



SVSYSTEMS

INDEX / SUPPLY CHAINS / BANANA

From a lab in Ecuador to a shelf in Tashkent

Uzbekistan is 1 of 2 doubly landlocked countries in the world. Almost all of its bananas come from Ecuador. This is the route a banana takes, and the clock it races once it is cut.

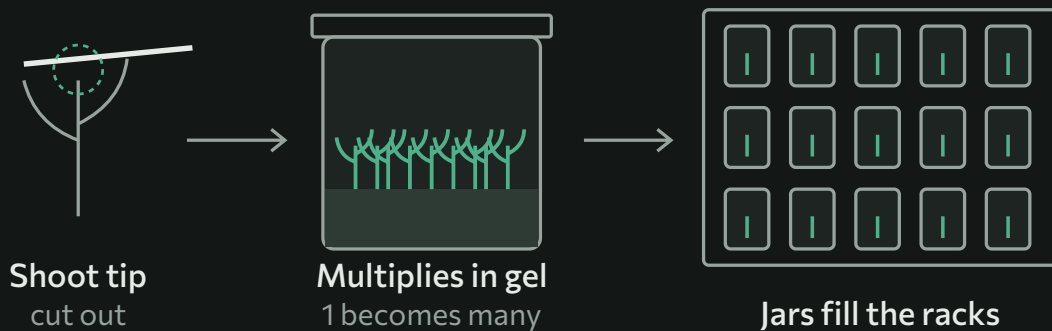
Scroll to follow it. Figures are from public records, dated October 2026. Tags mark what is calculated and what still needs a source.

The lab

Guayaquil, Ecuador

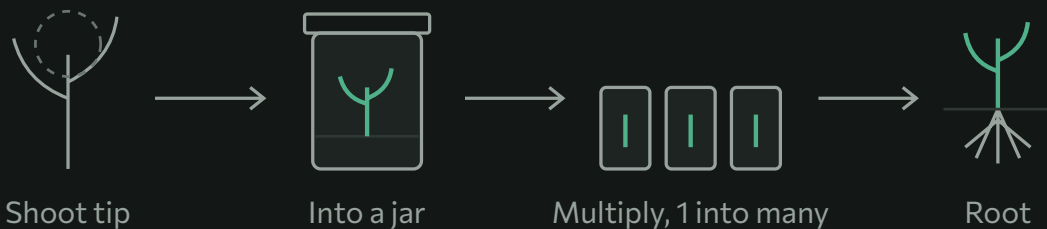
Commercial bananas do not grow from seed. A Cavendish plant is cloned from a shoot tip in a sterile lab, multiplied in jars, then rooted. CIBE, the biotechnology centre at ESPOL in Guayaquil, has propagation protocols for more than 30 banana and plantain varieties.

CLONING A BANANA PLANT

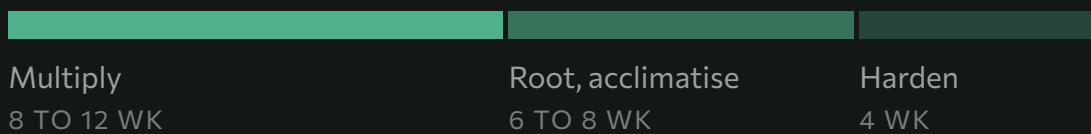


EVERY PLANT IS A CLONE OF THE PARENT, SO THE FRUIT COMES OUT UNIFORM

Animated. Still frame when motion is reduced. Sources: CIBE, ESPOL; BananAction.



18 to 24 weeks in total



Lead times from order to a plant ready for the nursery. Source: BananAction.

TIME	18 to 24 weeks, from order to a plantlet ready for the nursery
CONDITION	Sterile jars, a clone of the parent plant
WHO	A tissue-culture lab
RISK	Every plant is a clone, so every plant shares the same weakness. Fusarium TR4, a soil fungus with no cure, reached Ecuador in December 2025 on a farm in Santa Rosa, El Oro. A 2nd farm

next to it was confirmed in July 2026

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

WHY HERE	CIBE, the biotechnology centre at ESPOL in Guayaquil, already has protocols for more than 30 banana and plantain varieties, a short drive from the plantations.
COST	No public price per plantlet
NEXT LEG	Plantlets go by road to a nursery near the farm, about 50 km CALCULATED

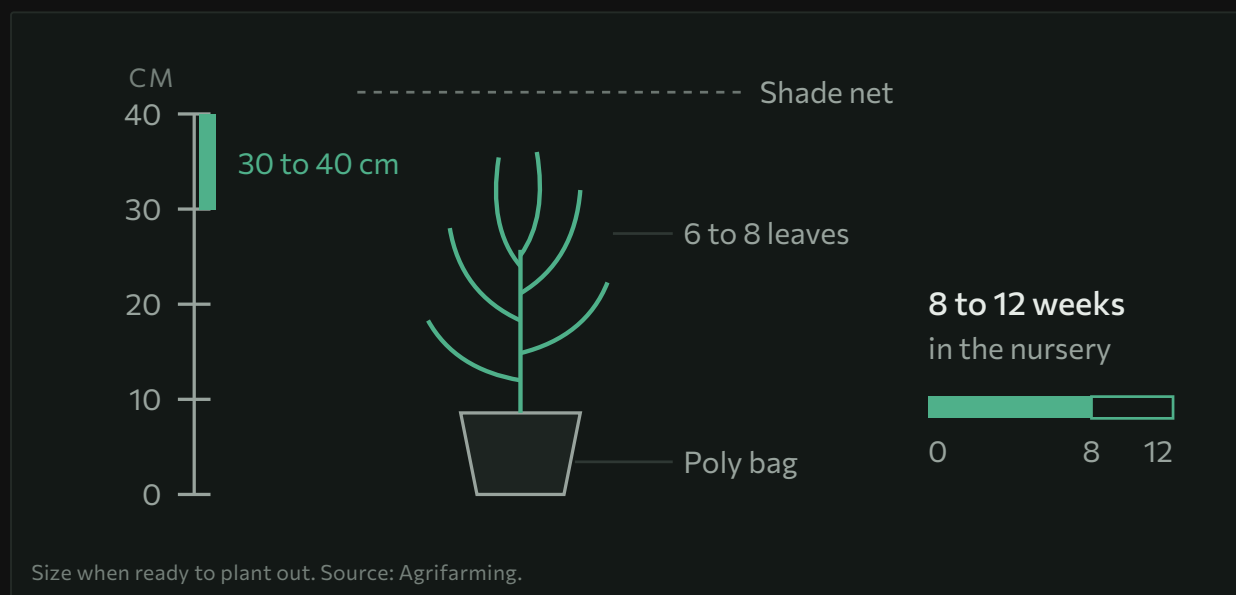
Sources: [CIBE](#), [ESPOL](#), [BananAction](#), [MDPI](#), [Metro Ecuador](#)

STAGE 2 OF 10

The nursery

Near the farm, Los Ríos province

The plantlet is hardened in a shaded nursery until it can survive in the open field.



