COLUMBIA | SIPA
School of International and Public Affairs

Value Chain Analysis – Day 1

Guest lecture by Carl Cervone
April 10, 2018

Plan for the week

Today

- The Value Chain Framework
- Global coffee value chain
- Break
- Case: Vietnam coffee
- Case: Colombia coffee

Thursday

- Case: Ethiopia coffee
- Practical aspects / Q&A

Why do value chain analysis?

OUTPUTS

- Identify new opportunities
- Compare different opportunities
- Identify levers of value creation
- Quantify value creation potential
- …
- …
- …
- …

OUTCOMES

- Inform project proposals
- Influence policy makers
- Influence business leaders
- Mobilize action (or funding)
- …
- …
- …
- …

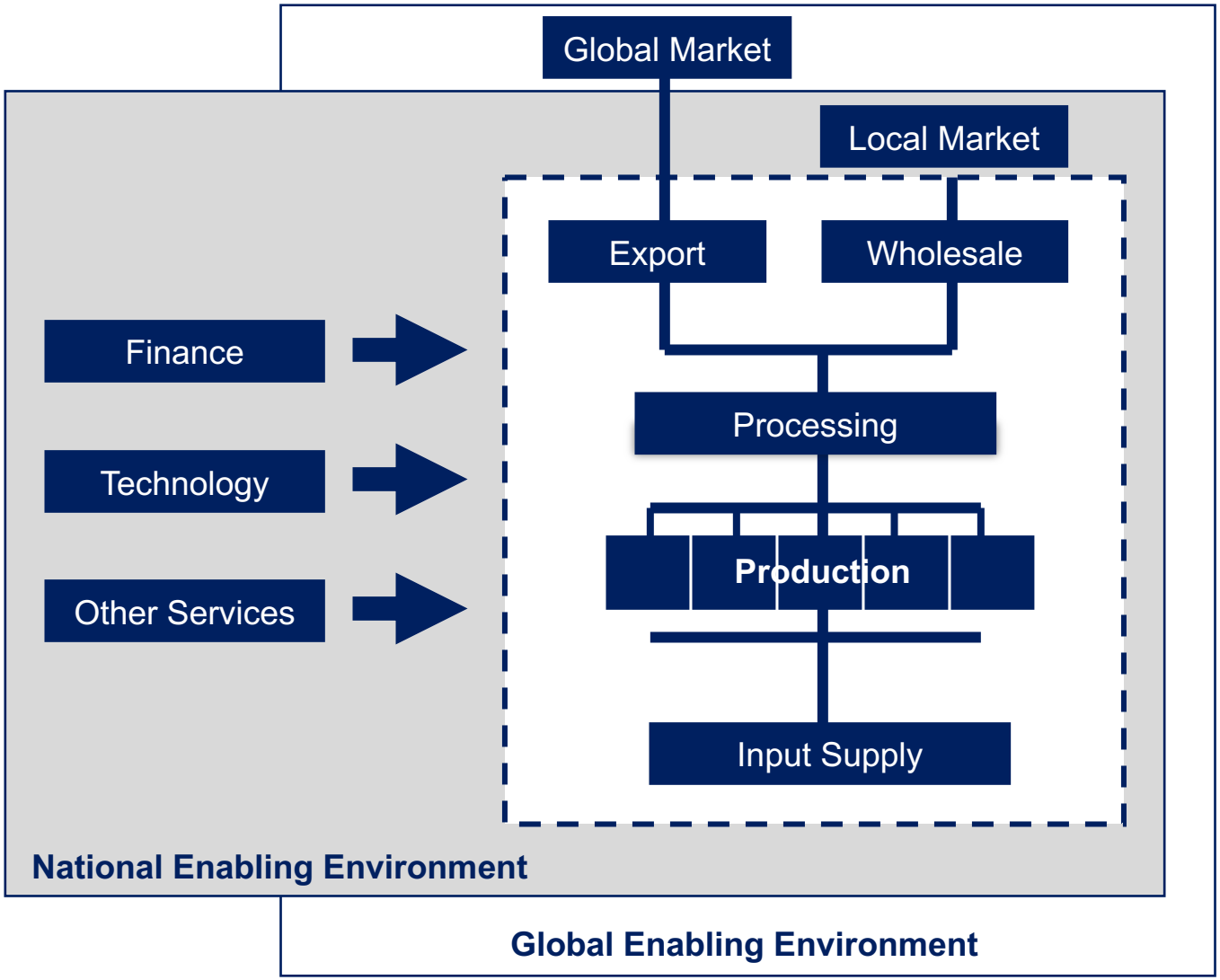
Thorough VC analysis should…

1. **MAP** — who the relevant actors are, what they do, how they relate to each other

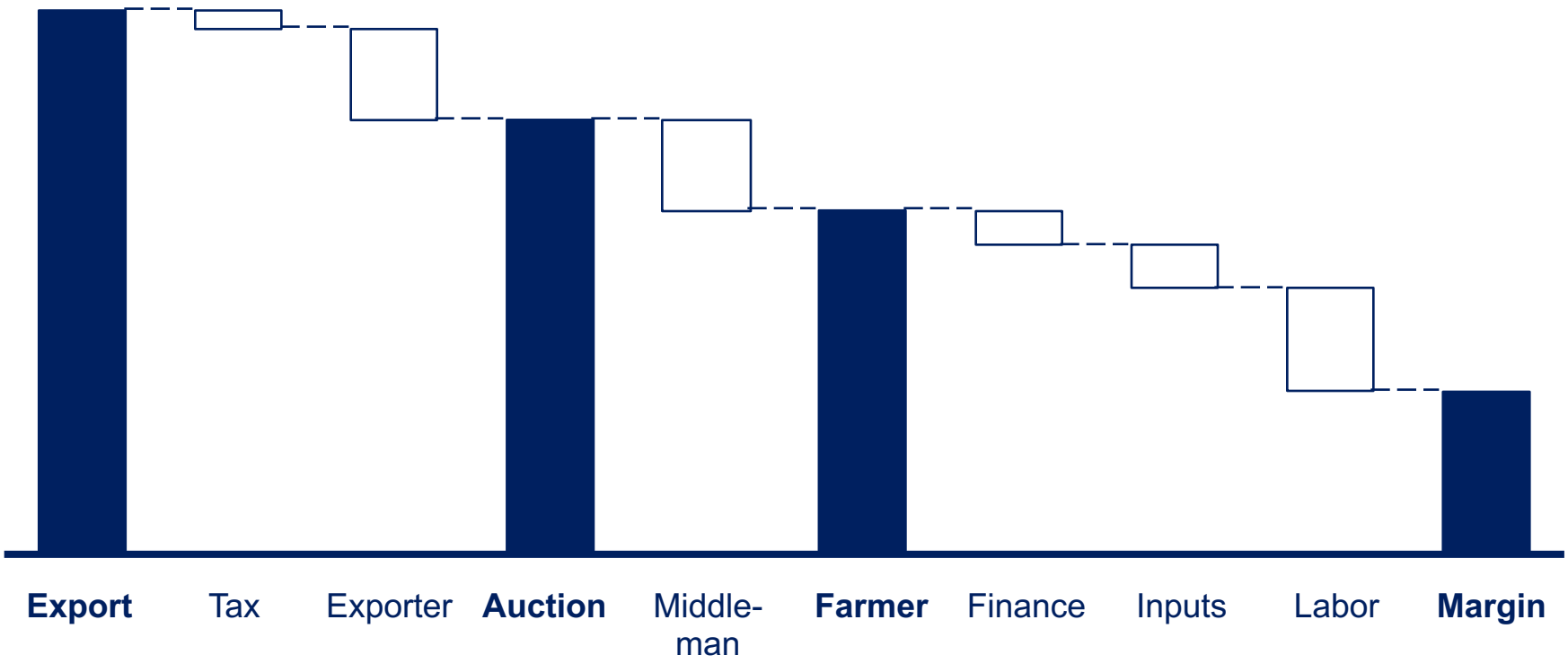
2. **BREAKDOWN** — costs and revenues for each actor, how value flows through the chain

3. **BENCHMARK** — performance of the value chain against peer countries or sectors

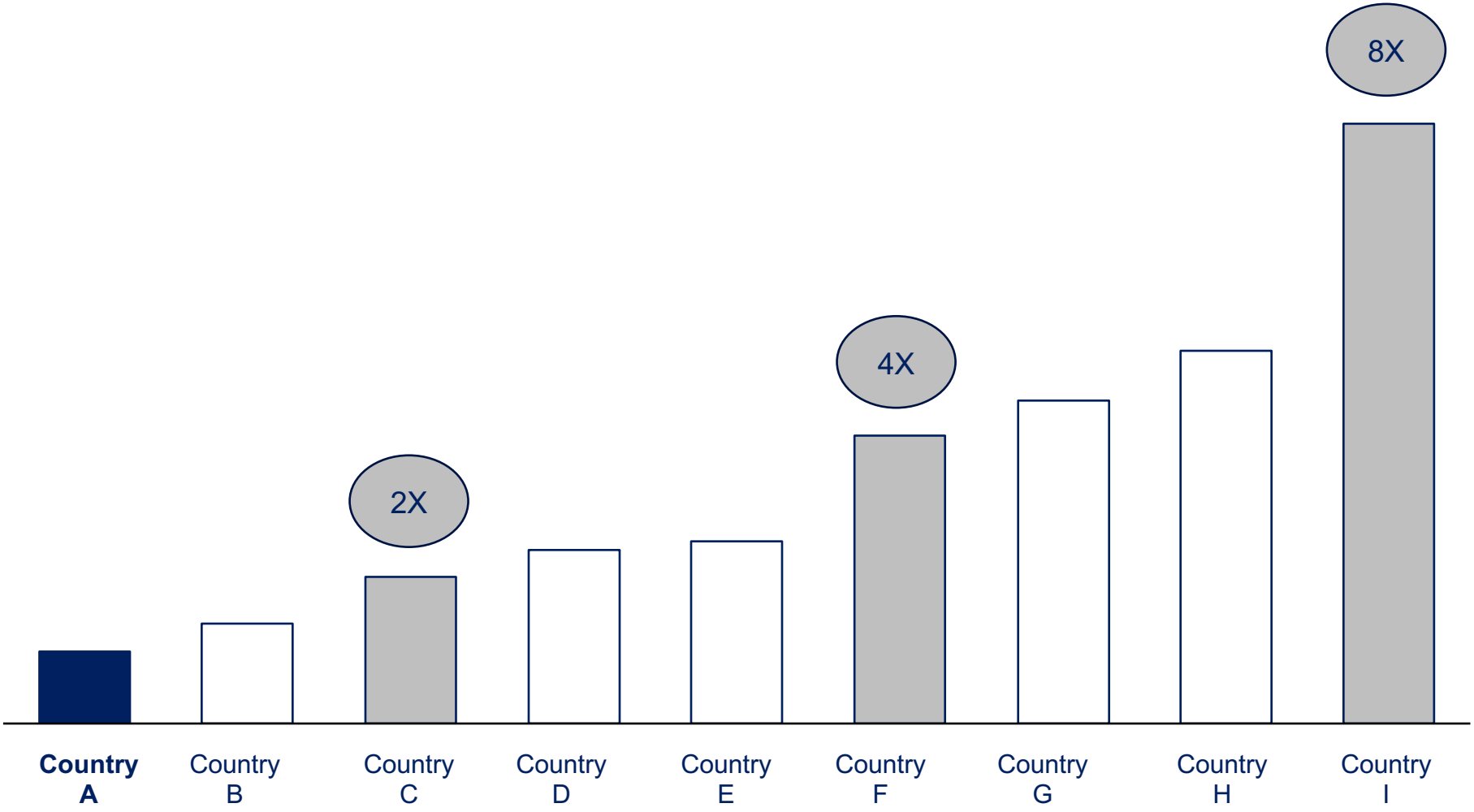
Map who the relevant actors are, what they do, how they relate to each other



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



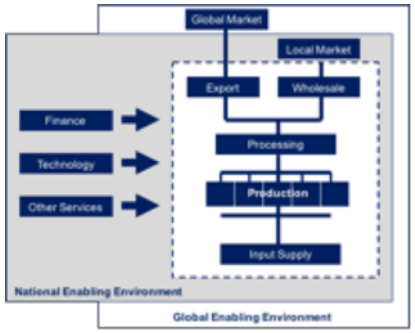
Benchmark performance of the value chain against peer countries or sectors



Recap

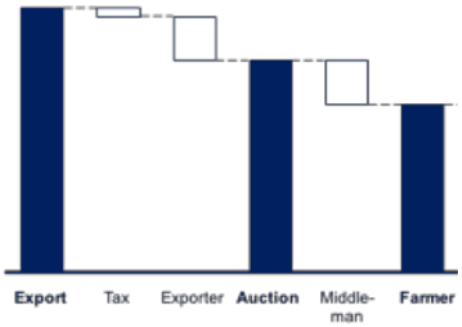
1. **MAP**

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



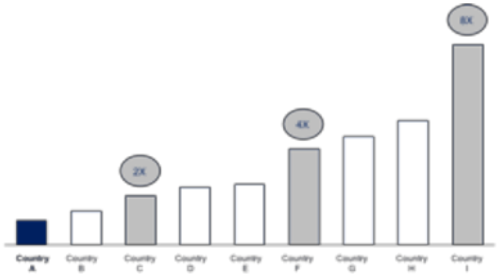
2. **BREAKDOWN**

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

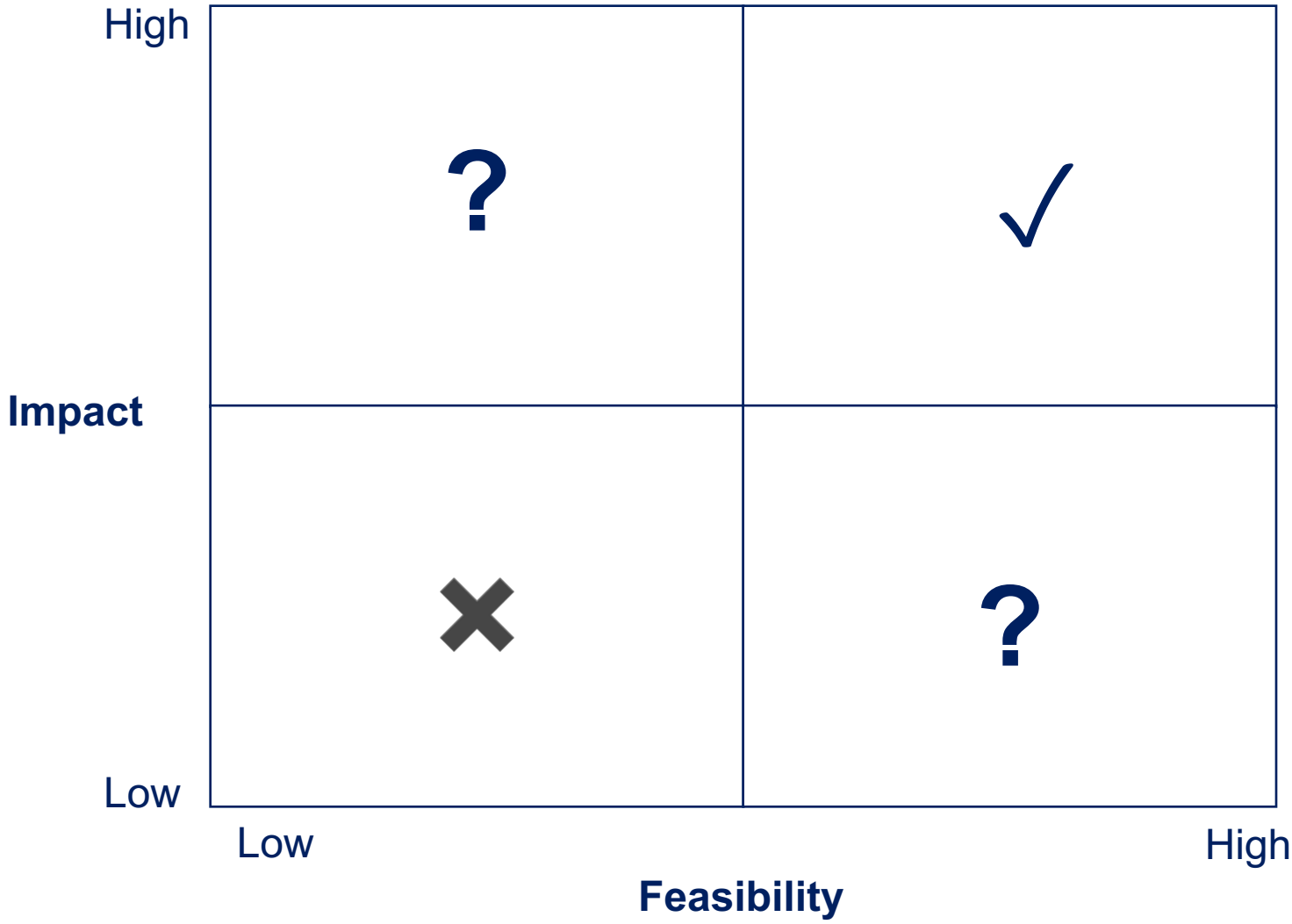


3. **BENCHMARK**

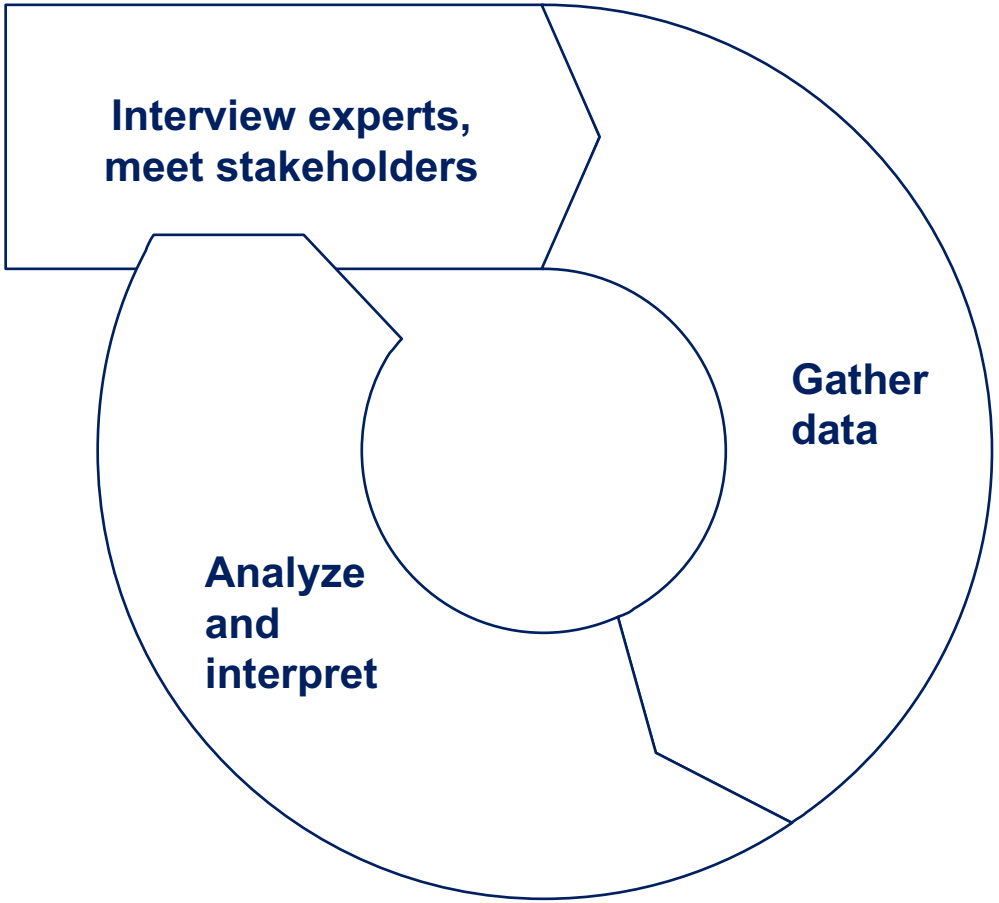
performance of the value chain against peer countries or sectors



