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# **Efficient Indian Commodity Markets – Need for Comprehensive Warehousing System**

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## **Abstract**

Warehouses are closely linked to commodity futures exchanges and form an important component in the process of price formation of commodities. Warehouses issue warehouse receipts to farmers, the warehouse guarantees the farmer the delivery of the goods stored in the premises of the warehouse while the warehouse receipts can be pledged in transactions which are financial in nature in order to generate loans for the financing of cost of storage. The current study tries to assess the nature of storage facilities of commodities in a few major countries as well as prominent global commodity exchanges to explore the status of warehousing and the future requirement of storage facilities in India with special reference to grain warehousing, since warehousing is necessary for agricultural commodities which are perishable in nature. As futures markets for commodities grow in their importance, there is a need for augmenting and strengthening the warehousing and delivery system in order to make the Indian commodity market more efficient. The paper also reviews the experience of warehouse receipt financing in developed and developing countries.

**Keywords:** Warehousing, Warehousing Receipts, Commodity Storage

**JEL Codes:** H57, N55, Q13, Q02

## **1.Introduction**

Warehouses are closely linked to commodity futures exchanges and form an important component of the process of price formation of commodities. A well functioning warehousing and delivery system adds efficiency to the commodity exchange. The commitment to delivery of the commodities in a futures contract more often than not ensures that the commodity futures price converge with the commodity spot price at the time of maturity of the contract. The physical delivery of the contract could be taken care of by the commodity exchange or may be outsourced to external agencies accredited by authorities. The warehouses are expected to maintain certain standards of the storage of commodities. Warehouses issue warehouse receipts to the user (say farmer), which guarantees the user the delivery of the goods stored in the premises of the warehouse. Warehouse receipts can be pledged in transactions which are financial in nature in order to generate loans for the financing of cost of storage.

The current study tries to assess the nature of storage facilities of commodities in a few major countries as well as prominent global commodity exchanges. The current study also discusses the status of warehousing and the future of storage facilities in India with special reference to grain warehousing since warehousing is necessary for agricultural commodities which are perishable in nature. As futures markets for commodities grow in their importance, there is a need for adaptation of warehousing and delivery system within the market. The paper also reviews the experience of warehouse receipt financing in developed and developing countries.

## **2. Status of storage facilities – International experience**

Warehousing is able to provide critical logical support to the commodity exchanges as well as to the agricultural marketing departments. Warehousing facilities are provided in some countries by the government through public sector units like in India, whereas in some countries it is a private sector initiative, for instance ‘on farm grain facilities’ provided in the United States of America. The storage facilities could be borrowed or owned by a commodity exchange or in the form of a public private partnership initiative.

In the United States of America, the storage of grains takes place both at ‘on farm grain storage facilities’ as well as ‘off farm grain storage facilities’. As per the definition of National

Agricultural Statistics Service (NASS) of United States Department of Agriculture (USDA), ‘on farm grain storage’ capacity includes cribs, sheds, bins, as well as structures which are located in the premises of the farm which are used to store whole grains, pulses and oilseeds. Similarly, in the ‘off farm grain storage’ capacity facilities include elevators, warehouses, terminals, merchant mills, oil seed crushers and other facilities that store commodities including whole grains, soybeans, canola, mustardseed, flax seed, safflower, Austrian winter peas, dry edible peas, chickpeas/garbanzo beans, sun flower, rapeseed, and lentils. The off grain storage facilities exclude facilities that can store only rice or peanuts, oil seed crushers which process cottonseed or peanuts, tobacco warehouses, seed warehouses, dry edible beans (other than chickpeas/garbanzo). Table 1 depicts the capacity of storage facilities at ‘on farm grain storage’ facilities and number and capacity of ‘off farm grain storage’ facilities for the last four years (2010-2013). Over the span of time from 2010 to 2013, the on farm storage capacity has increased by 4% whereas the off farm storage capacity rose by 7.07%. In 2013, the largest rise in off farm storage capacity took place in North Dakota followed by Nebraska and Kansas. Even though, the capacity of off farm storage facilities (in million bushels) increased from 2012 to 2013, it is observed that there was a minor fall in the number of storage facilities from 2012 to 2013, with largest number of facilities in Iowa. The grain storage facility in United States of America has been estimated to be about 20% greater than the total annual production of the country.

