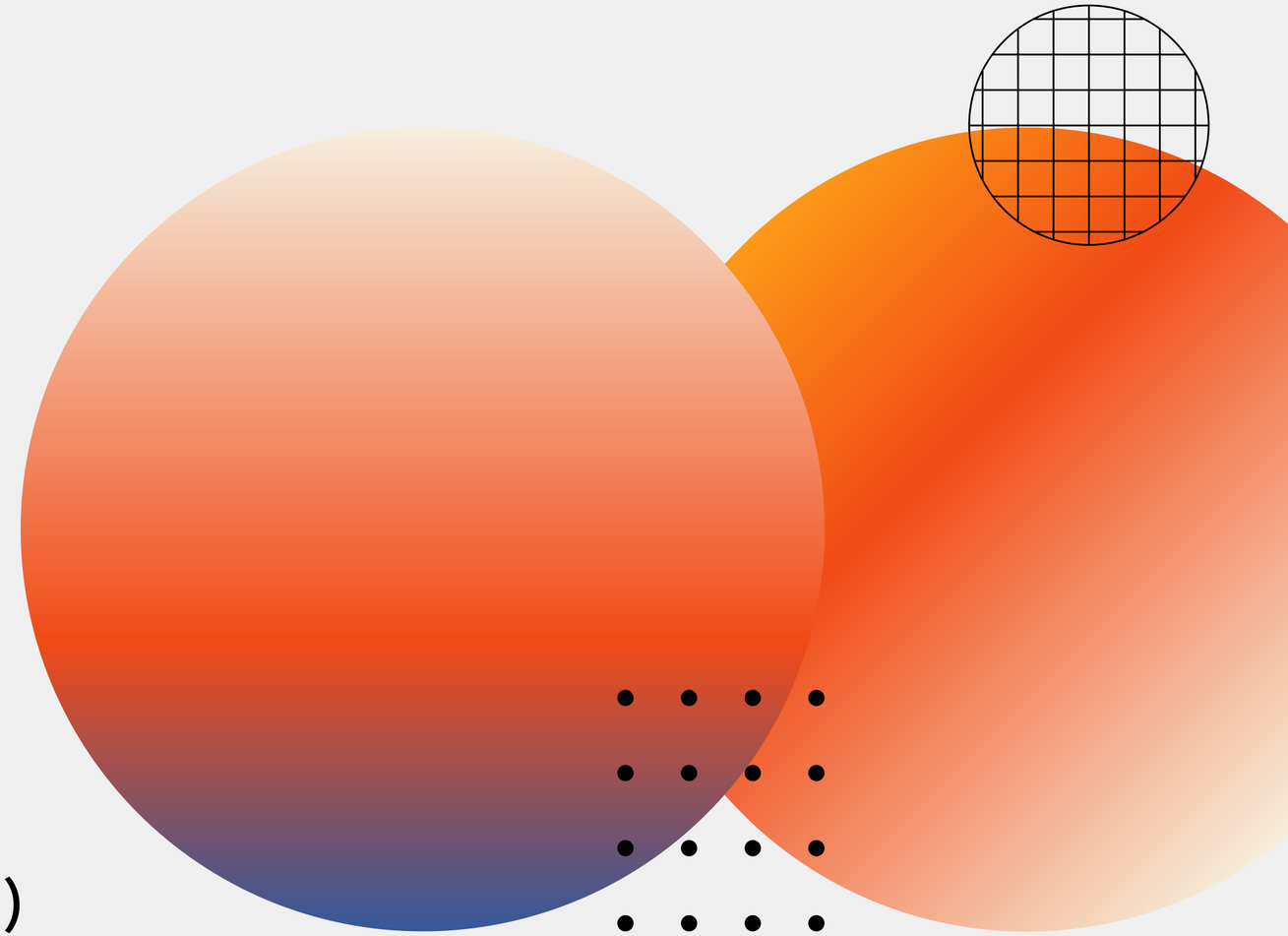
Lets start

ENGINEERING CLININCS

(Topic: Solar Food Processing)



Contents

Need for the idea

Before food reaches the plate, it travels from the farmer to wholesalers, retailers, and sometimes processors. At every stage, some proportion of crop production is lost.

