Sector	Agro and Food Processing
Sub - sector	Horticulture Infrastructure
Profile No.	AF-14
Project Title	Onion Cold Storage

Project Description

Onion, being high in water content, is a delicate commodity to store and requires special procedure and parameters, giving rise to the concept of Onion cold storage. The proposed project envisions setting up of an onion cold storage unit in Gujarat to tackle the problem of post harvest storage. It will be an essential infrastructure for onion exporters, both in private and public sector.

Project Application

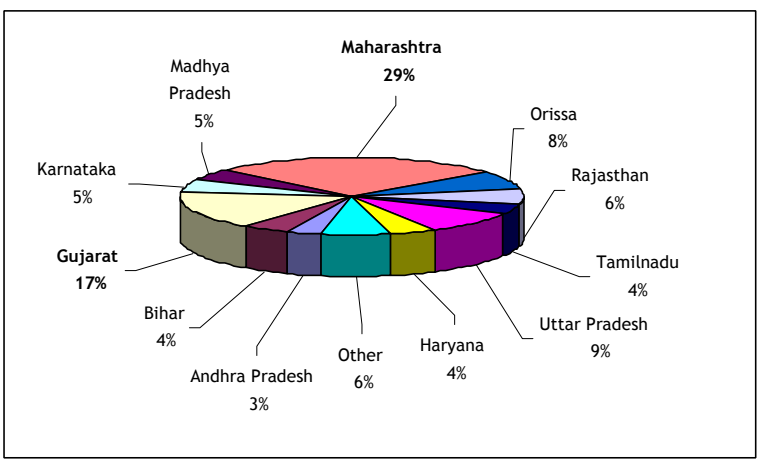
Onion is an important vegetable crop grown in India and forms a part of daily diet in almost all house holds throughout the year. It is also used for medical purpose. But due to non-availability of appropriate post-harvest storage facilities, 20-25% of the total produced onions are wasted, which in terms of value amounts to crores of rupees. Building up of the cold storage unit would minimize the waste upto the level of 3 to 4% that would in turn help the onion growers, and stabilize onion prices in market for all types of consumers.

Market and Growth Drivers

Market

China dominates the world in onion production with an annual contribution of around 32% to the world production. India's contribution was around 10% to the world production and is the second largest producer in the world. The other major producers are USA, Turkey, Pakistan, Russia, Indonesia, Vietnam and Myanmar.

India's onion production in the year 2005-2006 was estimated at 6.03 million MT, a bit higher as compared to 5.94 million MT in 2004-2005 and 5.72 million MT in 2003-2004. The following chart briefs the contribution of Indian states in onion production.



India mainly exports onions to South East Asian countries, Middle East-Gulf countries and CIS countries. The major importers of Indian produced onion are Malaysia, UAE, Sri Lanka, Bangladesh, Singapore and Saudi Arabia.

The following table briefly summarizes onion export for the last 4 available years.

Indian Export of Fresh Onions- Last 4 years

Sr. No.	Year of Export	Quantity (MT)	Value (Lacs)
1.	2003 – 2004	859938.7	71586.71
2.	2004 – 2005	870216.8	64411.89
3.	2005 – 2006	960507.3	70815.89
4.	2006-2007 (Apr-Jun)	375431.9	23514.13

Source: DIRECTORATE of Economics & Statistics, New Delhi & Department of Commerce, Government of India

The present storage capacity for onion is quite inadequate and inefficient in preventing post harvest losses. The structures available are traditional and unscientific. Even if 30% of the stocks are earmarked for scientific storage the potential for new cold storage capacity is around 4.125 Lac MT at current level of Onion production in Gujarat that is 165 cold storages of 2500 MT storage capacity each. Thus, huge gap exists for onion cold storage facilities in India in general and Gujarat in particular.

Growth Drivers

- Increasing area and production of Onion in Gujarat will require additional Onion cold storage facility to prevent post harvest losses, which is currently around 20 to 25 % of production and in value terms approximately INR 300 to 350 million every year.
- Onion demand is round the year because it is part of daily diet in almost all house holds in all regions of India. Onion cold storage will be required also at consuming centers.