**Table 1: Farm Storage Capacity of USA (as on December 31 of each year)**

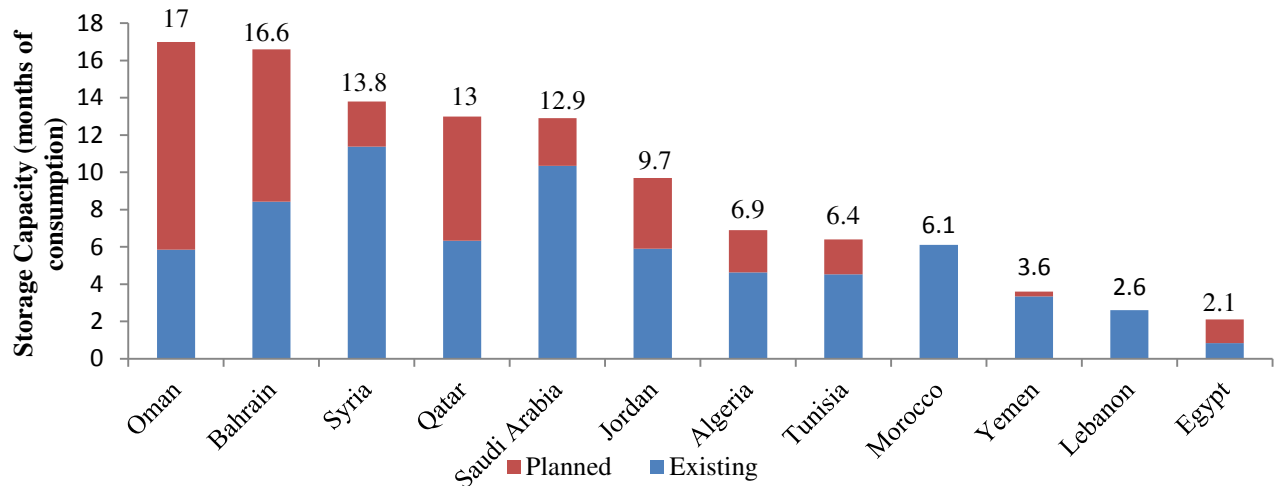
| <b>On Farm</b><br>Storage<br>Capacity of US<br>(Excludes<br>Alaska and<br>Hawaii)  | <b>Capacity in million bushels</b> |             |             |             |
|--|------------------------------------|-------------|-------------|-------------|
|  | <b>2010</b>                        | <b>2011</b> | <b>2012</b> | <b>2013</b> |
|  | 12,535                             | 12,775      | 12,940      | 13,010      |
| <b>Off Farm</b><br>Storage<br>Capacity of US<br>(Excludes<br>Alaska and<br>Hawaii) | <b>Capacity in million bushels</b> |             |             |             |
|  | <b>2010</b>                        | <b>2011</b> | <b>2012</b> | <b>2013</b> |
|  | 9741                               | 10,113      | 10,289      | 10,430      |
| <b>Number of Facilities</b>  |                                    |             |             |             |
|  | 8991                               | 8899        | 8801        | 8783        |

Source: Grain Stocks, National Agricultural Statistics Service, USDA (various issues)

The combined total on farm storage and bulk handling storage capacity (623 sites) of Australia in 2013 has been estimated to be 70 million metric tonnes, which is equal to twice the average grain

production of the country. Whereas, China possesses grain storage capacity to be approximately 150 million tonnes. Brazil also has a storage capacity of 145 million tonnes, but it falls short by 80 million tonnes of grain storage. (FAO, 2012) in their report on The Grain Chain – Food Security and Managing Wheat Imports in Arab countries give a detailed account of the existing as well as planned storage facilities of wheat in the Arab countries.

**Figure 1: Wheat Storage Capacity in the Arab Countries**



Source: FAO(2012)

Figure 1 gives the wheat storage capacity in the Arab countries (existing and planned) in terms of months of consumption. Oman planned a storage capacity of 11 months of consumption whereas it already possesses storage capacity that can store wheat worth 6 months of consumption. On the contrary, countries including Yemen, Lebanon, and Egypt lag behind with low level of existing and planned storage capacity to store wheat.

In the United States of America, the storage facilities of Natural Gas are approximately 400 in number and form an integral role in both supply and demand in the natural gas market. Statistics revealed by The China Chamber of Commerce Oil Distribution Committee suggest that 247 private companies are involved in the Petroleum storage business and have a petroleum storage capacity of 230 million tonnes.

The London Metal Exchange (LME) which is a successful global commodity exchange has a widespread network of warehouses across various countries. In all, LME has 4337 sponsored warehouses. At the end of 2011, LME had catered to storage of more than 11% of the global

annual production of Aluminum. Table 2 shows the network of LME's warehouses across the globe. It can be seen from the Table that Netherlands possesses the maximum number of warehouses (1016 warehouses) with 193 warehouses that have a capacity to store all metals. Netherlands, is followed by USA which has 834 warehouses.

