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# DESERT BREW

**Made Possible by:**



**in Study of:**

- Advanced Controlled-Environment Cultivation Model

## Grow Your Coffee in the Heart of Riyadh

### How Does it Work?

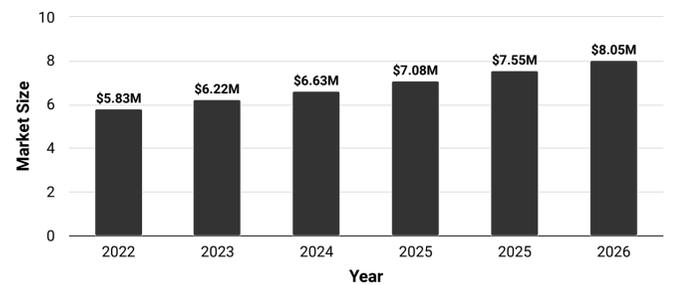
- Receiving dimensions or financial capability from the user.
- Generating a design based on unit room specifications found by our model.
- Defining the details of the design to the user.
- Highlighting the expected production and age of recovering installation cost.
- Providing a 3D scene for the designed farm.

### About Us

At Desert Brew, our mission is to empower coffee growers in Riyadh by providing tailored greenhouse solutions that optimize productivity, sustainability, and efficiency. Through our website, we design our clients' greenhouses that are perfectly suited to the local climate and environment. Through our commitment to sustainability and innovation, we aim to support the growth of the coffee industry in Riyadh while fostering meaningful partnerships and driving positive change in our community.

### Market Size and Coverage

Saudi Arabia Cafes Market has valued at USD5.83 billion in 2022 and is anticipated to project robust growth in the forecast period with a CAGR of 6.67% through 2028, and it's covered by imported coffee.



### Specifications Model

$$Max \ Max_s \{(l_s + 1)(Spl_s + 1)\}$$

s.t.

$$l_s = \left\lfloor \frac{W - 2R_s}{R_s} \right\rfloor \quad \sum_{u=1}^3 H_u HCA_u \geq 20$$

$$Spl_s = \left\lfloor \frac{L - 2R_s}{R_s} \right\rfloor \quad \sum_{u=1}^3 C_u CCA_u \geq 20$$

$$\sum_{u=1}^3 H_u = 1 \quad \sum_{u=1}^3 HF_u HFCA_u \geq 0.5(1 - C_2)$$

$$\sum_{u=1}^3 C_u = 1 \quad \sum_{u=1}^3 H_u HR_u \leq 1/WL$$

$$\sum_{u=1}^3 C_u = 1 \quad \sum_{u=1}^3 C_u CR_u \leq 1/WL$$

$$\sum_{u=1}^3 HF_u = 1 - C_2 \quad \sum_{u=1}^3 HF_u HFR_u \leq 1/WL$$

$$\sum_{u=1}^3 (H_u HC_u + C_u CC_u + HF_u HFC_u) + 51WL \leq BUDGET$$

$$H_u, C_u, HF_u = \{0,1\}, u = \{1,2,3\}$$

$$l_s, Spl_s \geq 0, integr, s = \{1,2,3\}$$

$$W, L \geq 0$$

### Potential Impact

+155K KG of Coffee Produced by an average area farm in Riyadh

Revitalizing Saudi coffee production industry on a wider range.

Creation of job opportunities in agriculture and logistics

### Power Features

77.5 Saudi Riyals to install each m<sup>2</sup> of your farm in Riyadh

Designed to Auto-Operate to Save Resources and Enhance Production

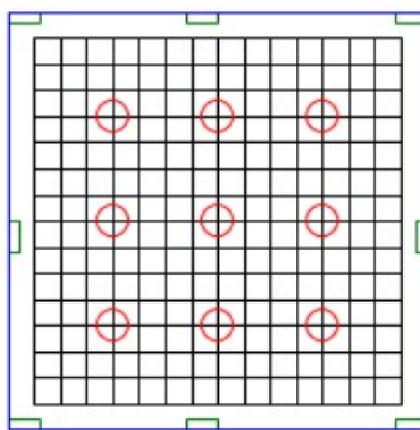
Customized to fit your property and financial capacity

Less than an hour to turn the harshest weather condition in Riyadh into perfect conditions to cultivate Coffee

### Technical Details

According to our model that's built to strictly obey constraints the best unit room must:

- Be 20m x 20m in area room.
- Utilize a Fan Coil Unit for heating
- Utilize an Evaporative Cooling Unit for cooling and humidifying.
- Achieve air exchange required by coffee beans through two kinds of fans:
  - 9 Out-In fans to heat, cool, humidify or recycle the air inside.
  - 8 In-Out fans to exhaust room's used air.
- Utilize a drip irrigation system.
- Host 225 Cultivated beans.



Unit Room

- 1.5m diameter fan
- 1m x 0.5m ducts each holds 1m diameter exhaust fan
- A bean planted on every pixel corner

- Above the room's ceiling are:
- 1 FCU
  - 1 ECU
  - 2 Ducting Systems one for entering air and the other is for leaving air
  - Piping system for Drip Irrigation System