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



Value chain analysis is an iterative process



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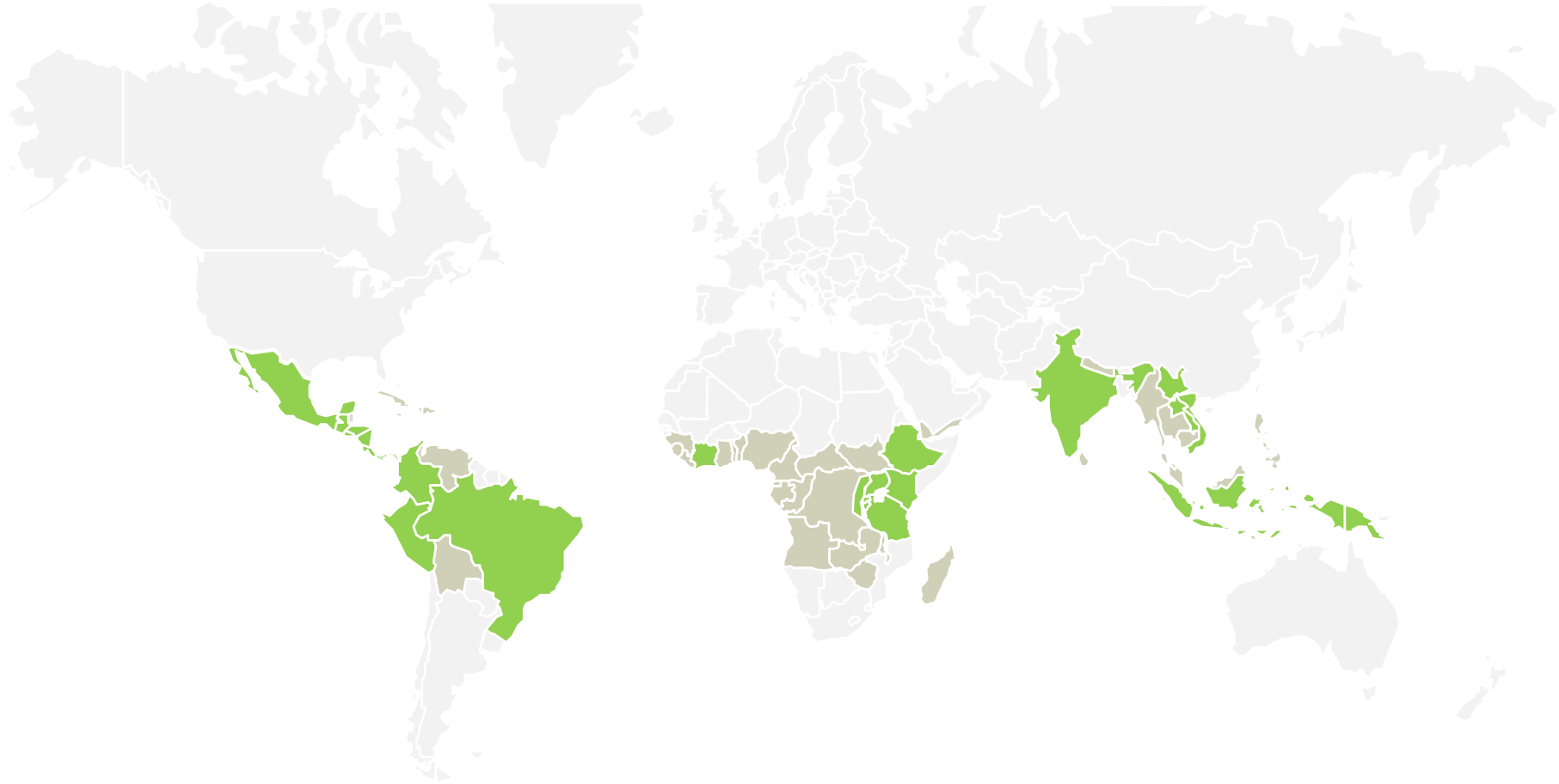
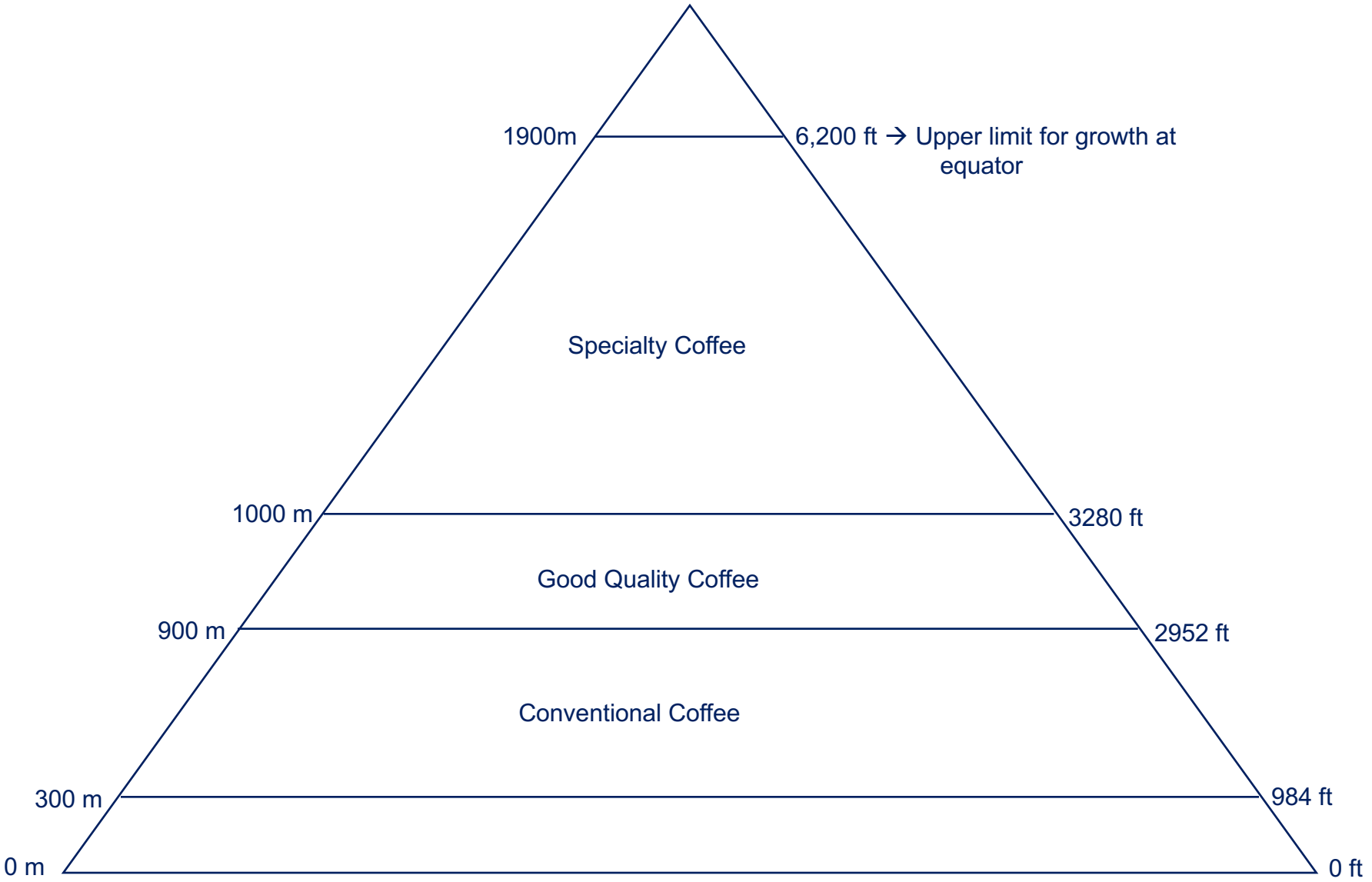
Coffee grows in the tropics



Specialty coffee requires specific growing conditions



95% OF THE WORLD'S COFFEE FARMS ARE SMALL (< 5HA)

THE OTHER EXTREME

COFFEE “CHERRIES” ARE HARVESTED BY HAND

COFFEE NEEDS TO BE PROCESSED IMMEDIATELY AFTER PICKING

CHERRY IS EITHER “PULPED”

OR DRIED WITH THE FRUIT STILL ON THE BEAN

SECONDARY PROCESSING PREPARES “GREEN” COFFEE FOR EXPORT

“CUPPING” IS USED TO EVALUATE COFFEE QUALITY

Value chain review

Farming → Primary processing → Secondary processing → Exporting → Roasting





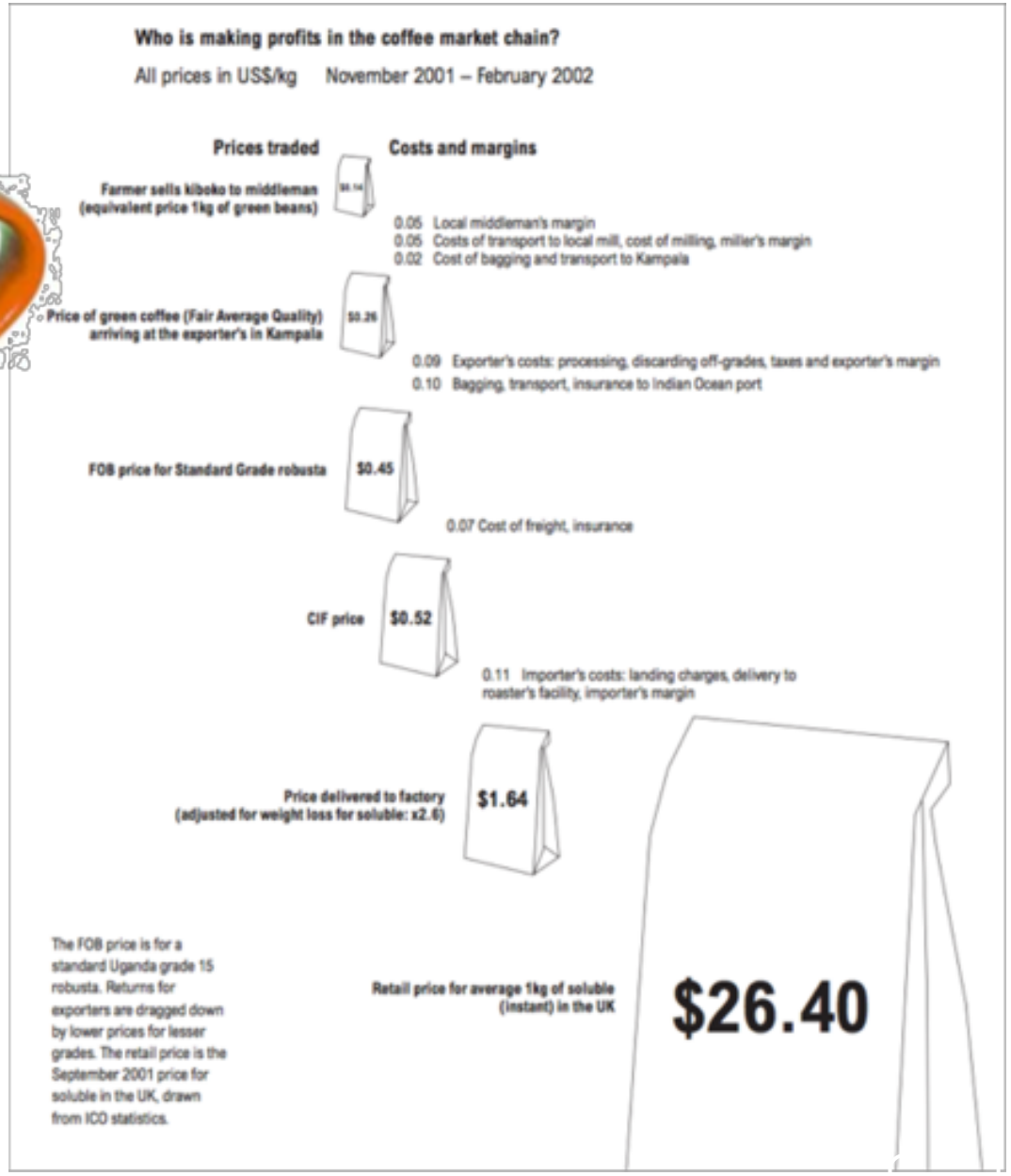

Cherry


Parchment


Green


Roasted

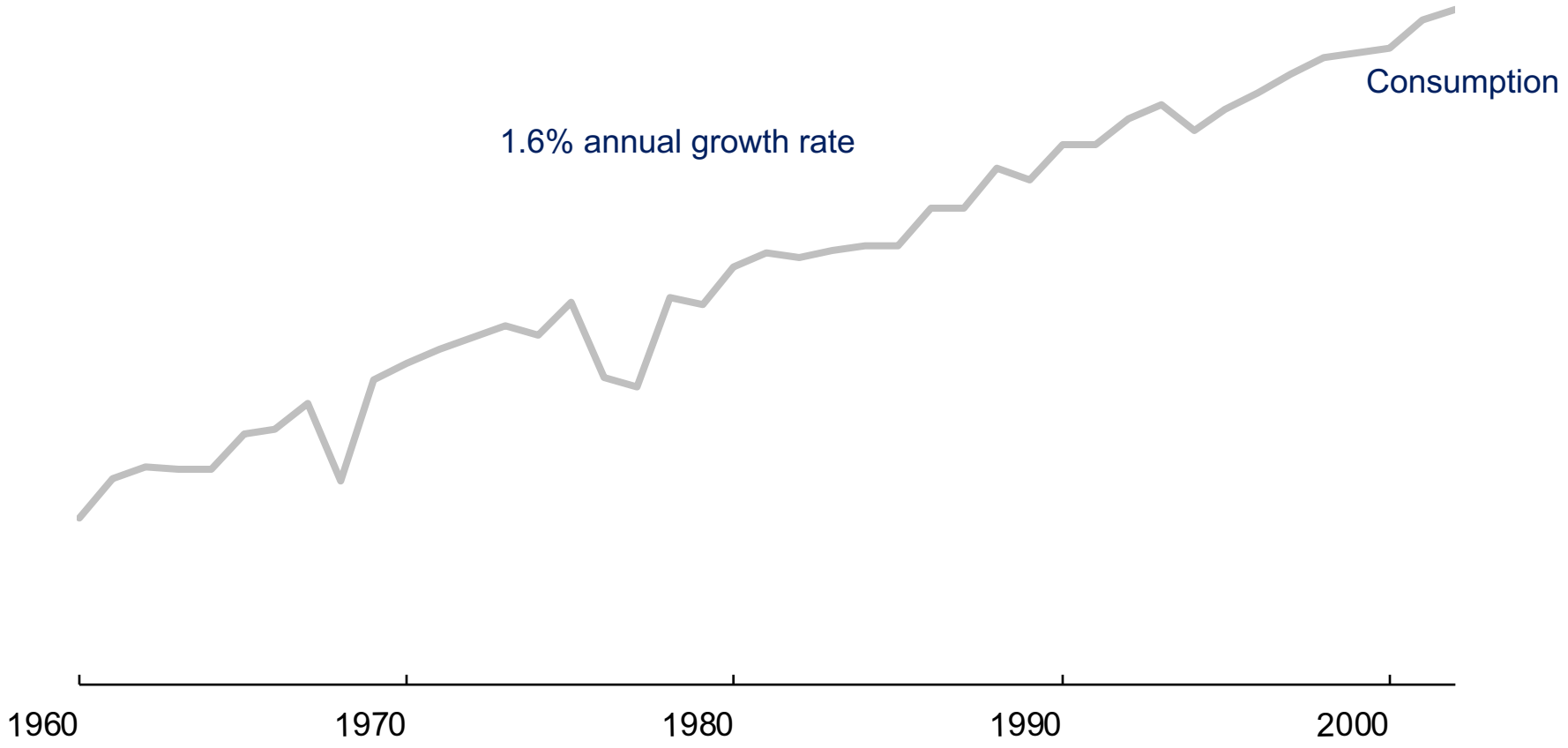
The “Coffee Crisis”



MAKE TRADE FAIR

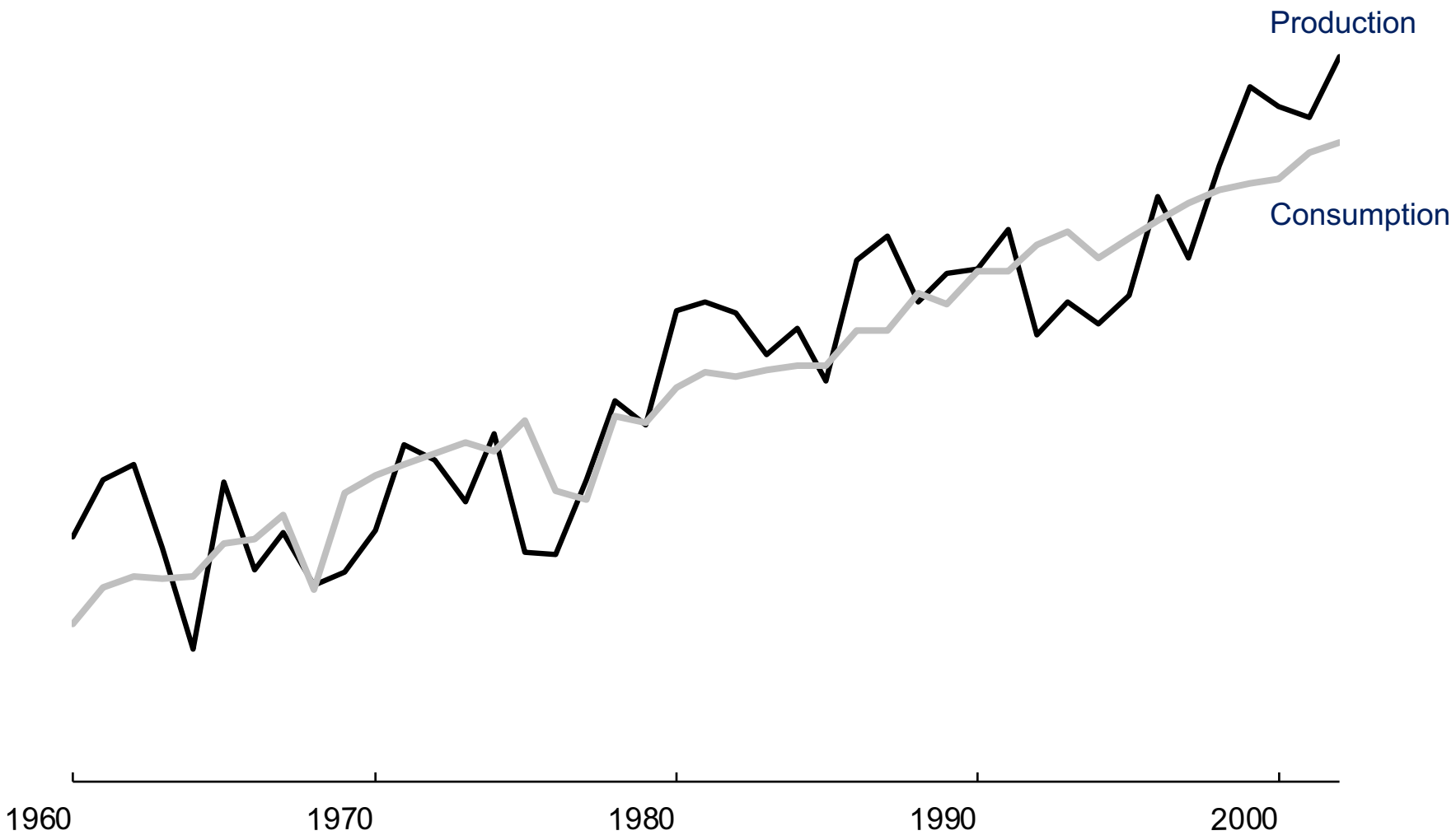
Oxfam

Global coffee consumption has grown steadily



Source: ICO; World Bank; *150 Years of Coffee*, Marcellino Martins and E. Johnston

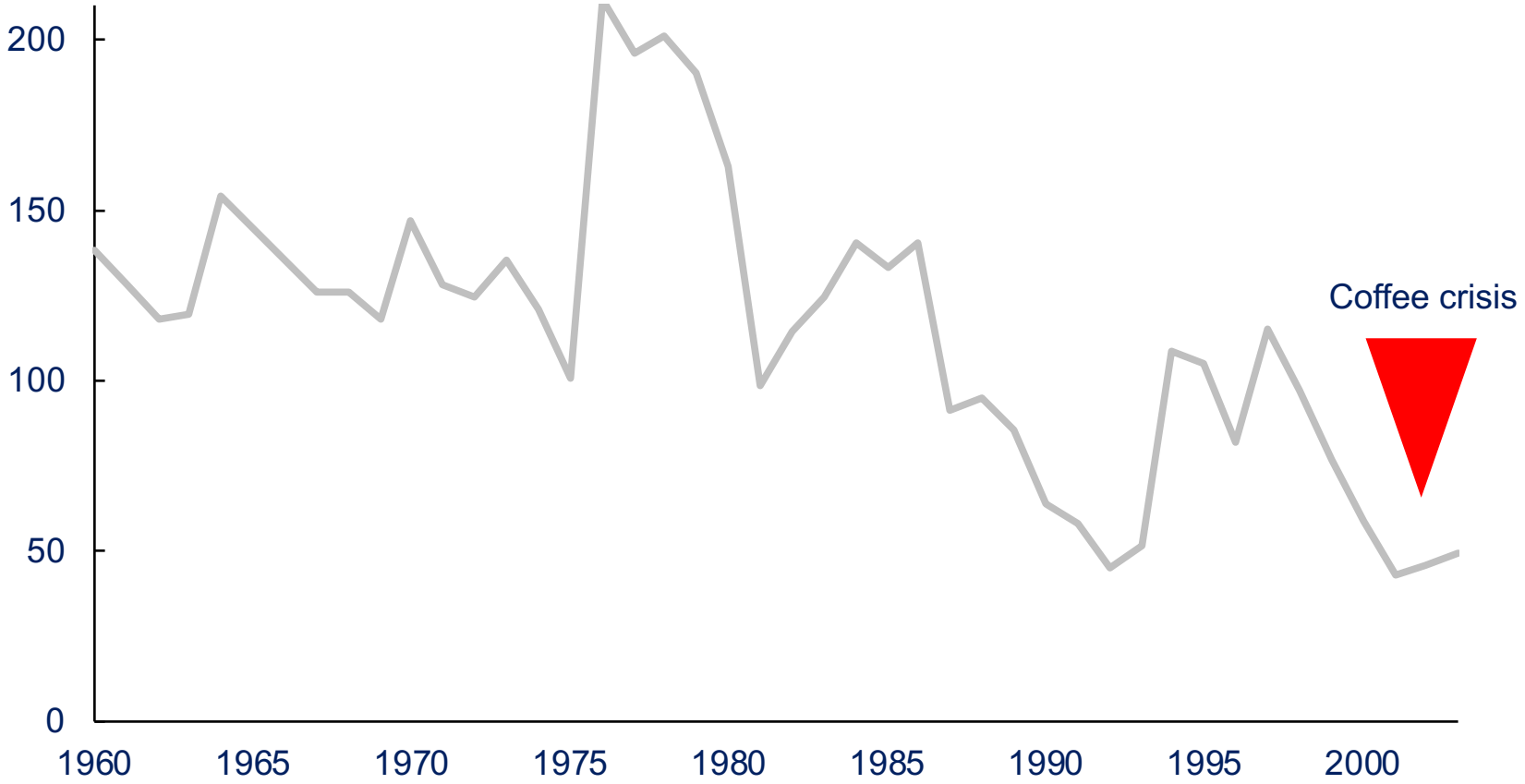
Production is more volatile than consumption