**Table 2: LME's network of warehouses**

|               | Aluminum   | Copper     | Zinc       | Lead       | Tin        | Nickel     | Cobalt1   | Cobalt2  | Steel     | All metals |
|---------------|------------|------------|------------|------------|------------|------------|-----------|----------|-----------|------------|
| Belgium       | 32         | 32         | 32         | 32         | 27         | 27         | 3         | -        | 12        | 44         |
| Germany       | 18         | 15         | 18         | 18         | 14         | 14         | -         | -        | -         | 18         |
| Italy         | 38         | 28         | 38         | 38         | 26         | 34         | -         | -        | 2         | 40         |
| Japan         | 6          | -          | -          | -          | -          | -          | -         | -        | -         | 6          |
| Korea (South) | 58         | 58         | -          | -          | 42         | 58         | -         | -        | 5         | 63         |
| Malaysia      | 52         | 52         | 52         | 52         | 24         | 49         | -         | -        | 11        | 63         |
| Netherlands   | 177        | 177        | 177        | 174        | 142        | 145        | 6         | 2        | 16        | 193        |
| Singapore     | 54         | 54         | 54         | 54         | 50         | 50         | 3         | 3        | -         | 54         |
| Spain         | 20         | 20         | 20         | 20         | 20         | 20         | -         | -        | 2         | 22         |
| Sweden        | 8          | 7          | 7          | 7          | -          | 2          | -         | -        | -         | 8          |
| Turkey        | -          | -          | -          | -          | -          | -          | -         | -        | 9         | 9          |
| UAE           | -          | 8          | 8          | 8          | -          | 8          | -         | -        | 4         | 11         |
| UK            | 37         | 31         | 37         | 37         | 33         | 33         | -         | -        | -         | 37         |
| USA           | 160        | 116        | 159        | 160        | 84         | 141        | 2         | 1        | 11        | 174        |
| <b>Total</b>  | <b>660</b> | <b>598</b> | <b>602</b> | <b>600</b> | <b>462</b> | <b>581</b> | <b>14</b> | <b>6</b> | <b>72</b> | <b>742</b> |

Source: Valiante (2013)

The Chinese commodity futures exchange, Shanghai Futures Exchange has warehouses for a number of commodities with warehouses for aluminum located in Shanghai, Guangdong, Jiangsu and Zhejiang. As of March 2014, SHFE had warehouses with a combined capacity to store as much as 1.13 million mt of copper cathode (Platts, 2014).

### 3. Status and Future Requirement of Warehousing in India

Warehousing in India has evolved gradually from traditional "godowns" to evolved solutions of warehouse management systems into modern warehouses with latest storage and handling facilities. The Indian warehousing industry is in a deplorable condition and suffers severely from deficiency of physical infrastructure. In many of the existing warehouses, there is a lack of standards of maintenance by the authorities. Warehouses in India can be categorised into four types which include – Industrial/Retail warehouses, Agricultural warehouses, Container Freight Stations/Inland Container Depots and Cold storage warehouses.

Most of the commodity futures exchanges in India take physical delivery through a network of accredited warehouses. In the month of July 2013, NCDEX had 594 accredited warehouses through eight warehouse service providers with a total storage capacity of 1.5 million tonnes. As of December 2010, MCX had 57 exchange designated warehouses in 22 locations in order to support the physical delivery of commodities traded on the exchange. The National Bulk Handling Corporation Limited (a company that provides commodity and collateral management services) is involved in the provision of warehousing services and the delivery of futures contracts traded on MCX.

### **3.1 Status of Warehousing in India**

The organisations involved in the warehousing sector in India are largely government run including Central Warehousing Corporation (CWC), State Warehousing Corporation (SWC) and Food Corporation of India (FCI) among others. The Warehouse Development Regulatory Authority (WDRA), an organisation under the Department of Food and Public Distribution, is looks after the regulation of warehouses and promotes the Indian warehousing industry.

As of March 2013, the Central Warehousing Corporation had 469 warehouses across the country with a capacity of 10.8 Million Metric Tonnes and provides storage facilities to agricultural as well non agricultural products. Some of the warehouses provided by CWC are custom bonded warehouses (61 such warehouses with 0.342 Million MT as of March 31, 2013), Container Freight Station (CFSs), Inland Container Depot (ICD) (36 CFCs and ICDs with 1.532 Million Metric Tonnes as of March 31, 2013), Air Cargo Complexes (3 complexes with 5961MT as of March 31, 2013). Table 3 presents the storage capacity of CWC warehouses from the year 2007-08 to 2012-13. It is evident from Table 3 that over the span of five years, the performance has improved by approximately 9.35% in terms of both operating capacity and owned capacity.