TIME	8 to 12 weeks
CONDITION	30 to 40 cm tall, 6 to 8 leaves
WHO	A nursery, often run by the grower

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

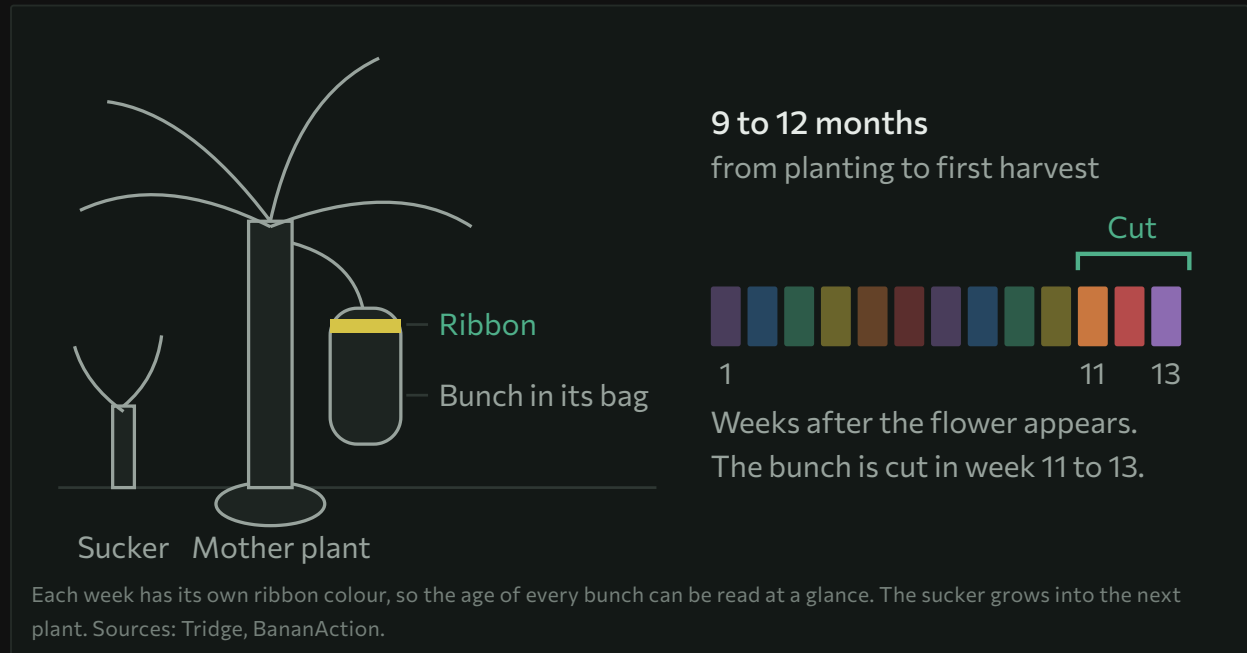
WHY HERE	The nursery sits by the farm, so young plants travel only a short way and harden in the same climate they will grow in.
COST	Not public. Often run by the grower
NEXT LEG	Planted out in the field, a short walk or truck ride.

Sources: [Agrifarming](#)

The field

Los Ríos province, Ecuador

The plant grows for months, flowers once, and sets a single bunch. Each bunch is bagged and tied with a coloured ribbon that marks its week, so the crew knows exactly when to cut it.



TIME	9 to 12 months from planting to first harvest. The bunch is cut 11 to 13 weeks after the flower appears
CONDITION	Green, checked for calibre before cutting
WHO	The grower
SPRAYING	About 28 fungicide applications a year against black sigatoka, a leaf disease (farms studied in Pasaje, El Oro)
PAY	Ecuador's minimum wage in 2026 is \$482 a month, the farm price of about 64 boxes CALCULATED . Fairtrade-certified fruit earns an extra \$1 per box for farmers and workers
PAPERWORK	A purchase contract between grower and exporter, registered with the Ministry of Agriculture at or above the \$7.50 minimum

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

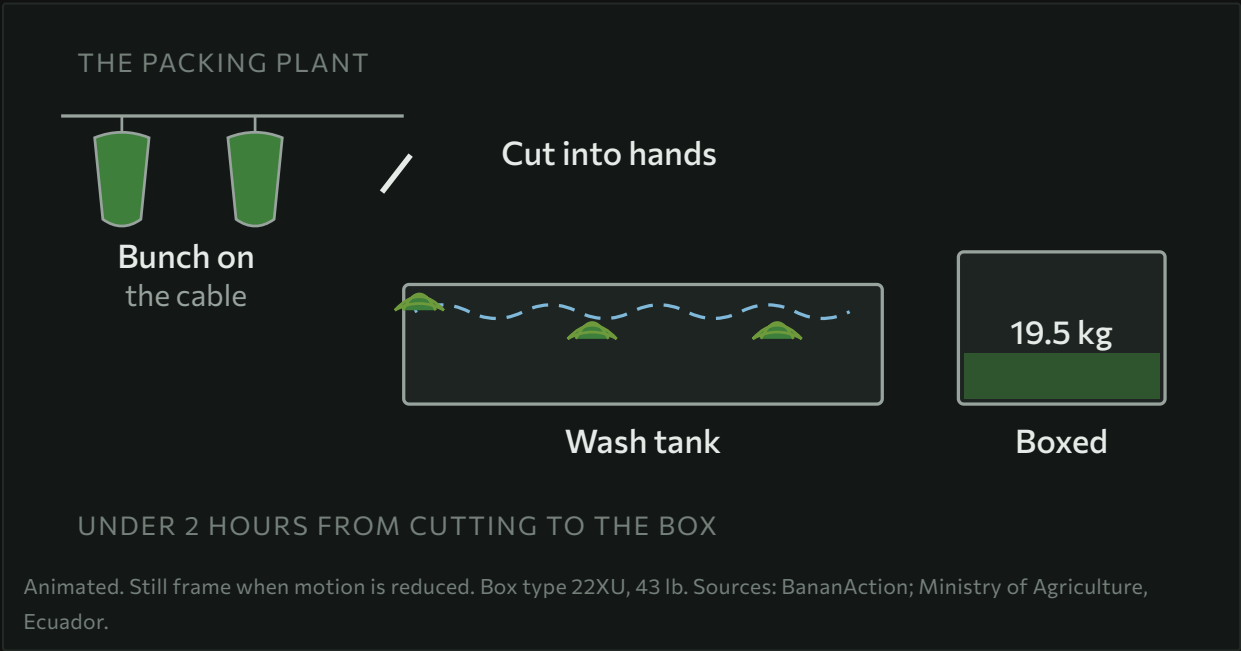
WHY HERE	The coastal lowlands of Los Ríos, Guayas and El Oro are warm and wet all year, full of rivers and free of hurricanes. Ecuador is the world's largest banana exporter, over 377 million boxes in 2025.
COST	The grower is paid at least \$7.50 a box, and sprays about 28 times a year against black sigatoka
NEXT LEG	Cut bunches go to the farm's packing plant, often on an overhead cable CHECK THE SOURCE

Sources: [Tridge](#), [BananAction](#), [Quevedo Guerrero et al.](#), [Ministry of Labour](#), [Fairtrade](#), [Contract registration](#), [Wikipedia](#), [FreshFruitPortal](#), [Ministry of Agriculture](#), [Ecuador](#)

Cut and packed

Packing plant on the farm

The bunch is cut green and carried to the farm's packing plant, where it is washed, split into hands and boxed. The green-life clock starts here.



