

SunHarvested CoolRooms Conceptual Drawings

Requirement:

The shortcomings of the existing space cooling systems validated the need for a methodology that was more efficient, economical and environment friendly than the ones mentioned below.

Apart from being able to decrease the temperature, reduce the relative humidity and increase the rate of air flow within a select space, the new cooling system needed to be one that could be implemented at minimal cost, involved low maintenance & recurring costs and which could be operated without the use of electricity.

<u>PARAMETERS FOR COMPARISON</u>	<u>FANS</u>	<u>AIR CONDITIONER (1 ton)</u>	<u>AIR COOLERS</u>
Temperature Variation / Cooling Intensity	Nil	(-)15 Degrees	(-) 8 to10 Degrees
Humidity Levels (while in operation)	No Change	Very Low	Very High
Indoor Air Quality	Fresh	Stale	Stale
Capital Investment per unit (Approx)	INR 1200	INR 30,000	INR 12000-15000
Maintenance Cost per annum (Approx)	INR 500	INR 5000	INR 3000
Electricity Consumption per hour	75 watts/hr	1000 watts/hr	275 watts/hr

Table No. 1: Review of the available systems of air cooling

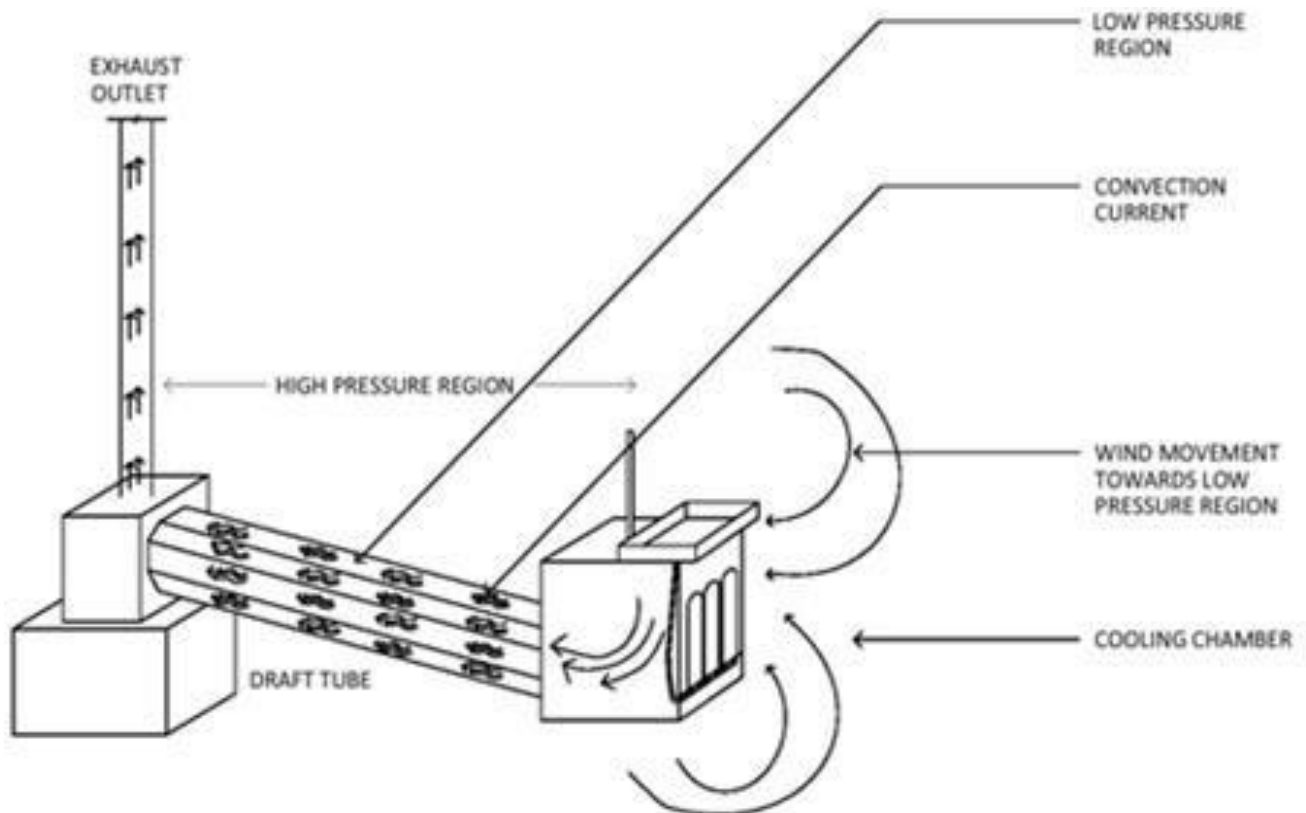


Figure No. 1 : Overview of laboratory model

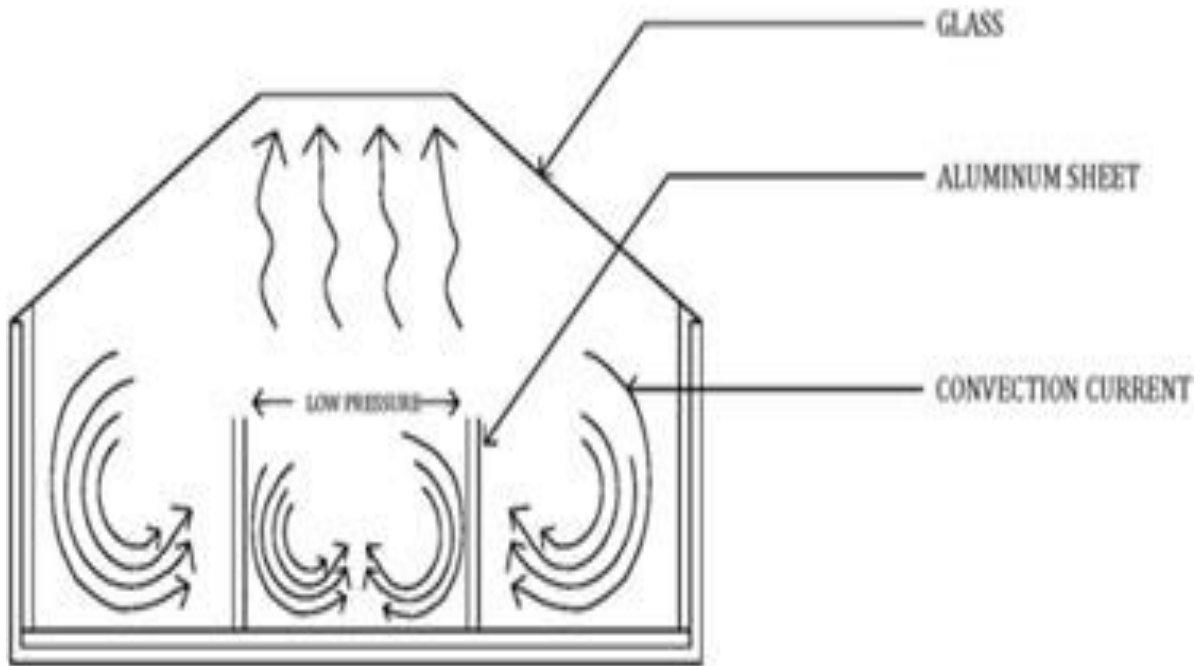


Figure No.2 : Cross-section of draft tube

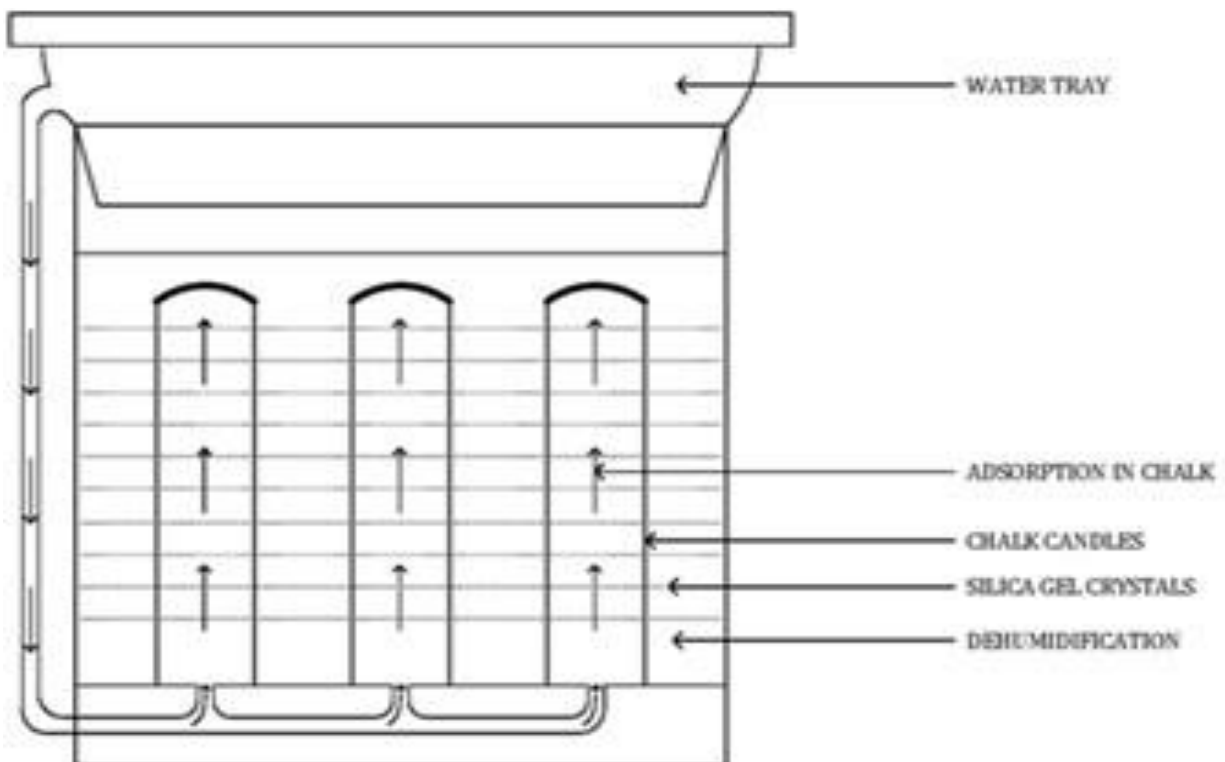


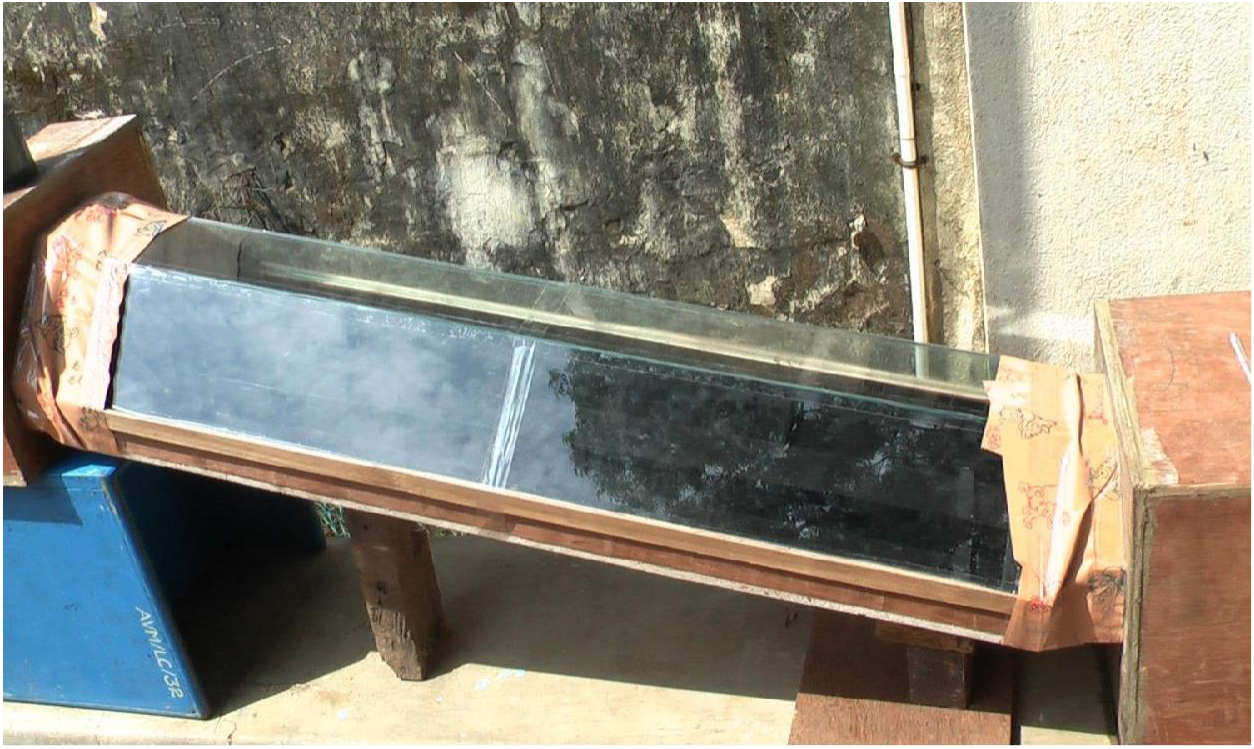
Figure No. 3: Cross-section of room

SunHarvested CoolRooms

Lab Experiment

Photographs of the Laboratory Experiment:







Result and conclusion:

The observational recording of the laboratory experiment undertaken in relation to the eco-friendly air cooling system validated all the hypothesis and established that the in-synced working of the principles related to absorption, convection currents, pressure change, pressure gradient force, stack effect, de-humidification, adsorption, evaporative cooling, and the LeChateliers principle of equilibrium, within a specific design format created a methodology that could lower the temperature of a select space by 6-8 degrees Celsius or 42-46 degree Fahrenheit. Since most of the materials used in the invented methodology were cost viable added to the fact that its operational processes neither draws on fossil fuels to emit heat absorbing carbon dioxide gas nor releases ozone depleting substances like chlorofluorocarbons and hydrochlorofluorocarbons, it is considered to be an economically viable and ecologically friendly means of space cooling system.

Outcome:

<u>PARAMETERS</u>	<u>DESIREABLE OUTCOMES</u>
Cooling Intensity	High to Medium
Temperature Variation	(-) 6 to 8 Degree
Humidity Levels (while in operation)	Optimal
Indoor Air Quality	100% Fresh and cool
Electricity Consumption per hour	NIL

Table No. 2: Outcomes obtained from the lab experiment

SunHarvested CoolRooms **Prototype**

Test's Outcome?

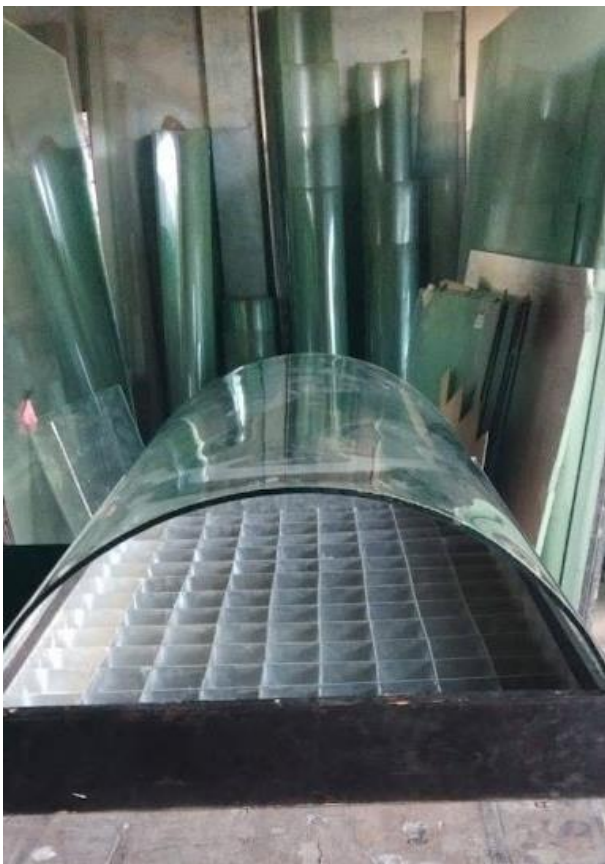
The operational efficacy of the prototype was tested with soft vegetables including beans, brinjal and tomatoes stacked in perforated stackable-trays within the best performing 'SunHarvested CoolRoom' (prototype 1). This category of agri-produce which normally remains fresh for only 2 days post harvest, now remained salable even after 7 days. Effectively implying that the post-harvest shelf life of this category of produce had improved 3 folds with the optimal temperature, humidity and windspeed of this gridless prototype.

	TEMPERATURE (Deg. C)	HUMIDITY (%)	PERISHABILITY (Days)
NO ON-FARM STORAGE SYSTEM	40	80	2
GRIDLESS ON-FARM STORAGE (ShCr)	25 - 30	60	7
GRID STORAGE	5	40	10

Table No. 4 : Table of storage data of Carrot with different mechanisms

The above outcomes effectively implying that the shelf life of soft vegetables like beans, brinjal and tomatoes, could be tripled in an environment with temperature of around 25 – 30 Degrees Celsius and humidity of 60% (RH) which the 'SunHarvested CoolRoom' was able to provide without the use of electricity.

PHOTOGRAPHS OF THE PROTOTYPE -







SunHarvested CoolRooms

Future Plans

For stacking leafy vegetables like Spinach, Methi, Coriander or hard vegetables like Potatoes, Beetroots, or Chow-chow or fruits like Papaya, Orange or Apples etc, the 'SunHarvested CoolRoom' prototype will require customization in terms of the optimal temperature, wind speed and humidity for each of these categories of fresh produce. This is anticipated to be possible by applying the principles of 'Design Thinking' and also 'Computing Skills' like image processing, cloud computing, neural networks etc.

