



CRITICAL GAPS IN STORAGES/WAREHOUSES FACILITIES IN INDIA AND IMPLEMENTABLE MODEL TO BRIDGE THE GAPS

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Abstract

The Logistic play very important role in moving the goods and service from production centre to consumption centre. Logistic is the process which involves transportation, warehousing and distribution of goods and services. Traditionally, food storage has unique role, since the starting of farming and settlement of world (Hall D. W. 1969), and storage or warehousing extended its services as “in-house in nature”, even today’s modern civilisation continue to play and discussed at international level. They used to provide only service to store the manufactured and primary produces and materials from production to till the point of consumption. The warehousing industry plays very important role in the management industrial and agriculture products of different stages i.e. raw material, semi -finished, finished in nature, as a part of logistic operation across countries including India. As per the principal of supply chain management, the modern firm tries to attain high level of production and allocation of goods using least inventories throughout the logistic chain that are delivered within short response times. The warehousing and storage is the important factors contributing to cost and speed in logistic supply chain management.

Secondly large geographical landmass created wider gap between production and consumption centres of agriculture and manufactured products. This has created need to seating up warehouses and storages at various strategic locations to keep the inventory to reduce the interruptions in logistic supply chain management. The thirdly the tax structure; industry has setup the warehouses in different states to evade larger tax outgo. The fourth is increasing international trade, has increased the demand of Container Freight Station (CFS) and Inland Container Depots (ICD) which has required bigger space for operations.

The government or its agencies stores agriculture products with twin objective. The first is to maintain price stability in deficient region or country, by bridging the demand and supply gap of essential primary products through unique national stabilisation programs by maintaining buffer stock, variable tariff rates and extending monopoly powered various marketing boards of primary products (Larson Donald F. et al 2004).

This paper discusses about the critical gaps in storage and warehousing of agriculture commodities at village level from the perspective of individual farmer. The paper follows with agriculture marketing infrastructure, post harvest loss due to inefficient warehousing and storage, current storage and warehousing situation, gaps and challenges for warehousing sector, proposed warehousing or storage model from the perspective of individual farmer to remove the gaps and manage the challenges of warehousing sector.

Introduction

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The construction, export import, and manufacturing are driving sectors are having heavy warehousing demand in India due to various reasons. The firstly rising demand is the growing manufacturing base of automobile, fertilizer, steel, cement, textile and pharmaceutical industries, which required heavy warehousing and storage space to store raw material, semi and finished products.



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Agriculture Marketing Infrastructure

Two third of Indian population is depend on the agriculture for their livelihood. The Government of India (GOI) has initiated the various steps towards marketing for agriculture products. Agriculture as a state subject, state government has enacted the state level agriculture marketing acts popularly known as “Agriculture Produce Marketing Committee Act” (APMC). Most of the state governments have enacted their respective act to create or set up marketing infrastructure for agriculture commodity. The APMC Acts, under the provisions of act a state level marketing board allows setting up of market for notified agriculture commodity (ies) produced and traded in large quantity, in precise location or place or area. Earlier agriculture markets have been set up with objective to get best price to the farmers for their produce determined through open auction system and smooth operation of markets curtail the black marketing and hoarding of agriculture commodities, which hostile to the farmers.

The act provisions have made farmers to sell the agriculture produce compulsorily through designated APMC markets or mandies of specific area through commission agents and trader popularly called as “Arthiya”. These provisions do not provide the farmer a flexibility to sell their produce through other or alternative channels of their choice and causes, the local market trader and commission agents have created their monopoly in determining quality and price of agriculture produce. Based on the various reports of committees and task force’s recommendations, set up by GOI, various ministries and department, department of Agriculture, GOI had framed Model APMC Act 2003 with the consultation with state governments and Union Territories to facilitate to amend their respective APMC Acts in the line of Model Act 2003.

The government of India has set up the 14 Marketing Intelligence Units(MIU) across the states to monitoring the agriculture commodity prices, formulating, implementing and review the agriculture price policy related to storage, procurement, marketing, import –export, transportation and credit etc. The number of primary regulated has increased from 146 at end of 1945 to 7566 in March 2008. Further there were increased to 6503 whole sale assembling markets, 20887 rural primary markets, 2478 principal regulated markets and 5088 regulated sub market yards were set in March 2008. The regulated markets have had coved total area of 32,87,300 sq. km covering on an average 434.48 sq. km are in 2008 whereas according to farmer commission agriculture market should be within the radius of 5 km. The 74% of markets are having storage facility and just 9% markets are having Cold Storage facility(**CSO- Manual on Agriculture Prices and Marketing, 2010**). Further the numbers of wholesale markets, rural primary markets, regulated principal markets and sub market yards have been increased to 6539,21238, 2433, and 4813 respectively as on 31st March 2011 (PatnaikGokul 2011).

