

EUDR Coffee — Geolocation & Traceability Requirements

commodity	coffee
regulation	EU Regulation 2023/1115 (EUDR)
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cutoff_date	2020-12-31
enforcement_large	2024-12-30
enforcement_sme	2025-06-30
primary_country	Colombia
schema_version	1.1
last_updated	2026-05-27

Geolocation Specifications Under Article 9

The EUDR's geolocation requirement is the most technically demanding element of compliance for the coffee sector. The regulation distinguishes two cases based on plot area:

- **Plots > 4 hectares:** A polygon boundary is required — a set of latitude/longitude coordinate pairs (WGS84 datum) defining the perimeter of the production area. The polygon must be sufficiently precise to enable satellite-based deforestation monitoring. For Colombian coffee, this applies primarily to larger estates (haciendas) in departments like Caldas, Quindío, and parts of Antioquia.
- **Plots ? 4 hectares:** A single geolocation point (latitude, longitude) is sufficient. Given that the vast majority of Colombian coffee farms are under 4 hectares, the point-based requirement applies to the bulk of the sector. However, precision matters: coordinates must have at least 5 decimal places (approximately 1.1-metre accuracy at the equator) to enable meaningful satellite cross-referencing.

GPS Data Collection Methods for Smallholder Coffee Farms

Collecting geolocation data from 540,000 Colombian coffee farms requires scalable, cost-effective methods:

- **Smartphone GPS (assisted GPS/A-GPS):** Modern smartphones achieve 3–5 metre horizontal accuracy under open sky conditions. The FNC's extensionistas can use mobile apps (e.g., ODK Collect, KoBoToolbox, or custom apps) to record GPS waypoints during farm visits. Challenges: canopy cover in shade-grown coffee can degrade GPS accuracy to 10–15 metres; multipath errors in mountainous terrain are common.
- **Handheld GPS receivers:** Dedicated devices (Garmin eTrex, Trimble R1) offer 2–3 metre accuracy with SBAS correction. More expensive than smartphones but more reliable under canopy. Already used by some FNC extensionistas for SICA updates.

- **RTK/PPK GNSS:** Real-Time Kinematic or Post-Processed Kinematic systems achieve centimetre-level accuracy. Overkill for EUDR point requirements but valuable for polygon boundary mapping of larger plots. High equipment cost (USD 5,000–15,000) limits deployment to cooperatives or aggregation points.
- **Drone-based photogrammetry:** UAVs equipped with RTK GNSS can map plot boundaries with centimetre precision. Useful for polygon generation on medium-to-large farms. Regulatory constraints (Colombian CAA/Aerocivil drone regulations) and cost limit broad deployment.
- **Satellite-derived boundaries:** Using very high-resolution (VHR) optical imagery (Planet SkySat at 50 cm, Maxar WorldView at 30 cm) to digitize farm boundaries. Scalable but requires manual or AI-assisted delineation. The EU Joint Research Centre (JRC) is developing tools for this approach.

SICA as a Geolocation Foundation

The FNC's SICA database represents the most comprehensive existing geolocation resource for Colombian coffee. SICA contains:

- Farm centroid coordinates for over 540,000 registered fincas
- Parcel-level data including area planted to coffee (hectares), coffee variety (Castillo, Caturra, Colombia, Typica, Bourbon), plant age, and shade tree species
- Historical update records from extensionista visits

SICA's limitations for EUDR compliance include: variable coordinate precision (some older records use 3–4 decimal places), incomplete polygon coverage (most farms have centroids only, not boundaries), and update frequency (some records may not reflect recent changes in planted area). Upgrading SICA to EUDR-grade precision is a priority project that several CLP-affiliated startups and international development partners are supporting.

Satellite Verification for Deforestation-Free Status

The deforestation-free verification step requires comparing the geolocated plot against historical satellite imagery to confirm no forest loss occurred after the 31 December 2020 cutoff. Key platforms and data sources:

- **Global Forest Watch (GFW):** Operated by the World Resources Institute (WRI). Provides annual tree cover loss data based on Landsat imagery (30 m resolution). Free and publicly accessible. The GFW API can be queried programmatically with geolocation coordinates to check for alerts. Limitation: 30 m resolution may miss small-scale deforestation on fragmented smallholder plots.
- **IDEAM/SMBYC:** Colombia's Instituto de Hidrología, Meteorología y Estudios Ambientales operates the Sistema de Monitoreo de Bosques y Carbono. SMBYC produces quarterly deforestation bulletins at 12.5-metre resolution (using Sentinel-1 SAR data) — significantly more granular than GFW. The Early Warning System (AT-D) provides near-real-time alerts. IDEAM data is the authoritative national source and should be the primary reference for Colombian coffee EUDR compliance.
- **Copernicus/Sentinel-2:** EU's own satellite constellation providing 10-metre multispectral imagery with a 5-day revisit time. Free data via Copernicus Open Access Hub. Sentinel-2 NDVI time series can detect forest-to-agriculture conversion. The EU may require Sentinel-2 as the baseline verification source given it is an EU-operated system.
- **Planet Labs (PlanetScope):** Commercial constellation providing daily 3-metre imagery globally. High temporal frequency enables detection of rapid land use change. Planet's Forest Carbon Diligence product is specifically designed for EUDR-style verification. Cost: commercial subscription required.
- **NICFI (Norway's International Climate and Forests Initiative):** Provides free access to high-resolution Planet basemaps (4.77 m) for tropical countries, including Colombia. Monthly mosaics since September 2020 — almost exactly aligned with the EUDR cutoff date. NICFI data is the most cost-

Traceability Architecture: From Farm to Port

EUDR compliance requires an unbroken chain of custody linking the exported consignment to the geolocated production plot. For Colombian coffee, this chain typically involves:

1. **Farm level:** Caficultor harvests cherry, performs wet processing (despulpado, fermentation, washing) on-farm. Parchment coffee (café pergamino) is dried. The farm is identified by cédula cafetera number and SICA GPS coordinate.
2. **Purchase point (punto de compra):** Parchment coffee is sold to a cooperative, private buyer (comercializador), or directly to the FNC at a guaranteed minimum price (precio de sustentación). The purchase transaction records the seller's cédula cafetera, volume (kg), and quality grade. This is the critical aggregation point where farm-level traceability must be maintained.
3. **Dry mill (trilladora):** Parchment is hulled to produce green (excelso) coffee. Almacafé operates the FNC's trilladoras. Lot identity must be preserved or, if blending occurs, the lot must carry geolocation data for all contributing farms.
4. **Export warehouse:** Green coffee is graded, sampled, and prepared for shipment. The ICO (International Coffee Organization) export certificate and Colombian export documentation (DEX — Declaración de Exportación) are prepared.
5. **Port (Buenaventura, Cartagena, Santa Marta, Barranquilla):** Container loading. The DDS (Due Diligence Statement) must be submitted to the EU Information System before the shipment clears EU customs.

Blockchain and digital platforms (Farmer Connect, IBM Food Trust, iFinca) can create tamper-evident records at each step. However, the critical weak link remains the purchase point, where parchment from multiple farms may be commingled. Maintaining lot segregation or digital mass-balance at this node is essential for EUDR compliance.

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