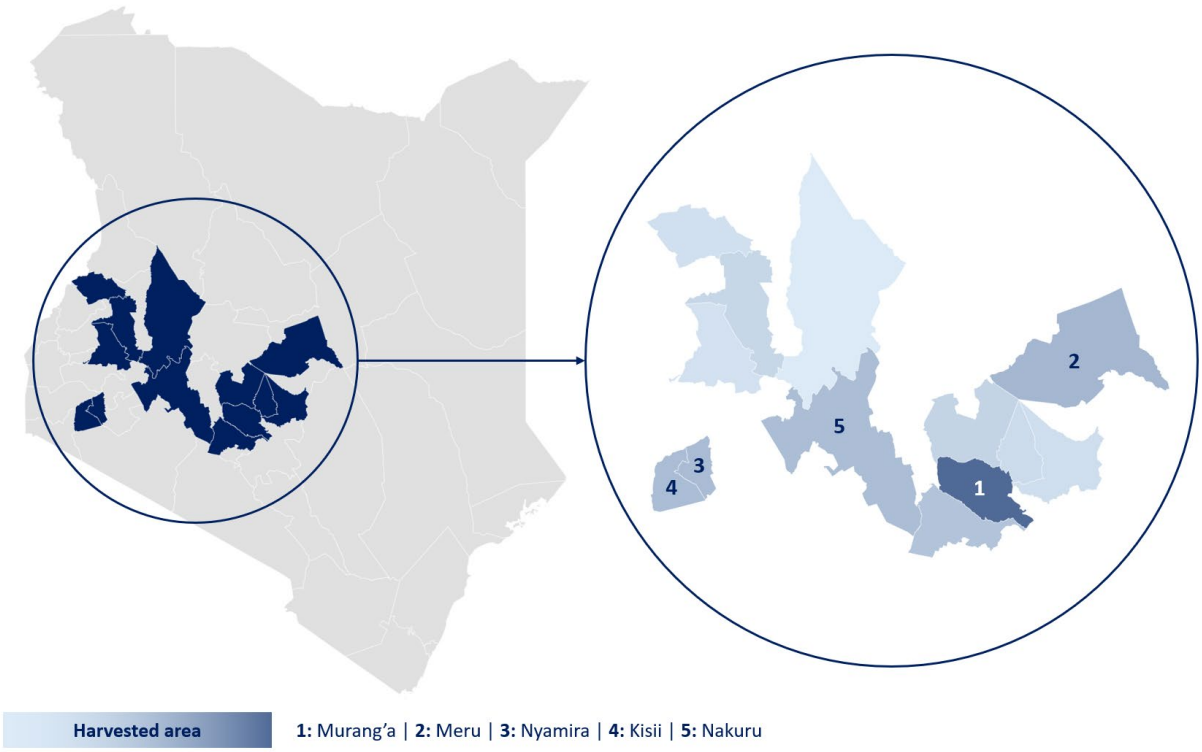

Figure 3: Main avocado-producing counties in Kenya in 2025 (forecast) based on harvested area
Source: USDA, 2025

The harvesting window for the Hass variety in Kenya runs from March to August, extending to December in the western counties[8]. The exact timing varies with microclimate and altitude—even neighboring areas may experience different patterns—and the diversity the country offers in this regard allows for almost continuous production throughout the year[6,8].

Production practices

Smallholder farmers account for roughly 70% of Kenya's avocado production, typically managing farms of less than one acre with 10–20 trees. Medium-scale farms contribute around 20% of national output, and large-scale farms—generally defined as those exceeding 10 hectares—account for the remaining 10%.[5]

Production practices and resource use vary significantly across farm sizes. Most smallholder farmers—about 80% to 90%—rely on rain-fed production, whereas large-scale farms typically operate well-developed irrigation systems, including sprinklers, water tanks or catchment areas, and soil moisture monitoring equipment[6,10]. Note that Kenya's National Irrigation Authority (NIA), under the Ministry of Water, Sanitation and Irrigation, launched the National Expanded Irrigation Programme (NEIP) in 2011 to expand irrigated agriculture, including for smallholder communities[11]. The programme aims to increase national irrigated area by over 50% between 2011 and 2030 and has so far achieved roughly 60% of this target.

Fertilizer and pesticide use show similar contrasts. A study in Meru County found that 98% of smallholder farmers grow avocados organically, relying on manure, and most use traditional pest and disease control methods such as wood ash, burying infected material, and cutting down affected trees[10]. In Kiambu County, another study reported that only 13% of smallholder farmers had applied chemical fertilizers to their avocado trees, and just 9% had ever used chemical pesticides[12]. Large-

scale farms, by contrast, rely on more intensive input use and typically employ in-house agronomists who guide fertilizer application and pest and disease management[6].

These differences are largely explained by disparities in resources and knowledge. Beyond limited financial means, many smallholder farmers lack technical expertise and report inadequate access to extension services or training[10]. Large-scale farms on the other hand have the financial capacity to invest in inputs, technology, and in-house expertise that support high-yield production.

Official data suggest that Kenyan avocado yields are among the highest among the main producing countries in the world (see Figure 2). However, these figures should be interpreted with caution, as harvested area tend to be underreported—particularly in the smallholder context, where farms are numerous, dispersed, and typically intercropped—leading to an overestimation of yields. While Kenya's climate is highly suitable for avocado production (see Step 5), the production practices described above indicate that current yields likely have considerable scope for improvement.

Export

Export volumes over time

Most of the value generated by Kenya's avocado industry comes from exports, where avocados are positioned as a high-value product. Although domestic consumption is also substantial—Kenya has the highest per-capita avocado consumption in Africa[8]—local markets offer lower prices than export destinations. Farmgate prices for export-grade fruit are often two to three times higher than those paid in local markets (see Appendix 2).

Avocado exports from Kenya have grown steadily over the past decade. Between 2013 and 2023, export volumes increased at a CAGR of 17%, slightly outpacing production growth over the same period (12%)[7]. In 2023, Kenya exported 123,000 tons of avocados valued at USD 141 million[7]. More recent data indicate continued growth, with exports rising to 127,000 tons in 2024 and forecasts projecting 135,000 tons in 2025[8]. Avocados are now Kenya's leading fruit in terms of export, accounting for around 80% of total fruit export value and nearly one-fifth of all horticultural exports to Europe[13].

In 2023, Europe remained the principal market, absorbing around 60% of Kenya's avocado exports, and Kenya supplied roughly 9% of all avocados consumed in Europe[14]. The main export destinations were the Netherlands, the United Arab Emirates, France, Spain, Turkey, and Germany (see Figure 4).

Despite this progress, exports still represent just under one-quarter of total avocado production[7]. This gap partly reflects the inclusion of varieties in national production statistics that are not typically suitable for export markets. However, the extent to which these varieties—versus other potential production or supply chain constraints—contribute to the low export share remains uncertain.

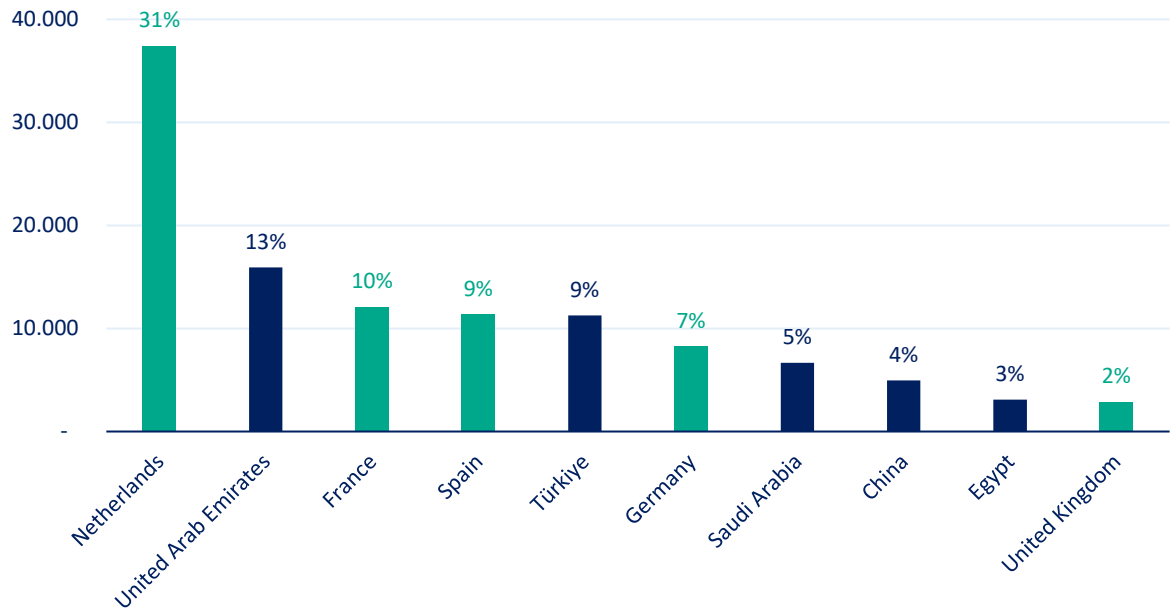

Figure 4: Top 10 importing countries of Kenyan avocados in 2024, in volume (t)
Source: United Nations, 2025

Export prices and market dynamics

Kenya's Hass avocado harvest runs from March to August, with some production in the western counties extending into December[8]. As shown in Figure 5, export volumes peak between April and August and decline sharply thereafter. In practice, HCD typically closes the export season toward the end of October, limiting shipments in the final months of the year[6].

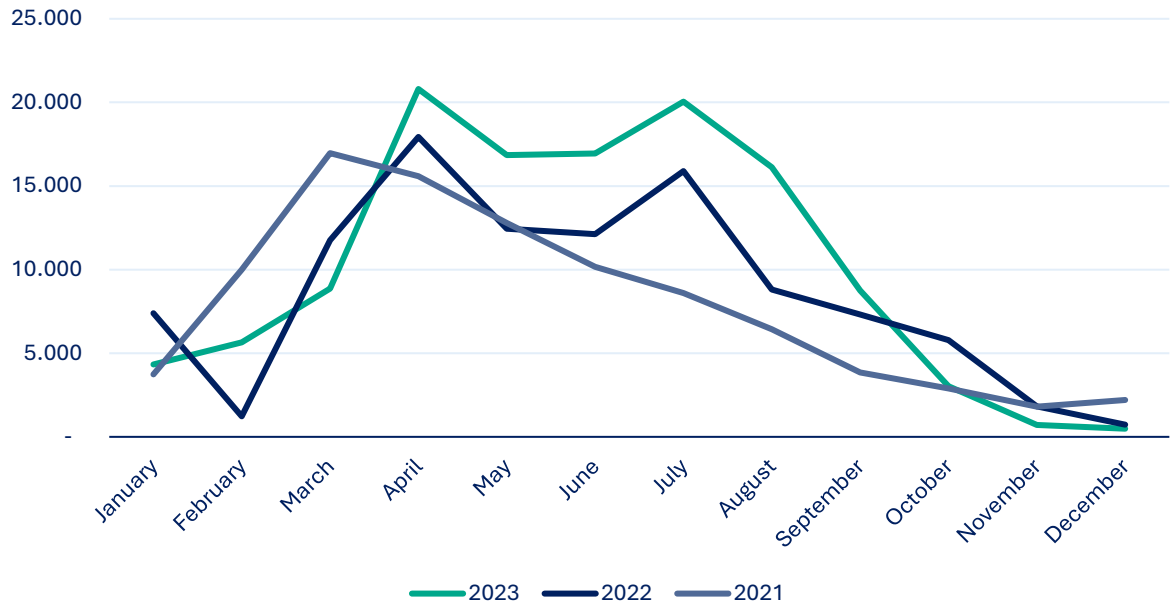

Figure 5: Monthly avocado export volumes from Kenya, 2021–2023 (t)
Source: United Nations, 2025

Kenya's peak season overlaps with Peru's, whose exports surge from May to August (see Figure 6). This influx of Peruvian fruit significantly increases overall supply on the European market and pushes prices down: between June and September, European import prices are 11–32% lower than in the rest of the year (2021–2023; see Appendix 3). As a result, Kenyan exporters prefer to ship early in the season (March–April) or toward the tail end (as of September) when competition is lower and prices are higher[6].

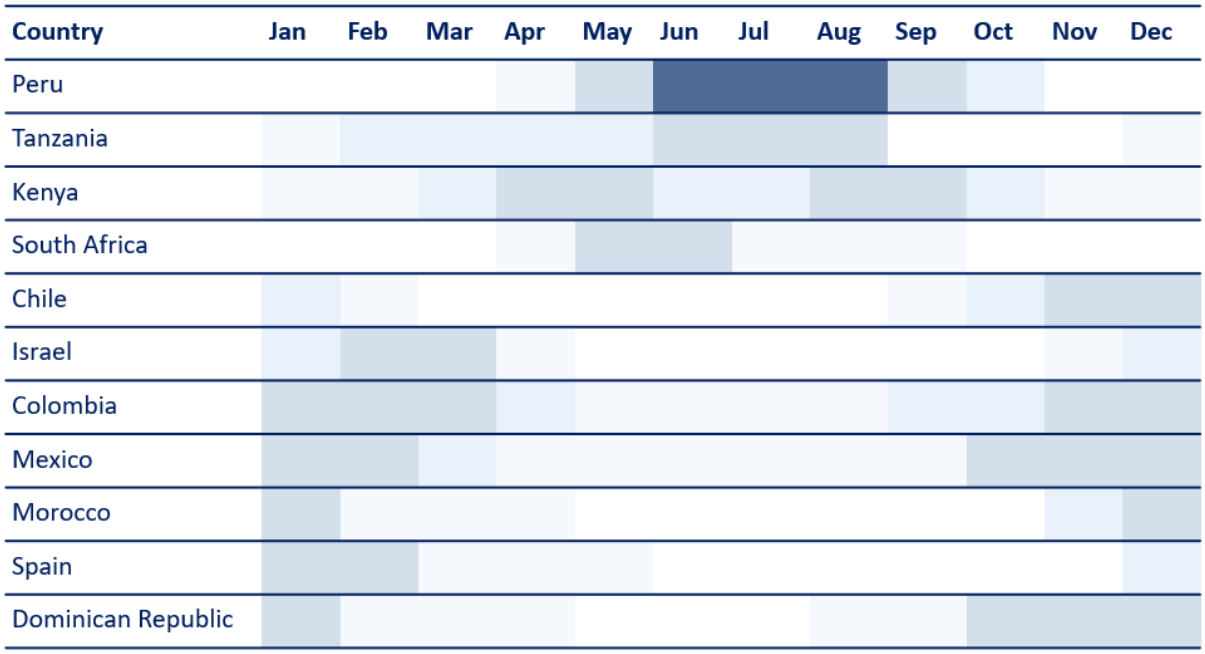

Figure 6: Avocado supply windows for exporting countries serving the European market
Source: CBI, 2024

Overall, Kenya's export prices remain slightly below those of the main suppliers to Europe—about 5% lower than Peru and 4% lower than Colombia, the largest and second-largest sources for the European market between 2021 and 2023[14]. Importers often view Kenya as a back-up or "filler" supplier rather than a primary origin, largely due to ongoing concerns about quality consistency, reliability, and the smaller scale of production compared to leading suppliers; in their view, the modest 4-5% price advantage does not sufficiently offset these risks[6].