Source: ICO; World Bank; *150 Years of Coffee*, Marcellino Martins and E. Johnston

In 2003, production surpluses caused prices to drop to record lows

Real price of green coffee
ICO indicator price, U.S. ¢ per lb., constant 2002 dollars*

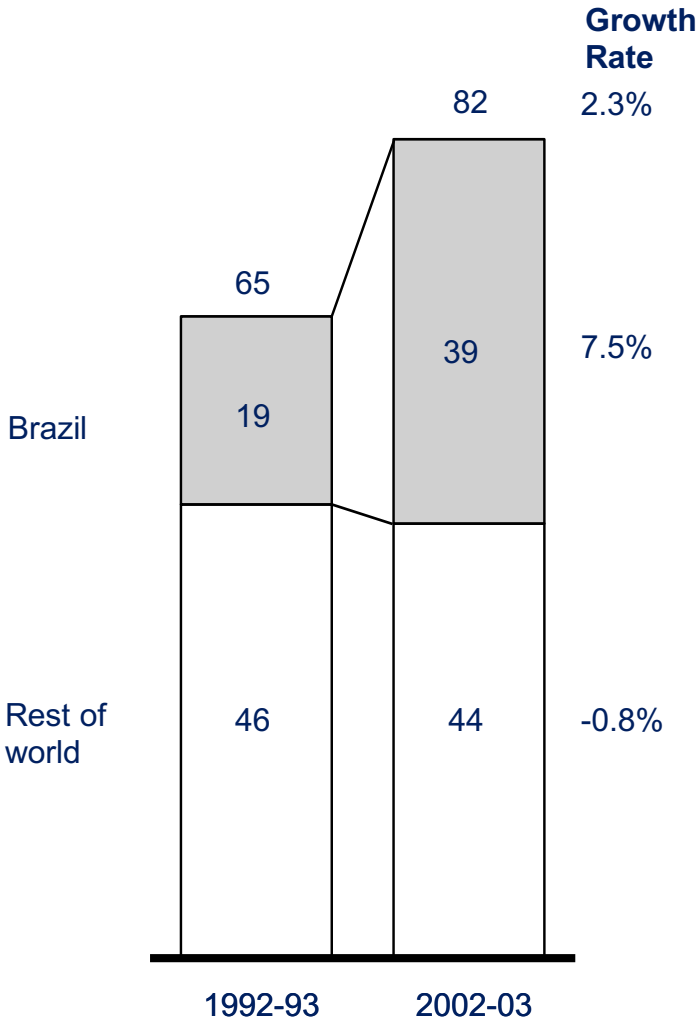


* Real price index created by combining 1900-91 average U.S. import prices from *150 Years of Coffee* and 1992-2002 ICO indicator prices; all prices in 2002 dollars adjusted using World Bank Global Manufactured Unit Value index

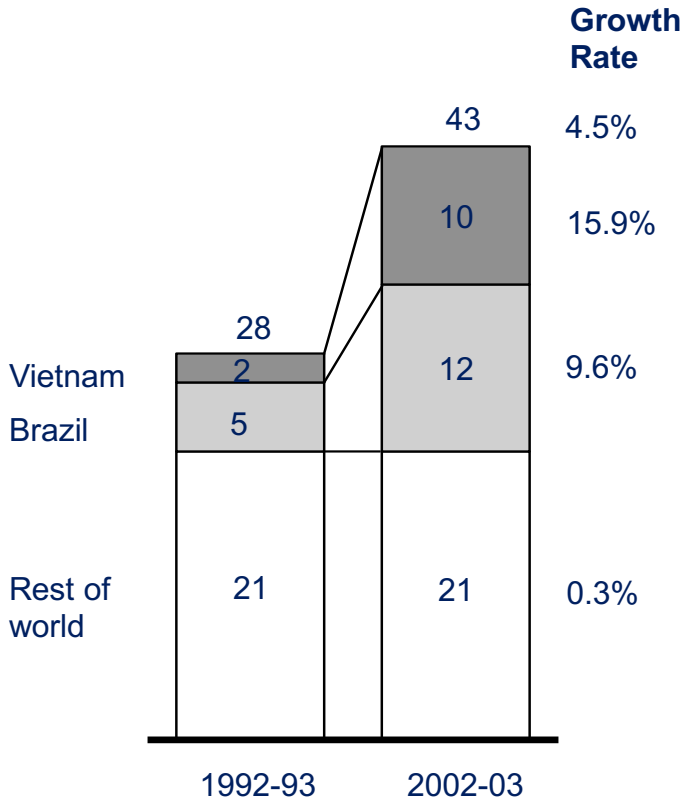
Source: ICO; World Bank; *150 Years of Coffee*, Marcellino Martins and E. Johnston

Production increase was driven by Brazil and Vietnam

***Arabica* production**
(millions of 60 kg bags)

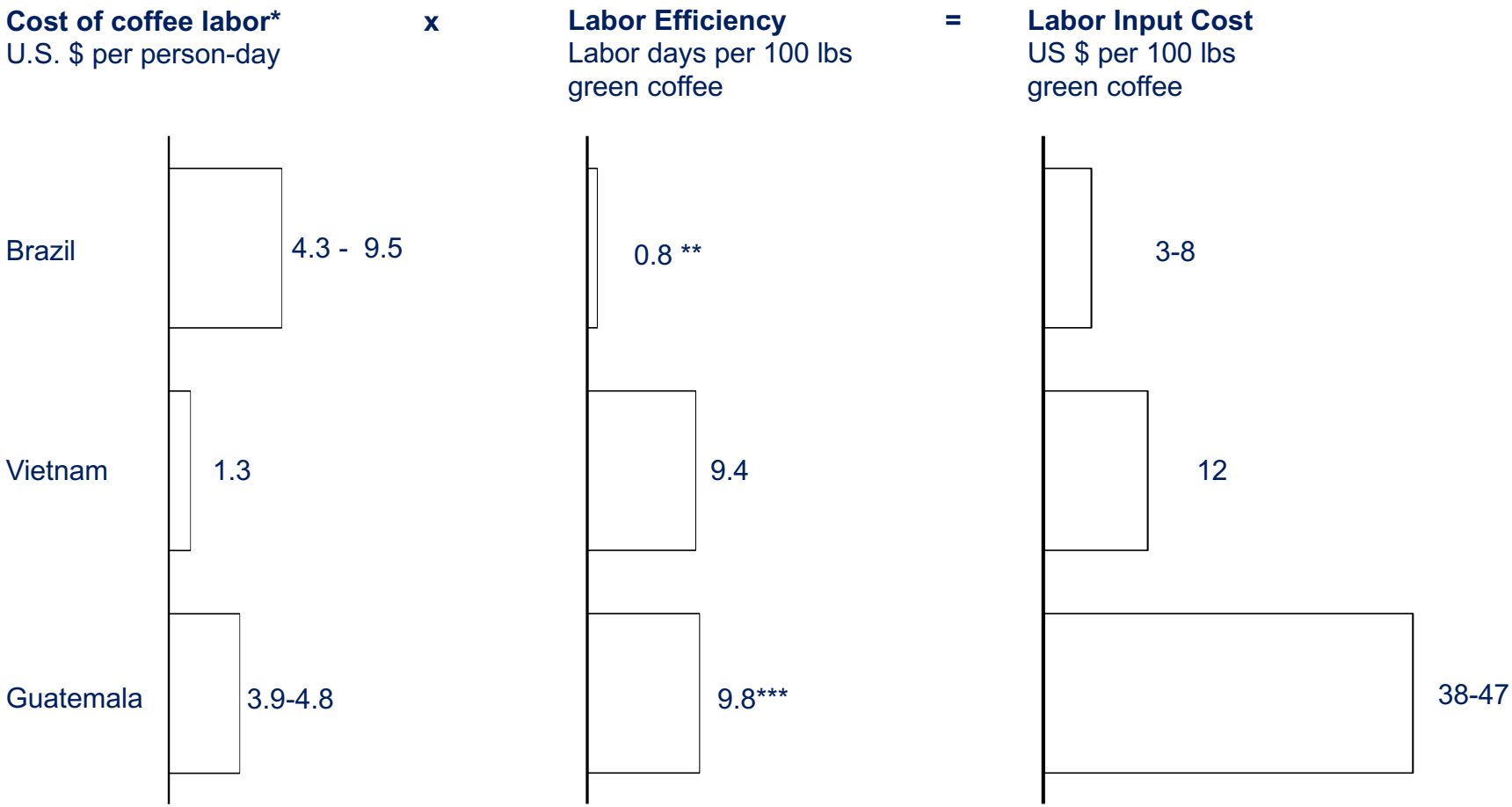


***Robusta* production**
(millions of 60 kg bags)



Source: USDA; interviews

Brazil and Vietnam had a cost advantage due to low labor costs and high labor efficiency levels

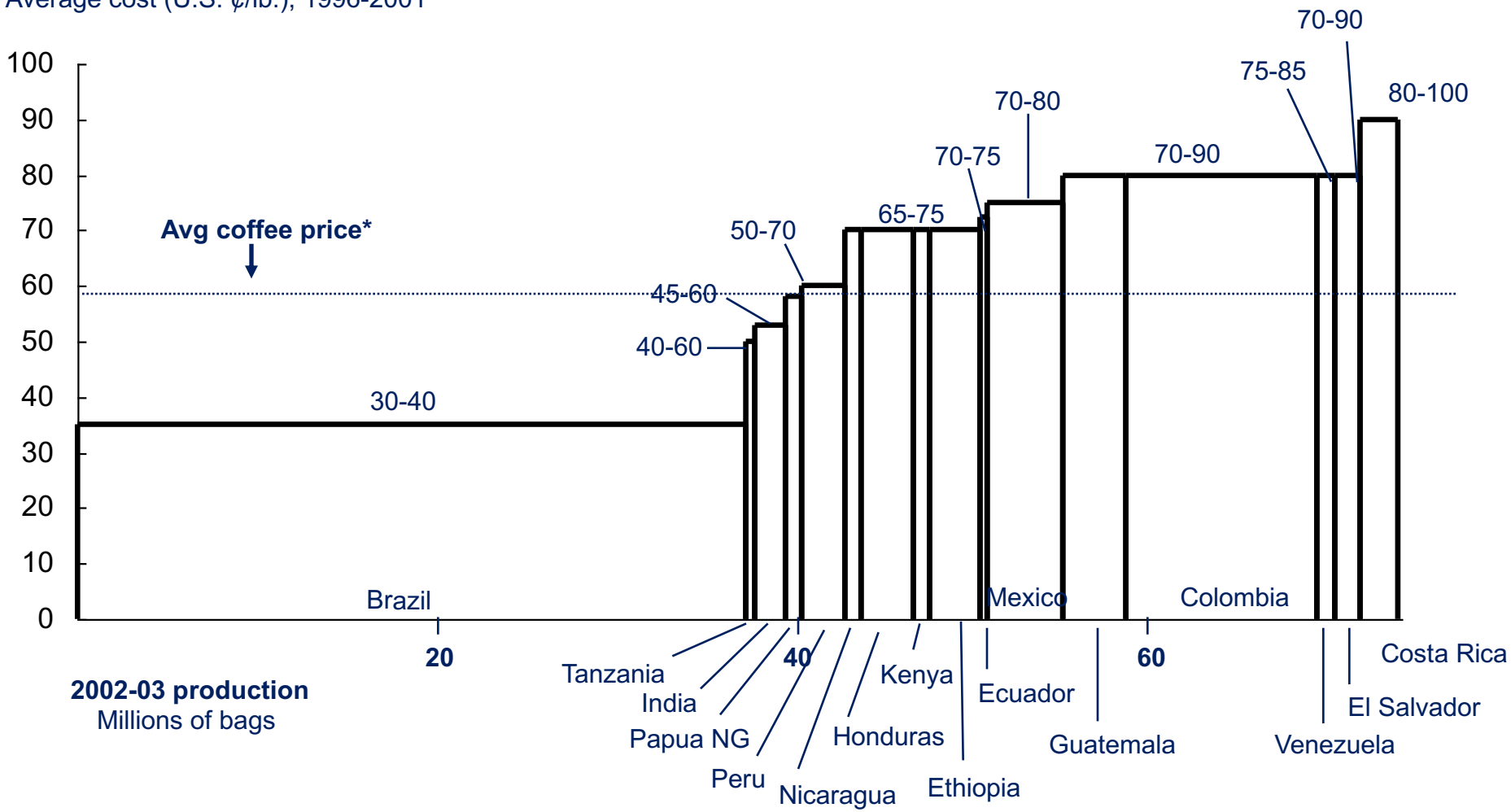


* Range based on direct wages (low-end) and fully loaded cost (high-end)
** Assuming mechanical harvesting
*** Uses Guatemala wage of $4.75 per day and includes wet-milling in labor costs

Source: Interviews, cost models, team analysis

Producers in higher-cost countries were not profitable

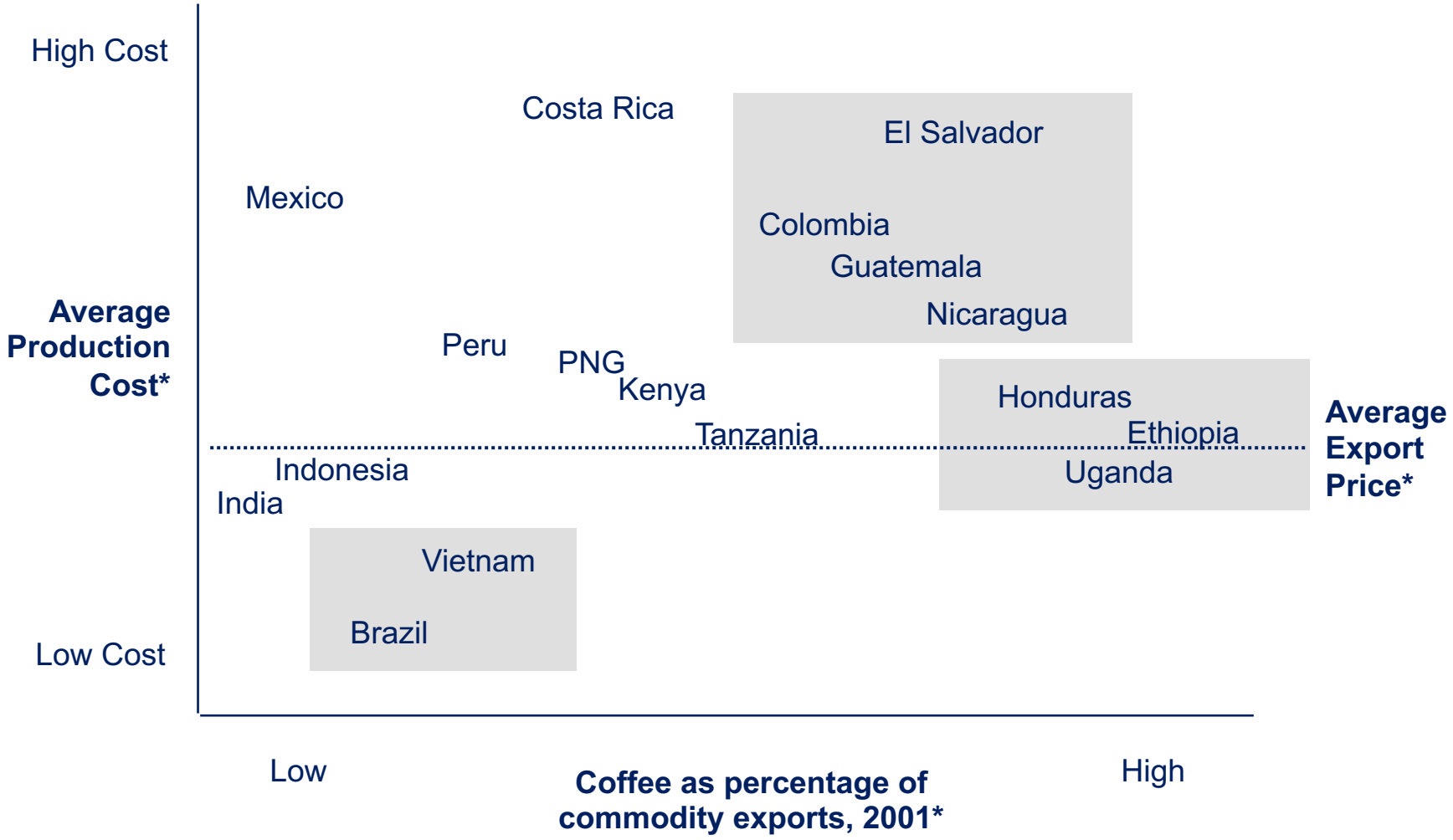
***Arabica* FOB supply curve**
Average cost (U.S. ¢/lb.), 1996-2001



* December 2003 contract as of 12/1

Source: ICO; USDA; TechnoServe; Volcafe; Judith Ganes Consulting; Coffee Business International; "Dealing with the Coffee Crisis in Central America," World Bank (2003); team analysis

How do you think different countries responded?



* Cost positions are adjusted to reflect the relative prices differentials received by specific countries

Source: USDA; ICO Coffee Statistics, Sept 2002; Compete Coffee Coverage; TechnoServe; Economist Intelligence Unit; team analysis

Global coffee value chain review

1. **MAP**
   - Diverse supply base: 20+ countries, 10 million farms, varying levels of sophistication
   - Volatile export market

2. **BREAKDOWN**
   - Prices set internationally; costs are local
   - Labor costs and efficiency levels vary considerably by country

3. **BENCHMARK**
   - Low cost countries (Brazil and Vietnam) increasing production
   - High cost countries getting squeezed

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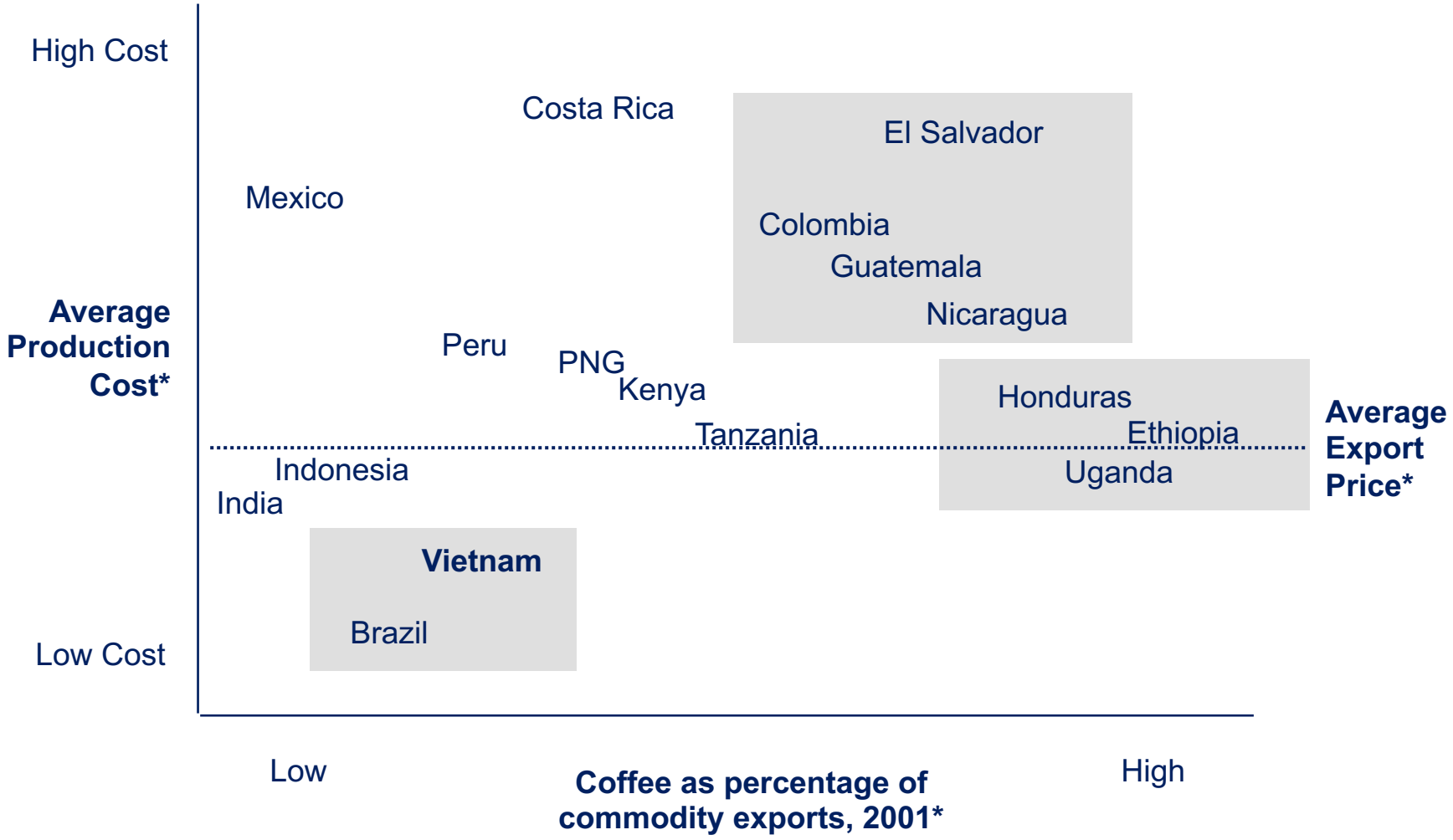
Vietnam: what happened next?

