Columbia | SIPA
School of International and Public Affairs

# Value Chain Analysis

Guest lecture by Carl Cervone
March 1, 2022

# Coffee: the value chain from farm to cup

$4/kilo

$4/cup

# Plan for today

- The Coffee Value Chain
- The Value Chain Framework
- Case Study: Vietnam
- Case Study: Colombia
- Practical Advice

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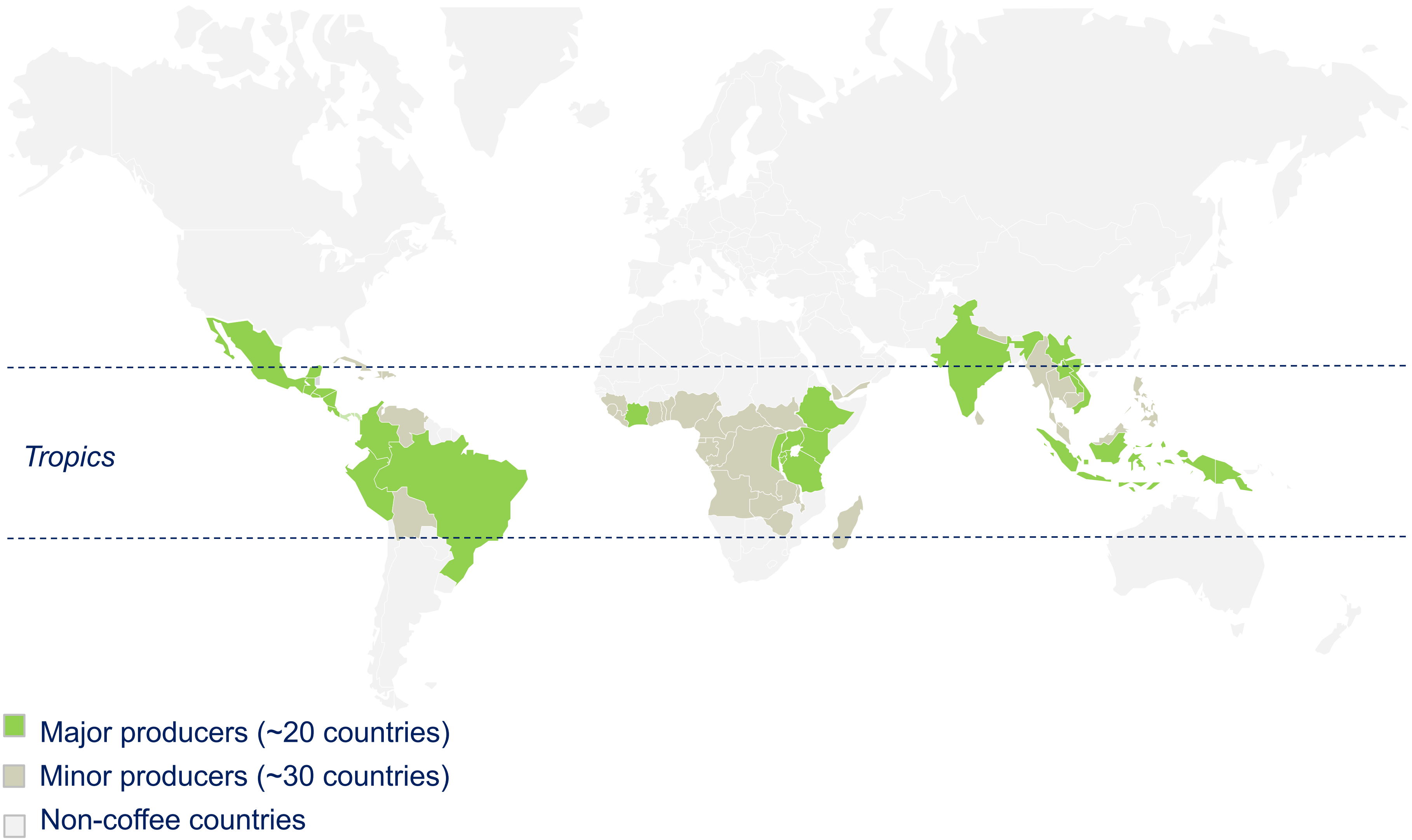
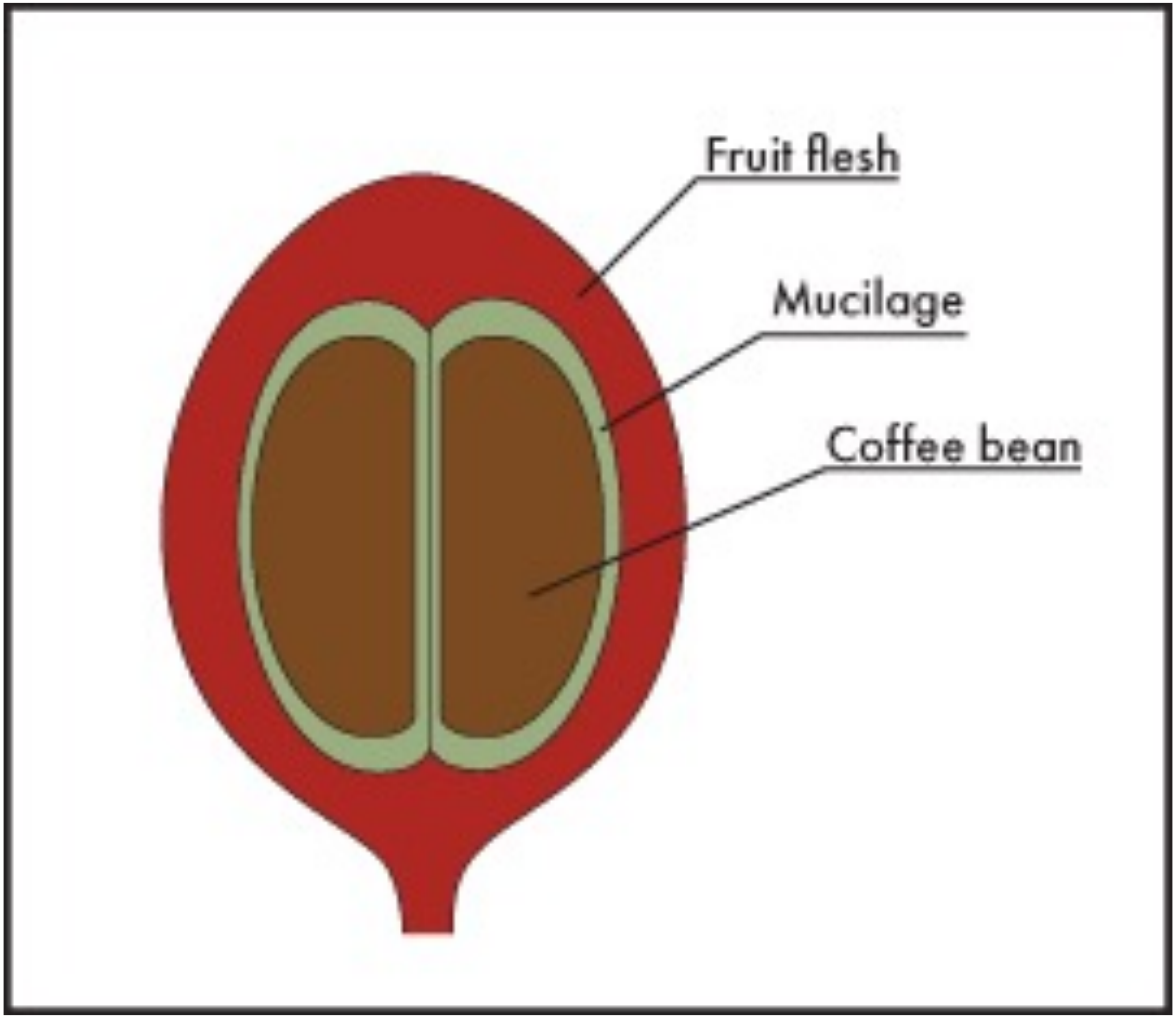
# Coffee is a fruit that grows on trees

# Coffee trees require a tropical climate



# The coffee “bean” is the seed inside the fruit




Source: http://www.dbmudhouse.coffee/coffee-processing/

# The coffee value chain from cherry to cup

| Cherry | Parchment | Green | Roasted | Ground | Cup |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

# >95% of the world's coffee farms are "smallholders"

**Cherry**

# There are some very large, industrial coffee farms

**Cherry**

# On small farms, coffee cherries are harvested by hand

**Cherry**

# Coffee should be processed immediately after picking

**Cherry**

# Cherries are de-pulped…

**Parchment**

# … washed …

**Parchment**

Source: https://lisaleo.wordpress.com/2013/09/26/fully-washed-coffee-natural-process-coffee/

# … and dried

**Parchment**

Source: https://www.perfectdailygrind.com/2018/12/processing-101-what-is-wet-washed-coffee-why-is-it-so-popular/

# Large mills process coffee for export

**Green**

# Exportable coffee is bagged and loaded in containers

**Green**


Source: https://coffeecollective.dk/stories/kenya-2012-part-2-kieni-gichathaini-karatu-and-more/

# Coffees are blended and roasted to different profiles

**Roasted**


Source: https://www.sentryair.com/blog/industry-applications/chemical-solvents/diacetyl-hazards-coffee-roasting-industry/

# Coffee is ground, packaged, and vacuum-sealed

**Ground**


Source: http://www.starbucksmelody.com/2014/08/10/free-tall-coffee-phased-out/

# Water is added – and it's ready to drink!

**Cup**


Source: https://www.coffeedesk.com/blog/what-is-v60-and-how-to-make-drip-coffee/

# Each stage of the value chain involves different actors

| Cherry | Parchment | Green | Roasted | Ground | Cup |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| **>10 M farms** | **<1 M mills** | **< 0.01 M traders** | **< 0.1 M roasters** | **>1 M retailers** | **>1000 M consumers** |

# Natural and logistical factors make it difficult to occupy more than 1-2 roles in the overall value chain

| Cherry | Parchment | Green | Roasted | Ground | Cup |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| >10 M farms | <1 M mills | < 0.01 M traders | < 0.1 M roasters | >1 M retailers | >1000 M consumers |

**Value addition done closer to farm**

**Value addition done where it's most efficient**

**Value addition done closer to consumer**

# Today, we will focus on the first three stages of the value chain only

| Cherry | Parchment | Green | Roasted | Ground | Cup |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| **>10 M farms** | **<1 M mills** | **< 0.01 M traders** | **< 0.1 M roasters** | **>1 M retailers** | **>1000 M consumers** |

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# Three important steps in any Value Chain Analysis

