COFFEE PRODUCTION COSTS

2020 COLOMBIA

SUSTAINABLE TRADE PLATFORM

FACILITATED BY Solidaridad

The concepts, thoughts and analyses presented in this report does not bind any of the allies who provided information. These are conclusions from data analysis given in advance by the author.

Special Thanks

We thank the allies of the sustainable commerce platform (Plataforma de Comercio Sostenible by it's name in Spanish) that have trusted us for a decade, cooperating in the construction of this analysis exercise of the microeconomic coffee farming indicators.

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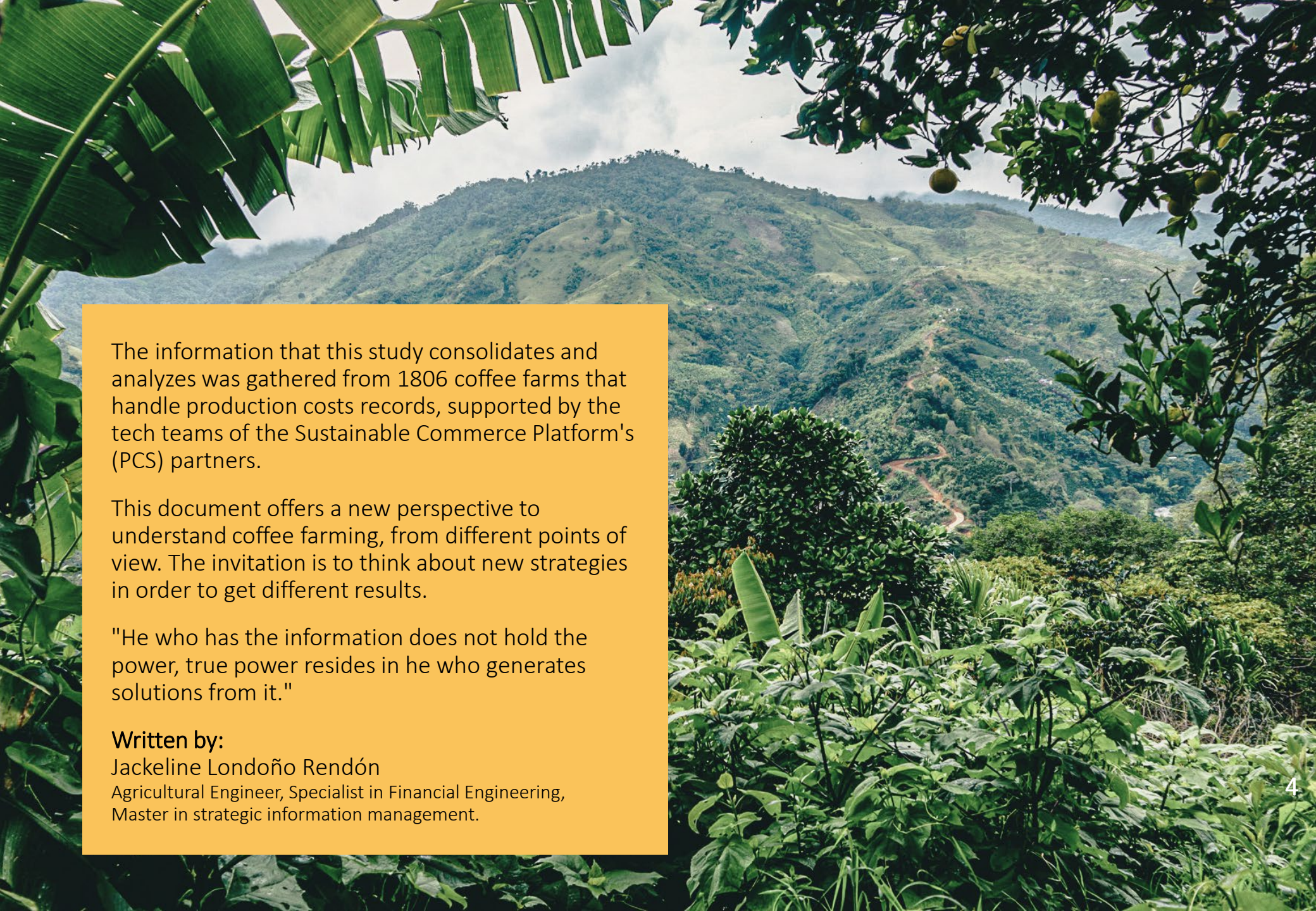

The information that this study consolidates and analyzes was gathered from 1806 coffee farms that handle production costs records, supported by the tech teams of the Sustainable Commerce Platform's (PCS) partners.

This document offers a new perspective to understand coffee farming, from different points of view. The invitation is to think about new strategies in order to get different results.

"He who has the information does not hold the power, true power resides in he who generates solutions from it."

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General Information

Study Overview

During 2020, information from coffee farms in the departments of Antioquia, Caldas, Cauca, Cundinamarca, Huila, Meta, Nariño, Risaralda, Santander and Tolima was analyzed.

This information was gathered from the records of production costs and income of coffee growers, provided by farms certified with different voluntary sustainability standards.

Summary of figures and some indexes.

1806
Farms

Average renovated area
15%

Coffee area / average (Ha)
3,2

Productivity (@/Ha)
130

Return (@/Ha)
152

Productivity: calculated from the total coffee area
Return: calculated from the production area

Insights

Some relevant conclusions

In 2020, the analysis was directed from three determining variables of net income, these are: coffee cultivated area, productivity and selling price.

Reflections connected with the living income

- 64% of the families in this study do not reach the living income even though the average selling price of 110.200 $/@ cps
- The margin per hectare has presented broad fluctuation in the 10 years the study has taken place. This variable receives the effect of price volatility (very typical of its nature) and variability of its productivity as well. These fluctuations amplify the risk of small coffee growers (especially those who own less than three coffee hectares) of being below the living income or the poverty line from one year to the next.
- Farms with less than two coffee hectares did not reach the living income, despite selling at a price of $111,300/ @. Complimentary strategies should be sought instead of just offering a reference selling price, narrowing the gap between net income and living income, otherwise, price-based strategies will not take into account the majority of the colombian coffee growers.

Some relevant conclusions

Insights linked with productivity

- Several factors (climatic and technical) affect productivity making it quite volatile, a strategy to partially mitigate its volatile character is the renewal of coffee plantations in equal parts. However, the 10-year exercise reveals the broadness of the fluctuation in the percentage of renewed area year by year (around 14 and 22%), with medium-sized farms being the ones with the greatest fluctuation. The impact of this variation is important in the margin per hectare, due to the marked influence of productivity on this index.

- The correlation between cost per hectare and productivity is 0.84, which means that a high cost per hectare is associated with a higher productivity. It should not be a cause for alarm to find high costs per hectare, unless these are derived from a very high renewed area. Beginning to understand the relation between important business variables is needed. For example, the higher the productivity, the higher the cost per hectare, not meaning over expenditure.

- In the same way, the correlation between the cost per hectare and the margin per hectare is positive and significant at 99% confidence. The higher the cost per hectare, the higher the margin. The understanding comes from the fact that we are facing a productive model where variable costs predominate, therefore, a greater productivity will drive the costs up and this will end up generating a greater profit.

- In the 10-year series, farms under five hectares have had the lowest levels of productivity (120 @ / ha). However in 2020, 30% of farms in this segment reached a 184@/ha productivity. Identifying these successful cases to "find out what they do different", what are the technical variables, administrative decisions, or sociocultural variables that end up making a difference is imperative. Based on learned lessons, replicate successful practices and experiences with other coffee growers in this segment.

Some relevant conclusions

Insights Connected With The Sale Price

- There must be explored and understood the variables that make up the living income, in order generate strategies that lead to narrow the gap between net income and living income. Solutions focused on sale prices are not compelling. In a year with an exceptional sale price, it was not enough to close the gap for more than 60% of the families included in the study.

- The average selling price ($113,800/ha), has been the highest in the data series (since 2011), in spite of these price levels, 44% of families who grow less than five hectares of coffee found themselves below the poverty line. Then, is actually the selling price the true index of the economic performance for small growers? This is a question that needs the value chain actor´s analysis, because more than 95% of the country's coffee growers belong to this segment.