TIME	Under 2 hours from cutting to box
CONDITION	Green, 22XU box of 43 lb (19.5 kg)
PRICE	\$7.50 per box at the farm, \$0.38 per kg, the 2026 legal minimum
WHO	The grower and the exporter's packing crew
PAPERWORK	Packing list: cartons, lot numbers, pallets. The exporter must hold a Ministry of Agriculture registration, renewed every 3 years

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

WHY HERE	Packing on the farm keeps the time from cutting to box under 2 hours, which protects the green life.
COST	\$7.50 a box, \$0.38 a kg: the 2026 legal minimum
NEXT LEG	Boxes are palletised and trucked to Guayaquil, 1 to 2 days to loading.

Sources: [BananAction](#), [Ministry of Agriculture](#), [Exporter registration](#)

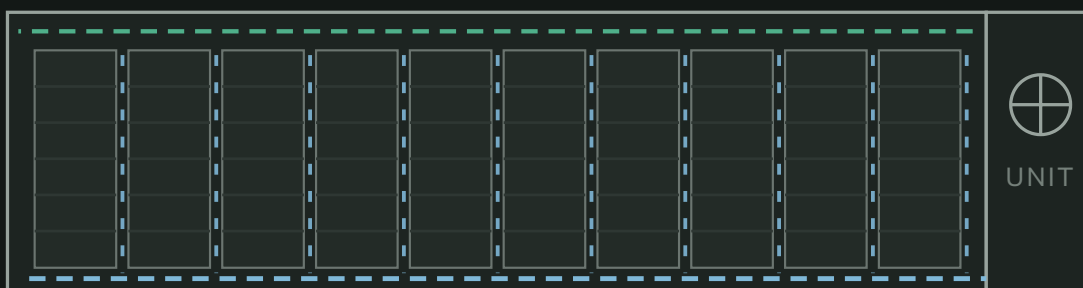
The port

Guayaquil, Ecuador

The boxes are trucked to Guayaquil, cooled and loaded into a refrigerated container. Ecuador's plant-health agency inspects the lot before it can leave.

13.3 °C

90 to 95% humidity



Cold air goes in along the floor, rises through the stacks, and returns along the ceiling to the cooling unit.

About 1,080 boxes
20 pallets, 54 per pallet

Animated. Still frame when motion is reduced. Shown from the side: 10 pallet stacks visible, 2 rows deep. Sources: Carrier, Sol de Olmos, TPC Larzhen.

TIME	1 to 2 days
CONDITION	Cooled to 13.3 °C, 90 to 95% humidity
PRICE	About \$9.80 per box when loaded, \$0.50 per kg (spot price on the Russia route, Q1 2026)
WHO	The exporter, the port terminal, the plant-health inspector
SECURITY	Containers are sealed, then checked by anti-narcotics police with dogs before loading. Cocaine is regularly found hidden in banana cargo at Guayaquil: 1.2 t on 14 August 2026
PAPERWORK	Phytosanitary inspection and certificate (Agrocalidad); export declaration, the DAE, filed with customs through ECUAPASS; commercial invoice; certificate of origin; bill of lading, issued once the container is loaded. Sold FOB: the buyer takes on freight and risk from here

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

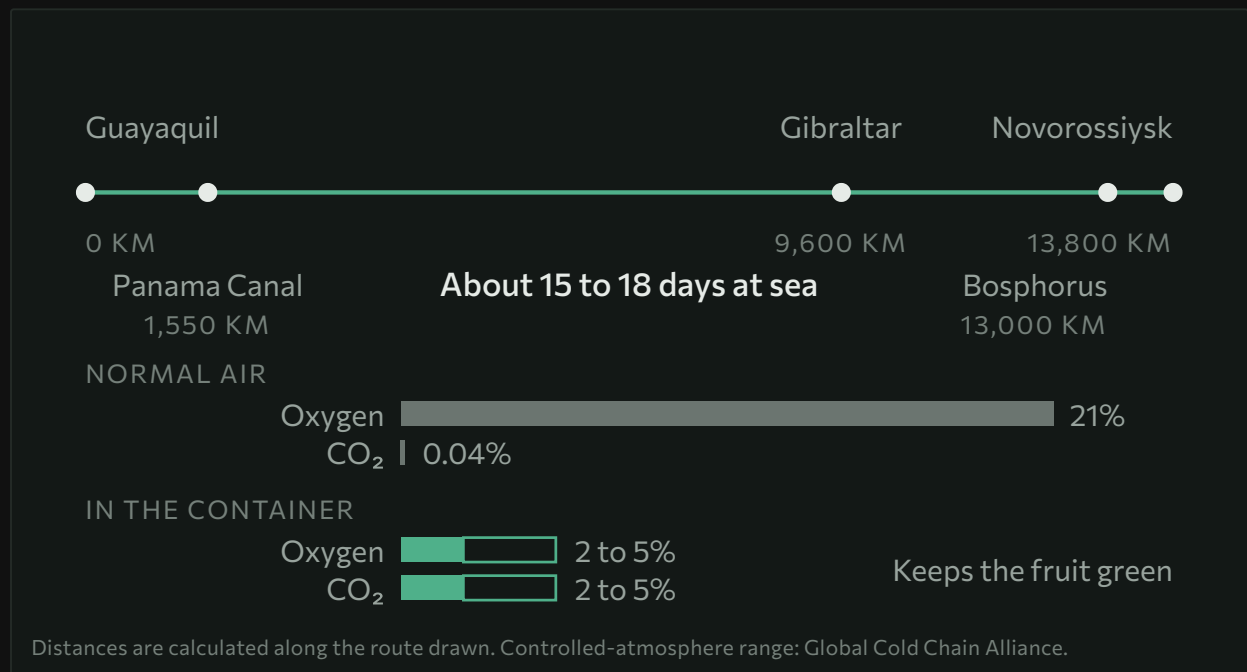
WHY HERE	Guayaquil is Ecuador's main fruit port, with refrigerated warehouses built for bananas. Russia buys more than a fifth of Ecuador's bananas.
COST	About \$9.80 a box when loaded, \$0.50 a kg
NEXT LEG	In a 40 ft reefer container at 13.3 °C, about 1,080 boxes, by ship.