Export requirements

To access the European avocado market, exporters must comply with strict requirements related to sanitary and phytosanitary (SPS) standards, quality standards, and minimum maturity levels. These measures protect consumer health, mitigate environmental risks, and ensure consistent product quality. Table 1 summarizes the requirements.

Table 1: Requirements to access the European avocado market

Sanitary standards	Avocados must comply with the European Union's (EU)—and any stricter country-specific—maximum residue levels for pesticides and other contaminants such as heavy metals.
Phytosanitary standards	Avocados must undergo plant-health inspection in the country of origin. Shipments must be free from quarantine pests, meet thresholds for non-quarantine pests, and be practically free of all other pests. A phytosanitary certificate is mandatory.
Quality standards	Avocados must meet general quality requirements (intact, clean, free of damage, etc.). The European market predominantly demands Extra Class or Class I fruit, which require stricter quality specifications.
Maturity requirements	Avocados must reach a minimum dry-matter content of 21% (for Hass), with consistent maturity across the shipped batch.

Source: CBI, 2021

Compliance with these requirements is overseen in Kenya by the Kenya Plant Health Inspectorate Service (KEPHIS), which conducts consignment checks and issues the phytosanitary certificate. AFA's Horticultural Crops Directorate (HCD) licenses exporters and enforces national horticultural export regulations[6]. Together, these two institutions thus help Kenyan exporters access the European market.

Beyond the mandatory regulations described in Table 1, European importers often impose additional private requirements, relating to fruit size, packaging specifications, and third-party certifications. With respect to certifications, most buyers expect GlobalG.A.P. for primary production and BRCGS, IFS, or other food-safety management systems based on the Hazard Analysis and Critical Control Points (HACCP) system for packhouses[15]. Buyers are also increasingly demanding full traceability of the fruit and they typically engage only with exporters who can guarantee sufficient and consistent volumes across the season (e.g., supplying at least one container per week over eight weeks)[6].

Meeting these requirements is not straightforward. Immature harvesting—fruit picked below the required dry-matter threshold, which will never ripen properly—has repeatedly undermined Kenya's reputation[6,16]. In response, HCD introduced defined open and closed export seasons, granting exemptions only where maturity and volumes allow[6]. While the situation is improving, importers still report uneven maturity within batches, which generally happens when avocados are aggregated from different smallholder farmers[6]. This leaves them with two costly options: increase sorting to separate fruit by maturity and manage multiple ripening schedules or ripen all fruit simultaneously and accept that part of the batch will overripen. The latter is often preferred, with the resulting losses typically absorbed through discounted prices offered by exporters.

This issue of non-uniformity is only one of several difficulties associated with smallholder-based supply chains. Exporters also struggle to meet SPS standards, as ensuring consistent compliance across many farmers is complex[17]. Certification adds further strain: schemes such as GlobalG.A.P. are costly and administratively demanding, leaving most smallholders dependent on group certification arrangements[6]. Traceability is equally problematic, as aggregators typically mix fruit from multiple farms, making it difficult to track origin[6,10,18]. To address this, HCD is developing a dedicated traceability application[6].

Most Kenyan avocados still do not meet the stringent requirements for Europe, as well as other export destinations[4]. Reaching these standards would require substantial investments that many smallholder farmers cannot afford. Consequently, the lucrative export segment remains inaccessible to most of them.

Supply chain

Actors

Kenya's avocado sector involves a diverse set of actors, each playing a distinct role in production, aggregation, and export. They include smallholder farmers, cooperatives and farmer groups, aggregators, exporters, logistics services providers, and cold storage providers.

Smallholder farmers. As mentioned previously, smallholders account for roughly 70% of avocado production in Kenya but frequently lack the resources and technical knowledge required to meet modern production and export standards. Although there are close to one million avocado farmers in Kenya, only about 140,000 are known to be engaged in commercial production, of which approximately 130,000 are smallholders[5]. Most smallholder farmers cultivate avocados in intercropped systems alongside tea, coffee, bananas, maize, and other staples, using the fruit as a supplementary income source in addition to their primary cash and food crops[4]. Appendix 4 provides gross county product per capita figures, which offer a useful proxy for the economic context in which these farmers operate.

Cooperatives and farmer groups. Cooperatives and farmer groups help smallholder farmers pool resources, access better inputs, strengthen their bargaining power, and improve access to market information. They may also provide logistical support by facilitating harvesting and transportation of the fruits[2,6,18]. While Kenya's coffee and tea sector has long benefited from strong farmer organizations, avocado producers remain far less organized[6]. However, new cooperatives are gradually emerging—supported by governmental and non-governmental interventions (see Step 6).

Aggregators. Aggregators—also referred to as brokers or middlemen—play a key role in sourcing fruit from dispersed smallholder farms, especially those not directly connected to exporter supply chains. While they provide an essential link, some are known for unethical practices in certain regions, including the use of faulty weighing scales or offering unfair prices, which has earned them the reputation of "con men" among farmers[6].

Exporters. A small number of large companies dominate Kenya's avocado export market—among them East African Growers, Kakuzi, Keitt, Kenya Horticultural Exporters, Sasini, Sunripe, and Vegpro[4,6]. These exporters source fruit through a mix of models: from their own estates, from medium-scale farmers, or through extensive outgrower networks of smallholder farmers[4,6]. When sourcing from smallholders, many depend (at least partly) on external aggregators to collect and consolidate the fruit. Large exporters typically operate their own packhouses near Nairobi and Thika, equipped with packing lines and cold rooms.

Logistics service providers. Transport to the packhouse is typically arranged either directly by exporters, through aggregators acting on their behalf, or by farmers themselves. From the packhouse onward, logistics service providers take over. At this stage, cold and controlled-atmosphere (CA) conditions are applied to maintain fruit quality[6]. Maersk currently appears to play a leading role in coordinating these logistics services[6].

Cold storage providers. Cold storage providers aim to safeguard avocado quality and shelf life by maintaining proper temperatures from postharvest to export. At the first mile, decentralized models are expanding, with companies such as SokoFresh, for example, deploying solar-powered mobile cold

rooms to serve smallholder farmers (see Step 6). County-led facilities also contribute to early-stage cold storage capacity—for instance, Kisii County operates units that serve bananas and other produce (see Step 6).

First mile (from farm to packhouse)

The supply chain between the farm and the port of destination can be divided into three main segments: the first mile (the segment from the farm to the packhouse); the segment from the packhouse to the port of origin; and the segment from the port of origin to the port of destination.

First-mile arrangements vary depending on who handles harvesting and transport (see Table 2 and Appendix 5 for details). These two activities are typically considered jointly: avocados must be moved as soon as possible after harvest to avoid exposure to weather conditions and to ensure rapid entry into the cold chain at the packhouse and thus maintain quality and shelf life.

Table 2: Different modus operandi for avocado harvesting and transport in western Kenya

Actor consulted	**Responsible for harvesting**	**Responsible for first-mile transport**
Cooperative 1	Cooperative	Cooperative to aggregation center (one location) then exporter
Cooperative 2	Exporter (farmer when remote)	Exporter (farmer when remote to collection point)
Cooperative 3	Cooperative	Exporter (farmer when remote to collection point)
Cooperative 4	Cooperative	Cooperative to aggregation center (one location) then exporter
Exporter 2	Farmer	Farmer
Exporter 4	Exporter	Farmer to collection point then exporter
Exporter 5	Exporter (farmer when remote)	Exporter (farmer when remote to collection point)
Exporter 6	Farmer	Exporter (farmer when remote to collection point)

Source: Interviews

For smallholder farmers, levels of involvement range from fully hands-off to fully hands-on. In the most coordinated model, exporters manage both harvesting and transportation directly from the farm. In these cases, exporters supply crates in advance, and fruit is harvested directly into these crates, which are then loaded onto trucks for transport to the packhouse. When farmers are organized into cooperatives, these functions may also be handled internally, with cooperatives deploying trained harvesters and arranging transport to their aggregation centers or directly to the packhouses. At the opposite end of the spectrum, farmers harvest and transport the fruit themselves to collection points—a term used here to distinguish these informal, minimally equipped sites (often

simply a household compound) from more structured aggregation centers. Farmers in this scenario typically rely on motorbikes or small pickup trucks, transporting the fruit in bulk or in sacks or poly gunny bags, as crates are typically not provided. This model is most common in remote or hard-to-reach areas where exporters and cooperatives are reluctant to operate due to high logistics costs and limited accessibility.

Interview estimates indicate that a substantial share of farmers in western Kenya—ranging from 10% to as high as 75%, depending on the county—are remote and fall at the more informal end of the first-mile spectrum (see Table 3). While a few may still manage to engage directly with exporters, many rely primarily on aggregators and therefore receive lower prices. Remoteness also tends to limit their inclusion in cooperatives, which may not be able to operate effectively in these areas.

Table 3: Estimated share of smallholder farmers in western Kenya considered too remote to work directly with exporters

Source	Estimate	County	Notes
Cooperative 2	≥10%	Nyamira	Based on cooperative members; many more remote farmers were excluded from membership, so the true share is higher
Exporter 5	~30%	Nyamira and Bomet	Based on exporter's own smallholder's basis
Exporter 7	~30%	Uasin Gishu	County estimate
Exporter 7	~70%	Nandi	County estimate
Expert 8	~50%	Emerging western counties, including Nandi, Trans Nzoia, and Elgeyo-Marakwet	Region estimate
Expert 9	~75%	Nandi	County estimate

Source: Interviews

The collection process—whether directly from farms or collection points—typically involves a truck making rounds across dispersed locations. This is operationally challenging: farms are scattered and roads are unpaved. Collection costs rise quickly, so the collecting actor must secure sufficient volumes to justify a trip. Exporters generally require a minimum load; farmers unable to meet this threshold typically resort to aggregators. Weather and road conditions add further uncertainty. Harvesting cannot take place during rainfall, and transport becomes difficult when roads are muddy or impassable, leading to frequent delays. While waiting, avocados are typically stored under trees at the farm, with no proper storage infrastructure.

As a result, collection can take up to three days. Once fruit is finally picked up, transport from the western counties to packhouses around Nairobi requires four to eight hours—compared with one to four hours for central counties (see Figure 7). A major road expansion project, the Rironi–Mau Summit Highway (See Appendix 7), has recently been launched and is expected to reduce travel times

and associated risks for western counties. Transport usually takes place at night to take advantage of cooler temperatures, as vehicles at this stage are generally not refrigerated. All of these delays and extended lead times make it difficult for remote smallholder farmers to meet best-practice guidance to deliver fruit to the packhouse within maximum 12 hours after harvest and to enter the cold chain within 17 hours after harvest.

Figure 7: Kenya's in-country supply chain for avocados

From packhouse to port of origin

At the packhouse, avocados undergo postharvest processes to meet export standards and preserve shelf life during long-distance shipping. After reception, weighing, and an initial quality check, the fruit is cleaned, then sorted and graded—manually or via automated lines—by size and external quality according to international standards. Postharvest treatments, including fungicide dips and waxing, are applied to reduce decay and moisture loss. The fruit is then packed into standardized cartons, palletized, and labeled for traceability. Finally, avocados enter cold storage, where forced-air cooling removes field heat and brings them to shipping temperature (typically around 4-8°C[13]).

Kenya's avocado exports move predominantly by sea—around 90%—with air freight used only in exceptional cases, typically towards the end of the season when volumes are low. After packing, fruits are loaded into reefer containers and transported to the Port of Mombasa, located roughly 500 km and about 12 hours by road from Nairobi, though actual transit times can be longer due to traffic and road conditions. In theory, Mombasa offers a priority "green lane" for fresh produce, with dedicated handling facilities and plug-in points for reefer containers. In practice, however, reefer units can wait

up to 10 hours without power before entering the port. This is partly because Mombasa operates primarily as an import hub—around 90% of its throughput consists of imports—leaving limited capacity and attention for outbound perishable cargo. Congestion caused by limited berth capacity and aging handling equipment also create delays: inbound vessels may wait up to five days at anchorage before gaining entry to the port, delaying the pickup of export consignments. In some cases, vessels even skip Mombasa altogether, creating significant risks for highly perishable shipments awaiting export.[19]

From port of origin to port of destination

From Mombasa, cargo is usually transshipped in Oman (Salalah port) before continuing to Europe via the Suez Canal (see Figure 8), though the exact transshipment point varies by shipping line (see Appendix 6)[19]. Under normal conditions, the full journey takes roughly 30 days[6,20]. Since late 2023, however, Houthi attacks on vessels in the Red Sea have forced ships to avoid the Suez route and instead travel around the Cape of Good Hope, adding approximately 10 days to transit times[6,20]. This is particularly challenging given that the maximum shelf life of avocados under optimal cold-storage conditions is about 40 days[4], leaving very little margin for delays. In practice, end-to-end lead times have reached up to 50 days during the crisis, pushing exporters to the limits of what avocado shelf life allows and resulting in frequent overripening losses upon arrival[20]. Shipping lines have recently begun reopening routes through the Suez Canal, and most exporters and importers expect to return to this route by the end of 2025[6].

Efforts to shift part of the inland cold chain onto the Standard Gauge Railway (SGR)—Kenya's modern freight and passenger railway linking Naivasha and Nairobi to Mombasa—have evolved in recent years. Historically, the SGR could not move reefer containers because freight trains lacked electrical plug-in points, meaning refrigerated units would have required gensets—a solution no operator had piloted[19]. Recently, however, Kenya Railways has introduced reefer wagons equipped with on-board powerhouses, allowing reefer containers to be transported between inland consolidation points and the Port of Mombasa[21]. While still limited in scale, this development marks the first step toward making the SGR a viable cold-chain option for avocado exports.

Figure 8: Kenya's export supply chain for avocados

Postharvest losses

Step 3 identifies multiple causes across Kenya's avocado supply chain that contribute to postharvest losses, which are examined in more detail in Step 7. A key question, however, concerns the magnitude of these losses. Estimates for Kenya vary widely depending on whether the fruit is destined for domestic markets or for export. Domestic chains experience the highest losses—typically 35–50%—reflecting very poor postharvest practices and market conditions (see Table 4). Export chains perform better, with estimated losses of 13–33%; applied to 2023 export volumes, this corresponds to losses of approximately 18,000–61,000 tons, equivalent to USD 21–69 million. Studies that do not distinguish between domestic and export channels generally report losses of around 40%.