Productivity:

The economic performance shaper

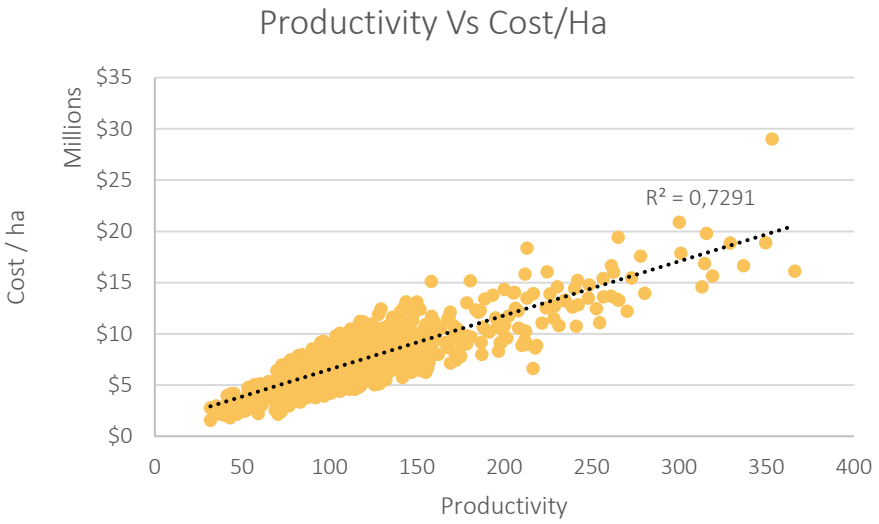
The effect of productivity on the margin per hectare

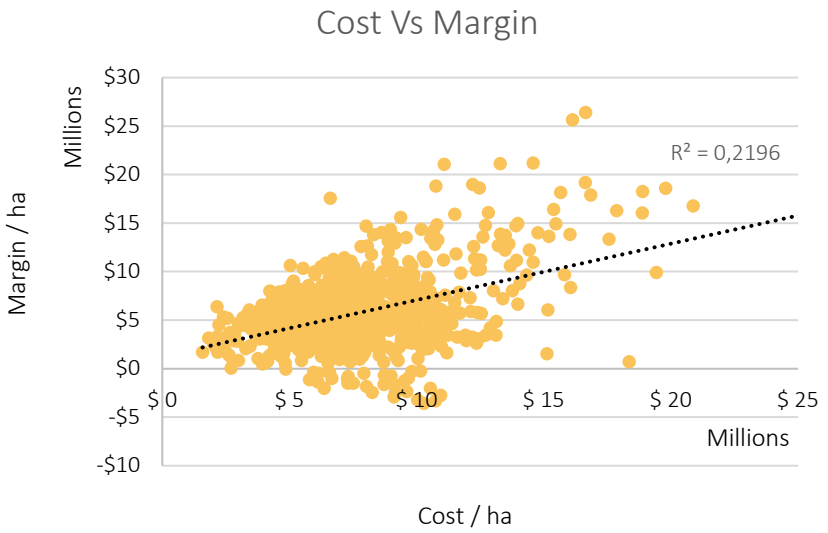
For this comparison farms were grouped in two tires, divided by their productivity weighted average (130 @ / ha).

Variable	Average 1806 farms	< 130 @	> 130 @
Productivity (@ / ha)	130	96	190
Return (@/ ha)	152	114	215
Fertilization (kilos / ha)	1.240	1.140	1.410
% renovated area	14,6%	16,1%	12%
Coffee area (ha)	3,2	2,9	3,7
Cost / Arroba	$65.940	$69.200	$ 63.000
Selling price ($ / @)	$113.800	$ 114.000	$113.600
Operating cost / hectare (1)	$8.555.000	$ 6.612.000	$11.200.000
Operating cost / hectare (2)	$2´964.000	$ 2.500.000	$3.778.000
Margin / hectare	$ 6.204.000	$4.276.000	$9.577.000
Net Income for the farm	19´852.000	$12.400.400	$35´434.900

Return: calculated over production area
Operating cost / ha (1): includes Harvesting and processing costs
Operating cost / ha (2): does not include harvesting and production costs

Productivity shapes the business' economic performance





- The correlation between cost per hectare and productivity is 0.84, which means that a high cost per hectare is associated with higher productivity.
- The correlation between the cost per hectare and the margin per hectare is 0.43, which means a relationship that is not only positive but significant at 99% confidence.

The costs dilemma: the higher the costs, the lower the utility, or quite the opposite?

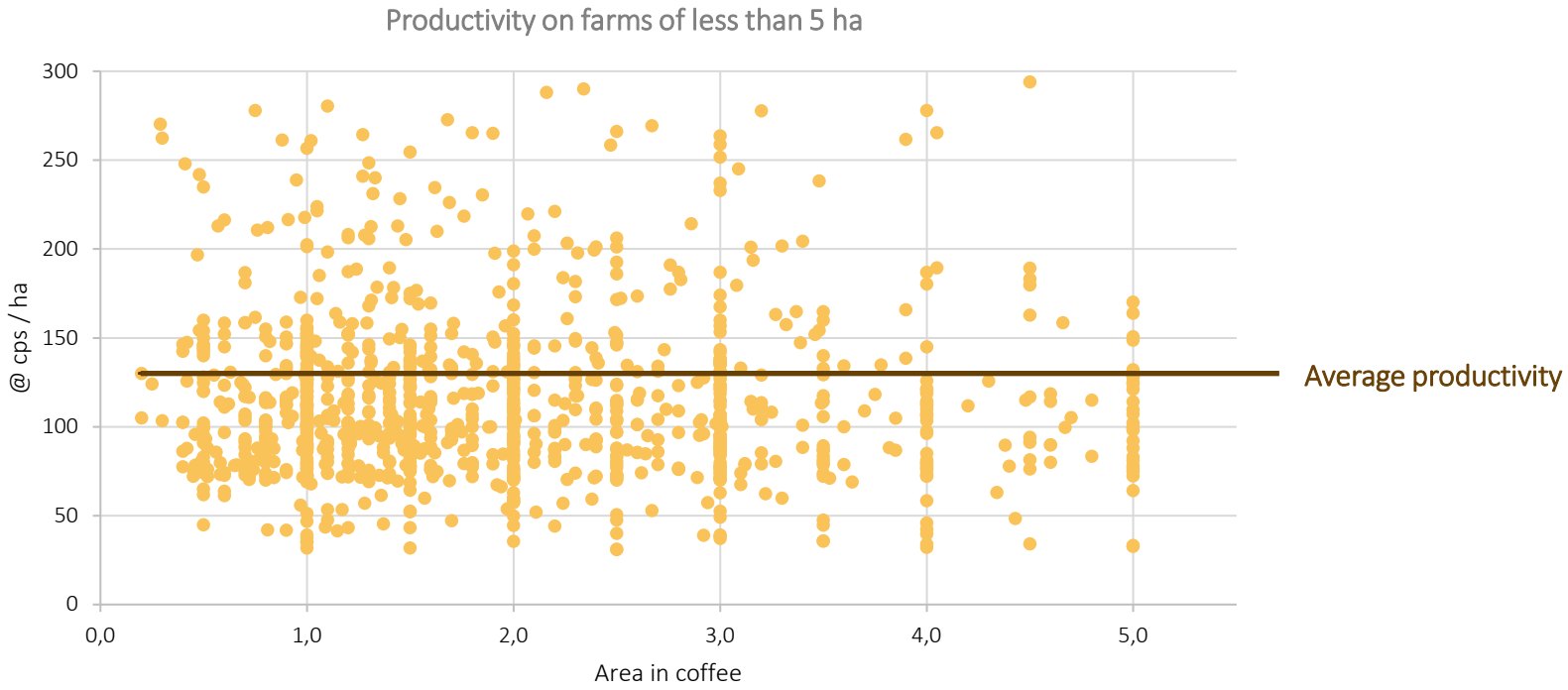
- High productivity farms double, in this index, those with low productivity. This result has various effects on cost per arroba, cost per hectare and margin per hectare variables, but each of these variables are affected differently. While productivity has an indirect relationship with the cost per arroba, its relationship is direct with the cost per hectare. Therefore the farms with the highest productivity will always have a higher cost per hectare. By 2020 the most productive farms had a cost per hectare 69% higher than the least productive farms.

- From the production costs perspective, it is evident the higher capital investment on the farms with the highest productivity. Discounting the cost of harvesting, these farms invested 51% more working capital.