Other important issue is the grading and standard which impact price realisation of agriculture produce. According to the manual of agricultural prices and marketing (CSO- MAPM2010) indicated only 30% of regulated market has grading facility, and 61% are having price display boards for dissemination of prices. There were 1637 grading units at primary level which includes 125 grading units of cooperative sector, 44 grading unit of others and 1368 grading units at 7157 regulated market and sub-yards. In terms of storage facility was just 30% of required capacity whereas cold storage facility just covering 10% & 20% of fruits and vegetable production and targeted capacity respectively (GOI 2011). The inefficiencies in supply chain and processes in bringing agriculture products to end consumers have created the demand supply gap in the market.

Wastage of Agriculture Products due to inefficient Agriculture Marketing Infrastructure

The loss of farm produce is being impacted in qualitative and quantitative terms at different levels starting from farm level to importing country passing through international trade and again processed locally in importing country. The inadequacy in agriculture supply chain in rural area, leading to heavy losses of farm produces due to the lack of appropriate scientific storage and warehousing, logistic facilities throughout the country. There is vast fissure in quantity and quality of farm produce and available storage and warehousing capacity.



Global scenario: In the developing country the loss of food grains after harvested was estimated as high as 35% to 50% at farm level, 10% to 12% at traders level and upto 5% at central storage level in 1956 to 20% as an average in 1969 (Hall D.W. 1969). The report of HLPE committee, FAO in June 2014, found that 12600 kgs per capita per annum food is lost in South and South-eastern Asia before reaching to end consumers.

India: The studies has indicated that 9% food grains are lost in stores in quantitative terms, 7% in handling and processing and 3% in other ways in fifties.

Table 1.1 Total Post Harvest Losses

Stages of Loss	1966 (in %)	Between 1998-99 to 1999-00 (in %)	Stages of Loss	1966 (in %)	Between 1998-99 to 1999-00 (in %)
Threshing losses	1.68	0.59	Insects	2.55	1.22
Transport losses	0.15	0.14	Moisture	0.68	0.04
Processing losses	0.92	0.99	Harvesting		1.13
Rodents	2.5	0.59	Total Post Harvest Losses	9.33	4.75
Birds	0.85	0.05			

Sources: 1) Adopted Planning Commission, GOI, October, 2011, 2) Adopted Dept. of Food & Public Distribution, GOI, Feb, 2015.

Table 1.2 % of Loss of Cereals in Millennium (2004) & ICAR (2010) Study

Crop	% of Loss by Study		Fruits	% of Loss by Study		Vegetables	% of Loss by Study	
	Millennium	ICAR		Millennium	ICAR		Millennium	ICAR
Paddy	11	5.2	Apple	14	2.3	Cabbage	37	6.9
Wheat	8	6	Banana	50	5.6	Cauliflower	49	6.8
Maize	7.5	4.1	Grapes	27	8.3	Onion	25.5	7.5
Bajra	6	4.8	Papaya	70	7.4	Potato	22.5	9
Jwar	10	3.9				Tomato	22.5	12.4
Gram	9	4.3						

Source: Department of Agriculture and Cooperation, Ministry of Agriculture, GOI, 22nd January 2013.

The various studies has indicated wastage of food grains and horticulture crops got damaged on account of post harvest operations, inefficient market & storage facilities, which range between 18 to 40% for various horticulture commodities (Planning Commission, GOI 2012). The total food supply chain loss was estimated as high as 18-25%. ICAR Report has indicated post harvest loss is Rs. 44,000 crore at 2009 prices (State of Agriculture 2012-13). Therefore there is an urgent need to set up state of art robust logistic supply chain and related infrastructures like cold storage, warehouses and storages etc, to match the growing consumption demand of agriculture crops, meat and dairy products of consumer at the same to meet the storage demand of agriculture products produced by farmer. To minimise the wastage of agriculture commodity and to increase the share of farmers in realisation of price paid by end consumers. The new model is being discussed to bridge the critical gaps in warehousing and storage.