Why Gujarat?

- Gujarat ranks second in Onion production, contributing 17% to the national output.
- Onion cold storage will ensure smooth supply of raw materials for Dehydrated Onion units that are mainly Export Oriented units and this will make them competitive in their export, ensuring continuous supply of good quality raw material.
- Majority Onion growers are small and marginal farmers and Onion cold storage will protect them against making distress selling of their produce. This will also ensure stable onion prices for all class of consumers in Gujarat.
- Well developed transport infrastructure like road, rail, port and air connectivity and Onion cold storage will also help in boosting export of Onion from Gujarat.
- With the advent of Gas in most of the regions of Gujarat, and with the usage of NG for Power generation, the cost of this captive power would be highly competitive. Power is important and main input in Onion cold storage operation.

Raw Material

Onion is the basic raw material for the proposed cold storage unit. The table below depicts onion production in the state for the last 4 years. As evident from the table, onion production has subsequently increasing from 717441 MT in 2002-03 to an estimated figure of 1375000 MT in 2005-06.

Onion cultivation area and production in Gujarat

Sr. No.	Year	Area in Hectare	Production in MT
1.	2002-03	25020	717441
2.	2003-04	51497	1315353
3.	2004-05	58475	1340564
4.	2005-06(E)	60000	1375000

Source: Directorate of Horticulture, Gujarat (E) estimated area and Production of Onion in Gujarat

Bhavnagar, Jamnagar, Junagadh, Amreli, Rajkot and Kheda are the major districts producing onion in the state.

Technology / Process

- Onion cold storage system is used in many countries of the world to store Indian onion. It is suggested here that along with cold chain facilities it is required to maintain the quality due to high ambient temperature prevalent in our country.
- Onion should not be stored unless adequately dried either in the field or by artificial means. It is necessary to dry the neck tissue and outer scales until they rustle when handled, otherwise the bulbs will rot in storage.
- Sprouting in onion is controlled by lower temperature. The temperature between 10-25°C increases sprouting. Rooting is influenced by relative humidity (RH). More the relative humidity more is rooting. For effective long storage of onion in Cold Storage the parameters essential to be looked after are the bulb size, choice of cultivars, cultivation practices, time of harvest, field curing, removal of tops, drying, grading, packing, storage conditions (optimum storage range of relative humidity 65% to 70% with the temperature ranging between -4°C to -6 °C).
- Most important features of Onion Cold storage structures are:

  Use of RCC roof or other suitable materials with insulation to prevent built up of high temperature inside.

  Increased centre height and more slope for better air circulation and preventing humid micro climate inside Cold Storage chambers.

  Providing bottom and side ventilations for free and faster air circulation and to avoid formation of hot and humid pockets between the onion layers.

  Avoid direct sunlight or rain water falling on onion bulbs to reduce sun scald, fading of colour and quality deterioration.

  Maintenance of stacking height and use of plastic crates for storage to avoid pressure bruising. Periodical disinfection of structures and premises to check rottage.

Suggested Storage Capacity and Project Cost

Estimated project cost for set up Onion Cold Storage having 2500 MT storage. The unit will have an estimated project cost of INR 50 million (US $ 1.11 million)

Estimated Project cost & means of finance

Sr. No	Cost of project	INR in million
1	Land and Land Development	4.20
2	Building and Civil works	10.50
3	Plant & Machinery 2500 MT storage	25.00
4	Misc. Fixed Assets	2.75
5	Preliminary & Pre-operative	2.50
6	Provision for contingencies	1.80
	Fixed Cost of Project	**46.75**
7	Margin Money for working capital	3.25
	Estimated Block capital Cost of Project	**50.00**
	Means of Finance	
8	Promoters contribution	14.30
9	Term loan	35.70
	Total Means of Finance	**50.00**

As indicated above, the proposed project will require an approx 14000 sq. mt of land with an proposed built up area of 3500 sq. mt. The unit is proposed to have an installed capacity of 2500 TPA. The total fixed cost of the project is estimated at INR 46.75 million and INR 3.25 million is the working capital margin which adds up to capital cost of INR 50 million. The unit being proposed to cater to domestic as well as to International demand and hence it is suggested to have a Debt equity ratio of 2.5:1.0 Thus, the estimated term loan amounts to INR 35.70 million and Equity at INR 14.30 million.