Most county-level estimates presented in Table 4 show lower losses than national ones, although many of these figures are self-reported and should be interpreted with caution. Losses are expected to vary across counties—typically lower in more established central regions and higher in emerging western regions—but the available data remain too limited to draw firm conclusions.

Table 4: Postharvest losses in Kenya's avocado supply chain according to various sources

Location	Domestic chain	Export chain	Mixed	Source
Country estimates	*35-50%*	*13-33%*	*up to 40%-48%*	
Kenya	35%	15%		4
Kenya			48%	10
Kenya			up to 40%	6
Kenya	43-50%	30-33%		22
Kenya		13-18%		23
Kenya			40%	24
County estimates	*10-20%*	*15%*	*37-45%*	
Bomet	20%*			6
Kisii	20%*			6
Meru			37-38%	25
Nandi	10-20%*	15%*		6
Nandi			45%	18
Nyamira	10-20%*			6
Uasin Gishu	10-20%*			6

**Self-reported*
Where available, numbers are broken down in Figure 10

Beyond the distinction between domestic and export channels, it is also important to differentiate between smallholder and large-scale operations. Most published loss estimates reflect smallholder-dominated systems, which face greater first-mile challenges. Large-scale operations typically report lower losses due to stronger control over harvesting, handling, and transport. That said, even major exporters experienced significant losses last season: one large company reported discarding roughly half of its fruit upon arrival in Europe, largely due to disruptions caused by the Red Sea crisis[20].

Step 4: Trends

A number of trends—across the general trade environment as well as on the demand and supply sides—are shaping the future of Kenya's avocado industry.

General

Kenya's trade environment is evolving in ways that may influence the future of its avocado industry. The country is actively deepening its integration into two major trade frameworks: the African Continental Free Trade Area (AfCFTA) and the EU–Kenya Economic Partnership Agreement (EPA). The AfCFTA, now gaining operational momentum across the continent, aims to boost intra-African trade, harmonize tariffs, and strengthen regional value chains—expanding opportunities for Kenyan agricultural exports within growing African markets. Meanwhile, the EU–Kenya EPA, which entered into force in July 2024, guarantees duty-free, quota-free access for Kenyan products to the EU while

embedding commitments namely on labor rights, environmental protection, and climate. The agreement is expected to attract investment into export-oriented value chains, including horticulture. Together, these frameworks position Kenya to expand its trade footprint both regionally and globally and may enhance long-term competitiveness for sectors such as avocados.

Demand

Maturing European market. Over half of Kenya's avocado exports are destined for Europe, where demand remains strong. EU imports grew rapidly between 2000 and 2023—at a CAGR of about 8% in volume and 13% in value (see Appendix 8)—reflecting sustained consumer interest in healthier, nutrient-rich foods[26,27,28]. European per-capita consumption remains well below the United States level of about 4 kg[28], with France—the EU's highest-consuming market—at 2.31 kg[26]. This gap indicates room for further growth, even as some mature markets such as France and Scandinavia show early signs of plateauing[26].

Growing organic segment. The European market is showing a strong and growing consumer interest in organic-certified avocados[28,29]. This trend, particularly prominent in German-speaking countries and Scandinavia[10,29], is driven by a preference for natural production methods and aversion to artificial fertilizers and pesticides. Organic avocados typically fetch a premium price—up to 25% to 45% above conventional fruit, though very depending on quality and season[10,29]. Kenya holds a strategic advantage in this segment, as more than half of its avocados are cultivated organically ("organic by default")[16].

Diversification beyond Europe. Kenya's avocado sector is diversifying beyond Europe, targeting Asia and the Middle East as key growth markets to reduce demand risk and expand opportunities[16,20]. The Middle East and India, offering shorter transit times than Europe, are increasingly seen by industry players as the next frontier for East African avocados[6,20]. China also presents significant potential: Kenya began exporting frozen avocados there in 2019, tapping into a vast and still underdeveloped market for processed avocado products[4,16]. In 2022, Kenya became the first African country authorized to export fresh avocados to China, further strengthening its position in this high-growth market[30,31].

Avocado oil. Kenya's avocado oil industry has expanded rapidly in the last years, driven by rising global demand from both the cosmetics and food industries[32]. The global avocado oil market is expected to grow in the years ahead, with North America accounting for more than half of global consumption and Europe showing steady growth[32,33]. In response, more than 30 processors—most established in the past two years—now absorb a growing share of Kenya's avocado production[34] by purchasing lower-grade, non-exportable fruit at prices well below those paid for export grade[6]. This provides an essential outlet for those fruit that would otherwise be lost[6].

Frozen avocados. Demand for frozen avocados is also on the rise, mainly for food services such as restaurants, hotels and other outlets, and for consumers looking for convenience[35,36,37]. Statistics are missing, but demand appears to be growing in North America, Europe, and Asia-Pacific[36].

Growing domestic demand. Kenya also has a strong and expanding domestic market for avocados. Per-capita consumption is high (4.5 kg), and the local market absorbs about 80% of national production, underscoring its importance alongside exports. Driven by rising health awareness and increasing purchasing power, domestic demand is expected to grow by about 5% annually, providing a stable outlet for lower-grade or non-exportable fruit.[17]

Supply

Shift toward larger farms. Although smallholder farmers traditionally account for around 70% of avocado production, the export sector is shifting toward greater reliance on larger commercial farms. European buyers favor guaranteed volumes and consistent quality, which are difficult to secure from fragmented smallholders with varying practices[6,15,16]. In response, major exporters have been establishing their own estates and engaging smallholder farmers as outgrowers to complement their volumes[6], reflecting a move toward greater control across the supply base to ensure export viability.

Expansion to the West. Avocado production in Kenya is experiencing a geographical shift from its traditional base in central Kenya to emerging hubs in western Kenya, particularly across the South and North Rift Valley regions[6]. This transition is driven by farmers diversifying from traditional crops such as maize into the more profitable avocado sector, and by the availability of larger tracts of land suitable for establishing new farms[6,8]. It is further supported by favorable incentives from both national and county governments, along with non-governmental organizations' (NGO) initiatives that have improved farmer access to high-yielding seedlings[8]. Expansion into these newer, more remote areas—where transport to the Nairobi packhouses can take up to eight hours—has spurred a rise in investment in decentralized postharvest infrastructure[6]. Both government programs and private exporters are establishing facilities such as packhouses and oil plants in key emerging zones, including Nakuru and Eldoret, signaling growing confidence in the region's long-term production potential[6].

Step 5: Climate

Kenya's diverse agro-ecological zones and temperate-to-subtropical climate provide highly favorable conditions for avocado cultivation (see Appendix 9)[4,18]. Most production takes place in highland areas between 1,200 and 1,800 meters above sea level, where moderate temperatures (16–24°C) and annual rainfall of 1,000–1,600mm support good yields[13]. The climatic diversity enables staggered harvests across regions, allowing Kenya to supply avocados for much of the year[8].

However, climate-related hazards increasingly challenge production. More frequent extreme rainfall, hailstorms, and prolonged droughts threaten yields, fruit size, and quality[4,6,38]. Some sources note that reduced rainfall contributed to lower yields in 2024, though the exact extent is unclear[8]. The sector is also experiencing greater pest and disease pressure[4], including the recent emergence of *Persea* mites, which have begun to significantly affect production[6].

Climate impacts extend beyond the farm. Rainfall disrupts harvesting and transport operations, as fruit should not be harvested when wet and rural roads often become difficult or impassable when it rains. These disruptions delay collection, leave harvested fruit stranded, or force producers to harvest later than optimal. Limited storage infrastructure at the first mile further increases exposure to weather-related losses.[6]

Step 6: Previous interventions

Kenya's avocado and broader horticulture sector has seen a wide range of interventions over the past years, driven by government agencies, development partners, NGOs, and private-sector actors. These initiatives span multiple areas, including farmer capacity building, certification and compliance support, supply chain and market linkage development, new infrastructure, and input access. Together, they reflect a dynamic ecosystem working to raise productivity, improve fruit quality, strengthen export competitiveness, and enhance the resilience and inclusiveness of the supply chain.

Table 5 presents a non-exhaustive overview of ongoing and past interventions, providing insight into what has been implemented as well as the factors that contributed to their success or shortcomings.

Building on these interventions, several lessons emerge about the conditions under which support to the avocado supply chain is most effective. Successful initiatives demonstrate strong coordination among donors, county governments, private actors, and cooperatives, where shared planning and clear roles enable smoother implementation. Meaningful private-sector participation, through public private partnerships (PPPs) or commercially driven models, anchors interventions in real market incentives and enhances sustainability. Holistic support that brings together farmer training, compliance assistance, governance strengthening, market access, and logistics drives greater results than isolated activities. Interventions tailored to local realities, along with practical field demonstrations, and hands-on standard operating procedures (SOPs) development, help build trust and strengthen farmers' technical capacity. Finally, infrastructure investments such as packhouses, cold rooms, and processing facilities work best when directly connected to committed buyers and stable markets; their impact can be further amplified when they are designed to accommodate multiple horticultural crops.

Conversely, recurring failure factors explain why some initiatives struggle to deliver impact. Infrastructure often remains underused when farmer volumes are insufficient or when linkage systems with cooperatives and buyers are weak, making facilities financially unsustainable. Low farmer engagement—due to side-selling, mistrust, limited awareness, or logistical constraints—undermines supply consistency and fruit quality. Weak governance and management structures further hinder accountability and long-term viability. Limited communication and information flow also leave many farmers unaware of how to use new facilities or what benefits they offer, resulting in low participation and throughput.

Together, these lessons point to the need for future interventions to be more integrated, market-aligned, and tailored to farmer realities.

Table 5: Previous and ongoing interventions in Kenya's avocado and broader horticulture sector

Intervention	Type	Funding	Geography	Main actors	Description	Timing	Strengths / factors for success	Weaknesses / factors for failure
Business Environment and Export Enhancement Programme (BEEP)	Cross-cutting	Donor-funded initiative	Multiple counties — incl. Makueni, Nakuru, Murang'a, Meru, Uasin Gishu, Nandi, and others	EU (funder); TradeMark Africa (implementer); County governments (hosts); Private operators (lessees); Farmer cooperatives (supply partners)	Program to strengthen Kenya's export competitiveness in avocado, mango, and vegetable value chains namely by improving compliance and logistics; it includes activities for capacity building, regulatory support, and business climate improvements	2023–2027	Strong coordination among diverse actors; focus on multiple horticultural products; comprehensive approach	*(too early to tell)*
[Part of BEEP] Export Supply Hubs (ESHs)	Cross-cutting	PPP with donor support	Multiple counties — pilots in Makueni, Nakuru, and Murang'a	EU (funder); TradeMark Africa (implementer); County governments (hosts); Private operators (lessees); Farmer cooperatives (supply partners)	Integrated "one-stop" export hubs (packhouses 2.0) to consolidate logistics, compliance, and value addition for horticultural exports (mango, avocado, vegetables, flowers) to EU/UK markets	Pilot operational in Makueni since 2025; expansion ongoing in other counties	Strong coordination among diverse actors; simultaneous focus on multiple horticultural products; comprehensive approach	*(too early to tell)*
CBI's air-to-sea shift program	Knowledge	Donor-funded initiative	Multiple counties	NL (funder) through CBI; Wageningen University & Research (technical support)	Program to shift from air to sea freight for avocado and mango exports, largely through developing SOPs to reduce spoilage and maintain	Started in 2025	Collaboration with exporters at different maturity levels, including both established exporters and firms new to exporting	*(too early to tell)*

					quality during longer transit times			
Cold chain facilities in Kisii	Infrastructure	PPP	Kisii	National government (through the Micro and Small Enterprise Authority) and Meru, Nyandarua, Kisii county governments (leads); Kenya Development Corporation (KDC) (financial support); Kenya Commercial Bank (KCB) (financial support); House of Procurement (implementing partner); Crop Soko (implementing partner); Africa Mega Agricorp (implementing partner)	Partnership to "revolutionize" cold storage and market access solutions for smallholder farmers; includes three cold storage facilities in Meru, Nyandarua, and Kisii	Started in 2025; Kiamokama (Kisii) cold storage facility currently operational, unclear for the two others	Focus on developing market linkages alongside cold storage infrastructure	Kiamokama cold storage appears underutilized so far; limited impact on avocado losses as it mainly serves bananas and leafy vegetables
Eldoret avocado packhouse	Infrastructure	PPP with donor support	Uasin Gishu	UK (funder) through the Sustainable Urban Economic Development (SUED) programme, Fresh Products Ltd (private investor and operator); County government of Uasin Gishu (public investor)	Intervention to decentralize avocado processing and cold chain logistics from Nairobi to western Kenya; located in Eldoret to serve the emerging avocado production area	Packhouse operational since 2024	Strategically important and well-located	Weak farmer linkages leading to low volumes; high operating costs due to limited throughput

Farm Moja and Technoserve collaboration	Organizational	Donor-funded initiative	Nyamira, Bomet, Nakuru	Farm Moja (implementer), TechnoServe (technical support)	Technical support to pilot logistics and aggregation models for sourcing and exporting avocados, including SOP development	Started in March 2025	Close collaboration between the two partners; trial exports to the Netherlands and Dubai; testing of multiple first-mile aggregation models (own farm, cooperatives, aggregators); cost-efficient reuse of tea aggregation centers	Complexity of crate logistics not yet fully "cracked"; lack of crate availability for farmers
Food Waste Reduction and Food Quality Living LAB (FORQLAB) project	Knowledge	Donor-funded research	Nandi and Meru	Dutch universities (VHL, HAS); Kenyan universities (Egerton, Meru UST)	Applied research and student-led living labs to reduce food losses and improve quality in avocado and dairy value chains	2022-2024; student research and hands-on pilot interventions delivered	Comprehensive, hands-on assessment; close collaboration with cooperatives with strong knowledge transfer; trial exports to the Netherlands; maintained support line after project end	Project ended after trial export (too early?); lack of uniform avocado maturity in export batches not addressed; limited farmer digital literacy and competitive concerns restricted data compiling and sharing