- A very important discovery regarding production costs is their direct relationship with profit margin, although it seems contradictory, the higher the production costs, the higher the margin per hectare. This result is derived from a production model where variable costs predominate (58%) which are directly related to the production volume. Therefore, what can be seen is the visible productivity effect: the higher the productivity, the higher the costs. Likewise, the higher the productivity, the higher the margin per hectare, which leads to the final relation: The higher costs per hectare, the higher margin per hectare, with very few exceptions.

- Regarding to the margin per hectare of the most productive farms, it was 2.2 times greater than the one of the less productive. Obviously, this result was not the consequence of lower costs, it was the result of the higher productivity.

Productivity, an area, management or environmental supply problem?



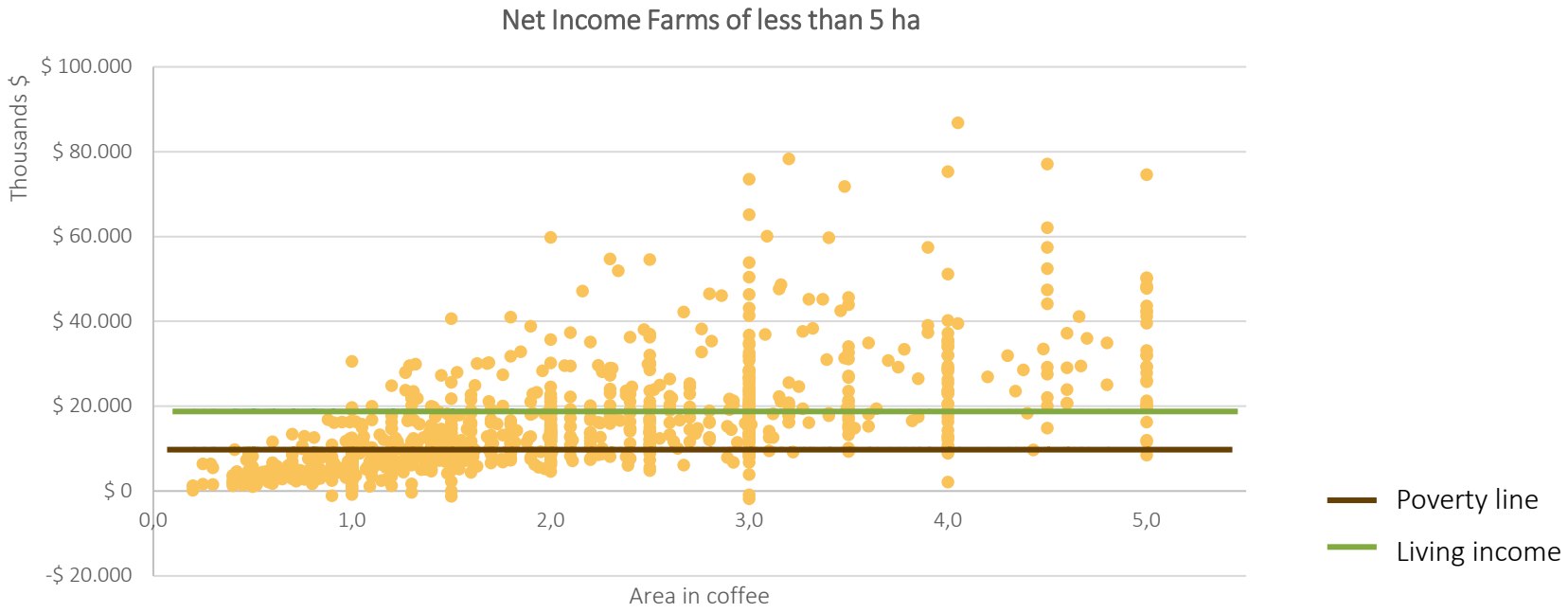
71% of coffee-growing families in the study, that own less than five coffee hectares, have a productivity below average (93@ cps/ha), and they grow only 2 coffee ha

In contrast, farms under five hectares that are above the average productivity, reached 184 @ / ha, and grow 1.9 ha in coffee.

The selling price:

What is its role in a business of small coffee growers?

Even with a historical high sale price, many families were not able to lift themselves above the poverty line



In order to estimate the families net income, the income and costs of production associated with coffee were taken into account, and family labor involved in the productive process was included as well.

The living income of COP $19´185,000 was set by the annual CPI, based on the value found in the True Price study of 2018. It was calculated for a family between 4 and 5 members.
The reference of the poverty line is taken from DANE (2020) and equals the sum of COP $10´126.000

The selling price and its limited contribution to close the gap between net income and living income

- 75% of coffee families that grow less than five hectares in coffee, are located below the living income, while 44% are below the line of poverty.
- Farms that exceeded the living income had an average productivity of 159 @ / hectare, a coffee-grown area of 3.1 hectares and a sale price of $115,300/@ cps
- The farms located below the living income, reached an average productivity of 104 @ / ha, a coffee-grown area of 1.6 ha and its selling price was 111,300 $/@.
- The sale price of the farms that reached the living income exceeded only 3.7%, those that did not. The role of the selling price to close the gap is better understood through the margin per hectare, while the correlation between productivity and margin per hectare is 0.78, the correlation between selling price and margin per hectare is 0.35. This means that the influence of productivity on the margin per hectare is even greater than the influence of the selling price, this effect is extended to net income as well.

The living income is defined as: "the net annual income required by a household, in a particular place to allow a decent living standard for all its members, including elements such as: food, water, housing, education, healthcare, transportation, clothing and other essential needs, including supply for unexpected events"
(https://www.living-income.com/)

The coffee-cultivated area:

a key piece in the segmentation of coffee-growing families

Cost structure by area

The information was segmented into three area ranges, small: farms with **less than 5 hectares**, medium **between 5 and 10 hectares** and large farms with **more than 10 hectares** in coffee.

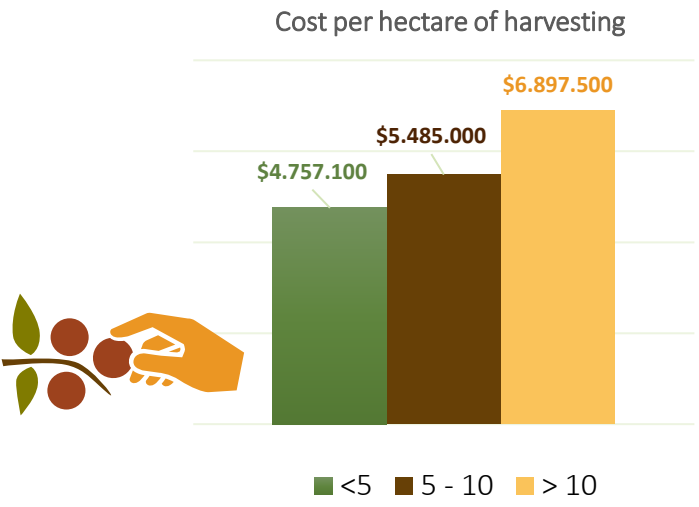
	Farms < =5 Ha (Small)			**Farms 5 - 10 Ha** (Median)			**Farms > 10 Ha** (Big)		
	$ /@ CPS	$ / ha	%	$ /@ CPS	$ / ha	%	$ /@ CPS	$ / ha	%
Harvesting	$ 34.250	$ 4.112.800	53,1%	$ 35.550	$ 4.580.100	53,1%	$ 37.610	$ 5.800.300	55,3%
Processing	$ 2.260	$ 271.600	3,5%	$ 3.190	$ 410.700	4,8%	$ 4.010	$ 618.700	5,9%
Fertilization	$ 17.150	$ 2.059.300	26,6%	$ 15.510	$ 1.998.700	23,1%	$ 13.180	$ 2.032.200	19,4%
Drill bit and phytosanitary	$ 540	$ 65.200	0,8%	$ 840	$ 107.900	1,3%	$ 790	$ 122.400	1,2%
Lots under Renovation	$ 1.540	$ 185.300	2,4%	$ 2.060	$ 265.600	3,1%	$ 2.780	$ 429.100	4,1%
Management of Weed	$ 4.630	$ 555.800	7,2%	$ 3.670	$ 472.400	5,5%	$ 2.770	$ 427.000	4,1%
Other tasks	$ 220	$ 26.500	0,3%	$ 210	$ 26.500	0,3%	$ 30	$ 4.000	0,0%
Management expense	$ 3.530	$ 424.300	5,5%	$ 5.480	$ 706.200	8,2%	$ 6.600	$ 1.017.400	9,7%
Financial expenses	$ 400	$ 44.000	0,6%	$ 500	$ 62.200	0,7%	$ 300	$ 41.800	0,4%
Total	**$ 64.520**	**$ 7.744.800**		**$ 67.010**	**$ 8.630.300**		**$ 68.070**	**$ 10.492.900**	

