Source Code focuses on showcasing the inner workings of coffee sourcing, transparency and sustainability.

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PUBLISHED BY
Metric Coffee Co.
2021 W. Fulton St.
Suite k-101b
Chicago, IL 60612
www.metriccoffee.com

PRINTED IN CHICAGO BY
Classic Color

DESIGN STUDIO
Something Else
www.somethingelse.works

ADDITIONAL THANKS:
Azahar Coffee,
Origin Coffee Lab,
Snap Coffee, and
Beneficio San Vicente
Selva Coffee.

ISSUE 01
Showcasing Transparency

COVER
Overlooking Nelson Chaves' farm in Yacuanquer, Nariño, Colombia.

COLOPHON
Set in GT Alpina and GT America by Grilli Type. Printed on both 80# [paper name] Text and Cover.

ISBN 978-0-578-87271-1

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Source Code

Issue 01: Showcasing Transparency

The inspiration behind Source Code was simple—we wanted to put together both a visual and textual representation of some of the inner workings of green coffee sourcing while also building a case for real sustainability. Now, after a year of interviews via email, Skype, and WhatsApp with coffee producers, cooperatives, exporters and educators behind us, we are psyched to be able to share the end product with you.

Why is this important to us? As coffee buyers and roasters, we are the most privileged participants in the supply chain. We have the power to both pay a meaningful or a menial price,as well as the power to turn that same product around and sell it for a margin well beyond what a producer earns. We believe that by including you in our efforts to explain what some of these systems mean, you can gain a better understanding of how complex, emotional, rewarding, and heartbreaking coffee can be. Ultimately, we hope the biggest takeaway for you, the reader, is to connect with the importance of why a “more sustainable income” matters and how the cost of production can add context to real sustainability. Over the course of this year, through the pandemic, we have toiled and obsessed over the topic of sustainability and price transparency, and this magazine is the result of that journey.

Lastly, our hope is that we as an industry can embrace our responsibility to pay attention to these dynamics and in turn take responsibility for them. Until we do that, it is hard to imagine we will see meaningful change in our supply chain.

— Xavier Alexander, Co-founder of Metric

Showcasing Transparency Within The Coffee Industry

I.

ORIGIN

(STORY)

Coffee Sourcing

There is a segment of society that may think coffee sourcing is stylistically similar to the plot of "Temple of Doom" with an abundance of deities, snakes, magical stones, and of course, coffee! But the reality is, coffee sourcing begins with emails, word of mouth recommendations, and planned visits to the country of interest. The goal is to establish a connection with both the producer at the farm level, and the mill, labs, and exporters in order to adequately button up the supply chain and ultimately become the recipient of the extraordinary effort placed forth by those before us. This part, at least for us, has taken **YEARS** to accomplish and has come with both victories and disappointments—but isn't that the stuff of life anyways? On any given season, we visit producers mid-to-late harvest, cup samples to get a sense of what we're dealing with (quality-wise), receive pre-shipment samples, taste sample roasts, cup and approve them, negotiate pricing, sign contracts, and task our import partners with managing the rest of the financing on the logistical end. These steps are repeated with every origin and can look a little different depending on the relationship and terms established, but these are the general steps involved in the buying process.

Weaving together all of these systems are people, places, and processes, all of which we long to fully understand, but often rarely comprehend. The future of our industry hinges on us asking the right questions. For example, are we paying enough for coffee? If so, how do we know we're making the right impact? Much like our company, there is no shortage of good intentions, but can the future of specialty coffee survive on good intentions?

PHOTO: GUJI ZONE – OROMIA REGION, ETHIOPIA

Specialty Coffee

The term was coined by Erna Knutsen of Knutsen Coffee Ltd. in an issue of the publication Tea & Coffee Trade Journal in 1974 as a simple concept to describe that special geographic microclimates produced coffees with unique flavor profiles, which she referred to as 'specialty coffees.' According to SCA (Specialty Coffee Association) definitions, speciality coffee "refers to the highest quality green coffee beans roasted to their greatest flavour potential by true craftspeople and then properly brewed to well-established SCAA developed standards."

On the sensory level, the SCA (Specialty Coffee Association) has developed a 100-point system of evaluating a coffee once it is brewed, using categories like fragrance/aroma, sweetness, and acidity to gather concrete data from a group of calibrated tasters. Any coffee that scores above 80 is considered specialty, while anything below is commodity coffee. In addition to this scoring system, the SCA, in collaboration with the WCR (World Coffee Research), has also created the research-based Coffee Taster's Flavor Wheel, which helps give coffee professionals a lexicon for describing the myriad flavors possible in coffee once it is brewed.

WHY DOES SPECIALTY COFFEE MATTER?

Historically, the price of coffee is rooted in poverty, social insecurity and racism and remnants of these issues are pervasive, in our opinion, the specialty coffee seeks to form solidarity by creating a better world through empathy, transparency and positivity- all crucial pillars that meet our guidelines for social, environmental and economic stewardship.

THE SHORT ANSWER IS

How can a small specialty roaster give coffee farmers a better quality of life?

EDUCATION & TRANS PARENCY.

Traceability

Traceability is a widely used term, and a broad concept, for which there are many definitions and applications. In practical terms it is about meeting legal requirements and marketplace demands and expectations, as well as implementing internal quality management objectives and improving business performance.

Two key pieces in asserting ethical business practices are traceability and transparency. **Traceability** identifies each point of ownership in the process, while transparency charts the flow of funds from source to final owner. In order to have traceability and transparency, businesses need to be able to both measure and report these two points accurately. The supply chain—across the board—has many layers and people involved, which means more folks that we have to equate into the final price of coffee. While it may not seem advantageous to the roaster or end consumer to pay for intermediary services, the truth of the matter is without everyone's collective effort, we cannot effectively source, export and import the coffee. This is why being fully transparent is of utmost importance, as well as finding effective ways to understand and calculate what prices paid to the producer will yield a sustainable income vs. an income that causes poverty.

SCAN TO VIEW A VIDEO
ABOUT SOURCING AT METRIC.

Transparency

Transparency in the supply chain is simply a way by which exporters/importers and roasters can share open information that helps not only consumers but our wholesale partners in understanding the breakdown of the costs associated with their coffees.

For Metric, full and equitable transparency throughout the chain means a stronger sense of just how your money is being spent, as well as the empowerment of coffee farmers with market knowledge which they can utilize when negotiating with the buyers.

Additionally, understanding the full social, environmental and economic impacts of coffee, from the field to the cup, means that producers, consumers, and all in between, are empowered with information to make sustainable choices at the retail level.

When coffee companies share the true cost of the coffee with their customers, it can better help them understand how and if the coffees they are buying are sourced in a sustainable way or contributing to poverty wages.

The challenge with sharing farm gate pricing and F.O.B figures alone is that the dollar amounts do not tell the entire story. They do not indicate the quality, quantity or cost of production for a particular coffee, nor communicate its unique supply chain, which will vary greatly from country to country, region to region, and producer to producer. They also do not account for variations in the cost of living, exchange rate fluctuations, or the costs associated with delivering the coffee, and there is no insight into the communities that grew and processed this coffee, or the types of social initiatives that may be undertaken within those communities by a producer, cooperative or exporter.

Seasonality

When we refer to a coffee as a “fresh crop” or “in-season,” we are referring to coffees that were harvested and roasted within that crop year. Much like apples or tomatoes, the coffee harvest cycle happens from the northern to the southern hemisphere. The start of the season looks something like this: coffee flowers bloom, then the fruit begins to set and mature, all encouraged by consistent rain. The following period of prolonged dry weather provides ideal conditions for coffee to be picked and processed. However, because it’s hard to predict the weather patterns, there are times when the rainy season kicks off earlier than expected, therefore kickstarting the season earlier (or later) than anticipated, thus presenting a challenge to the roaster, who has to coordinate keeping fresh coffees in stock year-round.

Outside of geography and climate, there are many variables that go into producing coffee that cafés and/or roasters expect to have on their menus within a few short months. For example, other factors to consider, which can affect the supply chain are: financing delays, logistical issues, seasonal delays, customs holds, political turmoil, or lack of available pickers. Because the pay is often so low, a lot of pickers, or cortadores (as they are referred to in Central America), opt out of working the fields, which can affect the overall yield of a farm, and by extension, the dependability of a farmer’s income. Due to this labor shortage, and the unpredictability of the season, smallholders can’t predict when the cherry will be mature enough for picking. Therefore, they must align the labor accordingly, which has to happen in several phases (or weeks and months).

WHAT IS ALTITUDE AND WHY DOES IT MATTER?

Coffee quality is often graded in part by altitude but is not always indicative of quality. Coffee beans and their surrounding fruit, when grown at low altitudes, tend to ripen quicker and develop duller, earthier flavor notes than coffees grown at higher altitudes. Cooler temperatures mean that the beans grow more slowly, and the fruit cherry surrounding them ripens more gradually. This extra time allows for complex flavors to develop. The slower the coffee grows, the denser the bean, and the better the flavor. Coffee plants grown at higher altitudes are also less susceptible to pests and disease (such as the widespread leaf rust) meaning potentially fewer defects in the crop. This is another feature which raises the overall quality.

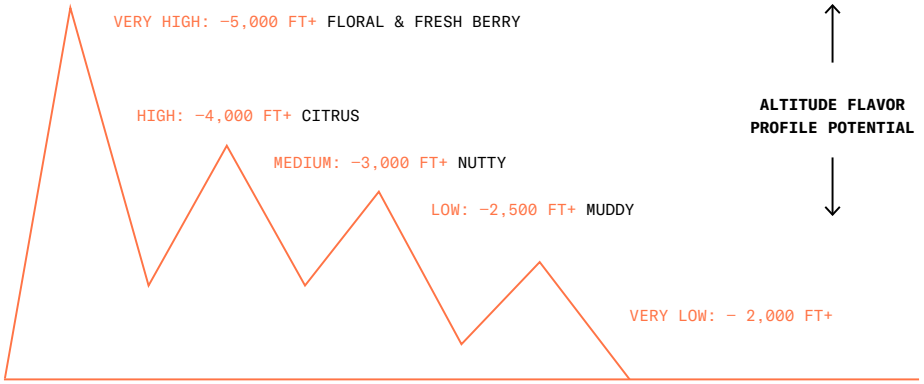
Other important factors that can directly affect the fluctuations of temperatures at different latitudes, therefore potentially creating more dense coffees are:

1. Shade: You can plant a variety of trees that can provide dense or light shading for the coffee plants. Shade causes cooler temperatures and increases density.
2. Density: You can plant your coffee trees closer or farther apart, depending on if you’d like the coffee plants to self-shade themselves or not. This also helps the trees stay cooler in warmer temperatures and possibly not become too stressed out from the sunlight. So, the closer the trees are planted, the more density in the bean due to self-shading.
3. Slope: You can plant on the northern side of the mountain, so that the sun doesn’t directly hit the trees, which means less time of direct sunlight exposure. This can also lead to cooler temperatures, slower cellular respiration, and higher density.

WHY IS CLIMATE IMPORTANT TO COFFEE?

Climate change is transforming ecosystems on an extraordinary scale, at an extraordinary pace.

Smallholder farmers are particularly vulnerable. They have the fewest resources to adapt to climate change, and temporary economic or environmental shocks can force them out



of coffee farming. There are about 12.5 million coffee farms and ensuring a stable livelihood for these farmers, in coffee or out, is an important development priority. Low prices also hit these producers the hardest, and under current prices, we predict most countries will decrease their amount of land under coffee cultivation, and some countries might curb coffee production entirely.

The main characteristics of climate change are increases in average global temperature (global warming), changes in cloud cover and precipitation particularly over land, melting of ice caps and glaciers and reduced snow cover, and rise in ocean temperatures and ocean acidity due to seawater absorbing heat and carbon dioxide from the atmosphere. Higher elevation improves the quality of the bean and potential cup quality due to a delay in ripening brought about by cooler weather associated with higher altitudes, and the inherent characteristics of acidity, aroma and body—all desirable sensory characteristics in coffee.