Kapsosio Green Gold Avocado Farmers' Cooperative facilities	Infrastructure	Donor-funded initiative	Uasin Gishu	DK (funder) through Danish International Development Agency (DANIDA); County government of Uasin Gishu; Micro Enterprises Support Programme Trust (MESPT) (implementing partner); Kapsosio Green Gold Avocado Farmers' Cooperative Society (owner of land and beneficiary)	Construction of an aggregation and training center plus a nursery for the Kapsosio cooperative to strengthen market access and build value for smallholder farmers	Cooperative operational since 2021; construction of the facilities in 2025	Strategic long-term investments in cooperative growth; well-developed infrastructure; active youth involvement; exposure visit to an EU coffee fair to support market linkages	Limited engagement from cooperative members; low awareness in neighboring counties
Kenya Horticultural Traceability System (KHTS) app	Digital	Donor-funded initiative	Murang'a county (pilot); intended for nationwide rollout	EU (funder); TradeMark Africa (implementing partner); HCD (implementing partner and regulatory oversight)	Digital traceability system for horticultural produce, particularly avocados, ensuring compliance with international standards and enhancing transparency in fragmented smallholder value chains	Pilot in 2025-2026	Targets critical sector-level challenges (lack of traceability, lack of uniform avocado maturity) for importers	*(too early to tell)*
Kisii avocado oil processing plant	Infrastructure	PPP with donor support	Kisii	UK (funder) through the Sustainable Urban Economic Development (SUED) programme, Avofresh Processors Ltd (private investor and operator); County	Value addition through avocado oil processing using non-export grade fruit; aiming to boost farmer incomes and reduce waste	Plant operational since 2023	Strong concept in turning surplus and no-export grade avocados into high-value oil for export	Competition from Nairobi not fully considered, now resulting in low volumes and lower prices; plant governance issues not addressed upfront

				government of Kisii (public investor)				
Loss to Value (L2V) project	Infrastructure	Donor-funded initiative	Nakuru and Nyandarua	DK (funder) through DANIDA; DanChurchAid (lead and implementer), Fresh Produce Exporters Association Of Kenya (FPEAK) (implementer); Financial Sector Deepening (FSD) Kenya (technical support); Danfoss (solution provider); Global Food Cold Chain Council (GFCCC) (technical support)	Solar- and grid-powered cold storage units for smallholder horticulture farmers, combined with training; main objective of reducing postharvest losses	2023-2027; five cooling units already operational	Capacity building integrated; testing of lease-to-own model; continuous monitoring and evaluation	Underutilized due to weak ownership/ governance of the cold-storage units
MESPT (Micro Enterprises Support Programme Trust)	Knowledge	Donor-funded initiative	Multiple counties	Government of Kenya (founder); EU (founder); DK through DANIDA (main funder); County governments; local cooperatives	Development trust supporting agri-enterprise growth (including avocado farmers' cooperatives), access to finance, and green transformation	Trust established in 2002; DANIDA leadership since 2007	Comprehensive approach; long-term driven; promotion of youth and gender inclusion	Limited communication beyond projects portfolio; lack of engagement with actors down the value chain
Mombasa port capacity upgrade	Infrastructure	Public initiative	Mombasa	Kenya Ports Authority (KPA), Government of Kenya; support from trade and logistics partners	Major port modernization to expand handling capacity and strengthen cold chain logistics for horticultural exports, including avocados; upgrades include new	Upgrades implemented progressively since 2013	Addresses critical sector-level challenges; improved reliability for horticultural exporters with remaining customs and clearance	Efforts must be further scaled

					reefer points, priority lanes for perishables, and improved equipment and berths		challenges in being addressed	
Nandi avocado packhouse	Infrastructure	Donor-funded initiative	Nandi	World Bank (funder); Nandi Avocado Farmers' Cooperative Society (owner of land and operator); County government of Nandi	Aggregation center with a cold room; planned as a packhouse with processing line for sorting, processing, and packing avocados locally	Cold room operational since 2024; processing line planned for 2026	Strong collaboration with cooperative	Fragmented project design: cold room underutilized until the processing line is installed and finance for processing line not yet guaranteed
New reefer wagons	Infrastructure	Government funded	National – Naivasha and Nairobi inland container depots (ICDs) to Mombasa Port	Kenya Railways Corporation; Government of Kenya (Min. of Transport) (funder?); Netherlands (co-funder?)	Launch of reefer wagons (16 in total) on the SGR to transport temperature-controlled containers of perishables to Mombasa, strengthening Kenya's cold chain logistics.	Started in 2025	Strategic investment for economically and environmentally sustainable logistics	Limited capacity to meet exporters' needs
NExT (New Export Trade) Kenya	Knowledge	Donor-funded initiative	Multiple counties	EU (funder); COLEAD (implementer)	Program to strengthen the horticultural value chains in Kenya by building capacity on SPS standards and other market requirements for value chain actors (incl. cooperatives, intermediaries, exporters and more).	2020-2025	Broad capacity building across value chain actors; addresses sector-level SPS compliance challenges; development of good practice guides; training of trainers enabling wider rollout.	*(not known by the authors)*

Parachichi Center	Knowledge	Private sector	Uasin Gishu and neighboring counties	Equator Avocados	Avocado nursery and certified seedling provider also offering training and support for adoption of avocado farming	Started in 2017	Local initiative commercially driven with support from parent company; strong farmer training and advisory services; increased awareness of avocado as a viable income source	*(not known by the authors)*
SokoFresh	Infrastructure	Private sector	Multiple counties	SokoFresh, Enviu (private investor), SNV (technical support), Ecozen Solutions (solution provider)	Mobile, off-grid cold-chain solutions and first-mile market linkage services for smallholder farmers (avocados, mangos, vegetables)	Founded in 2019	Focus on multiple horticultural products; market linkages provided on top of the technology	Expensive model to maintain; relies on grants
Sokolink	Cross-cutting	Private sector	Murang'a	P4G (funder); Enviu; One Acre Fund (implementing partner); SokoFresh (implementing partner)	Partnership to reduce postharvest losses by integrating SokoFresh's cooling technology, support GlobalG.A.P. certification for smallholder avocado farmers, and build a traceable supply chain	2022-2023	Comprehensive approach; strong focus on addressing traceability gaps	Delays in GlobalG.A.P. certification leading to unfulfilled orders; farmer side-selling persists as mindset change takes time

Step 7: Bottlenecks and possible solutions

Postharvest losses in Kenya's avocado export value chain are estimated at 13–33%, and may exceed 40% in some cases (see Step 3 and Table 4). Figure 10 synthesizes evidence from five studies that not only quantify total losses but also indicate where along the chain they occur. Although these studies vary in scope and level of detail, their combined findings suggest indicative ranges: 7–20% at harvesting, 3–22% between the farm and the collection point, 5–13% between the collection point and the packhouse (including packhouse activities), and 2–12% during distribution (post-packhouse)[1] (see Figure 9). It is important to note that these figures reflect the stage at which avocados are discarded, not necessarily the stage at which losses originate; for example, fruit rejected during distribution may have been compromised earlier in the first mile.

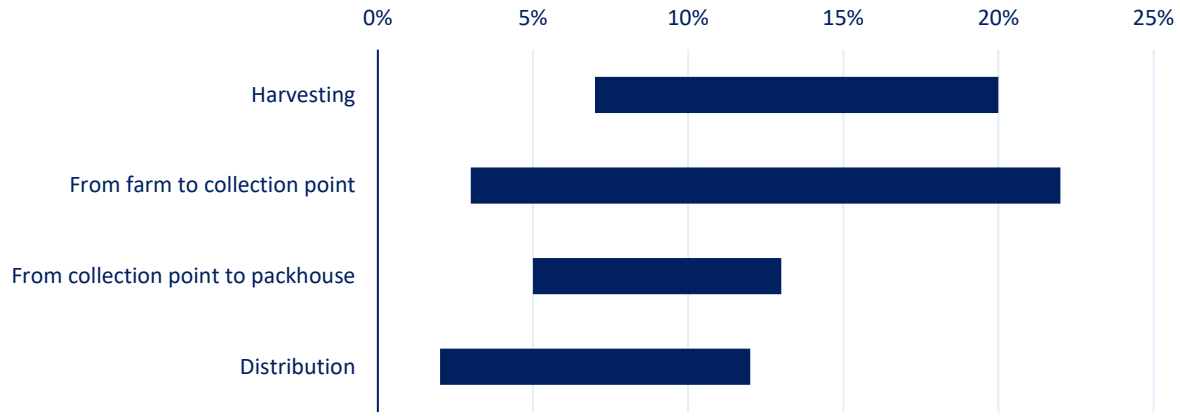

Figure 9: Ranges (min-max) of postharvest losses across Kenya's export-oriented avocado supply chains

These results indicate that the largest losses occur during harvesting and in the early first mile, before fruit enters more controlled handling environments. The wide variation across studies likely reflects differences in production systems, particularly between smallholder-based chains and large-scale commercial farms.

Across all stages, the root causes highlighted in the five studies, the broader literature, and field interviews converge around inadequate harvesting practices, poor postharvest storage and transport conditions, failures in cool/cold chain management, and systemic or socioeconomic constraints. These challenges are discussed next; they are particularly acute for remote, hard-to-reach smallholders who operate at the more informal end of the first-mile spectrum (see Step 3).

[1] To derive these ranges, aggregated loss estimates from some studies were proportionally allocated across the corresponding stages—for example, a reported 5% loss between the farm and the packhouse was split evenly between the farm-to-collection point and collection point-to-packhouse stages.

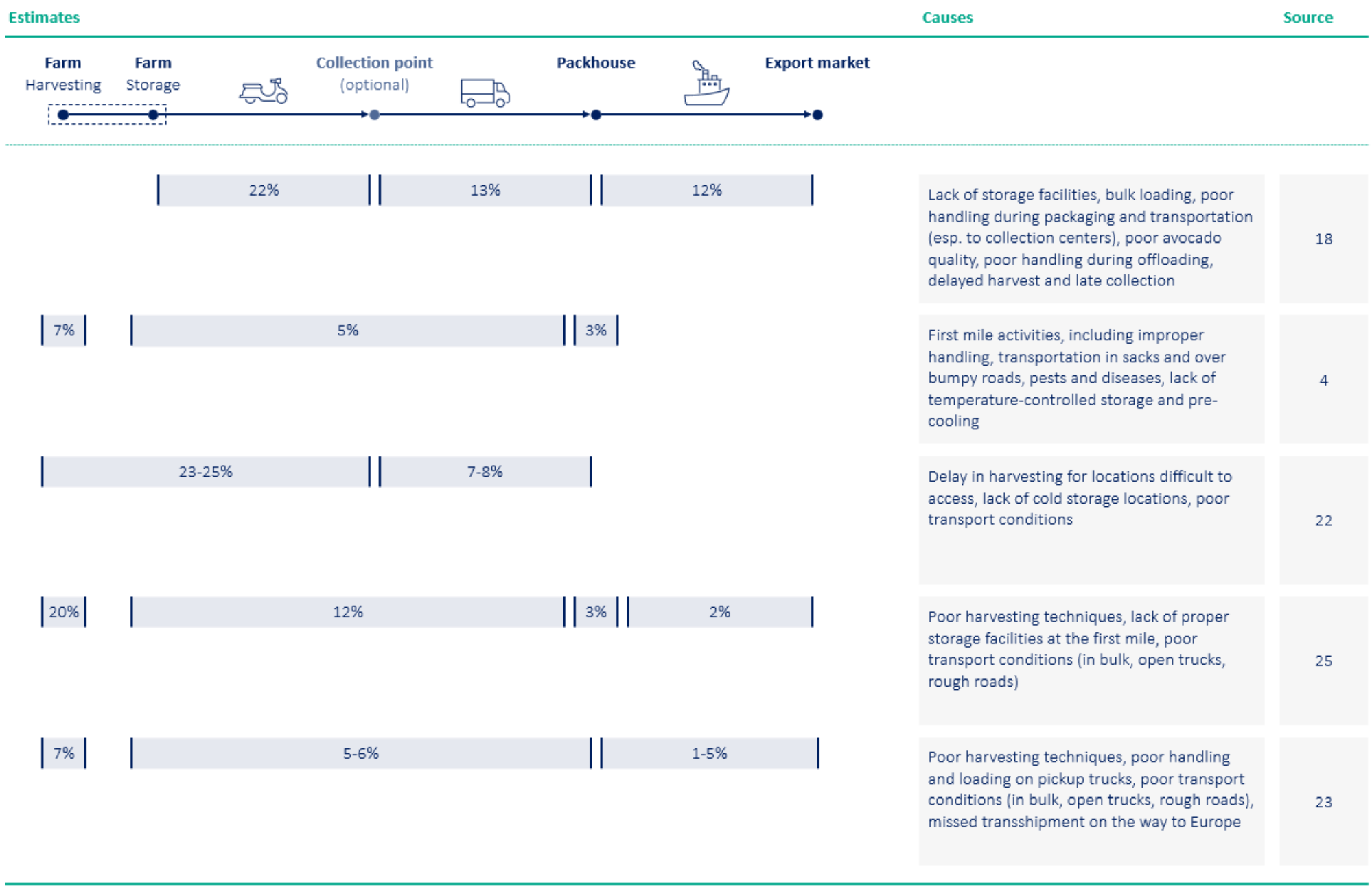

Figure 10: Breakdown of postharvest losses across Kenya's export-oriented avocado supply chains according to various sources

Inadequate harvesting practices

Poor harvesting practices. When harvesting is carried out by unskilled labor—often a result of limited access to formal training—fruit is handled without adequate care, leading to bruising and other mechanical damage that reduces marketability and creates entry points for postharvest pathogens. These problems are further exacerbated by the lack of appropriate harvesting tools, forcing farmers to rely on improvised or unsuitable equipment.[10,18,23,25]

Harvesting immature or overripe fruit. Immature harvesting is a widespread challenge in Kenya and a key factor undermining market reputation. Farmers often pick too early—seeking quick cash, reacting to price signals, or responding to pressure from aggregators—which leads to fruit that fails to ripen properly. Overripe fruit is also an issue, though less common, typically arising when harvesting is delayed because farmers wait for aggregators or hold out for higher prices.[6,16,18]

Mixing batches. Because smallholder farmers each produce small volumes, aggregators often combine fruit from many different farms, where tree age, soil types, and fruit maturity may vary. Part of the challenge is the limited access to dry-matter testing: mobile kits are costly, and sending samples to Nairobi—though cheaper—is slow and offers little flexibility for accurate, timely harvesting.[6,16]

Poor postharvest storage and transport conditions

Collection delays. Smallholder farmers often depend on intermediaries whose pickups may be delayed due to market speculation or, more commonly, transport inefficiencies. Poor road access and widely scattered, remote production areas make first-mile logistics both difficult and costly, and collectors must accumulate sufficient volumes to justify a full route. Transport challenges become even more severe during the rainy season, when frequent rainfall renders many rural roads impassable. Taken together, these factors mean that collection can take as long as three days.[6,10,18]

Lack of proper storage facilities. Many smallholder farmers and cooperatives lack access to proper storage facilities. As a result, harvested fruit is often kept on the ground—either under trees or inside homes—where it is exposed to high temperatures and other unfavorable conditions that accelerate deterioration and shorten shelf life. These issues become even more severe when collection delays occur (see previous point), as fruit remains in these poor conditions for longer periods.[6,10,12,39,40]

