

Feasibility of nationwide warehouse receipt system

An assessment of the potential for a nationwide warehouse receipt system and recommendation for the requisite legal and regulatory framework

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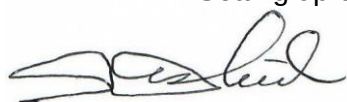


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ACRONYMS AND ABBREVIATIONS

ACE	Agricultural Commodity Exchange for Africa
ADB	Agricultural Development Bank
ADMARC	Agricultural Development and Market Corporation
AGMARK	Agriculture Marketing
AHCX	Auction Holdings Commodity Exchange
AMI	Agricultural Marketing Infrastructure
AMIGS	Agricultural Marketing Infrastructure, Grading and Standardization
BADC	Bangladesh Agricultural Development Corporation
BASWAP	Bangladesh-Swiss Agricultural Project
BBS	Bangladesh Bureau of Statistics
BCD	Basic Customs Duty
BFSA	Bangladesh Food Safety Authority
BIDS	Bangladesh Institute of Development Studies
BKB	Bangladesh Krishi Bank
BSE	Bombay Stock Exchange
BSEC	Bangladesh Securities and Exchange Commission
BSTI	Bangladesh Standards and Testing Institution
CBO	Community-Based Organization
CCRL	CDSL Commodity Repository Limited
CDA/WA	Cédula de Depósito Agrícola / Warrant Agrícola
CMA	Collateral Management Agreement
CMC	Collateral Management Companies
CSE	Chittagong Stock Exchange
CV	Coefficient of Variation
CWC	Central Warehousing Corporation
DAE	Department of Agricultural Extension
DAM	Department of Agricultural Marketing
EACWSE	Ethiopian Agricultural Commodities Warehousing Service Enterprise
EBRD	European Bank for Reconstruction and Development

ECA	Europe and Central Asia
ECX	Ethiopian Commodity Exchange
e-NAM	Electronic National Agriculture Market
e-NWR	Electronic-based Negotiable Warehouse Receipt
e-NNWR	Electronic-based Non-Negotiable Warehouse Receipt
ESC	Electronic Silo Certificate
FAO	Food and Agriculture Organization of the United Nations
FCB	Foreign Commercial Bank
FCI	Food Corporation of India
FPMU	Food Planning and Monitoring Unit
FPO	Farmer Producer Organization
FSSAI	Food Safety Standards Authority of India
FY	Fiscal Year
FYP	Five-Year Plan
GBY	Grameen Bhandaran Yojana
GDP	Gross Domestic Product
GGC	Ghana Grains Council
GoB	Government of Bangladesh
GoI	Government of India
GoP	Government of Pakistan
ICEX	Indian Commodity Exchange
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IFPRP	Integrated Food Policy Research Program
INR	Indian Rupee
IOSCO	International Organization of Securities Commissions
IPH	Institute of Public Health
ISAM	Integrated Scheme for Agricultural Marketing
JV	IFPRI-BIDS-UIUC Joint Venture
LGED	Local Government Engineering Department
LSD	Local Supply Depot

MCX	Multi Commodity Exchange
MFSP	Modern Food Storage Facilities Project
MRA	Microcredit Regulatory Authority
MSAMB	Maharashtra State Agriculture Marketing Board
MSP	Minimum Support Price
MT	Metric Ton
NBR	National Board of Revenue
NCDC	National Cooperative Development Corporation
NCDEX	National Commodity and Derivatives Exchange
NERL	National Electronic Repository Limited
NGO	Non-Governmental Organization
NMCE	National Multi Commodity Exchange
NWR	Negotiable Warehouse Receipt
PACS	Primary Agricultural Cooperative Credit Society
PCB	Private Commercial Bank
PEG	Private Entrepreneur Guarantee Scheme
PFDS	Public Foodgrain Distribution System
PMEX	Pakistan Mercantile Exchange Limited
PPP	Public-Private Partnership
PSL	Priority Sector Lending
RAKUB	Rajshahi Krishi Unnayan Bank
RBM	Reserve Bank of Malawi
RCS	Registrar of Cooperative Societies
RUCAM	Registro Único de Certificados, Almacenes y Mercancías
SAFEX	South African Futures Exchange
SBP	State Bank of Pakistan
SCB	State-Owned Commercial Bank
SDC	Swiss Development Corporation
SEBI	Securities Exchange Board of India
SECP	Securities & Exchange Commission of Pakistan
SHG	Self-Help Group

SHOGORIK	Shoshyo Gudam Rin Prokalpo (Grain Warehouse Credit Program)
SMA	Stock Monitoring Agreement
SME	Small and Medium Enterprises
SSL	Shree Shubham Logistics
SWC	State Warehousing Corporation
Tk/BDT	Bangladeshi Taka
UIUC	University of Illinois at Urbana-Champaign
UNCITRAL	United Nations Commission on International Trade Law
UNO	Upazila Nirbahi Officer
USAID	United States Agency for International Development
VCR	Value-Cost Ratio
VGf	Visibility Gap Fund
WBG	World Bank Group
WDRA	Warehousing Development and Regulatory Authority
WFP	World Food Programme
WR	Warehouse Receipt
WRS	Warehouse Receipt System
WSP	Warehouse Service Provider
ZAMACE	Zambian Commodities Exchange
ZIMACE	Zimbabwe Agriculture Commodity Exchange

EXECUTIVE SUMMARY

Warehouse receipts systems (WRS) have been used to tackle multiple challenges faced by farmers. In the absence of adequate collateral and consequent credit constraints, a WRS enables the use of inventory as collateral for loans, thus removing a key constraint farmers face. With growing digital reach, electronic based Negotiable Warehouse Receipts (e-NWR) that can be swapped, exchanged and traded and can assist in deepening financial markets while maintaining the integrity of the system.

While e-NWRS can potentially address farmer level constraints, they can also be viewed from a larger policy perspective as a system that aids government plans for food security and manage public procurement operations better and more nimbly; it can also play a key role for enhancing the efficiency and food quality and safety along value chains by enabling mid-stream players like traders and importers to manage these chains better.

This report seeks to inform the policy process around e-NWRS by focusing on the potential of Warehouse Receipt Financing, more broadly, in the agricultural development of Bangladesh. To do this we review global evidence as well as evidence closer to home, within South Asia, to understand the pre-conditions and prerequisites for a successful system.

Globally, e-NWRS have had a checkered history and only a handful of successful examples have emerged from among many attempts. These successes have come in diverse contexts – in some, e-NWRS was led by private players, while in others, the system was donor or government-driven; some have been enabled by dedicated legislation, and in others, not. There is however widespread consensus that certain conditions predispose an e-NWRS towards success. Market size and velocity of transactions matter so that e-NWRS may not be appropriate for commodities whose markets are small and are traded just once. They tend to succeed when there is an incentive to store because of intra-year variation in price but also for commodities where the risk of price declines is not common. Most of the successes have come where market players are diverse and include traders, importers, and processors and where e-NWRS is closely linked to commodity exchanges. Further, farmers can leverage e-NWRS and benefit from them when warehouses are accessible, where credit is still a constraint, and where preexisting relationships with moneylenders and traders are not dominant. Overall, a successful e-NWRS is predicated on the presence of clear legislation, strong trustworthy institutions that track and record receipts, inspect and register warehouses, provide oversight of the inventory and collateral, and enforce contracts. A financial system of guarantees and indemnity funds to safeguard against breach of contract is also an essential precondition.

India's experience with e-NWRS is particularly relevant for Bangladesh, on account of shared socio-economic context and institutional legacy. India's e-NWRS journey began in 2007 but the establishment of the Warehouse Development Regulatory Authority (WDRA) came only in 2010. Since then, the Government of India has taken a series of steps in response to emerging issues aimed at addressing barriers to uptake and operations. Despite impressive growth, India currently faces several factors that impede the growth of e-NWRS. First, registration of warehouses is not mandatory, and this implies that several warehouses remain unregistered, are managed by collateral management agencies, and issue WRs that banks accept as collateral to issue loans. This has resulted in a dual system that has restricted rapid growth of e-NWRS. Second, because of India's federal structure, state level regulations are not necessarily harmonized leading to a fragmented regulatory structure. In the past 5-6 years, the Indian government has taken several steps to create a supportive ecosystem for e-NWRS. This has involved incentivizing registration of warehouses to cooperatives, farmer producer companies, self-help groups, etc. to expand the pool of players and enhance access to registered warehouses for small farmers. Further in 2019 e-NWRS has been mandated for registered warehouses, though registration itself remains voluntary. Similarly, settlement of all derivative

contracts was mandated in 2019 to be via e-NWRS. The past two decades have also seen many state-supported programs and schemes to expand modern warehousing infrastructure, while the necessary digital infrastructure has been developed in-house. These steps have had a visible impact on the ecosystem. The increasing use of e-NWRS in India underscores the lessons learnt from other experiences globally – that e-NWRs are used disproportionately for a handful of commodities that trade commonly in exchanges, are used mainly by traders and processors, and are used mainly for storage for less than a year.

Bangladesh has the advantage, unlike India, of potentially having a unified as opposed to a federal system. Further, Bangladesh currently has no overarching regulatory institution so that it is well placed to institute an architecture that makes processes uniform and registration mandatory.

The larger question confronting the Government of Bangladesh is whether the country needs an e-NWRS. While carefully examining the need for and prospects for establishing a warehouse system, we note that although the e-NWRS may only be feasible for a small set of commodities, there is scope to institute and leverage a warehouse ecosystem for larger policy goals. For example, it can serve the Government of Bangladesh well in crafting an appropriate food security policy, in managing strategic reserves, including acquisition, stocking and distribution of food. A digital ecosystem of tracking stocks of various agricultural commodities, including the imported ones, can also provide real-time information to the Government about the stock in the country as well as the availability in various regions. It can bring efficiency to entire value chain by digitizing the process of transfer of stock from one owner to another.

From this perspective, the Government could proceed cautiously through a series of graduated steps in designing and implementing an e-NWRS. As a first step, the Government could launch a series of consultations with stakeholders on the potential and prospects for e-NWRS and warehouse regulation more generally. As a second step, based on these consultations and accumulated learnings from multilateral donors and global experience, the Government of Bangladesh can put in place the required legislation and institutions. As a third step, there is much merit in conducting focused and carefully selected pilots for specific commodities and locations to understand better the unique challenges and constraints that need to be addressed. Several possibilities already present themselves. First, under the existing innovations of establishing driers for paddy, it is possible to link smallholders to the public procurement system for stocking paddy in registered warehouses for sale to the government. Second, the impending plans of the Chittagong Stock Exchange (CSE) to develop commodity exchanges for cotton, if on track, offers an opportunity for a pilot. Third, harnessing the interests of importers, traders, and processors of commodities like fertilizers, seeds, oils, etc. offers a third flank for pilots in key locations near ports, for instance. Fourth, rejuvenating, leveraging and deepening preexisting schemes such as the Shoshyo Gudam Rin Prokalpo (SHOGORIK) offers scope for farmer-focused e-NWRS experiments. A rigorous evaluation of each of these models will yield clear actionable inputs. As the fourth step, Bangladesh would be well placed to assess home-grown models and evidence with cumulated learnings from elsewhere to chart of fruitful way forward.

This report is part of the research undertaken under The Integrated Food Policy Research Program (IFPRP), implemented by the Ministry of Food; it is one of the core programs of the Modern Food Storage Facilities Project (MFSP). The objectives of IFPRP are: (1) to enhance institutional capacity in policy and strategic decision making of DG Food to carry out their mandates linked to wider food market issues and, (2) to address analytical gaps and support the development of an evidence-based policy framework to improve efficiency and performance of the country's overall food storage system and management of strategic grain reserves.

1 INTRODUCTION

Farmers throughout the developing world face challenges in accessing credit, a crucial input into farming operations. These constraints can influence their resources allocation decisions. For instance, even if there are opportunities for higher profits from retaining produce and wait for higher prices, they are often forced to sell immediately after harvest when prices are typically low because they need the cash to meet their families' basic needs. Credit constraints also impact the commodity value chain starting from smallholders to the end users. Lack of access to credit limits smallholders' ability to adopt productivity-enhancing inputs which in turn affect both input dealers and output traders. Constraints faced by downstream actors including larger exporters, processors and retailers can impinge on farmers to the extent that the lack of credit shapes their procurement, financing, and trading practices.

Many financial instruments and institutions have emerged to address critical challenges along the value chain, often termed value chain finance, with varying degrees of success. Governments face significant barriers in identifying the appropriate set of policies that are fit for the context and purpose so as to deepen financial markets that are inclusive, accessible, and support financially viable institutions. While the scope of agricultural value chain finance is broad, and there is no consensus on classifying the various financial tools, instruments, and products, we focus on a specific class of instruments called commodity-backed finance or inventory-based finance that leverage the possibility of using commodities as collateral. This is especially valuable in contexts where many potential borrowers may lack the necessary collateral to access credit.

The Government of Bangladesh faces both opportunities and tradeoffs in identifying appropriate financial instruments and developing an ecosystem that can ultimately increase efficiency along the value chain and contribute to increasing the welfare of smallholders. A digital ecosystem of tracking stocks of various agricultural commodities, including the imported ones, can also provide real-time information to the Government about the stock in the country as well as the availability in various regions. It can bring efficiency to the entire value chain by digitizing the process of transfer of stock from one owner to another.

