STORAGE POTENTIAL FOR AGRICULTURAL COMMODITIES IN INDIA

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ABSTRACT

India is the 2nd largest populated country in the world and ranks 7th in the world for land coverage; to satisfy food need of such a huge country self sufficiency in food supply is necessary. Efforts for bridging the gap between India's food production and storage capacity can be useful for achieving self sufficiency in food supply by 2020. Storage of agricultural commodities is one of the important functions in agriculture marketing. According to 2012 estimates India is the second largest producer of wheat, rice, groundnut and ranks first in pulses production. Although India's position in terms of production is very much better but food wastage is one of the major factors which contribute to uneven availability of food grains and its loss. Hence it is very much necessary to study the storage potential for agricultural commodities in India.

Keywords: *Agricultural storage, agriculture Warehousing, Food grain.*

INTRODUCTION

In India, about 60-70% of food grains produced remains in the rural sector for varying period[1]. Farmers store grain in bulk, using different types of storage structures made from locally available materials. Storage losses constitute a major share of food grain loss in postproduction operations. The grains are stored at Producer's Level, Trader's Level and Urban Organizational Storage Level

The method followed for storing the grains are - (i) storage in bags, and (ii) loose storage. Storage in bags is convenient for short term storage, where grain is intended for very early onward movement.

Indigenous Storage structures used by farmers

1. Kanaj - This is a Grain storage container made up of bamboo.
2. **Sanduka-** It is a Wooden box used for storing pulses, seeds and smaller quantities of grains.
3**. Kothi**- These structures are made up of unburned clay mixture with straw, cow dung, mud and bricks.
4**. Thekka**- These are rectangular structures and are made up of gunny or cotton wound around wooden support.
5. **Metal drums**- These are cylindrical structures and are made up of metal sheets.

[1] Acharya S. S. and Agarwal N. L. (2009) *Agricultural Marketing in India*, Fourth edition Oxford & IBH publishing co. Pvt. Ltd. New Delhi.

Improved grain storage structures

The Indigenous storage structures used by village farmers lead to losses; hence various institutions engaged in research have evolved improved storage structures for farm as well as for large scale storage.

a. **For small scale storage**
   PAU bin, Pusa and Hapur Tekka are used for small scale storage.
b. **For Large scale storage**
   1. **Cover and Plinth(CAP) storage** -This structure is made up of brick pillars. The stacks are covered with 250 micron Polythene sheets from the top and all four sides. Food grains are generally stored in CAP storage for 6-12 month periods.
   2. **Silos-** The silos are made from either metal or concrete material with storage capacity of of around 25,000 ton.
   3. **Silo bag-** The silo bags are First time used in Madhya Pradesh. It Also referred to as horizontal silos.
   4. **Warehouse-** These are scientific storage structures specially constructed for the protection of the quality and quantity of stored agricultural produce..

NEED FOR THE STUDY

India is known as an agrarian country, where almost 70 % of the population depends on agriculture for livelihood. India has moved away from chronic food deficit to a surplus. India's food grain production is now (2013-14) at around 264.77 MT. A recent estimate by the Ministry of Food and Civil Supplies, Government of India, put the total preventable post-harvest losses of food grains at about 20 MT a year, which was nearly 10 per cent of the total production. Thus, the crusade for higher production of food grain as well as lowering the storage losses has to continue with increased efforts. Hence there is a need to find out the potential for storage of food grains in India

LIMITATIONS OF THE STUDY

This study is completely based on secondary data, it only takes in to account storage of food grains, pulses and oilseeds. It does not include study of storage of highly perishable agricultural commodities like fruits and vegetables.

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OBJECTIVES OF THE STUDY

1. To find out the different segments of farmers in India
2. To know the production status of various food grains & Oilseeds in India
3. To find out the potential for storage of agriculture commodities

RESEARCH METHODOLOGY

This study is mainly based on secondary data, the required data have been collected from various economical reports, economic survey, agriculture census reports, journals and books.

REVIEW OF LITERATURE

Dr Tripathi S. K. (2015) had studied that lack of storage infrastructure causes heavy losses of food grains, pulses, oilseeds, fruits and vegetables. Seasonal fluctuations in prices are aggravated in the absence of these facilities.

According to Subba Rao (1989) uneven supply, seasonality of production, price fluctuations and the lack of storage infrastructure are some of the major hurdles of the marketing system for the agricultural produce in India.