**Table 3: Performance of CWC during the period from 2007-08 to 2012-13**

|                                 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 |
|---------------------------------|---------|---------|---------|---------|---------|---------|
| Operating capacity (Million MT) | 9.878   | 10.525  | 10.598  | 10.247  | 10.085  | 10.802  |
| Owned capacity (Million MT)     | 6.763   | 6.760   | 6.846   | 6.985   | 7.181   | 7.395   |

Source: CWC Annual Reports

Table 4 gives the break up of the utilisation of commodities in the CWC warehouses. Out of the warehouses run by CWC, 5.675 Million Metric Tonnes (41%) was utilised for storage of food grains, 0.312 Million Metric Tonnes (4%) utilised for fertilisers, while other commodities utilised 3.504 Million Metric Tonnes as of March 31, 2013.

**Table 4: Commodity wise utilisation of CWC warehouses from 2007-08 to 2012-13**

| (in percentage terms) | As on March 31 <sup>st</sup> , 2008 | As on March 31 <sup>st</sup> , 2009 | As on March 31 <sup>st</sup> , 2010 | As on March 31 <sup>st</sup> , 2011 | As on March 31 <sup>st</sup> , 2012 | As on March 31 <sup>st</sup> , 2013 |
|-----------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Foodgrains            | 38%                                 | 45%                                 | 49%                                 | 54%                                 | 57%                                 | 41%                                 |
| Fertilisers           | 5%                                  | 3%                                  | 2%                                  | 2%                                  | 3%                                  | 4%                                  |
| Others                | 57%                                 | 52%                                 | 49%                                 | 44%                                 | 40%                                 | 55%                                 |

Source: CWC Annual Reports

The Central Warehousing Corporation owns 50 per cent of equity in seventeen State Warehousing Corporations (SWCs); the remaining equity is contributed by the respective state governments of the state. Seventeen of these SWCs were able to operate a network of 1659 warehouses with a capacity of 25.093 Million Metric Tonnes as on March 31, 2013. Table 5 describes the performance of State Warehousing Corporations for the year 2007-08 to 2012-13. A rising trend can be observed from the Table below as the performance of State Warehousing Corporation has shown a remarkable improvement of 34% over the period from 2007-08 to 2012-13.

**Table 5: Performance of SWC during the period from 2007-08 to 2012-13**

|  | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 |
|--|---------|---------|---------|---------|---------|---------|
| Storage capacity (Million Metric Tonnes) | 18.732  | 19.682  | 20.926  | 21.127  | 23.461  | 25.093  |

Source: CAG (2013) and CWC Annual Reports



Table 6 illustrates the capacity of the seventeen warehouses as on March 31, 2013. From Table 6, it can be noted that Madhya Pradesh, Punjab and Uttar Pradesh are leading in terms of total capacity whereas the states unable to perform in terms of storage capacities include Meghalaya, Kerala and Gujarat.

**Table 6: Position of SWCs as on March 31, 2013**

| S.No. | Name of SWC        | No of Centers | Total capacity (in Million MTs) |
|-------|--------------------|---------------|---------------------------------|
| 1     | Andhra Pradesh     | 159           | 2.615                           |
| 2     | Assam              | 44            | 0.248                           |
| 3     | Bihar              | 38            | 0.284                           |
| 4     | Chhatisgarh        | 123           | 1.175                           |
| 5     | Gujarat            | 45            | 0.148                           |
| 6     | Haryana            | 109           | 1.874                           |
| 7     | Karnataka          | 125           | 1.068                           |
| 8     | Kerala             | 57            | 0.204                           |
| 9     | Madhya Pradesh WLC | 275           | 4.403                           |
| 10    | Maharashtra        | 176           | 1.358                           |
| 11    | Meghalaya          | 6             | 0.0014                          |
| 12    | Odisha             | 61            | 0.476                           |
| 13    | Punjab             | 115           | 6.246                           |
| 14    | Rajasthan          | 90            | 0.852                           |
| 15    | Tamil Nadu         | 57            | 0.645                           |
| 16    | Uttar Pradesh      | 149           | 3.267                           |
| 17    | West Bengal        | 30            | 0.216                           |

Source: Ministry of Agriculture, Government of India

The Food Corporation of India, a public sector enterprise under the Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution, is responsible for the provisioning of storage services of the food grains procured by them. It has a network of storage depots (depots consist of silos, godowns, covered and plinth storage facilities) located across India. The storage capacity with FCI is described in Table 7 for the period from 2008 to 2013. Over time, there has been a rise in total operating capacity of FCI from 23.89 Million MT to as much as 37.73 Million MT indicating a growth of 57.93%.