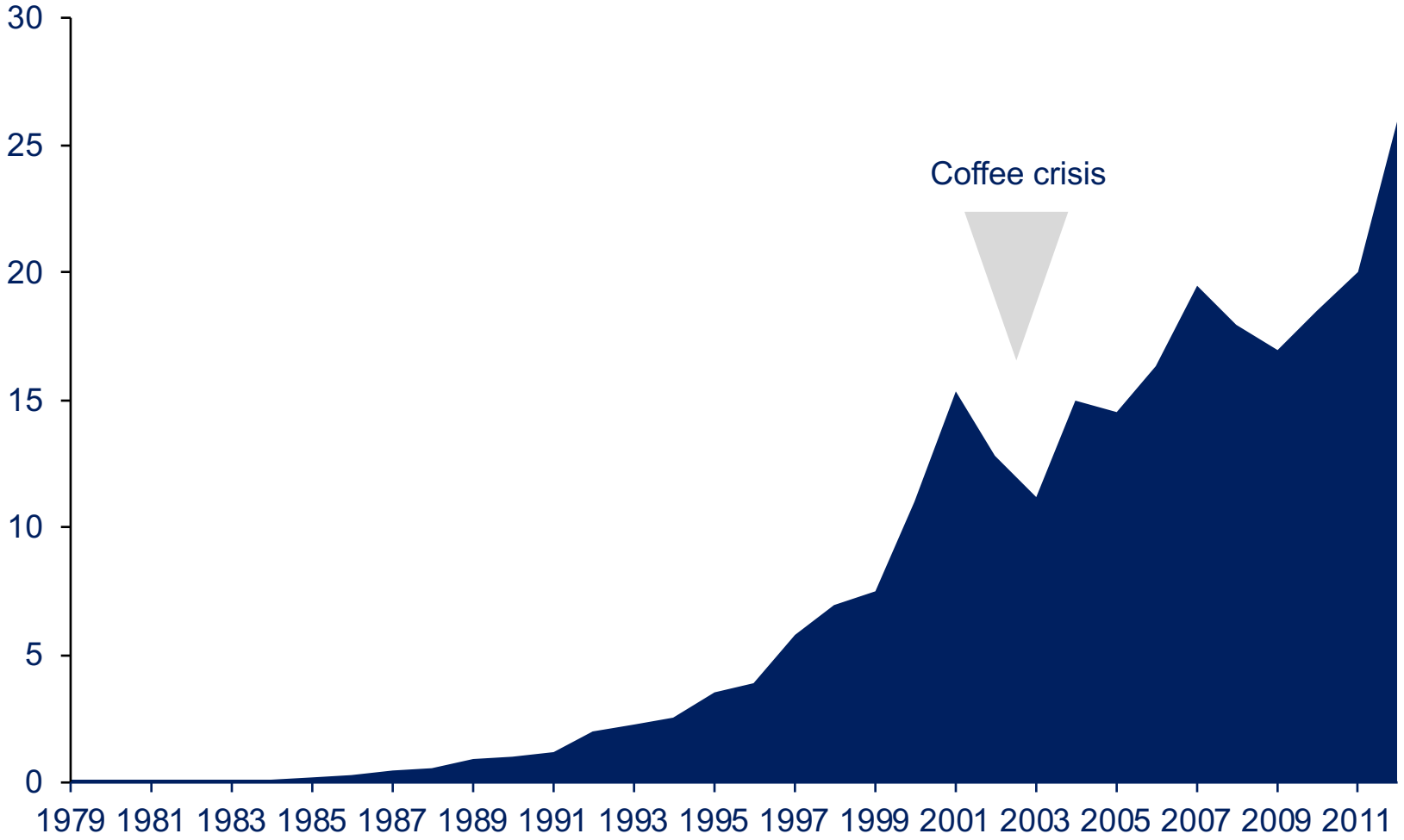


* Cost positions are adjusted to reflect the relative prices differentials received by specific countries

Source: USDA; ICO Coffee Statistics, Sept 2002; Compete Coffee Coverage; TechnoServe; Economist Intelligence Unit; team analysis

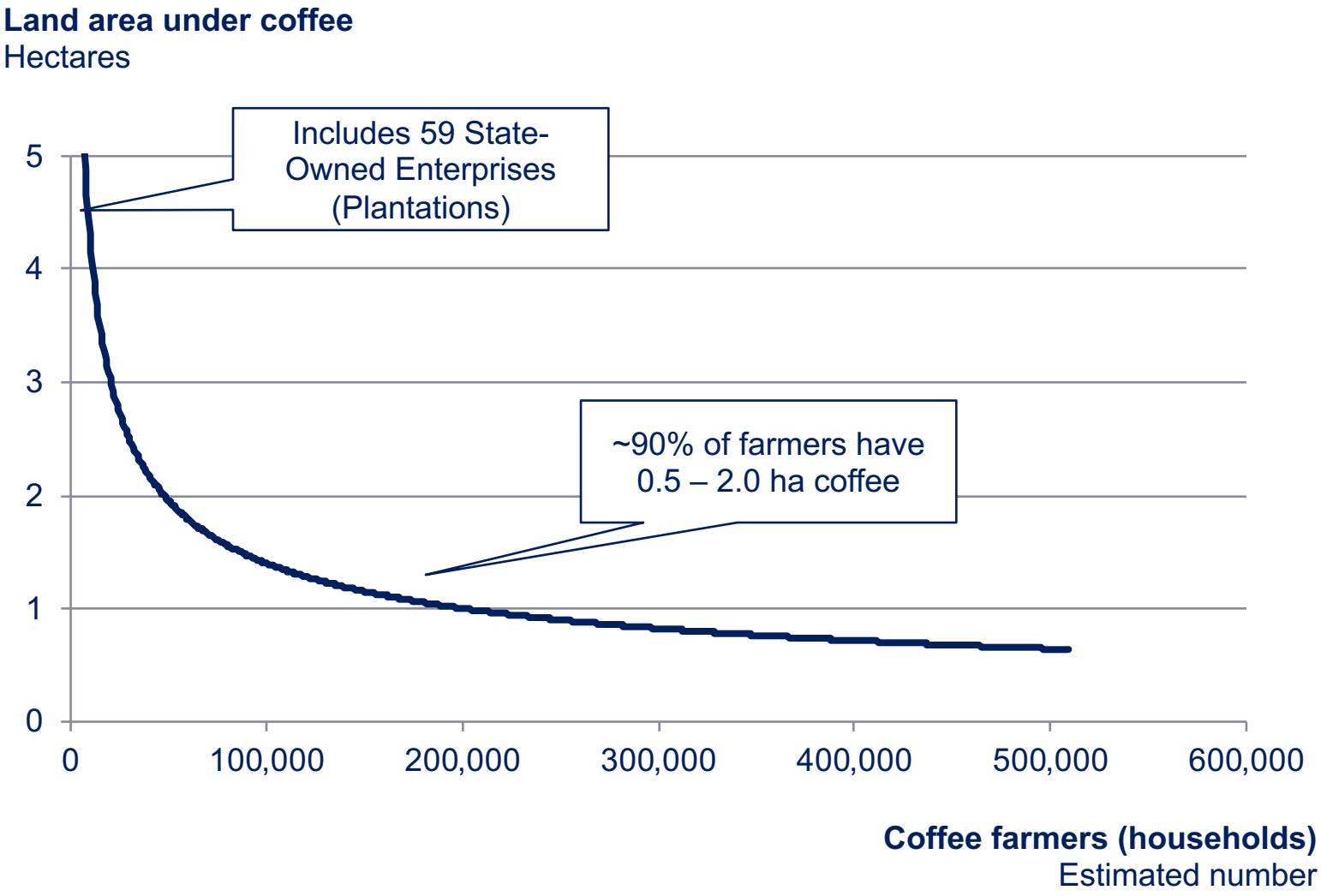
Production doubles

Vietnam coffee production
Bags (60-kg), millions



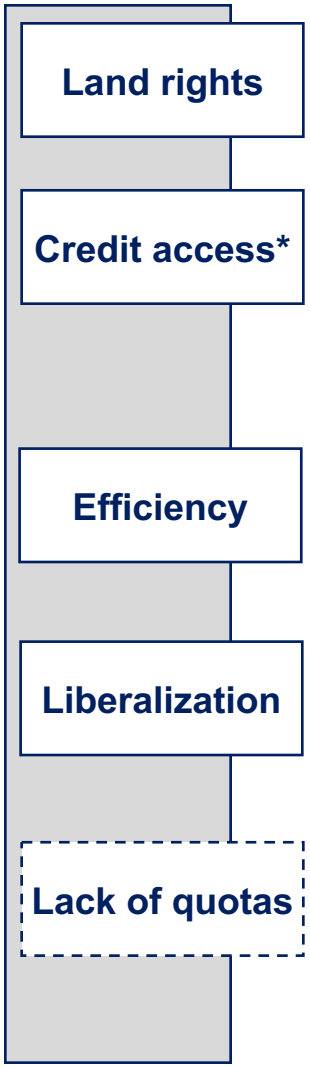
Source: USDA production figures; FAO; interviews with Vietnam coffee industry members

Virtually all farmers are “small”



Source: FAO; Kuit Consultancy; WASI; TNS analysis

A supportive enabling environment



- Through the land reform of 1991, farmers gained the ability to freely buy and sell land, and to use it as collateral for loans

- The state-owned Vietnamese Bank of Agriculture and Rural Development has 1600 branches in rural areas and offers a comprehensive rural banking system
- It has offered flexible repayments to farmers in times of hardship and lower coffee prices

- Strong competition between multinationals and local export companies
- No export taxes or levies

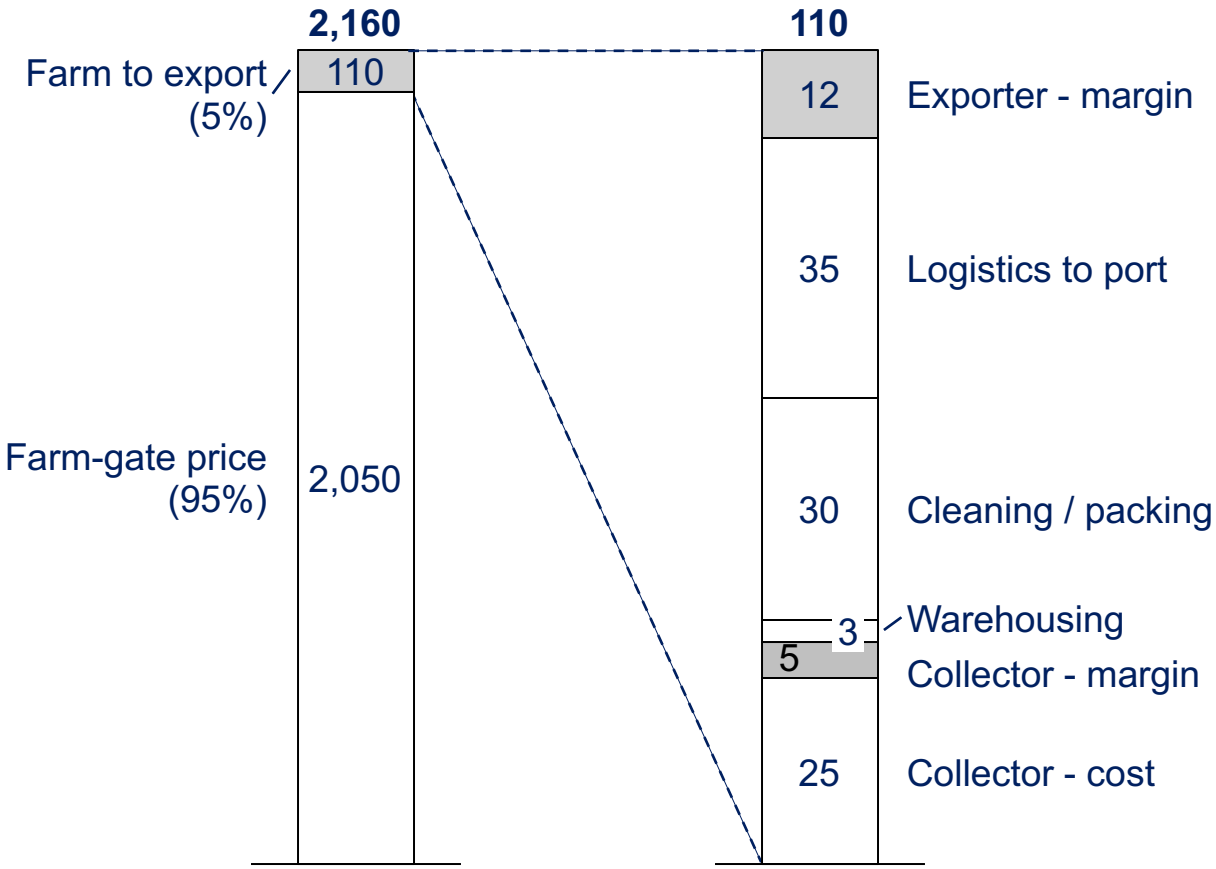
- Gradual reforms transferred control of the coffee industry from the state to the private sector, including the selling of state-owned enterprises and plantations

- Price quotas and other controls on food crops (e.g., rice) led farmers to focus on export crops (e.g., coffee), which were not subject to any controls

* Many in the Vietnamese industry still see smallholders' access to credit, especially for inputs, as a major challenge
Source: Anthony Marsh / FAO

Farmers earn 95% of the export price

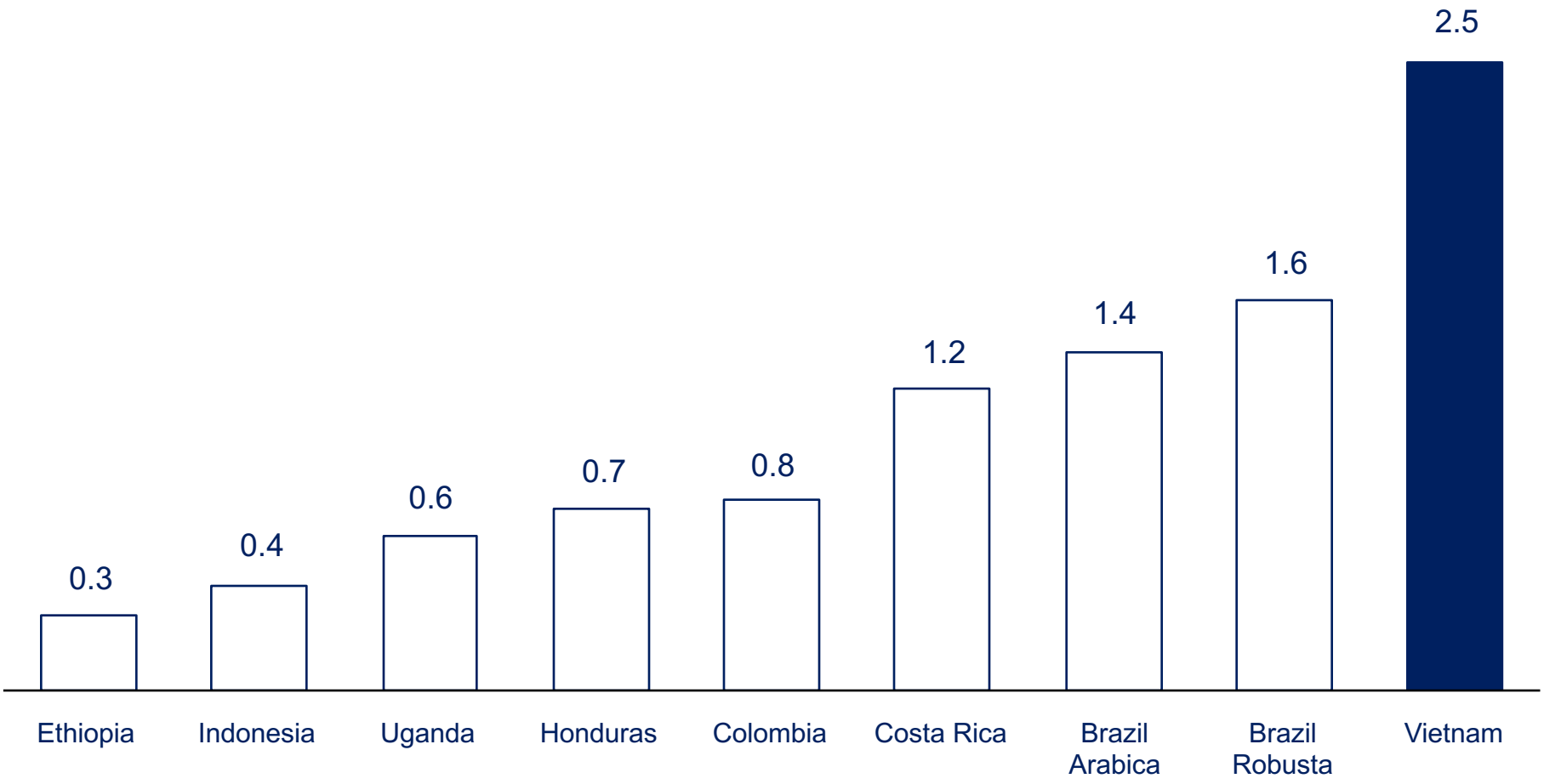
Illustrative Vietnam Robusta supply chain cost breakdown
US$ per ton green



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

Highest farm yields in the world

Average coffee farm yields*
Metric tons green coffee per hectare

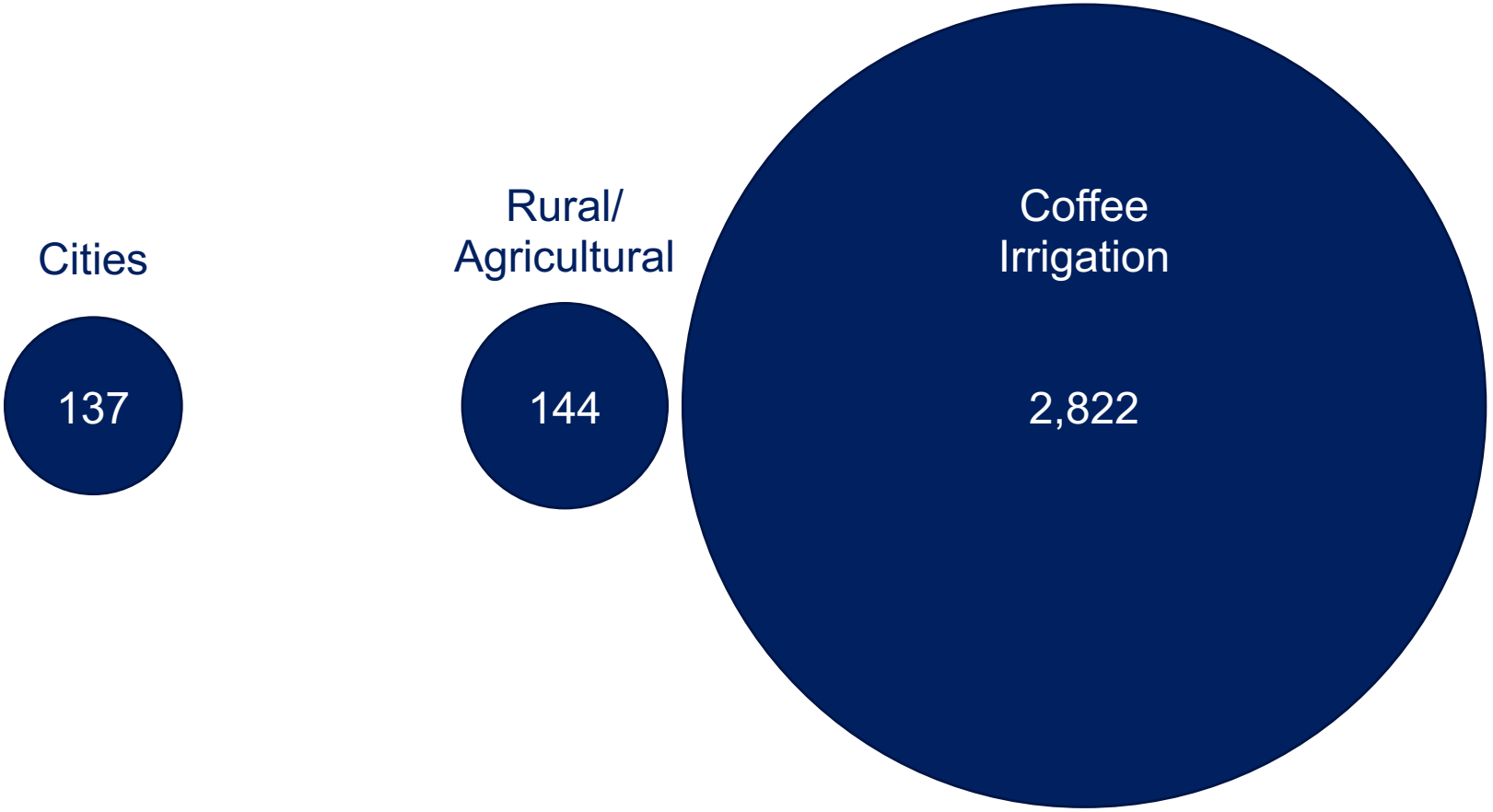


*National average based on total production (average of last two crops) and area under coffee; includes both Arabica and Robusta unless noted otherwise