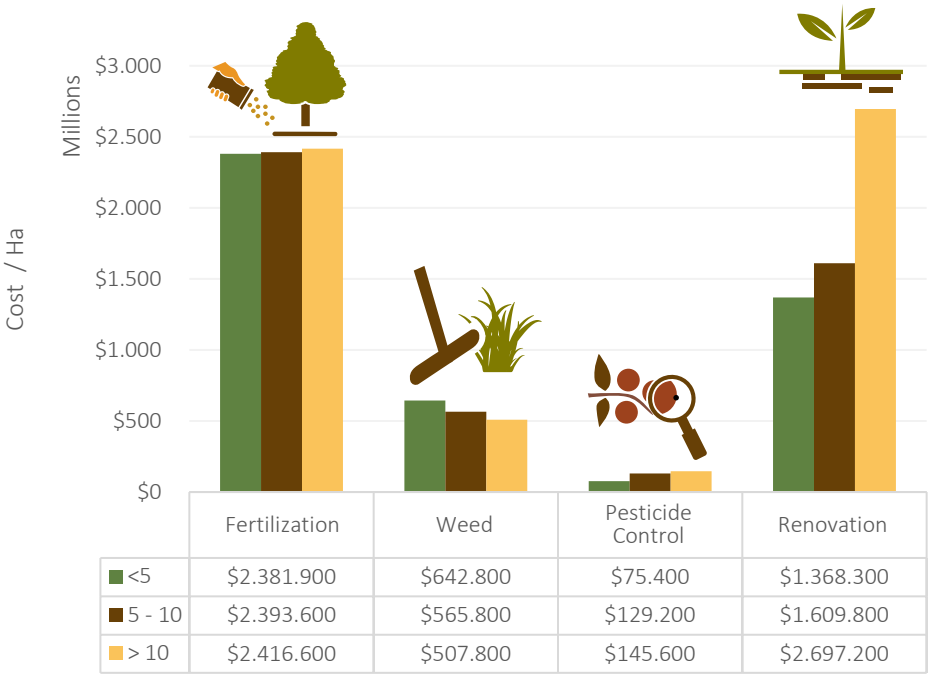
Costs calculation based on the total coffee-grown area

Comparative cost / hectare

The year 2020 did not represent differences in the fertilization doses for coffee plantations, in the different segments per area, even though this variable did show significant differences between segments per area, compared to previous years.

The average fertilizer applied per hectare was 1240 kilos without significant differences between the three segments.

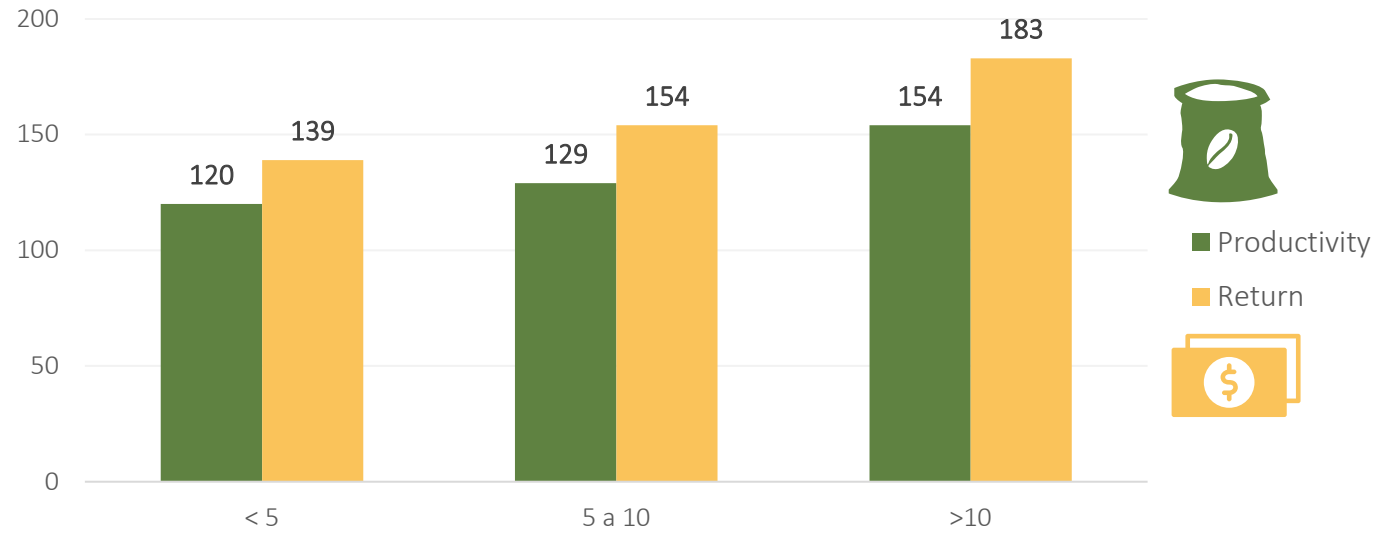




	Fertilization	Weed	Pesticide Control	Renovation
<5	$2.381.900	$642.800	$75.400	$1.368.300
5 - 10	$2.393.600	$565.800	$129.200	$1.609.800
> 10	$2.416.600	$507.800	$145.600	$2.697.200

Renovation: costs calculated over starting phase area.
Other items: costs calculated over productive areas.

Comparative Return and Productivity (@ cps/ ha)



Given the effect of the renewed area on productivity, the return should be taken as a variable of analysis to understand the performance of the farm with respect to its productive potential, eliminating the bias that the percentage of renovated coffee area introduces.

Return: calculated on production area
Productivity: calculated on total area of coffee

Comparative index / area range (2020)

Technical index

Area range	% renewed area	Cost @	Selling price @	Productivity	Return	Price of harvesting
< 5	13,5 %	$64.500	$113,200	120	139	571 $ /k cc
5 - 10	16,5 %	$67.000	$115.420	129	154	593 $ /k cc
> 10	15,9 %	$68.040	$113,780	154	183	627 $ /k cc

Financial index

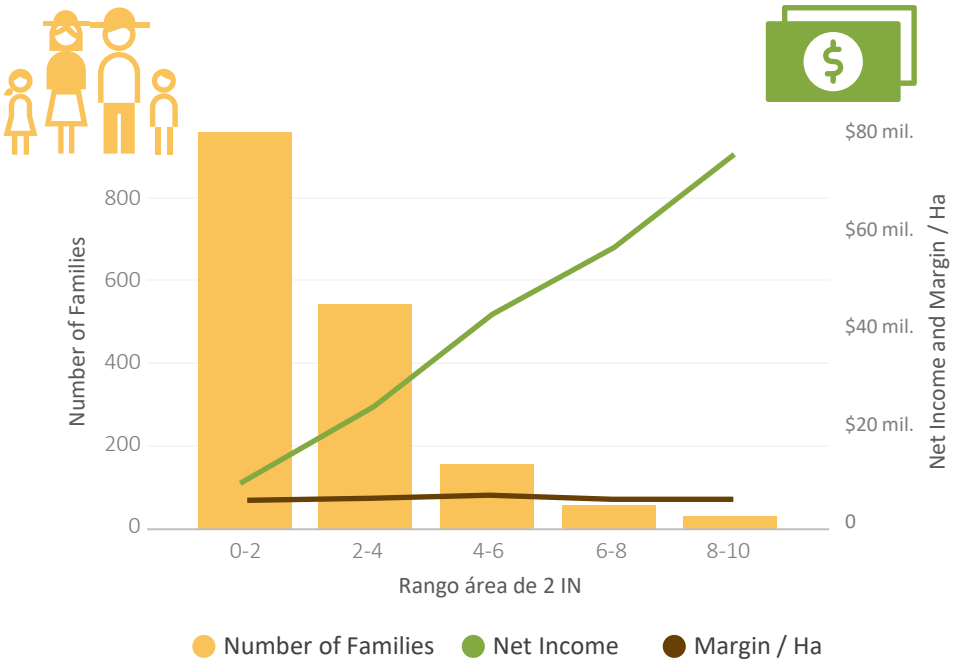
Area range	**Costs has 1**	Costs has 2	Revenue / ha	Margin ha	Coffee area	**Net income**
< 5	$ 7.744.800	$ 2.892.100	$ 13.593.100	$ 5.848.300	2,08	$12´164.000
5 - 10	$ 8.630.300	$ 2.871.000	$ 14.868.800	$ 6.238.500	7,09	$44´230.000
> 10	$ 10.493.100	$ 3.014.800	$ 17.546.600	$ 7.053.500	22,57	$159.197.000

Cost / ha (1): includes harvesting and processing costs
Cost / ha (2): does not include harvesting and processing costs

Farms larger than 10 hectares, invest a bit more capital in the plantation and also...