Inadequate packaging. A common challenge is the use of sacks, poly gunny bags, or bulk loading (e.g., in an open pick up) instead of protective crates during collection and transport. Such packaging causes compression and mechanical damage, reducing fruit quality. Although HCD has mandated the use of plastic crates, many farmers lack the capital required to purchase them.[2,4,6,10,18,22,23,25,40]

Bumpy roads. Transporting fruit along rough, unpaved rural roads exposes it to continuous jolting and vibration, causing bruising and other mechanical damage. This risk is especially high when no protective crates are used (see previous point).[4,6,10,23]

Failures in cool/cold chain management

Insufficient cool/cold chain infrastructure. A key driver of loss in the Kenyan avocado value chain is inadequate cool/cold chain management. Avocados require storage at 4–8°C to maintain quality and extend shelf life, which in practice means removing field heat soon after harvest and then keeping fruit within a continuous cold chain. However, pre-cooling capacity is largely absent at the first mile, so fruit often sits at ambient temperatures while awaiting collection and begins to ripen prematurely. In most cases, avocados only enter the cold chain once they reach the packhouse, where cold rooms are available; all earlier stages remain unrefrigerated, accelerating deterioration.[4,10,16,18]

Unrefrigerated transport. Throughout the first mile—up to the packhouse—transport is typically undertaken with non-refrigerated vehicles. In the early stages, fruit is often moved in open pick-ups, leaving the top layers exposed to direct sunlight and heat, which accelerates quality deterioration and reduces shelf life. Transport to the packhouse is commonly carried out at night to avoid high temperatures. While this helps limit heat exposure, the system remains highly dependent on ambient conditions.[6,10,13,24]

Lack of packhouses in western counties. Emerging avocado production areas in western Kenya face long transport times—often six hours or more—to reach the nearest packhouse. The absence of local packhouses delays cooling and prolongs exposure to heat and rough handling. It also complicates the logistics of supplying and retrieving crates.[6]

Underlying systemic and socioeconomic factors

Smallholder capacity gaps. Smallholder farmers often rely on traditional production and postharvest practices. Limited awareness and knowledge contribute to quality issues from the outset.

Market coordination. Weak market organization often forces smallholders to sell through aggregators. These intermediaries may contribute to losses through inadequate handling and transport practices and reflect those losses in the lower prices they offer to farmers.

Financial constraints. Limited access to credit facilities prevents smallholder farmers from investing in improved postharvest technologies or solutions.

Lack of traceability. Weak traceability systems result in fruit from multiple farms being mixed during aggregation and transport, making it difficult to link quality issues to specific sources and contributing to uneven ripening.

Solutions

Improving first-mile performance begins with better harvesting practices, as many losses originate at this stage. Expanding farmer training, ensuring access to skilled harvesting teams, and the use of appropriate tools can significantly reduce physical damage and improve harvest timing. Introducing reliable dry-matter mobile testing kits—through cooperatives or shared services—can further support harvesting at the correct maturity as well as improve consistency across farms. Together, these measures raise the quality of the fruit entering the value chain and help protect Kenya's market reputation.

A second priority is to improve postharvest practices, including storage and transport. Establishing well-located aggregation centers—equipped with shade, clean handling areas, and crates—can reduce losses linked to collection delays, heat exposure, and rough handling, while also making remote farmers more accessible to exporters. Effective operation of these centers relies on sound governance through farmers' groups and cooperatives. Improved route planning and better visibility on pickup times can further help minimize delays. Expanding packhouse capacity closer to western production areas would also shorten first mile distances and speeds entry into the cold chain; it would ease logistics challenges and lead to better farmgate prices.

Finally, Kenya's avocado sector would benefit from investment in decentralized cool- and cold-chain infrastructure and more coordinated market systems. Introducing pre-cooling at aggregation points, piloting cool or insulated transport, and encouraging exporters to co-invest in packhouses would strengthen temperature management and the fruit shelf life.

All these improvements should be accompanied by the development and implementation of export-oriented SOPs that cover all steps of the chain. Practical, widely understood SOPs provide a common operating framework for all actors and help guarantee consistency.

Step 8: Diagnostic

This step brings together the findings from Steps 1–7 to assess the feasibility of a postharvest intervention to strengthen first-mile resilience in Kenya's avocado export supply chain. The diagnostic evaluates both the rationale for intervention (Modules 1 and 2) and the status of the enabling environment (Modules 3–11). Each module is scored on a scale from 1 to 5—1 (very weak), 2 (weak), 3 (moderate), 4 (strong), and 5 (very strong)—with scores jointly agreed by KCC and WUR based on sector knowledge and experience. Figure 11 shows the score overview and Table 6 presents the diagnostic results

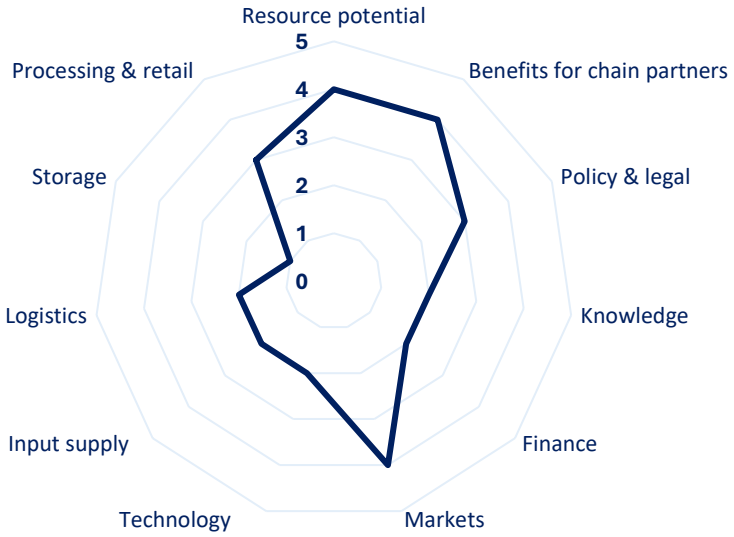

Figure 11: PHAM diagnostic scores

Table 6: PHAM diagnostic

Module	Score	Justification
Resource potential	4	Kenya has a strong natural resource base for avocado production. Highlands across central and western Kenya offer favorable temperatures, adequate rainfall, and a long, regionally staggered harvest window. With production growing—especially westward—the country provides a reliable long-term supply base.
Benefits for chain partners	4	Postharvest interventions generate benefits across all main supply chain actors. Exporters gain from improved fruit quality

		and higher volumes, as they can sell more effectively; this in turn helps strengthen Kenya's reputation in the European market. Over time, better and more reliable quality should be reflected in improved farmgate prices, including for farmers who previously struggled to access exporters due to remoteness. On the European side, higher and more uniform quality reduces arrival losses and operational hurdles for importers, while increased and more reliable volumes enable them to benefit more fully from Kenya's long harvesting window. In an increasingly uncertain global context, having Kenya as an additional dependable sourcing option also enhances flexibility and helps importers manage risk through diversified supply.
Policy & legal	3	HCD, under the AFA, is the primary regulator for horticultural products, including avocados. The AFA Act, No. 13 of 2013 establishes AFA and its directorates and provides HCD's regulatory mandate. The Crops Act (2013) and the Crops (Horticultural Crops) Regulations (2019) provide the legal basis and detailed rules governing production, harvesting, postharvest handling, licensing, and traceability. KEPHIS is the other key regulator. As Kenya's national plant protection organization, it oversees plant health inspections and issues the phytosanitary certificates required for export, ensuring that consignments meet importing countries' SPS requirements. Exporters broadly acknowledge the value of the regulatory framework but point to persistent operational challenges. Enforcement is inconsistent, with perceived preferential treatment in issuing waivers and inspection delays during peak periods that compromise quality[16]. Compliance costs, particularly the high upfront investment in crates without affordable leasing options, undermine confidence in enforcement[16]. On enforcement, immature fruit also remains a major concern, with exporters warning that premature harvesting is still happening and damages Kenya's reputation in export markets[41]. Overall, while the regulatory framework is strong on paper, implementation remains insufficient and uneven in practice.
Knowledge	2	Postharvest knowledge at farmer and aggregator level remains limited. Most smallholders have only a basic understanding of postharvest SOPs, such as maturity testing and proper handling, and many aggregators continue to mix fruit from multiple farms without any form of control or record-keeping. Although multiple farmer training initiatives exist, led by exporters, national and county governments, and development partners (including programs aimed at supporting GLOBALG.A.P. certification), farmers report limited access to these extension services. Overall, the initiatives have not reached sufficient scale to influence

		practices nationally, particularly in newer western production zones. As a result, significant knowledge gaps persist, contributing to inconsistent quality and weak first-mile performance. Smallholder farmers typically also face knowledge gaps in areas such as regulation and compliance, business and legal requirements, and access to finance.
Finance	2	Kenya's agricultural finance landscape is developing, but access to affordable credit for postharvest investments remains costly and limited. Recent studies indicate that agri-SME credit is increasing, yet interest rates remain high—rising from about 12% in 2020 to 14% in 2023—largely due to lender risk and operational costs[42]. Lenders typically require substantial collateral and offer short repayment periods, which increases the effective cost of financing[43]. The Agricultural Finance Corporation (AFC) provides dedicated agricultural credit and operates widely across the country, but uptake of its asset-finance products is constrained by collateral requirements and slow loan-processing timelines[44]. SACCOs (Savings And Credit Co-Operatives) and MFIs (Microfinance Institutions) remain important for short-term working capital, yet they have limited capacity to finance longer-term, capital-intensive investments such as cold rooms, packhouses, or transport assets[45]. One model being explored by AFC involves wholesale lending through SACCOs or community-based organizations, which could be structured as public-private partnerships[44,45]. For smallholders and cooperatives, these financial conditions translate into limited access to capital for postharvest needs—including crates, aggregation infrastructure, and transport equipment. Certification costs, such as GLOBALG.A.P., also add to the financial burden, acting as a barrier to accessing export markets. Overall, the financing environment remains insufficient to support first-mile postharvest improvements at scale.
Markets	4	Global demand for avocados continues to expand, with Europe and the United States expected to remain the main importers through 2030. EU imports grew rapidly between 2000 and 2023 (CAGR of 8%), and per capita consumption in the expanded EU market now averages around 1.7 kg—still far below U.S. levels (4.1 kg). This gap indicates room for further growth, even as some mature markets such as France and Scandinavia show signs of reaching a plateau. Kenya is well positioned to respond to rising demand given its expanding supply base, although competition from Peru remains strong. Beyond Europe, demand is rising across the Middle East, India, and China—where Kenya now has access for both frozen and

		fresh avocados—offering avenues for market diversification. Organic demand in Europe is also growing, and Kenya's largely "organic by default" production gives it a strategic advantage. Processing markets, including avocado oil and frozen pulp, provide additional outlets for lower-grade fruit. Overall, market pull remains strong and supportive of first-mile postharvest interventions.
Technology	2	First-mile technology remains basic: shade structures are limited, raised platforms are largely absent, pre-cooling is not used, and transport relies on non-refrigerated vehicles (let alone CA options). Although some new facilities exist (such as mobile cold rooms and county-level cold storage), their scale and utilization remain low, and several past investments were misaligned with local needs. In contrast, packhouse-level technology is comparatively modern, with established packing lines, grading systems, and cold rooms. While packhouses remain largely concentrated around Nairobi, some new investments are beginning to emerge in the western production region.
Input supply	2	Avocado production relies on access to quality seedlings, fertilizers, pesticides and other crop-protection inputs, irrigation equipment, and basic tools for pruning and spraying. Postharvest handling further requires proper harvesting tools and crates. Although most of these inputs are available locally, smallholders face significant financial constraints, as well as knowledge gaps—particularly regarding the correct use of fertilizers and pesticides. A further critical input is access to dry-matter mobile testing kits. These kits remain prohibitively expensive for most exporters, aggregators, and cooperatives (let alone smallholder farmers), forcing reliance on centralized laboratories in Nairobi—an arrangement that limits operational flexibility, especially for western counties located far from the capital. This contributes to poor harvesting timing and the mixing of batches with different maturity levels, ultimately compromising fruit quality upon arrival in export markets.
Logistics	2	Logistics challenges remain a major barrier to postharvest performance. At the first mile, dispersed and remote farms with low harvest volumes, poor rural road conditions, the use of open non-refrigerated trucks, and long lead times to packhouses—particularly from western counties—expose fruit to damage and heat, reducing quality and shelf life. Further downstream, transport bottlenecks along the Nairobi–Mombasa corridor and congestion at the Port of Mombasa can further degrade fruit quality and shorten remaining shelf life. Internationally, the

		limited availability of direct sailings to Europe forces transshipment through Middle Eastern hubs, resulting in longer transit times, higher risks of missed connections, and reduced flexibility and reliability across the chain. Recent Red Sea disruptions and the resulting rerouting have only amplified these challenges. Efforts to strengthen the logistics backbone are underway. Kenya Railways has introduced reefer wagons with on-board power to enable temperature-controlled transport to Mombasa, and major upgrades along the Northern Corridor are expected to increase road capacity and improve reliability from western counties. In parallel, initiatives to shift more horticultural exports from air to sea are driving enhancements in inbound cold-chain operations at the Port of Mombasa.
Storage	1	Storage capacity in avocado-growing regions remains limited. Many smallholders store harvested fruit on the ground—either under trees or inside homes—and typically keep it in sacks or buckets rather than crates. This exposes the fruit to heat, compression, and mechanical damage, reducing quality and shelf life.
Processing & retail	3	Kenya's fast-growing avocado oil industry provides an important outlet for lower-grade fruit, reducing waste pressure from the fresh-export market. However, many facilities struggle due to inconsistent supply volumes and governance issues, and there are ongoing concerns that demand from oil processors may incentivize premature harvesting[41]. Prices offered by oil processors remain significantly lower than those available in the fresh export market, limiting the income potential for farmers. A smaller yet growing segment involves frozen avocado products, with China currently the main destination. The domestic retail market is also developing, but local prices likewise remain well below export parity.

Step 9: Preliminary outline of intervention

As noted earlier, this assessment—and the Life-Links application it informs—aims to strengthen the resilience of the Kenya–Europe avocado supply chain, with a particular focus on the first mile. This is intended to benefit smallholder farmers as well as other supply chain actors. Two interventions aligned with this focus emerge as the most suitable: aggregation centers and a crate-management company.

Aggregation centers

Description

Aggregation centers serve as designated delivery points where smallholder farmers bring avocados immediately after harvest. Designed for ambient, natural temperature moderation, they typically include shaded roofing, ventilated or open walls, raised platforms, and dedicated sorting and grading spaces. Centers also function as crate banks, enabling distribution of clean crates to farms and the return of filled crates after harvesting. An example of such a facility is shown in Appendix 10.