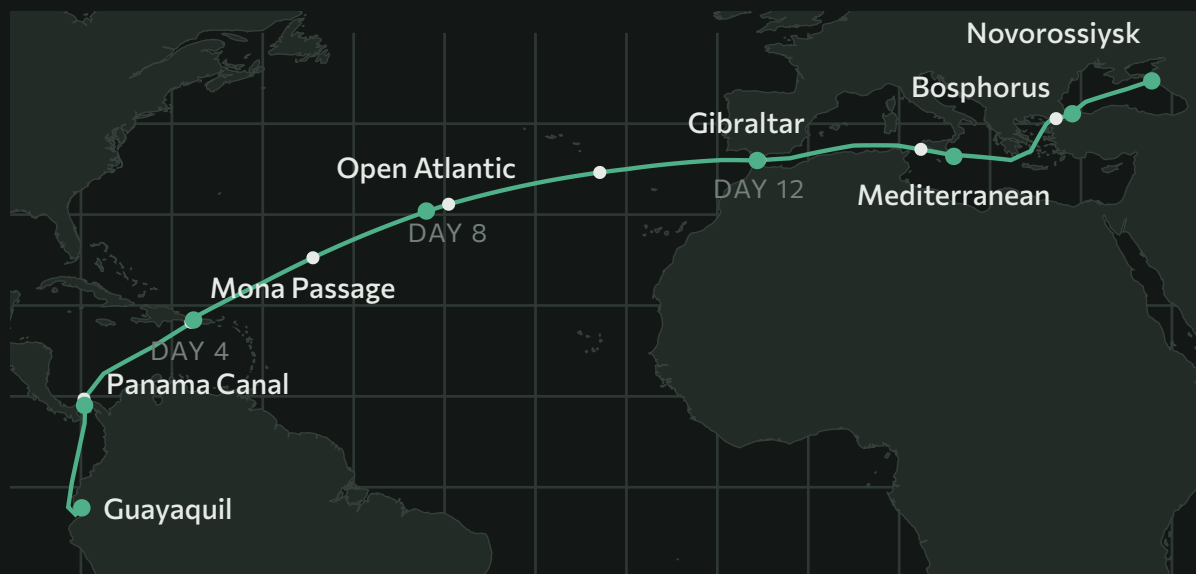
Sources: [Carrier](#), [BananAction](#), [Expreso](#), [Primicias](#), [Agrocalidad](#), [Logistica.com.ec](#), [Dole Ecuador](#), [Cool Carriers](#), [Fruitnet](#)

The sea

Panama Canal, Atlantic, Mediterranean, Black Sea

The ship goes north to Panama, through the canal, across the Atlantic, through the Strait of Gibraltar and the length of the Mediterranean, then up the Dardanelles and the Bosphorus into the Black Sea.





LEG	DISTANCE	AT 18 KNOTS
Guayaquil to the Panama Canal	800 nm	About 2 days
Through the canal	About 40 nm	About half a day CHECK THE SOURCE
Panama Canal to Gibraltar, across the Atlantic	4,330 nm	About 10 days
Gibraltar to the Bosphorus	1,840 nm	About 4 days
Bosphorus to Novorossiysk	440 nm	About 1 day
Total	About 7,450 nm	About 17 to 18 days

The passage, simplified. White dots mark every 2 days at 18 knots, the service speed of a modern reefer ship. Distances and days are calculated along the route drawn; real ships also wait for the canal and for weather. [CALCULATED](#)

TIME	About 15 to 18 days CALCULATED
DISTANCE	About 13,800 km (7,450 nm) CALCULATED
CONDITION	13.3 °C, with the air controlled to keep the fruit green
WHO	A reefer shipping line
PAPERWORK	The original bill of lading travels separately, by courier or through the bank. Whoever holds it can claim the container

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

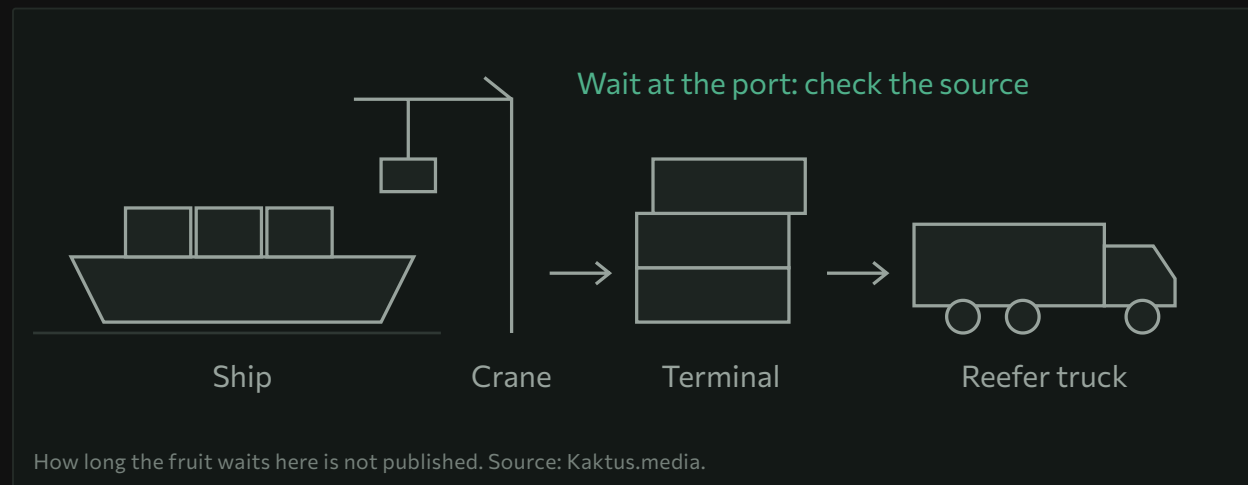
WHY HERE	Russia is the biggest single buyer, and its Black Sea port is the shortest road start for Central Asia.
COST	The sea freight rate on this lane is not public CHECK THE SOURCE
NEXT LEG	About 13,800 km and 15 to 18 days to Novorossiysk CALCULATED

Sources: [Fruitnet](#), [Exim Internationals](#), [Dole Ecuador](#), [Fruitnet](#), [Kaktus.media](#)

The Black Sea port

Novorossiysk, Russia

The container comes off the ship at a Russian port. Regional reporting names Novorossiysk and St Petersburg as the ports used for Central Asia. From here the fruit goes by road.



