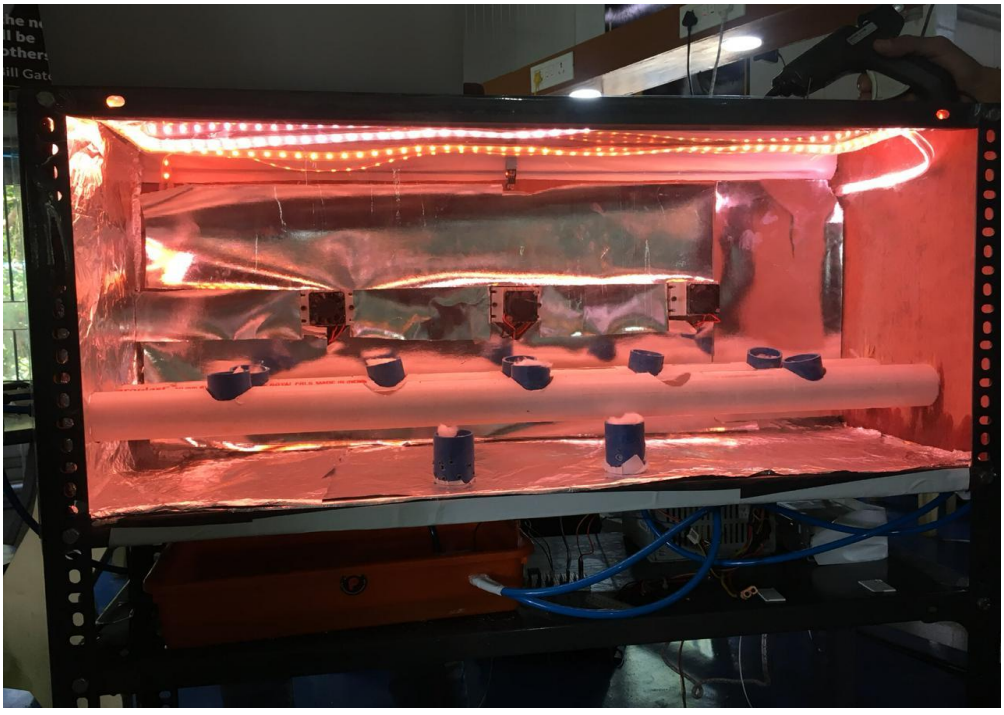
Demeter

1) We designed Demeter, an incubator for agriculture which was named after the Greek goddess for harvest, yield and prosperity. Demeter is a fusion between the concepts of a **Hydroponics** and **LED conductive rendering** for enhanced plant growth.
2) It worked on the principle of growing plants in a nutrient rich water-based environment which gave us an edge over the contemporary methods, such as zero soil use, consumption of 80% less water, nutrient efficiency, 2X growth rate and maximum utilization of available space.
3) Moreover, we enabled remote monitoring of all the environment parameters such as **humidity, temperature, water level of reservoir** and **intensity** as well as **wavelength of led emission spectrum** with the aim of providing complete control over the climatic conditions faced by the crops to the user.
4) In many reports, red–blue LEDs were demonstrated to be more suitable for lettuce cultivation. Red and blue lights have the greatest impact on plant growth because they are the major energy sources for **photosynthetic CO_2 assimilation.**
5) By analysing the specific wavelength absorption patterns of plant pigments, known as **absorption spectra** which shows the comparison of absorption spectrum of fresh lettuce leaf with spectra of sunlight and white fluorescent light, we noticed that there were two intense absorption bands of fresh lettuce leaf in the range of **400–800 nm**, mainly from chlorophyll and carotene absorptions.
6) We devised a system to vary the emission spectrums as per the crop's requirement and also formed an algorithm to take into consideration several phenomenon like photoperiodism
7) Our target audience:
    - **Urban farming enthusiasts** who wish to venture in the sphere of farming as a hobby within constrained proportions.

The dry weight of lettuces under the RYB light treament is 3.0 times as high as that under the radiation of SRB light. The results can support the above deduction that the RYB light with good “color rendering” is to the benefit of the growth of plant.



From experiments it has been consistently found that the plants that are growing only under LEDs red (660 nm, long waves) spectrum growing poorly with leaf deformities, though adding a small amount of blue allows most plants to grow normally.