**Table 7: Performance of FCI during the period from 2007-08 to 2012-13**

|                                      | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 |
|--------------------------------------|---------|---------|---------|---------|---------|---------|
| Total Operating capacity(Million MT) | 23.89   | 25.28   | 28.84   | 31.61   | 33.60   | 37.73   |

Source: FCI Annual Report

### 3.2 Requirement of storage capacity in the future

Studies have revealed that there exists a gap between the procurement by the Central Pool and the storage capacity with FCI. Apart from lack of storage capacity, the existing facilities lack scientific facilities, optimal size, optimal design and inventory management leading to loss of food grains. Table 8 explains the worsening situation of storage capacity with FCI from 2008 onwards. The gap has been seen to reduce from 33.19 MMT to 20.65 MMT from 2012 to 2013, which could be attributed to not just a rise in total storage capacity with FCI but a decline in food grain stock in the central pool.

**Table 8: Gap in Storage Capacity with FCI (as on 1<sup>st</sup> June of the year)**

| Year | Food grain Stock in the Central Pool (MMT) | Food grains procured by decentralised procurement states (MMT) | Food grains procured in central pool minus food grains procured by decentralised procurement states (MMT) | Total storage capacity available with FCI (MMT) | Gap in storage capacity with FCI (MMT) |
|------|--|--|---|---|--|
| 2008 | 36.37                                      | 6.48   | 29.89   | 23.89   | 5.95                                   |
| 2009 | 54.83                                      | 12.83  | 41.99   | 25.28   | 16.72                                  |
| 2010 | 60.88                                      | 14.01  | 46.87   | 28.84   | 18.04                                  |
| 2011 | 65.60                                      | 11.46  | 54.14   | 31.61   | 22.53                                  |
| 2012 | 82.41                                      | 15.62  | 66.79   | 33.60   | 33.19                                  |
| 2013 | 77.74                                      | 19.15  | 58.58   | 37.73   | 20.65                                  |

Source: CAG (2013) and FCI

It has been observed that the gap in storage capacity with FCI has been widening rapidly with time and thus the capacity is largely found to be inadequate. Even if the total storage capacities with FCI, SWC and CWC had been used for storage of procured food grains, the storage capacity would fall short of the requirement. The lack of storage leads to the wastage of food grains indicating that it is necessary to expand warehousing facilities and delivery system in the country. It has also been felt that there are insufficient warehouses for commodities other than rice and wheat in India. The Working Group on Warehousing Development and Regulation of Planning Commission had recommended that the country requires an additional warehousing

capacity of 35 MMT during the twelfth plan period (2012-17) for the storage of major food crops. With the recently announced National Food Security Bill as well shortage in warehouses, it is imperative to invest in grain storage facilities in India.

### **3.3 Government run programmes in India to increase storage capacity**

In June 2000, the government approved the **National Policy on Bulk Handling, Storage & Transportation of foodgrains** in order to create integrated bulk handling and transportation facilities at identified locations in procuring and consuming areas in partnership with private parties through Build Own Operate (BOO) system. A storage capacity of 5.5 lakh MT was created via BOO with location of warehouses in Moga, Chennai, Coimbatore, Bangalore, Kaithal, Navi Mumbai and Hooghly.

Another scheme that was launched in 2001 is **Gramin Bhandaran Yojana** for construction or renovation of rural godowns. As part of the scheme, a certain percentage of project cost is provided for the construction or renovation of rural godowns. A scheme introduced in 2008, **Private Entrepreneurs Godown (PEG)** 2008 scheme has been launched to meet the increasing requirement of storage facilities for food grains through the participation from private players. By February 2014, it was reported that, a total capacity of 203.76 lakh MT had been approved for construction across 19 states through private participation as well as CWC and SWCs. Under the same scheme, a storage capacity of 20 lakh MT is being created in the form of modern silos under the Public Private Partnership mode.

A fiscal incentive allowed by the **government- under Section 35-AD of the Income Tax Act 1961**, the government allows a deduction for expenditure incurred on setting up a warehouse facility for storing agricultural production or setting up a cold chain facility to the extent of 150% on the condition that the taxpayer had started the business on or after April 1, 2012.

Another initiative taken up by the government is through the Scheme for financing warehouse infrastructure under **Rural Infrastructure Development Fund**. In spite of the existing government policies in place it has been felt that there is an urgent need for upgradation of

manuals which include details about arrangement of goods in the warehouse, laboratory facilities etc. The country requires the setting up of warehouse zones in the country.

#### **4. Role of Warehousing Receipt Financing in Commodity Exchanges**

The Government of India established the Warehousing Development and Regulatory Authority (WDRA) in October, 2010 and made WDRA responsible for the development and regulation of warehouses.