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. 500,000 mostly small-scale farmers
- Supportive enabling environment (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

Potential ways forward

Sustain	• Improve environmental stewardship (water, etc.)
Add value	• Develop capacity to roast and package locally, and sell into regional markets (e.g., China)
Local demand	• Boost local coffee consumption, reducing exposure to volatile export prices

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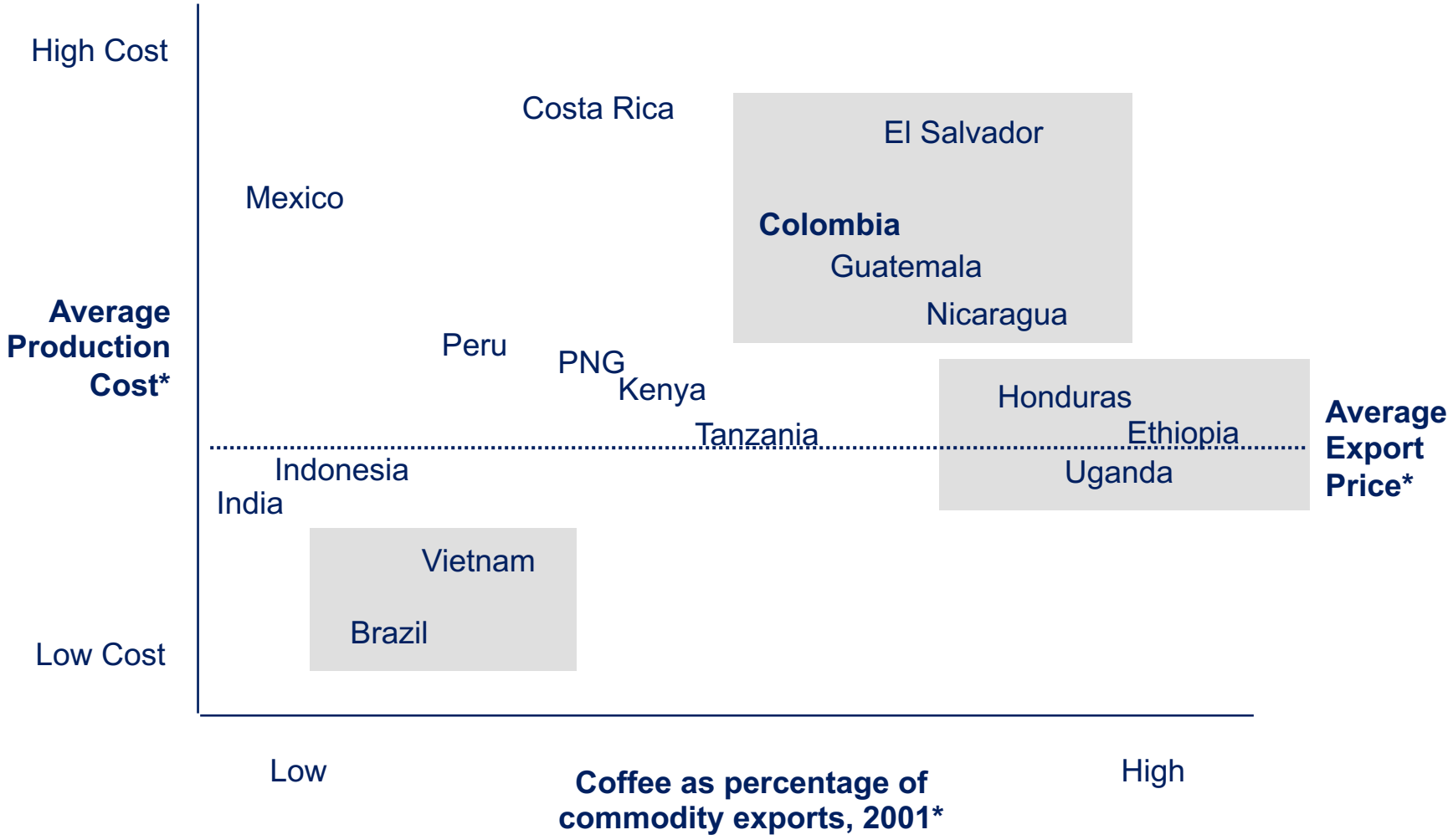
Colombia: at a cross roads

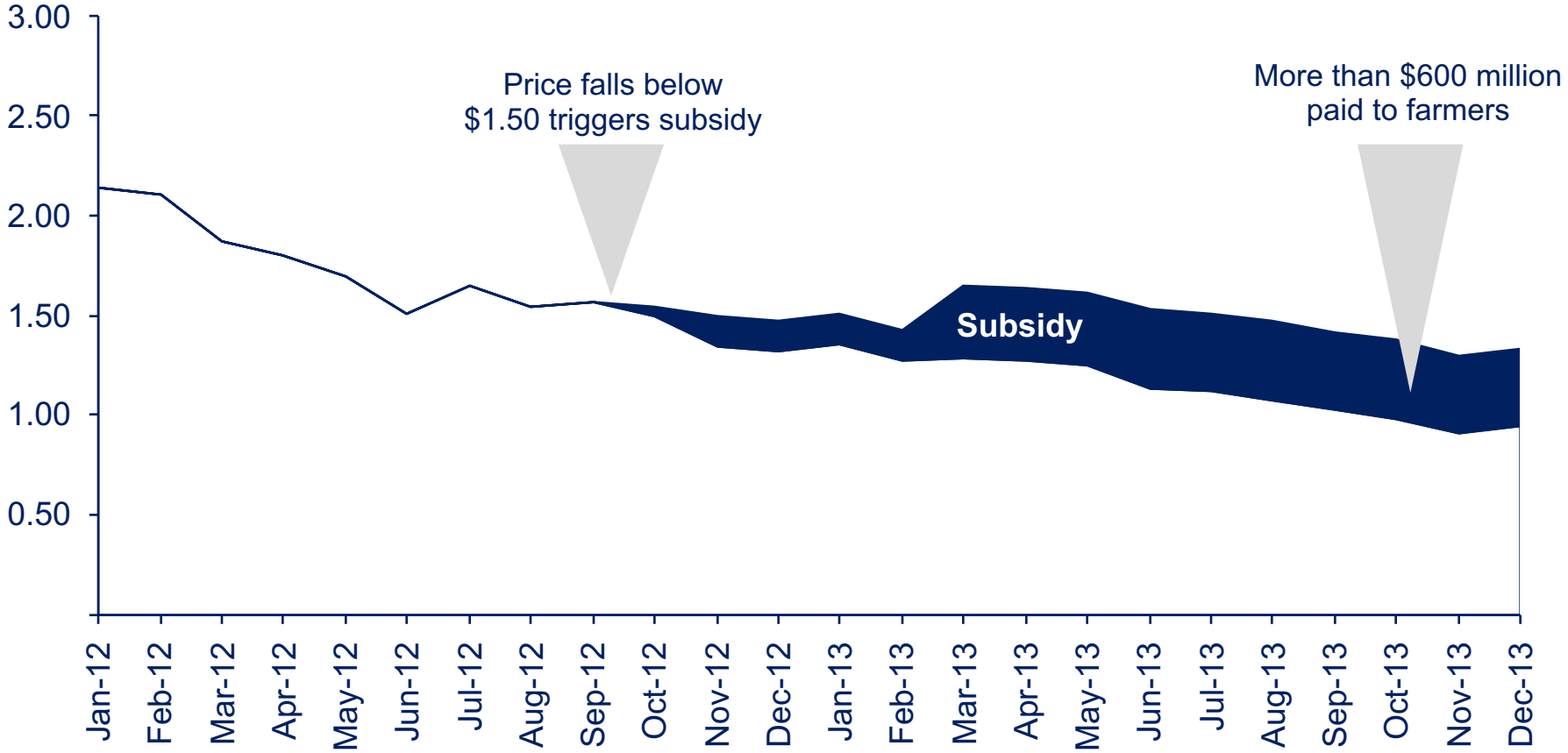


* Cost positions are adjusted to reflect the relative prices differentials received by specific countries

Source: USDA; ICO Coffee Statistics, Sept 2002; Compete Coffee Coverage; TechnoServe; Economist Intelligence Unit; team analysis

10 years later: $600 million subsidy to farmers

Colombia average farm-gate price
US$ per lb green



*At current exchange rate; subsidy paid if internal base price is below COP 700,000; sum of income from coffee sale and subsidy cannot exceed COP 700,000; subsidy of COP 165,000 paid if price is below COP 480,000; otherwise payment of up to COP 145,000; between Oct 2012 and March 2013 producers received COP 20,000 and later 60,000 per load if price was below 650,000
Source: FNC, TechnoServe analysis

Colombia has a unique coffee value chain

Colombia's coffee value chain (Arabica)

Distinctive to Colombia

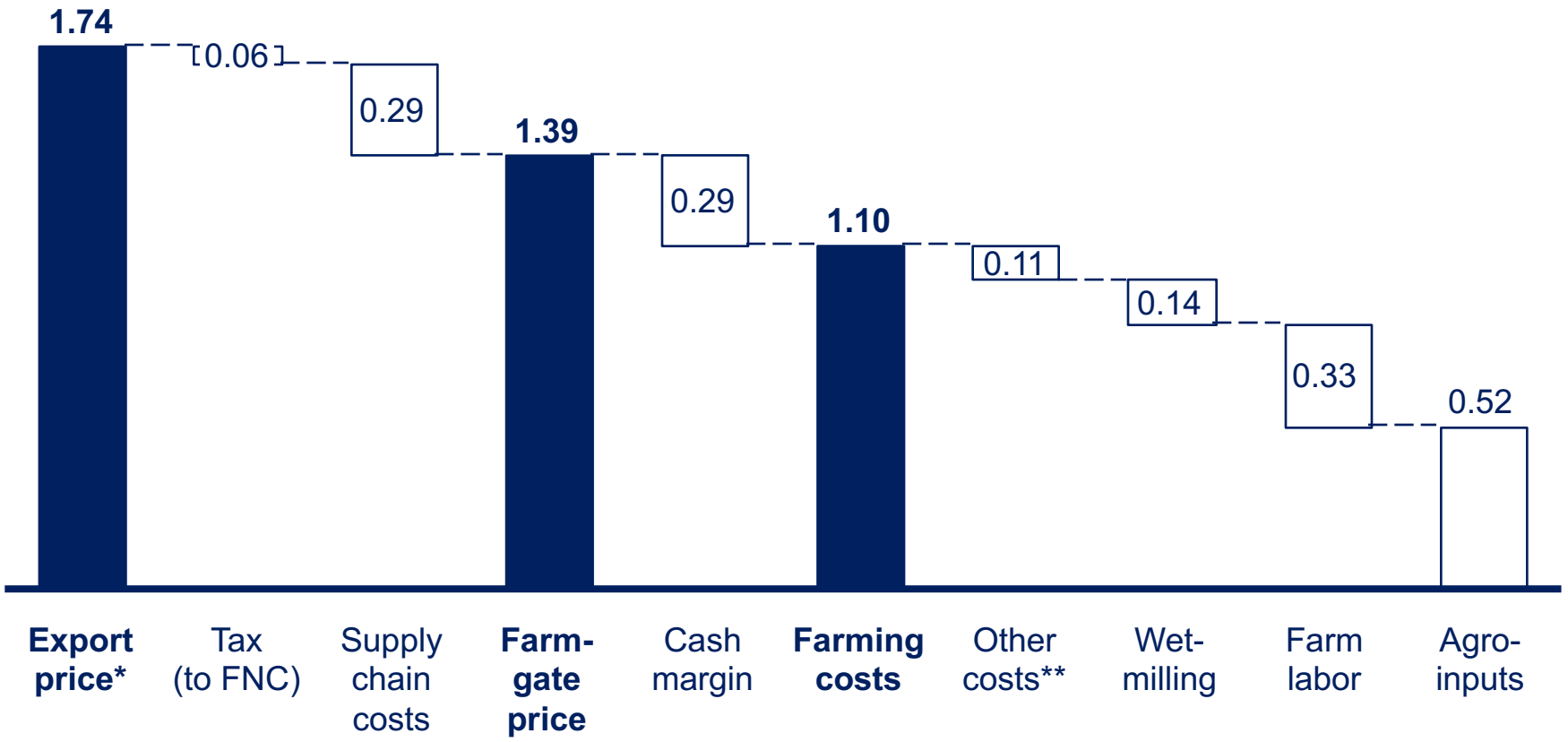
Farming	Processing: Wet milling	Aggregation	Exporting	Roasting
• **~500,000 farms, majority are small-holders** (with less than 5 ha under coffee)	• **Nearly all farmers wet-mill at home and sell dry parchment** (in most regions there is no market for cherry)	• Aggregation is done **both by cooperatives and private buyers**	• **Competition exists between local and multinational exporters** (multi-national exporters have ~33% market share)	• **~10% of production is consumed internally**
• **Harvesting occurs year-round** in most areas, with a main harvest and a 2nd mid-year harvest (*mitaca*)	• Some **wet mills have infrastructure gaps**, e.g., insufficient drying space, inadequate waste-water disposal, etc.	• **~ 35% of volume goes through coops*** , the highest share in Latin America	• **The FNC**, a nonprofit, is the largest exporter** (25% market share)	• **Internal demand is mainly for roast & ground** (rather than soluble)
		• **A purchase guarantee** exists at all aggregation points	• **~90% of total production is exported*****	• **Soluble manufacturing capacity exists**, both for export and internal markets

- **Strong institutional framework** through the establishment of the National Coffee Fund, which provides support to the coffee sector and is managed by the FNC

* There are 34 coops with 515 purchase points country-wide
** Federación Nacional de Café; responsible for the implementation of the National Coffee Fund
*** Coffee not fulfilling export quality standards is used for internal consumption
Source: FNC; interviews

Farmer earns 80% of the export price

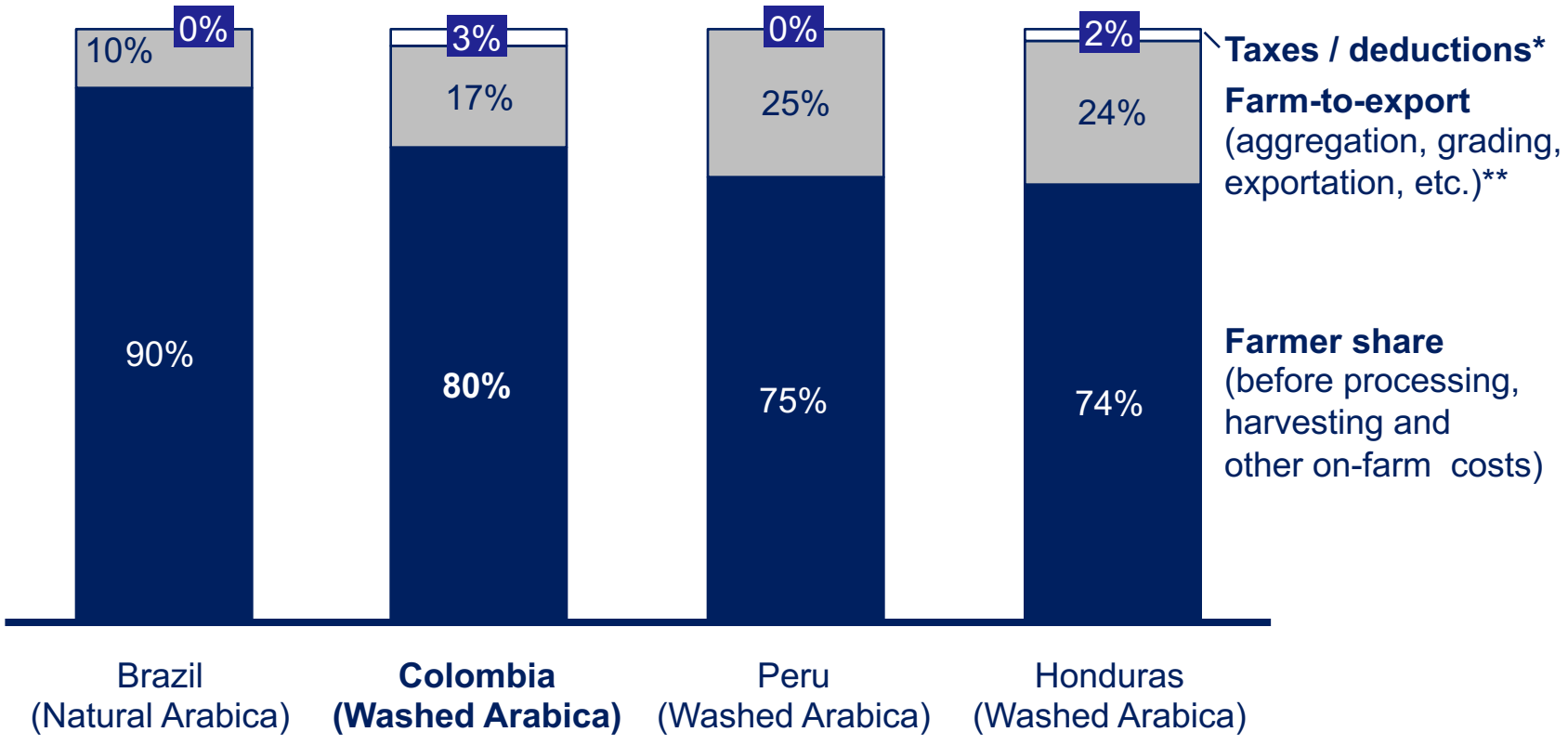
Value chain analysis for average Colombian farm
US$ per lb green



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's farm-to-export chain is efficient relative to regional peers (e.g., Peru, Honduras)

Efficiency levels of major Latin American coffee supply chains, 2012/13
US$ per pound green



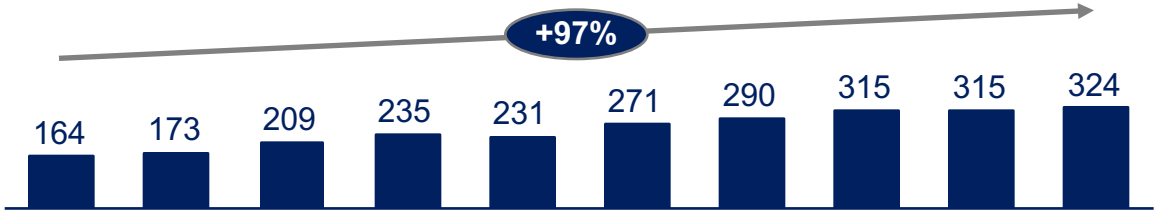
* Coffee contribution of US$ 6 cents/lb in Colombia and US$ 4.25 per 46-kg bag in Honduras (not considering 'retención' of US$ 9 per 46 kg bag that is reimbursed to registered farmers after payment)
** Calculated as difference between farm gate price and ICO price
Source: trade statistics; TechnoServe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

Farming costs have risen rapidly

x% 2005-14 growth rate

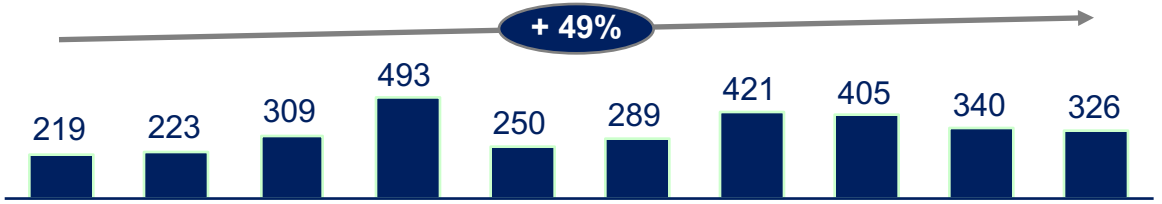
Labor
+97%

Minimum wage (US$ per month)



