**Exploring Coffee Quality Data with Power BI  
About Dataset**

The Coffee Quality Institute (CQI) is a non-profit organization that works to improve the quality and value of coffee worldwide. It was founded in 1996 and has its headquarters in California, USA.

CQI's mission is to promote coffee quality through a range of activities that include research, training, and certification programs. The organization works with coffee growers, processors, roasters, and other stakeholders to improve coffee quality standards, promote sustainability, and support the development of the specialty coffee industry.

**Data:**

The data includes a range of information on coffee production, processing, and sensory evaluation. It also contains data on coffee genetics, soil types, and other factors that can affect coffee quality.

Sensory evaluations (coffee quality scores)

* Aroma: Refers to the scent or fragrance of the coffee.
* Flavor: The flavor of coffee is evaluated based on the taste, including any sweetness, bitterness, acidity, and other flavor notes.
* Aftertaste: Refers to the lingering taste that remains in the mouth after swallowing the coffee.
* Acidity: Acidity in coffee refers to the brightness or liveliness of the taste.
* Body: The body of coffee refers to the thickness or viscosity of the coffee in the mouth.
* Balance: Balance refers to how well the different flavor components of the coffee work together.
* Uniformity: Uniformity refers to the consistency of the coffee from cup to cup.
* Clean Cup: A clean cup refers to a coffee that is free of any off-flavors or defects, such as sourness, mustiness, or staleness.
* Sweetness: It can be described as caramel-like, fruity, or floral, and is a desirable quality in coffee.

Defects are undesirable qualities that can occur in coffee beans during processing or storage. Defects can be categorized into two categories: Category One and Category Two defects.

Category One defects are primary defects that can be perceived through visual inspection of the coffee beans. These defects include Black beans, sour beans, insect-damaged beans, fungus-damaged beans, etc.

Category Two defects are secondary defects that are more subtle and can only be detected through tasting. These defects include Over-fermentation, staleness, rancidness, chemical taste, etc.

**Objective:**

The primary goal of this project is to leverage the rich dataset provided by CQI to understand the factors that contribute to coffee quality. Specifically, we aim to explore the following research questions:

1. What are the key determinants of coffee quality as evaluated through sensory attributes such as aroma, flavor, acidity, etc.?

2. Is there a correlation between processing methods, origin regions, and coffee quality scores?

3. Can we identify any trends or patterns in defect occurrences and their impact on overall coffee quality?

4. How do different variables interact to influence the Total Cup Points, which represent an overall measure of coffee quality?

**Analysis**

### **Processing Methods Distribution Across Countries**

The first graph in our Power BI dashboard illustrates the distribution of different coffee processing methods across countries. The dominant processing method is “Washed/Wet,” accounting for 61.73%, followed by “Natural/Dry” at 22.9%, and “Pulped Natural/Honey” at 11.73%.

This distribution highlights the prevalent techniques used in coffee processing, which can significantly influence the flavor profile and quality of the coffee. Understanding the geographical preferences for processing methods helps in identifying regional specialties and potential areas for quality improvement.

### **Grading Date Trend**

The trend of samples graded over time reveals fluctuations in the number of coffee samples evaluated each month. Notably, the peak grading month is November, with 51 samples graded, followed by January with 31 samples, and April with 24 samples. This trend indicates a seasonality in coffee production and grading activities, which could be linked to harvest cycles and market demands.

### **Grading Completion Status**

Out of the total samples graded, all 207 have completed the grading process. This status update ensures that the evaluation process is on track and helps in identifying any bottlenecks in the grading pipeline.

### **Category One and Two Defects Count**

Defects play a crucial role in determining the overall coffee quality. The dashboard shows 25 instances of Category One defects and 443 instances of Category Two defects. Category One defects are more severe and visually identifiable, whereas Category Two defects are subtle and detected through tasting.

### **Impact of Defects on Total Cup Points**

An analysis of how defects impact the Total Cup Points across different processing methods shows that certain methods like “Double Anaerobic Washed” and “Honey, Mossto” have higher average scores despite the presence of defects. This suggests that some processing methods might mitigate the negative effects of defects better than others.

### **Heatmap**: **Processing Method vs. Total Cup Points & Sensory Attributes**

A heatmap comparing processing methods against sensory attributes and Total Cup Points highlights the superior performance of “Double Anaerobic Washed” and “Honey, Mossto” methods. These methods consistently achieve higher scores across all sensory attributes, indicating their effectiveness in enhancing coffee quality.

### **Production of Coffee Beans by Country of Origin**

The production volume of coffee beans by country highlights Ethiopia, Guatemala, Brazil, and Colombia as the top producers. This metric provides insights into the scale of coffee production and helps in understanding the supply dynamics in the global coffee market.

Insights I found from my project

Ethiopia and Tanzania guatamelaare top 3 coutries having highest score

Cattura,catuai varieties have highest category 2defects counts

Brown or yellowish colured beans have highest quality score

Washed wet,natural dry,pulped natural, are the mostly used processing methods for almost all varieties of coffee.

double anaerobica,semi washed ,honey mostto processing methods used for specially Castillo, java, red bourbon varieties respectively are having highest score as they have good aroma ,good flavor balance,levilines and good feel after taste but they are very less used processing methods and these methods have more moisture percentage too.

Nearly 80% of the coffee are produced from Ethiopia

Coffe beans from gautemela and Taiwan,El salvador are having highest category 2 defects.

Ethiopian heirloom variety from Ethiopia has high category 2 defects while gesha and walishalo are top 2 varieties from etiopia

Catuai variety from Honduras have more category 2 defects

When buying your next bag of beans, pay attention to the processing method, which influences the coffee quality most.