As discussed by Pancholi (2013), the recent National Spot Exchange Limited (NSEL) Crisis which came to light in July 2013 wherein the National Spot Exchange Limited had allowed trading of long forward contracts (with expiry ranging from 30 to 40 days instead of permitted one day spot contracts to spot exchanges) on the basis of Warehouse Receipts, without actually checking whether the commodities were stored in their physical form in the seventeen warehouses across India. The commodities on which contracts were available included steel, paddy, sugar etc. This scam led to a loss amounting to Rs. 5,574.13 crores as NSEL was not in a position to honour the contracts, thus leading to the NSEL debacle. Keeping this crisis in mind, the Forward Market Commission (FMC) has made it imperative for commodity exchanges to ensure that all warehouses accredited by commodity exchanges are registered with the Warehousing Development and Regulatory Authority (WDRA).

A 2005 report by RBI (2005) entitled Report of the Working Group on Warehouse Receipts and Commodity Futures suggested that warehouse receipts be made freely transferrable in order to reduce transaction charges as well as lead to an increased usage of the receipts. The warehouses registered under the Warehousing Development and Regulation Act (2007) are allowed to issue Negotiable Warehouse Receipts (NWRs) which help farmers to apply for loans through banks against the NWRs. This process of using warehouse receipts for financing is called Warehouse Receipt Financing. Warehouse receipts can be transferred between members of the trade through endorsement. Some of the advantages of NWRs include – higher liquidity in the hands of the farmers in rural areas, encouragement of employing scientific techniques in a warehouse, and lower cost of financing loans for banks. Mor and Fernandes (2009) discuss the merits and demerits of warehouse receipt financing for small farmers in India.

In India, the loans given to farmers against NWRs which are issued by the warehouses registered under WDRA are considered to be a part of priority sector lending by the banks. Targets for such loans backed by NWRs may be prescribed by the Boards of Public Sector banks and the Reserve Bank of India has laid out guidelines for financing against these NWRs. These guidelines can be seen in Table 9.

**Table 9: Warehouse Receipt Financing and RBI Guidelines**

|                                |   |
|--------------------------------|---|
| <b>Priority Sector Lending</b> | Loans of upto Rs.50 Lakhs against warehouse receipts for a period of less than 12 months, whether or not the farmer was given crop loans for the agricultural produce |
|                                | Loans for construction and running of storage facilities including warehouses, godowns, silos and cold storage units  |

Source: RBI

Even though warehouse financing has been in existence for a number of years in India, it has been found that it is the large and medium farmers have benefited more from this source of finance in comparison to the number of small and marginal farmers.

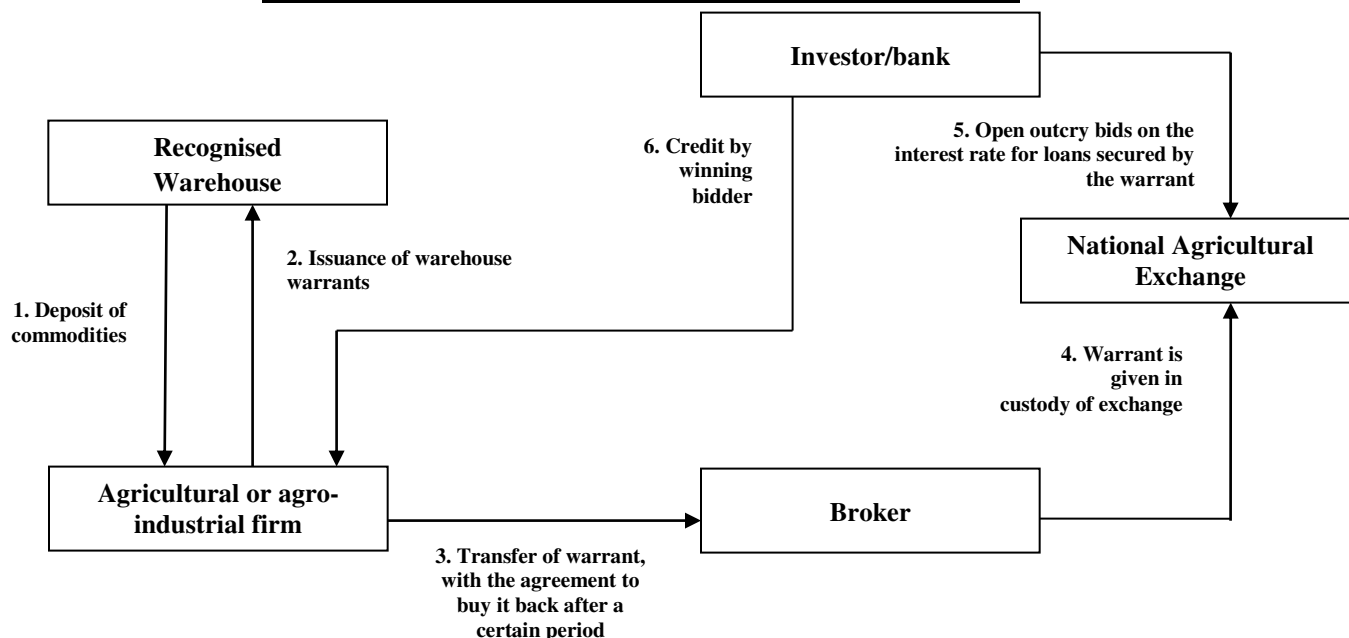
Warehousing system and commodity exchanges have been active in a number of countries of the world. But it is only recently that warehouse receipt financing has been introduced by warehouses, commodity exchanges and financial institutions as a source of finance. International experience in warehouse receipt financing indicates that it is beneficial to both the parties – the farmer as well as the financing agency.