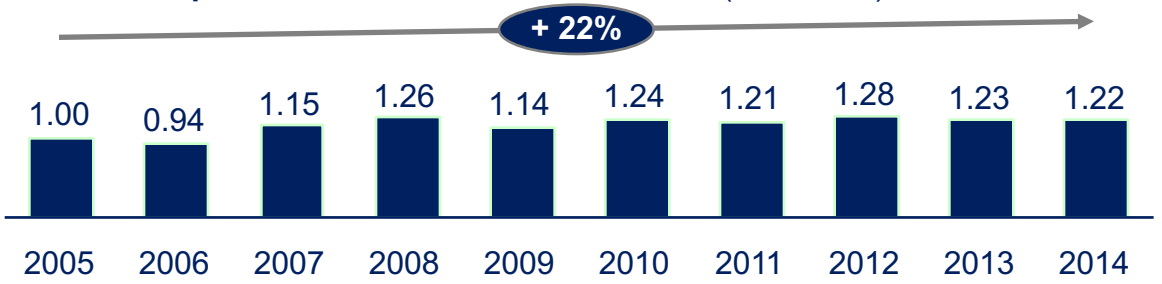
Fertilizer
+49%

Price of urea (US$ per ton)*



Currency
+22%

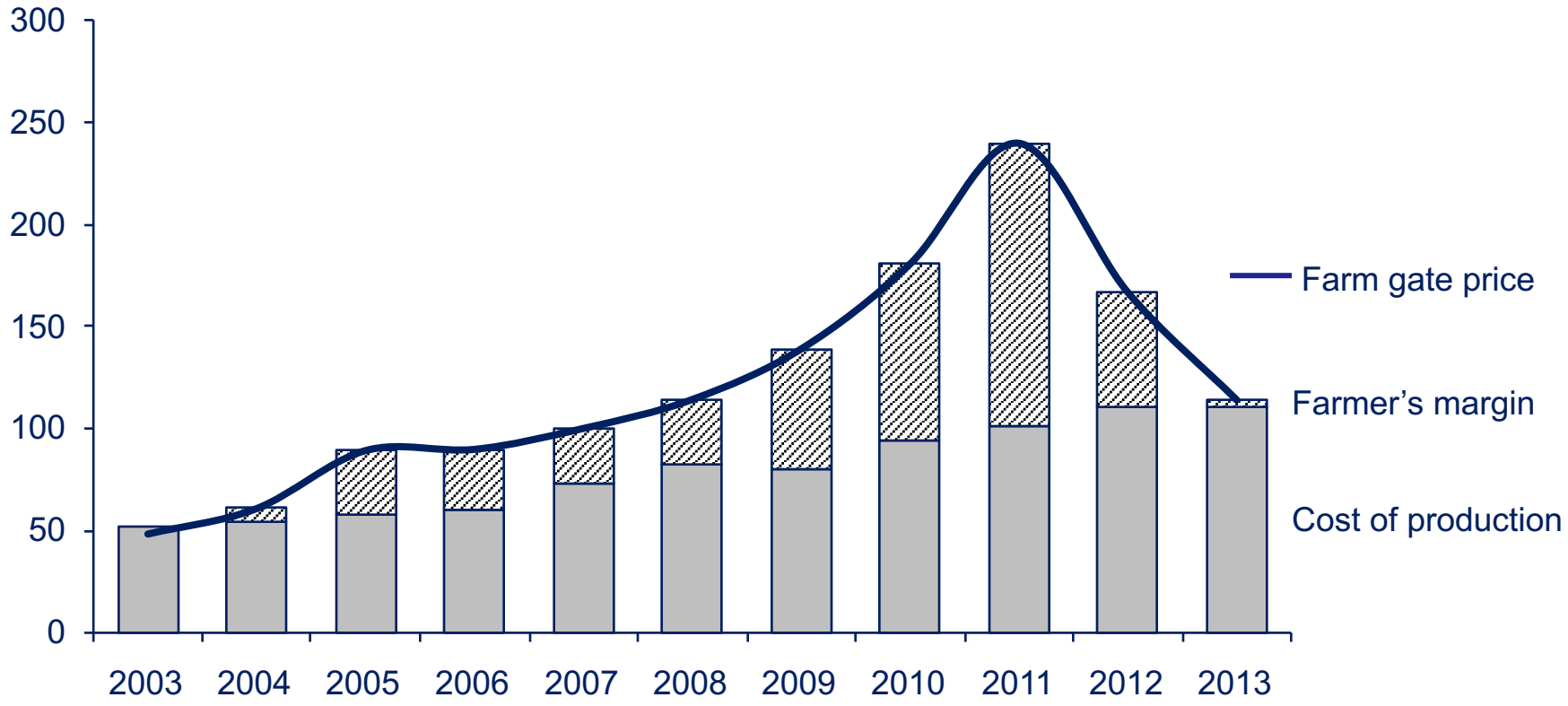
Colombian peso relative to US dollar, indexed (2005=100)**



* Average sales price of key importers; import taxes on fertilizers higher in Colombia than in other coffee producing countries
** Rise is appreciation of the Colombian peso relative to the US dollar
Source: Ministerio de la Protección Social (minimum wage); indexmundi.com (urea price); xe.com (exchange rate)

Farmers' margins have eroded

Colombia prices and production costs*
US cents per lb green



* Cash production costs
Source: ICO, FNC, TechnoServe analysis

Colombia insights

1 **MAP**

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

2 **BREAKDOWN**

- Farmers earn 80% of export price
- Farmers' margins shrinking due to rising cost base

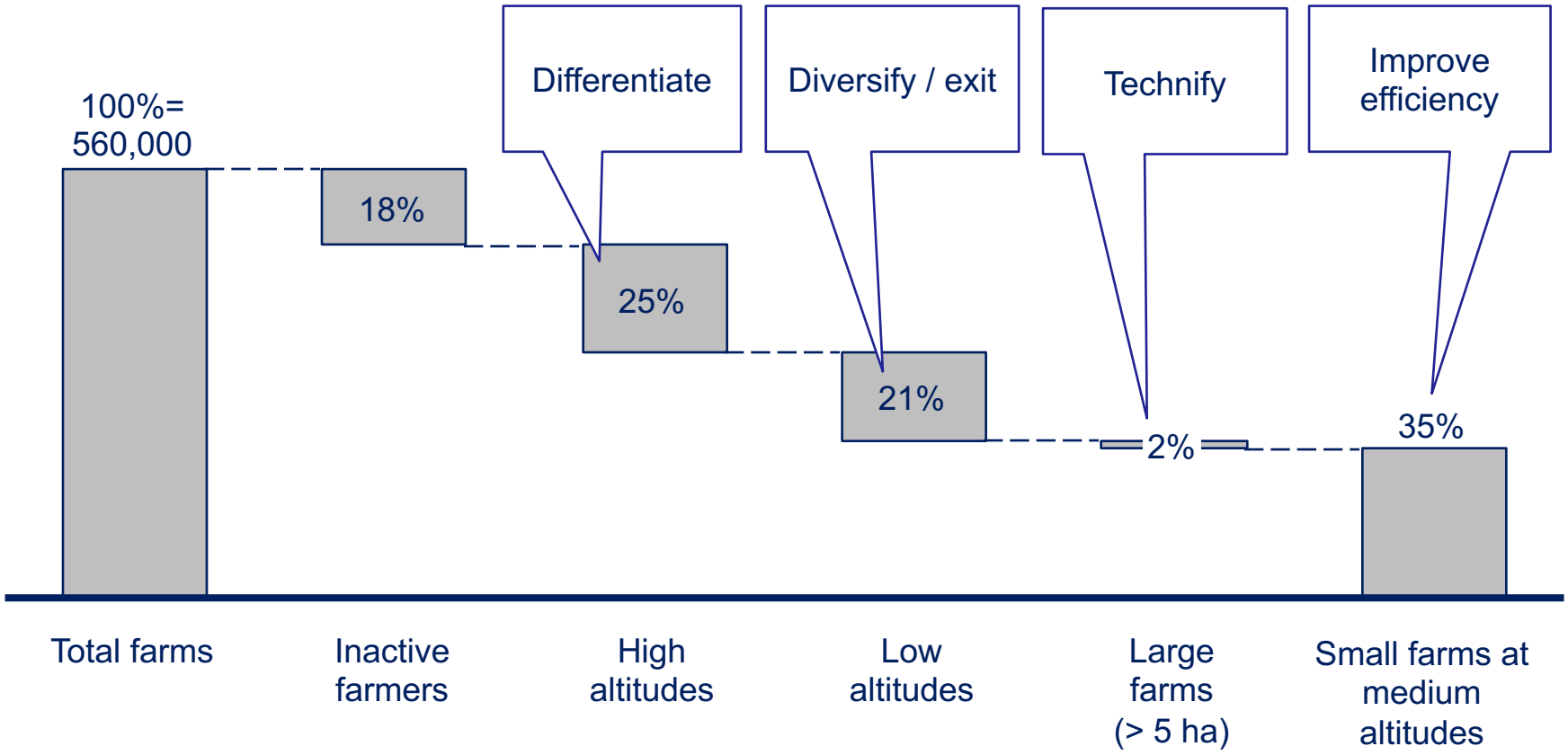
3 **BENCHMARK**

- ???

Potential ways forward

Exit	• Shift away from coffee farming and move into other economic activities that provide better income prospects • In particular, in peri-urban areas and in places most vulnerable to climate change
Diversify	• Diversification into additional crops that provide income and decrease dependency on coffee prices • In particular, in lower altitudes that are more susceptible to disease and climate change
Differentiate	• Focus on specialty coffee and implement activities to improve quality in order to achieve higher margins • In particular for farmers at higher altitudes or with traditional varieties
Improve efficiency	• Decrease cost of production in order to improve efficiency and gain higher profit margin

Different strategies for different producer types



Plan for tomorrow

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Homework

Background reading:

"What is in a Bean? ECX and the Specialty Coffee Market"

Excel:

Complete the 'worksheet' tab using the data in the preceding sheets

Questions to think about:

1. Which problems in Ethiopia's coffee value chain is ECX seeking to address?
2. How have Ethiopia's coffee export revenues changed since 2008?
3. What do the data suggest is the primary reason for the change?
4. How did the premium for Ethiopia's 'washed' coffee change over this period?
5. What share of the export price is the farmer capturing (as of 2010/11)?
6. Suppose you are interviewing an expert about the 2007/08 crop. The expert tells you that farmers received an average price of 4 birr per kg cherry for washed coffee and 3.3 birr per kg cherry for unwashed coffee that year (and the exchange rate was ~9 birr to the dollar). How would you interpret those prices? What share of the export price (for that harvest) does this represent?

COLUMBIA | SIPA
School of International and Public Affairs

Value Chain Analysis – Day 2

Guest lecture by Carl Cervone
April 12, 2018

Plan for today

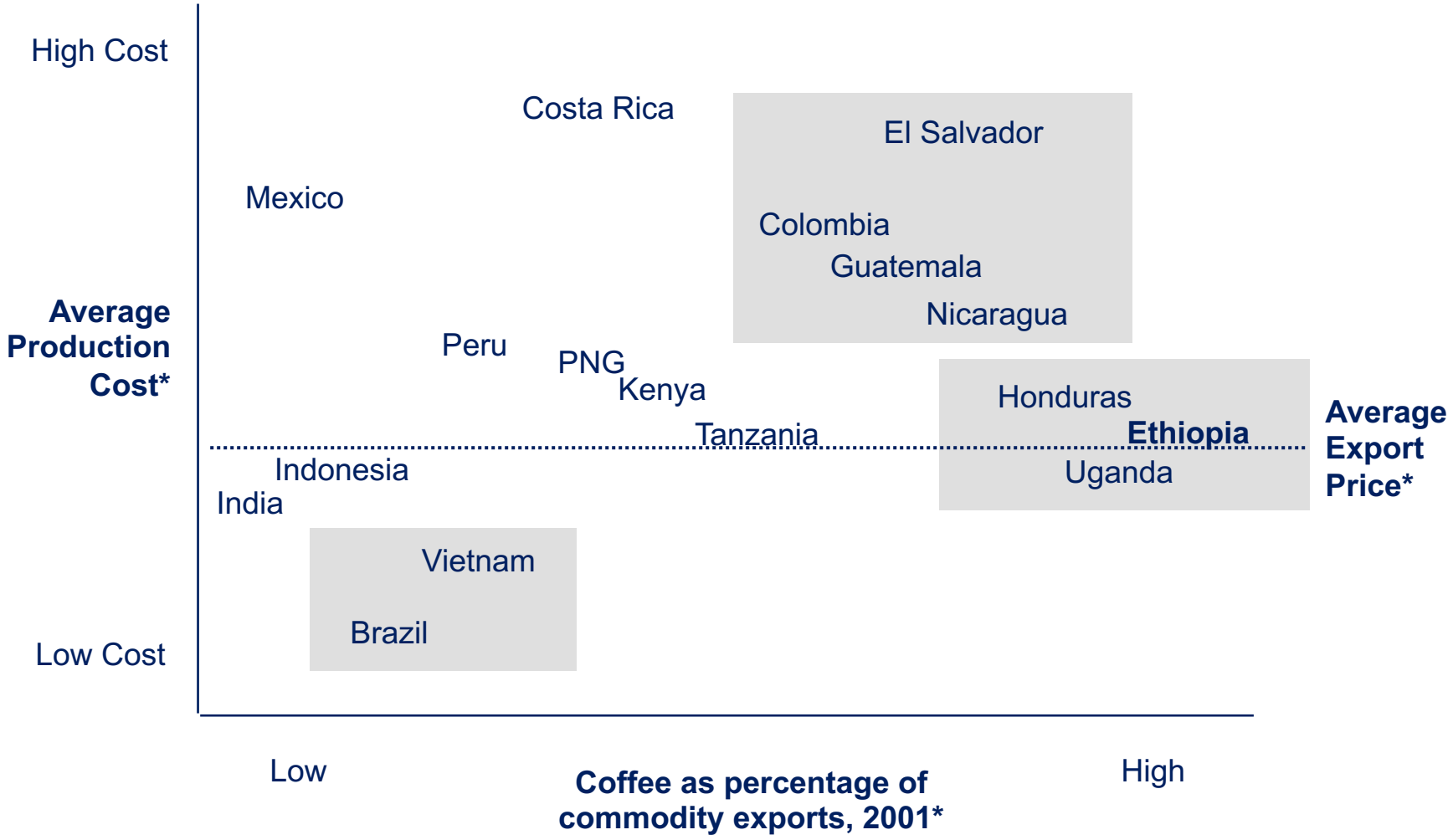
Tuesday

- The Value Chain Framework
- Global coffee value chain
- Break
- Case: Vietnam coffee
- Case: Colombia coffee

Today

- **Case: Ethiopia coffee**
- Practical aspects / Q&A

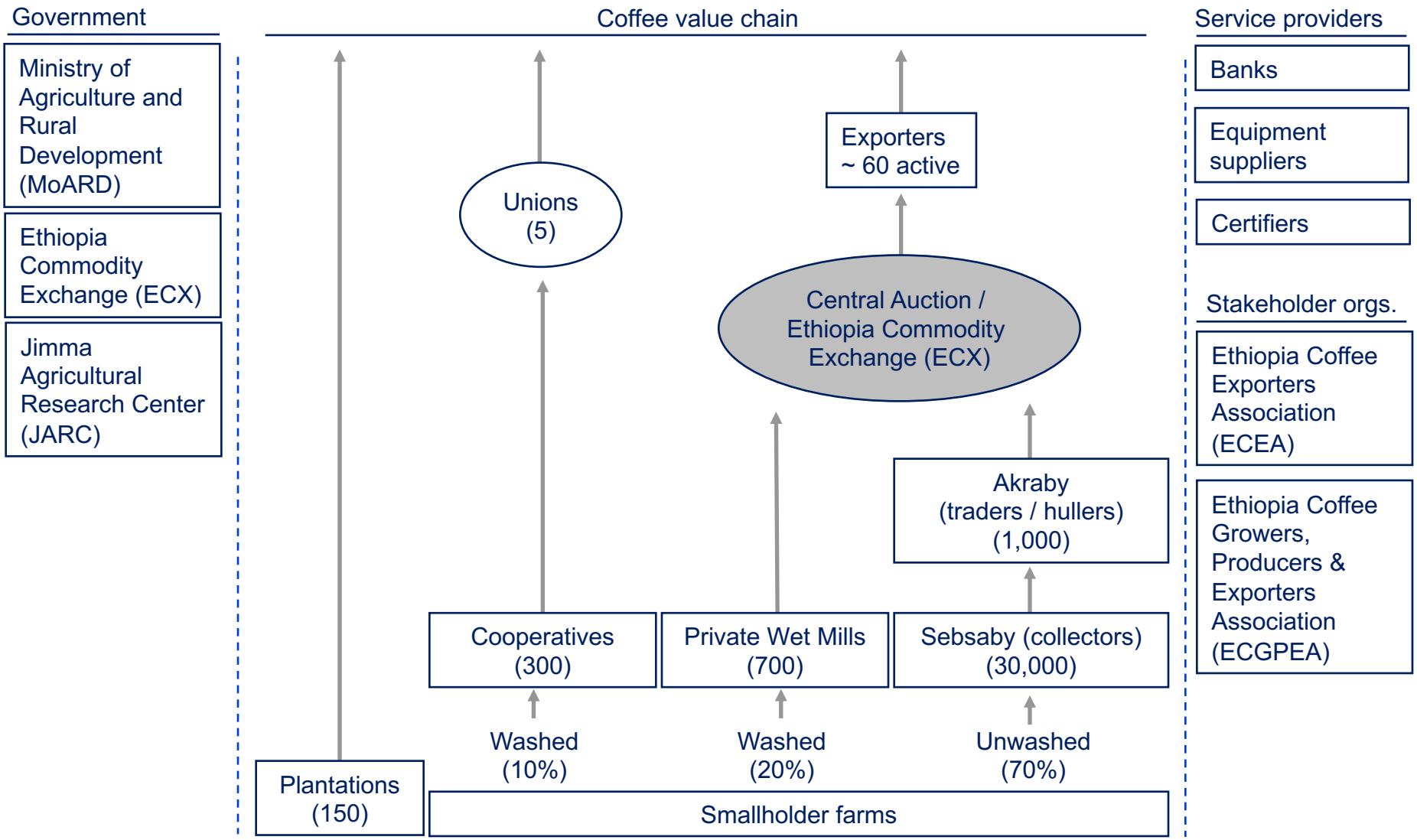
Ethiopia



* Cost positions are adjusted to reflect the relative prices differentials received by specific countries

Source: USDA; ICO Coffee Statistics, Sept 2002; Compete Coffee Coverage; TechnoServe; Economist Intelligence Unit; team analysis

Ethiopia coffee value chain map (export)



Source: TechnoServe

Two distinct value chains

Unwashed (naturals, sundried)