TIME	About 2 to 3 days CHECK THE SOURCE
CONDITION	Container kept at 13 to 14 °C
WHO	The port terminal and a freight forwarder
PAPERWORK	Bill of lading handed over to release the container; a customs transit declaration opened for the road trip. Russian rules for plant products in transit CHECK THE SOURCE

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

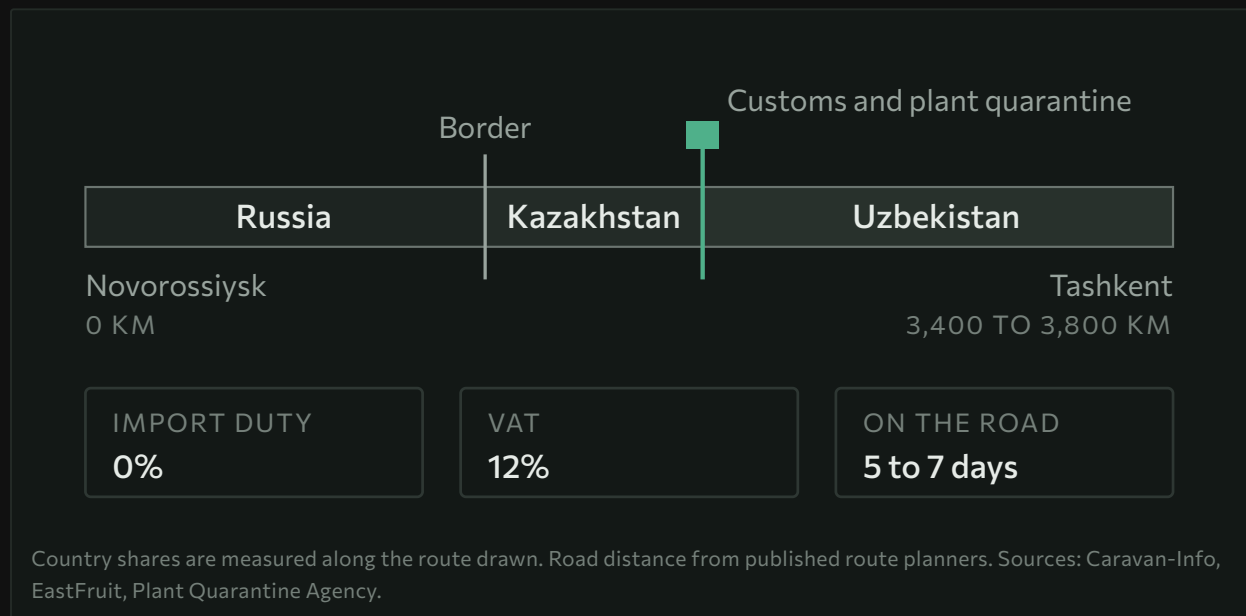
WHY HERE	Regional reporting names Novorossiysk and St Petersburg as the ports used for fruit going to Central Asia.
COST	Port charges are not public
NEXT LEG	Into a refrigerated truck at 13 to 14 °C for 3,400 to 3,800 km.

Sources: [Kaktus.media](#), [Infobeta](#)

The road to Tashkent

Russia, Kazakhstan, Uzbekistan

A refrigerated truck crosses southern Russia and western Kazakhstan, then enters Uzbekistan. At the Uzbek border the lot is cleared by customs and the plant quarantine agency. Uzbekistan charges no import duty on fruit it cannot grow, only 12% VAT.



TIME	About 5 to 7 days, including borders CALCULATED
DISTANCE	3,400 to 3,800 km by road
PRICE	Declared at customs: \$0.30 per kg, below the farm price (Q1 2026)
WHO	A trucking firm, customs, plant quarantine
PAPERWORK	CMR road waybill; transit declaration closed at each border, or 1 TIR carnet for the whole trip. At the Uzbek border: quarantine permit, the Ecuadorian phytosanitary certificate, the contract registered in the customs single window, and a customs declaration filed by a licensed broker

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

WHY HERE	Uzbekistan is doubly landlocked: no route reaches it by sea, so the last leg is always by road or rail.
COST	Declared at customs at \$0.30 a kg, below the farm price. The truck rate is not public
NEXT LEG	Into the importer's ripening room in Tashkent.

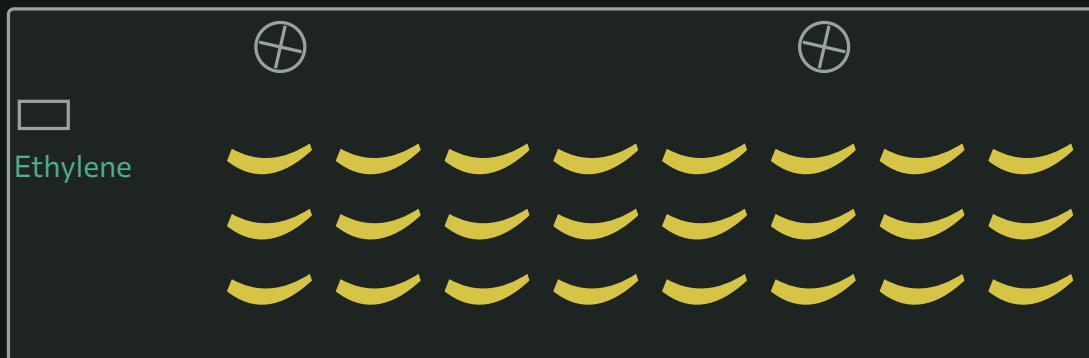
Sources: [Road distance](#), [Caravan-Info](#), [EastFruit](#), [Plant quarantine agency](#), [Infobeta](#), [Norma.uz](#), [Lex.uz](#), [Customs single window](#), [Uz2b](#)

The ripening room

Tashkent, Uzbekistan

The importer moves the boxes into a sealed room, warms them to 18 to 20 °C and adds ethylene, the gas bananas give off naturally. The skin turns from green to yellow. The fruit has arrived at, or just inside, the end of its green life.