Table 1.3 the current warehousing and storage capacity in India

Sr. No	Name of Organisation/Sector/Agency/Department	Storage Capacity (in Million Metric Tonne)
1	Food Corporation of India (FCI)	36.89
2	Central Warehousing Corporation (CWC)	10.49
3	Central Railside Warehousing Corporation (CRWC)	3.13
4	State Warehousing Corporation (SWC)	26.69
5	Cooperative Sector	15.07
6	Private Sector	18.97
	Total	111.24

Sources: Annual Financial Reports of FCE, CWC, CRWC for Financial year 2013-14, website portal for Sr. No 1 to 4. Adopted Dept. of Food & Public Distribution, GOI, 18th Feb, 2015 from sr. No 5 & 6.



Table 1.4 Warehouses Registered with WRDA

Sr. No	Name of Sector/Agency	No. of Warehouse/Storage	Storage Capacity (in Lakh Metric Tonne)
1	Central Warehousing Corporation (CWC)	175	5.8
2	Primary Co-operative Societies	146	0.47
3	State Warehousing Corporation (SWC)	124	5.15
4	Private Sector	76	6.9
	Total	521	18.33

Sources: WRDA Website portal, data as on 27/12/2013 Availability of Cold Storage in India:

Table 1.5 No. of Cold Storages build between 1955 to 2012 (Capacity in 000 MT)

Year	Cold Storages			
	Number	% of Growth	Capacity	% of Growth in Capacity
1955	83		43	
1960	359	333%	305	609%
1965	600	67%	682	124%
1970	1218	103%	1638	140%
1975	1615	33%	1994	22%
1979	2266	40%	3348	68%
1986	2607	15%	5402	61%
2004	4748	82%	19552	262%
2007	5316	12%	23334	19%
2009 &	5381	1%	24450	5%
2010 #	5837	8%	26903	10%
2011 #	6156	5%	28681	7%
2012 #&	6284	2%	29305	2%
&- Directorate of Marketing and Inspection				
# - Includes NHB & NHM assisted Cold Storages during 2009-10 and 2010-11				
#&- as on 9th Feb, 2012				
Sources: Division Policy Division, Planning Commission (2012)				

The majority of the cold storage is located in Uttar Pradesh for potato, some part of the storage also being allocated to other horticulture crops like vegetables, species, dry fruits and other products like dairy and meat products. Meat, sea food s, milk and dairy products, and species are accounts just 1% of total cold storage installed capacity space. The cold storages sector dominated by Private sector followed by cooperatives and public accounts 95.70%, 3.8% and 0.4% respectively in December 2009. Due to the lack agriculture marketing efficiency and traditional methods of handling, transportation and storages of horticulture crops has considerable wastages.

Gaps in Storage or Warehousing: Farmers Level storage has been ignore (Hall D.W. 1969) till recent years. So there is needed to start the base of storage and warehousing from village level fork. There are various types of gap in storage and warehouse sector broadly classified as Capacity gap, Strategic gap, and Operational gap of warehousing and storage sector. Warehousing and storage sector is facing critical gaps in capacity, strategic gaps or challenges and operational challenges/gaps. To bridge the gaps the following model is being developed.

Capacity Gap

The studies have indicated shortage of in terms of capacity and availability of warehousing/ storage and cold storage. The growing agriculture production and increasing competition from retail marketing chain, manufacturing sector has created warehousing /storage or cold storage gaps for agriculture commodities.

To boost the warehousing and storage capacity government has instituted various schemes/programs like:

- Construction of Godwons- Private Entrepreneur Guarantee Scheme (PEG) in 2008
- Construction of modern warehousing facilities through PPP model
- Establishment of Terminal /Wholesale /Retail Markets under National Horticulture Mission (NHM)
- Setting up of National Centre for Cold Chain Development (NCCD)
- GraminBhandaranYojana (GBY) now merged with Agriculture Marketing Infrastructure (AMI)
- Schemes run by NABARD



To examine the gap area in capacity of warehousing and storage and cold storage sector, GOI, Planning commission, different ministries has been setup various task force, working committees. The Report of the Working Group on Agricultural Marketing Infrastructure, Secondary Agriculture and Policy required for internal and external trade for the XII Five Year Plan 2012-17. December, 2011 estimated the warehousing gap of 35 Million Metric Tonnes during 12th five year plan.