1 **MAP**

- who the relevant actors are
- what they do
- how they relate to each other

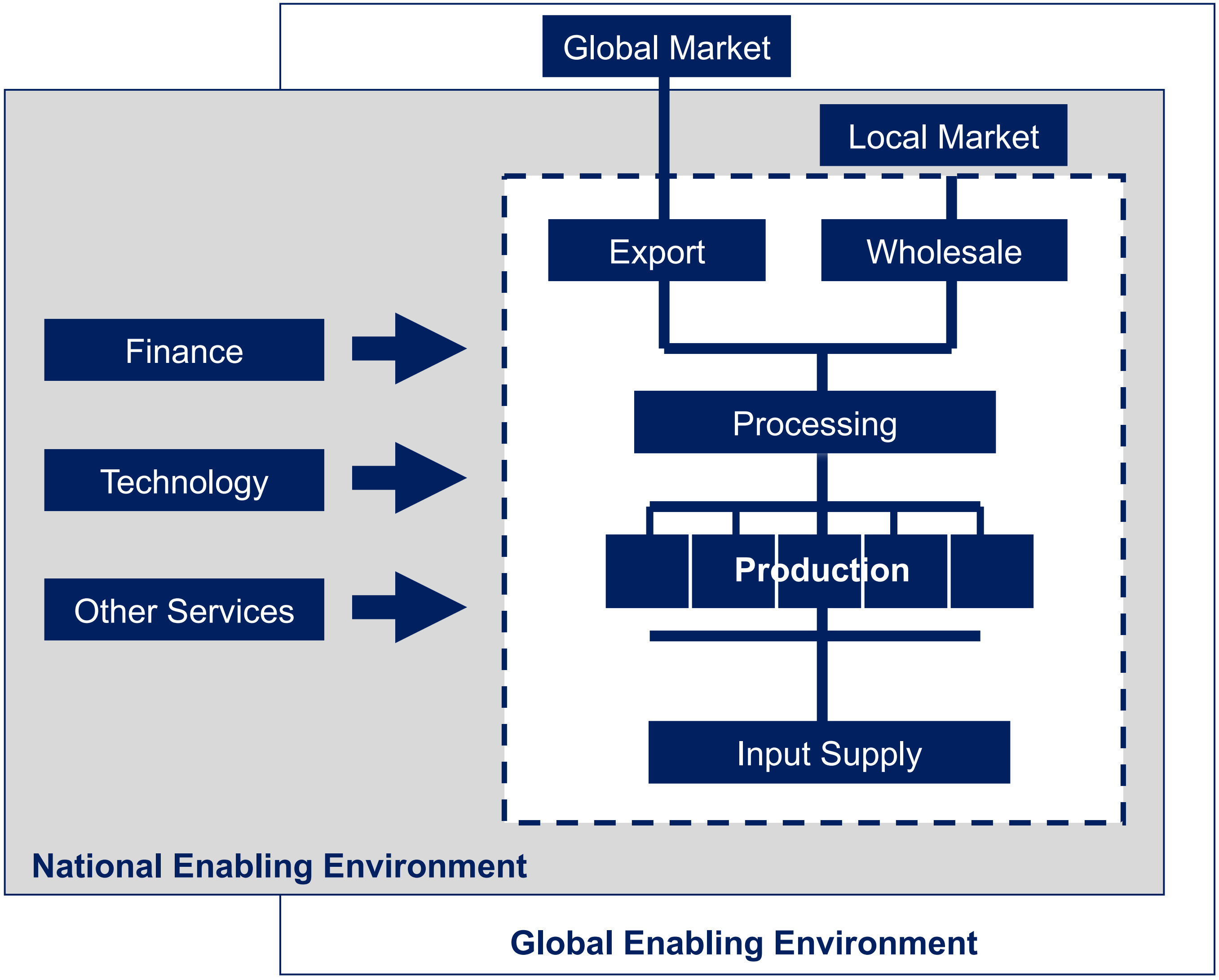
2 **BREAKDOWN**

- costs and revenues for each actor
- how value flows through the chain

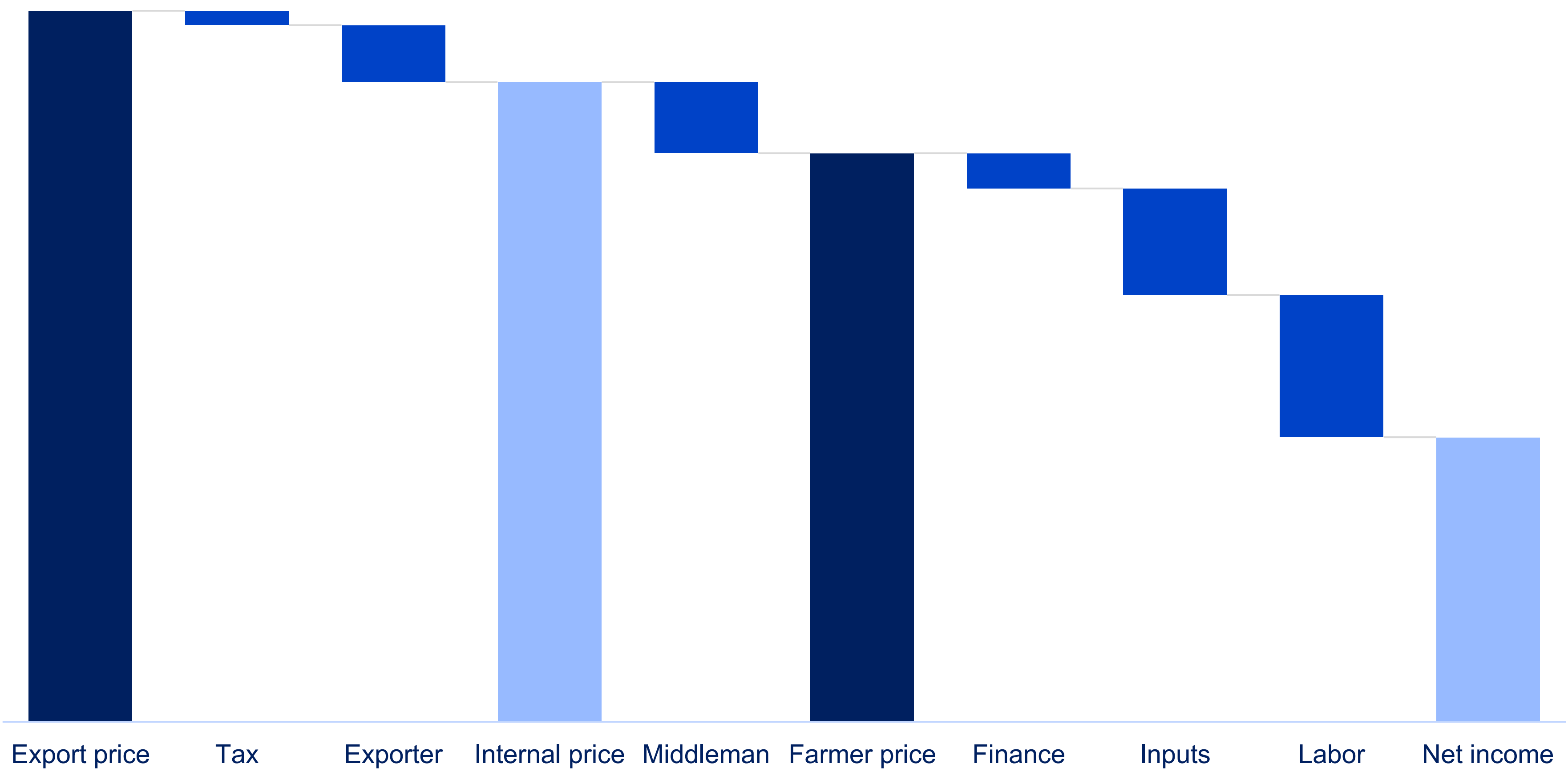
3 **BENCHMARK**

- performance of the value chain against peer countries or sectors
- use data to justify recommendations

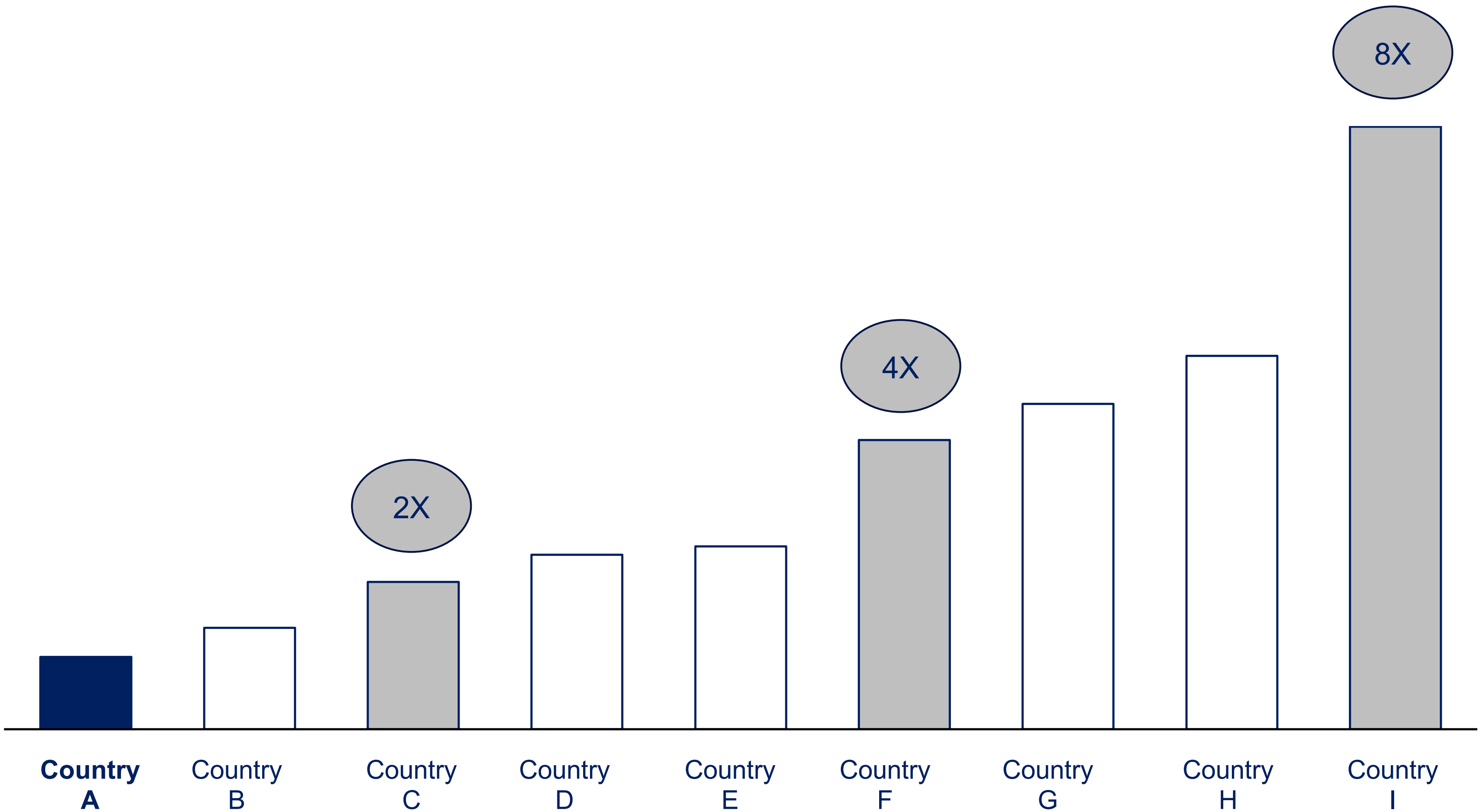
# **Map** who the relevant actors are, what they do, how they relate to each other



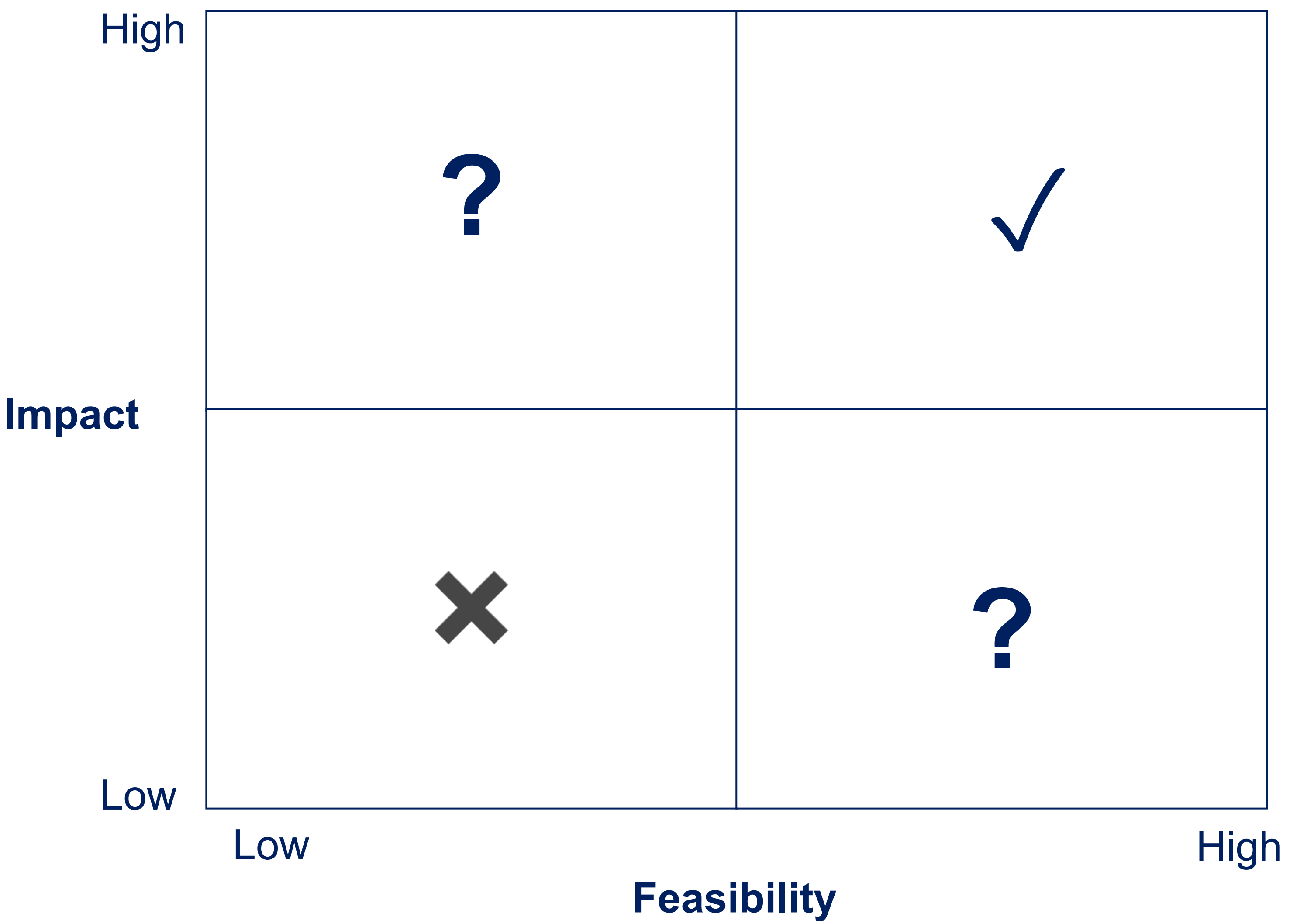
# **Breakdown** costs and revenues for each actor, how value flows through the chain



# **Benchmark** performance of the value chain against peer countries or sectors



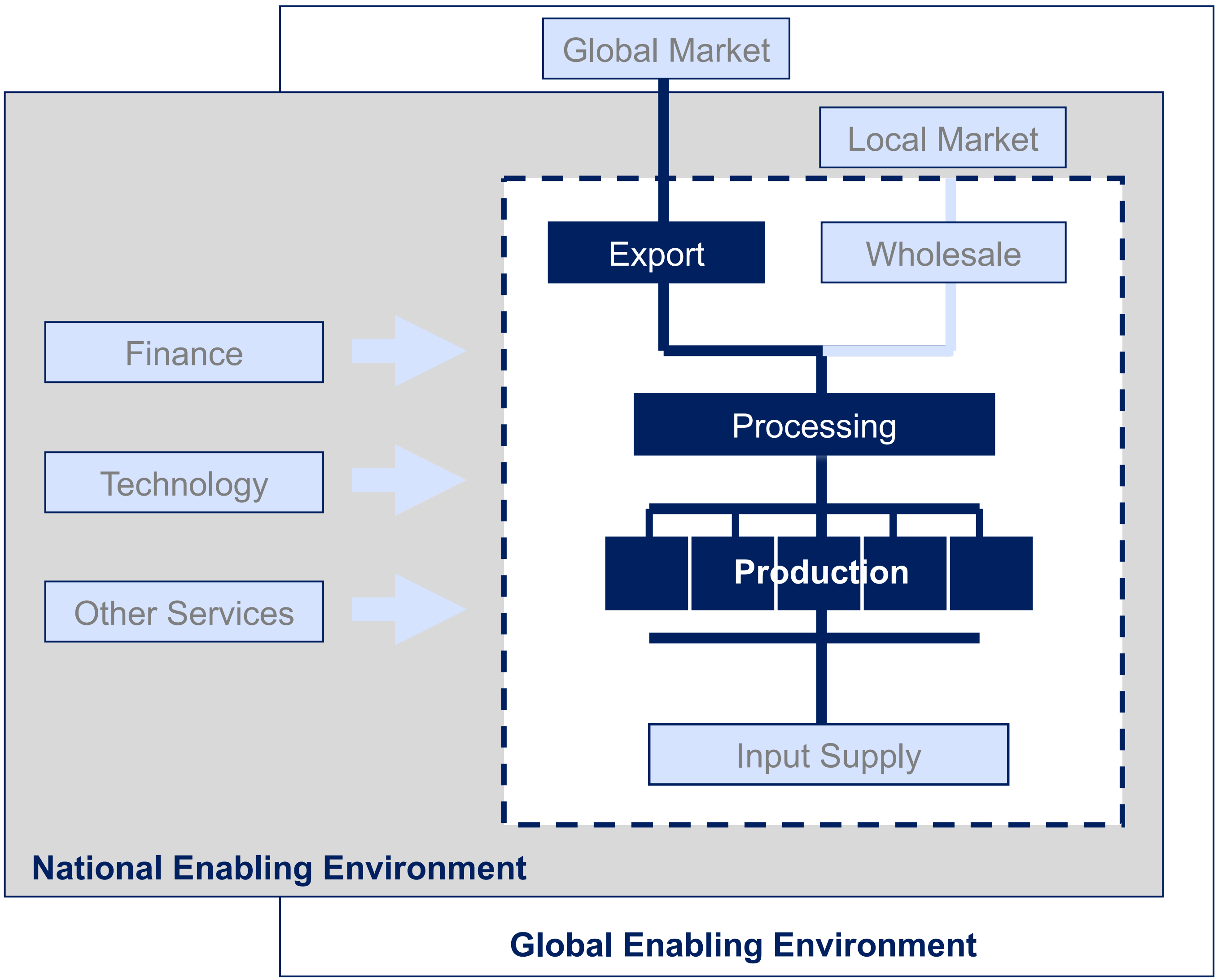
# After analysis, **prioritize** recommendations (based on some pre-defined selection criteria)



