Improving Product Quality & Profit for Smallholder Kenyan Coffee Farmers

Client: Kyle Freedman, Tonny Gitonga
Students: Tracy Corado, Olivia Geoghegan, Alec Schwartz
Project Background

Meet Our Clients:

Smallholder coffee farmers in Kenya are not earning enough profit to support their livelihood. Despite high demand in the international market for premium beans, farmers are still exiting the industry.

How to increase the quality of coffee beans produced by smallholder farms?

1. Provide an affordable, small-scale roaster to encourage quality monitoring

2. Improve quality control measures during coffee bean processing
Voices of Kamavindi Farmers

“I have never tasted my own coffee because of lack of affordable farm based equipment.”

“The millers are quite a distance from my farm and it is difficult for me to mill my coffee.”

“Lack of affordable equipment to hull, roast grind and brew.”

Farmers surveyed expressed they would be willing to pay between $40-$70 USD for a small-scale roaster.
Methodology

What did we do?

1. Performance Analysis of several small-scale roasters on the market
2. Research on coffee processing and identify potential areas for farmers to improve quality control
Performance Analysis

Metrics/Considerations

- Chaff Removal
- Simplicity
- Durability
- Safety
- Cost
Performance Analysis:

**Probat Roaster**

**Cost:** $5,000+

**Features:**
- Long History
- Chaff Remover
- Individual air, heat, and cooler controls to change the type of roast
- Can do multiple roasts at once

**Pros**

**Cons**

Cost: $5,000+

Features:
- Long History
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Pros

Cons
Performance Analysis:

**Barwell Rotating Arm Roaster**

**Cost:** $100

**Features:**
- Can roast 4-24oz at a time
- Consistent mixing arm
- Variable Time/Temp parameters
- Slower come-up time for heat
- Beans visible

**Pros**

- Light, portable

**Cons**

- Requires supervision
- Chaff blows everywhere (messy)
Performance Analysis:

**Air Crazy Popcorn Popper**

**Cost:** $20

**Features:**
- 3oz of beans at a time
- Beans rotated by air
- No temp control, just an on/off switch
- Fast (3 minutes)
- Heats up quickly
- Electric

**Pros:**

**Cons:**
- Requires supervision
- Chaff blows everywhere (messy)
- Light, portable

Cost: $20

**Chaff Removal**

**Durability**

**Safety**
Sorting

Sorting is important for maximizing quality and is less costly and simpler than changing agricultural practices.

Selling multiple grades of coffee could potentially fetch a higher overall price.

Final Recommendation

We recommend using the air popper design as a base prototype and improving the overall user experience and safety features. In addition, we recommend to the client to investigate quality control measures in place such as sorting, and implementing them to raise coffee bean quality and price.

We recommend moving this project to the D-Lab II stage.

Air Popper Design

Modifications to improve ventilation and durability

Investigate quality control measures and work with farmers to make improvements