Agriculture contributes as much as 11.5% to Bangladesh's GDP in 2021-22 and employs approximately 41% of the total workforce. As a country of small farmers, with an estimated size of operational holding at 1.29 acres, small farmers are constrained to sell produce immediately after harvest and depend on expensive loans for both farm production and household consumption. Much has been written on the need to build resilient and efficient value chains in agriculture. Our broad goal is to examine the prospects of inventory-based or commodity-backed financing for agriculture in Bangladesh. The main purpose of this study is two-fold: (a) systematically assess whether the key pre-conditions exist in Bangladesh to make WRS feasible; and (b) analyze potential policy options for making WRS or similar institutions work. In assessing the pre-conditions, as well as alternative policy options, lessons are drawn from international best practices with an in-depth look at the Indian experiences.

This report is organized into six sections. It begins with a brief background on the types of inventory-based instruments and the rationale for warehouse receipts. We then present a brief historical overview and global experience. Section 3 focusses on the Indian experience. Section 4 takes an in-depth look at the Indian experiences in implementing commodity-backed financing. Given India's long history in policy making for agricultural credit, and many shared contextual factors, the premise is that India can offer specific lessons for Bangladesh, both emanating from its successes as well as its failures. Section 5 summarizes the lessons learnt and outlines the essential ingredients of a successful e-NWRS. The report concludes by discussing the options for Bangladesh with respect to e-NWRS.

2 CONCEPT AND TYPOLOGIES

2.1 Value chain finance and instruments

Value chains are generally defined as the full range of activities required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers and final disposal after use (Kaplinsky and Morris, 2000). Agricultural value chain finance thus refers to “any or all of the financial services, products and support services flowing to and/or through a value chain to address the needs and constraints of those involved in that chain, be it a need to access finance, secure sales, procure products, reduce risk or improve efficiency within the chain” (Miller and Jones, 2010, page 2). Figure 1 provides a typology of various agricultural value chain finance products. As mentioned, for the purpose of this report we focus on warehouse receipts, which is just one form of commodity-backed or inventory-based financing.

Figure 1: Typologies of agricultural value chain finance products

AGRICULTURAL VALUE CHAIN FINANCE	
INVENTORY-BASED CREDIT	• Warehouse receipts • Stock Monitoring Agencies • Collateral Management Services • Repose • Financial lease
RECEIVABLES FINANCING	• Crop receipts financing • Contract farming linked credit • Trade receivables financing • Factoring • Forfaiting
PRODUCT FINANCING	• Trader credit • Input supplier credit • Marketing company credit • Lead firm financing
RISK MITIGATION	• Insurance • Forward contracts • Futures
FINANCIAL ENHANCEMENTS	• Securitization Arrangements • Loan guarantees • Joint venture finance

Source: Adapted from Miller and Jones (2010).

2.2 Commodity-backed or inventory-based finance

Commodity-backed or inventory-based finance leverages the use of stocks of commodities as collateral and can refer to both the pledge of existing stocks (known as post-harvest finance) and/or pledge of future production (as pre-harvest finance). Whereas some regard both as commodity-backed finance (Varangis and Saint-Geours, 2017, for example), others treat pre-harvest finance as receivables-based finance (Figure 1) since the inventory is not already secured. This distinction matters since the institutional arrangements and policy framework for post-harvest finance involve a system for managing physical stocks. We discuss three main types of commodity-backed finance instruments that leverage existing inventories as collateral: warehouse receipt systems, collateral management agreements, and stock monitoring agreements.

The **warehouse receipt system (WRS)** is a system that enables warehouse operators to issue receipts against inventory stored in the warehouse. Coulter and Onumah (2002) define warehouse receipts (WR) as “documents issued by warehouse operators as evidence that specified commodities (of stated quantity and quality) have been deposited at locations by named depositors. The depositor may be a producer, farmer group, trader, or other individual or corporate body, and the warehouse receipt represents ownership of the stored commodity until it is sold out of the warehouse. The warehouse operator (or warehouseman) holds the stored commodity in safe custody. These warehouse receipts can be used by the depositor as collateral and be pledged for loans from financial institutions (Hollinger, Rutten and Kiriakov, 2009) In general, lenders use the value of the warehouse receipt and provide loans that cover a fraction of this value, ranging from 50-80%, factoring in storage and financing costs, price volatility of the commodity and the trust they have in the warehouse operator and the enforcement system more broadly.¹

A variety of warehouse receipt systems (WRS) are built on this base. Figure 2 depicts the types of Warehouse receipts that a WRS can support. A WR can be non-negotiable, implying that the receipt is proof of inventory but cannot be used formally for financial purposes. These typically specify the party who has the right to these inventories and transfers of such receipts require endorsement upon such transfer. A negotiable warehouse receipt (NWR) in contrast can be exchanged, swapped, or traded. A transfer of the receipt represents the transfer of ownership of the goods that are backed. When the depositor sells the receipt and therefore the underlying crop in storage, the bank must be paid by the buyer before it releases the receipt; once released, the receipt must be presented to the warehouse alongside payment of storage and handling costs and fees in order to have the inventories delivered to their new owner. In general, these can be physical or electronic. In recent times, electronic receipts have acquired importance for their many advantages, discussed below.

2.2.1 Advantages of e-NWRs over physical warehouse receipts

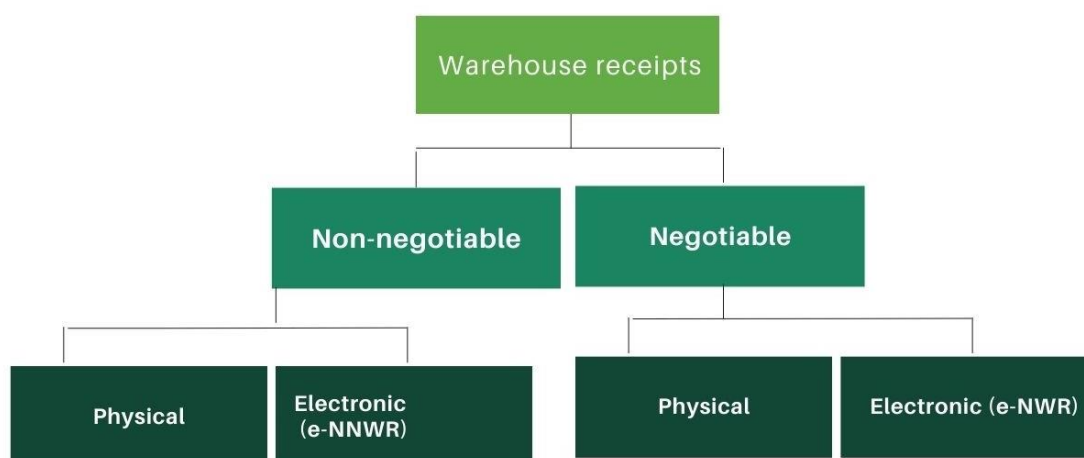
Traditionally the warehouses were issuing warehouse receipts in physical format and the same were accepted by the banks for extending pledge loans against the stock. Electronic Warehousing Receipts (e-WRs and e-NWRs) has several advantages over physical receipts. Some of these are mentioned below:

- ▶ Physical receipts issued on paper did not have uniformity and the warehouses followed different formats. They are prone to loss, mutilation, tampering, fudging of information etc.
- ▶ Physical WR treated the inventory as a unit, so that cannot be split, implying that the entire quantity is pledged to a bank against the WR. The e-NWRs on the other hand can be split with obligation to transfer only a part of the commodity.
- ▶ Issuance of WRs is harder to regulate. Asset registries and the use of blockchain technologies enable easier monitoring for regulation.
- ▶ Physical NWRs are associated with problems in transferability of goods in case of transfer/endorsements as they are not negotiable instruments. The e-NWRs are electronic receipts for which multiple transfers are easy in an online mode.
- ▶ In case of physical WR, fraudulent overstatement of the value of goods is possible. With a robust collateral registry and verifiability, the e-NWR is more amenable to verification at low cost

¹ In general, banks and other lenders may prefer to deal with some but not all warehouse companies that issue warehouse receipts and there is no obligation on the lenders to not do so.

by a third party. E-NWRs can verify the market prices of commodities from publicly available sources.

Figure 2: Warehouse receipts



2.2.2 How Warehouse Receipt Systems (WRS) can help

WRS can potentially address many problems in developing country contexts (Coulter and Norvell, 1998; Dorward et al., 2006; Hollinger and Ruttan, 2009, Onumah, 2003).

- ▶ The use of stored commodities as collateral is one way of **overcoming ubiquitous collateral constraints** and therefore for enhancing agricultural lending.
- ▶ By reducing the pressure on farmers and small traders to sell quickly when prices are low, warehouse receipt systems also **allow them to realize better prices** for their products later in the crop season. They provide liquidity to farmers and traders, by allowing them to access credit or sell a better-priced forward contract rather than sell produce when prices are low, but they need cash (for example, farmers often need to sell crops immediately after harvest, when prices are low, and small, cash-constrained traders need to turn produce over quickly in small lots).
- ▶ **Improved storage and grading of produce** is one fallout of using warehouses that prescribe quality standards, resulting in lower post-harvest losses and better produce grading and trading standards (by promoting greater use of formal warehouse storage).
- ▶ A general **thickening of rural financial markets and opportunities for farmers and traders to build up a formal record** of good performance in these systems. Furthermore, an established system reduces transaction costs in commercial lending because management and screening of this collateral is concentrated around a relatively small number of formal warehouse operators.
- ▶ **Reduced intra-seasonal variation in prices.** This is a wider benefit to producers and consumers even though they may not be directly engaged with warehouse receipt systems themselves.
- ▶ Warehouse receipt systems can also **complement and promote the development of commodity exchanges**.

To what extent these are borne out in practice is however a separate question that we address in a subsequent section.

Apart from WRS, there are other commonly used inventory-backed systems, two of which are described below (Varangis and Saint-Goures, 2017).

Collateral management agreements (CMAs) are tripartite arrangements involving the depositor, a collateral manager, and a financial institution. The collateral management company issues a certificate of deposit (like a warehouse receipt) that the depositor can use as collateral to obtain a loan. If/When the inventory is sold, the lender is repaid the loan first and then authorizes the collateral manager to release the inventories to the new owner. Occasionally a fourth party, the buyer is also added.

As is apparent, the collateral manager is the keystone. It is typically a professional firm that manages inventories and is trusted by the bank. Many collateral management firms offer performance guarantees, or have sufficient skills and capital, to ensure that banks are compensated even in cases of fraud. In general, the certificate of deposit issued by the collateral management agency can be registered at a collateral registry. Sometimes, these CMAs are roped in to manage e-NWRs.

A **stock monitoring agreement (SMA)** is another form of inventory-based arrangement. Here the lenders enter into an agreement with an inspection company that periodically monitors inventory levels (and sometimes the quality) of commodities stored or shipped to a location, with the aim of ensuring traceability. These inventories can often be held on the owner's premises and hence the inspection agency serves as a third-party monitor.

CMAs can be used in countries that do not have a formal WRS, but they can also coexist with a WRS. SMAs are a much less secure form of collateral compared to WRS and CMA for the banks unless the lenders have a lot of control over monitoring (see Varangis and Sait-Goures, 2017, for example). On the lenders' side, SMAs are used for longer-term partners whom they trust; borrowers prefer SMAs when they value the convenience of accessing inventories on their own premises to keep their production line moving. CMAs and SMAs tend to rely on general contract laws of a country. The operation of a WRS typically requires a legal and regulatory framework and a warehouse licensing and inspection authority – this is often a dedicated framework exclusively for WRS, located within a broader regulatory system for secured transactions. Such a framework establishes rules for who can own and operate warehouses, who can store inventory and on what terms, and the terms on which WR can be traded and exchanged or used as collateral. An enforcement mechanism and consistent grades and quality standards are required to ensure that WRs can be used for financial purposes. The additional cost and effort required to set up and operate a WRS can be justified by its increased reach and inclusiveness. CMAs and SMAs are often accessible only to more established players already having a track record with banks, and they tend to be concentrated in the country's main city or port. By contrast, a WRS can in theory offer access to commodity-backed financing to a wider range of market players, such as producers or smaller traders and processors.

In later sections we discuss the real-world experience with many of these issues and focus now on the potential gains from establishing an e-WRS.

3 GLOBAL EXPERIENCE WITH WRS

3.1 History and evolution

Warehouse receipts have a long but checkered history in the developing world and other emerging economies, encompassing very diverse institutional and economic contexts. This section offers a summary of experiences drawing on existing research and case studies and commentaries by experts who have been involved in warehouse receipt development activities or have studied them (EBRD, 2004; Höllinger, Rutten and Kiriakov, 2009; IFC, 2013).

For expository ease, we discuss these by region.

3.1.1 *Transition countries in Europe and Central Asia*

In the former Soviet Union, forms of WRS were operating for cooperatives and the collapse of the Soviet Union, Russia and many of the eastern bloc nations who often grow excess grain, implemented public warehouse receipt systems (IFC, 2013). If one were to examine the Warehouse Receipt Systems in European and Central Asian (ECA) countries, experiences in Bulgaria and Kazakhstan have demonstrated that a well-structured and efficient government regulatory agency can make significant contributions to building and maintaining trust in the system (IFC, 2013).

An FAO report (Höllinger, Rutten, and Kiriakov, 2009) showed that in the 2000s 12 countries sought to develop WR systems, although such a system is most fully developed in only 3: Bulgaria, Hungary, and Kazakhstan. These three countries have special WR laws for grains rather than broad legislation encompassing various commodities and different commercial practices. The Hungarian system consists of three very large and well-capitalized warehousing companies carrying out extensive field warehousing. Bulgaria and Kazakhstan are closer to U.S. practice; both have established well-structured and efficient government regulatory agencies and indemnity funds.