OTHER ENEMIES

Major diseases that occur because of climate variation during coffee growing will increase pest and disease prevalence, expanding the altitudinal range in which the fungal disease coffee rust and the coffee berry borer can survive. These two are currently the most significant coffee pests which become more serious and damaging with climate change:

Coffee Berry Borer: The Coffee Berry Borer or Coffee Borer Beetle (CBB) is an insect found around the world and prevalent in most coffee producing countries. This type of beetle is the only animal that can feed solely on coffee beans. Other insects may occasionally nibble the seeds or other parts of the coffee plant but will need to eat other vegetation for sustenance. The CBB is a very harmful pest, with the main damage caused to the fruit. This can result in the falling of the fruits from the trees, as well as losses in the weight and quality of the seed/beans, destroying the marketable product.

Coffee Berry Disease: Coffee Berry Disease caused by Colletotrichum coffeanum was detected in Kenya in 1922. The fungus lives in the bark of the coffee tree and produces spores which attack the coffee cherries. Spraying has been determined to be the best way to avoid the coffee berry disease.

Coffee Leaf Rust or “Roya”: Coffee rust is a parasitic fungus that infects the foliage of a coffee tree. The leaves will eventually fall, decreasing the tree's ability to accumulate the necessary energy for fruit production. The disease shows up as yellow spots on the leaves of a coffee tree, but by then it's too late: photosynthesis stops, leaves drop, and coffee cherries stop growing. If an infected leaf touches or even just grazes another healthy tree, the spores can travel and affect neighboring trees.

Coffee Varieties

Coffee varieties are the diverse subspecies derived through the selective breeding or natural selection of coffee plants. Varieties often occur in nature and most varieties are true to type, which means the seedlings grown from the variety will also have the same unique characteristics as the parent plant. Cultivars on the other hand are not true to type, they are controlled hybrids or "mash-ups". To put it simply, varieties are naturally occurring subspecies, and cultivars are cultivated subspecies.

Varietals have a big impact on the cup profile of each of our single origin coffees. Varietal is a term used to describe a wine made from or belonging to a single specified variety of grape. The coffee industry has somewhat adopted this term, but instead of using it to describe a coffee of a specific variety or cultivar (i.e. Bourbon coffee), it is used in the place of the term variety or cultivar. Different cultivars will produce different size cherries and seeds, with varying climates, soil, and growth processes. Your cup of coffee has a specific flavor profile that can be traced to its region and country of origin. For example, in wine, varieties play a role in naming and designating different origins and types of wine like Pinot Noir, Gamay, or Grenache. In apples, different varieties include the tart Granny Smith and the sweet but sharp Empire Apple, which is named after the state where it was developed.

There are over 100 species of coffee (Coffea) in the world, and all are native to tropical Africa and some Indian Ocean islands (Madagascar, Macerenes). Most have very limited distribution, and over 70% are threatened with extinction. Usually only two species, C. arabica and C. canephora, are commonly grown commercially. They are described below, along with a few other interesting species, and the most common commercial varieties of these species. Because certain types grow best in the shade and others in the sun, knowledge of these names can be a convenient clue as to how your coffee may have been grown.

Arabica coffee is the most popular coffee species in the world. It makes up approximately 70% of all coffee production and is the preferred species for many coffee lovers. Arabica beans originated from the southwestern highlands of Ethiopia. The name 'Arabica' is thought to have originated when beans moved from Ethiopia to lower Arabia in the 7th century. Arabica plants are fairly fragile and prefer temperatures between 15 and 24 degrees Celsius. Plants can grow up to 12 meters but will typically be kept at 2 meters to make for easy harvesting.

Coffea arabica, which is indigenous to Ethiopia and some of its neighboring territories, was first transported out of its homeland into neighboring Yemen. From Yemen, coffee was transported around the world. The coffees that we call Typica today originated from plants that left Yemen and were taken to Java and other outlying Islands, possibly by the Dutch, possibly with some transport by the mythical monk Baba Budan. The coffees we call Bourbon today stem from plants transported to Ile Bourbon by the French. Both of these epic journeys may have involved a very small number of coffee plants or seeds.

Robusta (Coffea canephora) is typically produced at lower altitudes, is more disease and pest-resistant (partly because of its higher caffeine content), and tends to produce a larger crop than Arabica. It is usually much cheaper. Robusta coffee plants are hardy and caffeine-rich, but not delicious. Robusta beans are known for having 50% more caffeine than arabica beans, but wow, can they be super bitter. These are the low-quality and low-cost beans used in traditional instant coffee. They often taste lackluster, with no noticeable sweetness or acidity.

Rust Resistant Varieties For a full list of Varieties, Cultivars, Selections and Mutations please scan the QR code below ↓

FRESHLY PICKED COFFEE CHERRIES BY EVIN MORENO — SANTA BARBARA, HONDURAS

SINGLE ORIGIN VS. BLEND

FULLY BLOSSOMED COFFEE FLOWERS — SAN IGNACIO, PERU

Single Origin: This simply refers to a coffee that is sourced from one producer, crop, or region in one country. Other terms used to denote single origin are single farm, and single estate (which means that the coffee comes from one farm, mill, or coop). Overtime, single origin coffees have become more sought after due to their distinct profiles based on the growing and processing conditions, and their traceability. For us, single origin coffees tend to be roasted on the lighter end of the roasting spectrum in order to highlight the inherent flavors from that lot.

Micro lots: Micro lots can have a different mean-ing depending on the roaster, but a general description would be a coffee distinguished at a smaller volume that is traceable and often from one smallholder, or a group of smallholders, that is carefully separated by picking date, variety, process, and drying.

Blends: Coffees that aren't single origin are typically referred to as blends, which are made up of more than one single origin coffee. Generally, most companies will have mainstay blends, which are coffees that are offered on a year-round basis, as well as seasonal blends. With our mainstay blends, the countries will change based on seasonality and inventory, but we ensure that the coffees we offer all year are as consistent and true to the blend name and profile they represent.

Community Blends: Community lots represent a flavor profile from a specific region or community of producers that are sustainably sourced and traceable. Depending on the country of origin, most producers have between one to two hectares that are only producing a small amount of parchment. By contributing to a community lot, producers are likely to fetch a higher and more consistent price, especially if companies commit to buying the same regional lot year after year.

Plantations & Estates In addition to micro lots and blends, there are other classifications out on the market such as estates and plantations. These terms are rooted in colonialism and racism and, in our opinion, must be replaced within the lexicon of specialty coffee with **decolonized** and more representative names.

Coffee Processing

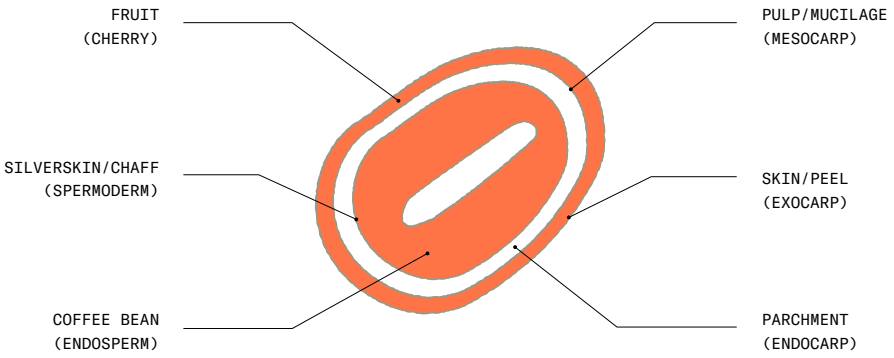
Processing coffee is the act of removing the layers of skin, pulp, mucilage, and parchment that surround a coffee bean—the raw ingredient that the farmer will sell. How a grower chooses to process the coffee will have a profound impact on how that coffee tastes.

A coffee cherry is made up of several layers, including the skin, fruit, mucilage and parchment. After the cherries are picked, they require processing, which involves removing these layers to isolate the bean. This can be done in a number of ways and each process can impart a different cup profile onto the coffee.

Once coffee cherries have been cultivated and picked, they are processed. Processing needs to be started at least 2 days after the berries have been collected to prevent them from fermenting. Processing has an immense effect on the flavor of the coffee, and is all about removing these 5 outer layers over specific amounts of time (including time for fermenting and drying) to eventually get down to the bean itself.

Most of the coffee we sell is “washed,” or wet-processed. For this process, the freshly-harvested coffee cherries are de-pulped, which removes the skin and most of the fruit around the bean. The coffee then is placed in tanks where it is allowed to naturally ferment for 18-24 hours. This fermentation begins to break down the mucilage, which is a sugary, slimy substance that surrounds the bean.

The Coffee Cherry



DEPULPED COFFEE IN MUCILAGE BY PRODUCER EVIN MORENO – SANTA BARBARA, HONDURAS

Below are some of the most common coffee processes explained in more detail:

As coffee buyers, our focus (and menu) is mostly centered around buying washed coffees because of their bright and acidic flavor attributes. Depending on the geographical position and climate, performing anything other than a washed process can prove to be risky and involves much more work. Naturals, for example, take more space on drying surfaces, require more attention and labor (to prevent mold and infestation during drying), and are constantly at potential risk for spoilage, or "over fermentation", as the fruit material that is intact on the seeds provides a long term and concentrated fuel source for yeast and bacteria to metabolize.

Naturals or Sun-Dried: Also known as dry-processed, ripe cherries are laid out on a patio, or on raised beds–fruit intact–allowing the coffee to slowly dry. Because the seeds of sun-dried processed coffee are encased in the cherry for longer, the resulting flavors from this process are generally fruitier and fuller-bodied. The natural sugars in and around the seed are infused into it during this process and result in a higher sugar content than washed coffees. Still, natural processed coffees are not without risks. If the drying cherries are not frequently raked, the fruit can ferment or spoil, and the resulting coffee can taste sour, like vinegar. Unlike a well dried pulped coffee, natural coffees can have intense sweetness, great mouthfeel, and rounded acidity.

Honey or Semi-Washed: This process removes the pulp, similar to the wet-mill/washed process. However, the membrane is not removed before drying, but rather after, like with naturally dried coffees. This allows the berries to retain a moderate amount of sweetness during the drying process. Flavor-wise, honey process coffees fall somewhere between washed and dried coffees, with a moderately heavy but clean mouthfeel. Pulped, natural, honey and wet-hulled processes are all somewhat similar to semi-washed processes.

Anaerobic: With this process, the fermentation stage of a coffee bean occurs due to the absence of oxygen. This involves removing any oxygen from the processing environment before processing occurs, often using a controlled tank regulated by valves that ensure no oxygen can seep through during the fermentation process, and allow for the release of C02 build-up in tanks, if desired. Keeping the coffee cherry enclosed creates a different profile that some producers value for its own sake. Other producers use additives with the coffee cherries in an attempt to introduce different flavors and/or to affect the progress of the fermentation.

Washed: Harvested coffee cherry is placed through a de-pulper to remove the skin and fruit. These machines can either be manual, which involve workers turning a wheel-mechanism to de-pulp the coffee, or they can be electric powered. Huge industrialized machines can de-pulp coffee much quicker and more efficiently.

Found inside these machines are carefully calibrated disks (holes), which drive the coffee beans out of the fruit. As ripe coffee cherries are soft, when they pass through these machines they break and only the coffee seed passes through successfully. Unripe cherries are separated, often used elsewhere for natural processing, sold for lower prices to local markets or used internally for the workers to drink. The next stage is to remove the sweet, sticky mucilage that surrounds the coffee bean. This is done by placing the coffee in fermentation tanks for a certain period of time. Although typically between 12-36 hours, producers often experiment with different lengths of fermentation times to affect the profile of the coffee. After fermentation, the coffee is washed with clean water before being dried on patios, tables or raised beds.

Decaffeination: Solvent based processes are those in which the caffeine is removed from the beans with the help of a chemical solvent, such as methylene chloride or ethyl acetate. Those

Here are two decaffeination methods that we purchase on average, and feature on our menu:

solvent-based processes in turn can be used in the "direct" method versus the "indirect" method. In the direct method caffeine is removed by soaking the materials directly in a solvent; the solvent is directly applied to the beans. On the other hand, in the indirect method, the caffeine-laden water is transferred to a separate tank and treated with a solvent; in this case the solvent never touches the bean.