Singh, 2010 had reported that food grains looses are before, during and post harvest also. A series of operations such as harvesting, threshing, winnowing, bagging, transportation, storage, and processing before they reach the consumer experiences looses at every step. The post-harvest losses in India amount to 12 to 16 million metric tons of food grains each year, an amount that the World Bank stipulates could feed one-third of India's poor.

Ramesh (1999) studied that the storage infrastructure is a reason behind wastage and value loss of agricultural commodities. The losses during storage are quantity and quality losses.
Tara Negi and Dhriti Solanki (2015) had studied that rural farmers uses traditional knowledge for constructing grain storage structures. This traditional knowledge regarding storage practices in different parts of the country can be standardized by using modern methods and storage losses can be minimized.

Amitabh Jhingan and Cyrus Guzder (October 2013) *The Indian Warehousing Industry : An Overview*, Confederation of Indian Industry-Institute of Logistics (CII) stated that continuous growth in annual agricultural production is creating ongoing demand for more storage space to reduce wastage. Agricultural exports from India are increasing by 20%–25% annually and have emerged as the one of the largest exporters of fruit and vegetables, propelling growth in high-quality demand for warehousing.

H. Basavaraja, S.B. Mahajanashetti and Naveen C. Udagatti (2007) studied that the storage losses at different stages have added up to about 35.80 per cent of the total post-harvest losses in rice and 33.52 per cent in wheat, The establishment of small-size cold storage units in the production centers would help reduce the storage losses.

Sudha Narayanan and Nicolas Gerber (2016) had made a comprehensive comparative review of Indian Public Distribution System of food grains and MGNREGA and found that there is gap exist especially on the potential synergies between the programs.

Shweta Saini and Marta Kozicka (2014) had analyzed the net production of food grains and per capita availability of food grains in India. The study estimated that even though the food grain production shows increasing trend, the per capita availability of food grains is decreasing continuously due to gaps in storage and public distribution system.

SUMMARY OF THE LITERATURE REVIEW

Most of the studies on agricultural marketing points out numerous problems in marketing of agricultural produce i.e. problems in grading, transportation, storage, pricing etc. These studies also put some facts regarding the procurement and supply of agricultural commodities in India. All the above studies indicate the need and importance of storage facility for agricultural commodities in India.

DATA ANALYSIS & INTERPRETATION

Objective I - To find out the different segments of farmers in India

The table given below shows that, there are 138.348 Million total number of farmers, Out of which 0.23 million have Institutional farm holdings, 19.51 Million Joint Holdings and 118.59 Million Individual farm holdings. In India 67% farmers are Marginal, 18 % small farmers and only 1% large farmers.

Table-1 Number & area of Holding by size group

Area: in '000' Ha Number: '000' Units

Sr No	Size of holding	Individual Holding		Joint Holding		Institutional Holding		Total Holding		%
	Number	Number	Area	Number	Area	Number	Area	Number	Area	
1	Marginal (0-1 Ha)	80125	30807	12563	5004	138	45	92826	35908	67%
2	Small (1-2 Ha)	21354	30407	3392	4790	33	47	24779	35244	18%
3	Semi medium (2- 4 Ha)	11684	31583	2185	6048	26	73	13896	37705	10%
4	Medium (4-10 Ha)	4738	27130	115	6567	21	132	5875	33828	4%
5	Large (10 Ha & above)	691	10874	262	4788	20	1245	973	16907	1%
All Classes		118592	130854	19518	27196	239	1542	138348	159592	100%

(Source: Agriculture census report 2011)

Objective II- To know the production status of various food grains & Oilseeds in India

Table No 2 Area & production of Food grains & pulses in India

Area: In Million Ha **Production:** In Million Ton (MT)

Crop/ commodity	2011-12		2012-13		2013-14	
	Area	Production	Area	Production	Area	Production
Rice	44.0063	105.301	42.7539	105.2316	44.136	106.6455
Wheat	29.8648	94.8821	30.0033	93.5065	30.4732	95.8498
Jowar	6.2451	5.9792	6.2144	5.2815	5.7934	5.5418
Bajra	8.7767	10.276	7.2974	8.742	7.8107	9.2501
Maize	8.7819	21.7594	8.6726	22.2582	9.0662	24.2595
Ragi	1.1758	1.9292	1.131	1.5744	1.1937	1.9829
Small Millets	0.7988	0.4515	0.7541	0.4357	0.6823	0.4299
Barley	0.6434	1.6187	0.6951	1.7524	0.6735	1.8307
Pulses	24.4622	17.0889	23.2568	18.3425	25.2129	19.2529
Foodgrains	124.7549	259.286	120.7787	257.1247	125.042	265.0432

(Source: Directorate of Economics & Statistics)

The area under rice cultivation has increased from 44.00 million Ha in 2011-12 to 44.13 Million Ha in 2013-14. Similarly the area under wheat increased from 29.86 Million Ha to 30.47 million Ha in the same period. The area under pulses was 24.46 Million Ha in 2011-12 which was decreased to 23.25 Million Ha in 2012-13 and again increased to 25.21 Million Ha in 2013-14. Jowar and Bajara crop showed highest percentage decrease in cultivation area and production.