# Applying these concepts to the Coffee Value Chain

| Cherry | Parchment | Green | Roasted | Ground | Cup |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| >10 M farms | <1 M mills | < 0.01 M traders | < 0.1 M roasters | >1 M retailers | >1000 M consumers |

# Global coffee value chain **map**

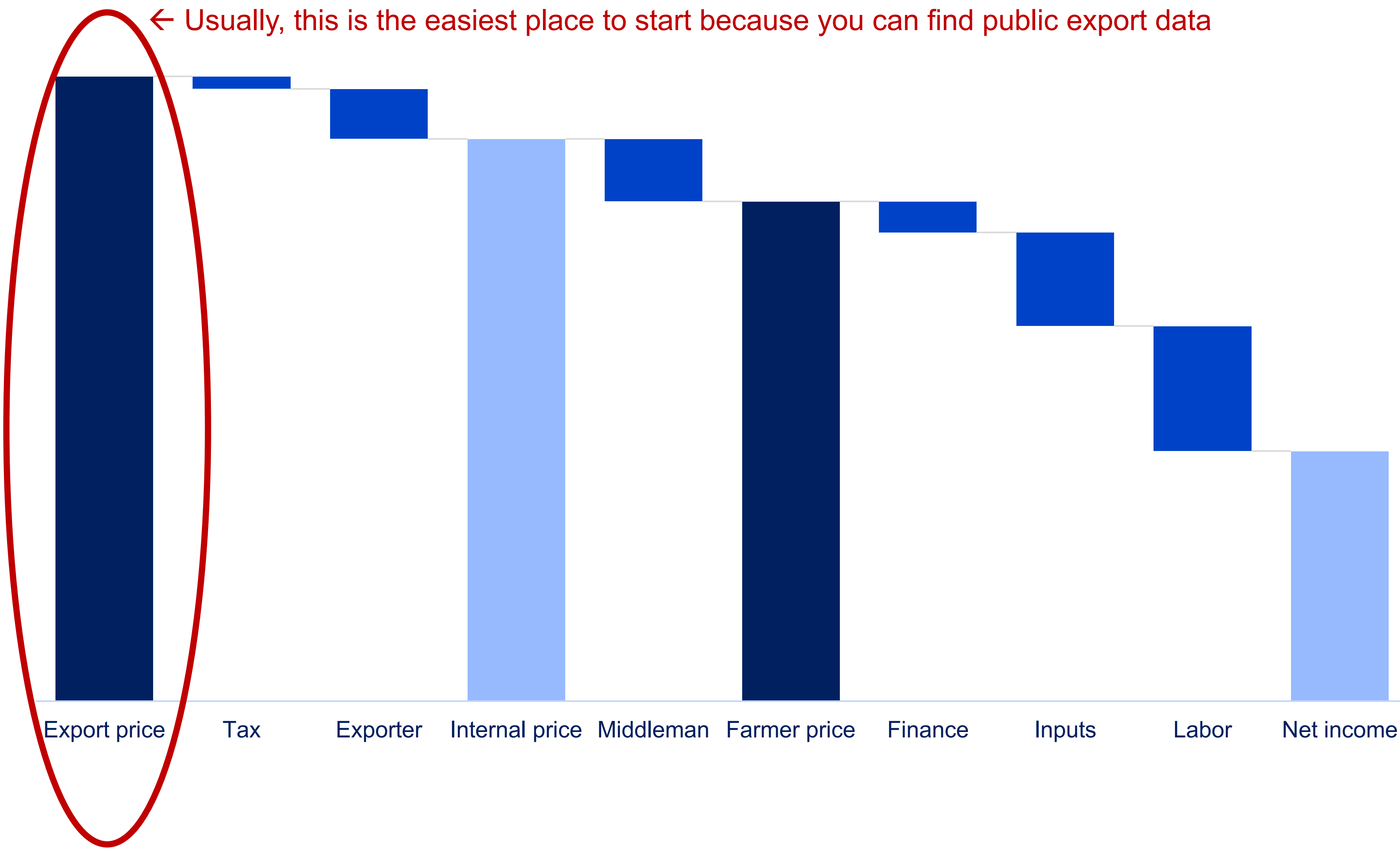



< 0.01 M traders

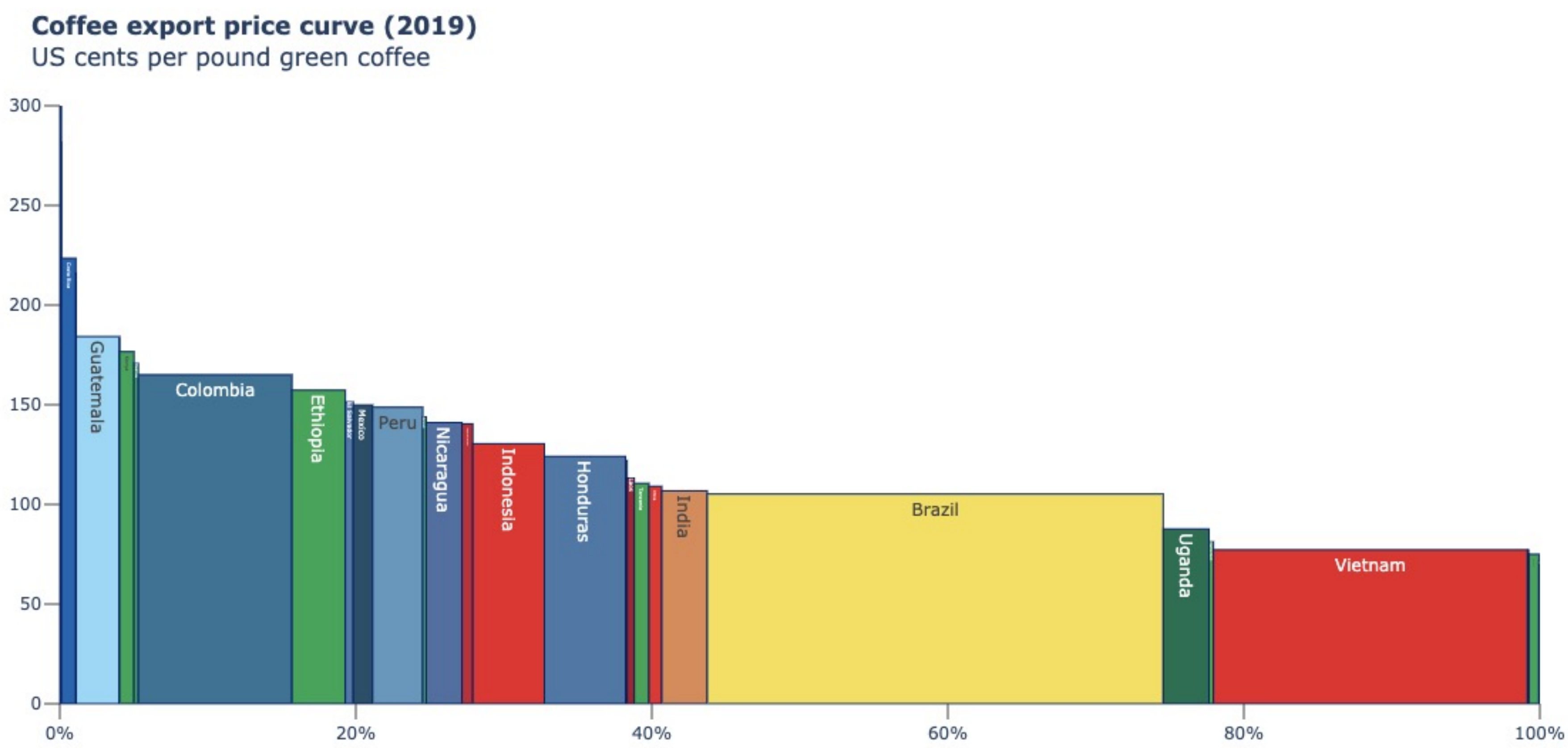
< 1 M mills

> 10 M farms

# **Breakdown** costs and revenues for each actor, how value flows through the chain

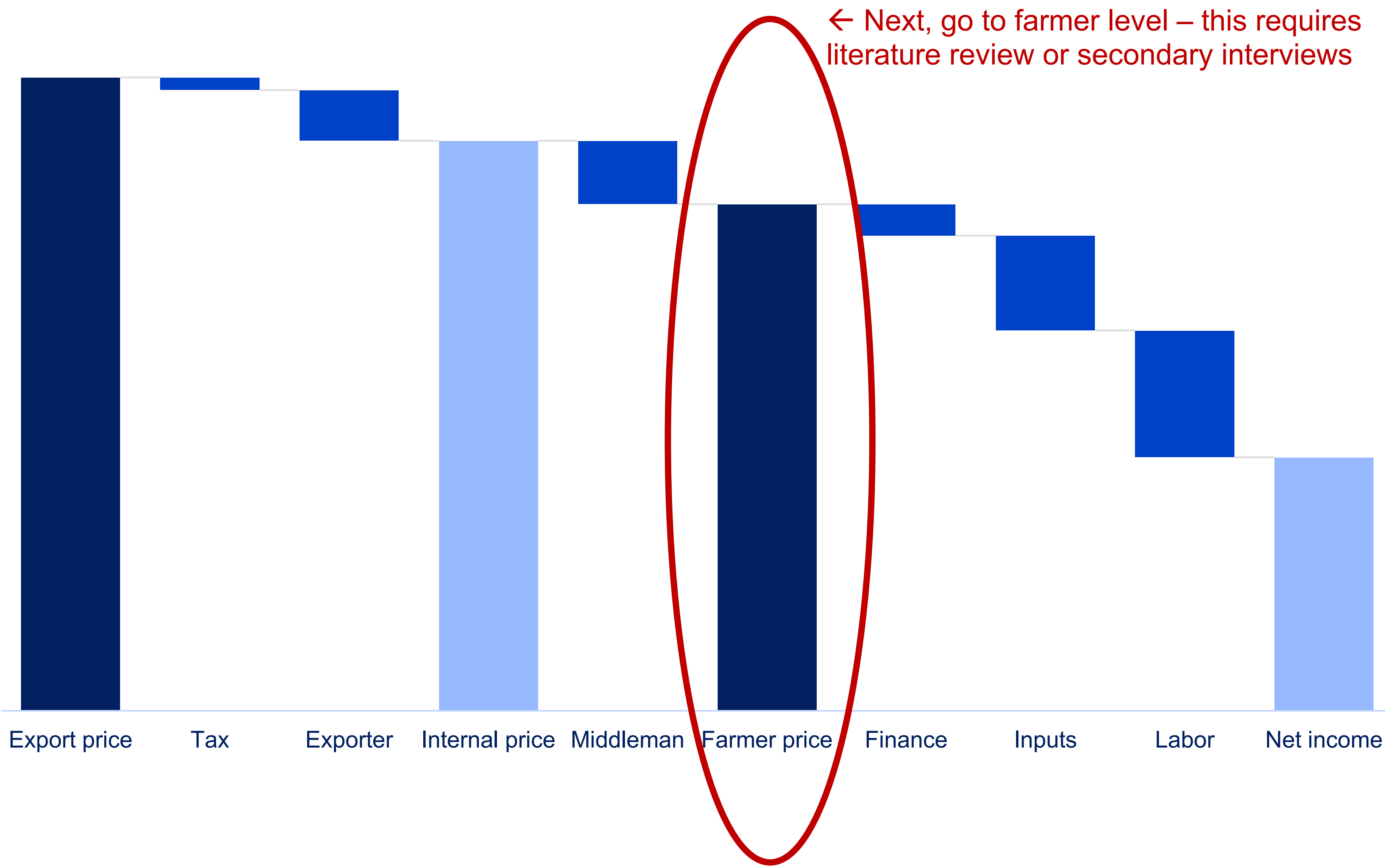


# Big “commodity” producers tend to receive lower coffee prices




Source: COMTRADE

# **Breakdown** costs and revenues for each actor, how value flows through the chain



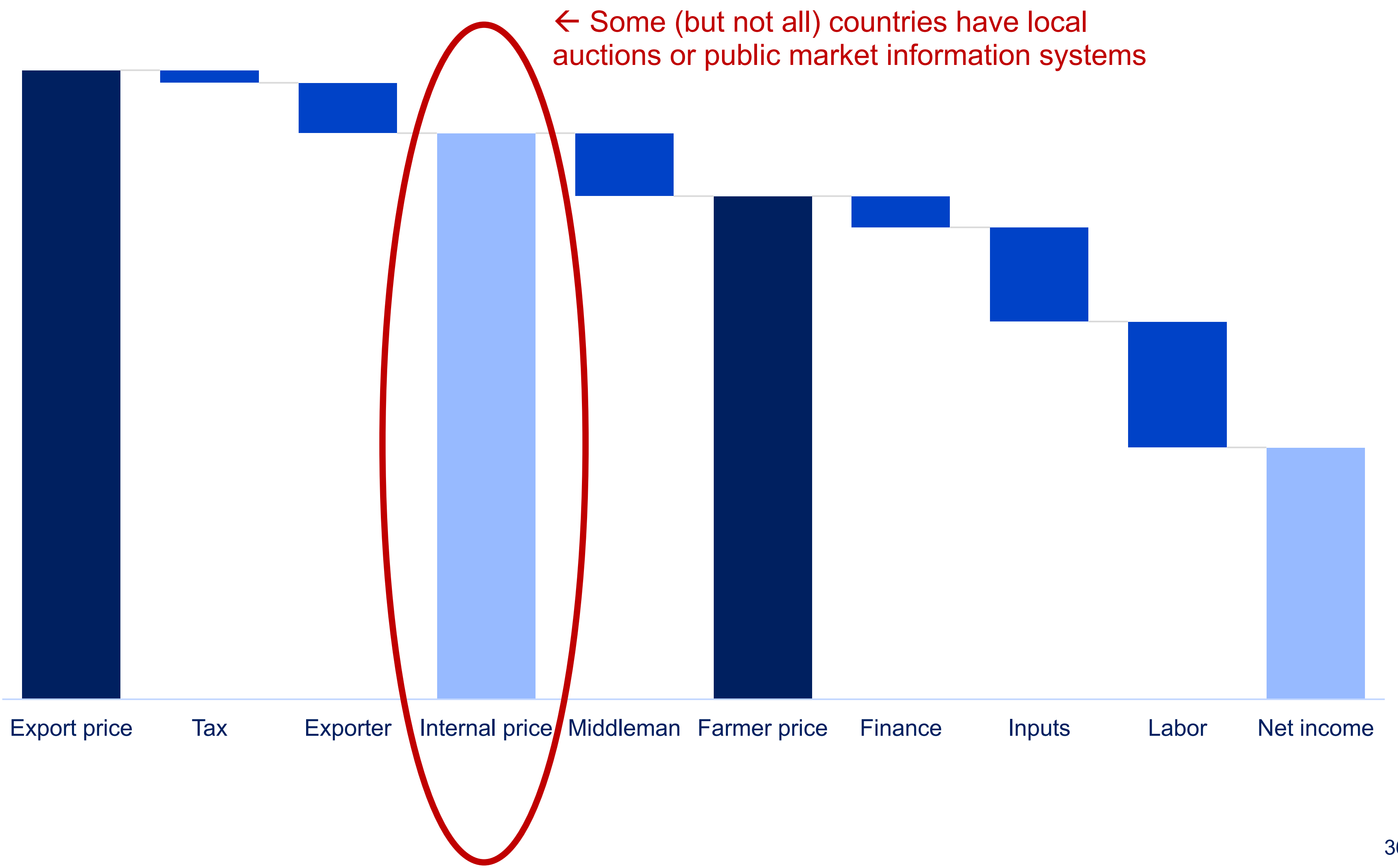
# Farm-gate prices usually require conversions to go from local units to standard international units

**COLOMBIA EXAMPLE**

| | Conventional | | Organic | |
|---|---|---|---|---|
| | **COP** | **US$ estimate** | **COP** | **US$ estimate** |
| Farm gate price (dried parchment) per kg | 9,900 | $2.75 | 11,000 | $3.06 |
| Farm gate price (dried parchment) per lb | 4,500 | $1.25 | 5,000 | $1.39 |
| Farm gate price (green bean equivalent) per lb | 6,048 | $1.68 | 6,720 | $1.87 |
| Conversion rate: 1 lb dried parchment = 0.744 lb green bean equivalent | | | | |