In Bulgaria, the WRS program started around the beginning of the millennium, with the complex tasks of drafting proper primary and secondary legislation, starting a government regulatory agency, and creating awareness of the benefits of using the system among grain producers, processors, and bankers. The concept of developing a warehouse receipt system in Bulgaria was formalized on 29 July 1998, when Parliament passed a new law for the marketing and storage of grain. The grain law regulates two types of business entities involved in the storage of grain: public warehouses and grain storage facilities. Licensed grain storage facilities do not participate in the indemnity fund and are not allowed to issue warehouse receipts. They can only provide storage services for third parties and the performance risk is accepted by the depositor. According to the Bulgarian legislation, a public warehouse licensed for the storage of grain is a sole proprietor (trader) whose main business activity is the storage of deposited grain and issuing of warehouse receipts. These companies should be joint stock or limited liability companies registered under commercial law. As of 2009, the system was fully operational, with 47 licensed public warehouses and more than 500,000 tons of licensed capacity, and there have been no defaults related to the activities of licensed public warehouses (Höllinger, Rutten, and Kiriakov, 2009; IFC, 2013).

A popular view is that attempts to build private warehouse receipts systems based on the contractual obligations (i.e., Russia, Turkey, and Kazakhstan) by the banks and commodity exchanges are less effective compared to the legally established public warehouse systems. Yet, the Serbian experience offers a cautionary tale, that poor inspection and enforcement can undermine public systems as well. Serbia introduced the system of public warehouses in 2009 backed by a well-established legal framework. The Ministry of Agriculture established a system of licensing and supervision, and an indemnity fund. However, the lack of an inspection service for public warehouses in practice has

led to issues, including two large-scale frauds in 2014 and 2015. Thus, despite expansion between 2010 and 2014 in public warehouse capacities and number of licensed warehouses, the system has deteriorated since then. In some countries including Poland and Slovakia, government intervention was maintained at a high level, resulting in farmers not being interested in storage using WRs. In Ukraine, there have been inconsistencies in legislation and weaknesses in the licensing process, leading to a lack of trust.

3.1.2 Africa

In recent times, many African nations have begun using the warehouse receipt systems with mixed success. In Africa, most of the WRS have emerged in the context of commodity exchanges. Of the 23 exchanges in Africa, over half were still in their planning or inception stages in the mid-2010s and, with the notable exception of the agricultural futures and options traded on the Johannesburg Stock Exchange, most of the remaining are thinly traded and receive financial support from government and/or donors.

On the one hand, in countries such as South Africa, the emergence of WRS was somewhat organically spearheaded by large private sector players. This contract-based warehouse receipt financing without a dedicated national Act continues to stand out as something of an exception. With the establishment of future and options contracts on the South African Futures Exchange (SAFEX) and the development of electronic silo certificates (ESC) in the mid-1990s, farmers were able to use these to raise collateral financing from banks. In 2004, two large silo operators established an e-system that serves as an online registry as well as a platform for NWRs. There is consensus that among African e-NWRS the success of the South African experience is something of an outlier. The existence of exchange trading is attributed to a strong presence of commercially-oriented farming as well-developed financial systems.

A pioneer in establishing WRS was Ethiopia, piloting one in 2003 with little success. With the establishment of the Ethiopian Commodity Exchange (ECX) in 2008, it absorbed the warehousing oversight responsibilities from the government. A later 2015 attempt to establish the Ethiopian Agricultural Commodities Warehousing Service Enterprise (EACWSE) to provide warehouse management services failed on account of dissatisfaction from potential users on the quality of services. The EACWSE was then merged back to the ECX. Despite the reputation for pioneering innovation, a failed attempt to expand into the coffee sector and inability to attract volumes have resulted in thin trading of WRs.

ZAMACE in Zambia and ZIMACE in Zimbabwe are two other exchanges that emerged around the same time that the Ethiopian ECX emerged. ZAMACE exists with minimal trade, and WRS were offered since its inception in 2007 enabled by 2010 when an Agricultural Credits Act forbade it. It was resumed in 2014, followed by Electronic Silo Certificates (ESC) using the same software as the Johannesburg Software Exchange. In February 2020, ZAMACE's ESC became tradeable on an agricultural commodity platform run by ZAMACE and Lusaka Securities Exchange. The ZAMACE has, however, attracted very thin volumes. The Zimbabwe Agricultural Commodity Exchange (ZIMACE) did not last long and was closed down by the Government, leading to the suspension of its silo certificates program.

Malawi has often been touted as a success (Baulch et al., 2018a, 2018b) and is unusual in having two, not just one, commodity exchanges: Agricultural Commodity Exchange for Africa (ACE) and Auction Holdings Commodity Exchange (AHCX) Ltd. ACE, which was established in 2006, followed the traditional model for establishing a commodity exchange by gradually diversifying from physical spot auctions to an electronic bulletin board, to a WRS with certified warehouses, to forward contracts. ACE consists of ACE Ltd., a limited liability commercial company, and ACE Trust, a non-

profit organization that has implemented various development projects. ACE has received substantial donor support since its inception and is now arguably the second longest running commodity exchange in Africa after SAFEX. Established in 2013, AHCX followed an alternative model. AHCX invested heavily in e-trading infrastructure and exchange-owned warehouses. AHCX is described as a fully commercial platform owned by Auction Holdings Ltd., which is itself partly owned by the Agricultural Development and Market Corporation (ADMARC), Malawi's main agricultural marketing and processing parastatal. AHCX enjoys considerable government support. Interestingly, Malawi had no legal framework to govern their operations beyond general contract law when both ACE and AHCX were established. However, the recent Warehouse Receipt Act and the Commodity Exchange Directive have fundamentally changed this situation. The Warehouse Receipt Act was approved by parliament in late 2017 and defines the legal status of warehouse receipts as documents of title. It clarifies the rights and obligations of warehouse operators and holders of warehouse receipts in accordance with international best practices. The Commodity Exchange Directive was approved by the Reserve Bank of Malawi (RBM) on April 3, 2018. The Directive includes provisions for the RBM to license and regulate the exchange. Malawi's exchanges have weathered many storms and are considered as robust institutions with a healthy trade in e-NWRS, although the predominant use of the warehouses is to store and sell, rather than for inventory-based finance.

The Government of Tanzania sought to implement warehouse receipts as part of a strategy to ensure the mainstreaming of the system for eight crops such as cotton, coffee, cashew nuts, paddy, sunflower, sesame, maize, and pigeon peas to facilitate agricultural productivity and financing for smallholder farmers. These policies include Tanzania vision 2025, National Strategy for Growth and Reduction of Poverty, National Microfinance Policy 2000, Cooperative Policy 2002, Tanzania Agriculture Policy 1997, and Agricultural Marketing Policy 2008. The government has also put in place regulation tools, including Cooperative Societies Act 2003 (currently Tanzania Cooperative Societies Act 2013) and Cooperative Societies Rules 2004, Warehouse Receipt Act 2005, Warehouse Regulations 2006, and Tanzania Warehouse Licensing Board (Coulter and Onumah, 2012). These efforts have resulted towards the creation of an enabling environment, the provision of proactive support to private operators, farmers' organizations, NGOs, and community-based organizations (CBOs) who supply inputs and credit to smallholder farmers as well as ensuring a strong regulatory mechanism. Therefore, due to these efforts, the WRS has emerged as a way of getting around this financing problem by linking small holder farmers with financial institutions. As of the mid 2010s, reports suggest that the WRS enabled improvements in the quality of cashews stored, and higher prices. The use of warehouses by indigenous traders also purportedly augmented production.

In 2008, backed by the Government of Ghana and supported by the US Agency for International Development (USAID), a body of Ghanaian producer groups, traders, processors, and financial institutions involved in the grain trade formed the Ghana Grains Council (GGC). One of GGC's articulated missions is to facilitate the integration of smallholders into more competitive markets by establishing a regulated warehouse receipt system in Ghana, with the GGC itself acting as the certification and regulatory agency. As of April 2017, the GGC had certified twelve commercial warehouses with a combined storage capacity of 54,600 metric tons to issue warehouse receipts. Another model used in Ghana serves as a good example of a WR financing system designed specifically for small farmers. The basic structure of WR financing in Ghana is the formation of NGO-assisted farmers' cooperatives that own and operate the warehouses so that they are community warehouses (Giovannucci). Since 1989, TechnoServe has worked closely with the Department of Cooperatives and the Agricultural Development Bank (ADB) in Ghana to encourage small scale farmers to form cooperatives and use warehouse receipts to store their crops for sale in the lean season. ADB provided loans against the farmers' grain, at 75-80% of current market value, and the grain is stored in cooperatively owned warehouses. The scheme is concentrated in the Brong-Ahafo "maize triangle" of Ghana – the major area of agricultural surplus, where annual price fluctuations are high.

3.1.3 Latin America

Latin America has seen a few successes as well. In 2014, Mexico reformed its WRS legal framework to provide for a centralized warehouse receipts (and pledge bonds) registry known as RUCAM administered by the Ministry of Economy. RUCAM's objective is to provide increased legal certainty to lenders when securing obligations with pledge bonds. In contrast, the Brazilian warehousing structure is mainly controlled by private parties. Large farmers, cooperatives, trading companies (local and international) as well as millers and processors hold very large warehouse capacities. The law obliges each Warehouse manager to issue a receipt to the holder of the grain. This receipt makes the Warehouse manager fully responsible for the product quantity and quality. Warehouse receipts are not directly tradable or negotiable. However, Sellers may issue CDAWA (Cédula de Depósito Agrícola / Warrant Agrícola) that can be traded on the Brazilian commodity exchange. The issuance is done through the contracting of a supervision company / WH Manager that holds the physical guarantee against the document. Financing is also possible on CDAWA. These documents are directly traded in the local commodity exchange board from seller to buyer without any intervention from the Brazilian Government. Both the issuance and trading are the responsibility of the Board that holds control on the emitting body. This possibility has been a strong developer of the Brazilian agriculture and the main string to harness private investment and private financing.

3.1.4 Asia

Asia has seen varying degrees of successes and failures (IFC, 2013). For instance, both India and Thailand have developed successful regional commodity-based models. The case of India is discussed in the following section. Correspondingly, Indonesia has recently seen a boost with support from the International Finance Corporation (IFC) for implementation of a broader warehouse receipt system (Höllinger, Rutten, and Kiriakov, 2009). Within South Asia, Sri Lanka, and Pakistan present contrasting experiences. In Sri Lanka, donor supported pilots for e-NWRS have largely failed. These were initiated by leveraging the Inland Trust Receipts Act of 1990. For the warehouse receipts to be converted into tradable financial instruments, a new law or amendments to the existing Securities Exchange Commission Act were needed to protect all parties involved.

The Pakistan Mercantile Exchange Limited (PMEX) was established in 2007 to support trading of locally produced agricultural commodities. Under an initiative of the Government of Pakistan (GoP) led by the Securities & Exchange Commission of Pakistan (SECP), PMEX is working to integrate its system with Pakistan's first Collateral Management Company (CMC) to offer an end-to-end trading facility for Pakistan's farmers using EWRs. As part of efforts to improve institutional financing to the agricultural sector and rural population, particularly small farmers, the State Bank of Pakistan (SBP) announced, in October 2019, that it had amended its Prudential Regulations of Agriculture Financing, SME Financing, and Corporate & Commercial Banking to allow banks to accept EWRs as collateral for financing. Pakistan's Financial Institutions (Secured Transactions) Act, 2016 includes warehouse receipts in its definition of documents of title, which however does not include the electronic variety. Under the new Prudential Regulations for Agriculture Financing, EWRs may be used as proof of title to pledged or hypothecated agricultural produce, which is defined as a form of security. This follows changes on 31 July 2019 by the Securities & Exchange Commission of Pakistan (SECP) to the Collateral Management Companies (CMC) Regulations 2019, under the Companies Act 2017 to promote warehouse receipt financing and electronic trading of agricultural commodities. Amendments to the Secured Transactions Act (2016) and the 2002 Electronic Transactions Ordinance have been proposed to ensure that they enabled the issuance and transfers of warehouse receipts in electronic form.

Table 1: A summary of select examples from developing and transition countries

Country	Scheme	Established	Volume (MT) (latest year)	Commodity Exchange Operator	Comments
Ethiopia	Warehouse Receipt Finance Initiative	2009	Minimal	ECX (IFC Backed)	IFC supported Warehouse Receipt Financing system launched at the Ethiopia Commodity Exchange in partnership with Commercial Bank of Ethiopia on December 26, 2019. For maize
Ghana	GGC Warehouse Receipt System	2008	47,000 (2015)	Ghana Grains Council	Functional; no publicly available information on e-NWRS/WRS.
Kenya, Tanzania, Uganda	G-Soko	2014	1,200 (2017)	East African Grains Council	No publicly available information on how the project is faring
Malawi	ACE Warehouse Receipt System	2011	28,000	ACE	Despite setbacks, is functional
Malawi	ACHX Warehouse Receipt System	2014		ACE	Despite setbacks, is functional
South Africa	Electronic Silo Certificates System	2004	3.00 million (2019-20)	SAFEX/JSH	Is active and works well
Tanzania	Warehouse Licensing Scheme	2005	798,763 MT of cashew was auctioned or available (2023)	Warehouse Licensing Board	Warehouse Receipts Regulatory Board is the Government Institution under the Ministry of Industry and Trade. This institution was established under the Warehouse Receipts Act No. 10 of year 2005 and Act No 3 of 2015 as amended and Regulations 2016. Continues to work well
Zambia	Electronic Silo Certificates System	2014	Negligible	ZAMACE	ZAMACE is the Authorized Agency for implementation of the warehouse receipt system under the Zambia Agricultural Credits Act 35 of 2010.
Bulgaria		1998	In 2009, 47 operators, 500,000 MT licensed capacity		One of the few operational indemnity funds outside the United States.