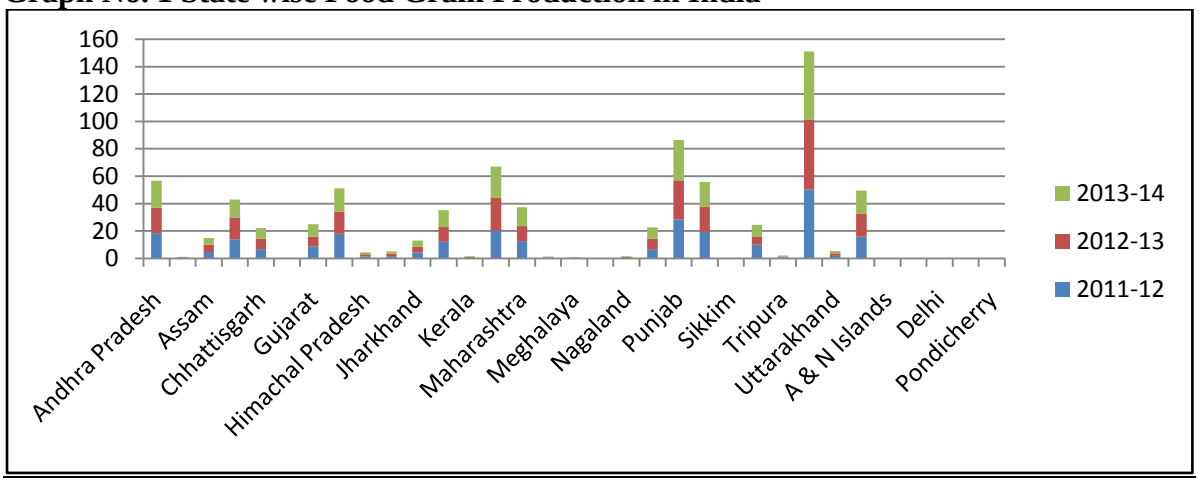
Table-3 Area & Production of Oilseeds in India

Crop/ commodity	2011-12		2012-13		2013-14	
	Area	Production	Area	Production	Area	Production
Groundnut	5.2637	6.963	4.721	4.6939	5.5052	9.7139
Castor seed	1.4709	2.29	1.2336	1.9635	1.0632	1.7265
Niger seed	0.3644	0.098	0.3104	0.1008	0.2987	0.0978
Sesamum	1.9015	0.81	1.7058	0.685	1.6789	0.7146
Rapeseed & Mustard	5.8935	6.6	6.3626	8.0289	6.6457	7.8767
Linseed	0.3226	0.15	0.2963	0.1486	0.2931	0.1417
Safflower	0.2504	0.14	0.1835	0.1085	0.1777	0.1134
Sunflower	0.7319	0.51	0.8305	0.5441	0.6715	0.5039
Soyabean	10.1091	12.21	10.8407	14.6664	11.7164	11.8608
Total Oilseeds	26.3081	29.79	26.4844	30.9397	28.0505	32.7493

(Source: Directorate of Economics & Statistics)

The area under groundnut cultivation was 5.26 Million Ha in 2011-12 which was reduced to 4.72 Million Ha in 20102-13 and again steadily increased to 5.50 Million Ha in 2013-14. The area under soybean was 10.10 Million Ha in 2011-12, 10.84 Million Ha in 2012-13 and 11.71 Million Ha in 2013-14. The production of soyabean was highest in the country followed by Rapeseed, Mustard and Groundnut. The production of Soya bean was 12.21 MT in 2011-12, and it decreased to 11.86 MT in 2013-14.