Warehousing/Storage Demand and Supply Gap

India is the second largest producer of vegetables and fruits about 200 MT per annum; whereas the capacity to store these commodities is limited to 6156 cold storages accounting total capacity of 28.68 Million Metric Tonne (MMT) (Planning Commission, GOI 2012). The majority of cold storage space consumed by potatoes and there is very little space for other commodities. In addition to this, large quantity of horticulture commodities gets wasted due to variety of reasons stated earlier.

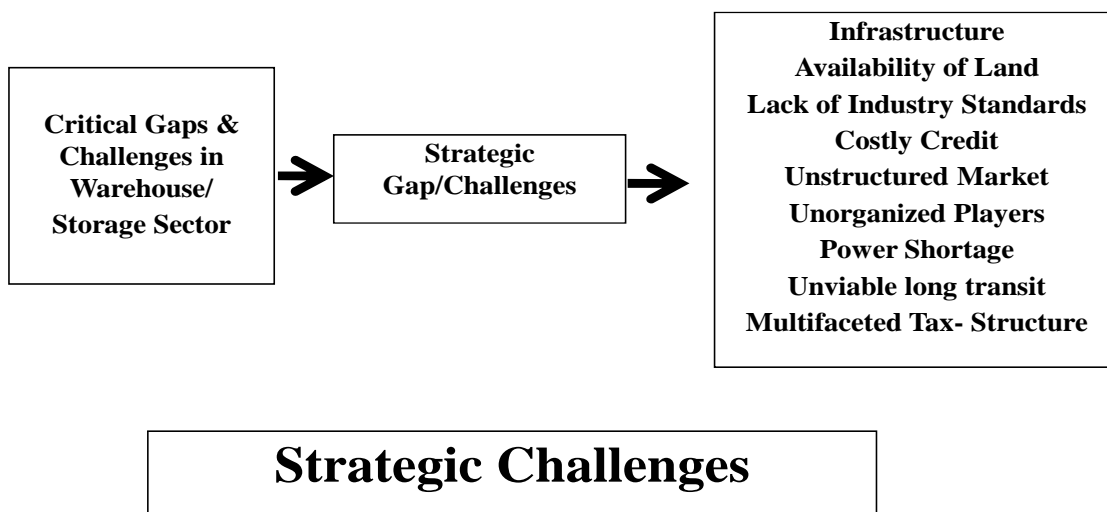
Cold Storage Demand & Supply Gap

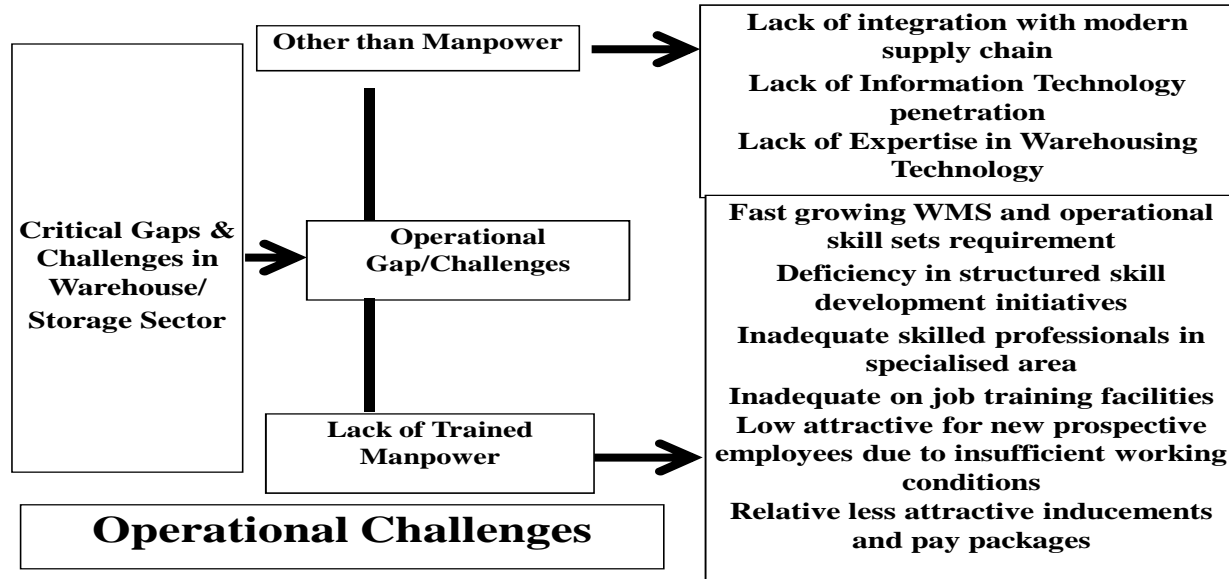
The National Spot Exchange had conducted in 2010 and estimated the cold storage capacity gap of 368.32 lakh metric tonnes. The capacity of cold storage in Delhi 126,158 Metric Tonnes, Goa 7,705 MT Andman and Nicobar 210 MT and Puducherry 85 MT. The current capacity survey done by NHB and implemented by Hansa Research Group in 2013 and report was pending till December 2014. The findings of the survey are not declared till December 2014. So the capacity of cold storage is twenty six million tonnes accounting 5200 cold storages.