- Farms larger than 10 hectares have operational costs (Not including harvesting and processing) higher by 5% compared to farms of less than five hectares, however, their productivity exceeds small farms by 28%. This means that it is not only the investment in management of the crop that is affecting this result, but there are technical variables such as density and average age of coffee in production that are influencing the differences presented in productivity.
- Consistently, farms larger than 10 hectares renew a greater percentage of their area, and invest more in its management, by 2020, they invested twice the capital per hectare than smaller farms; which is another reason why a productivity gap continues to be maintained between large and small farms. However, over the years the gap of applying fertilizers in coffee plantations in production has been closing.
- The cost of harvesting in larger farms, which is 48% higher than that of smaller farms, not only responds to its higher productivity but to a higher harvesting price per kilo (10% higher than small farms and 6% higher than medium sized farms).
- The wide gap in the margin per hectare between large and small farms (20.6%) does not have its origin in the production costs (operational), nor in the sale price.

Area planted in coffee: main cause of the gap of the net income amongst coffee growers



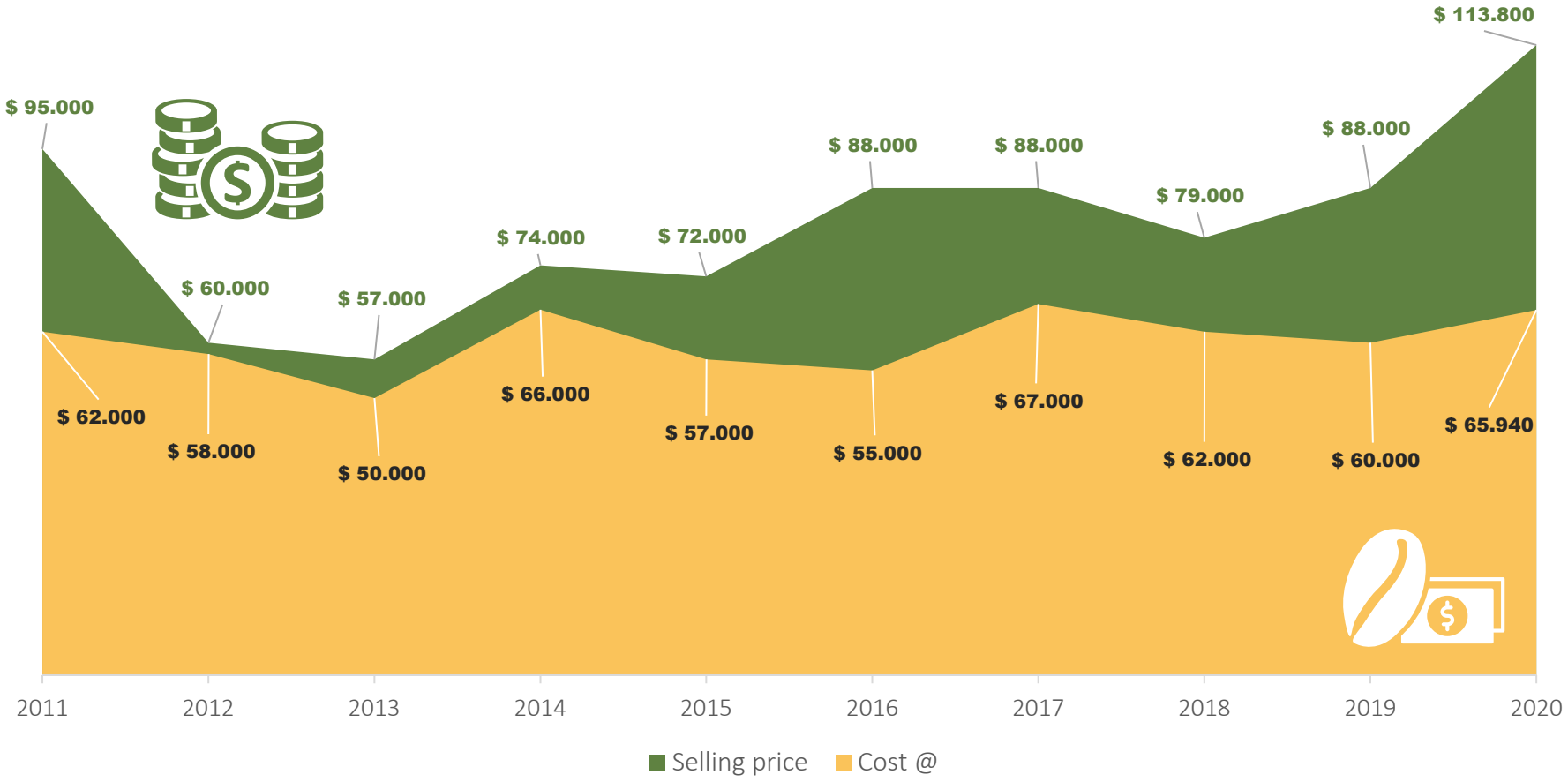
Area range	% Families	Margin / ha	Net Income
0 a 2	55%	$ 5.625.800	$ 9.840.000
2 a 4	31%	$ 5.822.000	$ 23.193.000
4 a 6	9%	$ 6.609.800	$ 42.840.000
6 a 8	3%	$ 5.979.200	$ 56.579.000
8 a 10	2%	$ 6.065.500	$ 75.260.000

53% of the coffee growers in the study own less than two hectares of coffee and reach a net income 51% lower than living income.

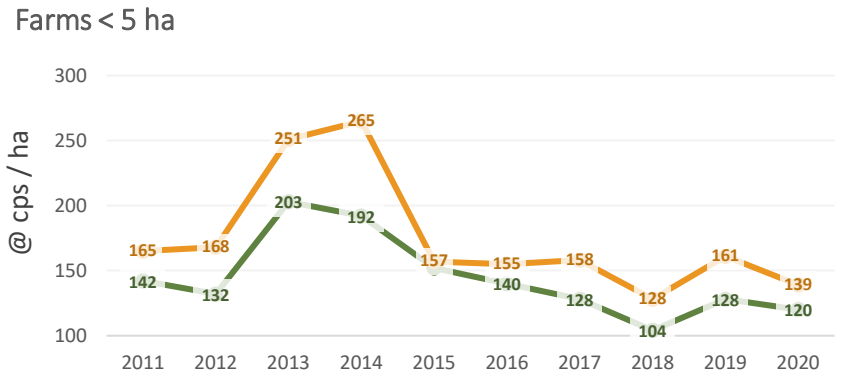
Although the margin/ha difference between the first and second area range is 3%, the families of the segment of 2 to 4 hectares, achieve a net income 2.4 times higher than that of families of the area range of less than 2 hectares.

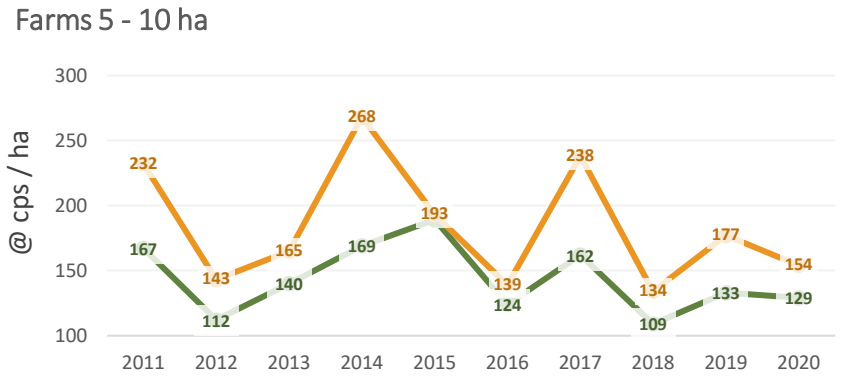
What are the variables that have actually changed over the years?