** COP to US$ exchange rate: 3600*

# **Breakdown** costs and revenues for each actor, how value flows through the chain



# Internal prices also require some local knowledge of quality grades and data analysis

**KENYA EXAMPLE**

NAIROBI COFFEE EXCHANGE

**TRANSACTION LISTING**

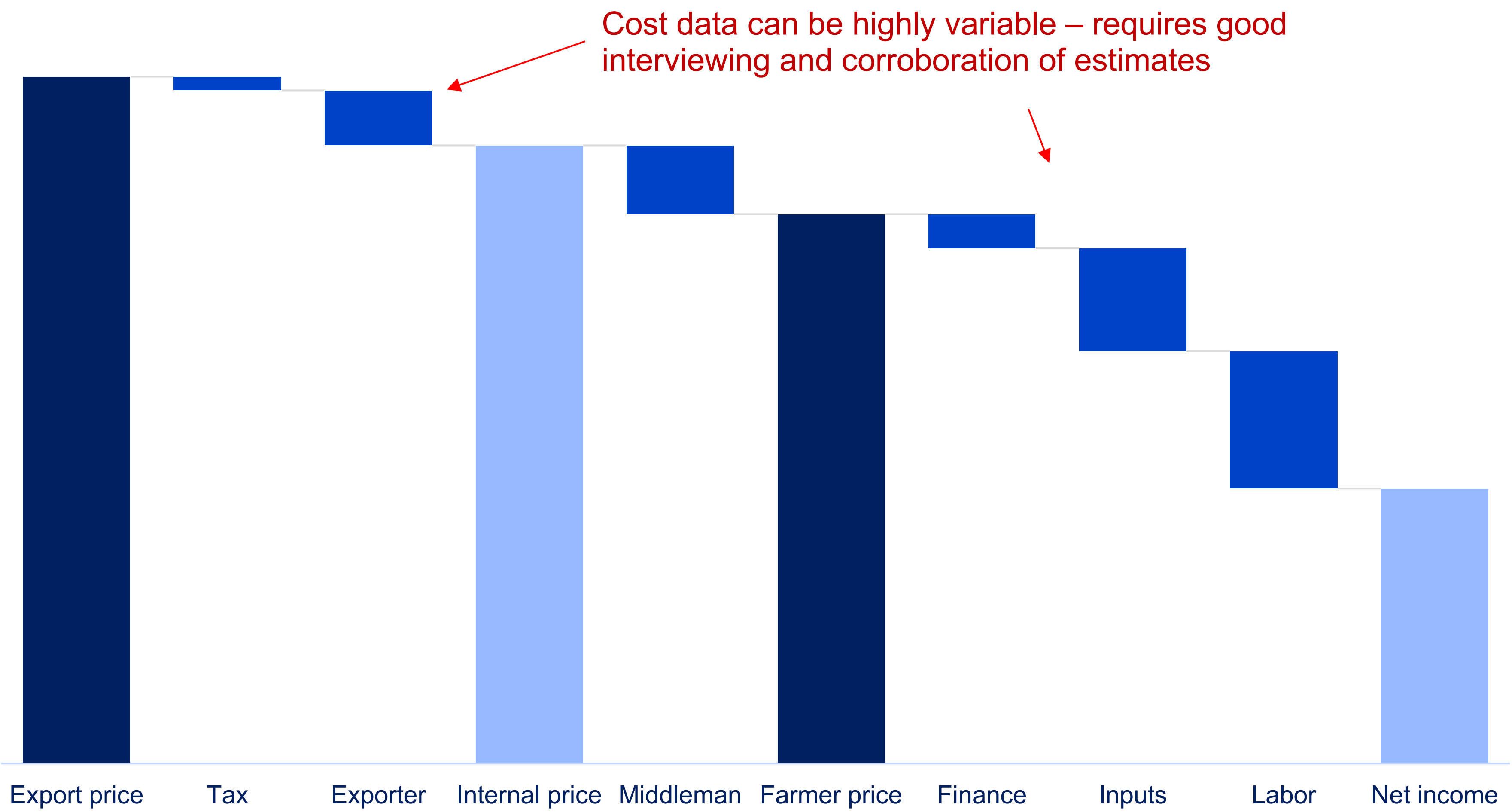
**Sale 18 of Tuesday, February 22, 2022**

2021 / 2022

**Agent** **Aristocrats Coffee & Tea**

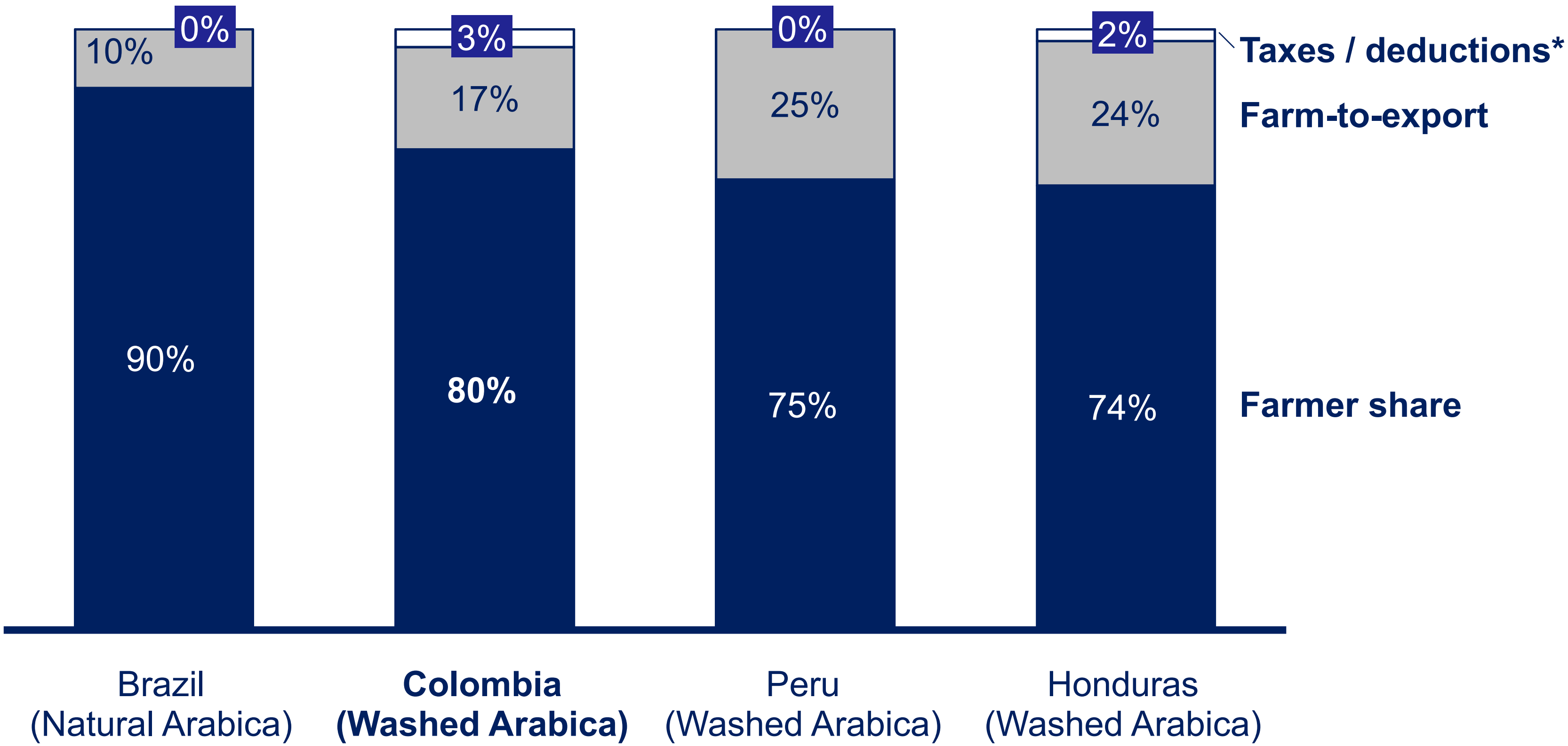
| Lot N° | Marks/Outturn | Certificate | Grade | Full Bags | Weight (kilos) | Price / 50Kg | Gross Value | Buyer | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1501 | 19SS2006/T/BULK | | T | 14 | 857 | 234 | 4,010.76 | Ibero Kenya Ltd | noted |
| 1502 | 19SS2002/T/BULK | | T | 18 | 1,091 | 252 | 5,498.64 | Louis Dreyfus Company | confirmed |
| 1503 | 19SS2001/T/BULK | | T | 20 | 1,247 | 248 | 6,185.12 | Ibero Kenya Ltd | noted |
| 1504 | 18SS2015/T/SASINI | CAFE, RFA, UTZ | T | 19 | 1,189 | 248 | 5,897.44 | Ibero Kenya Ltd | noted |
| 1505 | 17SS2005/T/BULK | | T | 15 | 909 | 251 | 4,563.18 | Louis Dreyfus Company | confirmed |
| 1506 | 17SS2002/T/BULK | | T | 23 | 1,445 | 249 | 7,196.10 | Ibero Kenya Ltd | noted |
| 1507 | 20SS2020/T/SASINI | CAFE, RFA, UTZ | T | 15 | 954 | 253 | 4,827.24 | Louis Dreyfus Company | noted |
| 1508 | 18SS2012/TT/SASINI | CAFE, RFA, UTZ | TT | 13 | 843 | 285 | 4,805.10 | C.Dorman Ltd | noted |
| 1509 | 18SS2010/TT/BULK | | TT | 23 | 1,399 | 276 | 7,722.48 | Ibero Kenya Ltd | noted |