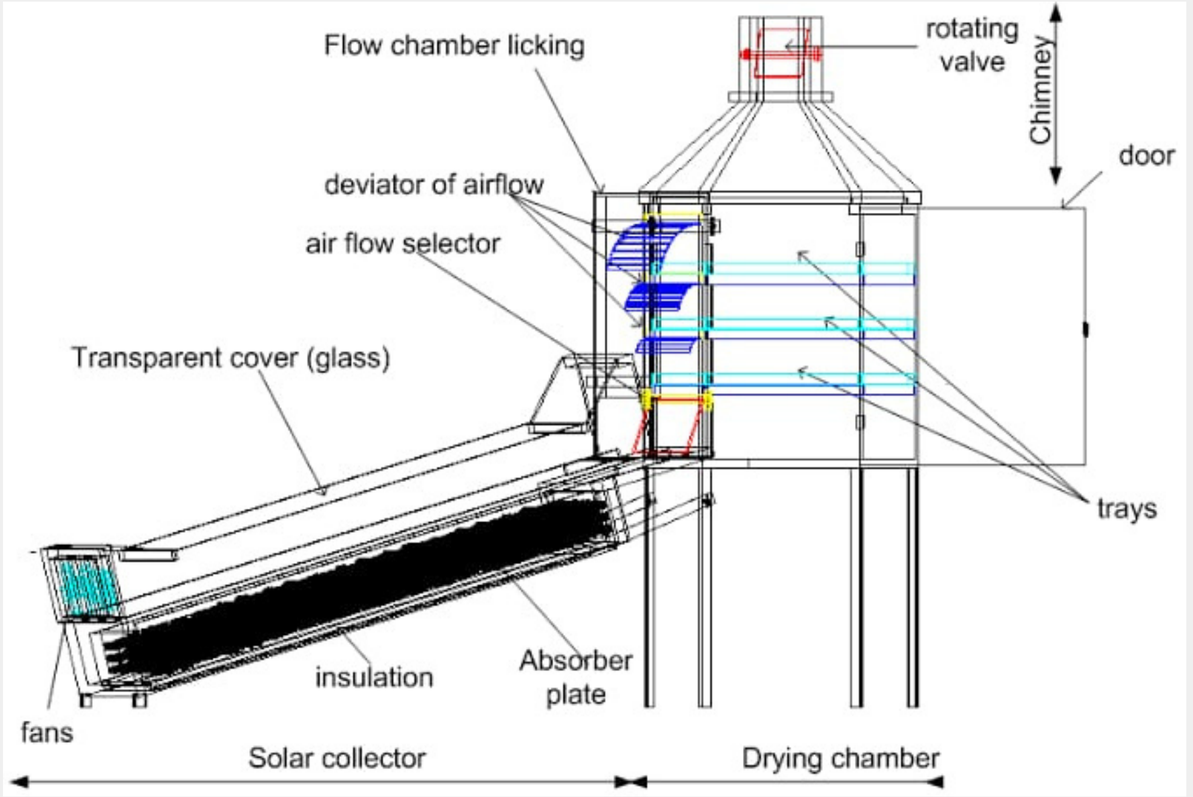
Most of the food is being wasted when there is more supply and less demand for a particular crop.