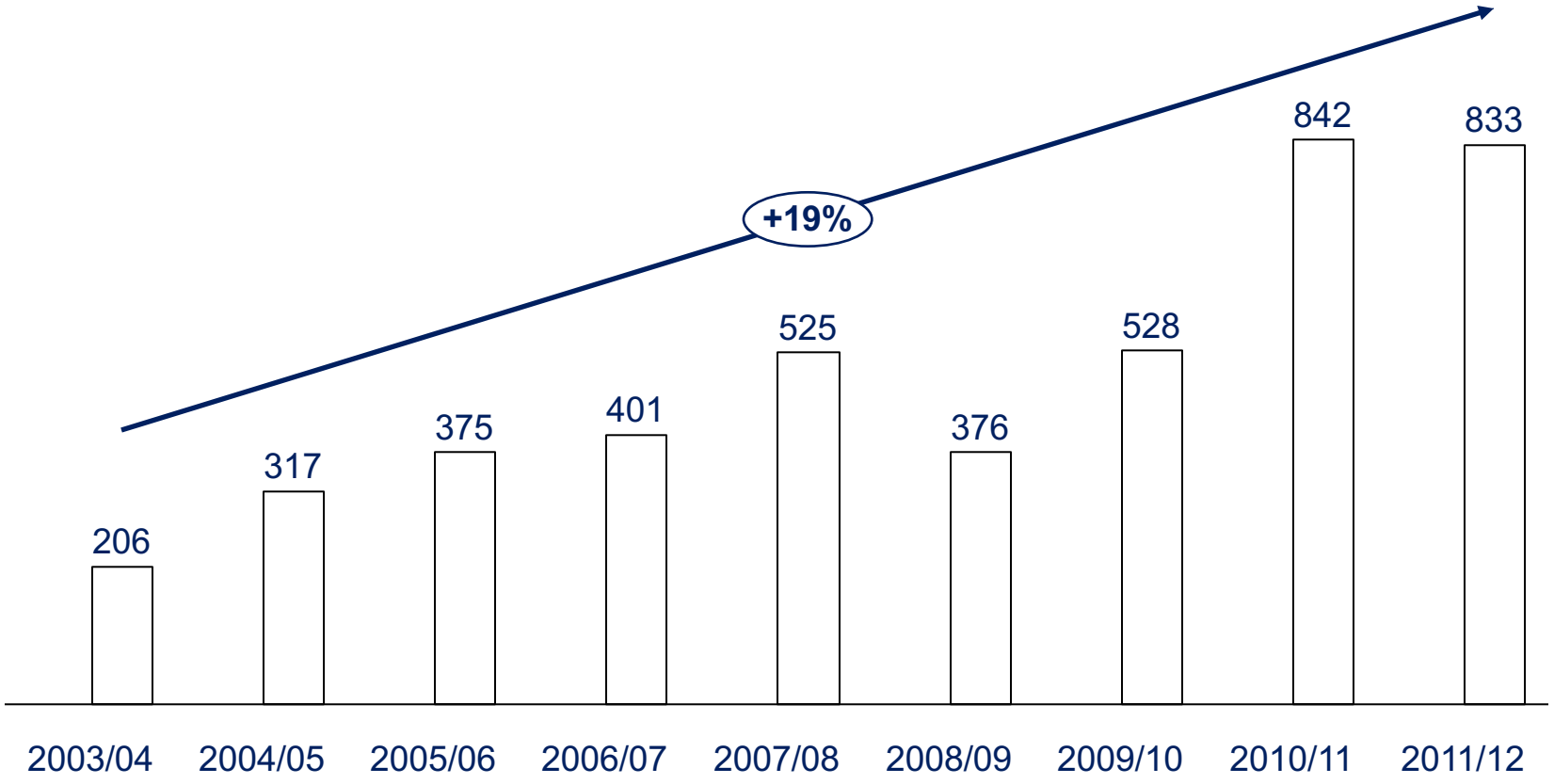
- Coffee is dried and hulled locally
- Labor intensive (for farmer)
- Inconsistent quality – low price
- Low margin / high risk business
- Can be stored as savings

Washed

- Farmers deliver ripe cherry to wet mill
- Wet mill processes into parchment
- Exported at a premium
- Large demand from specialty industry, as well as major roasters

The value of Ethiopia's coffee exports quadrupled between 2003/04 and 2011/12

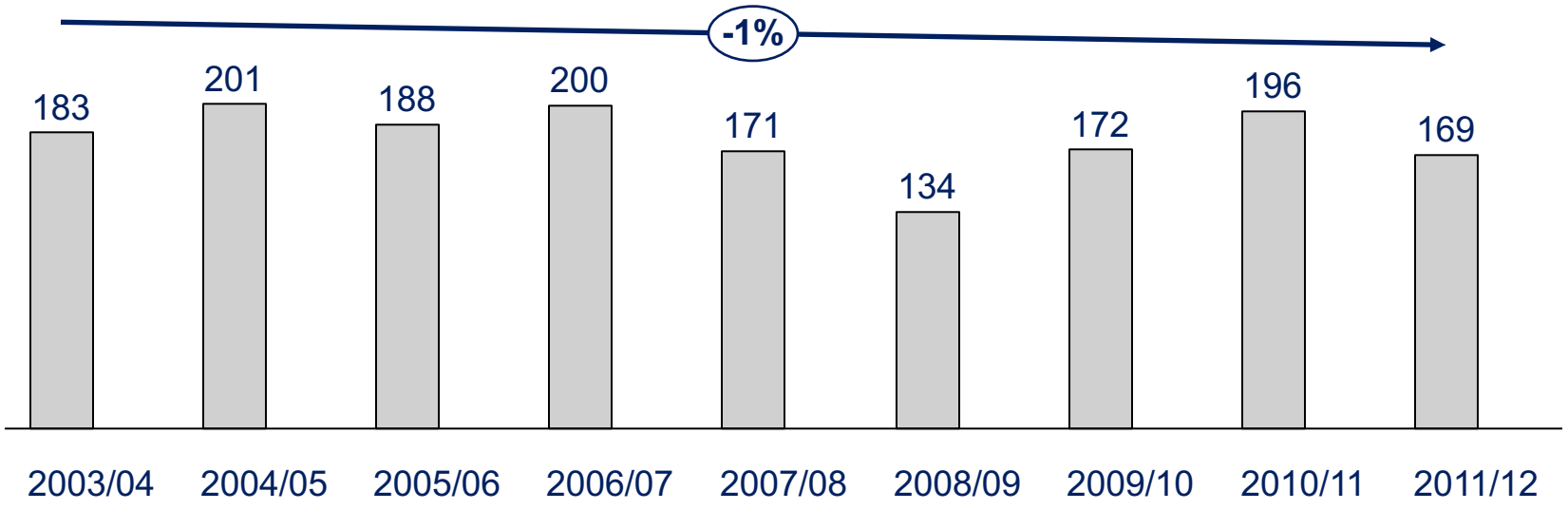
Value of Ethiopia coffee exports (US$ millions)



Source: National Bank of Ethiopia

However, export volumes stayed flat

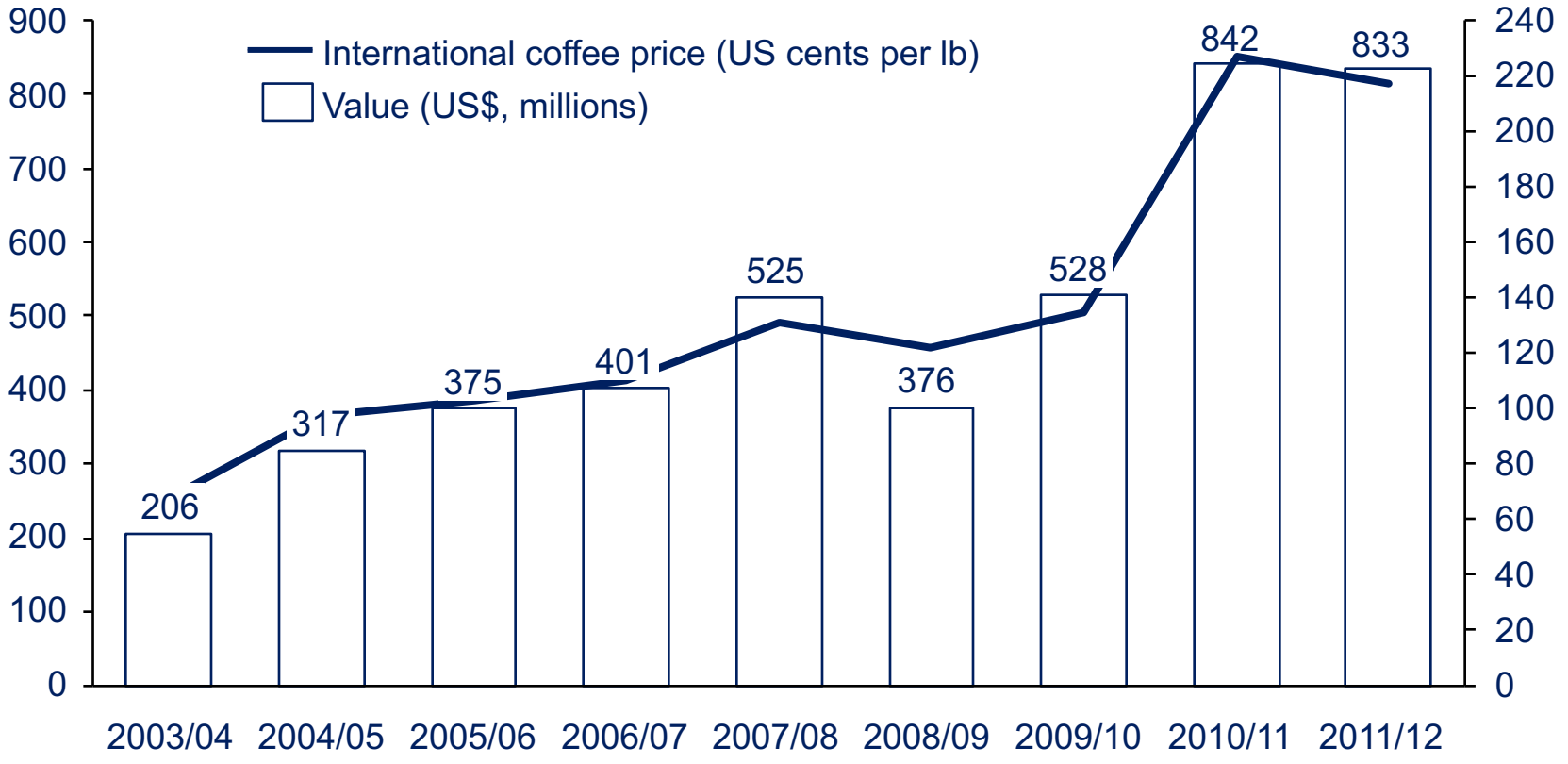
Volume of Ethiopia coffee exports (tons, thousands)



Source: National Bank of Ethiopia

Growth in export revenues resulted from rising prices

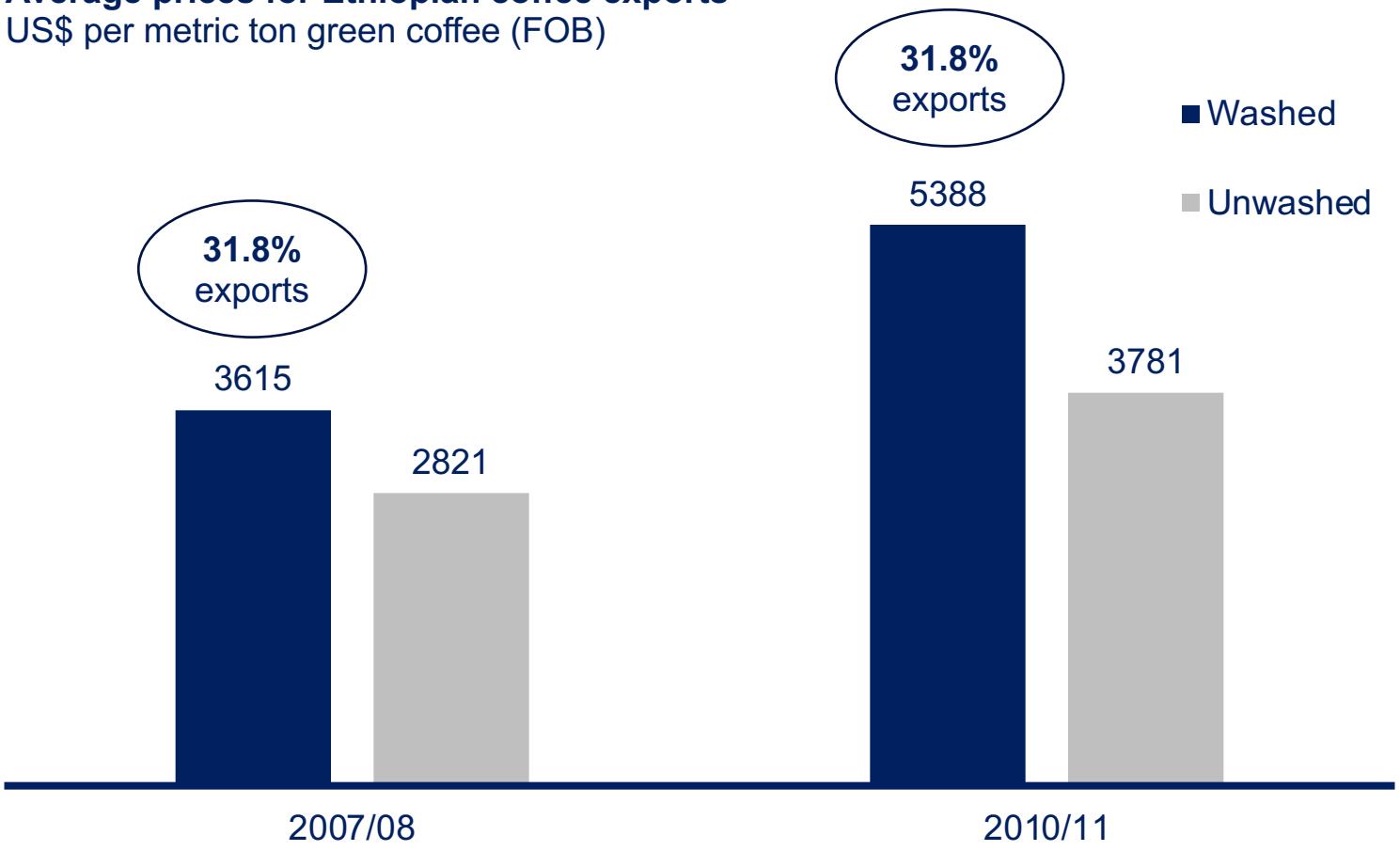
Value of Ethiopia coffee exports (US$ millions)



Source: National Bank of Ethiopia; ICO

Washed coffee earns a premium over unwashed

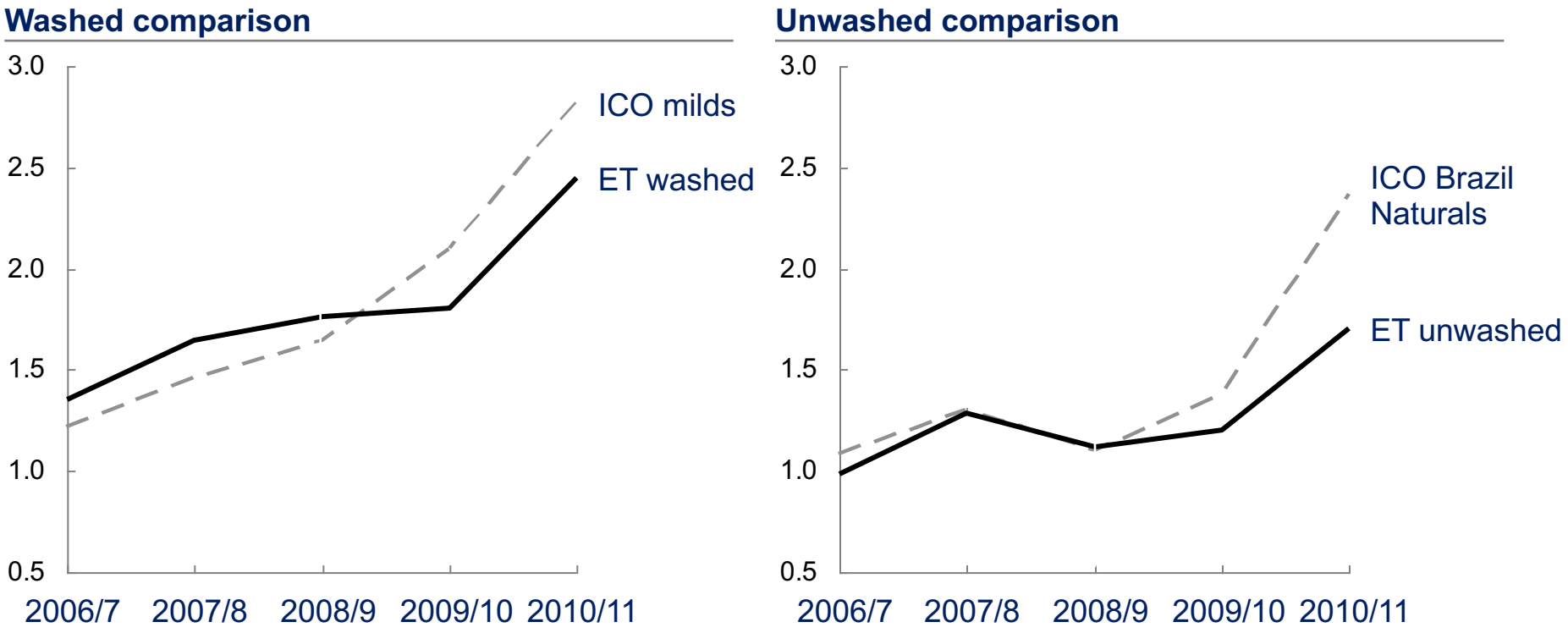
Average prices for Ethiopian coffee exports
US$ per metric ton green coffee (FOB)



Source: Ethiopian Coffee Exporters Association (ECEA)

Export differentials dropped after loss of traceability

Ethiopia export prices vs ICO composite prices by crop year
US$/lb green



Source: National Bank of Ethiopia; MoARD; ICO

Market confirmed hypothesis of reduced demand

"Starbucks wants to buy an additional 2,000 tons, but only if it is traceable and identity preserved."

"Lack of action in addressing the issue of traceability poses a real threat to Ethiopia. Once roasters have changed their blends – and believe me, they will if they cannot get hold of the coffee they want – then to get them back could take years and years…."

"Buyers need to do their own cupping to define quality, especially for specialty coffees."

"Ethiopia is the only producing country in the world where buyers are not able to buy identity preserved lots and see the quality of the coffee before they buy it."

"The buyer needs to be able to evaluate the coffee for himself. If he cannot, he will inevitably value the coffee at the "lowest common denominator" price according to what he might receive."

"Coffee is not a commodity... Ethiopia has a lot of special, valuable coffee. Making it a commodity by standardizing and mixing makes it trade at the bottom."

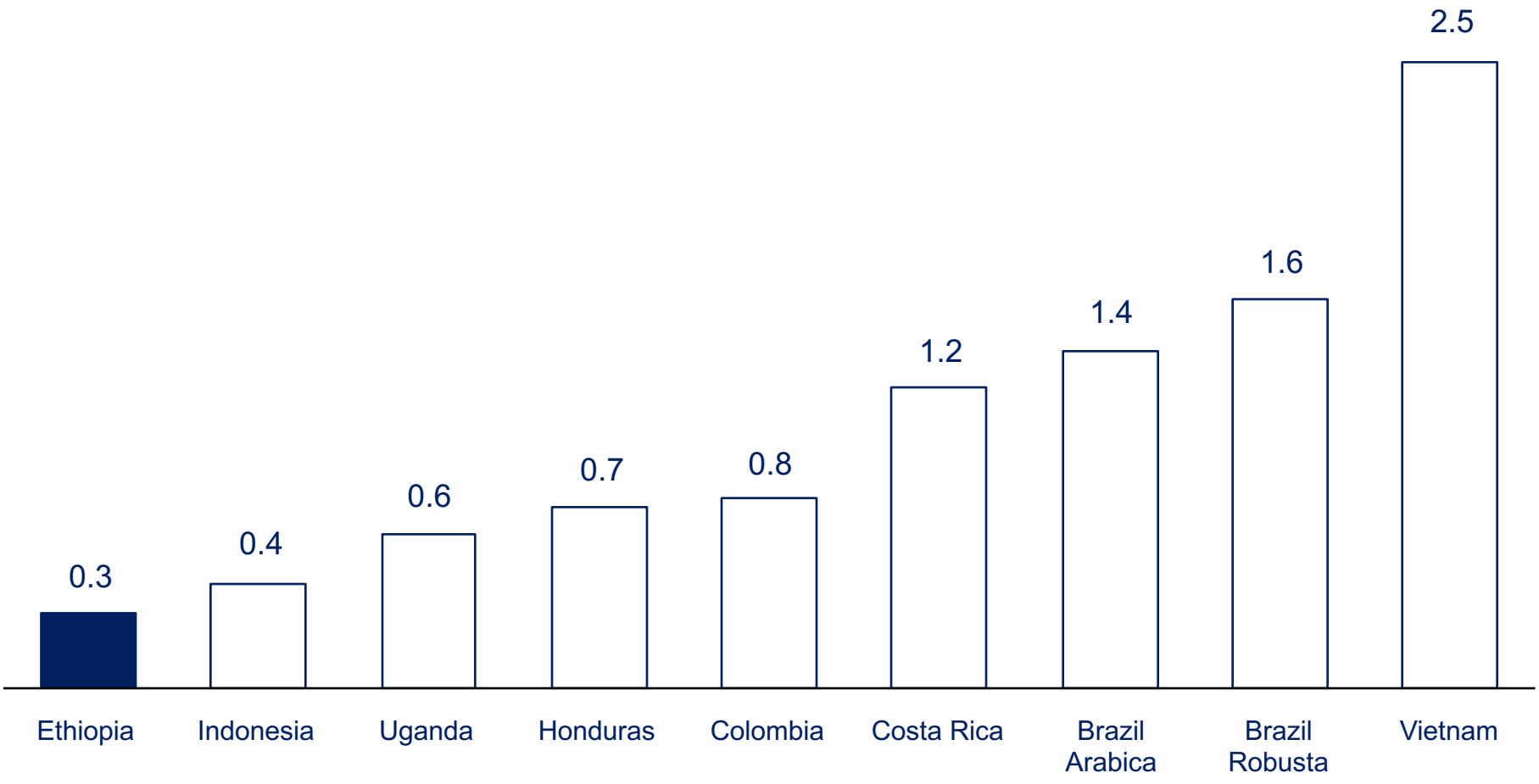
Buyers work in a very competitive international environment and demand reasonable prices for the quality offered. The market will push buyers in the direction of alternative countries."

How have farmers fared?