# **Breakdown** costs and revenues for each actor, how value flows through the chain



# **Benchmark** performance of the value chain

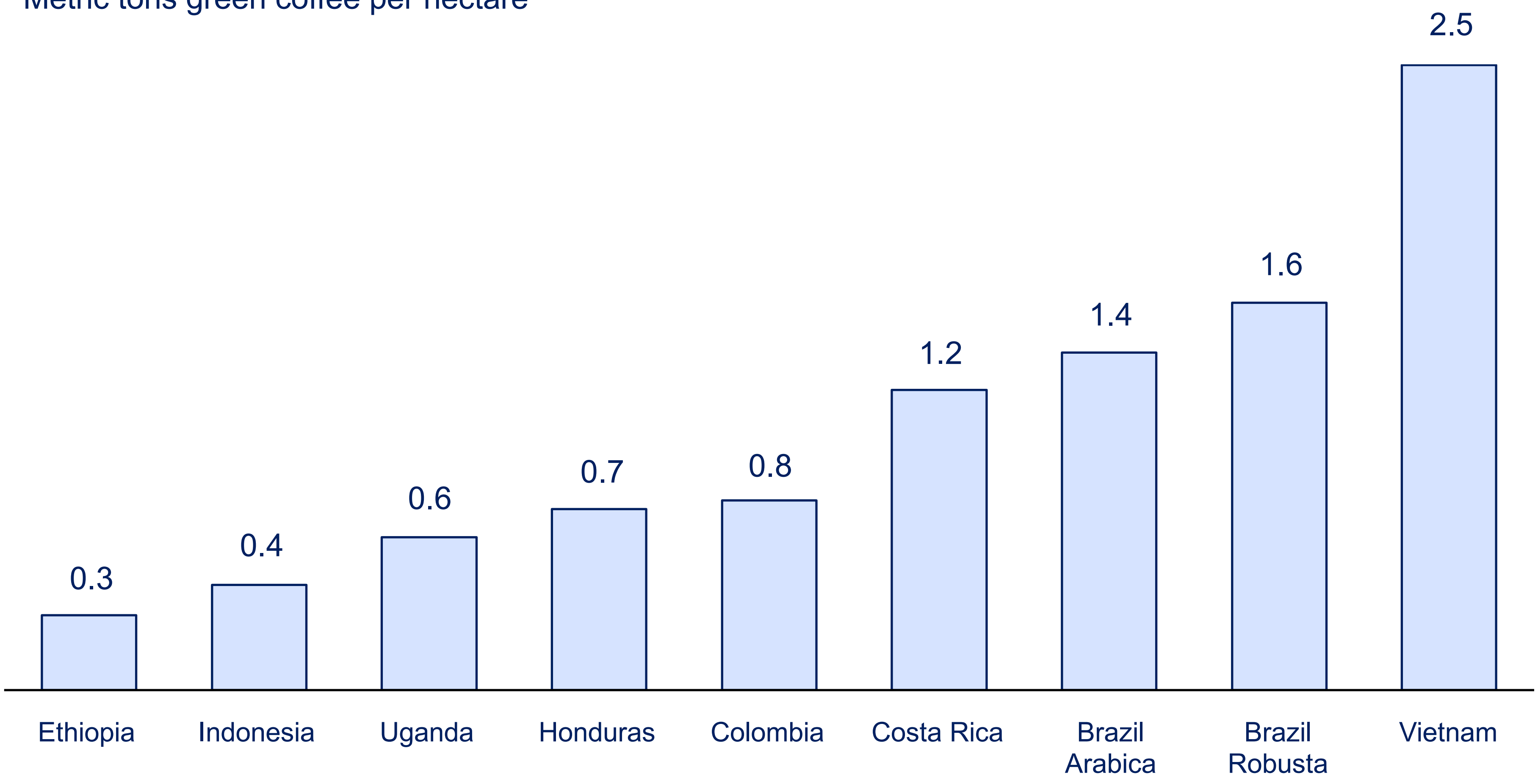
**Efficiency levels of major Latin American coffee supply chains, 2012/13**
100% = average export price




* Coffee contribution of US$ 6 cents/lb in Colombia and US$ 4.25 per 46-kg bag in Honduras (not considering 'retención' of US$ 9 per 46 kg bag that is reimbursed to registered farmers after payment)
** Calculated as difference between farm gate price and ICO price
Source: trade statistics; TechnoServe analysis and interviews in Brazil, Colombia, Honduras and Peru

# **Benchmark** performance of the value chain

**Average coffee farm yields***
Metric tons green coffee per hectare




*National average based on total production (average of last two crops) and area under coffee; includes both Arabica and Robusta unless noted otherwise

Source: USDA; TechnoServe analysis

# Global coffee value chain review

1 **MAP**

- Diverse supply base: 20+ countries, >10 million farms, varying levels of sophistication
- Most coffee sold for export

2 **BREAKDOWN**

- Prices set internationally
- Production costs are influenced by local policies and conditions (e.g., taxes, wages, infrastructure, etc.)

3 **BENCHMARK**

- Lower price countries (Brazil and Vietnam) have higher yields
- Higher price countries (Colombia and Ethiopia) have lower yields

# Recommendations for global coffee value chain

| Impact | Low Feasibility | High Feasibility |
|---|---|---|
| High | Transfer higher share of export price to farmer | Help smallholders improve quality and productivity |
| Low | Export roasted coffee direct to consumers | Boost local coffee consumption |

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- Case Study: Colombia
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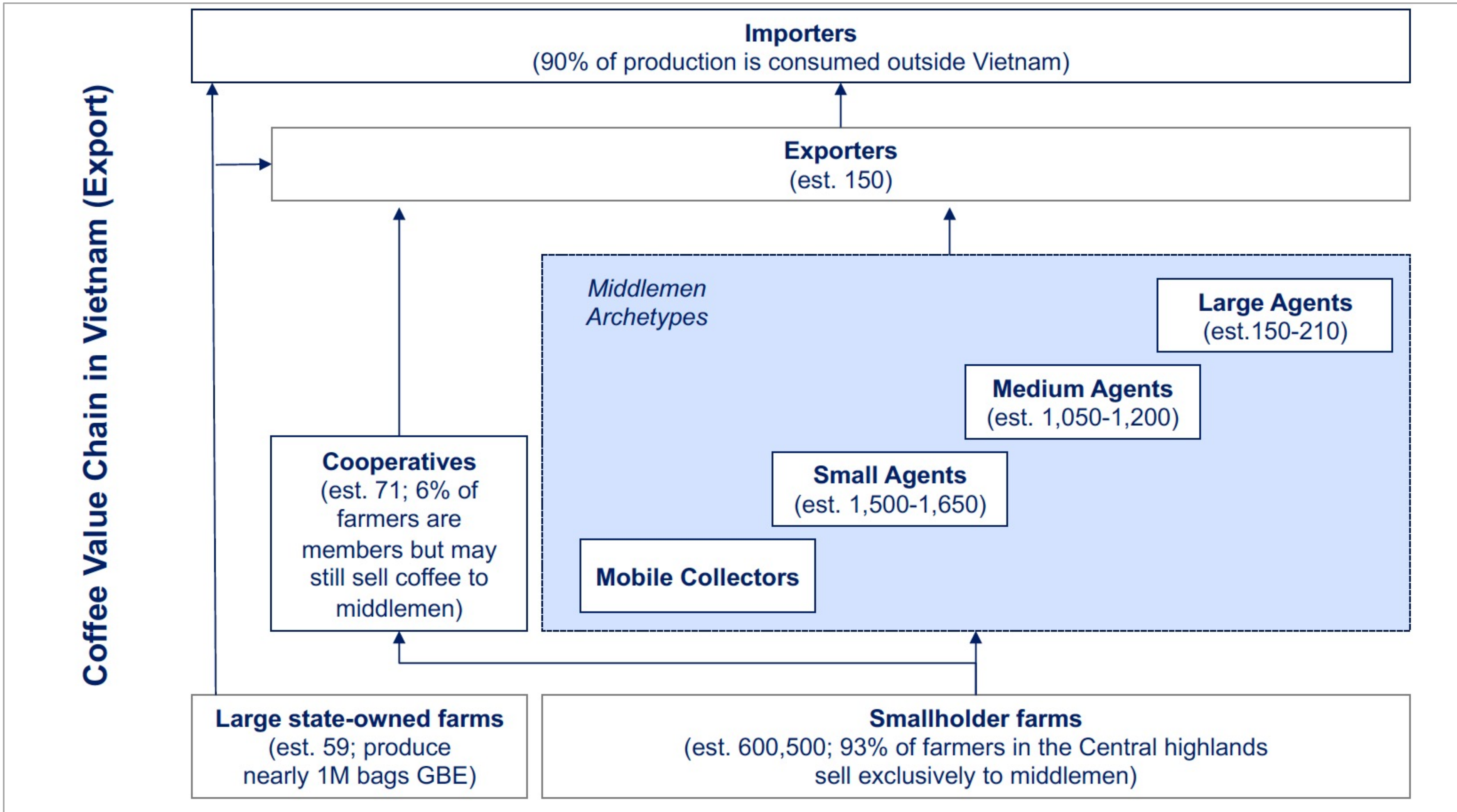
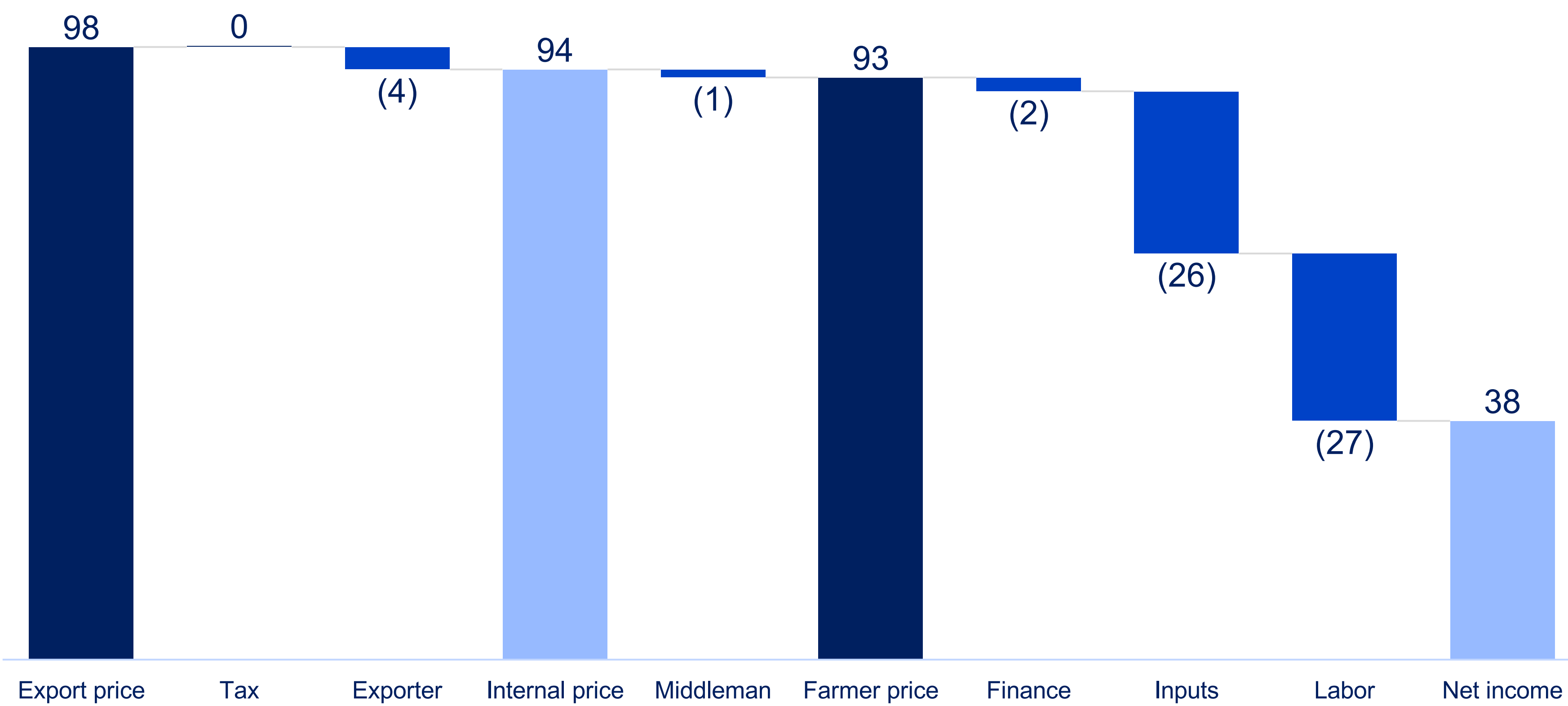
# Vietnam has ~600,000 coffee farmers and a highly competitive "middleman" economy




Source: An analysis of the role of middlemen in coffee supply chains: Vietnam Country Report; prepared by Enveritas in January 2020

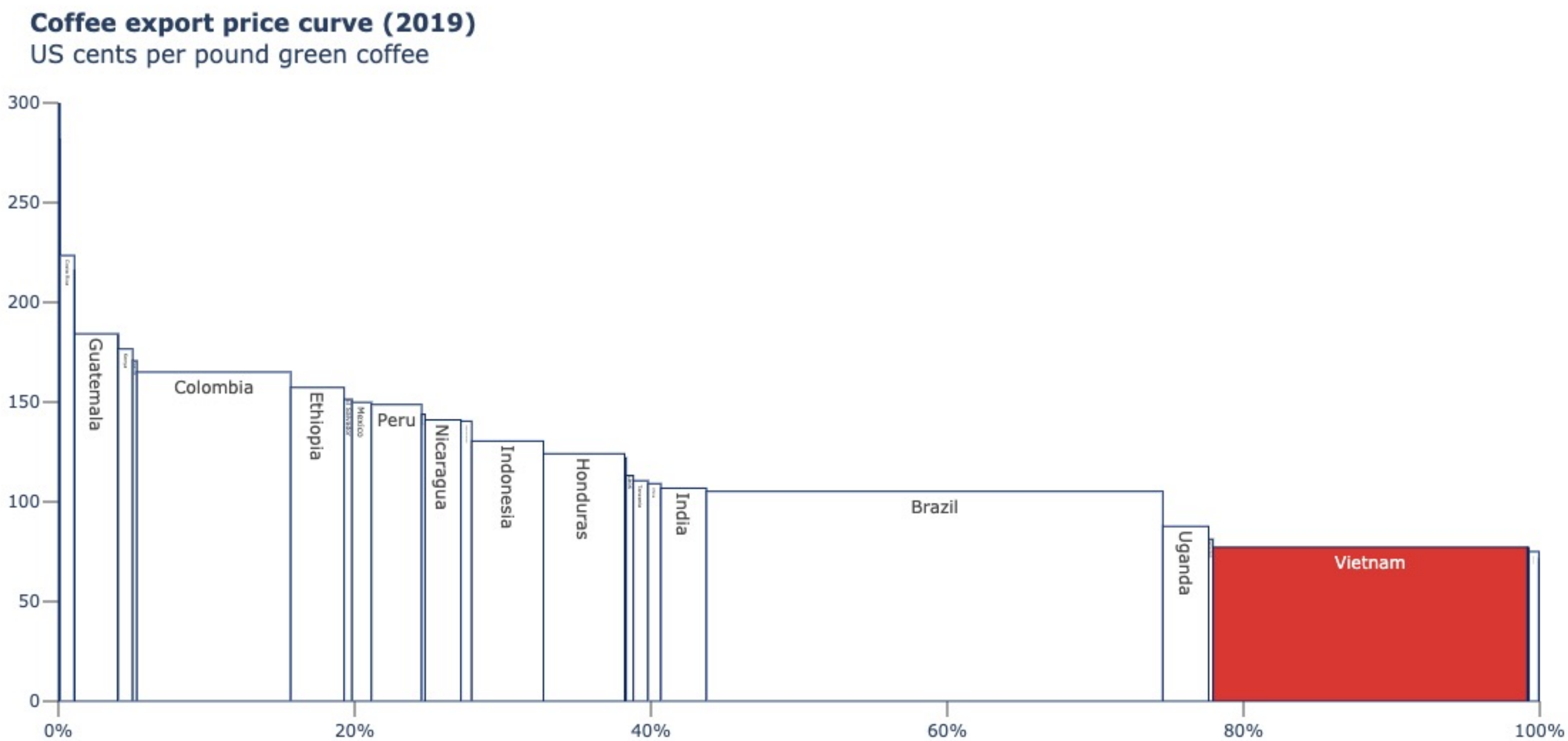
# Vietnamese farmers earn 95% of the export price