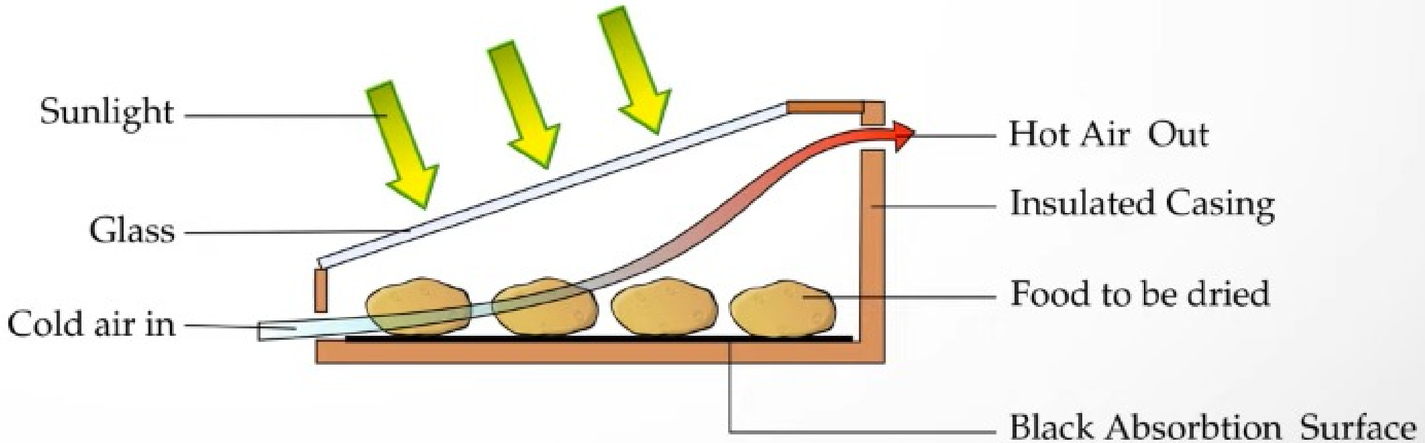
What is the idea

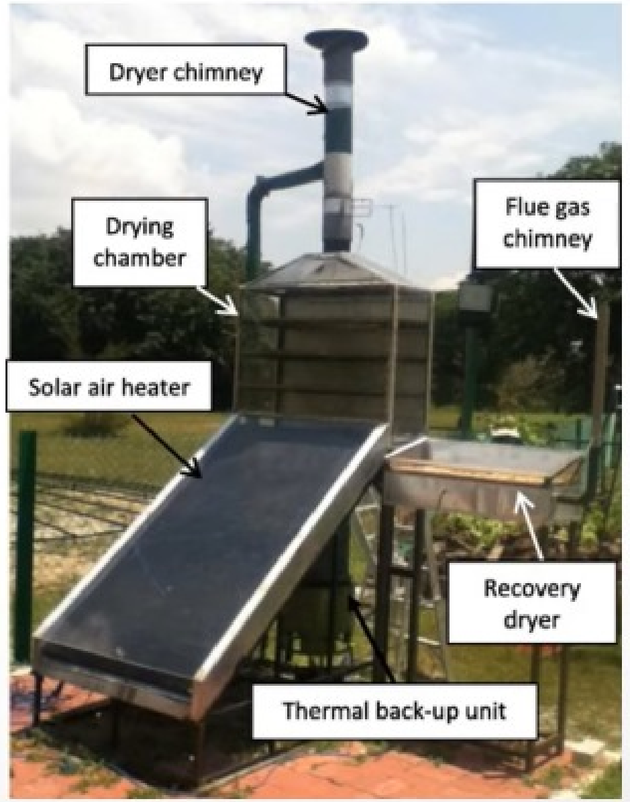
Traditional methods like open sun drying are used in past for preservation and to increase the shelf life of a crop. And we all know solar energy is sustainable energy and should be used the most to conserve fossil fuels. Open sun drying has disadvantages like food contamination, unpredictable weather changes, etc. These can be overcome by using solar drying.

Solar dryer and its working

- Solar dryers are used to eliminate the moisture content from crops, vegetables, and fruits.
- solar dryers - direct, indirect and mixed.
- Solar dryers are used to eliminate the moisture content from crops, vegetables, and fruits.
- Enough heat to draw out moisture, without cooking the food;
- Dry air to absorb the released moisture; and
- Adequate air circulation to carry off the moisture.


Flow chamber licking
rotating valve
Chimney
door
deviator of airflow
air flow selector
Transparent cover (glass)
trays
insulation
Absorber plate
fans
Solar collector
Drying chamber


Sunlight
Glass
Cold air in
Hot Air Out
Insulated Casing
Food to be dried
Black Absorbtion Surface


Dryer chimney
Drying chamber
Flue gas chimney
Solar air heater
Recovery dryer
Thermal back-up unit

Automation

- The automation of the dryer can easily be achieved by developing an IoT-based system with the help of Arduino and Raspberry Pi, microcontrollers, and microprocessors.

- Furthermore improvements and technological advancements are required, like fully automatic systems are not available

It took only 29 hours to bring the moisture content of tomatoes from 90 percent to 9 percent using indirect solar dryer whereas open sun drying 74 hours to do the same.

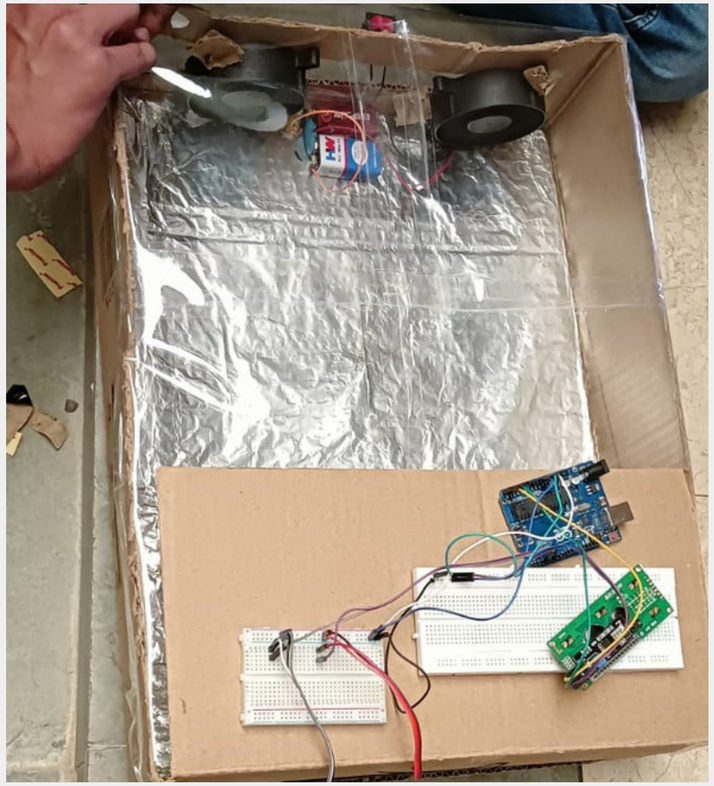
S No.	Name of the crop	Initial moisture content(%)	Final moisture content after drying in solar dryer(%)
1	Red chillies	63.8	8.01
2	Watermelon	94.62	10.72
3	Cabbage	91.2	8.63
4	Bitter Gourd	91	6.25
5	Parsley	74.7	10.0
6	Mango	79.63	60
7	Banana	75.5	64.6
8	Papaya	94.17	60.13
9	Tomato	95.8	2.2
10	Carrot	93.4	2.6
11	Okra(ladies finger)	94	5