The United States of America has a warehouse receipt financing system governed by the US Warehousing Act of 1916 with amendments. The system in the US has been enhanced by the inclusion of Performance Guarantees which are usually posted as insurance bonds and sometimes the insurance bonds are supplemented with an indemnity fund.

Bolsa Mercantil De Colom (BMC) which operates as the national commodity exchange of Colombia, introduced the repo trading to provide a source of funding. The commodities include coffee, rice, wood, potassium, coal, palm oil etc., these are stored in warehouses (private or public warehouses) where a collateral manager takes charge over the warehouse. The warehouse operator issues warehouse receipts to the depositor who transfers the receipts to an exchange

broker. While the exchange broker sells the warrant and simultaneously enters into a repo contract committing to buy the warrant back at a point in time in future at a pre decided price. The sum paid by the bidder of the contract is channeled to the depositor of goods to the warehouse, there by reducing risk involved in the transaction. The figure below gives the pictorial representation of repos operating in Colombia (Figure 2). It explains the entire process discussed above.

**Figure 2: Pictorial Representation of Repos operating in Colombia**



The Bratislava Commodity Exchange in Slovakia also permits the trading of warehouse warrants for agricultural products. In Turkey, a number of banks own warehousing subsidiaries, with many of the warehouses concentrated near ports. The banks provide warehouse receipt financing on the basis of receipts stored in their warehouses.

A study on the status of warehouse receipt financing in Eastern Europe and Central Asia region carried out by Hollinger et al (2009) found that an advanced warehouse receipt financing system with proper legal framework was in place in Bulgaria, Kazakhstan, Hungary, Moldova and Lithuania. Whereas a few countries had a partially developed warehouse receipt system which included Poland, The Russian Federation, Ukraine, Romania, Serbia and Croatia. These countries did not possess a proper institutional framework for the licensing as well as framework of inspection of public warehouses.

## **5. Concluding Remarks**

Warehousing is able to provide critical support to the commodity exchanges as well as to the agricultural marketing departments. The commitment to delivery of the commodities in a futures contract more often than not ensures that the commodity futures price converge with the commodity spot price at the time of maturity of the contract. Thus, a well-functioning warehousing and delivery system adds efficiency to the commodity exchange. The physical delivery of the contract could be taken care of by the commodity exchange or may be outsourced to external agencies accredited by authorities. The warehouses are expected to maintain certain standards of the storage of commodities.

Warehousing facilities are provided in some countries by the government through public sector units whereas in some countries it is a private sector initiative. The storage facilities could be borrowed or owned by a commodity exchange or in the form of a public private partnership initiative.

It is observed that the storage facilities in developed countries is much more than the production whereas within a year India is currently able to cater storage facility to only 37.73 MMT of food grains, while it produces 77.74 MMT, leaving a gap of 20.65 MMT in the year 2012-13. The Working Group on Warehousing Development and Regulation (2010) of Planning Commission had recommended that the country requires an additional warehousing capacity of 35 MMT during the twelfth plan period (2012-17) for the storage of major food grains. The country requires the setting up of warehouse zones in the country in order to expand the storage facilities. With the loss of about Rs. 5600 crore due to NSEL crisis (July 2013), the Forward Market Commission has made it mandatory for commodity exchanges to ensure that all warehouses accredited by commodity exchanges are registered by the Warehousing Development and Regulatory Authority. This initiative is likely to save market participants from facing another crisis of this nature.