Sources: Thunde and Baulch (2020) Their compilation is based on information from African Development Bank (2017), Miranda et al. (2019), IAPRI (2019); ACE (www.aceafrica.org/), AHCX (www.ahcxmalawi.com/), ECX (www.exc.com.et), G-Soko (<http://g-soko.com/>), SAFEX (www.jse.co.za/redirects/safex) accessed March 30, 2020. For Tanzania, the figures are from <https://wrms.wrrb.go.tz/warehouse/data> for auctioned and available cashew, accessed Oct 14, 2023.

Note: GGC = Ghana Grains Council; ACE = Agricultural Commodity Exchange for Africa; AHCX Auction Holdings Commodity Exchange; ECX = Ethiopian Commodity Exchange

3.2 Lessons

Existing research suggests that WRS can generate benefits along many dimensions. Yet there is consensus that the benefits of WRs must not be overstated. Some note that it is likely that small farmers are not benefitted directly but may benefit indirectly (Miranda et al, 2019). In general, the performance of WR systems has been variable and there is not much work on the precise nature of impacts.

3.2.1 Producer benefits

One of the primary impacts is generated on account of the increased ability of producers to hold produce and to be able sell when prices are higher. In Zambia, producer prices were found to be almost 82% more than the alternative of selling outside of the WR system, by being able to time the

sale of part of the produce (Onumah, 2003). Thunde and Baulch (2020), use ACE transactional data between 2011 and 2018, for each of 710 warehouse receipts for nine commodities. Using the example of the most important commodities maize, soya bean and pigeon pea in terms of number of e-NWRs and quantities deposited they find that there exists an inverse relationship exists between the duration of storage, the cost of financing and the returns that ACE warehouse receipt depositors make. “Storing maize and soybeans for less than 180 days generally resulted in a depositor making a profit, while storing pigeon peas for less than 270 days, also generally resulted in profits to storers. However, 73 percent of warehouse receipts issued for pigeon peas made losses compared to 48 percent for maize and 53 percent for soybeans. Wide variations in profits to storers were linked to the collapse of pigeon pea exports and a fourfold decline in maize prices in 2016-17. Gross (2023) finds similar that for maize, smallholder farmers stand to benefit substantially by using WRs and for soyabean, the gains are more consistently positive than for maize. He also finds that in the analysis of over 5 years, the potential for losses due to price declines would not have pushed farmers into debt on account of WRs. In the case of Ghana’s community warehouses, studies suggest that from 1992 to 1996, participating farmers in this region were able to increase their profits on grain sales by an average of 94% per year, despite the high interest rate of 42% on the short-term loans. By 1997/98, more than 130 farmer groups were being assisted and for over eight years, loan repayments were an impressive 100%. Although this system relied on NGO support in terms of its uptake and repayment record, it contrasts with grain storage that is still under parastatal control and not as vibrant. Some of the benefits resulting from the scheme include: increased food production; better food security for farming families previously forced to accept low prices when selling at the same time (harvest); reduced post-harvest losses and higher rural investment (Onumah et al, 2011).

Apart from returns to storage, an unintended consequence of use of WR for loans is that farmers are more likely to use productivity enhancing inputs if they can be assured of more remunerative producer prices, rather than through subsidized distribution programs (Onumah, 2003). Value-cost ratios (VCR) – the incremental income from use of fertilizer divided by the cost of fertilizer applied is 1.81 where the crop is marketed without using the WR system and 3.86 when the system is used.²

3.2.2 High cost of WR services

The absence of scale implies that WR services can be relatively expensive (Coulter et al., 2000). In Ghana and Zambia, at the turn of the century, the charges were \$3.50 /ton/mth vis-à-vis \$2.50/ton/mth, to ensure long term viability. Storage rates in Africa tend to be high relative to international standards. Perhaps on account of that it has been pointed out that WRs are used predominantly as a component in financing import and export transactions, but rarely used for commodities not traded internationally, except where the depositor is a large processor or major trading company. In most African countries, this has greatly limited the benefits of the WR system in the domestic agricultural trade.

3.2.3 Targeting only small farmers may make it non-viable

One of the major causes of lack of significant success seems to be the selection of smallholder farmers as the major target beneficiary group. This focus was justified and understandable as larger market players, say those needing more than US\$50 000 of financing, already had access to finance through field warehousing arrangements). Yet, there are specific difficulties facing smallholder farmers and small-scale traders with regard to costs of accessing warehouse receipt systems, as they may operate at some distance from certified warehouses, they have problems bulking up stored quantities to fulfill minimum lot sizes needed to reduce storage and management costs

² The rule of thumb is a ratio of 2 indicates fertilizer use is profitable.

and fees, and there are substantial costs and difficulties in organizing and managing producer and trader organizations needed to reduce these problems.

Onumah (2003) emphasizes that the main users tend to be large operators, who own or can rent entire warehouses or silos, and can afford high fees (usually in thousands of dollars (US) per month). Their services are not available to farmer groups or traders who wish to deposit relatively small volumes of a commodity (e.g., 50 – 100 MTs). In Zambia, USAID sought a way of supporting the development of a warehouse receipt program that would involve smallholders and allow them to participate in the market. When an initial intervention through the Zambia Agricultural Commodity Agency was unable to establish an effective warehouse receipt system, USAID used the Production, Finance and Improved Technology project to work with the private sector and establish a new entity, the Zambia Agricultural Commodity Exchange, with a stronger commercial focus and links to a regional commodity exchange. Again, this report identifies the major focus on small farmers as one of the reasons for only limited success.

3.2.4 Price risk and general equilibrium effects

Doward et al. (2006) cite Gabre-Madhin (2005) as noting that warehouse receipt systems bear risks as prices may fall during the storage period, or may not rise as much as expected, so that gains in value do not cover administration and storage costs and losses. Furthermore, price gains may themselves be reduced by widespread adoption of warehouse receipt systems. Risk prone and risk averse small farmers should not be expected to take on the risks of holding inventory, and systems therefore need to be developed for small and/or larger traders to have incentives to bear these risks. These risks will, however, be particularly high in poorly developed market systems (for example, Ethiopian grain markets) where such market innovations are most needed, leading to a 'chicken and egg' problem affecting wider market system development.

3.2.5 What it does not do for smallholders

Höllinger and L Rutten (2009) state that the ability of a warehouse receipt system to overcome the credit access problems faced by small and poor farmers is limited due to limited marketable surpluses. Experiences with well-functioning warehouse receipt systems around the globe show that warehouse receipts are initially used by larger and more financially viable entities.³ Doward et al. (2006) point out too that inventory credit and other warehouse receipt systems do not directly address smallholder farmers' critical problem of financing seasonal capital (beyond their potential to increase income from previous season sales) as these systems only allow farmers to raise credit using existing production as collateral, they do not provide a mechanism for obtaining credit to finance production (unless production seasons overlap).

In theory the WRS permits smallholders to store their surplus safely in a modern warehouse, allowing them to use the stored commodity as collateral to secure a loan to finance household consumption and investment needs. However, in practice, it involves significant transaction costs and complex risk transfers that undermines its value to the smallholder. During recent decades, there have been many initiatives to develop markets from the bottom up, with results varying from success to abject failures.

³ A mid-term evaluation report on implementation of warehouse receipt systems in Southern and Eastern Africa, funded by CFC and conducted by the Natural Resources Institute, provides information about Coffee Market Development and Trade Promotion in Eastern and Southern Africa (CFC/ICO/03FA) and Improvement of Cotton Marketing and Trade Systems in Eastern and Southern Africa (CFC/ICA/12FA). Uganda, the United Republic of Tanzania and Zimbabwe are the participating countries. As well as the project design and implementation weaknesses described in detail in the report,

Consequently, it would be logical to state that despite the promise of a significant success, the warehouse receipt system for the coffee industry in Eastern Africa, is considered generally inefficient by Mr. Schluter due to lack of suitable storage infrastructure; legal and regulatory issues; lack of requisite skills; missing or weak complementary market institutions; difficulty in attracting key stakeholders especially bankers; problems encountered in ensuring smallholder participation and disabling elements in the policy environment.

Figure 3: A coffee buyer's experience with WRS for coffee



3.2.6 Need all sizes of participants and scale, for liquidity

As with commodity exchanges, these difficulties may be reduced where a financially viable system can be developed for large scale farmers and traders, exploiting economies of scale for large volumes, and then special mechanisms developed to enable smallholder farmers to use the system (this may need some form of financial or organizational subsidy). WR systems involve major scale economies, both in terms of managing warehouses and providing regulatory oversight or certification. Indeed, the management and regulatory costs associated with 2,000 and 20,000 MT warehousing sites are not very different. In Zambia, this challenge is being addressed by: (a) making the system open to all players including large millers and commercial farmers who should be encouraged to participate from the outset, and; (b) starting with large warehouses in major places of concentration.

Coulter et al. (2009) notes that as the system expands, the effects gradually spread over to smaller producers and operators. The major driving forces behind a sustainable warehouse receipt system are traders, large producers, and processors.

Even when smallholders do not actively participate in WRs they benefit indirectly from price smoothing and better information (Onumah, 2003). To date however, there is not much rigorous evidence of this.

3.2.7 Lack of supportive policy

Doward et al. (2006) suggest that major systemic problems inhibiting development of warehouse receipt systems include lack of supportive policies and legal frameworks. The absence of a regulatory regime is a critical factor. Coulter and Onumah (2002) argue that, as a consequence, warehouse service providers in Africa do not come close to fulfilling the industry's development potential,

except in the atypical cases of South Africa and Zimbabwe. Weak institutions governing the arrangements and undermining conflict resolution and investor confidence (in this case regulatory oversight of warehouse management).

3.2.8 Stable policy environment

Further, actual, or potential ad hoc government interventions in agricultural markets can be a formidable obstacle. For example, Coulter and Onumah (2001) noted that Governments often resort to ad hoc interventions, which can potentially undermine inventory credit programs. During the 1990s, there were two pilot inventory credit initiatives in Ghana, one of them involving small farmer co-operatives, and the other involving relatively larger traders storing in state-owned storage facilities. In 1997, both projects were adversely affected by an ad hoc Government decision to grant selected businesses exemption of import duties on white maize in reaction to crop forecast suggesting there would be a major food shortage. The forecast turned out to be incorrect, and the maize import seriously depressed market prices for two years, causing losses to those storing the domestic crop with inventory credit.

Development professionals have been advocating for the WRS in many developing countries, but while they have met with some success in emerging large economies, these institutions have not quite taken root in developing countries unless heavily supported by the governments or donors (Rashid, 2015). WR systems can only deal with the limited issue of post-harvest price variation and are not in general a solution to the overarching problem of the lack of financing for long-cycle agricultural investment during planting time.

First, WR systems have proven quite complex to build and maintain. They require credible registration of the collateralized grain.

Second, warehouse operators need to have deep liquidity and can extend a large amount of credit. Commercial banks such as the Yes Bank in India and Quedancor in the Philippines have worked to establish WR systems (Miller 2008),

In general, lack of understanding of the system among smallholder farmers has often been a reason for the reluctance of farmers to participate directly in WRS (Shalendra, Haque, and Anu Peter 2016; McIntosh and Mansini, 2018).

While on the one hand, intra year price variation and the prospect of hedging is a key motivation for depositors, WR systems can expose intermediaries to substantial commodity price risk and sudden price declines can deter users and undermine the sustainability of systems (Miranda, Mulangu, and Kemeze 2017; McIntosh and Mansini, 2018).

4 THE INDIAN EXPERIENCE

4.1 Background

India has had a long history of policy making focused on warehousing, dating back to the Warehousing Corporations Act of 1962 (See Appendix 1 for a longer historical view). This Act established a framework for warehousing of agricultural and other commodities and envisaged two levels of authorities: the federal or central level and at the state level (Government of India, 2018). The Central and State Warehousing Corporations (CWC and SWC, respectively) were established towards this end. The CWC is empowered to acquire and build godowns and warehouses in locations deemed to be appropriate, across the country. It can also run warehouses for the storage of agricultural produce, seeds, manures, fertilizers, agricultural implements and notified commodities offered by individuals, co-operative societies and other institutions. The SWC may do so within the State with the previous approval of the CWC. In addition to this, the CWC and SWC may arrange facilities for the transport of agricultural produce, seeds, manures, fertilizers, agricultural implements and notified commodities to and from warehouses. The CWC may also act as agent of the Government for the purposes of the purchase, sale, storage and distribution of agricultural produce, seeds, manures, fertilizers, agricultural implements and notified commodities. The SWC may act as an agent of the CWC for these purposes. In addition to these, both the SWC and CWC have been granted power to make regulations at the State and Central level, respectively. Warehousing was thus largely regulated by state governments and most states have warehousing laws under which they license warehouses.

Until the 2000s the thrust was on the creation of warehousing infrastructure, which was deemed to be vastly inadequate, specifically to accommodate the expansion of public procurement of food-grains in the country. Until the 1990s the focus was largely on public and cooperative sector warehouses. The year 2000 marked a crucial turning point when the recognition that private sector role might be crucial in expanding and upgrading warehousing infrastructure. Several innovative schemes that offered capital subsidies and tax breaks provided impetus and incentives to private players to build own and operate warehouses and cold storages. Under the Income Tax Act (1961) the Government of India was already provided deduction of up to 150% for setting up warehouses with an exemption of taxes on profits for first 5 years, and a 25-30% rebate on taxes for the next five; Warehouses were also exempt from service tax and excise duty. BCD and Excise on refrigerated containers reduced to 5 and 6% from 10 and 12.5% in 2016-17. Cold chains included in Priority Sector Lending (PSL) list and given infrastructure status since 2011-12 (Naik et al., 2022). These were collectively meant to incentivize private investment in warehouses and cold storages.