Ethyl Acetate: Decaf method is a process that exposes the green beans to water and steam in order to expand the cells of the bean before washing them with an ethyl acetate solution, which attracts and removes the caffeine. The ethyl acetate used in this process is a naturally obtained byproduct of fermented sugar cane. After the ethyl acetate wash, coffees are rinsed and dried.

Swiss Water: The Swiss Water® Process uses the elements of water, temperature, and time to create some of the most intriguing decaf coffee. First, we start with small batches of amazing coffee and green coffee extract. Then we add local water and a dash of loving attention by monitoring time and temperature until the coffee is 99.9% caffeine free.

Fermentation in Coffee

Fermentation is a natural process that happens without human intervention. Winemakers actively choose whether they will risk a spontaneous fermentation or select their microbes and control the process. Even if they choose to use wild yeast and not commercial yeast, they are still making a decision that will actively impact the flavor. Most commercial producers of fermented products inoculate their fermentation. Inoculation is rare in the coffee industry because the focus has been on reducing the risks of processing, and the rewards have been poorly understood.

During the coffee fermentation process, microorganisms are undergoing microbial activity. The fermentation duration determines the concentrations of free sugars (e.g., glucose and fructose) and free amino acids that continue to surround the bean, and also contribute to Maillard reactions during the roasting process. These reactions can result in more than 700 volatile and nonvolatile compounds that contribute to coffee flavor. The coffee's species, variety, geographic origin, and level of roasting determine the constitution and quantity of the flavor resulting from these compounds.

Things that are fermented on purpose

The challenge with fermentation is the difficulty of controlling the variables. The fermentation process must be well controlled to ensure the development of beneficial microorganisms that produce a high-quality beverage with a pleasing aroma. When fermentation fails, it results in the development of spoiled microorganisms that adversely affect the coffee's aroma and flavor. Coffee beans resulting from such fermentations are often referred to as "stinkers".

Fermentation is crucial in coffee processing, not only to remove mucilage, but also, to create essential sensory quality characteristics. Today, there are producers experimenting with inoculating the coffee with starter culture (yeast) in order to look for ways to accentuate coffee's depth of flavor and aroma. While it is exciting to test and push boundaries of coffee fermentation, this is still relatively a new field with a lot yet to be understood.

WHAT IS A WET MILL?

Coffee processing can be done at the coffee farm, if it is big enough to afford personal equipment. However, with specialty coffees, it is more likely that the farmers will deliver the crop to a separate washing station or wet mill. Wet mills are often cooperatives formed by local farmers. It is more time and cost effective for them to take care of the processing at a shared station, than to process individually. Coffees from different farms are usually not mixed together even if they are processed at the same washing station. Each batch is marked as its own micro lot. Often, even a single coffee farm can form multiple unique lots.

Many coffees are named after the washing process. On top of the washing station and farm, the coffee's name might also include the name of the farmer or area. Sometimes the coffee variety is also mentioned.

WHAT IS COFFEE PARCHMENT?

This is the shell-like layer of the coffee fruit that is removed from green coffee beans during processing. This usually happens during the dry milling and grading process, before roasting.

SCAN TO VIEW A VIDEO OF A WET MILL IN ACTION.

ILLUSTRATION: WINE, CHOCOLATE, CHEESE, BEER, AND BREAD.

Drying Coffee

Washed/wet-processed coffees are known for their brilliant cleanness. They allow the flavors of the coffee to shine, whether it's a sparkling acidity, or a rich, creamy body. However, that's only if they're dried slowly, evenly, and consistently. Mistakes in the drying phase can lead to fermentation, moldy flavors, and even a prematurely aged, faded cup profile. The drying process's objective is to reduce the moisture content in coffee beans from 45–50% to just 10–12%. In washed processing, this will occur after the cherry flesh has already been removed. With dry/natural processing, this will happen while the seeds, or beans, are still in the fruit.

Yet it's not just the coffee flavor and aroma profiles that are affected by drying—it's also the coffee's longevity. Generally, we estimate that green coffee beans can last up to a year, but if the drying phase was mishandled, you might find that coffee tastes faded and aged after just a couple of months.

PHOTO: SUN DRYING IN A ROOFTOP PATIO. – FINCA EL DIVISO IN BRUSELAS, HUILA

Coffee parchment is dried in one or several of these different methods:

Patios: The coffee is spread on the patio to a depth of 2-3cm for washed coffees and 5-6cm for natural process. To facilitate even drying, it is necessary to constantly turn (rake) the coffee throughout the day (approx. 15-17 times). The initial drying, or "skin drying", reduces the moisture from 55-60% down to 20-25%. At this point, the coffee can be layered slightly deeper. The second stage of drying reduces the moisture from 20-25% down to 10-12%. Care must be taken as to not dry the coffee too quickly or slowly, as each situation will affect the end cup quality. Average time needed to completely dry natural coffee is 15-20 days. To complete the drying process for washed coffee, the average is 8-12 days. Environmental conditions, patio material, and attention to detail will directly affect the process.

Raised Beds & Parabolic Dryers: Raised beds (also known as African drying beds) are above-ground beds, similar to garden beds, are often made out of wood and metal wire both to keep the cherries off the ground and to allow for easier air circulation. This method allows for good air movement and must be layered to no more than 3 inches and require movement every 3-4 hours so that the bottom and top dry equally. Also, during this stage the producer will remove defects ensuring the coffee is a uniform color for consistent, high-quality cup profiles. Parabolic Dryers consist of a transparent plastic roof and a rustic parabolic structure in guadua or bamboo that takes advantage of radiation during less sunny or rainy days and direct radiation during sunnier hours.

Mechanical Dryers: Vertical dryers and horizontal/rotary dryers are the two styles predominately used. They both are quite large and can dry many thousands of pounds of coffee. A rotary dryer is a long horizontal cylinder that rotates around a central tube through which heated air is blown. The cylinder rotates about 2-3 RPM. A vertical dryer uses a grain elevator to raise the coffee to the top of a chute. Once at the top coffee falls down the chute through streams of heated air blown through horizontal perforations in the chute. Similar to patio drying, the coffee dried in a mechanical dryer should not be dried too quickly (too high of heat) or too slowly (too low of heat), as each situation will lead to poor quality coffee. The heated air used in mechanical dryers should never exceed 40 degrees Celsius. This can look different from region to region and producer to producer, but in general, we love to see coffees dried in raised beds and under parabolic dryers, but this does not mean that quality cannot be achieved with the other methods.

Dry Mill

The dry mill's purpose is to hull, sort, and bag coffee per the buyer's specifications. Oftentimes, dry mills are in charge of facilitating conversations with coffee buyers about finances and exporting operations. When coffee arrives at the dry mill, the beans are carefully checked for impurities or debris before one final parchment layer is removed. This technique is called hulling. Once the parchment layer is eliminated, the beans are sorted and differentiated by size, color, and density.

Density Sorter: The next step is to sort the coffee by density. This machine has a single tray set on an angle both horizontally and vertically. The tray vibrates, sending the beans towards the vertical bottom, with the lighter beans remaining at the horizontal top, and heavier beans moving towards the horizontal bottom. Metal plates at the base of the tray divide the coffee beans so they can be poured into different bags or buckets. First, machines blow the beans into the air. Those that fall into bins closest to the air source are heaviest and biggest. The lightest (and likely defective) beans plus chaff are blown into the farthest bin. Other machines shake the beans through a series of sieves, sorting them by size. Finally, a gravity separator shakes the sized beans on a tilted table, so that the heaviest, densest and best vibrate to one side of the pulsating table, and the lightest to the other.

Color Sorting: Another variance among coffee beans is color. Beans that are defective often have a different color, so they are removed by a color sorter. Sophisticated machines now can mimic the human eye and hand. Streams of beans fall rapidly, one at a time, past sensors that are set according to parameters that can identify defective beans by value (dark to light) or by color. A tiny, decisive puff of compressed air pops each de-fective bean out of the stream of sound beans the instant the machine detects an anomaly.

PHOTO: DON NEPO'S DRYMILL — ARMENIA, COLOMBIA

Hand Sorting: Despite these advancements in the sorting process, there is still room for imperfections. After all, machines are not as reliable as humans. Thus, color sorting is followed by hand sorting, a manual process where people remove any beans that don't match the size, shape and color requirements of the buyer.

Coffee Size

The size of a bean is determined by its individual measurements. The largest size of a crop is named differently in each country. In Kenya, the largest coffee is an "AAA", while in other countries it is "AA". When the beans are extracted from the pulp they are graded according to their size. This is normally done at the mill, but can be done at the pre-assessment stage too.

As mentioned, the sizing is particular to where the coffee comes from, and where it is destined to land, so below is a list of other names for reference.

Screen size is a separation that generally happens as the last step in the green coffee preparation process at the dry mill before bagging and export. Because coffee is sorted by size in its originating country, it's size is usually expressed using local terminology. Sometimes we'll receive coffee that is described as "screen 17/18," but we also get coffees that are classified using a country's traditional terms. Unfortunately, this creates a lack of standardization in terminology, even though beans are sorted by size using the same techniques around the world.

Here's a chart that compares the bean sizes with different terms used in various parts of the world:

<table>
<tr><th>1/64 IN</th><th>1/64 MM</th><th>CLASSIFICATION</th><th>CENTRAL AMERICA AND MEXICO</th><th>COLOMBIA</th><th>AFRICA AND INDIA</th></tr>
<tr><td>20</td><td>8</td><td rowspan="3">Very Large</td><td rowspan="6">Superior</td><td rowspan="4">Supremo</td><td rowspan="3">AA</td></tr>
<tr><td>19.5</td><td>7.75</td></tr>
<tr><td>19</td><td>7.5</td></tr>
<tr><td>18.5</td><td>7.25</td><td rowspan="3">Large</td></tr>
<tr><td>18</td><td>7</td><td rowspan="2">A</td></tr>
<tr><td>17</td><td>6.75</td><td rowspan="3">Excelso</td></tr>
<tr><td>16</td><td>6.5</td><td rowspan="2">Medium</td><td rowspan="2">Segundas</td><td rowspan="2">B</td></tr>
<tr><td>15</td><td>6</td></tr>
<tr><td>14</td><td>5.5</td><td>Small</td><td>Terceras</td><td rowspan="7"></td><td>C</td></tr>
<tr><td>13</td><td>5.25</td><td rowspan="6">Shells</td><td rowspan="2">Caracol</td><td rowspan="7">PB</td></tr>
<tr><td>12</td><td>5</td></tr>
<tr><td>11</td><td>4.5</td><td rowspan="2">Caracolli</td></tr>
<tr><td>10</td><td>4</td></tr>
<tr><td>9</td><td>3.5</td><td rowspan="2">Caracolillo</td></tr>
<tr><td>8</td><td>3</td></tr>
</table>

Defects

The main culprits of damage to coffee while on the tree, or immediately after picking, are insects, genetic flaws, disease, environmental factors, and human error. Defects that are the most commonly encountered occur during processing, and they are usually the result of some combination of human and mechanical errors. No matter the processing type, post-harvest drying is the most critical stage in quality preservation and management, and errors during this hyper-sensitive process are magnified in the cup. Even if a coffee makes it all the way from picking to shipping with no problems, there are still risks for defects. Beetles are notorious pests that chew their way through dried coffee and reproduce prolifically. Insect holes seen on storage containers tend to be much larger than those from insect damage that occurs in the field.

Coffee infested with beetles, moths, or worms that eat the jute bags, must be quarantined and purged by freezing or by oxygen removal. Poor conditions are the other main culprit of storage-damaged coffee. Hot and humid conditions can exacerbate aging. In wet conditions, coffee may reabsorb water and fade in appearance as well as flavor. Black spots can occur if coffee has been poorly dried and pockets of water within the bean cause rot, and mold can develop on the surface of the coffee as well. Stable storage conditions will help prevent these defects. Dried coffee, whether in parchment or green form, prefers environments near 65°F/18°C with moderately low (40% to 60%) relative humidity.

Dry Milling, Sorting & Storage

Dry milling, which is the final stage in green coffee production, involves removing the last layers of dry skin, sorting, and preparing the beans for shipment. The first step is called hulling, which is the removal of the dried sheath peeling off the bean—which, in the case of coffee that has been washed as described above, is known as parchment skin. The parchment skin is removed from the coffee bean with the help of machines called hullers, that can range from simple mill-stones to sophisticated machines that can gently remove the parchment.

