C . O . D . S

Learn . Develop . Grow

FI-T229

Problem Statement:

According to market surveys, middlemen take away up to a staggering 60% of the price of agricultural goods offered by consumers. Such a situation arises due to the inability of the poor farmers to wait for long after harvesting their crops.

In order to meet his commitments and pay his debt, the poor farmer is forced to sell the produce at whatever price is offered to him. Our team, T229 intend to find a non-energy intensive, cold-storage solution to tackle this problem.

Abstract for solution:

To create a cold-chain solution which is not only versatile and cost efficient but non-energy intensive too, by engineering a solid plank like material which not only insulates but simultaneously cools. This ‘plank’ will have several layers to it made primarily from natural low-cost materials such as clay and cooled by water mists and soil.

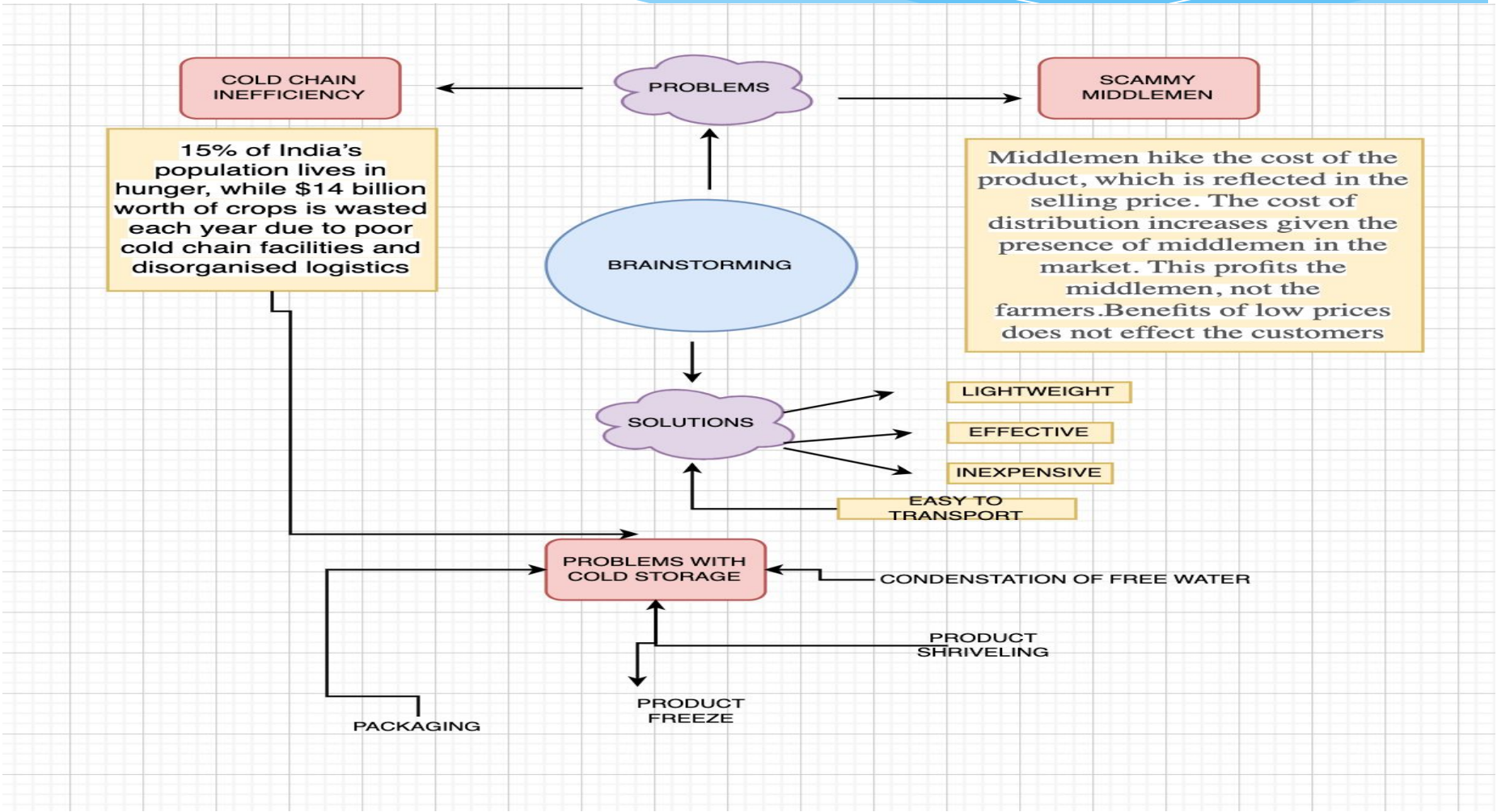
The Problem

- In the absence of sound marketing facilities, the farmers have to depend upon local traders and middlemen for the disposal of their farm produce which is sold at throw-away price.
- In most cases, these farmers are forced, under socio-economic conditions, to carry on distress sale of their produce.
- Such a situation arises due to the inability of the poor farmers to wait for long after harvesting their crops.