INSIDE A RIPENING ROOM

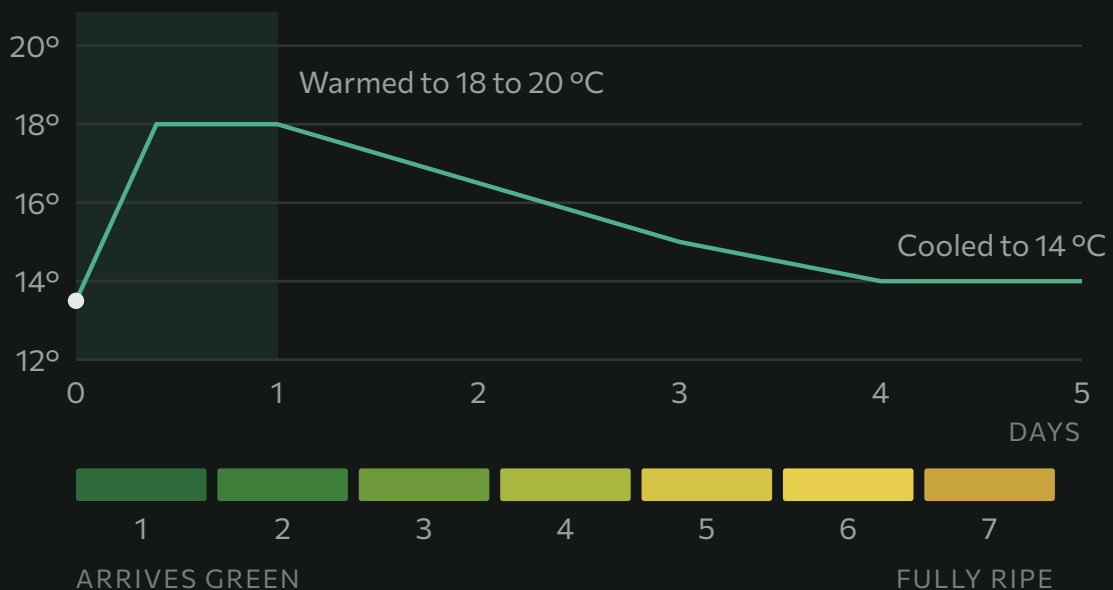


Day 3

Cooled to 15 °C

Animated. Still frame when motion is reduced. Schedule from HyperCold and Frigomekanik; colour stages as used by USDA.

Ethylene 100 to 150 ppm for the first 24 hours



Schedule from commercial ripening guides (HyperCold, Frigomekanik). Colour scale 1 to 7 as used by USDA and the trade; fruit arrives at 1.

TIME 4 to 5 days

CONDITION Green to yellow

WHO The importer

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

WHY HERE Bananas travel green and are ripened close to the market, so they reach the shelf just yellow.

COST The cost of ripening is not public

NEXT LEG By truck to supermarkets and markets across the city [CHECK THE SOURCE](#)

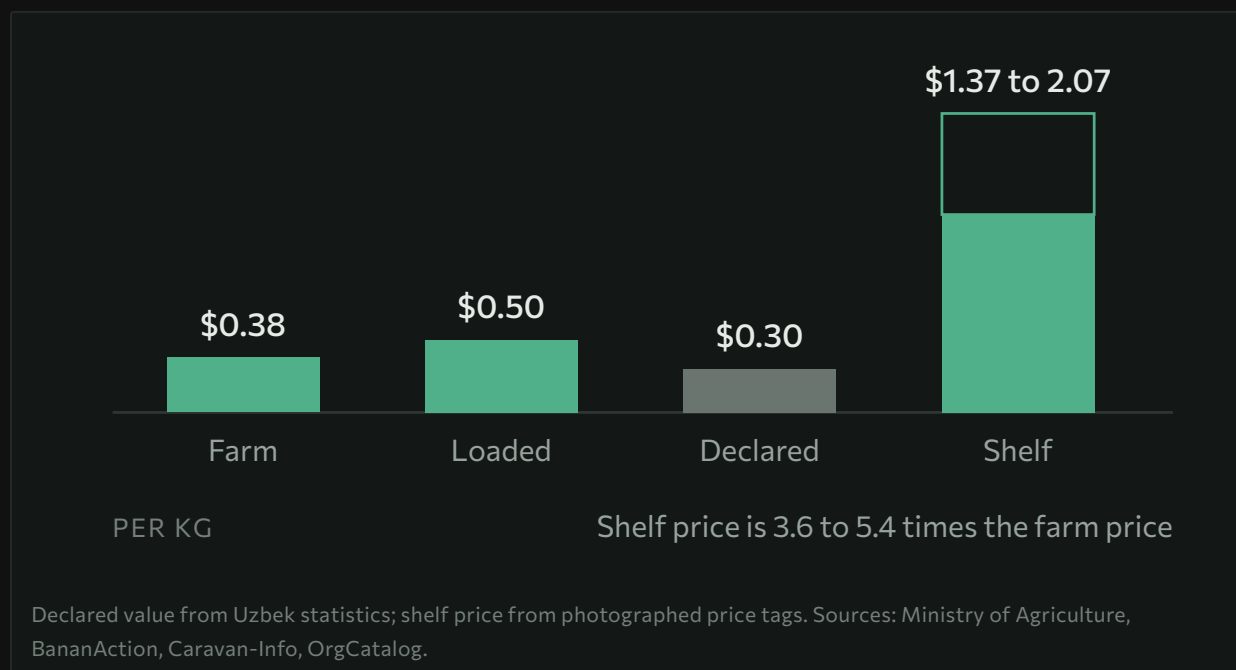
Sources: [Kaktus.media](#), [HyperCold](#), [Frigomekanik](#)

STAGE 10 OF 10

The shelf

Tashkent supermarkets

The banana goes on sale yellow, with about 5 days left before it is overripe. Uzbekistan imported 161,400 t of bananas from January to November 2025, and imports rose by 44.7% in the first quarter of 2026.



TIME About 5 days on sale

PRICE 16,500 to 25,000 sum per kg, \$1.37 to \$2.07

WHO Supermarkets and markets

Sources: [OrgCatalog](#), [Central Bank of Uzbekistan](#), [Statistics Committee](#)

SUMMARY

The whole trip

TIME	About 16 to 21 months from the lab to the shelf CALCULATED
CUT TO RIPENING	About 23 to 30 days, against a green life of 25 to 30 days CALCULATED
DISTANCE	About 13,800 km by sea and 3,400 to 3,800 km by road
PRICE	\$0.38 per kg at the farm, \$1.37 to \$2.07 per kg on a Tashkent shelf

PRICE

What 1 kg is worth along the way

Farm, minimum price		\$0.38
Loaded at Guayaquil		\$0.50
Declared at Uzbek customs		\$0.30
Tashkent shelf		\$1.37 to 2.07

The value declared at the Uzbek border is lower than the price Ecuadorian growers are legally guaranteed. Importers in neighbouring Kyrgyzstan have said their real costs run about 150% above what the official statistics show. Freight, transit and ripening costs are not published.

LEGS

How each piece reaches the next place

Every leg of the chain, from the lab to the shop.