**Illustrative Vietnam Robusta supply chain cost breakdown**
US cents per pound green




DATE: March 8, 2013 (for pricing)
Source: interviews with local and multinational exporters

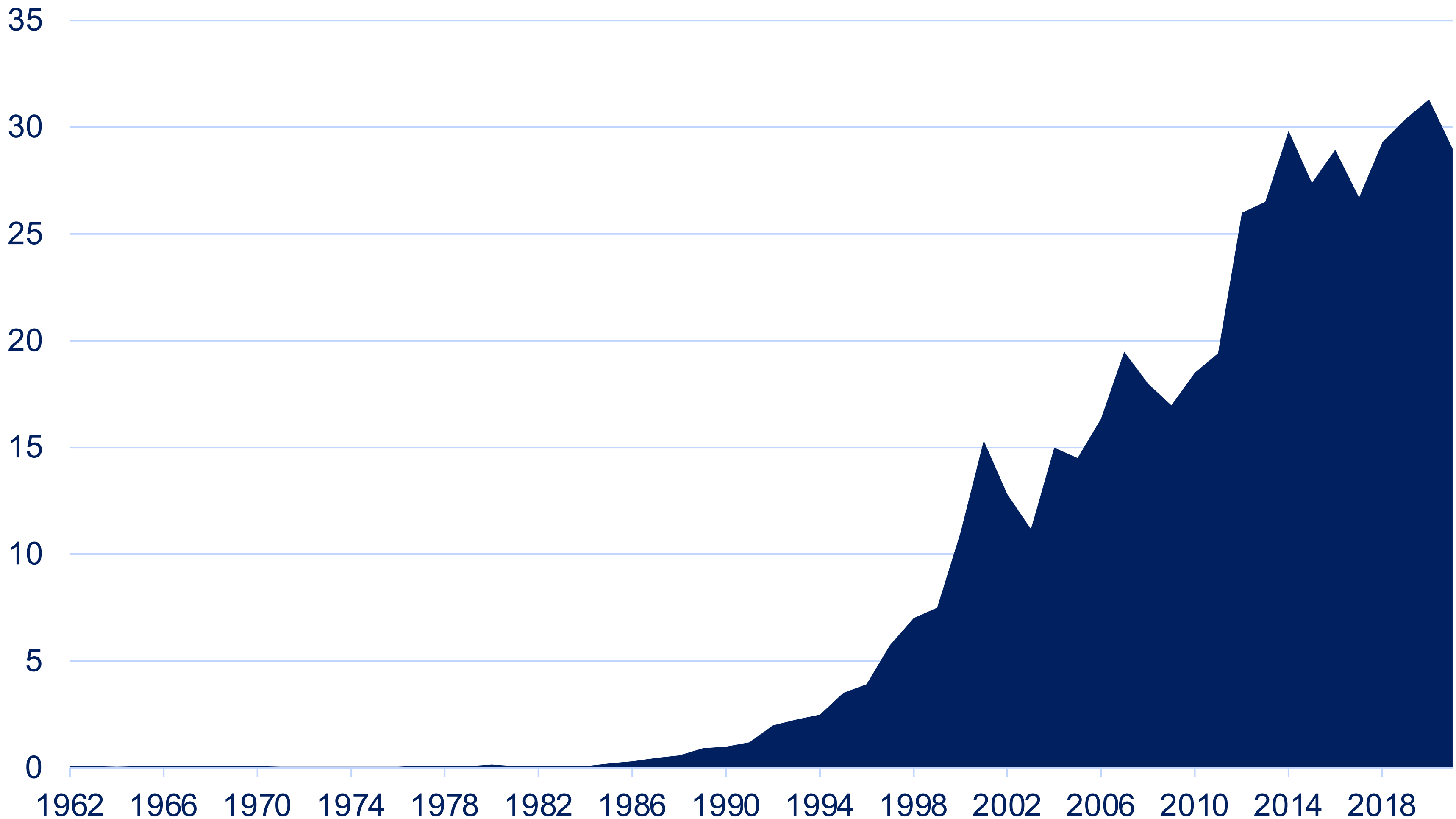
# Vietnam supplies ~20% of market at a low price




Source: COMTRADE

# Vietnam increased its coffee production rapidly

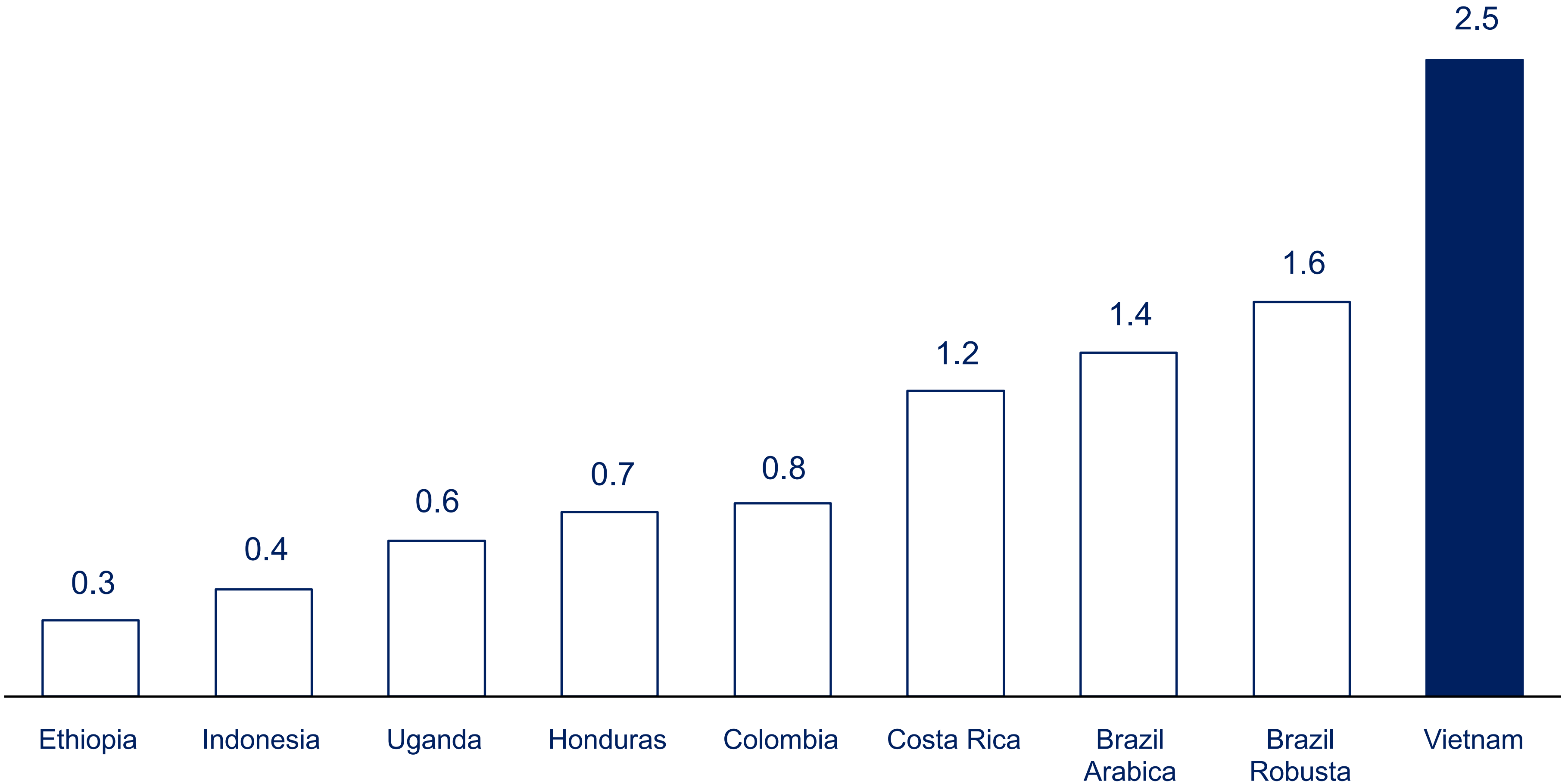
**Vietnam coffee production**
Bags (60-kg), millions




Source: USDA production figures

# Vietnamese farms have very high yields

**Average coffee farm yields***
Metric tons green coffee per hectare

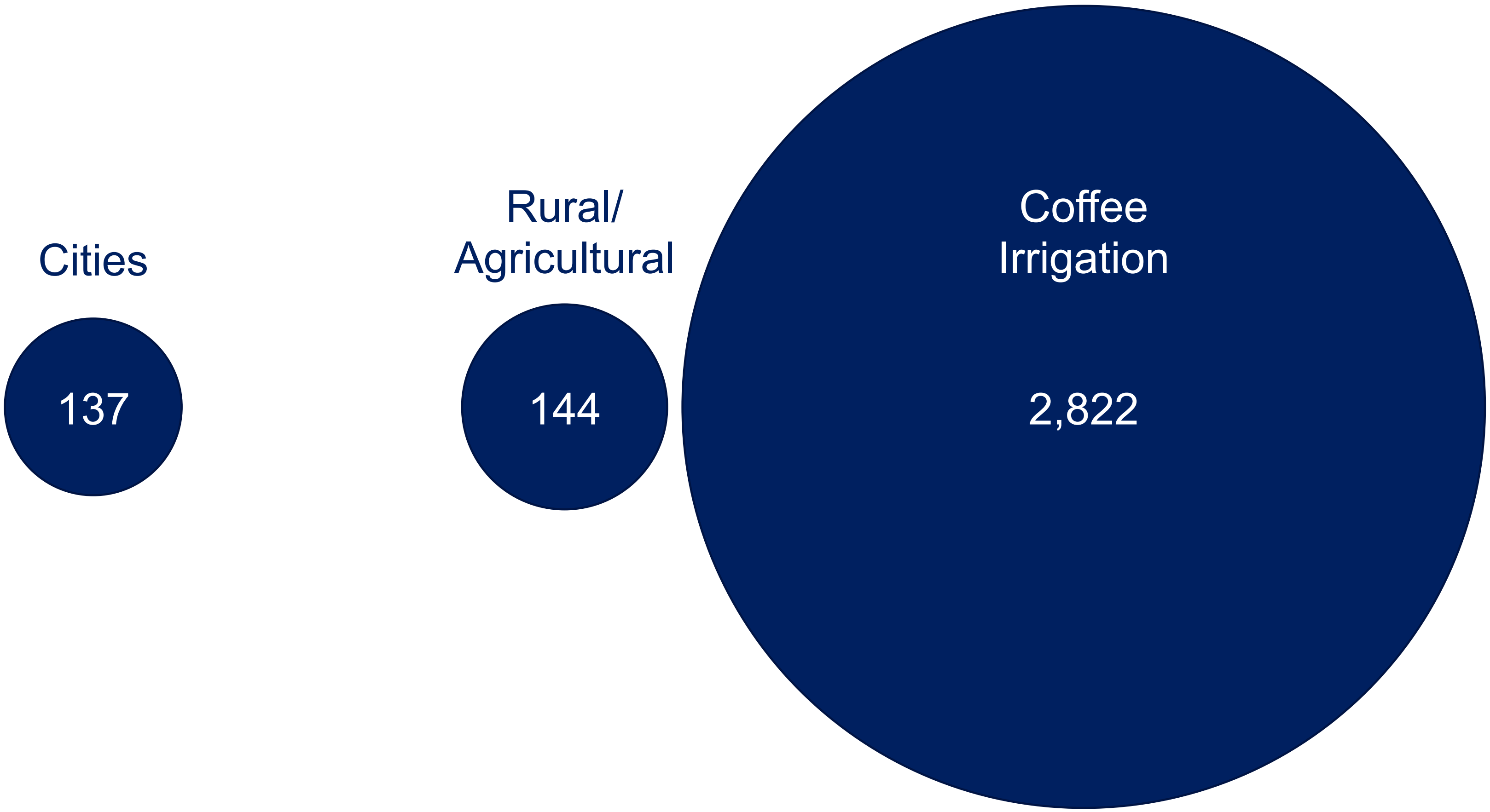



*National average based on total production (average of last two crops) and area under coffee; includes both Arabica and Robusta unless noted otherwise

Source: USDA; TechnoServe analysis

# Coffee production has a large environmental footprint

**Total water demand in Vietnam's Central Highlands**
Tons per household* per year




* Assumes average household size of 4.5

Source: D'Haeze 2004; Lu 2002; extrapolations to current estimated rates of urban and rural usage

# Vietnam review

**1 MAP**

- Approx. 600,000 mostly small-scale farmers
- Growth-focused government policies (land rights, credit access, lots of competition, etc.)