- The Rural Credit Survey Report rightly remarked that the producers in general sell their produce at an unfavourable place and at an unfavourable time and usually they get unfavourable terms.
- Many market surveys have revealed that middlemen take away about 48 per cent of the price of rice, 52 per cent of the price of groundnuts and 60 per cent of the price of potatoes offered by consumers.
- Storage facilities in the rural areas are either totally absent or grossly inadequate. Under such conditions the farmers are compelled to sell their produce immediately after the harvest at the prevailing market prices which are bound to be low. Such distress sale deprives the farmers of their legitimate income.

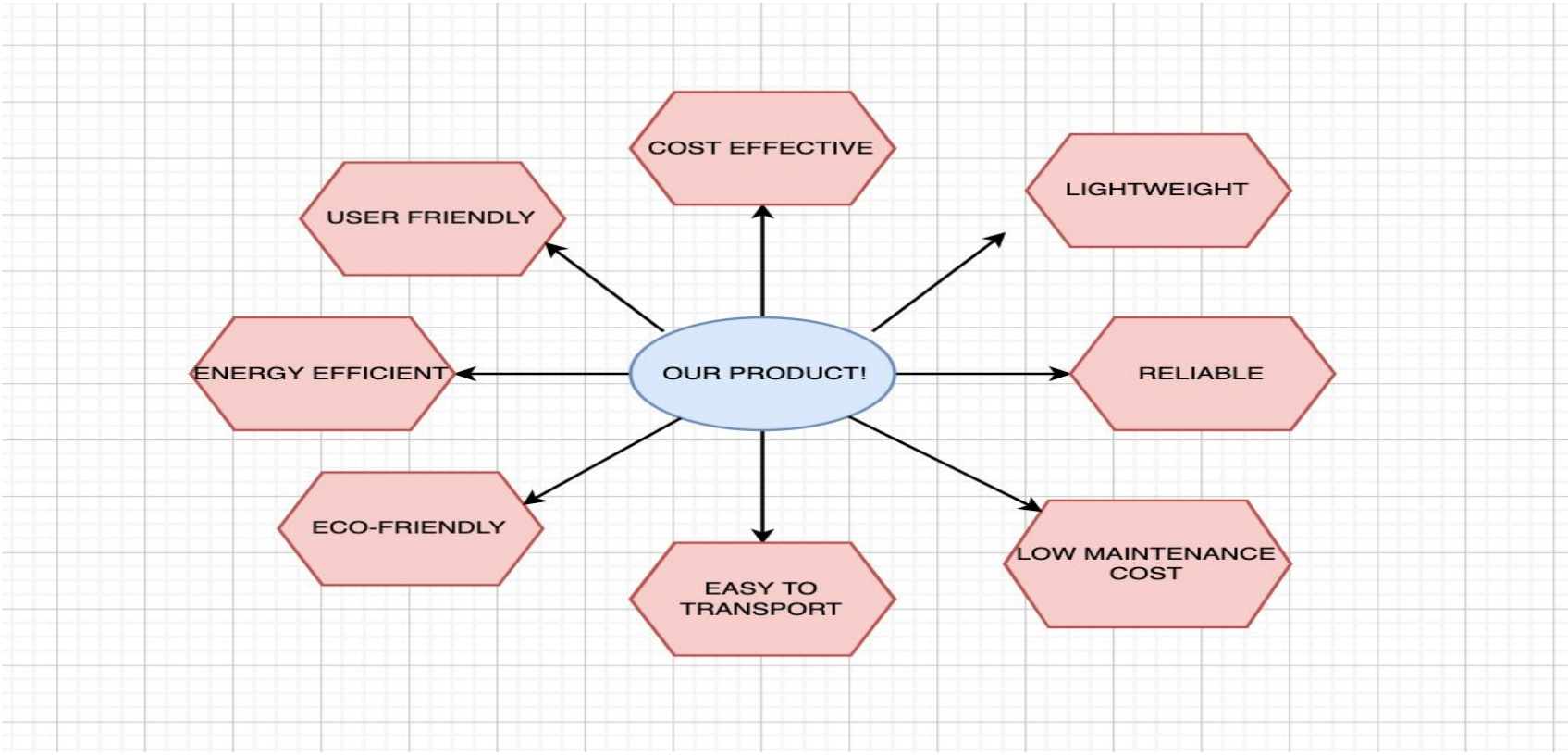
- Due to failed cold chain transits, poor warehouse conditions and traffic delays, India wastes 40% all harvested agricultural produce
- Furthermore, the Indian government estimates that 80-90% of cold storage in the country is used to house potatoes leaving disproportionate hoards of other perishable foods like fresh fruits unguarded. Between 2015-2016, India exported nearly $600 million in fresh fruits – a category that is most severely affected by poor cold chain logistics, losing 18% of all produce after harvest.