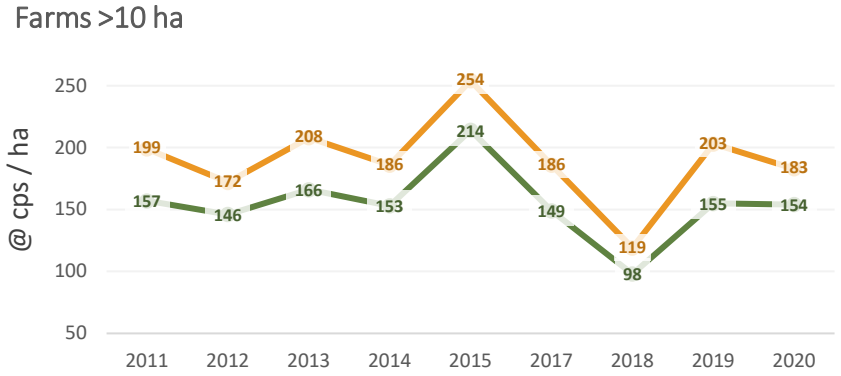
The sale price from 2011 to 2020 (constant prices)



The greater the area, the greater the productivity

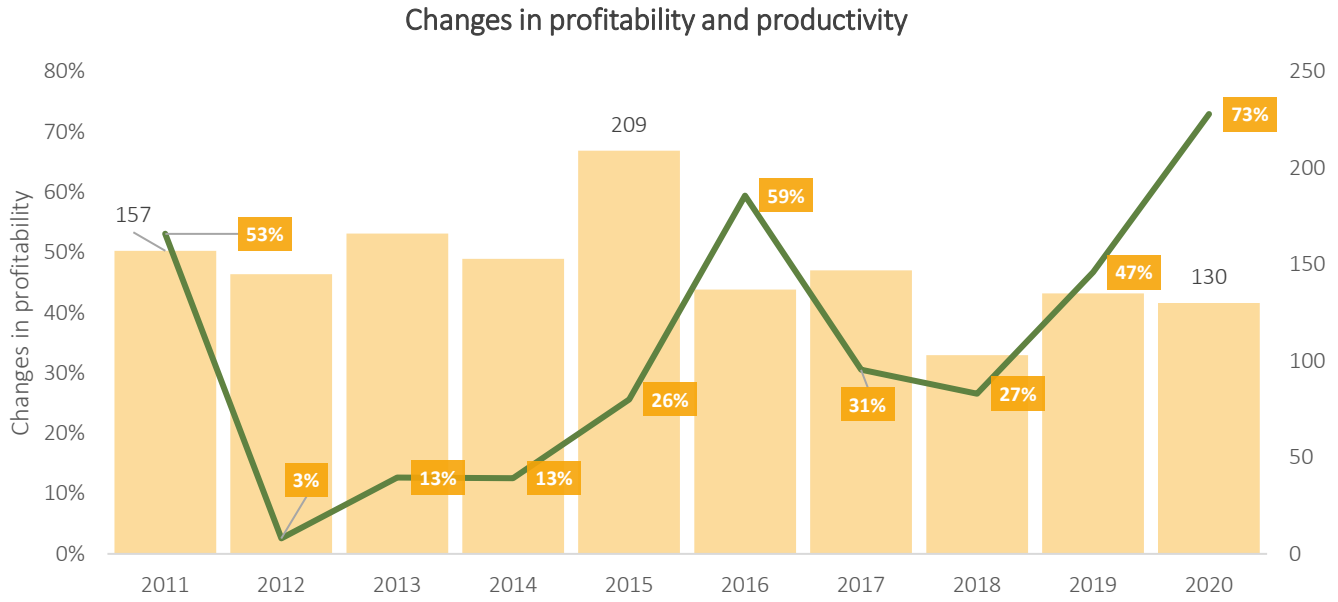






In the series of records, farms of more than 10 hectares have presented the highest productivity of the three coffee farming segments, the weighted average of farms larger than 10 hectares is 158 @/cps, farms of 5 to 10 ha, have an average of 130 @ and farms of less than 5 hectares, produced 120 @ cps in average.

Profitability and its high fluctuation can change the scenario of a farmer from one year to the next



Although the sale price is characterized by its volatility, it is not the only variable that shapes the profitability, the latter receives the accumulated effect of productivity and the selling price, where it originates its wide fluctuation.

Profitability understood as the relationship between the revenue and production costs

Fluctuating productivity, no stabilized renewal cycles

- The correlation between productivity and the percentage of renewed area is 0.218, this means that it is a significant relationship (with a confidence level of 99%), and, although productivity is explained by technical and climatic variables and not only by the percentage of renewed area, it can be inferred that the wide fluctuation in productivity is a reflection that farms have not adopted a coffee renewal process, annual and in equal parts, with the consequences on the profit margin of families of coffee growers. Based on the percentages of renewals recorded in the dataset, this value has ranged between 14 and 22 % in the last 10 years.

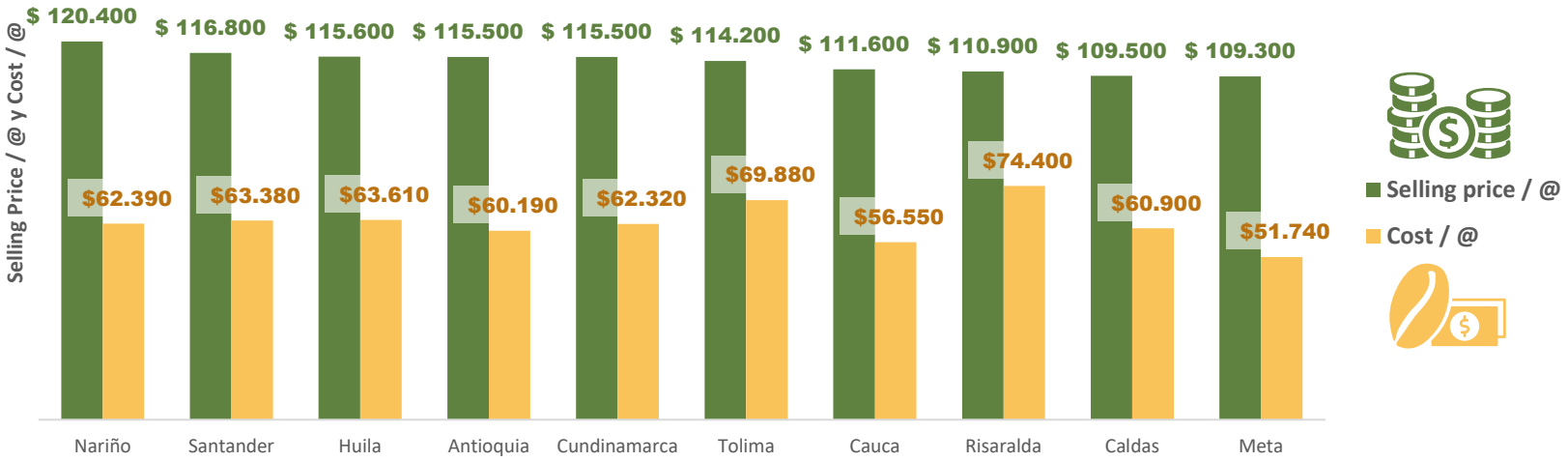
- The profit margin per hectare of 2020 has been the highest in the last decade, and the operational costs remain below the levels of investment recorded until 2017, above 3'000.000 $ / Ha. On the other hand, productivity being one of the lowest in the series of records, was leveraged by the prices required to achieve this positive economic result.