LEG	FROM	TO	WHAT	HOW	PACKED	DISTANCE OR TIME	COST
1	Lab, Guayaquil	Nursery, Los Ríos	Plantlets	Road	Trays CHECK THE SOURCE	About 50 km CALCULATED	Not published
2	Nursery	Field	Young plants	Road or on foot	Poly bags	On or near the farm	Not published
3	Field	Packing plant	Bunches	Overhead cable CHECK THE SOURCE	Bagged bunches	On the farm	Not published
4	Packing plant	Guayaquil	Boxes	Truck	22XU boxes, 19.5 kg	1 to 2 days to loading	\$7.50 a box

LEG	FROM	TO	WHAT	HOW	PACKED	DISTANCE OR TIME	COST
5	Guayaquil	Novorossiysk	Boxes	Reefer container ship	40 ft reefer, about 1,080 boxes	About 13,800 km, 15 to 18 days CALCULATED	\$9.80 a box loaded
6	Novorossiysk	Tashkent	Boxes	Refrigerated truck	13 to 14 °C	3,400 to 3,800 km, 5 to 7 days	\$0.30 a kg declared
7	Ripening room	Shops	Ripe boxes	Truck CHECK THE SOURCE	Boxes	Across Tashkent	16,500 to 25,000 sum a kg

PAPERWORK

The documents that move with the fruit

The fruit cannot move without its papers. Some ride with the container, 1 goes ahead on its own, and some exist only as electronic filings. Each is checked at a set point on the route.

	FARM	GUAYAQUIL PORT	BLACK SEA PORT AND ROAD	UZBEK BORDER
WITH THE CONTAINER	Packing list	Phytosanitary certificate Commercial invoice Certificate of origin	CMR road waybill Transit declaration or TIR carnet	Checked: phytosanitary certificate, invoice, waybill
SENT AHEAD		Bill of lading, issued on loading	Bill of lading handed in to release the container	
FILED ONLINE	Exporter registration Grower contract	Export declaration (DAE)		Quarantine permit Registered import contract Customs declaration

DOCUMENT	ISSUED BY	WHEN	WHAT IT PROVES
Exporter registration	Ministry of Agriculture, Ecuador	Every 3 years	The company may export bananas under its brands
Grower contract	Grower and exporter, registered with the ministry	Before harvest	The grower is paid at least the \$7.50 minimum per box

DOCUMENT	ISSUED BY	WHEN	WHAT IT PROVES
Packing list	Exporter	At packing	What is in each pallet: cartons, sizes, lot numbers
Phytosanitary certificate	Agrocalidad, after inspection	Before loading	The fruit meets the importing country's plant-health rules
Commercial invoice	Exporter	At sale	Price, quantity and the price term, here FOB
Export declaration (DAE)	Exporter, filed with Ecuadorian customs on ECUAPASS	Before loading	The goods have left Ecuador legally
Certificate of origin	Authorised body in Ecuador	Before loading	The bananas were grown in Ecuador
Bill of lading	Shipping line	On loading	The cargo is on board; whoever holds the original can claim it
Transit declaration or TIR carnet	Carrier or forwarder, with customs	At the Black Sea port	The goods cross Russia and Kazakhstan without being imported there
CMR road waybill	Road carrier	At the Black Sea port	The contract for the road trip and the condition of the load
Quarantine permit	Agency for Plant Quarantine and Protection, Uzbekistan	Before entry	The lot may enter, or cross, Uzbekistan
Registered import contract	Importer, in the customs single window	Before entry	The foreign trade deal is on record with customs
Customs declaration	Licensed broker for the importer	At the border	Duty (0%) and VAT (12%) assessed and paid

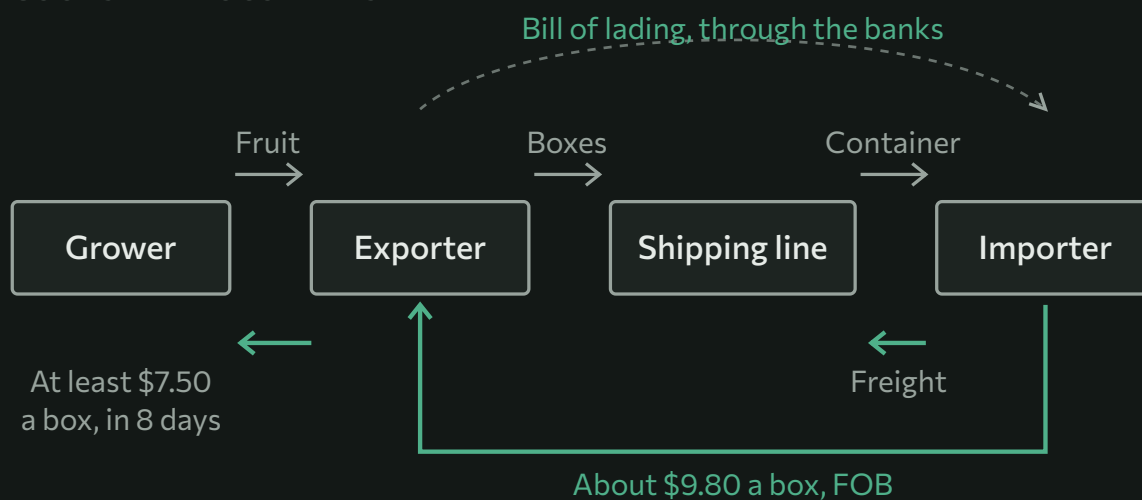
FOB, free on board. The price at Guayaquil covers the fruit until it is loaded. From that moment the buyer pays the freight and carries the risk. That is why the \$9.80 per box quoted on this page is a port price, not a delivered price.

MONEY

How the money moves

Goods and documents travel east. Money travels back west, in the opposite direction, and the bill of lading is what ties the 2 together: the buyer gets it, and so the container, once the exporter has been paid or a bank has promised payment.

GOODS AND DOCUMENTS

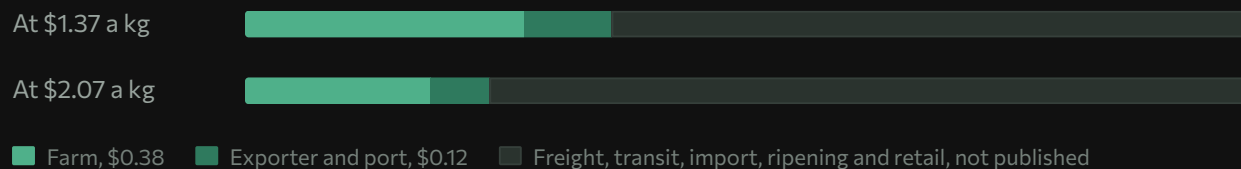


MONEY

Sources: Ministry of Agriculture, Ecuador; BananAction contract guide; PEI Trade.

Common payment terms in the fruit trade are a letter of credit, where the buyer's bank promises to pay once the documents are presented; documents against payment, where the bank hands over the bill of lading only when the buyer pays; a straight transfer; or open account between partners who trust each other. Which terms Uzbek importers use with Ecuadorian exporters is not published.