Draw.io

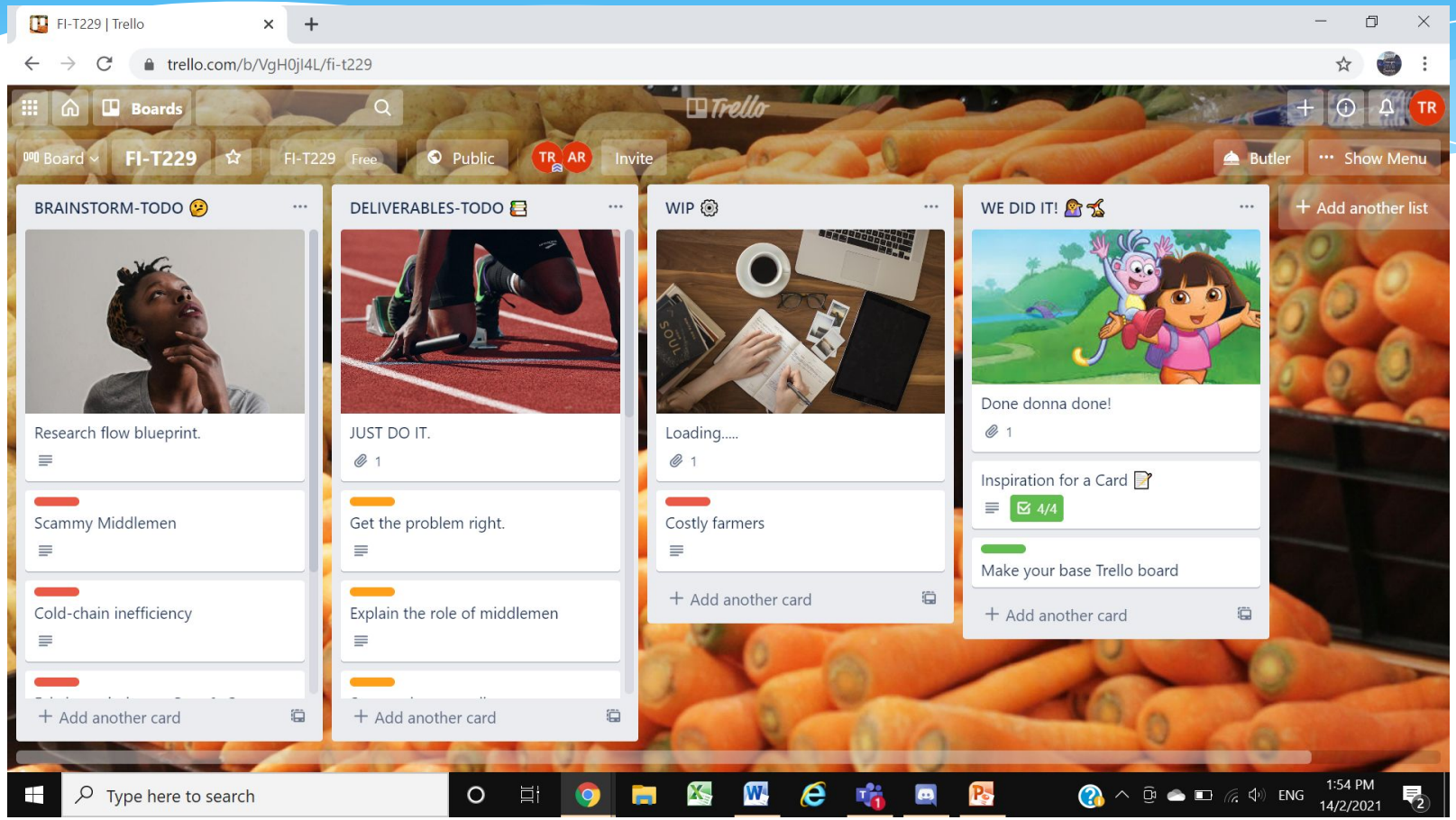
I. How we approached the problem



II. How we tackled the problem

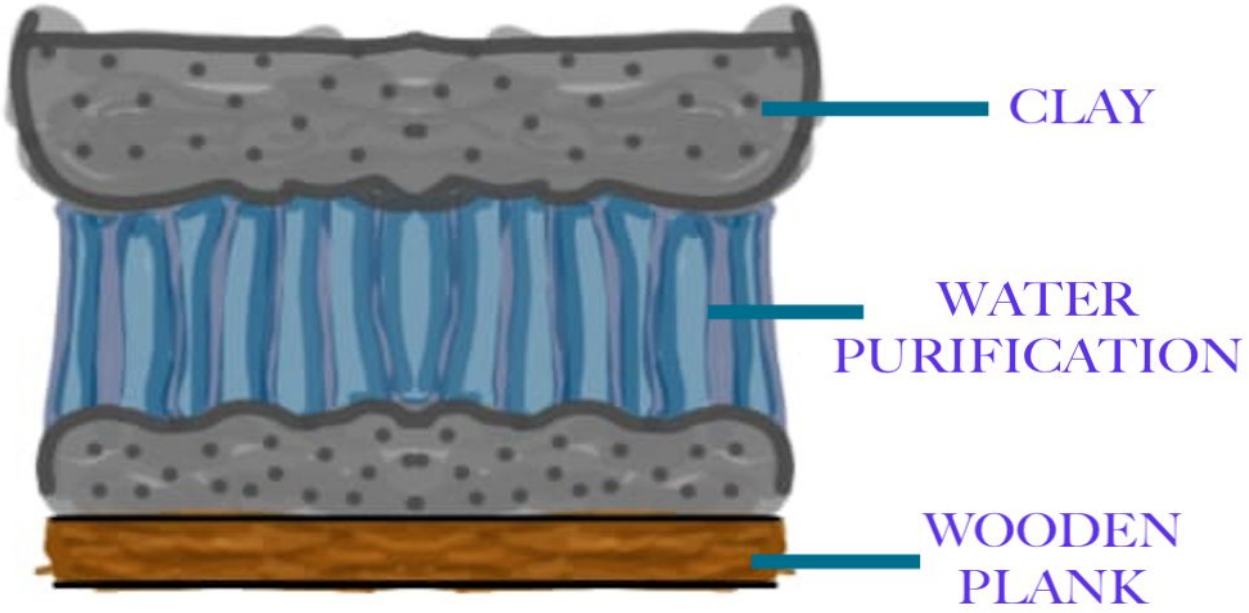


Trello



https://trello.com/b/VgH0jI4L/fi-t229

Solution features



---several thousand litres capacity

---cost-effective

---easy to use

---user friendly

---can be used to build several different structures.

(Used directly as a plank while transporting, can be used to construct a box that can be transported with ease!

It can also be used to build a refrigerator that has several planks to store all sorts of perishable items conveniently!)

---impermeable separation layer between the food and the porous clay layer to make sure food is not contaminated

---the temperature inside the pot is around 40F...to keep all the food fresh!

---a water mist system where water is supplied to the different layer of the plank in regular intervals, when required to prevent the overflowing of water

---purification system to ensure the water entering is pure

---this can be done using clay layer and the muslin cloth with activated carbon. Due to the purification system, any water can be used hence increasing the usability of the product!