**2 BREAKDOWN**

- Farmers earn 95% of export price
- Margins for exporters / collectors are very slim (<1%)

**3 BENCHMARK**

- High farm yields and low costs relative to other coffee countries
- Production has a large environmental footprint

# Recommendations for Vietnam's coffee value chain

| Impact \ Feasibility | Low | High |
|---|---|---|
| High | Improve environmental stewardship (reduce water footprint) | Sell roasted coffee products into regional markets (increase value of exports) |
| Low | Organize farmer cooperatives and cut out middlemen (increase farmer share of price) | Boost local coffee consumption (increase avg price to farmer) |

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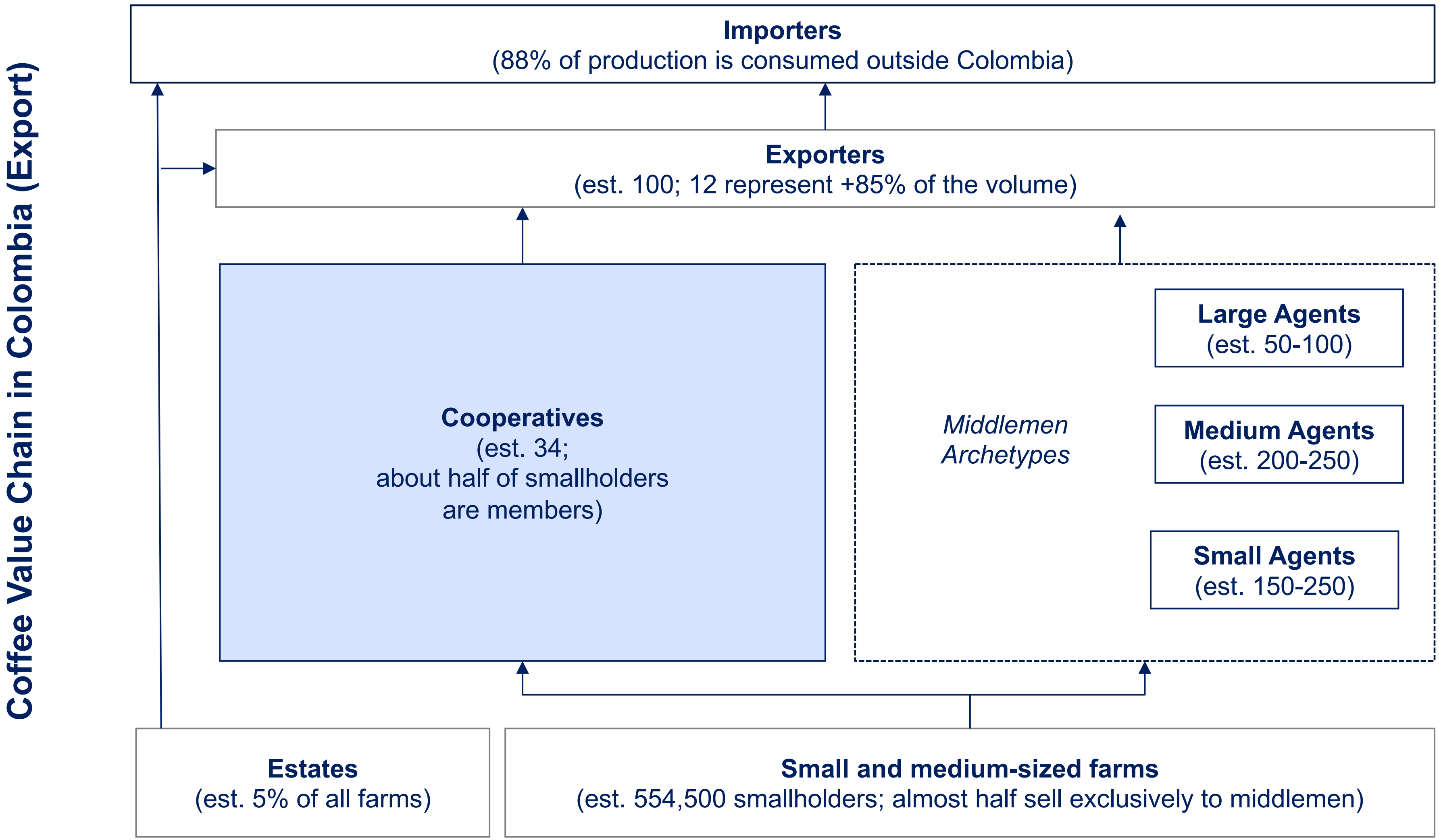
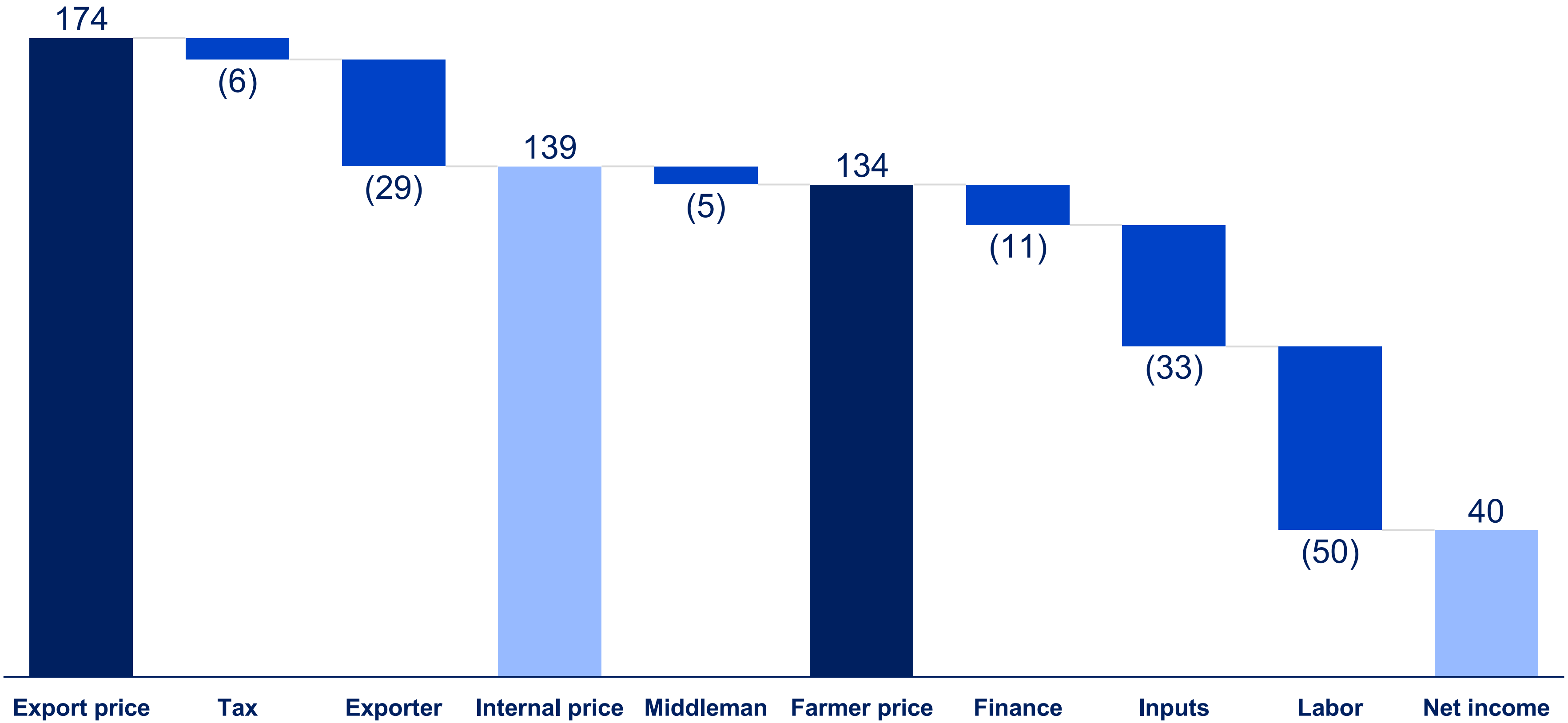
# Colombia has ~550,000 coffee farmers and a strong cooperative sector




Source: An analysis of the role of middlemen in coffee supply chains: Colombia Country Report; prepared by Enveritas in January 2020

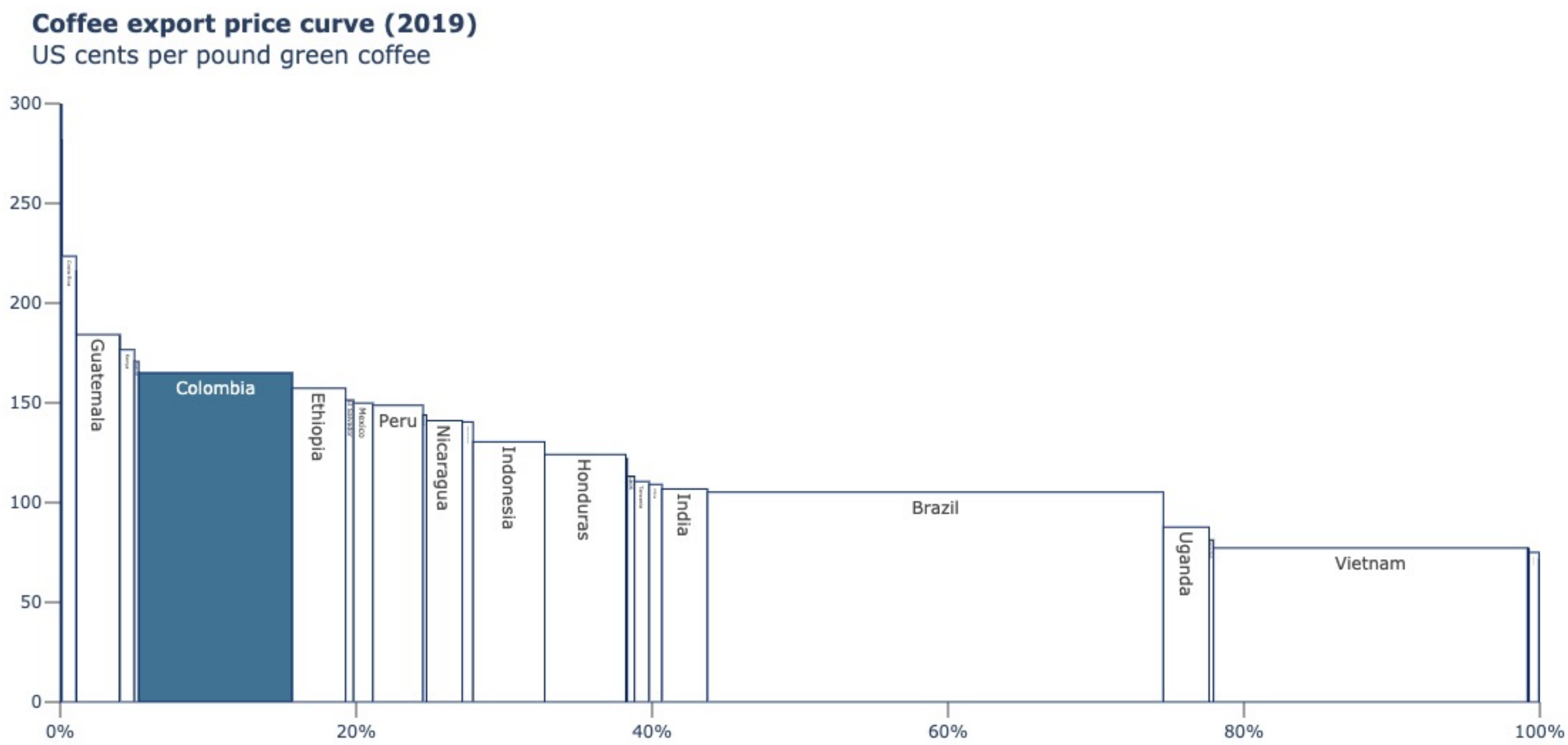
# Colombian farmers earn 80% of the export price

**Illustrative Colombia Arabica supply chain cost breakdown**
US cents per pound green



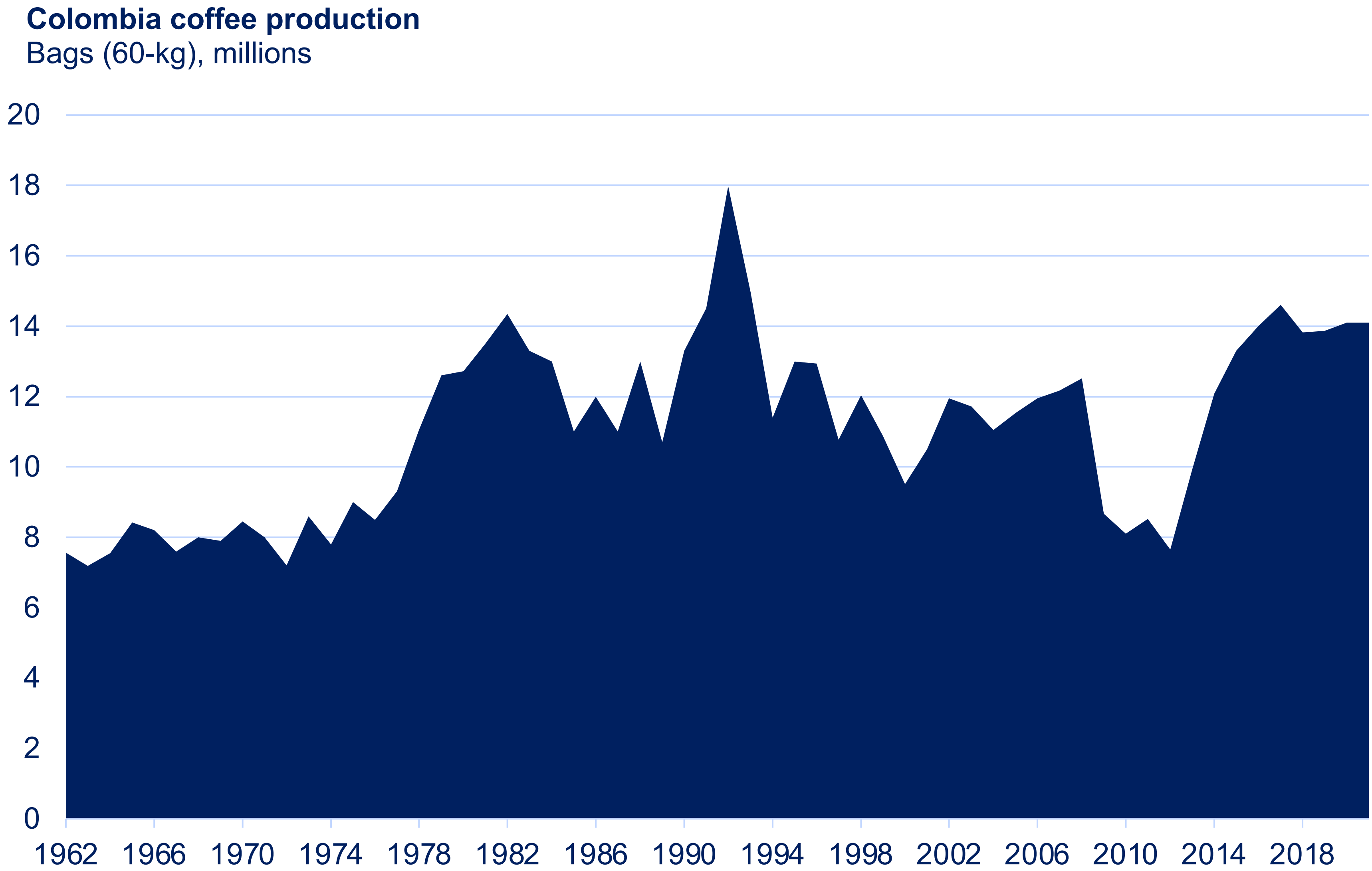

Note: Cost of production does not include costs for installation of wet milling equipment, tree renovation or financing
* Normalized to 2012/13 average commodity prices – Arabica ICE "C" of $1.50 but adjusted for market differentials
** Includes farm tools, equipment, internal transport, etc.
Source: Stakeholder interviews, TechnoServe analysis