Who gets what from a kilogram



The farm keeps 18 to 28% of the shelf price **CALCULATED**. How much of that reaches the workers who cut and pack the fruit is not published.

RISK

What can go wrong, and where

WHERE	RISK	WHAT HAPPENS
Field	Fusarium TR4	A soil fungus that kills Cavendish plants and stays in the soil for decades. Confirmed on 2 farms in El Oro, December 2025 and July 2026. It reached Colombia in 2019, Peru in 2021 and Venezuela in 2023
Field	Black sigatoka	A leaf fungus that cuts yields unless sprayed, about 28 times a year
Field	Weather	Heavier rains are forecast from November 2026 to January 2027, and El Oro has tightened its controls against the fungus ahead of them
Port	Drug searches	A container found with cocaine is held, and its fruit keeps ripening while it waits

WHERE RISK

WHAT HAPPENS

Arrival Pests

Lots with quarantine pests can be refused. Russia restricted 1 Ecuadorian exporter from 20 May 2026 after repeated finds, and briefly suspended several in 2024

Road Green life

The fruit reaches the ripening room on about day 23 to 30, at the end of its 25 to 30 days. A long wait at a port or border can push it past that point

How much fruit is lost along this route is not published.

CARBON

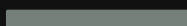
The carbon cost of a kilogram

Ecuador to a
European port,
whole chain



0.45 to 1.04

Of which the
ocean voyage



0.23

Kilograms of CO₂ equivalent per kilogram of bananas, from 2 studies of Ecuadorian export bananas shipped to Europe. The farm and the voyage are the largest parts. The route on this page has a longer voyage and adds 3,400 to 3,800 km by road, so its figure will be higher. No study of this route was found.

GAPS

What the public record does not show

- The exact route for Uzbekistan. Regional reporting names Russian ports, Novorossiysk or St Petersburg, with trucks entering through Kazakhstan, and routes through Iran or Turkey as alternatives. The map draws the Novorossiysk route and shows the others as dashed lines.
- Freight cost per box, and the cost of moving the fruit across Russia and Kazakhstan.
- How long the fruit waits at the Black Sea port and at each border.
- Whether the fruit crosses Russia as transit cargo or is bought and resold by Russian wholesalers. Uzbekistan recorded 404 t of bananas from Russia in the first quarter of 2026.
- A wholesale price series for Tashkent. The shelf prices come from photographed price tags.

SOURCES

Where the figures come from

1. [CIBE, ESPOL: tissue culture](#)
2. [BananAction: in-vitro plants, lead times](#)

3. [AgriFarming: secondary nursery, 8 to 12 weeks](#)
4. [Tridge: harvest 11 to 13 weeks after flowering](#)
5. [BananAction: harvest and packing under 2 hours](#)
6. [Ministry of Agriculture, Ecuador: \\$7.50 minimum price, 2026](#)
7. [BananAction: spot price, Russia route, Q1 2026](#)
8. [Carrier: 13.3 to 14.4 °C, 90 to 95% humidity](#)
9. [Sol de Olmos: green life 25 to 30 days at 13.5 °C](#)
10. [Exim Internationals: 40+ days with controlled atmosphere](#)
11. [Fruitnet: reefer service speed 18 knots](#)
12. [Kaktus.media: how bananas reach Central Asia](#)
13. [Road distance, Novorossiysk to Tashkent](#)
14. [National Statistics Committee of Uzbekistan: 2025 imports](#)
15. [Caravan-Info: Q1 2026 imports by country](#)
16. [EastFruit: import duties removed, wholesale prices](#)
17. [Agency for Plant Quarantine and Protection, Uzbekistan](#)
18. [OrgCatalog: Tashkent shelf prices from price tags](#)
19. [Central Bank of Uzbekistan rate via Spot.uz: 12,055.90 sum per dollar, 17 October 2026](#)
20. [Global Cold Chain Alliance: controlled atmosphere, 2 to 5% oxygen and carbon dioxide](#)
21. [TPC Larzhen: 1,080 or 1,200 boxes of 19.5 kg per 40 ft container](#)
22. [HyperCold: ripening room schedule](#)
23. [Frigomekanik: 100 to 150 ppm ethylene for 24 hours](#)
24. [USDA: banana colour stages](#)
25. [Wikipedia \(Russian\): ripening, warming to 18 to 20 °C](#)
26. [Agrocalidad: phytosanitary certification for export](#)
27. [Ministry of Agriculture, Ecuador: registration of grower and exporter contracts](#)
28. [Ministry of Agriculture, Ecuador: exporter registration, 3 years](#)
29. [Logistica.com.ec: export documents and the DAE](#)
30. [Dole Ecuador: documents and Incoterms for fruit from Ecuador](#)
31. [Infobeta: CMR and TIR on the road to Uzbekistan](#)
32. [Norma.uz: the Uzbek quarantine permit](#)
33. [Lex.uz: plant quarantine law, documents required for entry](#)
34. [Trade.gov: Uzbekistan import documentation](#)
35. [Customs of Uzbekistan: single window, contracts and e-declarations](#)
36. [Uz2b: customs clearance and licensed brokers in Uzbekistan](#)
37. [MDPI, Pathogens: Fusarium TR4 in Latin America, 2019 to 2023](#)
38. [Metro Ecuador: 2nd Fusarium TR4 case in El Oro, July 2026](#)
39. [Quevedo Guerrero et al.: 28 fungicide applications a year against black sigatoka](#)
40. [Ministry of Labour, Ecuador: minimum wage 2026](#)
41. [Fairtrade: minimum prices and the \\$1 premium per box](#)
42. [Expreso: inspection of a banana container at Guayaquil](#)
43. [Primicias: 1.2 t of cocaine in banana cargo, August 2026](#)
44. [FreshPlaza: the 2024 suspension of Ecuadorian exporters](#)

45. [Rosselkhoznadzor: restriction on 1 Ecuadorian exporter, May 2026](#)
46. [Iriarte et al.: carbon footprint of Ecuadorian export bananas](#)
47. [Roibás et al.: ocean transport, 0.23 kg CO₂e per kg](#)
48. [PEI Trade: payment terms in export trade](#)
49. [BananAction: banana contracts, payment within 8 days](#)
50. [Centro TV: El Oro, Fusarium and the rains forecast for 2026 to 2027](#)
51. [FreshFruitPortal: Ecuador exported over 377 million boxes in 2025](#)
52. [Wikipedia: banana production in Ecuador, climate and provinces](#)
53. [Fruitnet: Russia, the largest single buyer, first half of 2026](#)
54. [Cool Carriers: refrigerated banana warehouses at the port of Guayaquil](#)

Land and borders from Natural Earth. Routes are drawn through planning points and are not exact tracks.