Plant and Machinery

The proposed Onion Cold Storage project with storage capacity of 2500 MT will require the following plant and machineries and utility equipments:

List of Plant and Machinery

Sr. No.	Particulars	Quantity	Suppliers
1	Onion Grading and sorting equipments	1	- Global Agri-tech Engineers, Vadodara
2	Super freeze refrigeration compressors	3	- Frick India Limited, New Delhi. - Or Super freeze Ammonia compressor- Sheetal Refrigeration Co, Rajkot. - DCE Refrigeration Pvt. Ltd, Pune.
3	Screen protected induction motor 30 HP each	3	
4	Hand operated immersed starter /	3	

Sr. No.	Particulars	Quantity	Suppliers
	motor starter		- Rahul Agro Systems Pvt. Ltd., Nasik
5	Screen protected delivery induction motor	3	
6	Ammonia oil separator	3	
7	Ammonia gas charging type	3	
8	Atmospheric type ammonia condenser	2	
9	Ammonia receiver	3	
10	Water pipe lines and fittings	Lot	
11	Ammonia air cooling units	3	
12	Valves and fittings for the condensers and receivers	Lot	
13	Slide rail for compressor motors	3	
14	Humidity control system	2	Bry-Air India- Gurgaon, Delhi

Utilities

The unit will require utilities like water and electric power for operation of proposed Onion cold storage unit. Approx. 30 KL / day water and 250 HP connected power would be basic requirement for the proposed unit.

Man Power Required

The proposed unit would require 26 personnel that will include a manager, a maintenance supervisor, an accountant, store keeper, 5 skilled and 15 unskilled workers and 2 watchmen.

Suggested Location

Suggested locations for the proposed project are Bhavnagar, Junagadh, Rajkot, Ahmedabad, Jamnagar and Surendranagar districts.

Project Time Line

The proposed project will have cumulative implementation period of 10-12 months of which 5 to 6 months would be for obtaining the obligatory clearances from various authorities.

Financial Indicators

Based on the profitability projections worked out for the proposed project, key financial indicators are as summarized below:

Key Financial Indicators

Sr. No	Financial Ratios	1st Year	2nd Year	3rd Year
A	Break-Even Point In % Capacity	39.69	30.87	25.14
B	Debt-service Coverage Ratio	1.88	2.40	2.88

Sr. No	Financial Ratios	1st Year	2nd Year	3rd Year
C	**Average DSCR**	**2.38**		
D	Return on Investment (ROI) in %	17.94	21.73	24.08
E	**IRR 10 years project period**	**34%**		

As perceived from the Project cost and Means of finance table, the suggested Debt Equity Ratio for the proposed project is 2.5:1. The indicative IRR (Internal Rate of Return) for the proposed project is approx. 34 % projected for a period of 10 years.

Clearances Required

- Though, cold storages have now been freed from licensing provision applicable earlier, but still the unit will get register itself as a medium scale industry by filing Industrial Entrepreneur's Memorandum (IEM) with Secretariat of Industrial Approvals, Ministry of Industries, Government of India, New Delhi, as plant and machinery investment will be more than INR 10 million.
- Registration with MOFPI through state nodal agency GAIC, to avail benefits under their scheme for food processing industry
- To approach state office of National Horticulture Board for availing incentives under their scheme for cold storage and other post harvest infrastructure facilities including cold chain transportation.
- The process of cold storage includes no harmful effluents. However, NOC may be taken from the concerned State Pollution Control Board.
- The Ministry of Agriculture has repealed the cold storage order and advised the state government also to repeal it totally. By this, the cold storage industry will be able to enter the market free from all kinds of administrative interference

Agencies to be Contacted

Industrial Extension Bureau

Mott MacDonald India

Gujarat Agro Industries Corporation Ltd