

CASE STUDY SERIES

HOW DOES ALTITUDE AFFECT ATTITUDE?

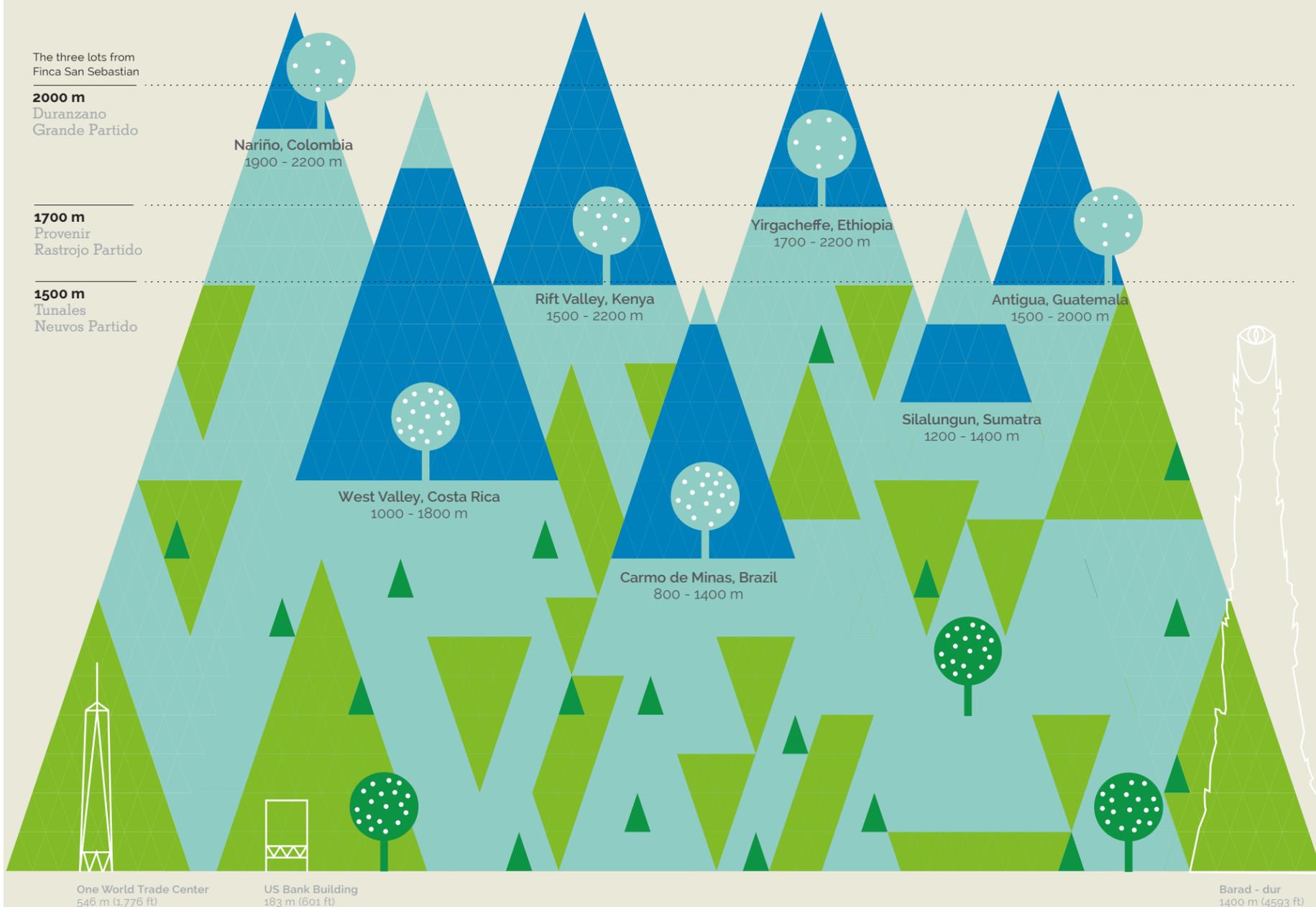
A CASE STUDY ON TERROIR FROM FINCA SAN SEBASTIAN.

STONE CREEK COFFEE LABORATORY

THE EXPERIMENT

We wanted to know more about terroir and how microclimates affect the flavor of coffee. We asked our friends Estuardo, Edgar, and Carlos at Finca San Sebastian to help us out.

We isolated the variables: Three lots, all from Finca San Sebastian, all Red Bourbon variety, and all were fermented for 36 hours in a traditional Guatemala washing tank. They were all dried on the same drying patio. (1700m lot look longer, likely due to less sunlight.)



WE CARE ABOUT WHERE OUR COFFEE COMES FROM. Buying off the "coffee store" shelf is unsatisfying. While we might be able to find really quality coffees that way, we feel it's better to know where our coffee comes from. We hop on a plane, meet the farmer, see their farm, see their mill, understand their mission, and work directly to pick, process, and sort the best coffees. We currently source about 80% of our coffee via this model, but our goal is to source it all this way. This is what we believe. It's Farm to Cup in motion.