Several Indian states have developed creative models for Public-Private Partnerships (PPP). Rajasthan for example privatized the running of warehouses and this resulted in an expansion in capacity utilization and upgradation (Naik et al., 2022). The Madhya Pradesh government, which expanded public procurement of wheat leveraged private warehouse construction offering guarantees of use. The Private Entrepreneur Guarantee (PEG) scheme of the Government of India (2008) for example, has enabled a rapid spread of warehousing. Under this scheme, storage gap was identified in all the districts and the construction of warehouses was done largely by private investors, without any investment by the Government. FCI provided guarantee of paying storage charges /rent for ten years even if no stock was stored in these warehouses. In many cases the private entrepreneur also took the responsibility of preservation and maintenance of stocks. As of August 2024, a capacity of 14.6 million MTs was created for storage of central pool stock of food grains by the FCI and the state agencies involved in procurement and storage of food grains under the PDS.

See Table 2 for more examples. However not all PPP are successful and these need to be carefully designed and executed.

Table 2: Some examples of state-level initiatives in India in warehousing

Who?	Year	Scheme	Remarks
Madhya Pradesh	2012	Warehousing and Logistics Policy, 2012.	A capital subsidy of 15 percent of the project cost or Rs 3000/MT (whichever is lower) and an interest subsidy of 5 percent of the loan amount was introduced. Applicants were required to construct a warehouse of a minimum capacity of 3334 MTs and Rs 1 crore investment with the prescribed specifications of warehouses.
Rajasthan	2010	Privatization	The Rajasthan government awarded 38 of its 90 warehouses to Shree Shubham Logistics (SSL), a private firm, through a Swiss Challenge bid process.
Maharashtra	1990	Pledge Loan Scheme of MSAMB Maharashtra	For producers only. Produce is valued at market price of the day at the government regulated mandi or the Minimum Support Price announced by the government, whichever is less. Loan attracts interest of 6% (up to 180 days), 8% (180-365 days) 12% beyond. Market Committee which makes repayment of loan within the prescribed period of 6 months (180 days) are applicable for 3% interest subsidies on loan amount from MSAMB. The market committee takes responsibility for storage, monitoring, and security of the mortgaged goods free of cost. And the responsibility of the concerned market committee to insure mortgage of the goods. The schemes extend to warehouse receipts of State or Central Warehousing Corporation. https://www.msamb.com/Schemes/PledgeFinance
Gujarat	2020-21	Mukhyamantri Pak Sangrah Yojna (Gujarat)	Scheme for farmers for construction of warehouse at least 20 square feet area as per specification. 50% of cost or Rs. 30,000 (thirty thousand) whichever is less; paid out in two installments, plinth and upon completion); application is online
India	2008	Private Entrepreneurs Guarantee Scheme (PEG)	Private entrepreneurs invested in building warehouses and in many cases took responsibility for maintenance of stock. FCI provided guarantee of paying storage charges /rent for ten years even if no stock was stored in these warehouses.
India	2014	Agricultural Marketing Infrastructure (AMI) under Integrated Scheme for Agricultural Marketing (ISAM)	Ministry of Agriculture & Farmers Welfare offers a capital investment subsidy sub-scheme with new guidelines from 22.10.2018. It is a credit linked capital subsidy scheme in which subsidy @25% and 33.33% (depending on beneficiary) on the capital cost of the project, subject to a capital cost norm.
Tamil Nadu	2021	Special PACS registration drive	Registrar of Cooperative Societies (RCS), Government of Tamil Nadu, organized a drive to encourage "net worth positive PACSs" registered their warehouses in WDRA. In 2021-22, 77 warehouses with an aggregate capacity of 1.53 lakh MT were registered.

Source: Compiled from various government websites and WDRA (2022).

Note: This is a selective list to illustrate the types of programs implemented to expand infrastructure and registration of warehouses, and should not be regarded as a complete list of all relevant programs.

Based on type of ownership and use, warehouses in India, maybe classified under five heads set out below:

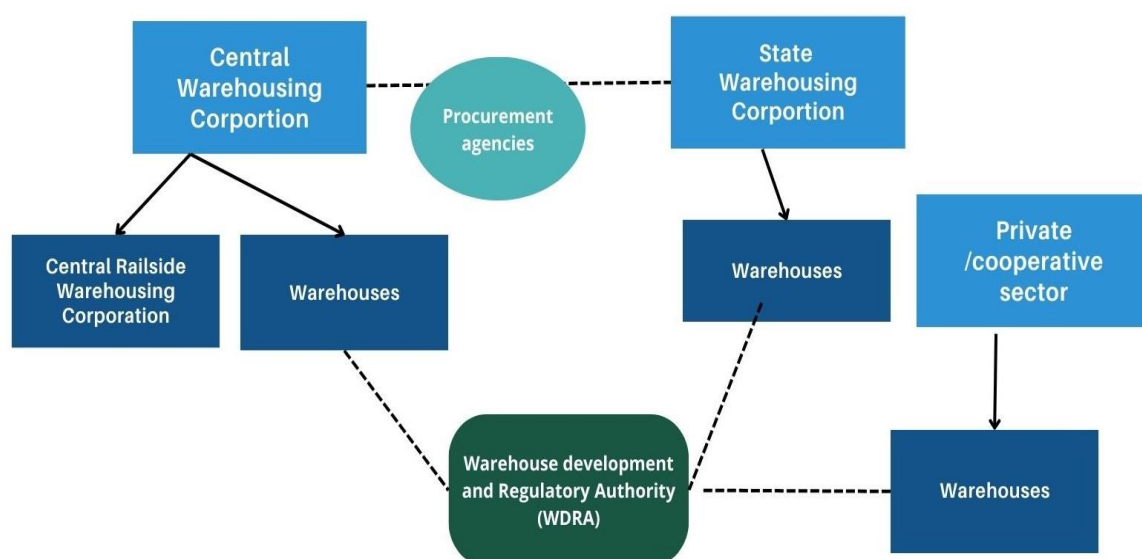
- ▶ **Public warehouses:** These warehouses are set up at transportation points of highways, railways, and waterways. They are used to store goods for the public and are generally licensed by the government to private entities and co-operative societies.
- ▶ **Private warehouses:** Private warehouses are owned by private entities for the storage of goods.
- ▶ **Bonded warehouses:** Bonded warehouses, as a concept were introduced to facilitate deferred payment of customs duty by the importers and exporters. These warehouses are used to store imported goods under an undertaking or 'bond', which does not allow the release of goods until

the custom duties are paid. Government and private parties together manage bonded warehouses. The Central Warehousing Corporation operated 39 custom-bonded warehouses in 2021⁴ located at Ahmedabad, Bangalore, Bhopal, Chandigarh, Chennai, Delhi, Hyderabad, Jaipur, J N Port, Kolkata, Kochi, Lucknow, and Mumbai.

- ▶ *Government owned warehouses:* These warehouses are owned, managed, and controlled by central or state governments, public corporations, or local authorities.
- ▶ *Co-operative warehouses:* These warehouses are owned, managed, and controlled by co-operative societies. Members of the co-operative societies are generally offered warehousing facilities at lower costs than non-members.
- ▶ Cold storage involves control of temperature, humidity, air composition such that agricultural produce maintains full integrity. Cold storages in India are used mainly for potatoes, chilies and increasingly for a range of spices.

A diagrammatic representation of the structure of warehouse system (excluding cold storages) in India is depicted in Figure 4.

Figure 4: Warehouse structure in India



Source: Authors, based on review of policies.

4.2 WRS: Conceptualization to implementation

Since the Sale of Goods Act (1930), receipts from warehouse keepers were always recognized as a document of title to the goods in the warehouse. Yet, there was no specific framework for WRS as such. The 1962 Act too was limited in scope, and focused on the public sector and on infrastructure, without offering a systematic framework for either regulation of private warehouses or for the establishment of (e-)NWR. The first major effort to formalize the operations of warehouses came in 2007 when the Union Government enacted the Warehousing (Development & Regulation) Act. The Act came into force on October 25, 2010. It provided for a Warehousing Development and Regulatory Authority (WDRA) that was finally set up on 26 October 2010. The primary objective of the Authority

⁴ Farmers, cooperatives, and ag startups receive a concession of 30, 10 and 10% respectively on warehouse tariffs as of March 2023.

was to make provisions for the development and regulation of warehouses and create an ecosystem of negotiability of warehouse receipts (WR). The idea was to enable farmers to store their agricultural produce in warehouses which are not only scientifically constructed but which are also professionally managed so that there is an assurance of maintenance of its quality and quantity. This ecosystem was also expected to provide an efficient and transparent system of registration of warehouses and promotion of scientific warehousing of agricultural produce. It was to improve the fiduciary trust of depositors of the produce so that they can raise credit from banks against the stock kept in such registered warehouses. It would bring liquidity to such stocks. Ultimately, this would promote the development of efficient supply chains of various items of agricultural produce. The WDRA thus became a central regulator for Negotiable Warehouse Receipts (NWRs). Figure 5 presents the trajectory of policies in India, marking key milestones. We discuss below these developments at length.

Figure 5: Timeline of India WRS policies



Source: Authors, based on review of policies. For a richer account of policies and milestones, see Appendix 1 based on Naik et al. (2022).

4.2.1 The beginnings of NWR: Warehousing (Development and Regulation) Act, 2007

As introduced already, the Warehousing (Development and Regulation) Act, 2007 (WDRA), was primarily enacted to promote warehouse receipt financing in India.

“...to make provisions for the development and regulation of warehouses, negotiability of warehouse receipts, establishment of a Warehousing Development and Regulatory Authority and for matters connected therewith or incidental thereto.”

The Act thus provided for the establishment of the WDRA as an independent regulator functioning under the overall superintendence of the Central Government. Some of the functions of the WDRA include to register all warehouses that issue NWRs, monitor and supervise them, regulate the NWRs, decide the charges that warehouses can apply for commodity, define the process to approve agencies for grading commodities, regulate rates of warehousing contracts and develop and

use an electronic database of goods deposited in the warehouses. The salient features of the WDRA include the following:

- ▶ Regulation of warehousing activities;
- ▶ Liabilities of warehousemen;
- ▶ Format of warehouse receipts;
- ▶ A framework for settlement of disputes and appeals; and
- ▶ Offences and penalties.

WDR Act 2007 thus provides an elaborate system of issue of warehousing receipts. The Act mentions that the receipt could be either in writing or in electronic form. It would be a document of title to goods in writing if it contained all the following particulars (Section 11 of WDR Act):

- (a) Receipt number;
- (b) Warehouse registration number and date up to which it is valid; Name of the warehouse and its complete postal address;
- (d) Name and address of the person by whom or on whose behalf the goods are deposited;
- (e) Date of issue of the warehouse receipt;
- (f) Statement that the goods received shall be delivered to the holder thereof, or that the goods shall be delivered to the order of a named person;
- (g) Rates of storage charges and handling charges.
- (h) Description of the goods or of the packages containing them with particulars of quantity and quality or grade;
- (l) market value of the goods at the time of deposit;
- (j) Private marks of depositor on the goods or packages, if any, except in the case of fungible goods;
- (k) Name of the insurance company indemnifying for fire, flood, theft, burglary, misappropriation, riots, strikes or terrorism;
- (l) Whether the warehouse receipt is negotiable or non-negotiable;
- (m) Statement of the amount of any advance made and of any liability incurred for which the warehouseman claims his lien;
- (n) Date and signature of the warehouseman or his authorized agent;
- (o) Declared shelf-life of goods;
- (p) The fact that the warehouseman holds the lien on the goods deposited for his storage and handling charges; and
- (q) That the receipt would be valid only till the date of expiry of declared shelf- life of the goods for which it is issued.

The most important provision of the WDR Act is to make the electronic receipt a negotiable instrument. The Act describes a negotiable receipt as one under which the goods represented



therein are deliverable to the depositor or order, the endorsement of which has the effect of transfer of goods represented thereby and the endorsee for which takes a good title". (Section 2(m) of W (D&R) Act 2007)

Establishing rules for registration and inspection: Warehousing (Development and Regulation) Registration of Warehouses Rules 2010 and 2017

Following the promulgation of the 2007 Act, the Union Government notified the Warehousing (Development and Regulation) Registration of Warehouses Rules in 2010. They were superseded on 23rd February 2017 when the revised Warehousing (Development and Regulation) Registration of Warehouses Rules, 2017 were notified. **The amended rules provide details of the process undertaken by the WDRA for registration of warehouse.** Eligibility for registration of a warehouse requires the fulfilment of following conditions:

1. Every application shall be accompanied by necessary documents to establish the identity of the applicant.
2. The applicant has to provide documentary proof of ownership of the warehouse and effective control of the warehouse.
3. The applicant should be a fit and proper person for which he has to declare that he or his key managerial persons, has not been convicted by any court for any offence at any time in the preceding five years and they have not been declared insolvent by any court. The applicant, or any of its key managerial persons, should not have been declared to be of unsound mind by any court. There are some other conditions which include that the applicant has complied with all local laws applicable for carrying out the business of warehousing.
4. The rules also mandate that the applicant or warehouseman shall have insurance coverage for the risks specified under the rules. The insurance coverage must be taken against at least fire, floods, burglary, misappropriation and riots and strikes.
5. The applicant is also required to satisfy WDRA that he meets the minimum net worth requirements on the basis of the sum total of the capacity of the warehouses concerned and all registered warehouses belonging to the applicant. In addition, he is required to maintain the minimum net worth requirements at all times during the period of registration of the warehouses. In fact, the evidence of compliance with net worth requirements must be periodically submitted to the Authority.
6. The applicant is also required to furnish a security deposit which has to be maintained with the WDRA during the period of registration of the warehouse.
7. The rules also mandate that with effect a date notified by the WDRA, no warehouseman shall issue any negotiable warehouse receipts in physical form and shall register with one or more repositories registered with the WDRA for issuing negotiable warehouse receipts in electronic form.