Infrastructure alone is insufficient. Each aggregation center must be paired with targeted capacity building for the associated cooperative or farmer group—covering proper harvesting, handling, and other postharvest activities—so that improved infrastructure is matched with improved practice. This integrated approach mirrors the Export Supply Hubs (ESHs) (see Step 6), which operate as packhouses 2.0 by combining upgraded facilities with embedded services. Likewise, aggregation centers become collection points 2.0: proper infrastructure supported by strengthened organizational capacity, enabling more reliable quality management at the first mile.

Because smallholder farmers are widely dispersed and road conditions vary, the placement of aggregation centers should be guided by a simple network-optimization approach rather than intuition. Mapping farmer density—and, where possible, their production volumes—helps identify supply clusters and prioritize locations that maximize farmer access while minimizing logistical barriers for exporters.

Benefits and costs

Aggregation centers strengthen first-mile logistics by creating predictable, accessible pickup hubs for farmers and exporters. By consolidating volumes, they reduce transport distances, lower fuel costs, and enable more structured collection routes—making even remote farmers commercially reachable. Improved storage conditions—shade, ventilation, raised platforms, and the use of crates—reduce exposure to sun, heat, and rain; minimize mechanical damage; and allow passive removal of field heat while fruit awaits collection. These upgrades directly enhance fruit quality and extend shelf life. Aggregation centers also function as practical touchpoints for farmer engagement, providing guidance on harvesting, handling, and other postharvest practices.

Evidence shows that well-managed aggregation centers can reduce postharvest losses by up to 20%, and when paired with a structured crate system, total handling and transport losses may fall by 30–40%, resulting in higher farmer incomes and more consistent supply for exporters[4]. When these centers are combined with extension services, the overall impact on loss reduction is expected to be even greater.

On the higher end, aggregation centers cost about USD 25,000[6], covering the structure and basic office space but excluding land, which should remain a farmer-owned contribution. Costs can be reduced by relying on existing community facilities, such as tea buying centers which are common in avocado-producing areas and offer most of the necessary functionality at minimal additional investment. An example of a tea buying center is shown in Appendix 10. Crate requirements add another cost consideration: at 40–50 crates per ton priced at USD 7–10 each, an aggregation center handling up to 10 tons per day in peak season would require roughly USD 2,800–5,000 in crates.

Governance

Management of aggregation centers should be anchored in locally trusted institutions to ensure accountability, transparency, and long-term sustainability. In many areas, cooperatives—whether

newly formed or well-established—are well positioned to oversee daily operations. They can enforce quality protocols, manage cleaning and hygiene, operate crate banks, and coordinate farmer scheduling. In other locations, exporter-organized farmer groups may take the lead, especially where exporters already cluster their suppliers geographically and seek tighter control over quality and collection logistics. A third option is a hybrid public–private arrangement in which county governments invest in basic infrastructure while farmer groups handle day-to-day management, and exporters commit to collection cycles. Together, these governance models provide different pathways for ensuring that aggregation centers function reliably, serve farmer needs, and meet exporter quality requirements.

Crate-management company

Description

A dedicated crate-management company would function as a shared logistics service, managing a centralized pool of crates for the avocado value chain (and other crops where relevant). Crates are essential for reducing damage and maintaining fruit quality, yet they remain scarce due to high upfront costs, frequent losses, and limited storage and rotation capacity among farmers and cooperatives. The crate-management company would purchase, own, and manage the crates stock, supplying crates to farmers, cooperatives, and exporters through rental, deposit-return, or pay-per-use models. It would also handle crate cleaning, redistribution, rotation, and replacement of damaged crate, supported by basic digital tracking tools to ensure accountability and minimize losses.

Benefits and costs

This model offsets the significant capital burden of crate procurement for farmers, cooperatives, and small exporters, while ensuring a steady supply of crates even during peak harvest periods. By replacing sacks and bulk loading with standardized stackable crates, the system reduces damage, improves airflow, lowers handling losses, and increases handling efficiency—especially in the early first mile. Better crate rotation also helps with transport planning and reduces the need for farmers to store crates themselves.

Costs depend on scale and configuration: crates typically cost USD 7–10 in Kenya, and service fees for users may be structured as a small daily rental, a seasonal subscription, or a refundable deposit. Digital tracking introduces an additional cost but considerably improves crate recovery and lifecycle management.

Governance

The crate-management company would operate as an independent service provider, ensuring neutrality and equal access across the value chain. Several governance configurations are possible. The company could be established as a private logistics company, anchored by an investor or consortium of exporters seeking reliable crate supply. Alternatively, it could operate as a public–private partnership, where HCD, counties, or development partners support initial capital expenditure while the company handles operations under commercial or semi-commercial terms. A recent assessment proposed a similar approach, recommending that HCD provide affordable crate-leasing services[16]. Regardless of the model, transparent pricing, reliable delivery schedules, and strong coordination with cooperatives, exporters, and aggregation centers are essential.

Step 10: Risk analysis and mitigation

Aggregation centers

Aggregation centres face several adoption risks. The main challenge is underutilisation, which may arise if centres are poorly located, inconvenient for farmers (or even exporters), or if farmers prefer farm-gate collection. This risk can be reduced by using a network-based optimisation approach that considers farmer density, production clusters, and road conditions—ensuring centres are well placed to improve logistics and connect remote farmers to exporters. Management through cooperatives or organised farmer groups, supported by offtake agreements with exporters and clear operating procedures, strengthens accountability and consistent use. Complementary capacity building on postharvest handling and clear communication of benefits to farmers further encourage adoption.

Financial sustainability is another concern. Centres may struggle to cover maintenance and staffing costs, particularly during low seasons, and farmers may initially resist service fees. Keeping infrastructure simple and low-cost helps limit expenses, while cooperative or exporter-linked governance structures provide built-in management capacity. As farmers gain price premiums for better-quality fruit, their willingness to pay modest fees increases—especially when benefits for quality and market access are evident. Serving additional crops can also diversify revenues and improve returns.

Governance risks are equally important. Weak cooperative management, poor record-keeping, or conflicts around crate allocation can erode trust and drive farmers back to informal systems. Assigning management to locally trusted entities, maintaining transparent records, and ensuring regular communication among members help sustain confidence and reliable operations.

Crate-management company

The crate-management company faces operational risks linked to crate loss, theft, and irregular return cycles. As crates are expensive, unmanaged circulation can quickly undermine the business model. These risks can be mitigated through clear user agreements, visible crate identification, and a simple digital tracking system to monitor circulation and enforce accountability.

Financial risks may emerge if adoption is slower than expected or if service fees are perceived as unaffordable by smallholders or cooperatives. To address this, different pricing structures—such as daily rental, refundable deposits, or seasonal subscriptions—should be tested through a feasibility or quick-scan study to determine the most viable options, and the business case must be grounded in farmers' operational and financial realities.

Governance risks include lack of transparency, inconsistent service, or dominance by a single exporter or private actor. These can be mitigated by maintaining a neutral ownership and management structure—either as an independent logistics enterprise operating under clear service-level agreements, or as a light private or public–private partnership involving multiple exporters. Transparent pricing, accountability mechanisms, and strong stakeholder coordination are essential to preserve trust and ensure equitable access.

Company-level assessment

This section moves from the broader value-chain assessment to the company level, drawing on two reference cases from western Kenya—Cooperative 1 and Exporter 5, as introduced in Appendix 5. Both are emerging actors in the region: Cooperative 1 is a smallholder organisation supplying the export market and Exporter 5 sources largely through organised farmer groups.

Using these two cases, the company-level assessment helps determine the appropriate technology level for an aggregation centre. Although both aggregation centres and a crate-management company were identified earlier as potential interventions, the latter requires a distinct analytical framework and is therefore not examined further at this stage.

Cooperative 1	Cooperative 1 is a leading avocado cooperative in western Kenya. It operates across all six sub-counties of its county and has grown rapidly since its establishment in 2019. Membership has expanded from a few dozen farmers to over 1,200—most of them smallholders cultivating 10–30 trees—making it the largest organized avocado group in the region. The cooperative plays a central role in aggregating volumes for the export market. Annual supply has increased from about 3 tons in 2020 to more than 135 tons handled between January and August 2024. It works with major exporters and has recently obtained its own export license. To ensure quality, the cooperative deploys trained harvesters and coordinates collection logistics, though operational challenges persist: it faces delays due to poor road networks and limited crate availability, and struggles with high transport costs, especially when collecting from remote farmers. It thus considers setting up small aggregations centers to facilitate the collection. The cooperative currently operates a large aggregation facility on its premises, used mainly as a cold room, and aims to upgrade this into a fully functional packhouse as its operations scale.
Exporter 5	Exporter 5 is a major agribusiness in western Kenya that has diversified from its core tea operations into avocado exports, leveraging a long-established trust network with local smallholder farmers. Its sourcing model combines production from the company's own 50-hectare commercial farm—currently under expansion—with procurement from surrounding farmer groups. Smallholders are integrated both to increase supply volumes and to support the company's broader commitment to local livelihoods. The exporter applies the same structured outgrower model used in its tea business, organizing suppliers into farmer groups that serve as focal points for training, harvest coordination, quality control, and logistics. As the company expands to reach more remote farmers, it sees aggregation centers as key to scaling its supplier network while maintaining consistent quality standards. To strengthen its avocado supply chain, the company plans to establish a dedicated packhouse near its farm, reducing reliance on facilities in Nairobi and improving operational efficiency.

The company-level assessment follows the steps outlined in the PHAM, including identifying the market level and the food-system level, which together inform the appropriate technology level of the aggregation centers.

Step 11: Market level

Both reference cases are fully export-oriented, which aligns with the focus of this assessment. Cooperative 1 currently supplies major exporters and has begun piloting its own direct exports to Belgium and the Netherlands following the acquisition of an export license. Exporter 5 is already well established in the European market and works directly with importers.

Step 12: Food system level

Both reference cases operate primarily within a traditional food system, as they source from smallholder farmers whose livelihoods depend on a mix of staple and cash crops—such as tea, bananas, and maize—and for whom avocados represent only one component of household income. These producers rely on traditional practices and have limited access to inputs and knowledge.

However, there are emerging elements of transition. Cooperative 1 has ambitions to professionalize and eventually function as a fully-fledged exporter, positioning itself closer to the intermediate food system level despite its traditional farmer base. Similarly, Exporter 5 operates as a modern agribusiness, integrating farmers through structured outgrower groups and more formalized supply-chain management.

Overall, while the farmers remain embedded in a traditional system, the organizations supporting them show characteristics of more advanced food-system levels.

Step 13: Technology level

Based on the market level (export) and the food-system level (positioned between traditional and intermediate), the appropriate technology level for the reference cases falls in the traditional–intermediate range (see Figure 12). This implies that aggregation centers should remain relatively simple and low-cost, while still incorporating essential features that support export quality.

In practice, this means basic sheds with sufficient space for sorting and grading, raised platforms to keep fruit off the ground, and passive cooling achieved through roofing, natural shade, and adequate ventilation. Active cold chain systems are not required at this stage.

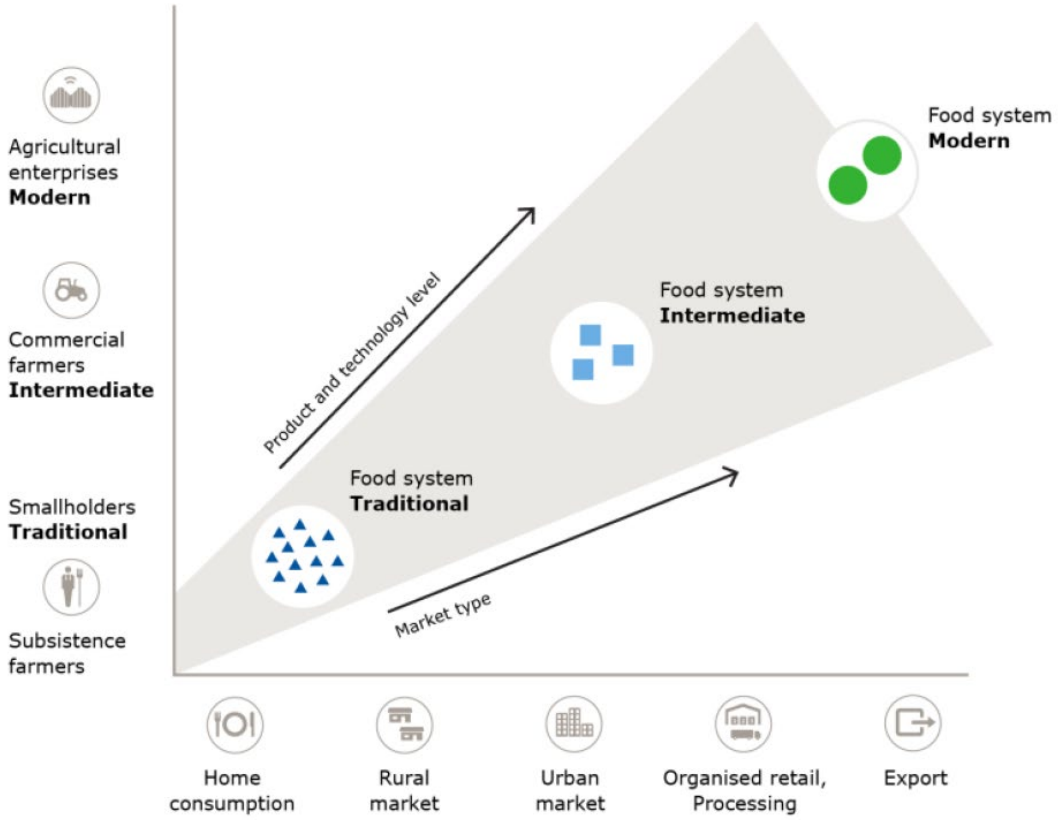

Figure 12: Technology level as a function of market and food system levels
Source: Verschuur et al., 2025

Step 14: Additional assessment needs

Before proceeding with investment and rollout, several aspects require further analysis. A practical assessment of the operating conditions for the aggregation centers is needed, specific to the context of each selected partner for this intervention. This should include a socio-economic assessment to identify factors influencing community acceptance and adoption of aggregation centers. Finally, a comprehensive business case should be developed, integrating these insights and accounting for future market and production developments.

Influence and control

The rollout and long-term success of aggregation centers will depend on the coordinated actions, incentives, and influence of multiple stakeholders across the avocado value chain. The following steps outline the key actors directly responsible for implementation, those exerting influence, and the broader systemic factors shaping adoption and sustainability.