---filtration layer in the form of a cardboard:

Layer 1: wooden plank to ensure a rigid structured capable of supporting the weight of the food

Layer 2: Thin layer of clay.

Layer 3: Purification system

Layer 4: Thin clay layer.

Instead of using one thick layer of clay we have introduced two thinner layers in a cardboard like structure, to increase surface area for extra cooling .

The entire purification system is sandwiched by the clay.

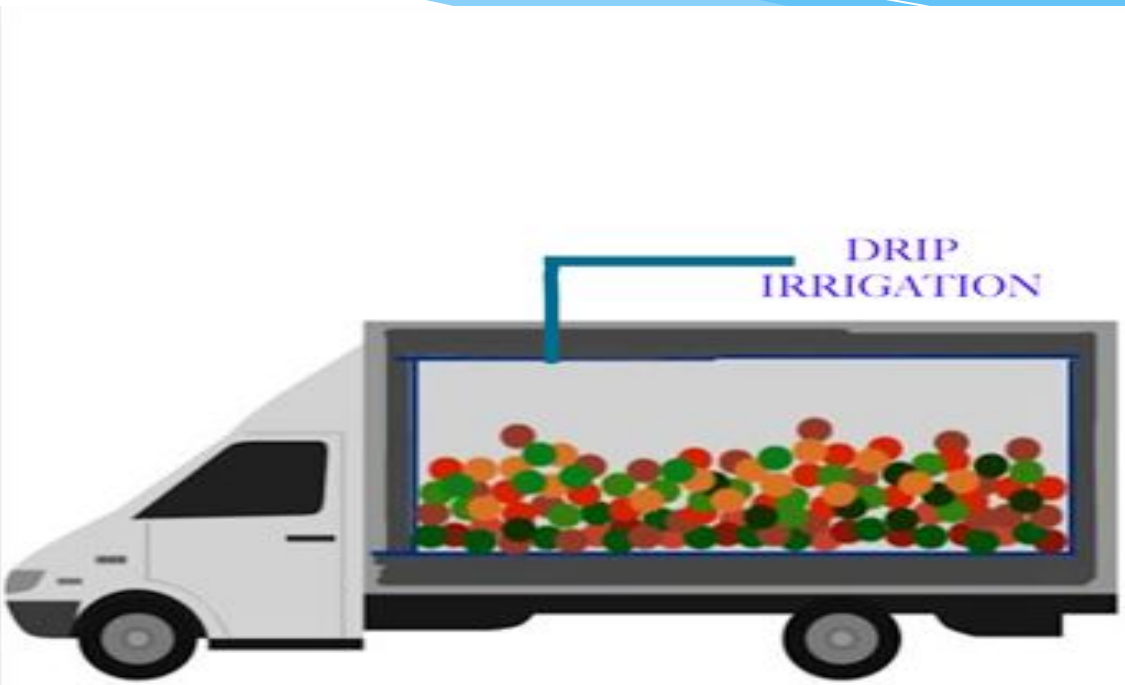
Applications

Underground Warehouse Units

- It makes use of the insulating effect of the ground and the cooling effect of the groundwater.
- The ground fridge is with the excavated earth. This layer of soil is about one meter thick and insulating. Thus, the temperature inside the fridge barely varies.

Cold Storage Transportation

- A container made of our product will be the transportation unit containing the goods.
- As we don’t have a constant source of underground water, as in the previous application, we would have to supply distributed water to this container using a drip irrigation method at constant intervals..
- The water will continuously absorb the heat and evaporate thus keeping inner contents cool.


DRIP
IRRIGATION

The Big Picture

* Encourage growing Horticulture Crops (fruits and vegetables) which not only bring in higher cash flow but decreases burden on FCI and their MSP policy. Decreases reliability on Food Crops (wheat, rice, maize, pulses etc.)
* A side gig for farmers to bring in an additional income, by setting up such warehouses. Will decrease their several agricultural woes, as demand for cold storage is always there and not dependent on monsoon, fertiliser rates etc.

Thank you for reviewing our project.

We hope you found it worth your time and we hope that we will be able to make a difference in the lives of millions of farmers who suffer each day.