The WDRA conducts physical inspection of a warehouse before it is given registration. The warehouses already registered are also periodically inspected. Since WDRA is a thinly staffed organization, it has empaneled nine professional organizations to conduct these inspections.

4.2.2 Amendment of Rules to address emerging situations

Since their formulation, the Rules have been amended seven times, to address emerging challenges, to facilitate registration of warehouses and to streamline procedures. Key amendments are discussed below.

In the first few years, only 1,222 were successfully registered. In 2017, the Union Government therefore announced a transformation plan **so that the WDRA activities are streamlined, and the registered warehouses are effectively monitored**. The WDRA set up an online portal for registration of warehouses and the entire process from receipt of applications to final approval was digitized and made online. Furthermore, to extend the reach and accessibility of WDRA registered warehouses to farmers, the Government devised a host of measures to enable concessionary registration terms to farmers-based organizations. Among these amendments of the rules, the significant ones are as follows:

1. On 20th March 2018, the rules were amended by WDRA and the amount of minimum net worth of warehousemen were notified.⁵
2. On 21st December 2020, the rules were further modified to provide a structure for application fees for registration and renewal of registration of warehouse with the WDRA. For a Farmer Producer Organization (FPO) or a Primary Agricultural Cooperative Credit Society (PACS), the fee was fixed at a nominal amount of Rs. 5,000 per warehouse. For example, to attract PACS to register their warehouses, WDRA is giving a number of incentives. These are:
 - a. Registration fee is only Rs. 500 as compared to Rs 20,000 to Rs. 30,000 for others. This is applicable to self-help groups (SHGs) also.
 - b. Net worth is required to be only positive irrespective of the capacity, while for other categories, it is specified with respect to the capacity of warehouse. SHGs also enjoy this concession.
 - c. Security deposit is Rs. 50,000 per warehouse in the form of a bank guarantee or bank fixed deposit irrespective of the value of e-NWRs/e-NNWRs issued by it), while for others it is Rs.50,000 (for warehouses up to 2,000 MT capacity) and Rs 1 Lakh (for warehouses of over 2,000 MT capacity). In addition, they have to provide a percentage of value of e-NWRs issued as security deposit.

These are significant steps to expand the reach of players. For example, as of 31 March 2022 there were as many as 67,251 functioning PACS across India.

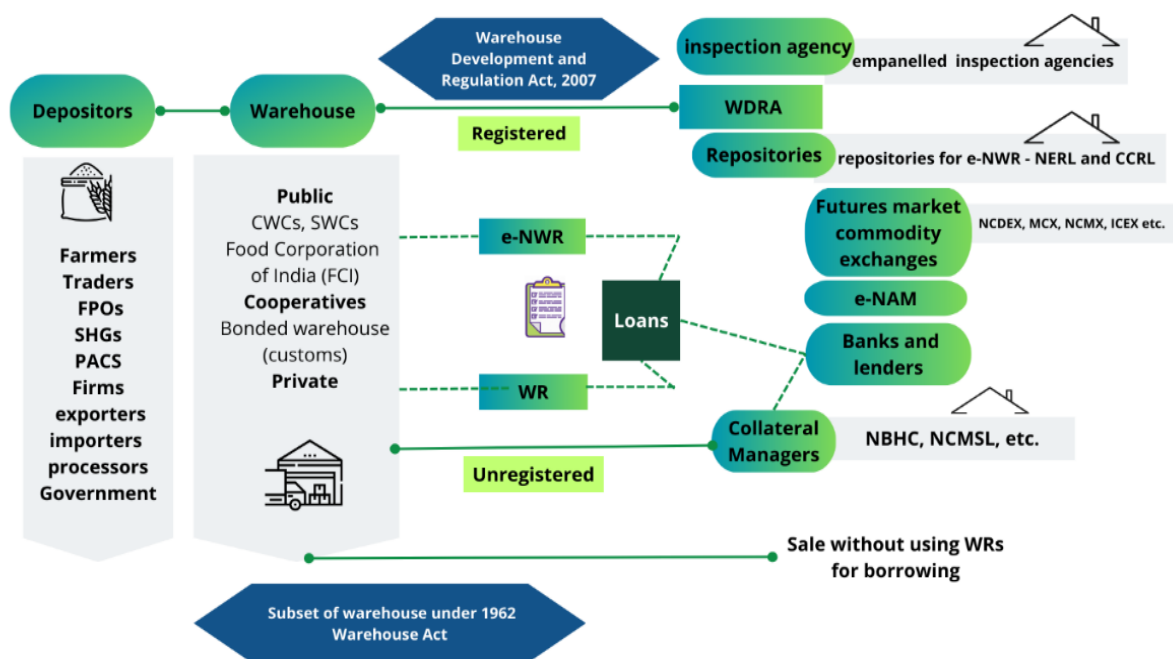
(<https://pib.gov.in/PressReleasePage.aspx?PRID=1907177>)

3. On 3rd November, 2021 the rules were modified to provide concessional rate of registration and renewal fee for (SHGs) too.
4. The rules were further revised on 5th April, 2022 and the rates for registration were reduced for warehouses which stored only agricultural commodities.

These provided conditions that expanded the portfolio of warehouse owners that registered with the WDRA and took the institution one step closer to farmers.

⁵ <https://wdra.gov.in/documents/32110/35427/20180321+2-3+Warehousing+%28Development+and+Regulation%29+Registration+of+Warehouses+%28Amendment%29+Rules%2C+2018+-+English.pdf/77443ecf-170b-4735-5809-7e84da4e3db4>

Figure 6: A stylized representation of the WRS ecosystem in India



Source: Authors.

4.2.3 The transition to e-NWR and nurturing its growth

After gaining experience of registration of warehouses and issuance of paper-based NWRs, the WDRA realized the challenges associated with the physical NWRs including the risk of mutilation, fudging, overwriting, damage, loss, issuance of an NWR without receiving goods, issuance of duplicate NWRs without following procedure, issuance of multiple NWRs for the same stock, possible delivery of stocks without surrendering the warehouse receipt and fraudulent overstatement of stock value in the warehouse receipt etc.⁶ To overcome these risks, the electronic Negotiable Warehouse Receipt (eNWR) were introduced by the WDRA. eNWR was made mandatory for all the registered warehouses from 1st August 2019 onwards, ensuring a distinct break from the past.

In the initial years of operation of WDRA Act 2007, the registered warehouses were also issuing physical receipts. From 2017-18, the warehouses started issuing eNWRs. On August 1, 2019, the WDRA made it mandatory for registered warehouses to issue eNWRs. In 2018, Securities Exchange Board of India (SEBI) instructed the Clearing Corporation to use eNWR only as settlement instrument for delivery of future contracts of agricultural produce. It was implemented from September 2019 and now all future contracts are delivered only through eNWRs. These two decisions made the ecosystem acceptable to various participants in agricultural trade.

4.2.4 Setting up of Repositories for managing e-NWRs

WDRA set up two repositories National Electronic Repository Limited (NERL) and CDSL Commodity Repository Limited (CCRL). They were responsible for creation and management of electronic Negotiable Warehouse Receipts (e-NWRs). They were mandated to provide the required access and support to warehouses, commodity exchanges and the banks. The two repositories and the

⁶ The introduction of e-NWR had previously been recommended by the Guru Committee (2001) and the Working Group on Warehouse Receipts and Commodity Futures of the Reserve Bank of India 2005.

online portal of WDRA became functional from 26th September 2017. They are responsible for accurate creation and maintenance of eNWRs and eNNWRs. They work to ensure **confidentiality and integrity of the electronic receipts**.

The repositories are also responsible for enabling the transfer, pledge or removal of the pledge, e-auction of e-NWRs. They also ensure the delivery of goods in part or full, underlying the e-NWR / e-NNWR, through the warehousemen. Since their incorporation under the Companies Act, the repositories have invested large amounts of money in digitization of their operations and now their operations are completely online.

The repositories signed legal agreement with the banks for giving them access to their platform. The banks then have direct access to platform of repositories. This digitization of repositories has enabled the banks to block the eNWRs so that they are not transferred before the pledge is created.

This has made it easy for depositors of an agricultural commodity stored in a registered warehouse to get pledge loan sanctioned by a bank which has signed an agreement with the repository.

India's futures and commodity exchanges, National Commodity and Derivatives Exchange (NCDEX), Multi Commodity Exchange (MCX), Bombay Stock Exchange (BSE), National Multi Commodity Exchange (NMCE/ICEX) have permitted the use of e-NWRs for settlement of derivative contracts of the agriculture commodities in which future trading is allowed at a given time.

The e-NWR has also been integrated with electronic National Agriculture Market (e-NAM) platform of the Government of India. An interface has been enabled between e-NAM and repositories but trading of agricultural produce through eNWRs on the e-NAM platform has not taken off as yet.

- ▶ eNWRs are issued in electronic form and they are uniform across India.
- ▶ eNWRs can pick up the value of goods from the Agmarknet portal operated by the Union Ministry of Agriculture. The portal picks up data from over 2600 *mandis* or spot markets across India.
- ▶ eNWRs are regulated by WDRA and there is a seamless, digital system of issuing eNWRs. There is regular monitoring and surveillance of eNWRs.
- ▶ They are backed up by W(D&R) Act 2007. It is therefore likely to result in lower litigation in courts about the ownership of stock.

A new warehouse-based trading module has been introduced in the ambitious electronic National Agriculture Market (e-NAM) platform to facilitate trading from the premises of warehouses using negotiable electronic warehouse receipts (e-NWR), while another module will allow farmers to get access to the e-NAM platform from collection centers set up by farmer producer organizations (FPOs). On the one hand, policy levers have been used to expand the potential users of e-NWRs and formalizing credit. Private moneylenders, for example, used to give loans against physical WRs. But their lien was not registered but they used to take the receipt and keep it till loan was repaid. Now in the electronic system, private unlicensed money lenders do not give loans as they cannot take any receipt as there is no physical receipt. They cannot be pledgee in the repository system.

4.3 Current state of WS

As is evident from this narrative account, the present ecosystem of eNWR in India has evolved over several years. Figure 7 presents the growth in WDRA registered warehouses, quantity stocked, pledge loans raised and NWR/eNWRs issued. Figure 8 presents the growth of warehouses by ownership. The patterns of growth are strongly correlated with key policy interventions. For example, the

concessions allowed to SHGs, FPOs etc. have seen a spurt in registered warehouses owned by them and the mandating of e-NWRs has naturally led to a steep growth in the use of e-NWRs.

The current storage capacity of warehousing sector in India for agricultural commodities is estimated at 188.02 million MT (WRDA, 2022), though precise estimates in the private sector are difficult to estimate precisely. As of 31st March 2022, there were 4256 warehouses registered with WDRA. But only 2516 of them were active (WDRA, 2022). Public sector entities Central Warehousing Corporation and State Warehousing Corporations had 489 and 500 registered warehouses. That said, interestingly, the Food Corporation of India, the organization for managing procurement and distribution of food grains has not registered even one of its warehouses.

As mentioned earlier, efforts have been made to register the warehouses of Primary Agriculture Co-operative Societies (PACS) registered with WDRA. PACS operate in villages for persons who are their members. They function at village level, and they are an important part of short-term co-operative credit structure. PACS deal directly with the farmers, give them crop loans and collect repayments. Fertilizers are also distributed by them to their members. As a result of the policy attention, 1242 PACS warehouses were registered. Some states, such as Tamil Nadu, have shown good progress in registering the warehouses operated by PACS. These are mostly small warehouses having a capacity of 100 MT to 500 MT.

In general, despite the recent growth of registered warehouses, registration of cold storages is however very low and only 59 cold storages were registered across India. Most the registered warehouses are currently dry storages (Naik et al., 2022).

Drawing on data for the repository that accounts for a majority of e-NWRs, it is apparent that just three states in India, Gujarat, Rajasthan and Maharashtra accounted for over 90% of the number of e-NWRs and over 85% of the quantity stored against e-NWRs in the years 2019-20 and 2020-21 (Table 4). Although the WDRA has notified a long list of commodities in practice, only a small subset of them are e-NWR popular. Naik et al (2023) note using that data of one repository that castor seed, soybean, guar seed and gum, chana, cottonseed and mustard account for over 80% of e-NWRs and quantity in 2019-21 (Table 3). These are highly commercial crops and most of these have a vibrant futures market, although occasionally susceptible to policy shocks, especially a ban on futures trading/suspension, etc.