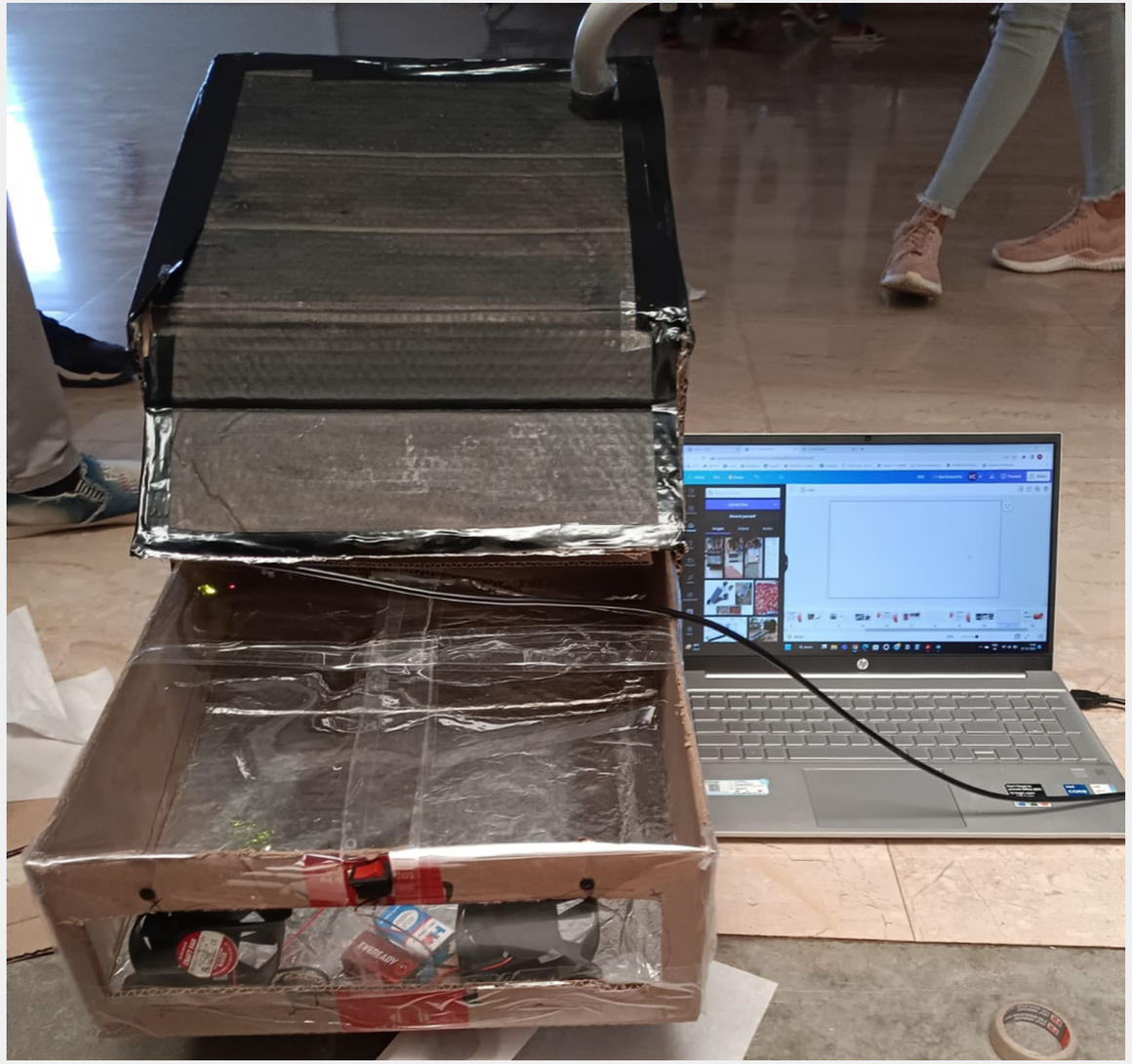
Basic prototype

- LCD 1602 display
- metal plate absorber
- dht11 sensors
- fans for faster air circulation
- Arduino uno

Further works

- UV lights and 24 hrs working
- ethylene sensors
- Image processing techniques
- IOT
- Arduino Mega





End

Thank you