Color sorting is the second step and perhaps the most important. Most high-quality coffees are color sorted by hand, due to inexpensive labor, or by a color sorting machine (such as a color separator) which can quickly inspect the color of each bean through a camera system. Regardless of the method, the beans are sorted into either a quality pile or a reject pile. Monochromatic machines remove white and black coffee beans since those will have a lighter or darker hue than the average bean. The more specific bi-chromatic color sorting machines detect and eliminate coffee beans that are not only white or black, but unripe, broken, or insect damaged.

For storage, all of our partners use GrainPro bags at the beginning and the end of the process. The objective of GrainPro is to slow down the aging process and also to allow the beans to rest in controlled environments without drastic humidity changes. In the event that the transport of the green coffee beans takes longer than expected (a frequent occurance), GrainPro offers a layer of protection that is crucial to the safe transport of green coffee beans.

TABACONAS DISTRICT — SAN IGNACIO, PERÚ

II.
ON BOARD/ THE BRIDGE

Direct Trade

Direct trade is a principle adopted by some of the world's leading quality-focused roasters to signal a new, more reliable way for buyers to foster relationships with farmers, build a reliable supply chain and serve as a template for transparency and equity. One man who is credited as the originator of the term "Direct Trade" is Geoff Watts, from Intelligentsia Coffee. Back in 2010, I had the honor to work in their Roasting and Quality Control team, therefore much of the inspiration and principles that are rooted, not only in Metric Coffee's business model, but in specialty coffee as a whole, can be attributed to Geoff. Knowing Geoff for me is a privilege and until this day, I consider his work and legacy an inspiration to our work.

In principle, the spirit of direct trade is to grow together with the producers we choose to work with in a way that shares the inherent risks in trading an agricultural product, with a focus on building viable, long term and truly equitable relationships with producers. Today, the principles behind direct trade have begun to spread throughout the coffee industry with roasters of all sizes beginning to examine the way they buy coffee. As it stands, direct trade is only a principle, which over time has been left to be interpreted in different ways. There are no foundational criteria yet, since it is not currently a certified initiative.

Here are some examples we've found on the subject:

DIRECT TRADE CRITERIA

- Exceptional coffee quality
- The grower must be committed to sustainable, environmental and social practices
- The price paid to the grower or local co-op must be at least 25% above the fair-trade price
- All trade participants must allow transparent financial disclosures back to the individual farmers
- Buyers must visit the farm or co-op a minimum of once per harvest season (More often, visits will take place three times per year: pre-harvest, mid-harvest, and post-harvest)

This system has been the catalyst for a sort of revolution in how the coffee industry behaves. However, our work is only just beginning. The people who farm coffee are still at a major disadvantage when it comes to achieving a profitable living. For example, in a systematic review of sustainability certifications, there are currently no overall net positive effects on farmer incomes which is largely due to not accounting for the cost of production. The direct trade model serves as a base structure on which to operate, but we must continue to explore ways to stabilize the industry at the farm level.

Commodity

The commodity market is an international market price for green coffee that is set in New York. However, this is determined based in part by supply and demand–meaning, that it doesn't consider the costs of production and exportation, differences in quality, and market speculation. As with most commodities, the actual quality of the coffee being bought is a minor consideration, but there are often scenarios where producers lacking access to fair buyers will sell coffees that would otherwise cup at specialty, meaning 80 SCA points and above, at commodity price.

CASH & FUTURES

In the coffee cash market, participants buy and sell physical, green coffee of different qualities that will be delivered either immediately or promptly. The cash transaction therefore involves the transfer of the ownership of a specific lot of a particular quality of physical coffee. The cash price for the physical coffee is the current local price for the specific product to be transferred. Note that sales of physical, green coffee for later (forward) delivery, called forward contracts, are not to be confused with futures contracts.

In the coffee futures market, participants buy and sell a price for a standard quality of coffee. The futures transaction centers around trading a futures contract based on physical coffee (or its cash equivalent) at a price determined in an open auction called the futures market.

The futures price is the price one expects to pay, or receive, for coffee at some future date.

Cash price: The daily price for coffee (by trading the physical product for immediate or prompt delivery).

Futures price: The expected price for coffee (by trading the different positions of the futures contract.)

The futures contract is a standardized legal commitment to deliver or receive a specific quantity and grade of a commodity or its cash equivalent on a specified date and at a specified delivery point. Its standardization allows the market participants to focus on the price and the choice of contract month.

Traders in the futures markets are primarily interested in risk management (hedging), investment opportunities, or speculation, rather than the physical exchange of actual coffee. Although delivery of physical coffee can take place under the terms of the futures contract, few contracts actually lead to delivery. Instead, purchases are usually matched by offsetting sales and vice versa, and no physical delivery takes place.

WHAT ARE COFFEE CONTRACTS?

The standard contracts used in coffee trade seek to guarantee purchase and sale of the product in markets characterized by great distance from exporter to importer which may be directed towards physical or future markets. The standardization of contracts and terms of sale allow for a greater security in coffee marketing on top of the product quality, price, quantities, shipping period and legal validity of the transaction.

Physical contracts allow sellers and buyers a greater degree of freedom to negotiate scheduling, product characteristics and ports of origin and destination to suit their specific needs. In this market, both sales for immediate delivery (spot) and those for the future (forward contracts) are treated as physical market transactions, as long as the negotiators undertake the transaction between themselves, through contracts and without intermediation of other institutions such as the futures market. Positions in the futures market serve as a basis for negotiations of physical contracts, but do not constitute actual operations in the physical market.

PAYMENT

There are a myriad of payment methods for coffee sold in the physicals market and the manner of payment use is dependent on your model of green coffee purchasing. For us, it begins by selecting our lots and volumes after which prices are negotiated to arrive at a fair Farm Gate price followed by the F.O.B price, our import partners are included in the conversation to manage payment and logistics on our behalf. For a small roaster like Metric, working with established notable import partners means relying on their supply chain, logistics and finance experience to ensure timeline payments to producers and safe delivery of our raw material to our door.

LETTER OF CREDIT

The letter of credit (L/C) is the modality of sale that offers the greatest guarantees both to the exporter and the importer, functioning as an international order of payment emitted by a bank, at the request of the importer and in favor of the exporter, who is paid once the negotiating terms are complied with. The L/C can be issued either for immediate or suspended payment. The drawback is that it can imply additional banking charges and guarantees required by the bank.

HEDGING

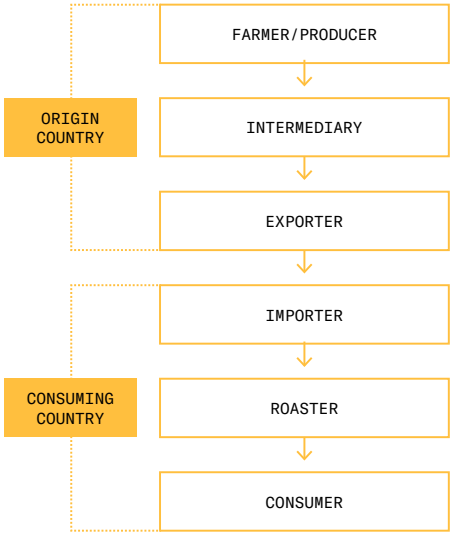
In this market, buyers and sellers are involved in hedging operations. **Hedging** is a strategy of transferring risks between agents. It implies entering into contracts for purchase or sale of coffee in the futures market against positions negotiated in the physicals market.

In essensence, this refers to the purchase or sale of a futures contract whose value is similar to a particular physical transaction, so that an eventual loss owing to price fluctuations is compensated by gains in the futures market, arising from the same price fluctuations. Similarly, if price variation would have yielded a net gain for the investor, the futures market annuls these gains.

Supply Chain

The structure of the value chain is very similar regardless of producing or consuming country. The coffee value chain is made up of the four main phases. Each stage in the process has environmental, social, economic and governance issues that affect the future sustainability of extracting the coffee bean. Coffee affects the lives of over 25 million farmers in more than 70 countries around the world, many of which are in developing regions. The coffee value chain is made up of the four main phases: cultivation, processing, roasting, and consumption. As I mentioned above, traditional coffee production methods can often adversely affect the surrounding environment through the use of harmful chemicals and unnecessary deforestation. Social issues arise due to poor labor practices combined with unfair wages and low prices of coffee.

ILLUSTRATIVE SUPPLY CHAIN:



Farmers & Producers: They can range from individual smallholders which are producers that cultivate five hectares or less of land leased to them by large estates, cooperatives, or unions.

Intermediary: Intermediaries are an inherent part of global trade that take over various tasks within supply chains. These supply chain facilitators play vital roles within the trade of goods and services and over time, they have evolved into different types. Historically, intermediaries took the roles of importers and exporters and in addition, they also took care of insurance, transportation and finances, on top of working directly with the cooperatives and unions to ensure that producers are earning a fair wage for their crops.

Exporter: Organizations operating at origin that price and commercialize coffee from farm gate level to meet the needs/specifications of buyers.

Importer: Global merchants who bring in the coffee from the origin country to the place of sale and exchange.

Roaster: Roasters are not only the people that roast the coffee but are also the educators and storytellers in the supply chain whose mission is to source fresh coffees, pay a fair price for the coffee, roast them well and serve them in way that represents not only the high quality of the coffee but also the work put forth by the producers.

Consumer: The last step in the process, the last link in the chain. After the coffee has passed through many hands, you, the consumer, are the final recipient of all of the hard work put forth by everyone involved in the supply chain. Our hope is that you enjoy the fruit of our labor in the same way we enjoy it: with joy and happiness.

Purchasing Protocols

HOW DO WE DEFINE QUALITY?

Quality is a trait difficult to pinpoint. By definition, quality is a "a distinctive attribute or characteristic possessed by someone or something," but the more we understand about coffee quality, we know that there are myriad factors, some that can be controlled and many that are not. Beyond the actual coffee, we define quality by these standards:

Farm Level: Quality coffee is a mix of knowledgeable producers who invest back into their land.

Mill: Coffee quality is linked to bean size, lack of defects, physical characteristics and proper packaging.

Exporter & Importer: Working with exporters and Importers that manage all aspects of logistics and financing is crucial to the procurement of our raw materials.

Roaster: Green coffee quality is paramount to the success of any coffee company but just as important is the quality of roasting associated with the brand. Yes, equipment does play a role in to the cup quality of all coffees but having an established quality control team to manage inventory is crucial.

Consumer: Coffee quality, at the end, is a matter of us backing the quality with a price that supports the value chain along with great taste and flavor.

The ultimate way to arrive at a conclusion on whether or not a coffee is of quality and meets our standards is to taste it. If the coffee inspires and moves us, and is what we call layered with positive flavor characteristics, then it most likely meets our buying criteria in which case we can move forward with contracting.

Building a reputable buying program requires having established buying protocols in order to meet the needs of our business. The decisions we make in order to reject or approve a coffee, or judgment calls around value vs. quality, and even commitments to environmental and social purchasing (strategies we employ to protect ourselves financially in a volatile marketplace) as well as the accountability we uphold for managing inventory properly and paying bills in a timely manner, have a major impact on everyone participating in the coffee chain, and are deeply significant to the originating coffee producer. As coffee buyers, we need to make good, sound, and ethical decisions in each of these areas.

METRIC COFFEE BUYING CRITERIA

- Source exceptional, high-quality coffees
- Pay sustainable prices
- Establish and foster direct relationships with coffee producers
- Pay them annual farm visits to encourage connection and express our commitment
- Work with sustainably minded intermediary partners to ensure real equity and transparency is present

Score

All sensory scales are arbitrary. Each sensory scale is created based on the personal choice or research conclusions of an individual, committee or group. Once created, the success of a sensory scale is determined by the number of people, or groups, who adopt it as a set standard for analysis. The most basic coffee scale consists of a three-point score: 1 is under quality, 2 is at quality, and 3 is above quality. This may sound overly simplistic, but this basic scale to identify expectations below, at or above quality, remains an often-utilized professional tool in the industry. We use a cupping form provided by Cropster through an application called Cropster Cup which collects both positive and negative descriptors and intensity (low-medium-high) in one step.