The study conducted by NCCD estimated the requirement for 2014-15 of 70, 080 number of pack house whereas available was only 249 i.e. gap of 69831 of pack houses, in other case, 341.65 and 9.36 lakh MT capacity of Bulk & Hub Cold Storage was required respectively whereas available in combine of both was 318.23 lakh MT i.e. gap of 52826 units of vehicles. Also, estimated of 61826 of reefer vehicles and 9000 of ripening chambers required where the available was only 9000 and 812 respectively i.e. of gap of 8319 units as on March 2014.

Warehousing /Storage Sector Challenges

Demand for improved for quality graded and standard fresh agriculture produces because of increase in per capital income. So there is urgent need to developed effective and efficient market infrastructure of warehouse and storage. The sector is facing diverse challenges to manage the operational efficiencies of storage and warehousing sectors. Some of them are strategic and operational gaps and challenge to manage them. They are:





Bridging Gap Storage Model

Inadequacy in marketing infrastructure and weak support services bring inefficiency in agriculture markets. The poor performance of agriculture sector linked to inefficient and lack of market infrastructure facilities in villages particularly storage and warehousing, especially in backward districts of country (KumariReena and Rakesh Raman 2012). A. D. Gorbala committee appointed by Reserve Bank of India in 1954 recommended setting up scientific storage facilities at door steps of farmer at village level to reduce the farm level storage loss (9%) of agriculture produce.

The success of the efforts taken through policy initiatives are significantly depends on the effective execution and efficient governance at grass root i.e. village level (Rao Hanumantha C. H. 2003). The storage and warehousing policies can be executed through setting up Producers Company, primary societies, NGO's and warehousing associations at local village level (Coulter et al 2000).

The majority of storage programs and schemes should be location specific with consultation with local villagers for program or scheme design and accountability which are relevant for farmers centric. There is an urgent need to sensitise farmers to store farm products in storage and warehouses at village level. This will enable the farmers to be self sufficient in food during off season, particularly those households who have a mismatch in needed and produced quantity or who sold produce in distress due to financial needs (MahantaDevajit 2012).

The task force on development of cold chain to review of storage and cold storage capacity had recommended the following:

- 1) Modernisation additional cold storage capacity of 12 Lakh Metric tonnes (LMT).
- 2) Rehabilitation of sick and closed units with capacity of about 8 LMT.
- 3) Creation of additional capacity of 4.5 LMT for storage of onion.

The challenges of storage and warehousing sector can be addressed with proper policy environment. The sector specific skill gap can be filled with enhancing the skills of workforce through skill development programs. The Ministry of Skill Development and Entrepreneurship initiated various mechanisms to improve on skill sets and provide skilled manpower in the country.

The ministry had set up the National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) entrusted to find the sector specific skill gaps and prepare and finance training program or curriculum with set outcomes and designed. This schemes or program should be approving by Sector Skill councils and under the framework of National Skill Qualification Framework (NSQF). These program run in association with industry bodies or associations, private training partners etc. The use of modern ICT technology and increased in investments has augmented the competitiveness of sector. The issue of availability of land should be getting address through sector specific dedicated land bank through setting up special economic zone for logistic and warehousing and storage in different mode at different level from village level to port.



