

Draft of Research Proposal

by

GVICAA Foundation

(An Impulse for life)

A non-government organization working hard to create the smooth track for mankind through its efforts and collaboration of government.

Aim: The main aim of proposing this research idea is to fill the food security gaps among the Indian population by reducing the post harvest losses and maintaining the food quality & safety. By establishing sophisticated cold chain facility with latest & emerging freezing technology at rural scale viz., solar driven refrigeration technology targeting the rural area with greater post harvest losses.

Research Topic:

“Establishment of cost affective & affordable cold chain facilities to mitigate post harvest losses targeting food security at rural India”

Introduction:

India is second largest producer of food next to China with estimated food processing industry size at US\$ 70 billion. In 2012, the production was 257 million tonnes of food grain (rice, wheat, coarse grains and pulses), 75 million tonnes of fruits and 149 million tonnes of vegetables. Out of these amounts, only 2.2 % of these are processed.

In contrast, countries like USA (65%) and China (23%) are far ahead of India in reducing the wastage and enhancing the value addition and shelf life of the farm products. The losses in postharvest sector are estimated to be from 10 to 25 per cent in durables, semi-perishables and products like milk, meat, fish and eggs.



The estimated losses in fruits and vegetables are higher and reached from 30 to 40 per cent. These percentages are not acceptable and adversely affect the Indian economy. To prevent such amount of losses, different organizations in India have been trying to find solution for serious issue related to post-harvest. Some efforts came with progress and achievements, other work didn't reflect to visible success as expected. So, in this study, our aim is to address and discuss the important ramified issues in post-harvest in India with focusing on the rules or constructions of most postharvest contributories. As noticed from the comprehensive literature review, India has well established postharvest institutions supported by government, public and private sector. The national-scale surveys and studies have been carried out mainly by the government and in few cases international organization, while, case studies and district/level research mostly carried out by local research institutions and universities.

There are many remarkable technologies distributed successfully and reached the end-users/farmers in some places. However the continuous impact and follow up stages of them haven't been covered by literature review. The rules of national/international non-governmental organizations varied and concentrated on specific areas. The economic losses reported either in districts or national level and the figures of losses didn't match for some cases. The role of women and their suited technology in post-harvest clearly highlighted, but the procedures of engaging them in postharvest losses reduction strategies still not clear

Literature review:

Due to well established governmental institutions in India, many research practices have been conducted. Governmental national level field surveys with help of State agricultural marketing boards/government undertakings/ agricultural universities etc., was conducted to study marketable surplus and post-harvest losses of foodgrains at the producer's level, with methodology and profile of sample villages during continuous basis for a period of three years, i.e. 1996-97, 1997-98 and 1998-99.

It Covered 25 States, 100 districts and 15,000 cultivator households in the country, and

covered also vital information on village population, geographical area, area under cultivation, sources of irrigation, ratio of area under each crop, distribution of cultivators in different categories, accessibility of the market, condition of the feeder roads and availability of storage capacity etc. as pre and post production factors (DMI, 2002a). Although the huge amount of data collected, there were very few figures about post-harvest losses and their values i.e. post-harvest losses during different operation for paddy at producers' level were as shown in Table 1 (Joshi et al., 2004; DMI, 2002b).

Literature Review:

India is the second largest producer of fruits and vegetables in the world, contributing about 9.3 per cent share of total world production. In 2020-21, the production of horticultural crops has been pegged at a record 326.6 million tonnes (MT) which is more than total foodgrain production. The production of vegetables, especially tomato, onion and potato has increased significantly over the years, making India the second largest producer of all the three vegetables in the world. Increase in production of TOP crops are mainly due to increase in area while productivity is stagnant. Horticulture is increasingly recognised as a sunrise sector, owing to its potential to raise farm income, provide livelihood security and earn foreign exchange through export. However, marketing of horticulture faces major problems like large post-harvest loss, lack of infrastructure development, price seasonality and volatility, etc. In this paper, we try to understand trends in overall production, price volatility and issues related to marketing of horticulture produce with special emphasis on TOP crops. Historical price volatility measurement of TOP crops suggest that price volatility is highest among the onion followed by tomato while price seasonality is highest in tomato. As potato has the highest storage capacity, it has lowest volatility among the TOP crops. Horticulture has been recognized as one of the rapidly growing and evolving sectors having the potential to lead us to our goal of doubling farmer's income by 2022 through backward and forward linkages. Unless the increase in production is met with sizeable increase in cold storage capacities and transportation to the consumer base, the farmers will not be able to receive their fair share of

income. Government of India has taken various initiatives to address the problems pertaining to horticulture sector like Operation Green, Agriculture Infrastructure Fund, PM Kisan Sampada Yojana, etc.