Graph No. 1 State wise Food Grain Production in India

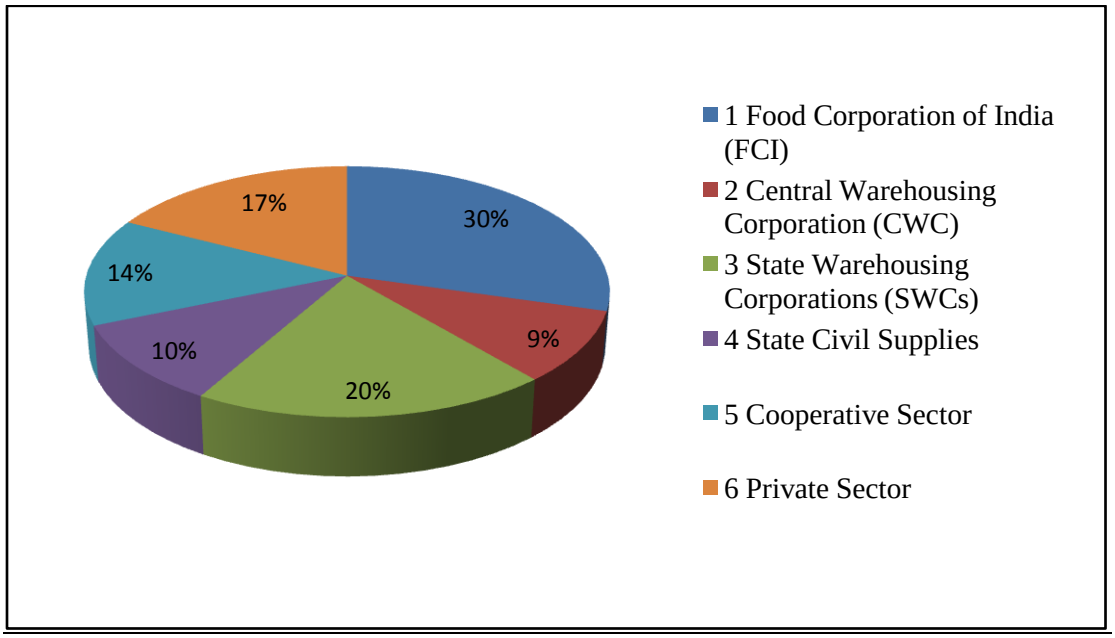


(Source: Directorate of Economics & Statistics)

The chart shows that total food grain of Uttar Pradesh was highest i.e. 50.028 MT in 2013-14 followed by Punjab having 29.48 MT food grain production in the year 2013-14.

Objective- III To find out the potential for storage of agriculture commodities

Graph No. 2 Storage capacity available in India



(Source: Report of Committee for Strengthening Negotiable Warehouse Receipts by the Warehousing Development and Regulatory Authority in the Country 2015)

The major player in warehousing is FCI, it contributes 30% Agricultural storage capacity of India. SWC's across India contributes 20% of total storage capacity, where as contribution of state civil supplies, cooperative sector and private sector is 10%, 14% and 17% respectively. The storage capacity available with FCI and a part of the warehousing capacity available with CWC and SWCs is used for the storage of food grains procured by Government agencies for Central Pool. The storage space available in the country is not sufficient to cater to the procured stocks. As a result, a substantial quantity of food grains is stored in CAP Storage.

The storage capacity available with the major player in Indian agricultural warehousing Food Corporation of India was 9.22 MT in Punjab, followed by 5.9 MT in Uttar Pradesh, 4.81 MT in Andhra Pradesh and 3.22 MT in Haryana where as food grain production in Punjab was 28.54 MT in 2012 and in Uttar Pradesh it was 50.745 MT in 2012.

Table No: 4 State wise production of food grains & storage capacity available with FCI as on 2012 (in Million Ton)

state / UT	Production 2012-13	storage	Utilization %	state / UT	Production 2012-13	Storage	Utilization %
Andhra Pradesh	18.663	4.81	69.1	Mizoram	0.0418	0.03	92.3
Arunachal Pradesh	0.364	0.02	50	Nagaland	0.5791	0.03	75.8
Assam	5.2806	0.28	50.9	Odisha	8.0088	0.61	67.3
Bihar	15.94	0.72	56.9	Punjab	28.543	9.22	81.7
Chhattisgarh	7.6436	1	56.6	Rajasthan	18.368	2.59	92.5
Goa	0.1318	0.02	60	Sikkim	0.106	0.01	54.5
Gujarat	7.0562	0.86	80.4	Tamil Nadu	5.5928	1.02	74.1
Haryana	16.226	3.22	88.6	Tripura	0.7252	0.05	83.3
Himachal Pradesh	1.4807	0.04	40	Uttar Pradesh	50.745	5.9	49.9
Jammu & Kashmir	1.8319	0.14	69.5	Uttarakhand	1.8277	0.2	62.9
Jharkhand	4.5575	0.13	63.4	West Bengal	16.547	1.09	52.9
Karnataka	10.863	0.91	90.2	A & N Islands	0.0224	0	0
Kerala	0.5118	0.54	76.7	Delhi	0.0903	0.37	63.5
Madhya Pradesh	23.69	0.74	80.5	D & N Haveli	0.0344	0	0
Maharashtra	10.973	2.31	70.6	Daman & Diu	0.0038	0	0
Manipur	0.3367	0.03	103.7	Pondicherry	0.0475	0	0
Meghalaya	0.265	0.03	69.2	**All India**	**257.12**	**37.34**	**72.7**