Additionally, to simplify the process, the starting number for scoring coffee is 80, which is on the lowest end of the specialty spectrum. We use a 1 through 5 scale for sweetness, acidity, flavor, body and aftertaste, which can give us a score anywhere from 80 to 100, with coffees in the range of 86 plus being in the ideal quality and point range.

Below is a graph describing the terms and descriptions for each category:

TERM	DESCRIPTION
FRAGRANCE	Aromatic aspects of dry ground coffee
AROMA	Aromatic aspects of ground coffee when infused with hot water
ACIDITY	Brightness and/or sourness of coffee
BODY	The mouthfeel or heviness percied on the surface of the tounge
FLAVOR	Defined as taste and aromas, mid-tones of coffee
SWEETNESS	Subtle pleasant sweetness in coffee
CLEAN CUP	Transparancy in the cup, should be free of off-flavors and defects
BALANCE	Overall rating of coffee, no one parameter should dominate
AFTERTASTE	Duration of positive flavor attributes in coffee
OVERALL	Your overall rating of this coffee

Cupping

Before discovering a deeper understanding of the vastness in flavor of coffee, roasted coffee was simply just that—coffee! As an industry, when we gained a deeper understanding of how complex coffee can be, especially with varieties that tend to bode well on the cupping table, we as buyers have become more intimate with the coffees' sensory attributes and through practice and calibration, we judge and score coffees based on our perceptions.

By definition, cupping is a process by which professional coffee tasters evaluate the coffee by identifying and grading key attributes of the cup. Also known as Sensory Evaluation, a taster will use sight, taste, touch (mouthfeel), and smell to grade the following categories: fragrance, aroma, flavor, finish, body, acidity, balance, sweetness, uni-formity, and if it is a clean cup which means it carries no defects. Coffees are scored on a 100-point scale. Most will receive between 75 to 90 points. Compared to the SCAA cupping protocol, our scoring focuses more on what makes a coffee interesting and fun, and less on the presence of defects which professionals might encounter in the field.

SCAN TO VIEW A VIDEO ABOUT CUPPING AT METRIC

PHOTO: XAVIER ALEXANDER OF METRIC PARTICIPATING IN A CUPPING AT ORIGIN COFFEE LAB.

FABIANA CARVALHO

THE SCIENCE OF TASTE

Taste is only what we perceive in our mouth as the five basic taste sensations; bitter, sweet, sour, salty and umami (savory). Whereas aroma can be perceived either as orthonasal (through our nasal cavity) or retro nasal (through our oral cavity) and up to the olfactory epithelium. When you take a sip of coffee the non-volatile compounds reach your taste buds, that are located on the papillae on your tongue, these are the dots you can see. In the taste buds you find taste cells which contain receptors for the basic tastes. For example, when a bitter compound reaches a bitter receptor a signal is sent to the brain indicating that you are tasting something bitter. The volatile compounds (the aromas) of the coffee are transported with air to the nose either orthonasal (by smelling) or retro nasal (by tasting). In the nose they reach the olfactory bulb which contains multiple receptors for the aromas. The perception of aromas functions as pattern recognition, meaning that a single volatile molecule (e.g. vanilin) will activate more than one receptor, and the emerging pattern of activation tells the brain that you smell the aroma 'vanilla'. If the same molecule is combined with other molecules, a greater number of receptors are activated, and a completely different signal may be sent to the brain telling us that we smell something different. Coffee is a good example of a complex product containing many different molecules—this explains why coffee tasting requires a lot of training.

BY: FABIANA CARVALHO
@THECOFFEESENSORIUM

Samples

Green bean samples are essential for roasters, allowing us to make informed buying decisions. By knowing the quality and cup profile of a coffee lot, you can decide if the profile and characteristics of said coffee belong on our menu and how much we want to pay for them. Generally speaking, we work with half a dozen producers in most of the countries we purchase coffee from and generally schedule our visits either mid to late harvest to be able to cup through our future offerings and get a chance to taste new ones. While on the ground, we establish our purchasing intentions with our intermediary partners at which point they will earmark those samples for us until the point where they are ready to be milled and transported to the nearest port. Before that happens, we receive pre-shipment samples to certify that we are happy with the quality and want to proceed with the purchase before we take on the contractual obligation with the importer.

Here are a few industry terms for sample types:

Offer Sample: Sample supplied by the producer, cooperative, or exporter to offer a particular lot of coffee for sale, whether it is a microlot of a few bags or large community lot of several hundred bags/full container volume.

Pre-shipment Sample: Representative sample gathered prior to shipping coffee. This sample is blended with coffee from each bag in a lot to represent the coffee that is being loaded onto the ship. Sometimes, an offer sample may also be a pre-shipment sample, representative of the lot that is ready to ship. In the case that significant time has passed between the evaluation of the offer sample and the container stuffing (more than a month) or in the case that a lot has been blended or subdivided and is meaningfully different than the offer sample, the pre-shipment sample serves to confirm that the coffee that will ship still meets quality expectations.

Type: This is a sample that is likely to be similar to the one that you will receive. It's typically of a previous harvest from that community, mill, or producer. This will often be provided before a sample of the current harvest is available.

Subject to Approval of Sample (SAS): This is one way to eliminate most of the quality risk inherent in buying unseen coffee from unknown shippers, as buyers are not obliged to accept any shipment that they have not first approved. SAS obliges the exporter to provide an approval sample before shipment.

Arrival Sample: Representative sample pulled from coffee after it has landed in the warehouse.

Coffee Grading

Green coffee is graded on the basis of visual inspection and cupping after being roasted. Visual inspection involves taking a 350g sample of green coffee beans and counting defective beans. Defects can be primary (e.g. black beans, sour beans) or secondary (e.g. broken beans). Coffee qualifies as specialty grade when it has zero primary defects and less than five secondary defects. Cupping is a process that involves roasting the coffee and simply brewing it by adding hot water to the ground beans. Specific scores for each of the attributes such as acidity, body, flavor and aroma are assigned by the green buyers.

Grading and classification are usually based on some of the following criteria:

- Altitude and/or region
- Botanical variety
- Preparation (wet or dry process = washed or natural)
- Bean size (screen size), sometimes also bean shape and color
- Number of defects (imperfections)
- Roast appearance and cup quality (flavor, characteristics, cleanliness, etc.)
- Density of the beans

SCAA Grading Scale

Grade 1: Specialty Grade Coffee Beans: no primary defects, 0-3 full defects, sorted with a maximum of 5% above and 5% below specified screen size or range of screen size, and exhibiting a distinct attribute in one or more of the following areas: taste, acidity, body, or aroma. Must also be free of cup faults and taints. Zero quakers allowed. Moisture content between 9-13%.

Grade 2: Premium Grade Coffee Beans: Same as Grade 1 except maximum of 3 quakers. 0-8 full defects.

Grade 3: Exchange Grade Coffee Beans: 50% above screen 15 and less than 5% below screen 15. Max of 5 quakers. Must be free from faults. 9-23 full defects.

Grade 4: Standard Grade Coffee Beans: 24-86 full defects.

Grade 5: Off Grade Coffee Beans: More than 86 full defects.

How is Coffee Shipped?

Shipping and logistics are the most complex parts of the process when it comes to sourcing green coffee beans. This is why having a solid relationship with an export/importer partner to manage financing & logistics for us as it travels through numerous ports via many different modes of transport is paramount. Paying close attention to each stage of the process is critical for ensuring that our coffees arrive without experiencing quality degradation. Depending on the final destination, a container of coffee may transit up to four ports, terminal complexes, and vessels; origin, destination, and several transshipments in between. Origin trucking, time afloat, and destination trucking and inbound handling to a secure warehouse can sometimes take as quickly as 6-7 weeks or with delays up to 3 months.

WHAT IS F.O.B (FREE ON BOARD)?

F.O.B refers to a term used in international commercial law that specifies at what point respective obligations, costs, and risk involved in the delivery of goods shift from the seller to the buyer under the Incoterms standard published by the International Chamber of Commerce. F.O.B is only used in non-containerized sea freightor inland waterway transport. As with all Incoterms, F.O.B does not define the point at which ownership of the goods is transferred.

THE MISCONCEPTION OF F.O.B PUBLISHING?

F.O.B is not by any means a true representation of prices paid to coffee farmers. However, since it relates to sea freight shipping and is found on nearly every green coffee contract between buyers and importers which may include costs such as transport, warehousing, finance, dry milling, grading, bagging/packaging, taxes, and documentation.

The challenge with publishing these prices is that it doesn't tell everything we need to know and is not always indicative of quality.

WHAT IS FARM GATE?

Farm gate is a practical description of a certain point along the supply chain, in order to clarify pricing to producers. Of course, as the coffee passes other stages in the supply chain the costs will continue to accumulate to cover each actor in the supply chain and their associated services. The prices we pay for our coffees are above fair-trade minimums, and with our Farm Gate coffees we can easily verify that the good price we pay makes it to the people who do the work, and are responsible for the great cup quality of our coffee. Alternatively, just because a roaster publishes Farm gate prices it doesn't always mean it's a fair price. The challenge with knowing the Farm Gate prices comes down to the difference between producers who deliver parchment to a collection point from those who deliver cherries. Delivering parchment requires more time and investment in processing and in this case the farmer takes more of a risk on their end. As more and more people adopt these platforms and show their willingness to share information, buyers' decisions will be more and more informed by price transparency. Roasters will also benefit in the long term, as producers will be encouraged to keep growing the coffee that roasters sell. And when producers benefit from more sustainable and profitable prices, they can create a better future for their farm, family, and community.

WHAT IS F.O.T.?

A common incoterm indicating that the buyer, not the seller, is required to organize and pay for overland transport to the destination. The transfer of risk occurs when the coffee is loaded onto a truck from a given warehouse. FOT may be used at both origin (where the buyer must arrange to get the coffee to the dock and account for any loading and drayage fees at the port as well as overseas shipment) or domestically. Royal usually sells FOT to roasters, which means our cost includes the fees for loading the truck and palletization, among other fees, as opposed to **EXW** where those fees would not be included.

RETURN TO ORIGIN (RTO)

Based on the F.O.B, several roasters have begun publishing percentages they call Return to Origin, or RTO. This is the F.O.B as a percentage of the final cost of roasted coffee. A 20% RTO means that 20% of the final price of that roasted coffee was paid to people in the country where that coffee was cultivated. This is an interesting initiative, and hats off to the roasters who use it. However, the risk of publishing the RTO as a percentage is that a higher percentage looks better, it suggests more money in the pockets of people at origin, but that isn't always true. It really depends on the final price of the roasted coffee; 10% of a high-priced coffee might mean more money than 20% of a cheaper coffee.

How are Green Coffee Prices Calculated?

How is the price of coffee calculated? Around the world, depending on the producing country, coffee is delivered in cherry or parchment. In this document, we are using as an example, producers with farms of up to 3 hectares in size and who perform their own picking, on site wet-milling and drying and who deliver parchment to a collection point for the purpose of education. In terms of price calculation, prices are generally calculated based on two factors: cup quality and against the C market. As an industry, we pride ourselves on being different or more ethical than the commodity roasters, but the truth is, even if we pay more, it doesn't always result in a sustainable price to the producer. Currently, for most roasters, even a price that nets $4.00 F.O.B instead of the current C Market price, the $4.00 price seems amazing in comparison to the commercial prices, but without full transparency from the producer, we can't know if they did in fact turn a profit on their harvest. Farmer profitability is key to ensuring not only the livelihood of farmers, but also our supply of coffee. As roasters, we may not be the best people in the coffee supply chain to help farmers reduce their costs of production, however, **price** is the part of the profitability equation that we are well-positioned to influence.

HOW DO OTHER PRODUCING COUNTRIES FACTOR SUSTAINABLE PRICING?

Ask any specialty coffee roaster anywhere and you would be hard pressed to find one that isn't looking for the very best coffees. We are no exception.

Here is a breakdown from our partners at Beneficio San Vicente in Honduras of where pricing begins for blends and single origins based on cupping scores. Also, please note, these prices are a starting point and by no means a reflection of how every buyer approaches pricing to the producer.