## 6. References

1. Central Warehousing Corporation (CWC) Annual Reports  
Weblink: [http://www.cewacor.nic.in/Docs/annual\\_report\\_12-13\\_101213.pdf](http://www.cewacor.nic.in/Docs/annual_report_12-13_101213.pdf)
2. Colombia – UNCTAD (2009) Review of Warehouse Receipt System and Inventory Credit Initiatives in Eastern & Southern Africa, Final report commissioned by UNCTAD under the All ACP Agricultural Commodities Programme (AAACP)
3. Comptroller and Auditor General of India (2013) Performance Audit Report on Storage Management and Movement of Food Grains in Food Corporation of India accessed on July 1, 2014  
Weblink: <http://164.100.47.132/paperlaidfiles/CONSUMER%20AFFAIRS,%20FOOD%20AND%20PUBLIC%20DISTRIBUTION/Report%20No%207%20-%20English.pdf>
4. D. Valiante (2013), Commodities Price Formation: Financialisation and Beyond, CEPS-ECMI Task Force Report, Centre for European Policy Studies, Brussels  
Web link: [http://www.ceps.eu/system/files/COM\\_TFR\\_ONLINE\\_DRAFT.pdf](http://www.ceps.eu/system/files/COM_TFR_ONLINE_DRAFT.pdf)
5. Food and Agriculture Organization (FAO) (2012) Innovative agricultural finance and risk management - Strengthening food production and trade in the transition region Working Paper  
Weblink: <http://www.unctad.info/upload/SUC/LusakaWorkshop/WarehouseReceiptsSystemsReport11.05.pdf>
6. Food and Agriculture Organization (FAO) (2012) The Grain Chain – Food Security and Managing Wheat Imports in Arab Countries Report  
Web link: [http://www.fao.org/fileadmin/templates/tci/pdf/MENA-WB-The\\_Grain\\_Chain\\_ENG\\_.pdf](http://www.fao.org/fileadmin/templates/tci/pdf/MENA-WB-The_Grain_Chain_ENG_.pdf) accessed on June 19, 2014
7. Food Corporation of India Website accessed on July 31, 2013  
Weblink: <http://fciweb.nic.in/upload/Stock/6.pdf>
8. Hollinger F, Rutten L, & Kiriakov K. (2009). The use of warehouse receipt finance in agriculture in transition countries, FAO Investment Center, Working Paper.  
Weblink: [http://www.ruralfinance.org/fileadmin/templates/rflc/documents/The\\_use\\_of\\_warehouse\\_pdf.pdf](http://www.ruralfinance.org/fileadmin/templates/rflc/documents/The_use_of_warehouse_pdf.pdf)
9. Mor N. and Fernandes K. (2009). Warehouse Receipt Finance for Farmers – A Glimpse, Commodity Insights Yearbook, pp.42-47.



10. National Agricultural Statistics Service, Agricultural Statistics Board, USDA, Journal. Grain Stocks. 2014 January and older issues.
11. NCDEX Website accessed on July 31, 2013  
Weblink:[http://www.ncdex.com/Downloads/News\\_Press/PDF/3542.pdf](http://www.ncdex.com/Downloads/News_Press/PDF/3542.pdf)
12. Pancholi J. (2013) NSEL Debacle, Commentary, Economic and Political Weekly, Vol - XLVIII No. 37.
13. Planning Commission (2011) Report on Working Group on Warehousing Development and Regulation for the Twelfth Plan Period (2012-17)  
Weblink:[http://planningcommission.gov.in/aboutus/committee/wrkgrp12/pp/wg\\_ware.pdf](http://planningcommission.gov.in/aboutus/committee/wrkgrp12/pp/wg_ware.pdf)
14. Platts (2014) web links accessed on June 21, 2014 - <http://www.platts.com/latest-news/metals/hongkong/copper-cathode-stocks-at-china-shfe-warehouses-26748952> and <http://www.platts.com/latest-news/metals/singapore/chinas-shfe-weekly-aluminum-stocks-fall-further-26795041>
15. Reserve Bank of India (2005). Report of the Working Group on Warehouse Receipts & Commodity Futures, Government of India, Mumbai  
Weblink: [www.rbi.org.in/upload/PublicationReport/Pdfs/62932.pdf](http://www.rbi.org.in/upload/PublicationReport/Pdfs/62932.pdf)
16. Singh M. (2012) China's Strategic Petroleum Reserves: A Reality Check, Issue Brief  
Weblink:[http://www.idsa.in/issuebrief/ChinasStrategicPetroleumReserves\\_MandipSingh\\_210512](http://www.idsa.in/issuebrief/ChinasStrategicPetroleumReserves_MandipSingh_210512)
17. Stretch T., Carter C, & Kingwell R. (2014) The cost of Australia's Bulk Grain Export Supply Chains, Information Paper by Australian Export Grains Innovation Centre  
Weblink:<http://www.aegic.org.au/media/22950/140130%20Final%20AEGIC%20Supply%20Chains%20Report.pdf>