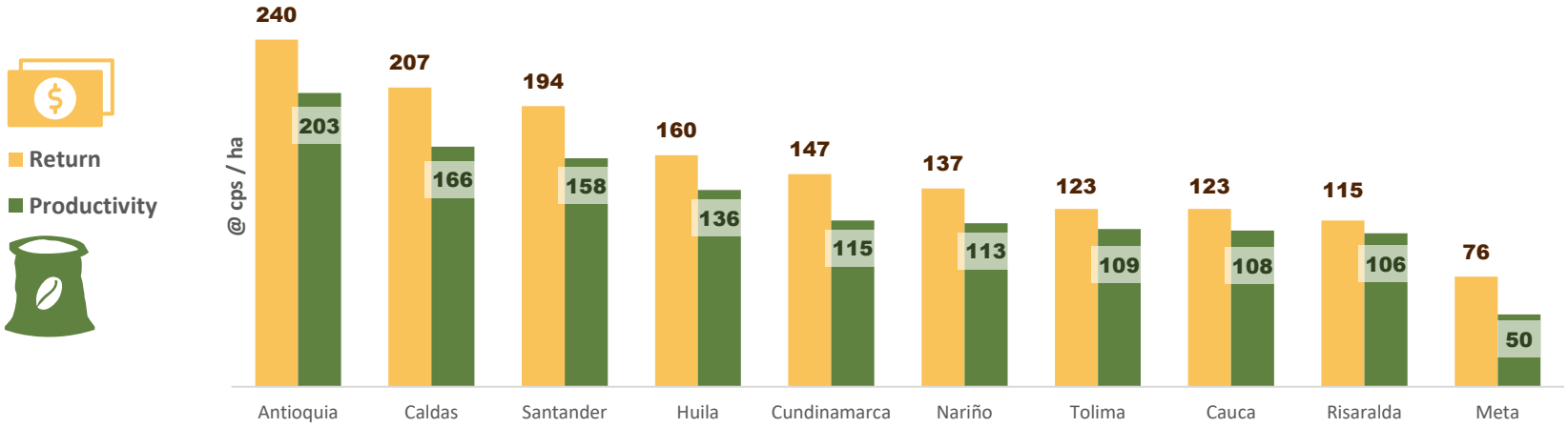
Comparative by regions 2020

Selling price / arroba cost by region

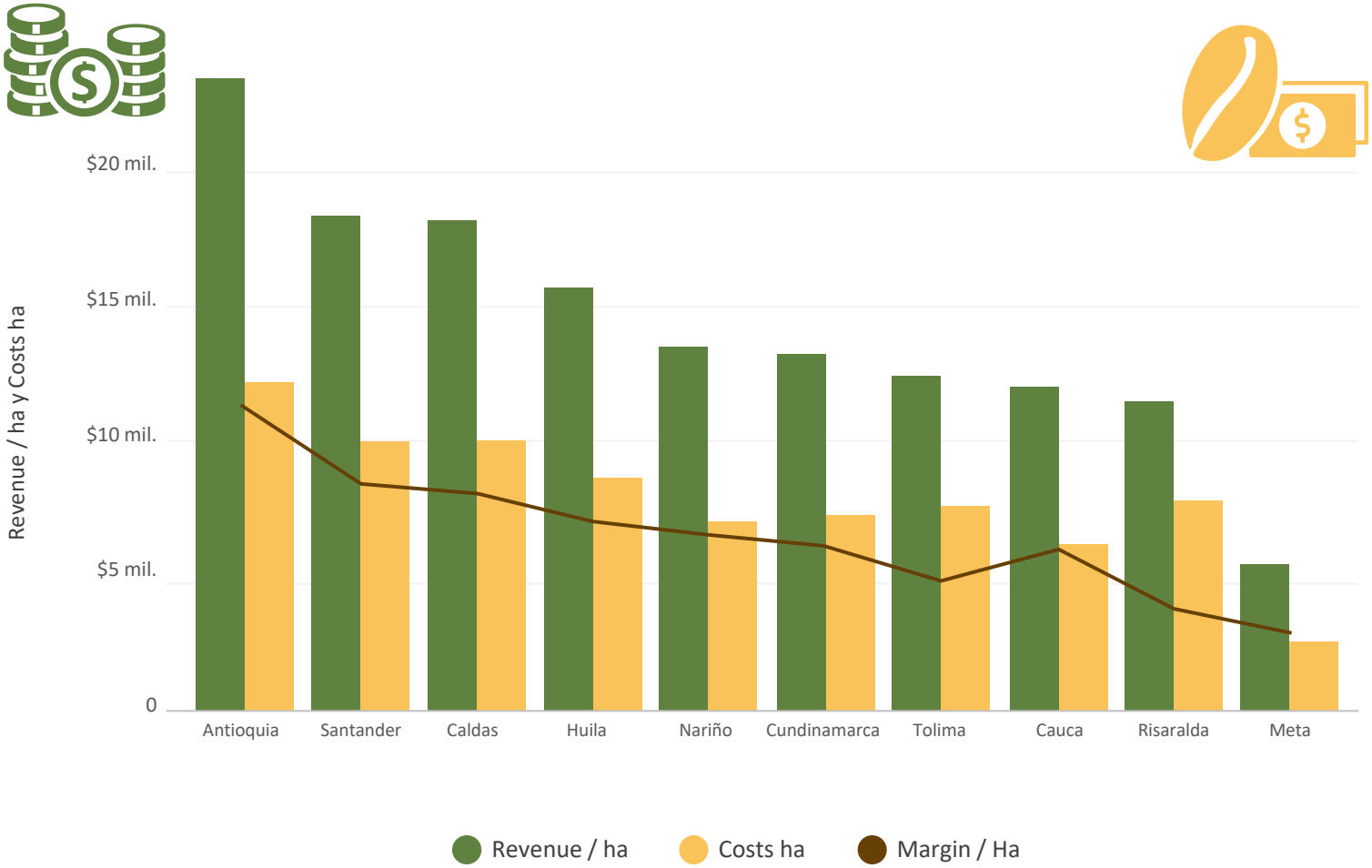
- For the regional analysis, farms larger than 10 hectares were excluded because for some departments this type of farms produce a bias in the results, because some indicators such as costs, productivity and sales prices are weighted by area and by volume of production.
- The results presented in this segment correspond to the analysis of the farms of the study, so they do not necessarily represent the wider reality of the country's coffee departments.