WHAT IS TERROIR?

Terroir (pronounced Tehr'-wah) is a concept often associated with winemaking. It refers to variables that give each vintage its unique personality. This includes subtle differences in soil composition, altitude, rainfall, microclimate, and topography. It's almost impossible to isolate the effect of each variable independently. Each part plays a unique function in developing the character of flavor.

What are the **terroir factors** and how do they affect coffee growth?

CLIMATE

Coffee originated in Ethiopia from regions where temperatures ranged from 64-72 degrees Fahrenheit. The coffee tree naturally adapted to thrive in this temperature range. When cultivated in areas that are warmer than these ideal conditions, the plant begins to stress. Photosynthesis slows. Parasites, like fungus and blight, start to thrive and threaten the tree. On the other hand, if it is too cool, night frosts can damage the leaves on the tree, making it harder for the plant to create energy to grow. Small variations in temperature, however, can help develop unique regional profiles of flavor.

SOIL

Soil fertilization must be in balance year-round. This can be difficult because the coffee tree needs different nutrients at different times of the year. The plant needs phosphorus to develop buds. Calcium is necessary to mature buds. It needs potassium to help ripen the fruit. If any of 16 key nutrients are lacking, plants will struggle to thrive. Alternatively, if the pH of the soil changes, plants may not be able to absorb nutrients – the ideal is 4.5-5.5pH or slightly acidic. Micro-differences within healthy mineral norms can have a positive impact on cup quality and the creation of unique flavors. For example, soils rich in phosphorus can yield coffees with more phosphoric acid in the cup.

ALTITUDE

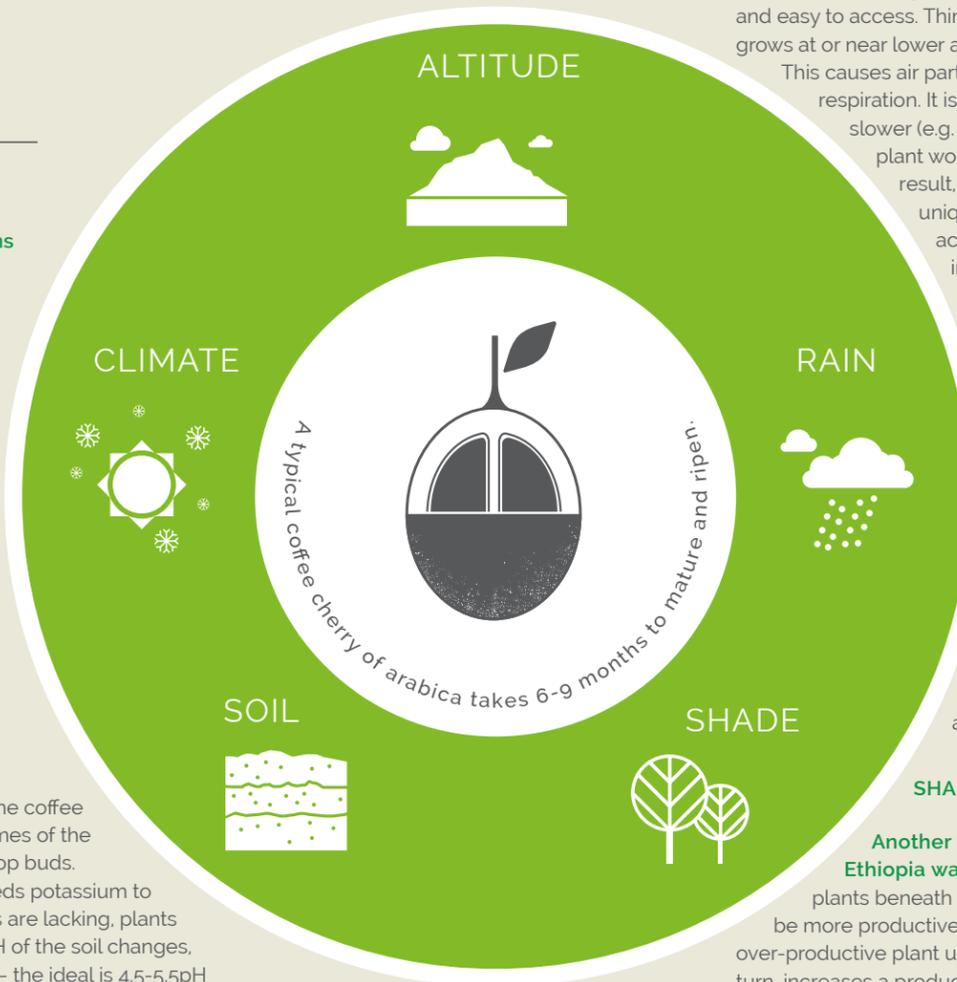
At low altitudes, higher pressure pushes air particles together. Plants have an easy time here, as gasses necessary for life are common and easy to access. Think about lush tropical plant life – much of this grows at or near lower altitudes. At high altitudes, there is less pressure. This causes air particles to spread apart, making it harder for plant respiration. It is also cooler, which causes particles to move slower (e.g. ice moves slower than water). This means that a plant works harder to breathe at higher altitudes. As a result, it stresses in a good way. This stress creates unique compounds and higher concentrations of acidity. Think about your muscles when you stress in exercise. You build up lactic acid. Similarly, a plant builds up citric and malic acids, which are key sweet and fruity flavors in the cup.