Indicator	2007/08	2010/11	Change
Export revenues	$525M	$842M	+60%
Export volume	171K tons	196K tons	+15%
Avg. export price	$3.07/kg	$4.29/kg	+40%
Avg. farmer price	$2.36/kg	$3.02/kg	+28%
Share of export	77%	70%	-8%
Costs	$0.72/kg	$1.27/kg	+77%

Lowest farm yields in the world (of the major origins)

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

What are some ways forward?

Improve quality

- Shift greater production from unwashed to washed
- Realize higher prices

Reduce costs

- Find efficiency gains in the supply chain
- Transfer greater share of export price to farmer

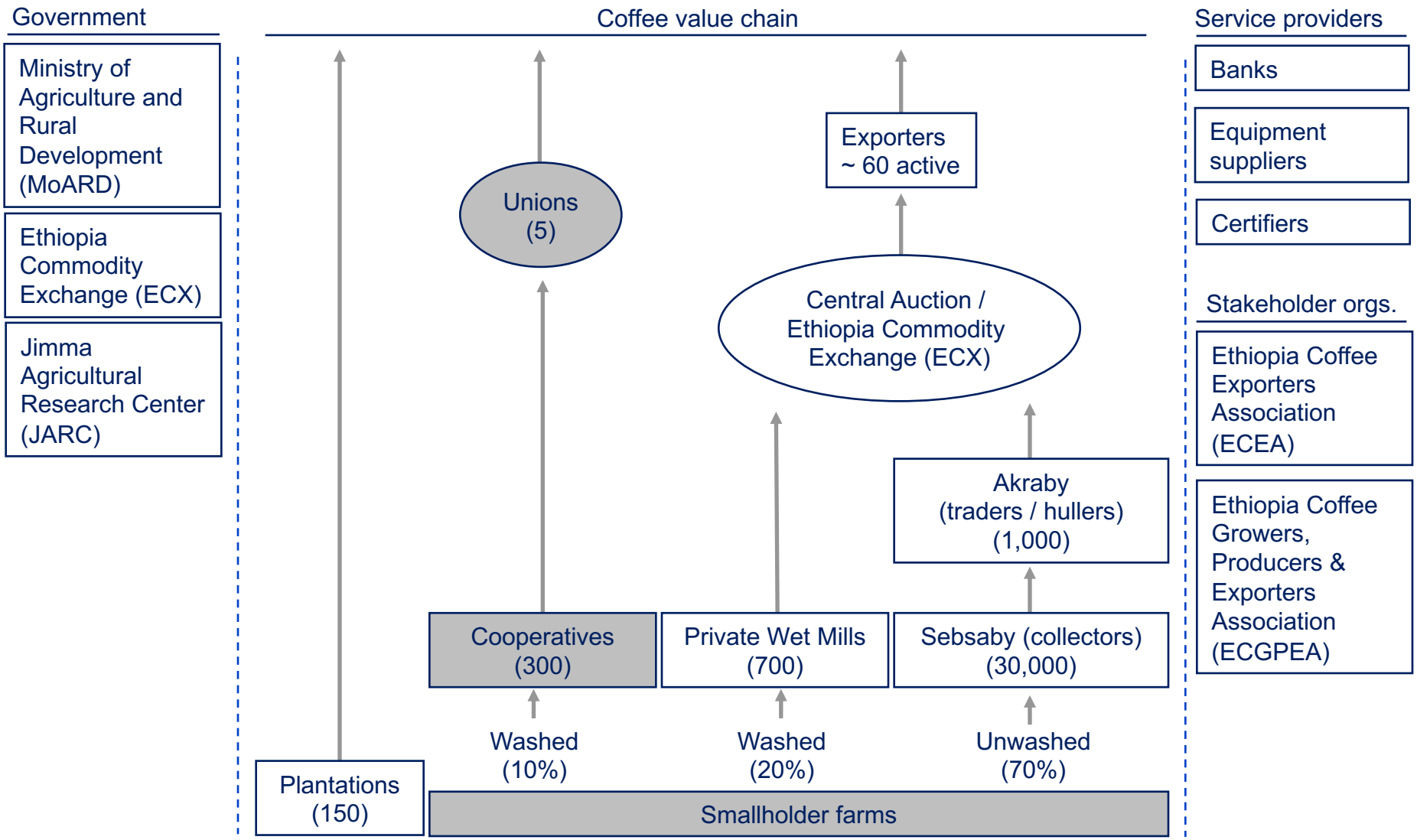
Increase farm yields

- Help farmers to double yields
- Keep farming costs low

Reform policy

- Improve enabling environment
- ECX? Financial regulations? Cooperative monopolies?

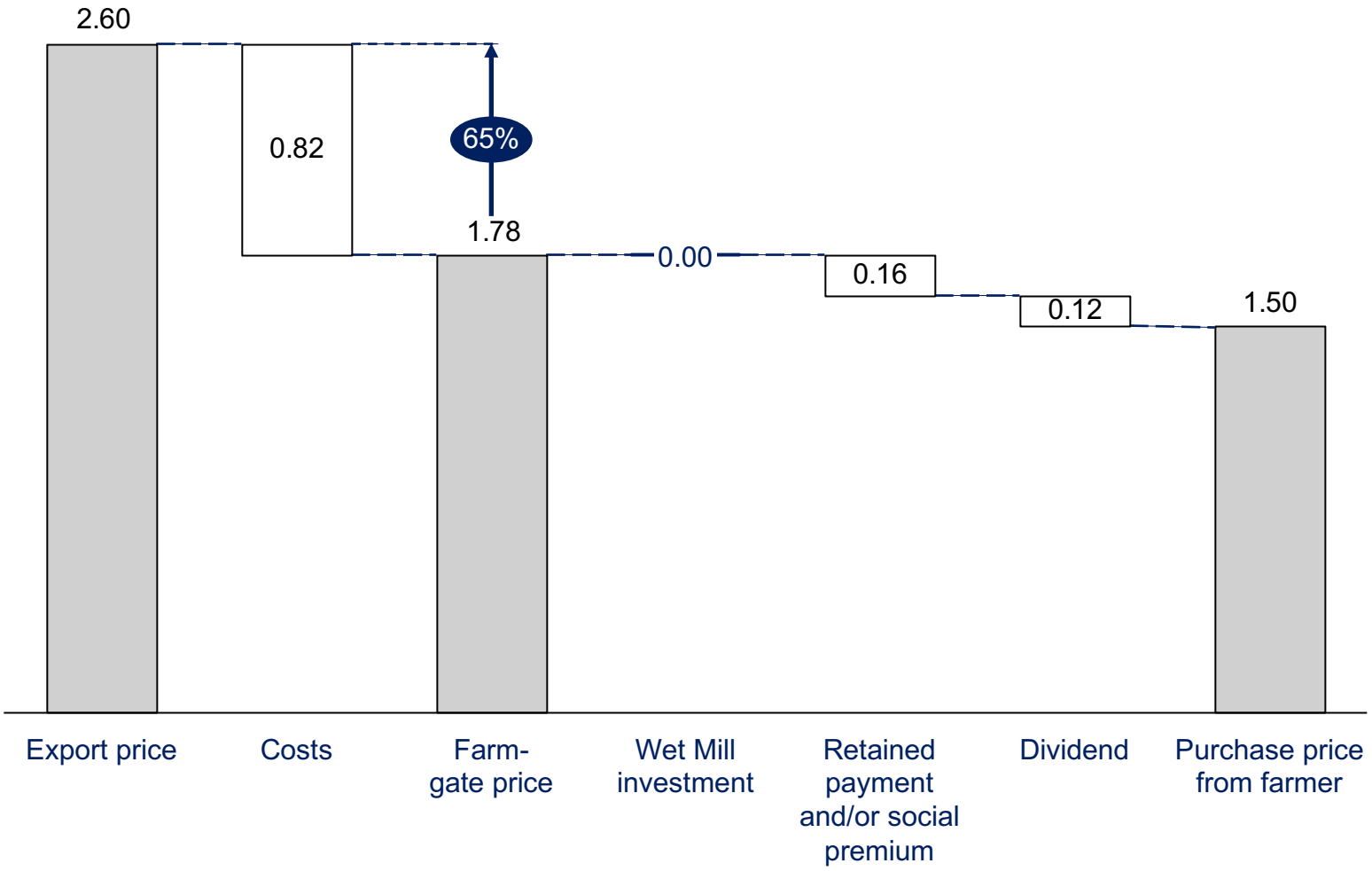
Zoom in on cooperative value chain



Source: TechnoServe

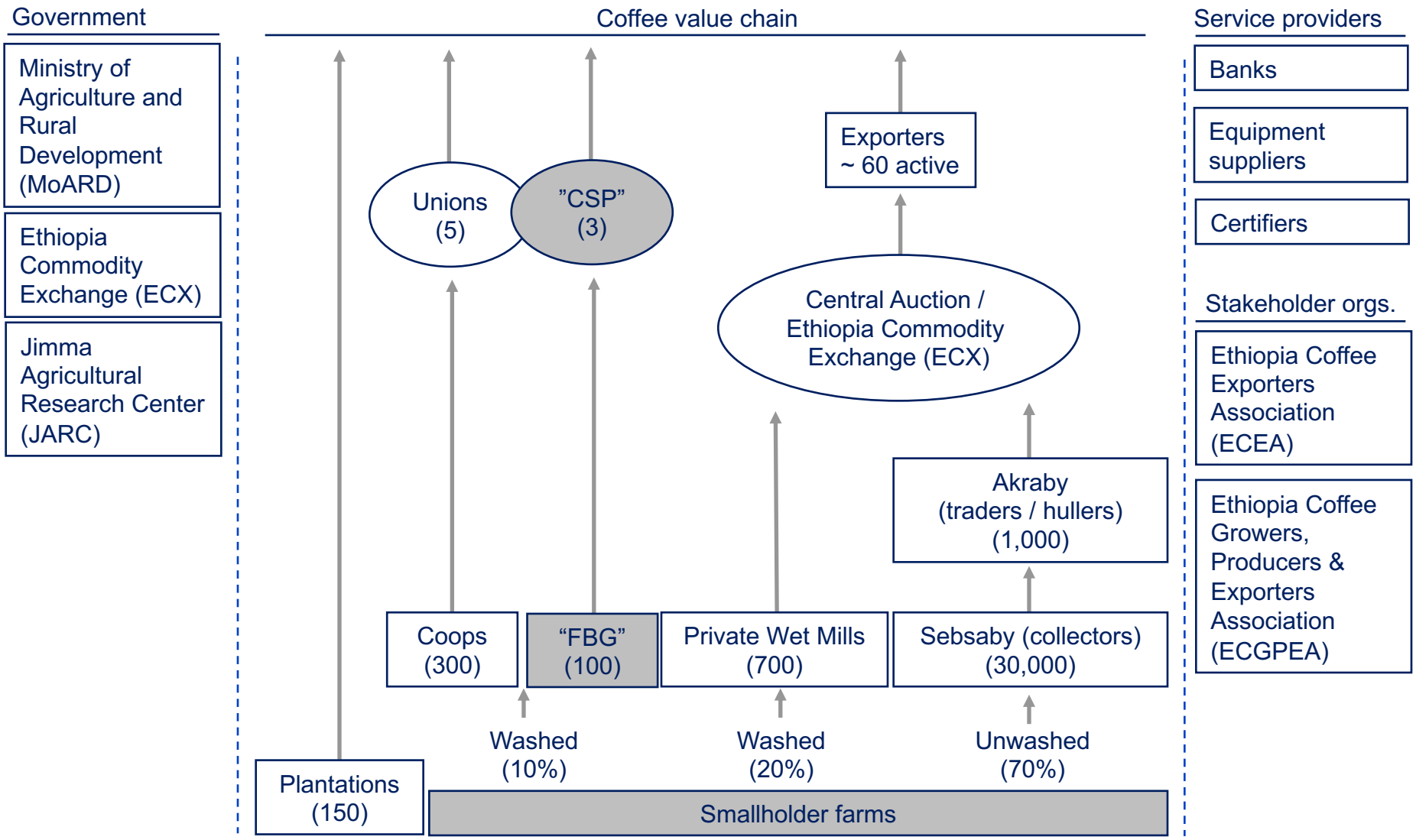
Cooperatives can bypass ECX, but take 35% of value

Washed coffee cost analysis for traditional cooperatives (2010/11)
US$/lb green



* Includes cooperatives in Southern Oromia, Sidama and Gedeo
Source: TechnoServe interviews and analysis

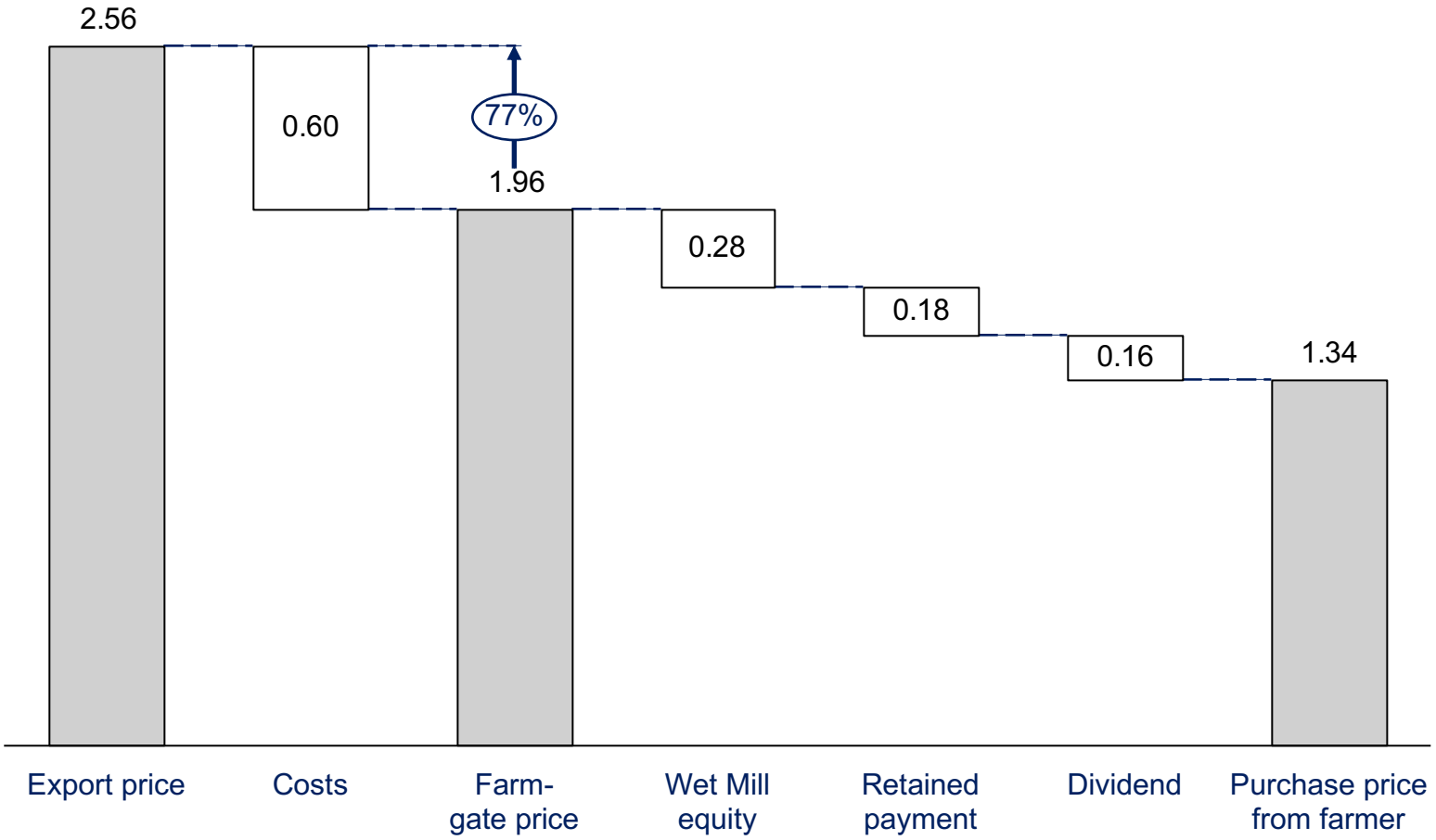
TechnoServe introduced a new value chain model



Source: TechnoServe

Farmers earned a higher share of the price

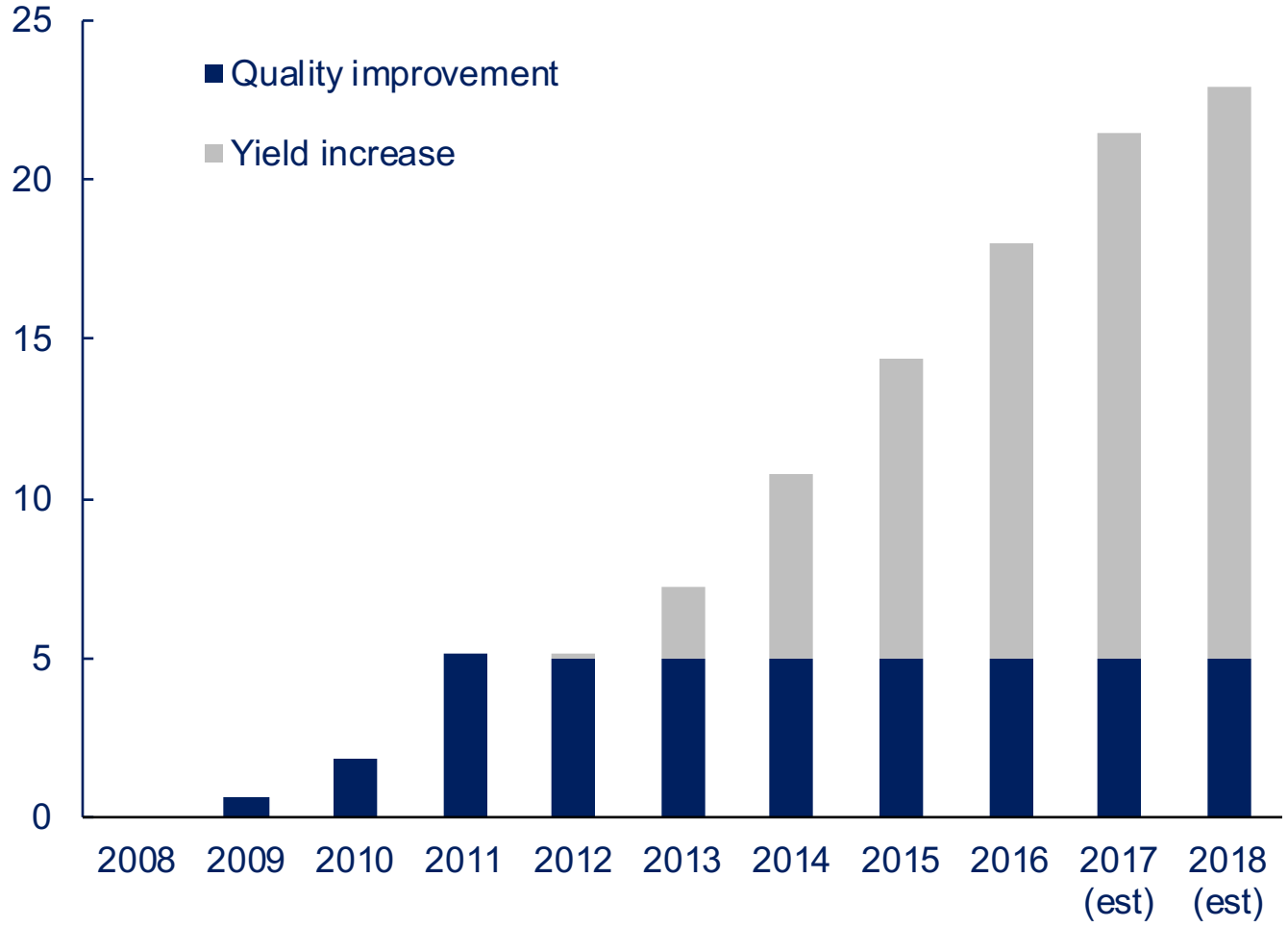
Washed coffee cost analysis for cooperatives working with "CSP"
US$/lb green



Source: TechnoServe results in 2010/11

Total value creation exceeded $20M/year

Value created by the Coffee Initiative in Ethiopia
US$, millions



ROI

- Grant of $25M over 8 years
- Eventual return of > $20M/year

Source: TechnoServe

Ethiopia review

1 **MAP**

- ~1.5M (or more) small-scale farmers
- Two distinct value chains: washed vs unwashed
- Complicated regulatory environment

2 **BREAKDOWN**

- Farmers earn <75% of export price
- High supply chain costs, especially through cooperatives

3 **BENCHMARK**

- Declining competitiveness (rising costs, not meeting market demand)
- High potential for impact (quality improvement, yield improvement, cost reduction)

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- **Practical aspects / Q&A**

Some pointers

- Context, context, context
- Identify the right mix of stakeholders to interview
- Get diverse opinions
- Carry a USB drive (people never email data after you leave)
- Official statistics aren’t always accurate
- Corroborate numbers with different sources
- Go bottom-up and top-down
- Talk through hypotheses with experts
- One-size-fits-all solutions are rare; segmentation is usually needed
- Keep slides simple