How the key indicators are found, as seen by regions



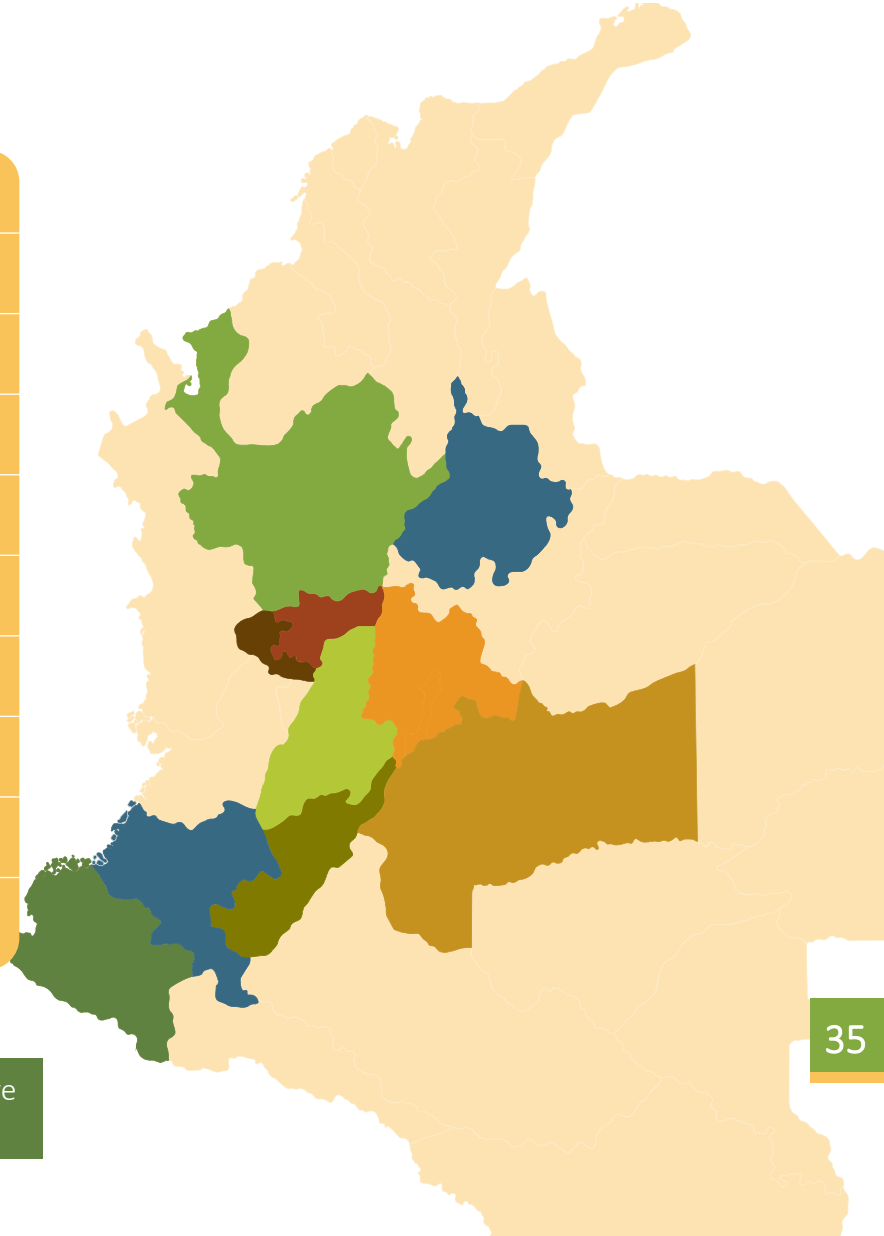


Income and Profit margin by region



Income and Profit margin by Region

Department	Income / ha	Operational Costs / ha	Operational Costs 2	Margin / ha	Coffee Area
Antioquia	$ 23.492.100	$ 11.530.000	$3.323.000	$ 11.251.000	2,3
Caldas	$ 18.177.000	$ 9.596.500	$3.009.000	$ 8.066.000	2,2
Cauca	$ 12.084.700	$ 5.631.300	$2´259.000	$ 5.963.000	1,5
Cundinamarca	$ 13.292.400	$ 6.480.800	$2´503.000	$ 6.117.900	1,9
Huila	$ 15.744.700	$ 8.166.900	$3.294.000	$ 7.082.900	2,7
Meta	$ 5.426.900	$ 2.554.400	$1.201,000	$ 2.858.400	2,1
Nariño	$ 13.546.600	$ 6.108.300	$2.754.00	$ 6.525.900	1,5
Risaralda	$ 11.499.800	$ 6.691.200	$2.372.00	$ 3.781.500	4,1
Santander	$ 18.425.600	$ 8.907.600	$2.920.000	$ 8.426.300	4,5
Tolima	$ 12.391.000	$ 7.420.600	$3.279.000	$ 4.807.400	2,5



Operational cost/ha(2): does not include Harvesting, Processing, or administrative expenses

Each region has a different competitive factor, it is not always the quality

(these results are only valid for the farms included in this research)

- The highest productivity of the farms of Antioquia (203 @/ ha) coincides with the highest margin / hectare ($ 11´ 251.000), although it does not correspond to the highest selling price obtained by the farms of Nariño.
- Although, the sale price is a variable that confers competitiveness to the regions; when the productivity levels are low, it is not enough to generate a good profit margin, such is the case of Nariño that presented the highest selling price (120,400 $/@), and obtained a margin /ha, which although being positive, it was 58% below the region with the highest margin/hectare.
- In contrast, the Caldas farms that had the second lowest selling price in the study (109,500$/@), presented the second margin / ha, this due to their good level of productivity (166 @ / ha, it was second on the list), this result has been consistent for several years.
- In the farms of Santander, which are positioned with the second margin / ha, converge a high price of sales (the second, 116,800 $/@) and a high level of productivity (the third, 158 @/ ha) which are the two variables with greater influence on the profit margin / hectare. In this department, the average area of the farms in the study is the highest: 4.5 ha grown in coffee.
- With the exception of the farms of Cauca, the regions where there was less investment in operational costs, correspond to the lowest margins / hectare. On the other hand, they coincide with the farms with the lowest fertilization levels.

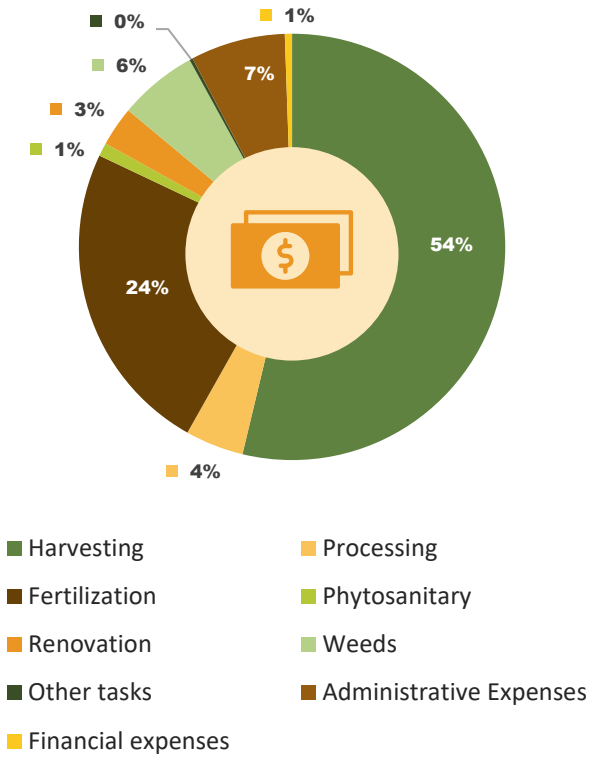
- For the second consecutive year, the highest levels of fertilization occurred in the departments of Antioquia and Tolima (1970 and 1522 kilos / ha, respectively); this result is reflected in the operational costs where the farms of Antioquia show the highest levels of investment in the management of the plantations (3,323,000 $ / ha) and a similar value in the farms of the departments of Huila and Tolima.

- Farms in four regions invested more than $3,000,000 $ / ha, in operational costs, these were: Antioquia, Huila, Tolima and Caldas.

Structure of production costs 2020

Cost per ‘arroba’ at as a reference indicator, NOT as a key indicator

Activity	$ /@ CPS	%
Harvesting	$35.430	53,7%
Processing	$2.920	4,4%
Fertilization	$15.740	23,9%
Drill bit and phytosanitary	$670	1,0%
Lots under Renovation	$1.980	3,0%
Management of Weed	$3.930	6,0%
Other tasks	$160	0,2%
Management expenses	$4.740	7,2%
Financial expenses	$360	0,5%
Total	**$ 65.930**	



The cost per arroba is a reference that gives a general idea of the result of the exercise of the coffee farming year. Its high correlation with productivity makes it very susceptible to changes in this indicator, therefore it is not the variable that allows to understand the situation of the farm from the point of view of production costs or its economic performance.

Annexes

Cost Structure

Plots in production

Harvesting

- Cutting patterns
- Harvesting labor
- Tows, collection jars

Processing

- Laborer, helper, bonuses
- Energy, dried fuel, parchment sacks
- Equipment maintenance, spare parts and drying equipment, transport
- cherry coffee, dry coffee freight

Fertilization

- Mixing and application of fertilizers and correctives, spraying foliar fertilizers
- Soil fertilizers, foliar fertilizers, adherents and amendments
- Fertilizer transportation costs, soil analysis

Pesticide Control

- Pest and disease control work
- Field evaluations and monitoring (drill bit, rust, miner, etc.)
- Insecticides, fungicides, adherents, biological products

Weed Handling

- Spraying of herbicides, plateos, disjoinery
- Control of weeds with machete, selector, scythe
- Herbicides, adherents, pH correctors, fuel and lubricants (scythe)

Other tasks

- Various tasks such as desorilla of lots, regulation of shade, suckers, road maintenance of batches in production

Cost Structure

Plots in starting phase

Plots under renovation

- Labor[1] and inputs used in zoca and planting: Cleaning before branch removal, branch removal, cutting and protection, material collection, selection, suckers, seedbed labors, seed transport, stroke, dimpling, sowing

It includes all the maintenance work demanded by the crops less than one (1) year.

Indirect expenses

Administrative expenditure

- Insurance, stationery, tax, utilities
- Butler, transport assistance, bonuses, endowment, drivers, surveillance, consultancies, social benefits[2], social security
- Fastening, tools and spare parts, vehicle maintenance, repair and maintenance of equipment, maintenance of constructions, maintenance of tracks, freight, fuel and lubricants

Freight does not include cherry and dry parchment coffee.

Financial expenses

- Interest on operating loans
- Bank fees
- Bank taxes

[1] The wages of the family labor force have been included in the cost of production, regardless of their payment in kind or in cash.

[2] Includes Business Economy Farms which only assume a partial payment of the socisl benefits for some of their workers..