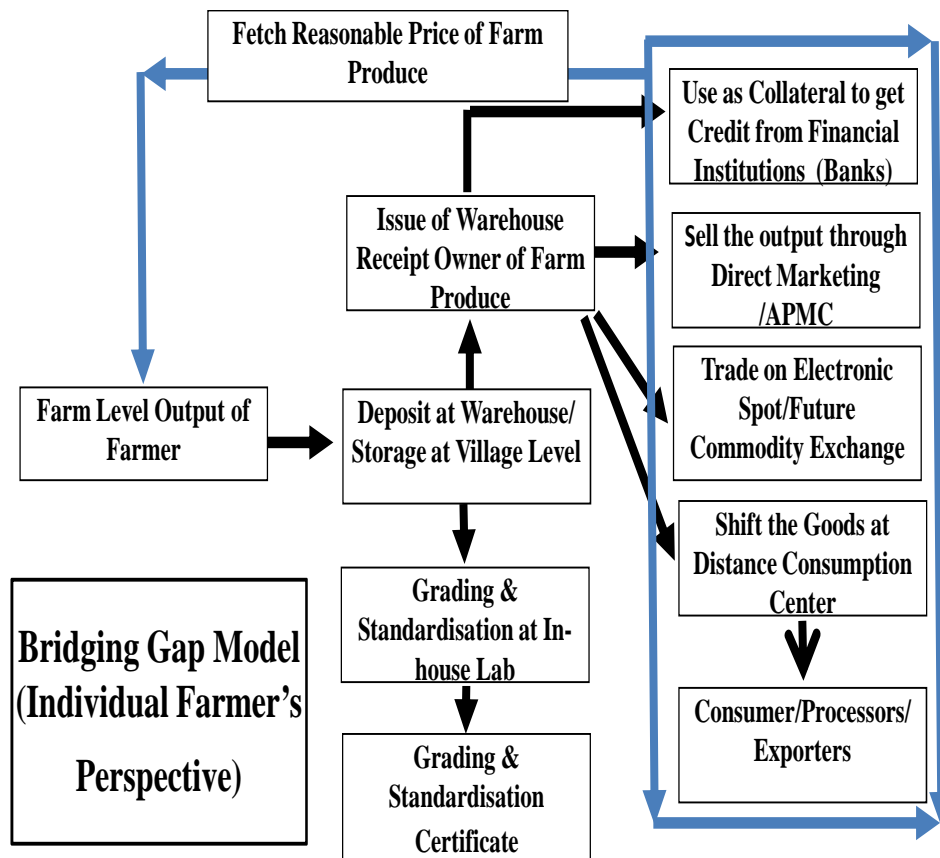
The set model is being prepared by keeping an individual farmer at centre point. The government has focused on storage of few essential food crops specifically on rice, wheat and pulses, and commodities like sugar. The government agencies have keeping the buffer stock and release, to open market or other purposes as per the government policies. The Private sector has shown the interest in marketing and storage of few profitable agriculture commodities only.

There is no mechanism in the systems, which created the warehouse and storage facilities for the farming community and solve their storage problem. Whatever facilities are available through public warehouses being used by traders in the name of farmers. There is no commodity specific warehousing or storage facility. The post harvest loss due to non availability of storage at village level account major share due to lack of financial resources and education and training. There is need to establish commodity specific scientific warehouses or storages which are getting produced in larger quantity at specific location/place.

The proposed model of storage to fill the critical gap, particularly related to agriculture commodities at village level.

Basic Steps to Executive the Model

- Form an association of farmer as producer company/marketing cooperative/primary agriculture - society and work as an aggregator.
- Set up storage and warehouse at village level and managed by an association set up at village level.
- Accredited & Register a warehouse or storage with Warehousing Development and Regulatory Authority (WDRA).
- Tie up with financial institution for financial needs of members.



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Working of Model

Farmers or association makes arrangement to bring agriculture produce in batches and store at warehouse or storage instead of taking to farmer's houses or their own unscientific store rooms.

Grade the produce according to standards in in-house laboratory and issue grade and standard certificate to farmer and Negotiable Warehouse Receipt (NWR) Farmer will use the grading certificate and NWR to market their agriculture produce in various marketing modes of his/her choice.

Utilities of Village Level Organised Storage and Warehousing

The model provides following benefits to Farmer

- Storing in scientific storage will improve the quality of agriculture produce and minimised the storage loss at farm level.
- Select new avenues to market his/her produce as per his/her choice.
- Protect farmer from distress sale in case of financial emergency.
- Receive price as per the quality grade of the produce.
- Save transportation cost
- Farmer use NWR to raise credit against agriculture produce in case of financial emergency.
- Get more shares in food supply chain in what end consumer is paying.
- Generate maximum return on investment and raise his/her income level
- Get training and awareness on post harvest management of produce.