*Information provided by Benjamin Paz from Beneficio San Vicente in F.O.B.

SCORE	LOT TYPE	PRICE
85	Blender	$3.00
85.25	Blender	$3.25
85.75	Blender	$3.50
86	Blender	$3.50 Large Lot
86	Santa Barbara	$3.75 Small Lot
86.25	Single Origin	$3.75
86.5	Single Origin	$4.00
86.75	Single Origin	$4.00
87	Single Origin	$4.25
87.25	Single Origin	$4.25
87.5	Single Origin	$4.50
88+	Single Origin	$4.50

III.

DEFINING SUSTAIABILITY

Cost of Production

By definition, the cost of production refers to costs incurred by the producer in order to grow and process coffee which covers everything from administrative fees, transport, labor, milling etc. Understanding the final price, the producer earns for their work can help ascertain if the farm gate prices paid to the producer are in fact sustainable or not. These equations, as complex as they may seem, are important to know in order for us to comply with our mission for true equity. Also, because most smallholders have little to no negotiating power when it comes to the price they receive for their coffee, which fluctuates wildly in accordance with the C Market, exchange rates, and myriad other factors, many of them have not made a habit of recording and tracking their costs of production. Time and again, however, they are rarely left with enough profit to reinvest in their farms or their families after covering all of the costs that go into producing coffee, not to mention high quality coffee, on a small scale.

PHOTO: RECORDING THE DAILY CHERRY DELIVERY FROM PICKERS. – SANTA BARBARA, HONDURAS

Below are factors that should be considered in order to better comprehend the costs the producers incur throughout the harvest:

Variable costs are costs directly related to coffee farm output. These include hired labor and production inputs such as fertilizer or pesticides. If a producer receives less than their total variable costs, then coffee is uneconomical to produce.

Fixed costs must be paid whether or not any coffee is produced. These include cooperative memberships costs, taxes, and supplies. If a producer meets the fixed cost benchmark then coffee is considered economical in the short term.

Depreciation is considered for all assets that are in use for more than one harvest cycle. This includes equipment and vehicles. If a producer meets the depreciation benchmark then coffee is considered economical in the medium term.

Total costs are the total expenditure incurred to produce some type of output. From an accounting perspective, the total cost concept is more applicable to financial reporting, where overhead costs must be assigned to certain assets. Total cost is less applicable to short-term decision making, where it is more likely that only variable costs will be considered.

A Sustainable Coffee Buyer's Guide: Azahar Coffee

When we originally set out to make this document, we wanted an honest answer to a question most consumers have when purchasing a bag of specialty coffee. **Why does it cost so much?**

When you travel up and down the aisles of most retailers, you will see well designed bags with a clear mission statement about how those coffees were sourced but yet the price is much less than what you would expect: so, does that make the coffee bad? Bad is relative and only means "bad" if it's not roasted well or it's defective but plenty of really tasty coffees can be purchased at or slightly above commodity pricing which can allow for comfortable margins for the roaster and still a much more competitive product on the retail shelf. So, what's wrong with that? For starters, not taking into consideration that coffee producers, like all businesses cannot operate at a loss, which many unfortunately do and sadly tend to keep very little data on what it costs them to produce their harvest.

This is what inspired the journey to make this document. We wanted to tackle these questions and also have data to support our findings but it wasn't up until we first got a glimpse of the pilot version for Azahar Coffee Company's "A Sustainable Buyer's Guide'' that we could finally use sound data to build a full spectrum of all of the costs associated with production from seed to cup. This idea was (and is) exciting for us because it is: A) something we have never done before and B) it gives us the language and tools to better approach buying from here on out. In our model, using Azahar's new sustainable pricing benchmark, we used as an example the purchases from one producer, Nelson Chaves Burbano, and connected Azahar's transparency report, coupled with our contracts, to support our findings.

In Colombia, in 2019, our partners at Azahar Coffee conducted a field study with the objective of learning more about the true cost of production in relation to the cost of living based on data gathered across four different coffee-growing departments in Colombia. The goal: To establish income targets by paying exponentially higher prices per carga (125 kg of parchment coffee) and getting away from the C Market prices.

The information has now manifested into a guide, which as of this writing is still under a pilot version. The underlying theme of this reference tool is to reframe the discussion around income using information that is tied to context and generated in a space that considers what the farmer actually makes for their cash crop.

The authors of this guide, Tyler Youngblood and Vera Espindola Rafael, gathered information from producers in four different departments in Colombia with the goal of better understanding just how much farmers are spending on the cultivation of their crop . The result: a formula centered around three different income goals which are poverty line, minimum wage and a more sustainable income.

Approximately 95% of coffee farmers make less than $4 a day, which is why Azahar is committed to working almost exclusively with smallholders. The goal with this type of information is to provide a benchmark for buyers to consider when buying coffee from producers in Colombia. In the study, Azahar interviewed around 100 different producers and calculated an average cost of production in each zone. In other words, by using their formula to determine income goals, coffee buyers can no longer operate under false assumptions of what a "good price" is and can undoubtedly place the producing partner on the path to real profitability. This adds meaningful context to what a "good price'' ought to be.

From here on out, our goal is to publish new issues of Source Code in order to measure the efficacy of sustainable buying, hopefully adding more regions and countries along the way.

CASE STUDY:

Nelson Chaves Burbano

Our buying relationship with Nelson began back in 2016, on our first visit to Azahar Coffee, our partners in Colombia whose lab is located in the state of Quindio's capital of Armenia, located right in the center of the Eje Cafetero or "coffee triangle", along with the neighboring cities of Pereira and Manizales. During that visit, I had the pleasure of tasting an abundance of delicious coffees with one sample standing tall above them all. That coffee was Nelson Chaves Burbano's coffee. Upon the first taste, the flavors were electric with loads of raspberry, citrus and honey: a real stunner which I just had to buy. After expressing my interest in the sample, what followed next was a visit to meet Nelson in Yacuanquer, a municipality in Southern Nariño. After a short flight and two hour plus car ride, we hiked up a semi steep hill that seemed to serpentine around his property, labyrinthine to say the least, finally plateauing on a large drying patio. Nestled behind was Nelson's home. As I made my way through his patio, I noticed Nelson walk out of his home as if he had been standing there the entire time just waiting for us to arrive and greeted us with a soft handshake and a shy crooked smile. After the initial formalities, we asked Nelson if he could give us a tour of his farm to which he obliged. Finca La Esperanza sits at around 2,000 meters above sea level. A narrow pathway connects the homestead to the other side; the path leads you to a vertical 45 degree incline right up to the summit which sits at 2,150 meters. The first climb was both exhilarating and exhausting but well worth the magical experience. From the summit, you could see and feel it all and there, we kept out conversations at a bare minimum allowing the experience and views to speak for themselves. While there Nelson expressed his gratitude for our visit followed by declaring his life mission–"To produce the best coffees in the world, take care of my family and land." From that day on, we vowed to be his roasting partners. 2021 marks our sixth year purchasing coffee from Nelson, both from his main harvest and fly crop. His coffees always manage to impress and live up to their mission.

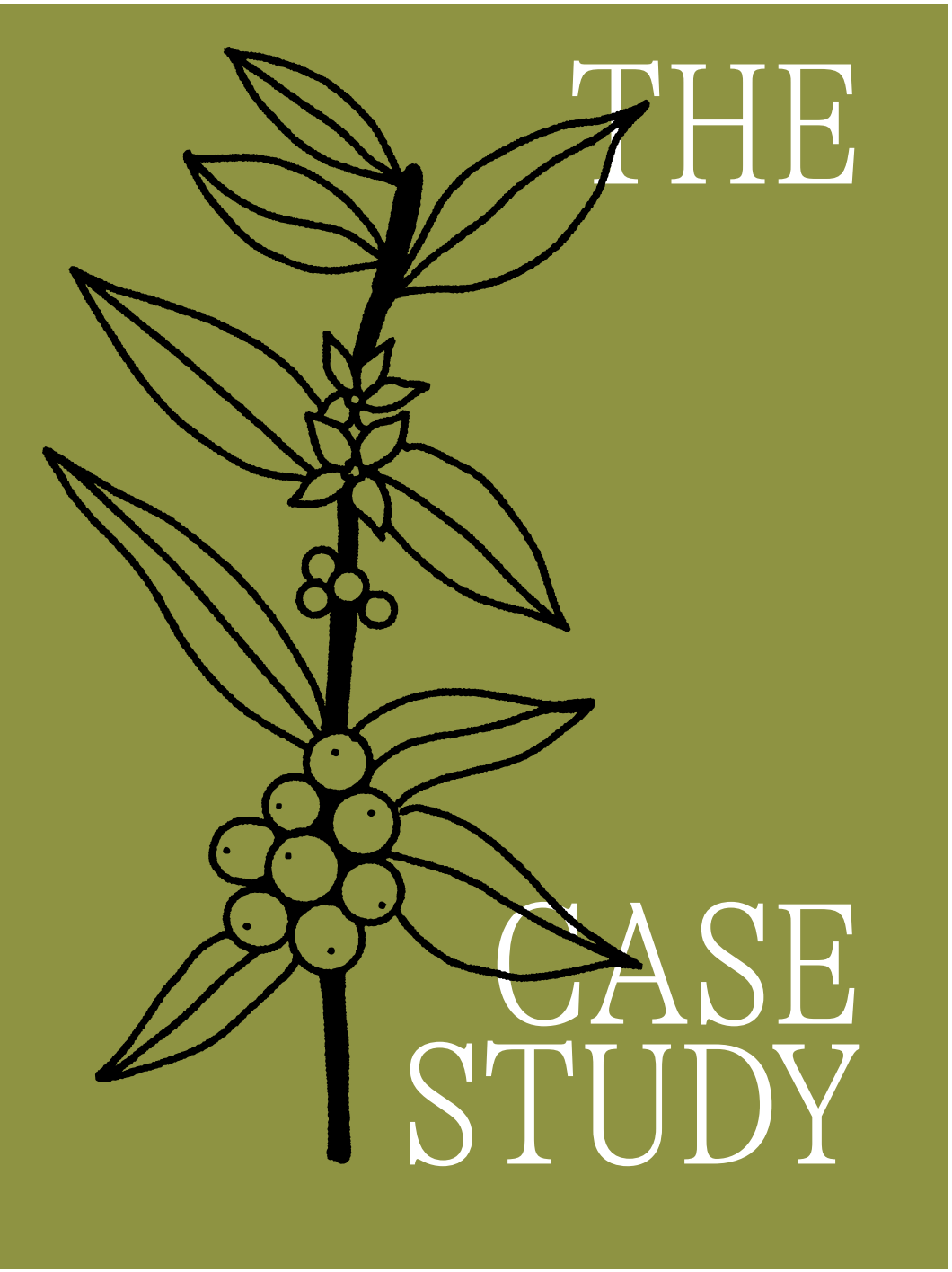
FINCA LA ESPERANZA –
YACUANQUER, NARIÑO

FARM

Farm: La Esperanza
Department: Nariño
Municipality: Yacuanquer
Vereda: Tasnaque
Altitude: 2,150 m.a.s.l
Varieties: Caturra & Castillo
Process: Washed

DETAILS

YACUANQUER, COLOMBIA



The main objective of our case study is to estimate the real cost of production using data provided by our friends at Azahar Coffee in Colombia using one model coffee producer's cost of production numbers. By publishing this information our hope is to bring awareness to the associated costs for a smallholder to produce coffee and how a gradual price increase from 2018 to 2020 positively impacted their lives. These numbers are by no means representative of all farmers living in Nariño or all of Colombia for that matter.

For us, this project is a starting point for a discussion around what can be achieved with a "more sustainable income" not just in Colombia, but also beyond.

For farmworkers, economic sustainability requires decent work and a fair income.A fair income is a wage that is "sufficient to afford a decent standard of living for the worker and her or his family." Minimum wage laws covering farm workers generally do not require a living wage, and the vast majority of farmworkers working in coffee—and in all other agricultural commodities, in any country—do not earn a fair income. For economic sustainability to be a reality in coffee production, farmworker earnings will have to increase. Yet increased income for farm workers could drastically increase costs of production, thus placing producers' own economic viability at risk—unless prices are high enough to cover both decent earnings for producers and decent income for their workers.