Step 15: Responsible for actions

The successful implementation of aggregation centers depends on coordinated contributions from several actors across the value chain, each with distinct roles and levels of influence. Primary responsibility lies with cooperatives and farmer groups, who are best positioned to establish and operate the centers given their proximity to producers and their role in organizing supply. They should be in the lead.

Exporters also play a critical enabling role, particularly by committing to predictable offtake volumes and potentially co-investing in the infrastructure. Their involvement strengthens commercial viability, ensures quality alignment, and reduces market uncertainty for farmers.

Finally, development organizations—such as KCC or similar partners—can provide essential support through technical guidance, SOPs, and partial co-investment. Their participation helps de-risk adoption and ensure compliance with export requirements.

Before investment begins, the economic added value for all parties—both farmers or farmer groups and exporters—must be clearly demonstrated. A transparent framework agreement should define roles, responsibilities, and benefit-sharing mechanisms to ensure feasibility, mutual commitment, and accountability. Together, these elements create a shared-responsibility model where farmer groups or cooperatives lead implementation, exporters anchor demand, and development partners provide the technical and financial scaffolding for successful rollout.

Step 16: Influence by other actors

Beyond the core implementing partners, several other actors in the food system influence the success of aggregation centers. Importers, who increasingly seek diversified and extended supply windows, stand to benefit from more reliable volumes from western Kenya—especially if the season can be stretched toward December. Their willingness to guarantee offtake, alongside exporters, can strengthen market security and incentivize investment.

County governments also exert significant influence. Through co-financing, provision of land, or integration into county-level agricultural programs, they can accelerate the establishment of aggregation centers and ensure alignment with local development priorities.

Step 17: Other means of influence

Several broader system-level forces shape the incentives for adopting aggregation centers. Market requirements from European importers—particularly for consistent quality, uniform maturity, sufficient volumes, and full traceability—create commercial pressure for exporters and their suppliers to improve first-mile practices. Aggregation centers directly support these demands.

Regulatory frameworks, especially those enforced by HCD, also reinforce the shift. Rules on harvesting windows, dry-matter requirements, and the mandated use of plastic crates indirectly encourage more centralized and controlled aggregation practices.

Financial actors also exert influence. Banks, development financiers, and donor programs can condition credit or support on improved postharvest handling or organizational strengthening, creating economic incentives for cooperatives and exporters to invest in aggregation centers.

Outcome

Step 18: Summary of assessment outcome

This assessment confirms Kenya's strong position in the global avocado sector and its growth potential, supported by favorable agro-ecological conditions, expanding harvested area as well as expanding markets. However, significant first-mile challenges constrain overall performance. Postharvest losses in export-oriented chains are estimated at 13–33% and can exceed 40% in some cases. Most losses occur at the first mile, before fruit enters controlled handling environments, driven by poor harvesting and handling practices, long collection times, limited aggregation and storage capacity, and inadequate transport conditions. Although progress has been made in recent years, these improvements remain insufficient especially given the pace of production growth, and climate change is expected to further intensify existing vulnerabilities.

First-mile challenges are most pronounced among smallholder farmers, who face limited technical support and restricted access to finance. The more remote the location, the harder it becomes for them to work directly with exporters, and the greater the operational difficulties. Many depend on aggregators, who offset losses by offering lower prices. For exporters, these challenges constrain growth and supply reliability, while for importers they result in inconsistent quality upon arrival and volumes too small to position Kenya as a reliable source.

The assessment identifies aggregation centers as a means to improve collection, handling, and short-term storage under cooperative management, and a crate-management company to ensure affordable and reusable packaging for smallholders and exporters.

Aggregation centers	Aggregation centers are designated delivery points where smallholder farmers bring avocados immediately after harvest. They provide shaded, ventilated spaces with raised platforms for sorting and grading, helping to reduce damage and exposure to heat or rain. These centers also serve as crate banks, allowing the distribution and return of clean crates. Managed by cooperatives or farmer groups, they function as structured collection points that make smallholder supply more accessible to exporters and ensure quality control. Each center should include a capacity-building component to ensure that participating farmers apply good harvest and postharvest practices.
Crate-management company	The crate-management company is a shared logistics service that owns and manages a common pool of plastic crates used across the value chain. Because crates are expensive and often unavailable to farmers, this system rents or leases them to users on affordable terms, handles cleaning and redistribution, and tracks circulation to prevent losses. It replaces the widespread use of sacks or bulk loading, which causes fruit damage, and ensures that high-quality, reusable crates are continuously available for harvesting and transport.

Together or independently these interventions can strengthen the resilience of the Kenya–Europe avocado supply chain by improving quality consistency and supply reliability, to the benefit of all actors along the chain—as well as consumers at the end of it.

Appendices

Appendix 1: List of interviewees

Table 7 provides an overview of all individuals interviewed for the assessment, including farmers, cooperatives, aggregators, exporters, importers, retailers, and sector experts. For each interviewee, the table summarizes the type of organization they represent, their role within that organization, and the country where they operate.

Table 7: List of interviewees

Interviewee ID	Description of interviewee's organization	Description of interviewee	Country of interviewee's organization (or of interviewee)
Farmer 1	*NA*	Smallholder farmer, also heading a small group of farmers	Kenya (Murang'a)
Cooperative 1*	Established cooperative of +1000 members	Head of the cooperative and its board; also smallholder farmers	Kenya (Nandi)
Cooperative 2	Established cooperative of +100 members	Head of the cooperative; also a smallholder farmer	Kenya (Nyamira)
Cooperative 3	Established cooperative of +100 members	Head of the cooperative	Kenya (Kisii)
Cooperative 4*	Established cooperative of +100 members	Head of the cooperative and its board; also smallholder farmers	Kenya (Uasin Gishu)
Aggregator 1*	*NA*	Independent aggregators	Kenya (Nairobi)
Exporter 1*	Sources from central and western counties; operates a packhouse in Nairobi	Packhouse operators	Kenya (Nairobi)
Exporter 2	Sources from central and western counties; also has its own farm; operates a packhouse in Nairobi	Management	Kenya (Nairobi)
Exporter 3*	Sources from western counties; also has its own farm (not at maturity yet)	Management	Kenya (Nairobi)

Exporter 4	Sources from western counties	Management	Kenya (Uasin Gishu)
Exporter 5*	Sources from western counties; also has its own farm	Sourcing	Kenya (Bomet)
Exporter 6*	Sources from central and western counties; also has its own farm; operates a packhouse in Nairobi	Sourcing	Kenya (Bomet)
Exporter 7*	Has its own farm; does not source from smallholder farmers but provides seedlings and trainings	Management	Kenya (Uasin Gishu)
Importer 1	International; organic only	Sourcing	Netherlands
Importer 2	Regional	Sourcing	Spain
Importer 3	International; organic only	Management	Germany
Importer 4	Regional	Sourcing	Spain
Importer 5*	Global	Sourcing	Netherlands
Importer 6	International	Management	France
Importer 7	Global	Management	United Kingdom
Importer 8	International	Sourcing	Netherlands
Importer 9	International	Sourcing	Spain
Importer 10	International	Sourcing	Netherlands
Importer 11	Regional	Sourcing	Belgium
Importer 12	Regional	Management	Belgium
Importer 13	Global	Management	South Africa
Retailer 1*	Global	Management	Belgium
Expert 1*	HCD	National staff	Kenya (Nairobi)
Expert 2*	Industry association for fresh produce	Management	Kenya (Nairobi)
Expert 3*	Development organization (governmental)	Management	Kenya (Nairobi)
Expert 4	County government	Management	Kenya (Kisii and Nyamira)
Expert 5	HCD	Local staff	Kenya (Kisii and Nyamira)

Expert 6*	Development organization (governmental)	Programs	Kenya (Nairobi)
Expert 7*	HCD	Local staff	Kenya (Uasin Gishu)
Expert 8	Farmers' group of +500 members	Head of a farmers' group; also a smallholder farmer	Kenya (Uasin Gishu, Nandi, Baringo, and Trans Nzoia)
Expert 8	Development organization (governmental)	Management	Kenya (Uasin Gishu)
Expert 9*	HCD	Local staff	Kenya (Nandi)
Expert 10*	Development organization	Programs	Kenya (Nairobi)
Expert 11	Development organization (governmental)	Programs	Netherlands
Expert 12*	Academia	Lecturers	Netherlands

** More than one person interviewed*

Appendix 2: Farmgate prices in western Kenya

Table 8 presents farmgate prices for avocados produced in western counties, showing how values differ across the export, local, and oil-processing markets. Across all regions where comparable data are available, export channels consistently offer the highest prices, typically about double—and in several cases up to triple—the prices paid in the local market. Oil-processing prices generally align with local market levels and remain the lowest-paying outlet. Overall, the data illustrate a clear market hierarchy in which export buyers provide the most favorable returns to farmers. Prices in central counties are generally slightly higher, due to lower transport costs, although it remains unclear whether quality differences also play a role[6].

Table 8: 2025 farmgate prices in western Kenya by market outlet (export, local market, and oil processing)

Location	**Export market (KES/kg)**	**Local market (KES/kg)**	**Oil plant (KES/kg)**	**Source**
Cross	*55-150*	*20-60*	*20-50*	
Nandi	55-100	~60	35-50	Cooperative 1
Nandi	60-80	30-50	30-50	51
Nandi	67-100	30-40		18
Meru	52		20-25	2
Uasin Gishu	60-100			Expert 5
Uasin Gishu	80-100 (season 1); 140-150 (season 2)	20-50	20-50	Expert 5
Nyamira	80-140	20-30	20-30	Cooperative 2
Kisii	60-100			Expert 4
Kisii	100-120		~22	Expert 5

Appendix 3: Import prices in Europe

Figures 13, 14, and 15 present import prices (CIF) per kilogram for the three main avocado-exporting countries supplying Europe in 2021, 2022, and 2023. Across all three years, price patterns are remarkably consistent, with Kenya averaging about 5% below Peru and 4% below Colombia. A notable seasonal trend is the sharp price decline during Peru's peak export window (June–September), when increased volumes entering Europe drove prices down by 11% in 2021, 15% in 2022, and 32% in 2023 compared with the rest of the year.

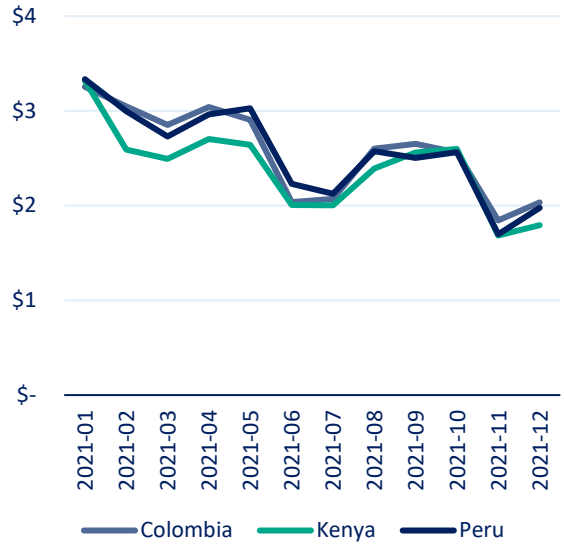

Figure 13: Monthly avocado prices (CIF, USD) in 2021 for main exporting countries serving the EU market

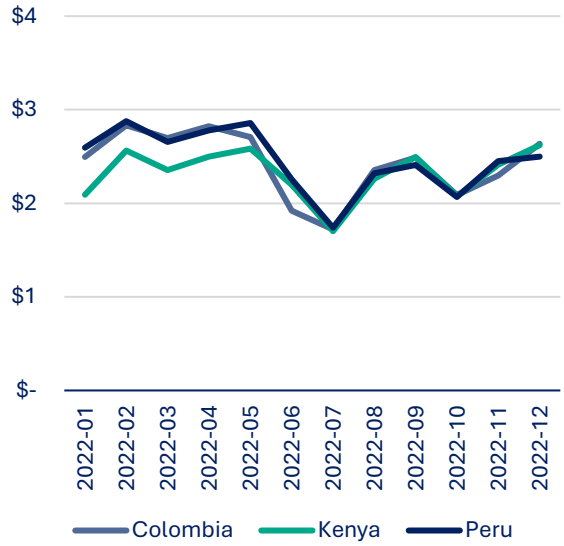

Figure 14: Monthly avocado prices (CIF, USD) in 2022 for main exporting countries serving the EU market

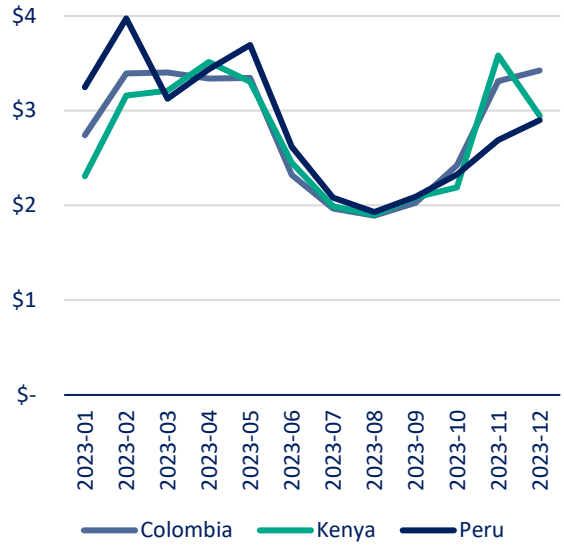

Figure 15: Monthly avocado prices (CIF, USD) in 2023 for main exporting countries serving the EU market

Source (Figures 13-14-15): United Nations, 2025

Appendix 4: Gross county product per capita in Kenya

Table 9 presents the Gross County Product (GCP) per capita for all 47 counties in Kenya, expressed in Kenyan shillings (KES) for the year 2022. The simple (non-weighted) average across counties is KES 198,064 (equivalent to approximately USD 1,700 using the 2022 average exchange rate). The median is slightly lower, at KES 181,492 (around USD 1,500).

Table 9: Gross county product per capita in Kenya (KES), 2022

County	GCP/capita (KES)	County	GCP/capita (KES)
Nairobi City	723.335	Narok	173.883
Mombasa	439.390	Kilifi	164.626
Nyeri	293.944	Kwale	164.048
Embu	292.827	Vihiga	163.068
Nyandarua	290.577	Kajiado	151.330
Kiambu	277.147	Marsabit	146.733
Nakuru	261.188	Bungoma	145.439
Machakos	257.025	Kakamega	140.535
Kisumu	254.663	Homa Bay	134.223
Meru	253.718	Kitui	133.037
Kirinyaga	248.397	Siaya	131.469
Elgeyo-Marakwet	247.276	Migori	131.203
Lamu	246.186	Baringo	130.030
Uasin Gishu	239.905	Turkana	129.040
Murang'a	225.007	West Pokot	128.520
Nyamira	221.382	Busia	121.582
Laikipia	217.284	Makueni	116.947
Kericho	216.953	Tana River	102.310
Bomet	210.134	Isiolo	102.008
Nandi	206.348	Samburu	100.013
Taita-Taveta	195.787	Garissa	75.662
Kisii	193.482	Wajir	73.021
Tharaka-Nithi	189.339	Mandera	67.518
Trans Nzoia	181.492	—	—

Source: KNBS, 2023

Figure 16 maps the values from Table 9 across the country. GCP per capita is highest in the central counties, with another concentration around Mombasa. Moving away from central Kenya toward the west, GCP per capita generally declines—though western counties still rank above much of the eastern and northern regions.