(Source: Directorate of Economics & Statistics & FCI website)

RESULT & DISCUSSION

India is the agriculture based economy. Infrastructure availability is a major lacuna of our country. The number of farmers having small and marginal holdings were 67% and 18% respectively, where as large farmers were only 1%. The major food grain produced in India are Rice and wheat. The total food grain production of India was increased from 259.28 MT in 2011-12 to 265.04 MT in 2013-14. The oilseed production also increased from 29.79 MT in 2011-12 to 32.74 MT in 2013-14. The total agriculture storage capacity of India was 108.75 MT in 2012 and it increased to 117.52 MT in 2014. Hence there is large scale gap between the agricultural production scenario and storage capacity of India. To mitigate this gap there is necessity to analyze strengths, weaknesses, opportunities and threats in agriculture storage system of India

SWOT Analysis of Storage of Agricultural commodities in India

Strengths

1. The total storage capacity of India was improved from 108.75 MT to 117.52 MT including public sector , private and cooperative warehouses.
2. The public distribution system is linked with central pool stock available with public sector warehouses hence agricultural warehouses provide linkage between supply and demand for agricultural commodities.
3. The storage capacity available with public sector warehouses i.e Food corporation of India (FCI), Central Warehousing Corporation and State Warehousing Corporations, having countrywide network of agricultural warehouses has increasing continuously.
4. Warehouse receipt is attached with the storage of agricultural commodities in the warehouses which can be used as option for easy loan and credit.

Weaknesses

1. The storage capacity of India is still low as compared to total food grain production of India i.e the total production of food grains in India was 265.04 MT in 2013-14 whereas the total storage capacity was 117.52 MT.
2. Regional imbalance in production as well as storage capacity.
3. 3.70 MT food grains stored in Cover and Plinth (CAP) storage which can not be stored for long time.[2]
4. There are large number (85%) of marginal and small farmers, they can not afford to create individual storage infrastructure due to limited amount of production
5. The capacity utilization in Public sector warehouses is very Less i.e on an average 40-60% capacity utilization in most of the state.

Opportunities

1. Agrarian economy of the country, 70% of the population depends on agriculture sector.
2. India constitutes second largest populated country in the world, shares 17.5 % of the world's population and ranks seventh in terms of land. For feeding such huge population, requirement of food is larger which can be fulfilled by stocking food in the years/areas of bumper production and supplying it to needy in periods of scarcity.
3. The food grain production of India is continuously growing from 259.28 MT in 2011-12 to 265.04 MT in 2013-14, growing food grain production means growing demand for storage and warehousing.
4. The oilseeds production of India is also growing from 29.79 MT in 2011-12 to 32.73 MT in 2013-14.

Threats

1. Uneven production of food grains and oilseeds in the country.
2. Seasonality of the agricultural production.
3. Scattered production of agricultural commodities.

[2] www.fci.gov.in

4. Diverse situation of climate leads to food scarcity in one part of the country and surplus production in other part.

CONCLUSION

The farmers population in India largely includes small and marginal farmers, there are 67% marginal farmers and 18% small farmers, these farmers due to limited land can not afford holding of commodity in improved storage structures.The Indian economy largely depends on agriculture sector, it is ironic that the India's position in the world is as a major producer of agricultural food like Rice, wheat, Pulses etc, still the country is facing food scarcity. The storage capacity available with country is 117.52 Million ton, which was very limited as compared to India's overall food grain, oilseed and pulses production. Storage is an important link in the entire procurement and distribution system of food grains, produced seasonally but consumed all the year round. Therefore, storage facilities in India need to be strengthened by supplying them with the much-needed scientific storage. It is not feasible to formulate individual storage infrastructure for near about 85% of small and marginal farmers. This can be achieved through supplying storage capacity to farmer groups. This improvement in storage capacity will aid in enhancing country's ability to meet its food security objectives by the year 2020.

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