With this in mind, after Azahar circulated "A Sustainable Coffee Buyers Guide", it became not only an inspiration to our sourcing program but also a supporting guide in what could be three of the most important guiding principles to a ethically minded sourcing program. These are:

Environmental sustainability encompasses two broad issues: the continued availability of resilient ecosystem services, and the maintenance of conserved nature. More broadly, it requires climate resiliency.

Social sustainability considers impacts on people. This includes the avoidance of harms—no child labor, no land grabbing—as well as positive steps, such as increasing food security.

Economic sustainability focuses on the ability of producers and farmworkers to earn sufficiently from their respective roles in coffee production in order to live a life with dignity.

The subject, Colombian producer Nelson Chaves Burbano is a Smallholder with 95% Colombian farmers owning less than 5 hectares of land and over 50% of those owning less than 1 hectare. Because of this, it is almost impossible to be economically viable which is why economic viability must be considered if we aim to support Azahar's "a more sustainable income" efforts.

Going beyond viability, economic sustainability should also consider producers' earnings and whether those earnings are sufficient compensation for their unpaid labor. This is at the core of the guide's income concept, which has shaped the purpose of this publication tremendously. Educating consumers on the associated costs of coffee production and profitability must be coupled with a strong emphasis on the topic of fair wages.

Nelson Chaves Cost of Production

The data presented here will show Nelson Chaves Burbano's costs of production from 2018 through 2020. There are myriad factors involved in collecting this data, some of which are listed below under key points. Following the cost of production, we have listed examples of the meaning of each section in order to add the most clarity around the topic.

KEY POINTS

- A carga of coffee is 125 kilos of parchment.
- Nelson Chaves Burbano is an average smallholder which means he produces on average around 15-20 bags of export ready coffee per year. In Colombia, the average volume of exportable coffee per producer is actually closer to 24 bags.
- Nelson produced anywhere from 29-41 60kg bags each year, perhaps you want to say that he produces just slightly more than the average farmer in Colombia.
- Despite producing significantly less volume in 2020 than he did in 2018, Nelson actually earned more revenue, with a higher gross margin, allowing him to increase his Operating Income by nearly 2 times what he did in 2019 or 2018.
- The costs of production include inputs, taxes, transportation, coop fees, insurance and all other costs associated with the production of his harvest.
- F.O.B is the final price at origin before it embarks onto a vessel, and all costs have been converted from Colombian Pesos to USD for readability.
- Coffee is not the sole income driver for the Chaves family. Nelson participates in monocropping which is growing and selling vegetables to supplement their income outside of coffee.
- These numbers are based on information reported to Azahar by Nelson Chaves Burbano.

SCAN TO VIEW THE ORIGINAL TRACEABILITY REPORT.

	2018	2019	2020
FARM SIZE	2.5 HA	2.5 HA	2.5 HA
ANNUAL YIELD	3,800KG PARCHMENT	2,968KG PARCHMENT	2,700KG PARCHMENT
VARIETY	CATURRA & CASTILLO	CATURRA & CASTILLO	CATURRA & CASTILLO
HARVEST PERIOD	APRIL-JULY & SEPT-DEC	APRIL-JULY & SEPT-DEC	APRIL-JULY & SEPT-DEC
TOTAL BAGS (GREEN)	41 BAGS (154 LBS. EA.)	32 BAGS (154 LBS. EA.)	29 BAGS (154 LBS. EA.)
COST OF PRODUCTION	$7,239.96	$6,577.91	$6,259.26
REVENUE PER CARGA	$371.71	$428.89	$607.60
POTENTIAL ANNUAL INCOME	$11,135.00	$10,254.60	$13,367.68
AVERAGE GROSS MARGIN	35.51%	35.85%	53.80%
C-MARKET AVERAGE	$1.20	$1.20	$1.20
FARM GATE	$2.90	$3.25	$3.50
F.O.B. PRICE	$4.00	$4.30	$4.71

Farm Size: means the size of the farm which is measured in hectares.

Annual Yield: is the measure of the amount of fruit produced by a given breed. It is usually expressed as kilograms or tons per hectare per year, assuming conventional plant densities of 1,100-1,400 trees per hectare

Variety: Varieties refer to different variations within the species.

Harvest Period: Typically, there is only one harvest per year, which will last for 2-3 months as cherry ripens. In countries north of the equator harvest occurs from September to **March**. South of the equator harvest is from **April** to August with Colombia as a partial exception, as the harvest in Nariño (and some other regions) happens more inline with the April to August period.

Total Bags: This refers to the total number of export ready bags sold to Metric.

Cost of Production: Cost of production or product costs refer to the costs incurred by a coffee producer from harvesting coffee. Production costs can include a variety of expenses, such as labor, raw materials, manufacturing equipment, supplies, and general overhead.

Revenue per Carga: This refers to the amount Nelson earned per "carga" of 125 kilos.

Potential Annual Income: Gross potential income (GPI) refers to the total rental income a property can produce if all units were fully leased and rented at market rents with a zero-vacancy rate. Gross potential income can also be referred to as potential gross income, gross scheduled income, or gross potential rent.

Average Gross Margin: Gross margin is a company's net sales revenue minus its cost of goods sold (COGS). In other words, it is the sales revenue a company retains after incurring the direct costs associated with producing the goods it sells, and the services it provides.

C-Market: In short, the C Market is the coffee commodity market wherein global coffee prices are decided daily by traders on the NYSE. It's basic supply-and-demand. This means that at any given time, a coffee farmer anywhere can deliver his/her coffee to a purchasing point and receive at least the C Market price of the day. In Colombia, farmers technically receive the C Market price minus the costs of transporting, warehousing, processing (i.e. milling and bagging) and exporting their coffee, part of which is covered by the coops and part of which is covered by the FNC.

Farm Gate: Farm Gate is a simple principle that allows coffee producers to make premium prices in reward for coffee quality, and to reinvest to improve quality even more in the future. We avoid the bureaucracy of coops that sometimes do not share premium prices with their farmer members.

F.O.B.: This means the seller must deliver the coffee onto the ship at the port in the country of embarkation. Any overland transportation costs from mills or warehouses to the port of origin must be paid for by the seller. The buyer agrees to book and pay for oversea shipping, insurance, and any drainage/transportation, customs, and overland freight costs incurred on arrival to the port of destination.

WHAT DOES PUBLISHING COFFEE PRICES SOLVE?

Beyond publishing prices, price transparency is important for understanding all of the associated costs of the supply chain and helps keep us roasters properly accountable and transparent in the way we do business. As discussed earlier, there are many challenges that come with transparency, with the biggest misconception being the publishing of F.O.B prices as they do not indicate the quality, quantity or sustainable efficacy for any coffee producer anywhere.

Still, we strongly believe that the only way we as coffee roasters can make an impact is by a) paying more for coffee and b) working with partners like Azahar who collect data that helps buyers identify prices that we need to pay in order to provide a more sustainable income so producers can reinvest in their land, cover their basic needs and also save money for the future. This data provides a useful benchmark to determine a healthy farmgate price which rolls into the FOB price—all costs that Azahar discusses at the point of contracting.

WHAT'S NEXT?

Merely stating that we are buying **sustainable** coffees isn't enough. Long before we dove into this project, we thought long and hard about not including this information for fear that it would be misleading. So, what can we do to establish trust with consumers? For starters, the short answer is a two-pronged solution with paying more for coffee and requiring transparency reports from the intermediary partners at origin. From our experience, we are still years away from seeing the type of advancements we're seeing in Colombia and we encourage other countries to take notice and apply similar benchmarks into their supply chain.

WHAT ROLE CAN CONSUMERS PLAY IN COFFEE?

Customers' attitudes and behavior involving satisfaction, loyalty and commitment to pay for premium or sustainable coffee are tending to be motivated by a sustainable supply chain. In order to evaluate the accomplishment of supply chains, sufficient Key Performance Indicators (KPI's) that consider customer needs and behaviors and align with strategic, tactical and operational levels to be developed. KPI's occur as benchmarks where the performance in terms of services, products as well as corresponding best practices are able to be assessed and measured.

WHAT CAN WE HOPE TO GAIN FROM THIS INFORMATION?

For starters, us coffee roasters need to commit to paying more for coffee and also publish our prices through quarterly, bi-annual or annual reports. In doing so, we hope to raise the level of consumer awareness because the future of coffee production and our industry depends on it. Roasters and buyers will ideally make their own pledges and commit to actually paying more sustainable income prices going forward.

The truth is, in today's world, roasters have access to specialty grade coffees that are both untraceable and sold at commodity prices.

This is yet another reason why communicating our data through effective marketing and transparency needs to be prioritized. The following are some examples of what we at Metric are trying to achieve as we move towards a more sustainable and equitable specialty coffee supply chain.

Best Practices: A best practice is a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means, or because it has become a standard way of doing things, e.g., a standard way of complying with legal or ethical requirements. Best practices are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking.

Price Publishing: For Metric, this currently means that each 12 oz bag of coffee produced and sold by us comes with a transparency report. We still have a way to go in finding the best sytems through which we make this information approachable and consumable. So far, for us, this is a solid start.

The Future: Whether it's using blockchain or simply publishing prices on a bag or website, we want to encourage consumers to not only demand transparency, but also have a basic understanding of what it takes to source, roast, promote and sell sustainable coffee.

BACK TO A SUSTAINABLE COFFEE BUYER'S GUIDE

In order to effectively illustrate the purpose of this next piece, we have to first consider what constitutes a "more sustainable income". As mentioned in our introduction to "A Sustainable Buyers Guide", the team at Azahar Coffee conducted a study in four different regions of Colombia and identified prices they need to pay in order to A) meet the poverty line, B) meet the minimum wage, and C) meet the minimum wage and have extra to reinvest in developing the farm. This data provides a useful and accessible benchmark for coffee buyers to determine the farmgate price, and from there the F.O.B price, which includes Azahar's margin and processing costs.

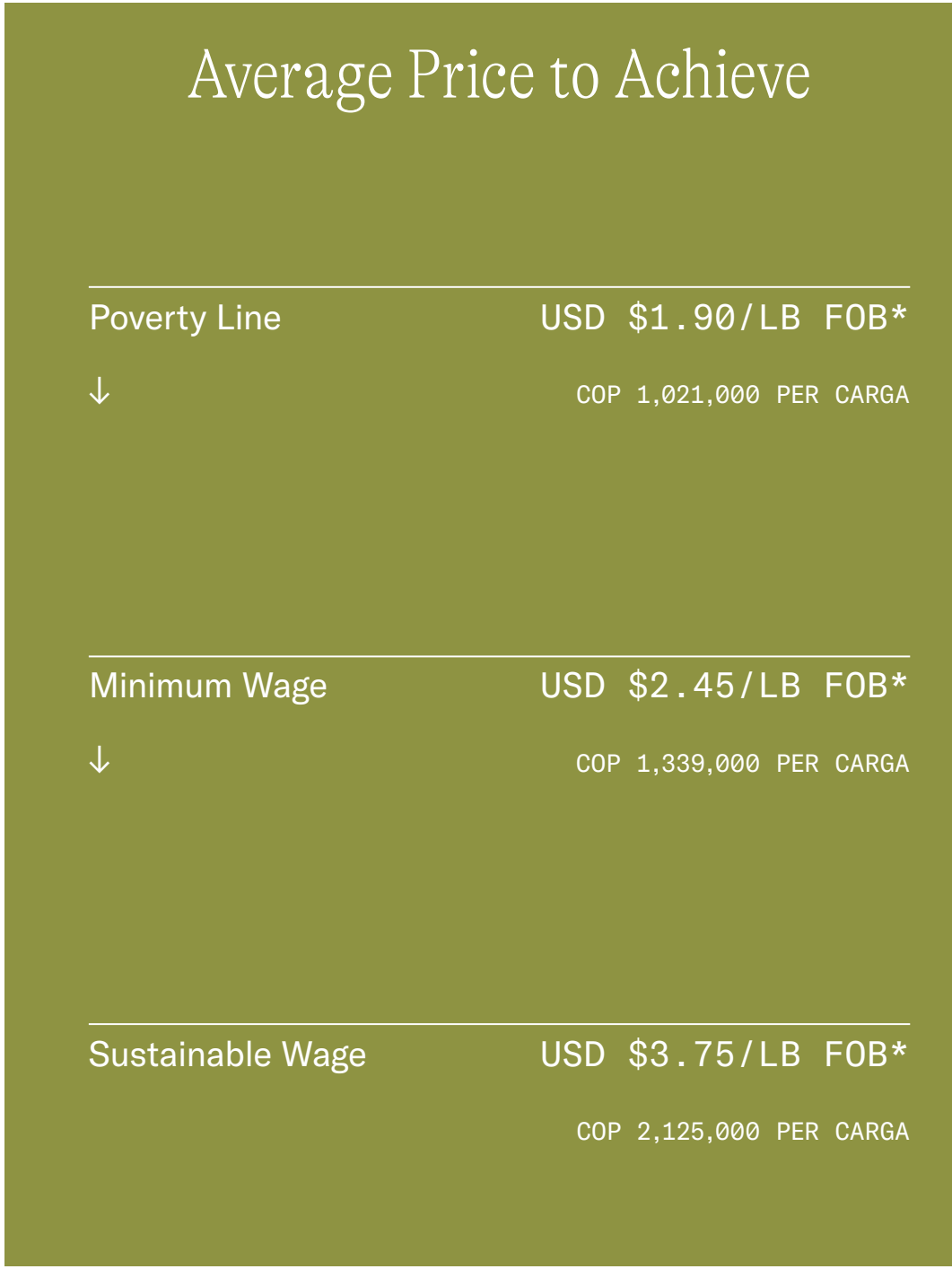
WHY IS THIS "AVERAGE PRICE TO ACHIEVE" IMPORTANT?