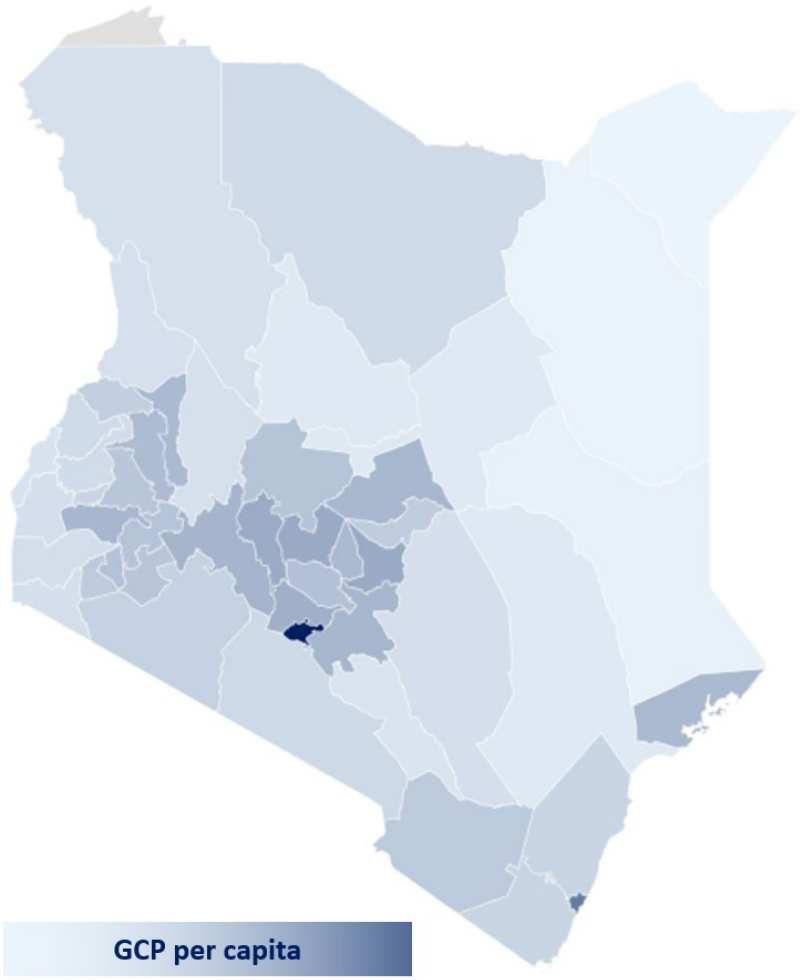

Figure 16: Gross county product per capita in Kenya, 2022
Source: KNBS, 2023

Appendix 5: Different modus operandi for harvesting and transport in western Kenya

Table 10 presents the different modus operandi for harvesting and transport. It covers the cooperatives and exporters consulted during the assessment phase; it includes only those for which sufficient information was gathered.

Table 10: Different modus operandi for avocado harvesting and transport in western Kenya (detailed view)

Cooperative 1	Harvesting is managed by the cooperative. Transport to their aggregation center (one location) is also managed by the cooperative with its limited resources (one truck and a small number of crates). It collects the fruit directly from the farms but plans to establish collection centers to streamline this process. The exporters manage transport from the aggregation center to their packhouses.
Cooperative 2	Harvesting is managed by the exporters, except for farmers in remote areas who must harvest themselves and bring the fruit to informal collection points. Transport up to the packhouses is also managed by the exporters, who collect the fruit from accessible farms and from these collection points.
Cooperative 3	Harvesting is managed by the cooperative. Transport up to the packhouses is managed by the exporters, although farmers in remote areas may be asked to bring their fruit to collection points.
Cooperative 4	Harvesting is managed by the cooperative. Transport to their aggregation center (one location) is also managed by the cooperative using funds provided by the exporters, with plans to take this over fully once they can acquire their own vehicles. The exporters manage transport from the aggregation center to their packhouses.
Exporter 2	Harvesting on smallholder farms is managed by the farmers but the exporter sends a quality control officer to ensure that only fruits meeting the required size and quality standards are picked. Transport up to the packhouse is managed by the farmer (or the aggregator when involved). The exporter also sources from its own farm.
Exporter 4	Harvesting on smallholder farms is managed by the exporter, using their own trained harvest teams. Farmers bring the harvested fruit to collection points, from where the exporter manages transport to the packhouse.
Exporter 5	Harvesting on smallholder farms is generally managed by the exporter, although experienced farmers in remote areas may harvest themselves when access is difficult. Transport up to the packhouse is managed by the exporter, with some remote farmers asked to bring their fruit to collection points. The exporter also sources from its own farm.
Exporter 6	Harvesting on smallholder farms is generally managed by farmers' own workers under the exporter's guidance, while the exporter deploys its own teams on larger farms. Transport up to the packhouse is managed by the exporter, although some farmers must bring their fruit to nearby collection points when direct farm access is difficult. The exporter also sources from its own farm.

Source: Interviews

Appendix 6: Sea freight routes between Kenya and Europe

Table 11 presents the main sea-freight routes between Kenya and Europe based on 2021 data, prior to the Red Sea crisis. At that time, the only direct service from Mombasa to Europe was a route to Genoa, operating at a frequency of once every 10 days. All other routes required transshipment in the Middle East (in Saudi Arabia or Oman) before onward shipment to European ports.

Table 11: Sea freight routes between Kenya and Europe

Shipping line	Destination	Transshipping	Travel days		
			Ideal	Realistic	Disaster
CMA	Rotterdam	Jeddah	28	35	35
	Marseille	Jeddah	25	32	32
	Genoa	Jeddah	22	29	29
Maersk	Rotterdam	Salalah & Algeciras	24	31	38
	London	Salalah	28-29	35	42
MSC	Rotterdam	King Abdullah	24-28	31-35	42
Messina	Genoa	Direct	21	21	31

Source: Embassy of the Netherlands, 2021

Appendix 7: Road infrastructure projects in Kenya

Kenya currently has a road project underway, designed to make the connection between western Kenya and Nairobi significantly faster and more reliable. There is also a proposal for the Nairobi–Mombasa Expressway meant to link Nairobi to Mombasa, leading to shorter travel time and improved freight efficiency.

The Rironi–Nakuru–Mau Summit (A8) Highway expansion is a major upgrade of the Northern Corridor, widening and modernizing the route through Kiambu, Nyandarua, and Nakuru to ease pressure on one of Kenya's busiest freight corridors[46,47,48]. The improved road will shorten travel times between Nairobi, Naivasha, Nakuru, and the wider western region[46,47,48], thereby improving market access and logistical efficiency for avocado producers in western Kenya. Construction officially began in November 2025[46], and the project is planned for completion by 2027[47].

The Nairobi–Mombasa Usahihi Expressway was a proposed 459-km tolled highway designed to provide a new, high-standard four-lane corridor from Nairobi to Mombasa[49,50]. Although it promised faster travel and smoother logistics, which would have supported the avocado value chain by reducing transport times to export hubs at Mombasa (from 12-10 hours to 4-5 hours)[49,50], concerns emerged over its high construction and land-acquisition costs, and the toll levels required for viability[49]. After reviewing the proposal, the National Treasury determined it did not meet PPP criteria, and the project was formally rejected and redirected to focus instead on upgrading the existing Nairobi–Mombasa highway and resubmit the evaluation[49].

Appendix 8: Avocado imports to Europe

Figure 17 presents EU avocado imports from 2000 to 2023, shown in both volume and value. Import volumes grew at a CAGR of approximately 8% over this period, while import value increased even more rapidly, at around 13% CAGR.

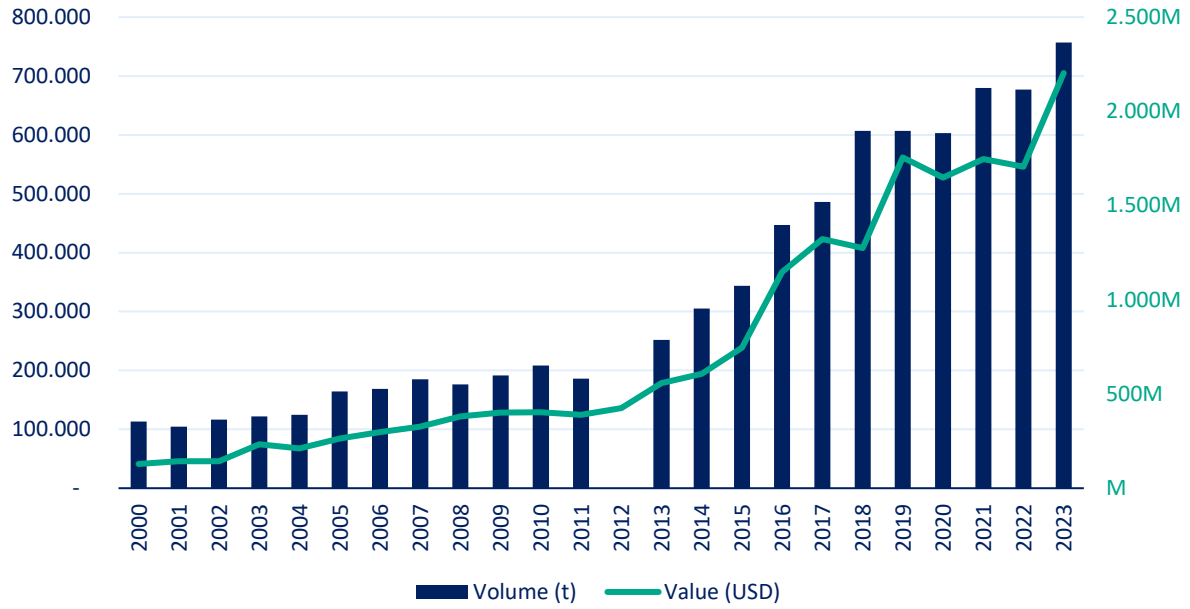

Figure 17: Avocado imports to the EU since 2000, in volume and value
Source: United Nations, 2025 | Note: Volume data for 2012 is missing

Appendix 9: Climate in Kenya

Kenya's agro-ecological zones can be grouped into three broad categories: humid, semi-arid, and arid. Figure 18 shows their spatial distribution. Table 12 outlines the main characteristics of each agro-ecological zone, including climatic conditions.

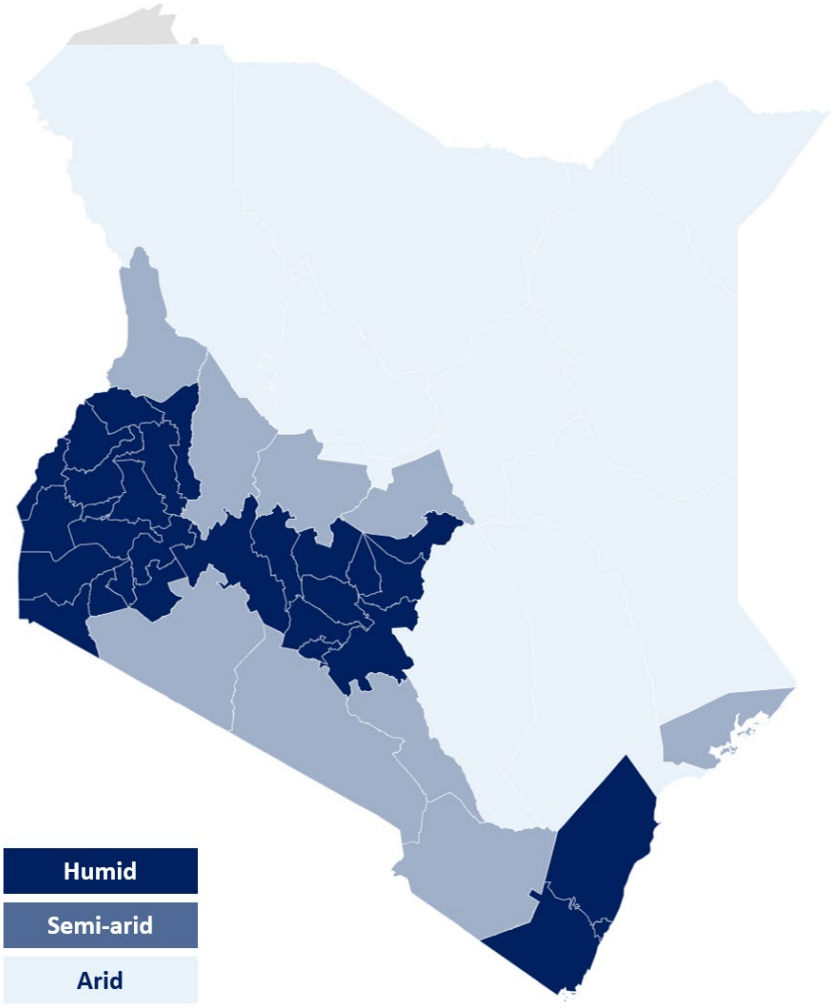

Figure 18: Humid, semi-arid, and arid zones in Kenya
Source: Enviu, 2023

Table 12: Conditions for humid, semi-arid, and arid zones in Kenya

	Humid (zones I.-III.)	Semi-arid (zones IV.-V.)	Arid (zones V.-VII.)
% of total land cover	12%	20%	68%
Annual rainfall (mm)	800-2700	400-1100	150-550
Moisture content	>50%	26-50%	<25%
Average temperature	<18°	18-30°	<30°
Common value chains	tea, coffee, dairy, vegetables, fruits	grains, cereals, tubers, fruits	livestock

Source: Enviu, 2023

Appendix 10: Aggregation centers

Figure 19 shows an avocado aggregation center which opened in 2025 (of Kapsosio Green Gold Avocado Farmers' Cooperative, in Uasin Gishu county, see Step 6). Figure 20 and Figure 21 show a tea buying center which also opened in 2025 (in Gathima, Kiambu county).

Figure 19: Avocado aggregation center
Source: Authors

Figure 20: Tea buying center
Source: Nyeri Mohoro NewsHub, 2025

Figure 21: Tea buying center (inside)
Source: Nyeri Mohoro NewsHub, 2025

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