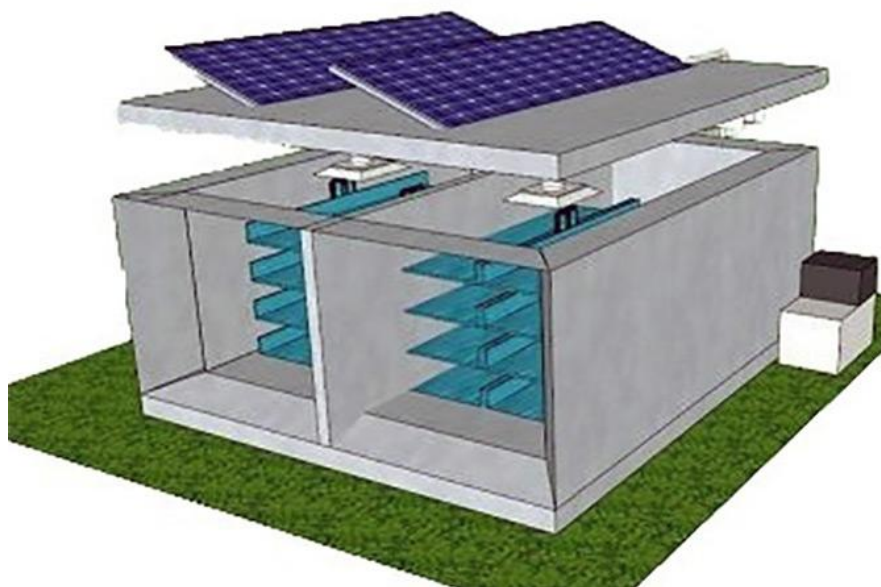
Research Gap:

Although conventional refrigeration facilities are there in India to reduce the post harvest losses of perishable commodities along with maintaining the food quality for comparatively longer period of time.

In India, there is huge lack of cold chain facility particularly at rural places which causes the loss of million metric ton fruits and vegetables along with other perishable commodities.

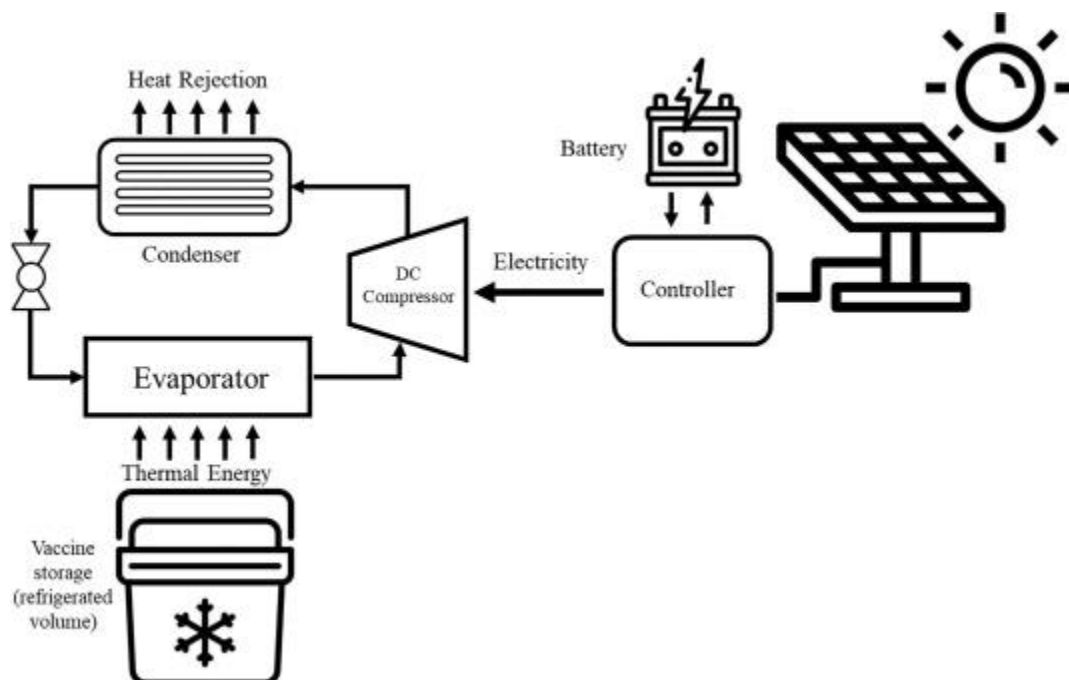
The main problem in establishing the cold chain facility in rural India is the lack of proper electricity that is needed to run the refrigeration system. This problem is actually click the importance of making something without electricity or with some sustainable source of system like driven by sun light.

In the project, the solar driven cold storage will be installed with installation of highly efficient compressor system requiring minimum input cost to make the model sustainable.



A hypothetical Design of Solar-driven cold storage system

Methodology:



Expected outcomes:

The solar-driven cold storage will be a sustainable model with comparatively greater efficiency and that will surely help to mitigate the food waste/post harvest losses and to maintain the food quality and safety as well.

Expected period of research:

Minimum period of work will be atleast 3 years with SD value of 1 or 2 years.

Budget/Fund Allocation:

2 crores.

List of equipment and machinery

Attached as annexure-I