To enable the automation, Project 'SunHarvested CoolRoom' will collaborate with Google India which is implementing Project Loon (Light-Beam Balloon Technology) for its internet connectivity related needs. For the quantitative scaling related requirements, the project is looking to partner with Tata Trust since its project, 'Internet Saathi' could be a potential implementation partner.

I am working on reaching out to these prospective partners through their award programs and also through LinkedIn

LinkedIn - <https://www.linkedin.com/in/mahek-parvez-3377341a5/>

Youtube -

<https://www.youtube.com/channel/UCaZWVmlvc7a80Kb92S INdw>

Personal Website - <https://mahekarparvez.wixsite.com/meg-nebula>



24th September, 2022

TO WHOMEVER IT MAY CONCERN

It is my pleasure to write this 'Letter of Recommendation' for Ms. Mahek Parvez on behalf of the social enterprise and charitable trust by the name of Aatma which works with communities of women in India to empower them, even further.

We at Aatma, sincerely believe that women are multitalented, intelligent and are an empowered lot. We immensely respect their sense of responsibility and have imbibed this understanding in the **P.O.W.E.R** programs that we have put together for them and committed to ourselves to.

The acronyms stand for:

P - Produce Food

O - Optimize Shelter

W - Water Conservation

E - Earn Money

R - Remain Healthy

I distinctly recall meeting Mahek as a volunteer the first time around, when she was about 14 years old volunteering to train rural children from Karate. When she expressed keen interest in joining our organisation, I was left wondering as to what this little child could do to resolve complex issues we were dealing with and how she could possibly be of support to the programs that we are working on.

Today I am thankful to the good senses that prevented me from shooing her away. Instead, we gave her menial errands to run over the weekends that she would invest with us. She would take upon herself the responsibility of drawing posters and painting canvases to create awareness and promote the acceptance of our proposed interventions, keep children occupied why their mothers were attending out campaigns.

She acted at creative head by artistic depictions to catalyse discussions for our workshop christened 'The Jewellery Tails' an attempt was made to incite a sense of cognitive dissonance against obsession for precious ornaments that have reached such heights that parents of young women are forced to hand-over humongous amounts of it as dowry or better still, gift it away under the garb of trousseau despite financial constraints.

www.trustaatma.org

502, Shanti Park Complex. Jayanagar 9th Block. Bengaluru - 560069. India. Ph +91 9341249224

become a star-feature of our POWER program dissipating women safety, self-confidence, and community well-being.

Mahek acted as creative head by making artistic depictions to catalyse discussions for our workshop christened 'The Jewellery Tails', an attempt made to incite a sense of cognitive dissonance against obsession for precious ornaments that have reached such heights that parents of young women are forced to hand-over humongous amounts of it as dowry or better still, gift it away under the garb of trousseau despite financial constraints.

Since investing in women's economic empowerment sets a path for poverty reduction and for equality between genders, women need to be motivated to groom and deploy professional skills to compete in markets and own their lives. Hence, the campaign 'Women@Work' was conducted, where Mahek made thought-provoking posters on career opportunities for women.

I consider the 'SunHarvested CoolRoom' project as her most valuable contribution till date.

The prototype of this project has been executed in the safe backyard of the premises belonging to Ocean Healthcare, in Orathur Village, Thiruporur Taluk, Chengalpet District Chennai, Tamil Nadu, India, a locality surrounded by farms engaged in cultivating horticultural produce. During the demonstration and testing of efficacy, most farmers showed keen interest in using Mahek's methodology to build what was referred to as the 'Cool Rooms' to stack and store their vegetables to prolong its shelf-life.

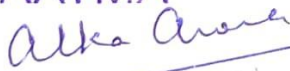
My team and I are of the considered opinion that Mahek should be encouraged both tangible and intangible to take her innovation to the next level by way of a larger application of the cooling methodology she has envisioned and executed with much success.

In all, her overall contribution to community welfare has been incredible and worth appreciating.

We, at Trust Aatma, wish her success at all that she decides to undertake in the future.

Best Regards,

For AATMA



Managing Trustee

Mrs. Alka Arora

Managing Trustee

www.trustaatma.org

502, Shanti Park Complex, Jayanagar 9th Block, Bengaluru - 560069, India. Ph +91 9341249224