RAIN

Rainfall is essential for plant growth. Coffee needs a certain amount every year. Ideal rainfall every year is 1400-2000 mm. Too little and the plant will dehydrate and not be productive. (A kind reminder to check your houseplants...) Too much, and the plant will over-saturate. While not bad for the plant, extra water absorption affects the fruit. Extra water causes it to taste diluted, flat, and bland. Too much rain can also wash away nutrients and create soil erosion.

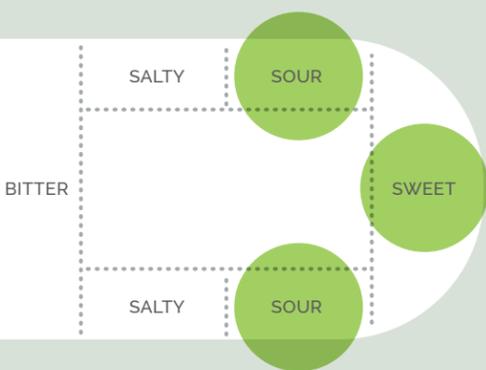
SHADE

Another feature of coffee's original habitat in Ethiopia was shade. The region is covered in forests, giving plants beneath it filtered sunlight. Coffee plants can technically be more productive in full sunlight, but this is not a good thing. An over-productive plant uses more nutrients and more energy, which, in turn, increases a producer's costs. The tree also tends to have a shortened lifespan. All work and no play make coffee a dull boy. By adding shade, producers can control the growth, maturation, and fertilization rates of their plants. It also has shown a positive correlation toward controlling disease and easing soil erosion.

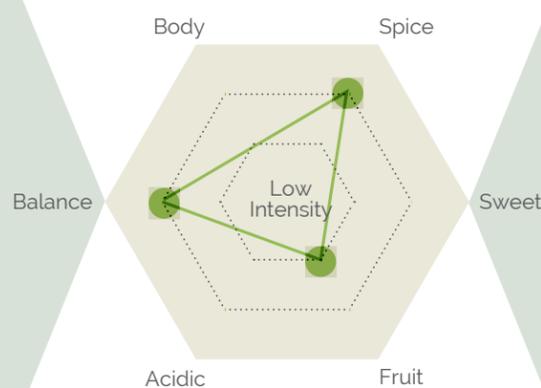


Taste

Pay attention to the different areas of your tongue. You experience different tastes (sweet, sour, bitter, salty) in distinct parts of the tongue. This is due to different types of taste buds being present in different zones. Watch for sweet to be more intense on the tip of the tongue. Sour will be more intense on the sides. You'll not actually "taste" body, but you'll feel viscosity on the middle of the tongue.



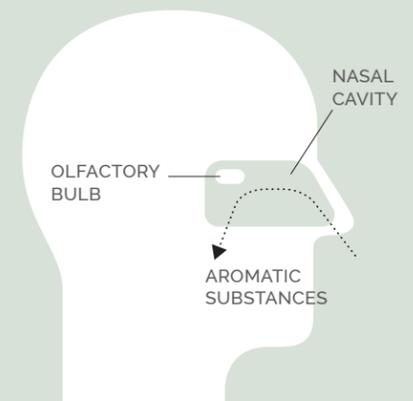
Flavor



Flavor is a juxtaposition of aroma and taste of a given coffee. It is easier to describe the flavor of something you have already tasted, so we often try to correlate coffee notes to familiar flavors. This makes flavor approachable and easy to describe.

Aroma

Aroma refers to the experience of smell. A large part of aroma happens when we put food or liquid into our mouths. Over 90% of flavor is smell. The act of chewing breaks apart chemical bonds in the food, releasing aroma particles. These particles escape up the back of the throat and activate sensations via the retronasal membranes. When we have a cold, we can still taste sweet, sour, bitter, and salty flavors, but not as well.



Fat matters. Through research, we learned that cupping scores didn't correlate directly with an increase in altitude alone, a common argument in the coffee world. Cupping scores did increase with the amount of fat in the coffee bean. Several scientists have confirmed a correlation between higher fat content and higher growing altitudes. This correlation was also made with coffees that were shade grown.

WHAT WE LEARNED

Altitude is attitude, but it's not everything. Terroir reigns supreme.