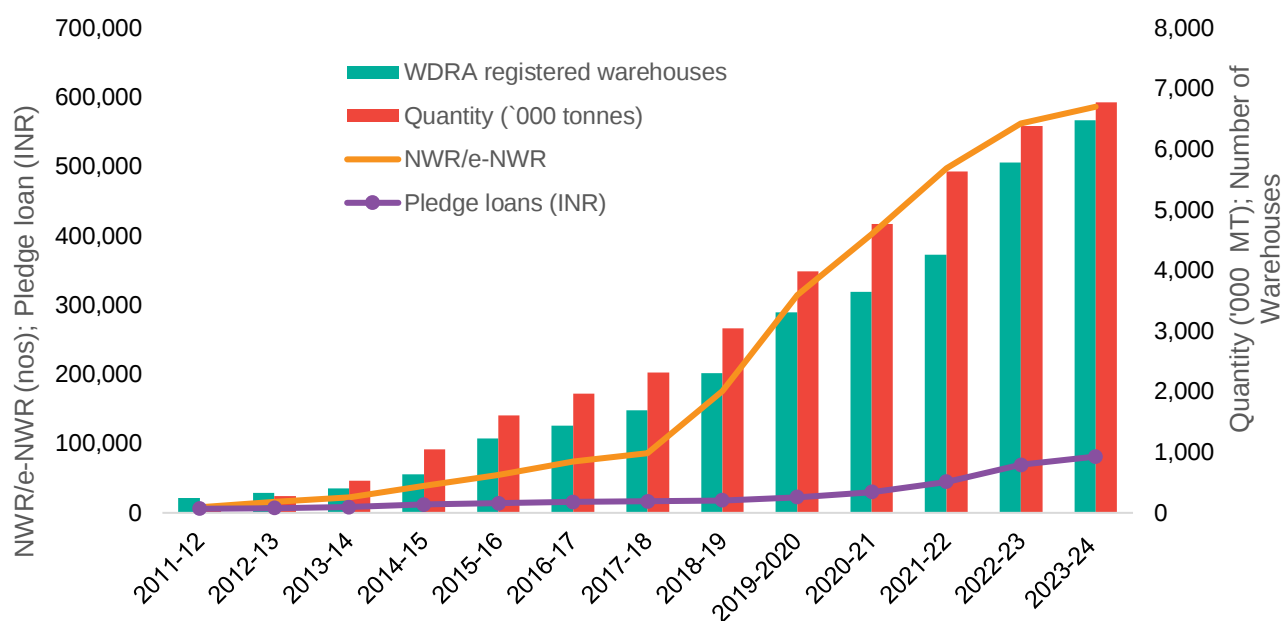
These patterns fluctuate significantly across years based on the policy environment, global conditions, and anticipated price movements. Domestically, for example, India's demonetization, introduction of GST and more recently the COVID-19 pandemic influenced the volumes under e-NWR.

Another pattern that emerges is that virtually all the commodities, excepting raw cashew nuts were stored for less than a year, suggesting that not many players are using warehouses for long duration storage (Naik et al., 2022). A dominant share of the WRs is also connected with those traded in commodity exchange and futures markets.

There is also substantial evidence that most users are traders/processors. However, at this time the main users of warehouses and the main beneficiaries of pledge financing are traders who use pledge financing to hedge manage liquidity constraints (NIPFP, 2015). A study on potato cold storage in Bihar reports that the number cold storages at the state level in Bihar increased between 2000 and 2009 from 195 to 320, an increase of 64% over the whole period (Minten, et al, 2014). Interestingly, unlike warehouses where it has been reported by NIPFP (2015) that a bulk of the users are traders, in the case of cold storages, Minten et al. (2014) find that 91% of the users of cold storages are farmers, including smallholders. Because of better storage conditions of their seeds, they benefit directly from the existence of these cold storages and from the existence of this extra market channel. Even those who do not directly participate can benefit because prices are smoothened due

to the availability of an extra marketing channel (the storage option), it can be expected that prices increase, on average, during the harvest. For those smaller farmers that sell relatively more directly after the harvest, they therefore benefit from these higher prices.

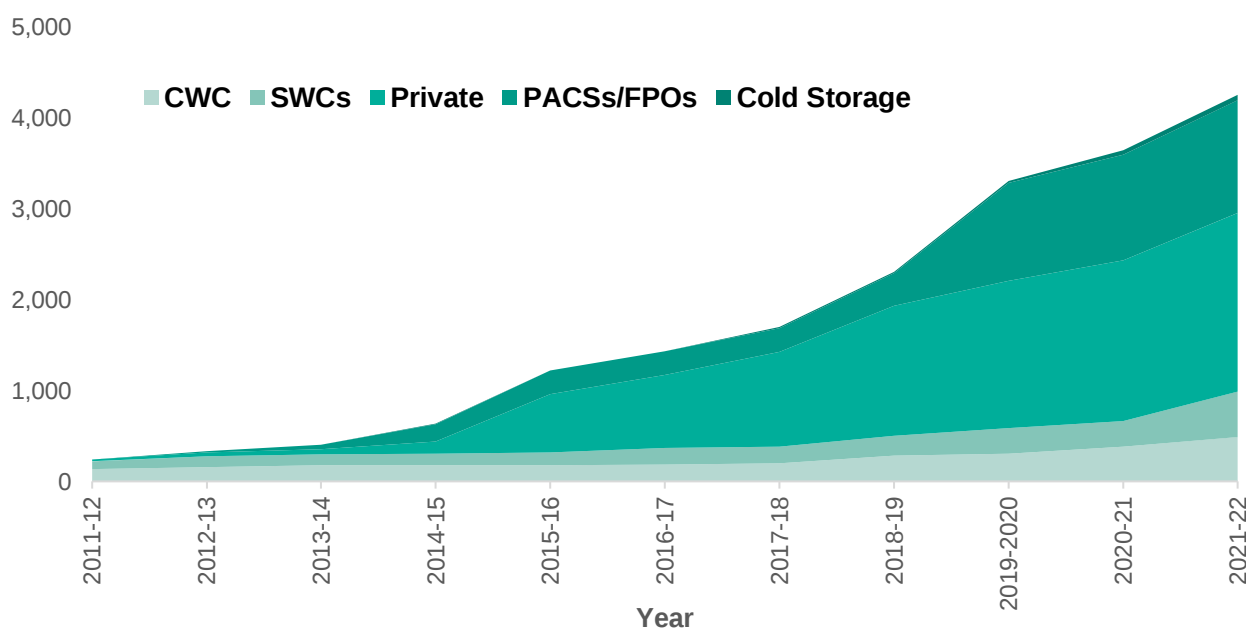
Figure 7: Trends in WDRA-registered warehouses and NWR/e-NWR



Source: WDRA.

Note: Registrations are cumulative and include active and inactive warehouses. NWR/e-NWR combines both until 2019, after which e-NWR was mandated.

Figure 8: Trends in WDRA-registered warehouses by ownership



Source: WDRA.

Table 3: e-NWR use in India by commodity in 2019-21

Commodity	Quantity		Share in total (%)	
	e-NWR	Volume (MT)	e-NWR	Volume
Castor seed	67,510	341,340	34	22
Soyabean	28,422	156,466	14	10
Whole Channa	22,053	243,732	11	15
Cotton seed	19,199	194,452	10	12
Mustard	17,447	178,155	9	11
Guar seed	15,587	103,037	8	7
Guar gum	10,328	61,774	5	4
Wheat	3,918	47,149	2	3
Cumin seed	2,917	9,130	1	1
Coriander seed	2,826	22,906	1	1
Turmeric	2,480	15,044	1	1
Maize	2,120	27,509	1	2
Barley	1,669	19,827	1	1
Paddy (Dhan)	1,191	36,999	1	2
Groundnut pods	568	16,444	0	1
Cotton bales	467	12,570	0	1
Arhar /tur (Red gram)	431	11,972	0	1
Gur (Jaggery) - Cold storage	305	6,396	0	0
Whole Green gram	272	5,745	0	0
Groundnut	237	5,488	0	0
Whole Urad (Black gram/beans)	225	12,053	0	1
Indian Sugar	183	25,312	0	2
Matki/Moth	97	4,130	0	0
Others	1,035	23,363	1	1
Total	201,487	1,580,995	100	100

Source: Naik et al. (2022) based on data from NERL.

Table 4: State-wise use of e-NWR use in India, 2019-21

State	2019-20		2020-21		Share (%)	
	No. of e-NWRs	Qty (tons)	No. of e-NWRs	Qty (tons)	e-NWRs	Qty
Gujarat	69,154	382,540	17,122	151,633	42.8	33.8
Rajasthan	37,646	317,200	37,911	340,618	37.5	41.6
Maharashtra	12,217	87,072	16,157	101,685	14.1	11.9
Madhya Pradesh	2,872	27,063	2,391	43,009	2.6	4.4
Bihar	1,310	13,248	325	3,240	0.8	1.0
Andhra Pradesh	483	7,613	833	24,472	0.7	2.0
Tamil Nadu	502	10,016	745	16,320	0.6	1.7
Telangana	369	2,456	322	5,251	0.3	0.5
Uttar Pradesh	163	3,953	370	12,146	0.3	1.0
Karnataka	153	2,890	220	5,122	0.2	0.5
Puducherry	24	459	82	1,989	0.1	0.2
Punjab	0	0	101	20,402	0.1	1.3
Haryana	12	486	3	111	0.0	0.0
Total	124,905	854,997	76,582	725,998	100.0	100.0

Source: Naik et al. (2022) based on data from NERL.

4.4 Issues and challenges of the Warehouse Receipts Ecosystem

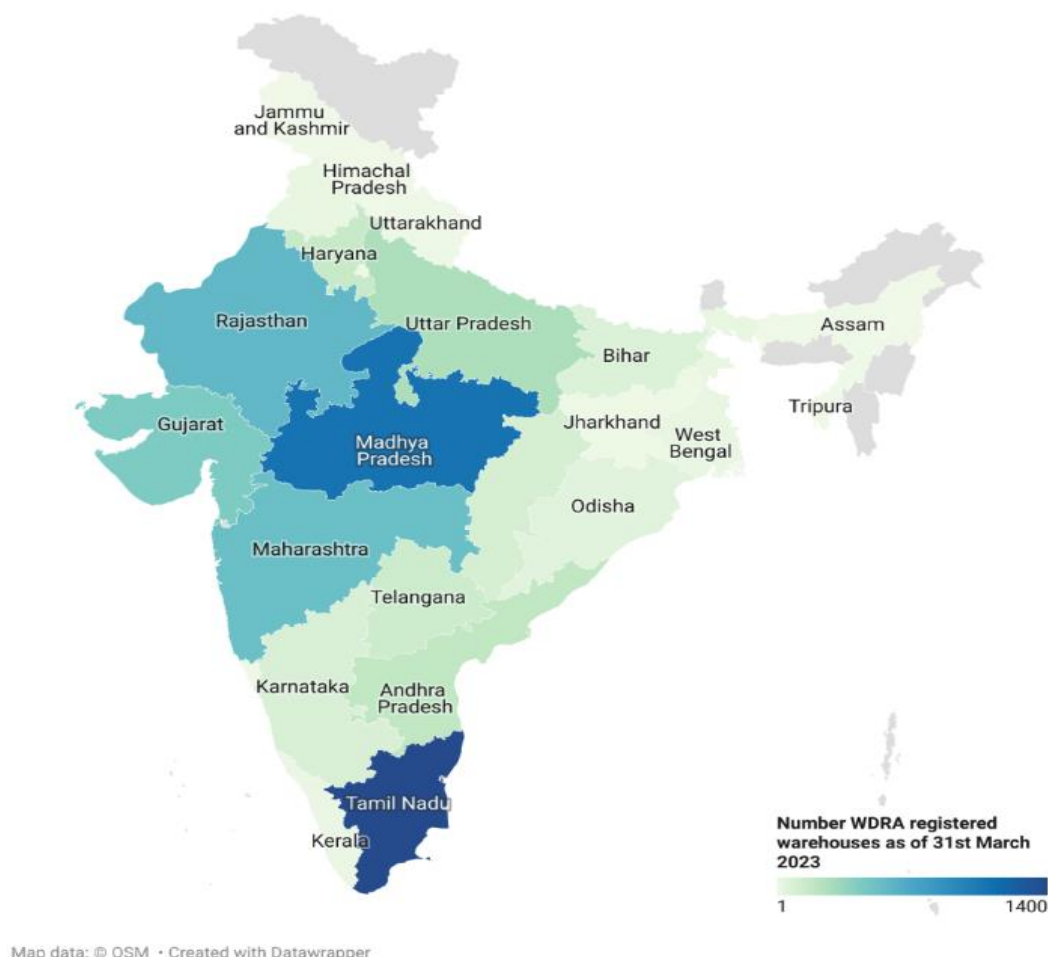
India's experience with eNWRs has had both successes and challenges. These offer valuable lessons for Bangladesh. We organize these into two parts. In the first, we focus on infrastructural issues and in the second we focus on the eNWR and the digital ecosystem intended to support it. In the pattern of use that has emerged, several puzzles stand out. Studies have suggested that although it costs depositors 10-70 times more to secure a loan from non-WDRA registered warehouses relative to WDRA, many continue to use Collateral Manager based pledge loans from banks. Many government warehouses remain unregistered, and many financial institutions prefer their status quo of relying on collateral management agencies (CMAs) and unregistered warehouses to lend against warehouse receipts issued by them. Among registered warehouses (i.e. the cumulative number of warehouses registered until 2021-22), only 59% of them remained active suggesting that viability is questionable; interestingly, however, the proportion of inactive warehouses is the highest among private warehouse (where only 42% are active) and lowest among those owned by FPOs/SHGs/Cooperatives (where 79% are active; See Appendix 3).