# Colombia supplies ~10% of market at a premium price




Source: COMTRADE

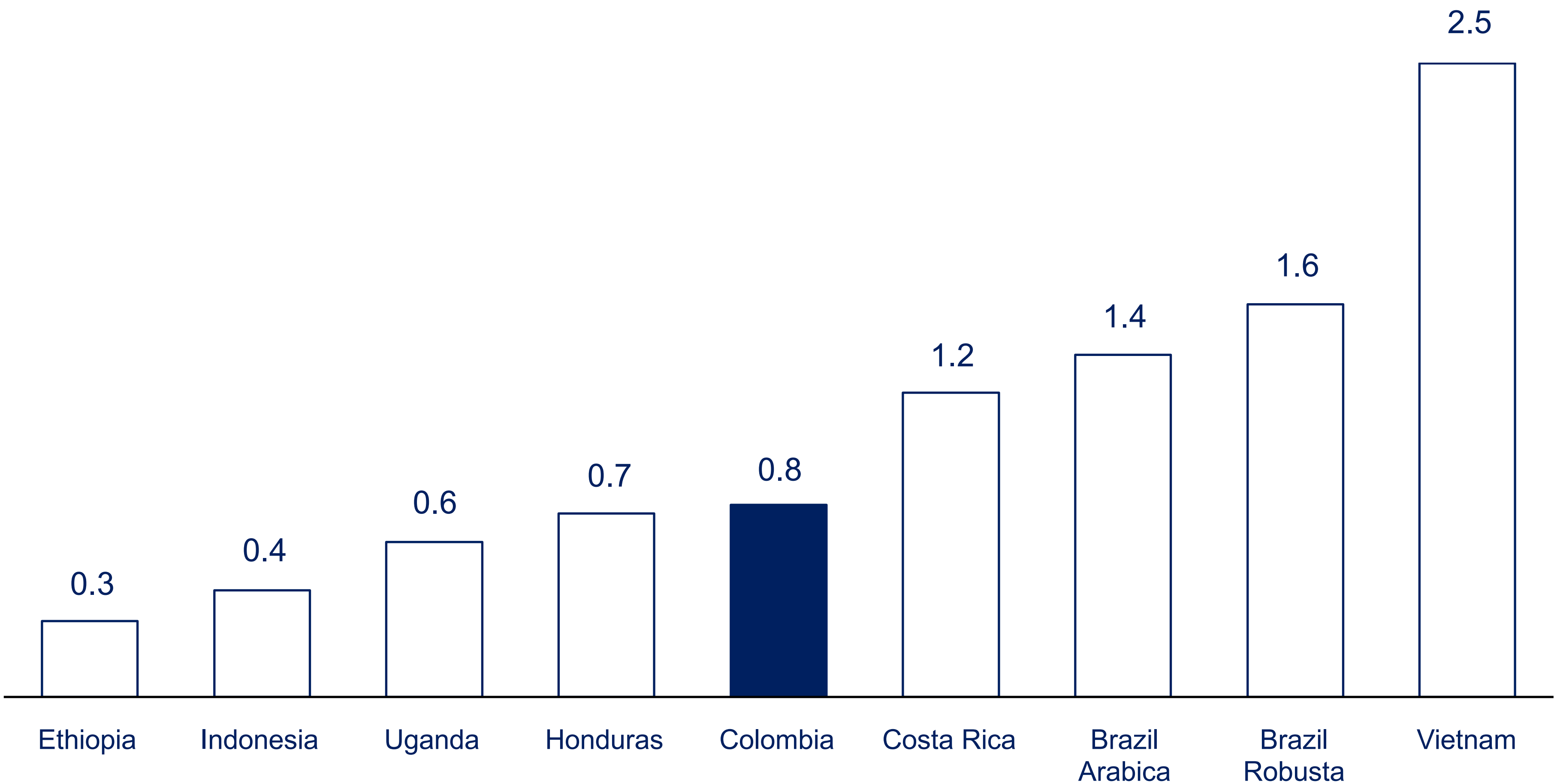
# Colombia’s coffee production has been relatively stable




Source: USDA production figures

# Colombian farms have average level yields

**Average coffee farm yields***
Metric tons green coffee per hectare

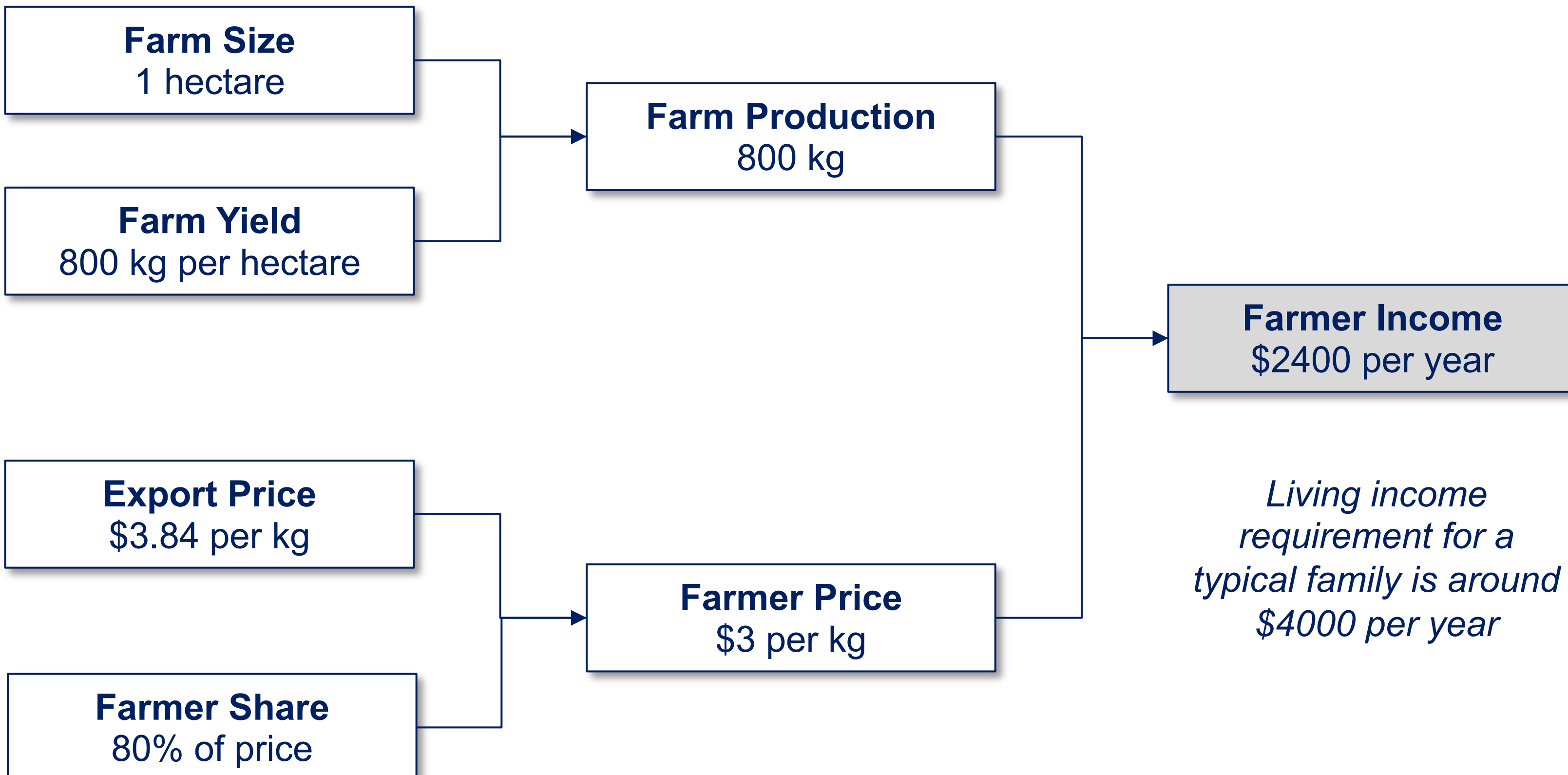



*National average based on total production (average of last two crops) and area under coffee; includes both Arabica and Robusta unless noted otherwise

Source: USDA; TechnoServe analysis

# Many Colombian farms struggle to earn a living income from coffee

**SIMPLIFIED MODEL**




*Living income requirement for a typical family is around $4000 per year*

Source: author estimates

# Colombia review

**1 MAP**

- Approx. 500,000 mostly small-scale farmers
- Unique supply chain with mix of private, public and cooperative operators

**2 BREAKDOWN**

- Farmers earn 80% of export price
- Strong cooperative sector and institutional support provided by government (through tax)

**3 BENCHMARK**

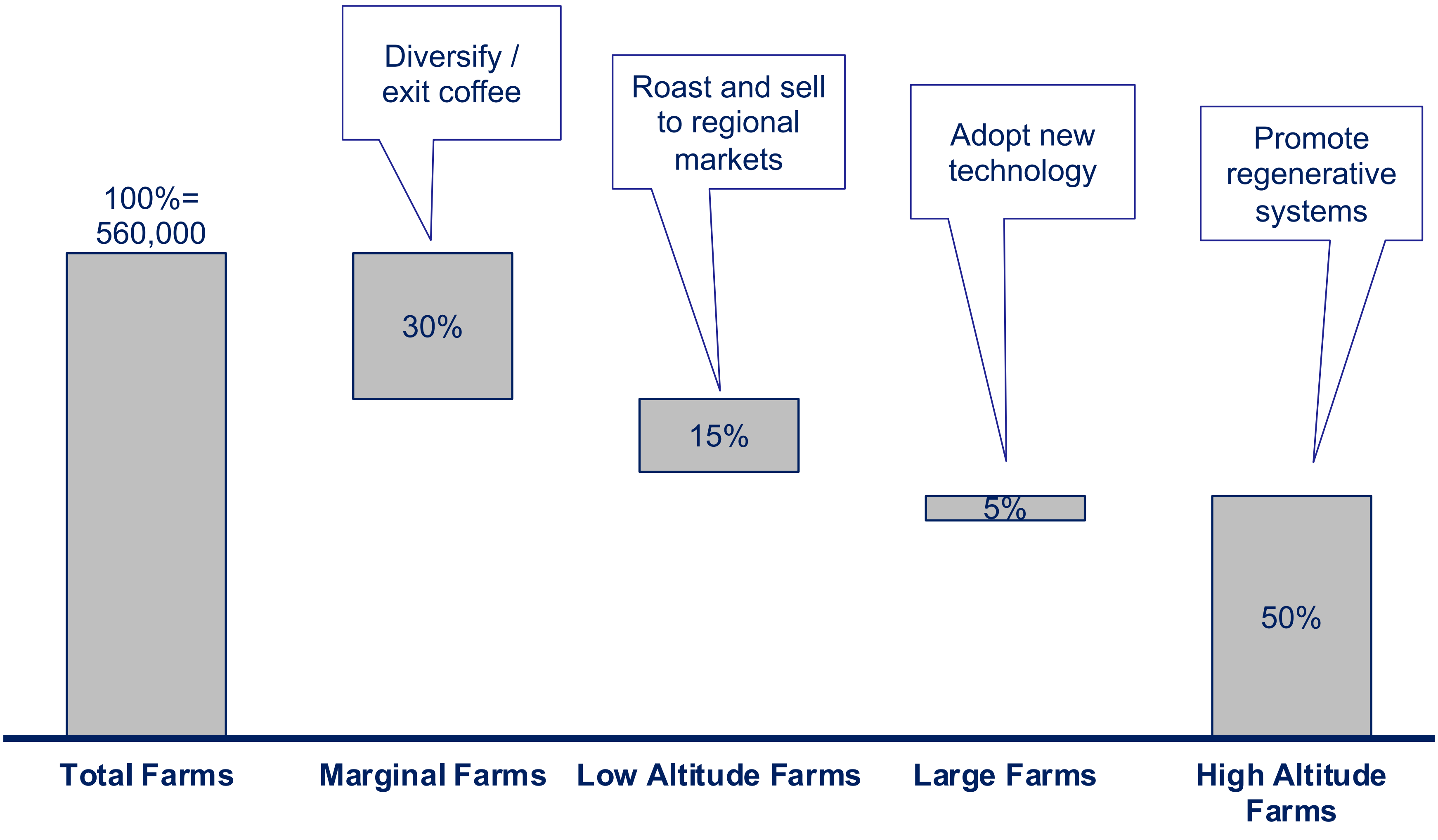
- Average yields and average costs relative to other coffee countries
- Many farmers are unable to achieve a living income solely from coffee

# Recommendations for Colombia’s coffee value chain

| Impact | Low | High |
|---|---|---|
| High | Assist farmers to diversify their income or subsidize to exit coffee (increase incomes) | Invest in “regenerative ag” (reduce farming cost and increase export price) |
| Low | Sell roasted coffee products into regional markets (increase value of exports) | Introduce new technology (reduce farming cost and increase yields) |

**Feasibility**

# Recommendations can also be segmented by producer type



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# Some pointers when doing VCA in the real world

- Context, context, context
- Identify the right mix of stakeholders to interview
- Get diverse opinions
- Make it easy for people to give you data (e.g., carry a USB)
- Know that official statistics aren't always accurate
- Corroborate numbers with different sources
- Be OK going downstream (start at farm) and upstream (start at buyer)
- Talk through hypotheses with experts
- One-size-fits-all solutions are rare; segmentation is usually needed
- Keep slides simple