



COFFEE INNOVATION

Green Bean Coffee Husk-Powered Mechanical Dryer

On-Site Dryers Provide Climate Change Resistant Production of Quality Coffee



CHALLENGE

Since sun drying is the only technology used for drying coffee in Ethiopia, it takes more than 10-15 days to complete the drying process and toxic microorganisms may develop on the coffee beans. Several researchers have reported Ochratoxin A (OTA) mycotoxin contamination risk is greater during sun drying due to the bean-soil contact and bean dehumidification under high relative humidity conditions. Mechanical drying also permits more consistent and controllable quality and improved shelf-life, which should command a higher price.

INNOVATION

QUALITY AND CONSISTENCY

Our company designed and manufactured a coffee dryer machine with capacity for drying a batch (3 to 5 tons) of green coffee within 15 - 24hr with high quality and uniform drying without compromising the quality of the coffee, and which consumes coffee waste to convert it to energy. The machine is also able to dry cherries no need to pulp the coffee before drying.



COMPANY DESCRIPTION

Green Bean Manufacturing S.C is a dryer machinery manufacturing company that works on innovative solutions that maximize yield and quality of major agricultural products.

NUMBER OF STAFF

6 FT & 12 PT



COST-BENEFIT ANALYSIS

COSTS

MACHINE PARTS AND COMPONENTS: 750,000 BIRR
LABOR AND STAFF: 225,000 BIRR
INSTALL AND TRAVEL: 175,00 BIRR
TOTAL: 976,750 BIRR (22,000 EUR)

EFFECTS ON REVENUE

UP TO 50% MORE INCOME FOR FARMER

EFFECTS ON YIELD

95% FEWER WORKING HOURS, A FRACTION OF DRYING SPACE NEEDED



PREPARATION

TIMELINE

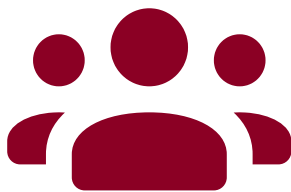
1-2 MONTHS

STAFFING REQUIREMENTS

INSTALL AND TRAINING: 1 FT, 4 PT
OPERATION: 2

MATERIALS & EQUIPMENT

- GREENBEAN MECHANICAL DRYER
- COFFEE HUSK (1 KG EVERY 10 MIN)
- WELDING MACHINE (FOR BUILDING AND INSTALLATION)
- DRILLING MACHINE (FOR BUILDING AND INSTALLATION)
- CUTTING MACHINE (FOR BUILDING AND INSTALLATION)



LESSONS LEARNED

CHALLENGES

Raw material costs were higher than anticipated.

TAKEAWAYS

- Timing is key to ensure that design, manufacture and testing happen before harvest
- Further optimization of the design could reduce costs and materials as well as running cost

RESULTS

As a result of Green Bean's trial,



15,000

FARMERS IN TWO EXISTING
COOPERATIVE UNIONS WILL BE ABLE
TO ACCESS THESE MECHANICAL
DRYERS



300kg in 19hrs

COFFEE BEANS DRIED

in initial trials in Kefa without losing
specialty quality.



94%

REDUCTION IN DRYING TIME PER
BATCH

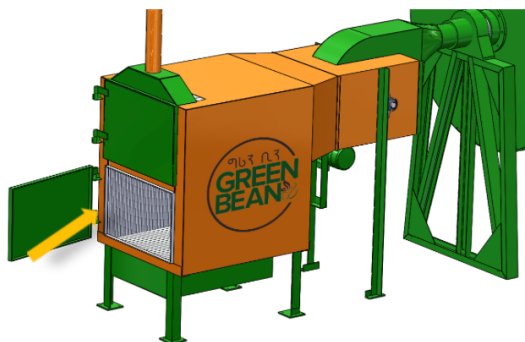
Drying completed within 15-24 hr.

IMPLEMENTATION

HOW TO USE THE MECHANICAL DRYER

1

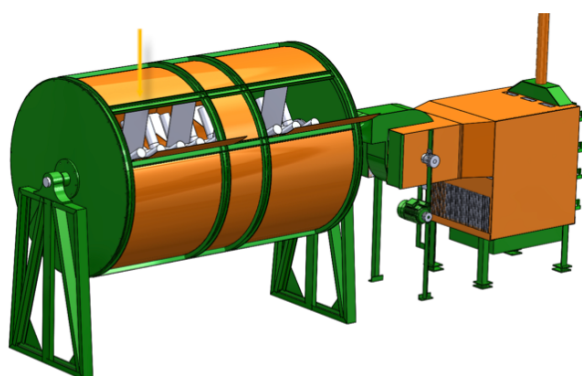
FURNACE IGNITION



- OPEN THE LOWER DOOR OF THE FURNACE
- INSERT THE COFFEE HUSK; IGNITE THE COFFEE HUSKS THAT ARE IN THE COMBUSTION CHAMBER
- CLOSE THE DOOR FOR 10 MIN
- EVERY 10 MINUTES, OPEN THE DOOR AND INSERT 1 KG OF COFFEE HUSK

2

FEEDING OF THE COFFEE



- OPEN THE TWO DOORS OF THE DRUM
- ALIGN THE DRUM TO BE PARALLEL WITH THE FEEDING DIRECTION
- ADD MANUALLY, BY HAND, THE COFFEE CHERRY THAT IS GOING TO BE DRIED

IMPLEMENTATION

HOW TO USE THE MECHANICAL DRYER

3

START DRYING THE COFFEE BEAN

- AFTER LOADING THE COFFEE, CLOSE THE DOOR OF THE DRUM
- CONTINUE FEEDING THE COMBUSTION CHAMBER WITH COFFEE HUSK EVERY 10 MINUTES
- EVERY HOUR AFTER ADDING COFFEE: CHECK THE MOISTURE LEVEL OF THE COFFEE BEAN BY TAKING A SAMPLE FROM THE DRUM AND TESTING IT WITH A MOISTURE METER

4

TEST THE MOISTURE LEVEL AND CONTROL DRYING TEMPERATURE OF THE COFFEE



- WHEN THE MOISTURE LEVEL IS 10-12% DUMP THE COFFEE CHERRY FROM THE DRUM, SPREAD ON A CLEAN SURFACE AND ALLOW TO COOL FOR 1+ HOURS
- STORE THE COFFEE IN A WAREHOUSE IN CLEAN SACKS ABOVE THE FLOOR UNTIL READY TO HULL AND SECONDARY PROCESS

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MISSION

The Fund's objective is to increase profitability of small-holder coffee farmers, and foster greater, more equitable value distribution in the supply chain through promoting innovative farming systems, transparent and inclusive business models, and access to new markets.