The Model Benefits to Village

- Generate the nonfarm employment to local educated youths at village level.
- Association and warehouse managed by local people, which will create confidence among the villagers.
- Gets professional training on how to manage the association/warehouse professionally under capacity building programs organised by government department/any other agency.

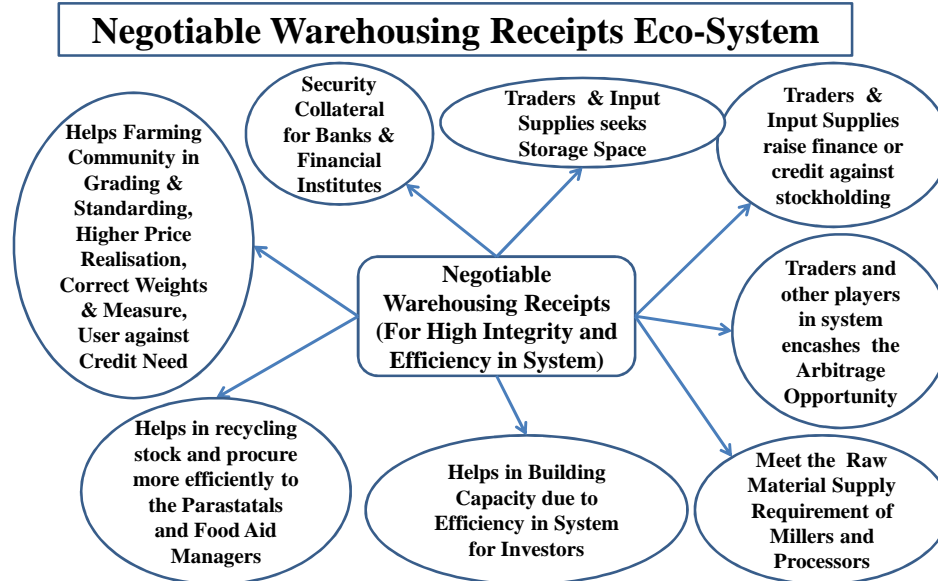
Benefits to Warehousing and Storage Sector

- Solve the land problem to establish warehouse or storage at village level.
- Reduce the cost of land as compare to other strategic location in urban and metropolitan cities.
- Organised scattered logistic and warehousing /storage operators.
- Tie up with local association /cooperative society/producers organisation to setting up warehouse or storage at village level.
- Connect with food processing industry to supply agriculture produce as raw material.
- Connect with exporters and traders of agriculture produce.
- Get funding from government department or agencies to set up warehousing in different schemes and programs.

Support the Government Initiatives

- The model supports the government to executive the various schemes or program related to agriculture in general and marketing in particular.
- Regulating warehousing and storage sector efficiently.
- Increase the warehousing capacity in the different corner of country at village level.
- Increase the penetration of accreditation of warehouses and storage.
- Conduct capacity building program at village level in association with grass root level organisation.
- Well connected with all levels from village level to special economic zones and free trade warehousing zone for logistic and warehousing sector.
- Negotiable Warehousing Receipt System (NWRS) Implementation.

Negotiable Warehousing Receipt System (NWRS) Implementation: The modern scientific storage technology used in warehousing and logistic industry contributes not only in stabilising the prices through linking the times and place of production centres and those of consumption centres of farm produce and minimised the post harvest loss of primary products which has greater impact on the economy. The twin objectives can be achieved by collective is the responsibility of all stakeholder of the eco system from producer to consumer. The government has to provide the suitable legal environment for viable warehousing or storage industry in country.



The execution of ambitious plan of Negotiable Warehousing Receipt (NWR) system in the country is depend on adequate scientific grading and standard procedures, on time market prices and inventory information to the users, conducive legal environment across country, effective licensing and monitoring system, and trustworthy act guarantee or insurance bonds from warehousing and storage industry and increases viability of storage and warehousing sector.

Conclusion

It is important to have viable storage or warehousing industry as an importable component of modern supply chain management eco system. This not only benefit to the farmers but also benefit in minimising post harvest loss of agriculture produces. The model bring all stakeholder at common platform farmer, government, logistic and warehousing industry, traders, consumers and financial institutions and sow the seeds of development from bottom of pyramid i.e. village level in logistic food supply chain. The model supports the uniform tax structure mechanism, monitoring in movement of goods and their prices and supports the secure sustainable livelihood for the farming community.

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