This information not only takes the guesswork out of what a "fair price" for coffee would be, but also puts into context what we assumed before was a really "great price." For example, it was long assumed that a price per carga of 1 million pesos for a smallholder in Nariño was a stellar price for microlots whereas when the study was conducted, the team at Azahar learned based on the average cost of living in Nariño coupled with the average farm size–a producer would have to earn 2,125,000 pesos per carga in order to not only earn a fair wage, but also earn enough to cover health insurance.

Moreover, the one piece that we found most compelling about the data is the three tier breakdown of what poverty, minimum and a more sustainable income looks like. In regards to the topic of poverty and wages, one need not look further than the wage disparities in our country. Since 2009, the federal minimum wage has been $7.25/hour, or $15,080/year, and regardless of many states paying slightly more, minimum wage earners continue to struggle to make ends meet.

Having said that- why draw comparisons between coffee farmers and the U.S. Citizens earning a poverty wage? While one would be correct to think that there are a myriad of factors that do not make the topic of poverty a "one size fits all" problem for Coffee Farmers as well as the U.S. Citizens, as a small independent company, help us understand the value and impact of a living wage as it relates to the products we sell. The truth is, a low price of coffee contributes to systemic poverty traps, racism and intense socio-economic marginalization which is why the power and responsibility to change the way we think and do business falls on the actors that stand to gain the most in the supply chain. Now the question is- can a better price be achieved and benefit everyone involved? The short answer is yes. Is the reality of it more involved and complex than the short answer? 100%. This is why, ultimately, our industry must expand on the meaning of "transparency" and work with partners that align with your mission to Champion true equity and it all begins with an important decision that will make or break the life of a coffee producer. How much are we willing to pay?

This infographic below, produced by Azhar Coffee is a great example of what a more sustainable income can look like:



Full Spectrum Illustrative Value Chain Analysis

For the last portion of our study, we partnered with Azahar Coffee Company, producer Nelson Chaves, and our importing partners at Olam in what we are calling a Full Spectrum Value Chain Analysis that covers every aspect of the associated costs starting with Azahar's raw material costs, Metric's Cost of Production, and Metric's Retail Costs.

AZAHAR'S RAW MATERIAL COSTS	
RAW MATERIAL COST:	$2.92
SOURCING COST:	$0.24
MILLING & PACKAGING:	$0.03
AFTER MILL LOGISTICS:	$0.19
INSURANCE:	$0.04
FINANCING COSTS:	$0.07
AZAHAR MARGINS:	$1.19
TOTAL COST TO THE BUYER FOB:	**$4.71**

SCAN TO VIEW AZAHAR COFFEE'S REPORT.

METRIC'S 2020 COST OF PRODUCTION	
LBS ROASTED:	183957
FOB PRICE:	$4.71
IMPORT COST:	$0.28
BAG & LABEL COST:	$0.55
DIRECT LABOR COST: (-20% SHRINKAGE):	$0.38 $0.58
TOTAL COGS:	$6.57
GROSS PROFIT:	$6.68
GROSS MARGIN:	49.58%
INDIRECT LABOR COST:	$1.05
RENT & UTILITIES:	$0.27
MARKETING:	$0.03
SOURCICNG COSTS (TRAVEL):	$0.04
INCOME, STATE, FEDERAL TAXES:	$0.54
INSURANCE:	$0.08
HEALTHCARE:	$0.34
REPAIRS & MAINTENANCE:	$0.10
TOTAL OVERHEAD PER 120Z BAG:	**$2.45**
TOTAL COST PER 12OZ BAG:	**$9.02**
NET PROFIT:	**$4.23**
NET MARGIN:	**31.92%**

METRIC'S 2020 RETAIL COSTS	
12OZ. WHOLESALE COST:	$13.25
LABOR COST:	$0.75
SUPPLIES:	$0.72
LEASE:	$0.08
UTILITIES:	$0.01
INSURANCE:	$0.04
MARKETING:	$0.04
EQUIPMENT:	$0.03
REPAIRS & MAINTENANCE:	$0.01
STATE & FEDERAL TAXES:	$0.20
OTHER EXPENSES:	$0.14
TOTAL COST PER 12OZ BAG:	$15.26
WHOLESALE PRICE:	**$21.75**
PROFIT MARGIN:	**30%**
NET PROFIT PER 12OZ BAG:	**$6.49**

SCAN TO VIEW METRIC'S CONTRACT WITH OLAM.

Conclusion

The purpose behind illustrating all of the costs to the best of our knowledge was born out of a desire to have more context around what makes a coffee “sustainable” and what doesn’t. When we first learned about the breakdown of poverty, minimum and sustainable income, everything connected in our brains in a way that put into context why it is important to consider a sustainable price to the producer that isn’t solely connected to cup quality. Yes, cup quality is super important and it needs to be a part of the equation, but at the same time, if we cannot have a larger conversation about why it is important to consider sustaining their livelihood, both the future of their work and ours will be at stake. We must, as an industry and as roasters share information willfully, commit to the pillars of sustainable coffee sourcing and never buy or sell cheap coffee.

Paying low, unsustainable prices minimizes the coffee producers’ life’s work and directly affects their livelihoods and we believe these exploitative practices should no longer exist within the specialty coffee industry, or any other supply chain for that matter.

Never again.

GLOSSARY

ARABICA One of the two most popular species of coffee. It is spread through the world in the form of Bourbon and Typica (from which most of modern specialty coffee is descended). It is the source for most specialty coffees.

BLEND Coffees that roasters mix together to create a signature profile that is exclusive to their menu.

CARGA Weight unit, 125kg, mostly used in expressing the weight of parchment.

CHERRY The ripe fruit that comes from the coffee tree.It bares a resemblance to cherry fruit, however, inside there is.

COFFEA The botanical genus colloquially referred to as the "coffee genus," which comprises over 120 individual species. The preferred habitat of most plants in the Coffea genus is tropical forests.

COFFEA ARABICA The botanical genus and species name for Arabica coffee, also written as C. arabica. It originated in the forests of Ethiopia and South Sudan, then famously spread throughout the world for the production of its seeds.

COOPERATIVES Organizations that represent small holders to gain better access to resources, provide infrastructure, provide training, and aid in price negotiation for a portion of the sale of their coffee.

CUPPING A quantifiable and widely used method of analysis for a coffee sample, from its overall quality to individual characteristics (such as acidity or body) and specific flavour notes.

CULTIVAR We owe much of our coffee to the hard work of plant scientists and farmers who have carefully bred disease-resistant, better-tasting coffee cultivars.

C- MARKET The Coffee C contract is the world benchmark for Arabica coffee. The contract prices physical delivery of exchange-grade green beans, from one of 20 countries of origin in a licensed warehouse to one of several ports in the U. S. and Europe, with stated premiums/discounts for ports and growths.

DEPULPING The process of separating the coffee seeds from the outer layer of flesh. If the cherries pass the 24-hour mark without being depulped, they may produce an overly fruity, rotten flavor that can ruin the quality of the coffee.

DIRECT TRADE Having a direct relationship with the coffee producers where equity and a fair price are involved in the transaction.

DRY MILL The final stage green coffee goes through before it is sold and shipped to the roaster. The beans are dried on raised beds that are exposed to the sun.

ELEVATION The distance above sea level, usually measured in meters or feet.

FARM GATE The price of the product available at the farm, excluding any separately billed transport or delivery charge.

FERMENTATION A metabolic process that uses sugar, either in the absence (anaerobic) or presence (aerobic) of oxygen. Coffee fermentation is critical for removing mucilage from parchment coffee.

F.O.B. "Free on boat" means the seller must deliver the coffee onto the ship at the port in the country of embarkation. Any overland transportation costs from mills or warehouses to the port of origin must be paid for by the seller. The buyer agrees to book and pay for oversea shipping, insurance, and any drayage/transportation, customs, and overland freight costs incurred on arrival to the port of destination.

F.O.T. "Free on Truck" The buyer, not the seller, is required to organize and pay for overland transport to the dock and account for any loading and fees at the port.

GRADING The quality of the coffee comes down to defects in the beans. Green coffee is often graded according to the seriousness of the defects.

HECTARES A unit of surface, or land, measure equal to 100 ares, or 10,000 square meters: equivalent to 2.471 acres.

HEIRLOOM Like an heirloom tomato, heirloom coffee grows wild and occurs spontaneously. This term is also used to refer to Ethiopian coffee varieties.

HYBRID The offspring of two different coffee plants. For example, Pacamara is the offspring of Pacas and Maragogipe.

MICRO LOT A term used by producers, buyers, and sellers to characterize coffees that can be small in size, traceable, of high quality and carry a premium price.

PRE-SHIPMENT A coffee sample that is milled and ready for transporting, specially prepared in advance of dry milling. If the sample is approved, the seller moves forward with preparing and exporting the finished coffee to the roaster.

QUALITY CONTROL Ensuring of the routine adherence to standards as the subject product is being produced.

REGIONAL BLEND Refers to lots that are homogenized into a "blend" of coffees from several producers to create a regional profile.

ROBUSTA One of the two most popular species of coffee. Robusta is most frequently consumed in the form of instant coffee. Much of the world's Robusta supply comes from Vietnam.

SAS "Subject to Approval of Sample" When a buyer signs a contract with a seller in advance of receiving a sample. However, fulfillment of that contract is dependent on approval of the sample. The buyer does not need to purchase the coffee, or justify their decision, other than by saying that the coffee does not meet their quality standards.

SINGLE ORIGIN Coffee that is sourced from one single producer, crop, or region in one country.

SMALL HOLDER A small-scale farmer that has less than 5 hectares.

SUPPLY CHAIN The coffee bean supply chain contains seven levels: growing, harvesting, hulling, drying and packing, bulking, blending, and roasting. The entire supply chain is further extended by several intermediaries, including global transporters, as well as exporters and retailers.

TRACEABILITY The process that ensures that coffee is traced and tracked throughout the supply chain.

TRANSPARENCY The process of being open, honest, and straightforward about the prices we pay for coffee.

VARIETY The massive millennia-long sprawl of coffee's iterations. It covers all the subspecies of the coffee plant.

VARIETAL An adjective to describe a coffee product. For example, "This single-varietal Kenya is delicious!"

WET MILL The process of washing the coffee fruit and seed, to prepare it for drying.

Metric is a Specialty Coffee roaster from Chicago, IL.

Founded in 2013 by Xavier Alexander & Darko Arandjelovic.