4.4.1 Warehouses and warehouse operations

Uneven regional distribution of Warehouses. The highly uneven distribution of warehouses merits attention. Out of 4256 registered warehouses the highest number was in Tamil Nadu (1,314). As mentioned earlier most of these were small warehouses operated by PACS. Madhya Pradesh has registered 749 warehouses followed by 575 in Rajasthan, 484 in Gujarat and 335 in Maharashtra.

Punjab and Haryana which were the first states to benefit from green revolution and contribute enormously to India's food procurement and buffer stocks have however registered only 42 and 57 warehouses respectively. Eastern states of Bihar and West Bengal have registered only 50 and 26 warehouses respectively. Assam has only 8 registered warehouses.

Figure 9: Regional variations in registered warehouse presence in India



Source: Based on data from WDRA.

This distribution speaks to the contextual differences across states but also to the policy initiatives of the state government.

- ▶ *Scale of marketed surplus.* States that are dominated by smallholders with limited agricultural marketed surplus also have very limited growth in warehousing. For example, in Bihar and West Bengal the average size of landholding is only 0.39 ha and 0.76 hectares respectively. The projected population of Bihar in 2023 is 13.10 crore (<https://www.census2011.co.in/census/state/bihar.html>). The projected population of West Bengal in 2023 is 10.42 crore (<https://www.census2011.co.in/census/state/west%20bengal.html>). As a result of small holdings and large population of these two states, the agricultural surpluses are very small. With small marketed surpluses, the need for warehousing is somewhat limited here.
- ▶ *Diversified crops with limited public procurement.* Similarly, in some states where a few crops dominate the agricultural production and government procurement dominates, registered warehouses are limited in number. For example, Punjab and Haryana grow wheat and rice in large quantities and large proportion of these two crops is procured by the Government at Minimum

Support Price (MSP), leaving only a small quantity for private sector. Due to huge procurement the private trade does not normally store large quantities in registered warehouse. As a result, these two agriculturally advanced states have only a small number of registered warehouses despite having a large network of warehouses. Investment in warehousing is greatest in states where the crop production is more diversified and in crops where government procurement is limited. Andhra Pradesh, Gujarat, Madhya Pradesh and Maharashtra, for example, grow several commercial crops like soybean, cotton, pulses etc. In Madhya Pradesh, for example, soybean and pulses are cultivated on a large scale. These crops are not procured in large quantity by the Government and the processors buy these crops as raw material. In each of these cases, private players find it attractive to set up warehouses. Due to close links with processing, the warehouse owners have preferred to register their warehouses.

- **State level policy incentives.** Further, some state governments are more proactive than others in attracting private investment. They hold investor meetings and provide an easier to navigate regulatory regime for obtaining various clearances and approvals. Madhya Pradesh is a good example. The state also has an active Warehousing and Logistics Policy 2012 (described in the previous section) and promoted itself as a state which is centrally located and compared to Punjab and Haryana is closer to ports.

Access to modern warehousing. For farmers, both distance and costs relative to their quantities produced are profound barriers. Minten et al. (2014) point out that more competition in the cold storage sector is desirable to drive down the cost of storage. While the subsidies that were given out by the government have helped to stimulate the setting up of cold storages it has however not (yet) led to lower storage costs that one would expect and advocate the promotion of a more competitive environment for cold storages.

Taxation structure. Storage and warehousing of agricultural produce have been exempt from GST.⁷ However, the creation of warehouses and provision of service of warehousing is liable for tax. This means that while outputs have been exempted from GST while input services have been included in GST. This deprives these service providers to claim input tax credits. For instance, one such input is the GST for renting commercial property which is 18% of the rent paid.

Storage losses and high cost of operations. Stock quality losses are a common problem in warehousing when the warehousing infrastructure is wanting. In the Indian experience, current storage technologies seem to limit losses effectively and studies suggest that farm losses outstrip storage losses for most commodities and the latter are less than 1% for non-perishables (Appendix 5). Regardless, there is a need to expand the scope of insurance beyond damages to flood, theft and so on, and create these insurance markets. The storage costs of cold storages are still very high on account of a large number of overheads such as investments in generators due to poor power supply. For instance, cold storages require a constant supply of electricity. Poor electricity supply in areas demand that operators maintain back-up generators. These are costly and increase the cost of warehousing.

Although private sector investment in warehousing has seen vibrant growth, a majority of the organized warehousing sector is currently controlled by the government owned public sector undertakings. The storage capacity available with Central Warehousing Corporation (CWC) and State Warehousing Corporation (SWC) is largely occupied by the Food Corporation of India (FCI) for storage of Central Pool stocks (NIPFP, 2015) locking in capacity that in the absence of procurement would be available to farmers.

⁷ This is continuation of the exemption in respect of service taxes of these activities.

Inadequate competition is also cited as another reason for high storage costs especially in cold storages (Minten, et al, 2014). Quality and efficiency of services provided by the warehouses and cold storages can be improved if the market is competitive.

4.4.2 The e-NWRS ecosystem in India

The Warehousing (Development and Regulation) Act was enacted in 2007 and the Warehousing Development and Regulatory Authority was constituted in 2010. Yet the number of warehouses registered and the active warehouses has remained low. There are a number of reasons for this (see Gol, 2018):

1. **Registration of a warehouse with WDRA is not compulsory:** The lack of a mandatory requirement for warehouse registration with the regulatory body (WDRA) under the Act means that many warehouses choose not to undergo the registration process. The voluntary nature of registration discourages large number of warehouses from participating. A proposal to make registration mandatory has been under consideration of Union government. This will enable the Government to track in real time the food stocks of agricultural produce stored in registered warehouses.
2. **Lack of awareness:** Even after more than a decade of existence of WDRA there is lack of awareness among farmers, traders, and warehouse owners about the benefits of warehouse registration with WDRA and the eNWR ecosystem.
3. **Financial incentives:** The banks continue to provide pledge loans based on physical WHRs issued by non-registered warehouses. Thus, many warehouses do not see any additional incentive for depositors of agricultural produce. The lack of financial incentive makes it less appealing for depositors to keep their stock in registered warehouses.
4. **Limited recognition of quality standards:** In the registered warehouses, the quality of produce is checked before e-NWR is issued. The produce has to meet the quality parameters laid down by AGMARK. These quality standards are higher than the specifications laid down by the Government for procurement under Minimum Support Price Operations. Many warehouses do not want to abide by AGMARK standards for the produce stored in them. Several issues relating to quality norms in warehouses need resolution. For example, in 2016, Food Safety Standards Authority of India (FSSAI) was mandated and disputes around quality and who bears the liability for deficient quality has been an issue. Yet, the cost of testing is fairly miniscule compared to the price.
5. **Fragmentation of the warehousing structure and standards:** Warehousing in agriculture is part of the larger agricultural ecosystem and like agriculture, the warehousing market is local, unorganised, and fragmented (NIPFP, 2015). Currently, there is lack of a single consolidated national standard for warehousing in India. Standards and regulations are fragmented and varied. National standards have not yet been uniformly adopted or mandated, and the quality of warehousing and the contractual obligations that Warehouse Service Providers (WSPs) enter into, vary widely across regions. The WDRA prescribes certain mandatory details required to be included in warehouse receipts. In many cases the State requirements of these receipts are not in tandem with the WDRA standards. For instance, there is variation under the M.P Agricultural Warehouse Rules, 1961, (<http://cgswc.cg.gov.in/pdf/The%20CG%20Agricultural%20Warehousing%20Rules%201961.pdf>) the Bombay Warehouses Act, 1959 (<https://www.legalcrystal.com/act/136074/the-bombay-warehouses-act-1959-complete-act>) and the WDRA. State requirements for warehouse receipts must be the same as the requirements under the WDRA.

6. **Resistance from Large Organised Warehouse Service Providers (WSPs):** Large Warehouse Service Providers typically operate warehouses in more than one state. Some are owned by them while some others are leased in. In some warehouses the maintenance of quality is undertaken by the WSPs from the owners on a revenue sharing basis. In some warehouses the maintenance of quality is undertaken by the WSPs. They do not prefer to register the warehouses due to the associated costs and tougher security and quality control requirements.
7. **Competition from collateral management services:** Most of the large WSPs also provide Collateral Management (CM) Services to banks. Under this system, the banks pay 0.75 to 1% percent fee to CM for conducting regular inspections and maintaining quality standards. The banks prefer them as many such warehouses are in rural areas where the concerned bank may not be having its own branch. It is a lucrative business for WSPs and it is one of the major reasons for resistance for registration of warehouses with WDRA.
8. **Financial Challenges for Individual Warehouses:** Individual warehouses which are not owned by WSPs or well-funded businesses also face challenges as they are not able to meet the WDRA's conditions of net worth and the condition of 3 percent dynamic security.
9. The Government procures wheat and rice under MSP operations at a very large scale. This is done by the FCI and state agencies. NAFED procures pulses and oilseeds and sometimes horticultural produce like onions. Cotton Corporation of India procures cotton. None of the warehouses of these organisations are registered with WDRA. One major reason for this is the extra expenditure on getting eNWRs and eNNWRs issued.
10. **Fear of transparency:** Another reason could be the fear of transparency of eNWR ecosystem. Many private warehouse owners want to avoid regulatory oversight by the WDRA and Government agencies and they would not like their stock position of various commodities known to WDRA and through them to the Government.
11. **Low credibility of warehouse receipts:** Only when the financial community has a high degree of confidence in the system will it lend against warehouse receipts, and interest rates will be reduced (FAO, Food Grain Forum, 2009).
12. **Poor enforcement:** The lack of a uniform enforcement mechanism.

5 FUNDAMENTALS OF SETTING UP WRS

Implementation of e-NWRS has remained a challenge in more of the developing countries, as in many cases they did not meet the pre-conditions for success (Rashid et al., 2010). In general, they have succeeded in emerging large economies, but have failed to take root in developing countries unless heavily supported by the governments or donors (Rashid, 2015). A scholarly consensus exists on the prerequisites and the essential steps to successfully develop a warehouse receipt system in a specific context.

This section elaborates on the core elements of a well-developed warehouse receipt system to shed light on which of these aspects can be nurtured in the context of Bangladesh. We group these into three broad areas.

5.1 Market pre-conditions

1. WRS is only relevant for commodities where farmers have a large enough marketed surplus for domestically produced commodities. More generally the market volume (including imported volumes) and velocity of transactions, i.e., the number of times a commodity changes hands matter.
2. Market conditions must be such that there is substantial intra-year variation in prices so that holding stocks for sales later generate benefits that exceed the cost of storage. At the same time, where price volatility is very high, and the returns to stockholding are rendered uncertain, it is unlikely the WRS will attract demand due to a risk that holding stocks might expose depositors to price falls at the time of intended sale.
3. Related to the above, in general, where government intervention in prices is high, for example, by offering a minimum support price that is fixed, given that this removes any price uncertainty for the farmer, conceivably stocking these commodities are unlikely to yield benefits. Thus, private depositors are unlikely to stock commodities where government price intervention is high unless the government itself can creatively leverage warehouses for procurement.
4. Where the policy uncertainty is high, for example, imposition of stocking limits (such as in India) or mercurial import and export policies, this renders the benefits of stockholding highly uncertain and e-NWRS in these contexts is unlikely to take off.
5. Commodities that tend to be highly standardized and do not have substantial variety in terms of grades and quality standards are ideally suited for e-NWRS since there is a shared understanding and awareness of quality standards by all stakeholders.
6. In many developing country contexts, farmers rely on informal credit from traders and input dealers with obligations to sell to their lenders. This can deter farmers from stocking since there is a moral binding to sell to their lenders to liquidate loans. In such contexts, it is essential to couple e-NWRS interventions with those that address interlinked transactions.

5.2 Institutional, regulatory, and legal requirements

1. **An appropriate legal framework is a fundamental prerequisite.** What does such a framework entail? International experience suggests that this may involve adapting existing legislation or designing a new one. Further, it can be incorporated in a broader general framework governing transactions or financial instruments or can take the form of a dedicated legislation addressing warehousing specifically. There are examples of countries using either approach – a broad-

based legislation encompassing various commodities and various commercial practices (e.g., Poland, Ukraine, and Indonesia) or a specialized warehouse legislation that focuses on main commodities to be used as collateral (e.g., Hungary, Slovakia, Bulgaria, and Kazakhstan). In general, an e-NWRS system requires primary, simple, and clear legislation providing the structural framework. Secondary legislation that is detailed addresses the technical specifics elaborated for each commodity for which e-NWRS is designed.

2. **A legal framework is necessary but only a first step** to building a robust e-NWR ecosystem. First, there is a need to establish a **government regulatory agency** that can work independently and can foster trust in the system among depositors, warehouse operators, and financial institutions. Such an agency would be responsible for the licensing, regulatory and inspection procedures of warehouses. This agency is the principal institution that is responsible for ensuring the security and integrity of the system, that banks rely on for due diligence of warehouses and market information to all. A reliable government regulatory agency would attract financial institutions since it offers assurance that an impartial and independent agency will protect the interests of all parties involved.
 - a. The Indian experience suggests that to truly nurture a robust and deep e-NWRS it is perhaps better to have a single **unified system of regulation with and mandatory registration** of all warehouses rather than optional registration with plural authorities. The Indian experience also suggests that there may be much value to ensuring that such registration is simple and low cost, and if necessary, on concessionary terms of farmer groups and organizations or NGOs so as to expand the number of players and be more inclusive.
 - b. Often, while the main regulatory oversight rests with the government agency, some of the **ancillary functions devolve on empaneled private agencies** so that the government regulatory authority relies on **inspection agencies and repositories** (as in India) or **Collateral Management Companies (CMCs)** as in Pakistan, for example. Whatever the route, the e-NWRS ecosystem requires institutions accountable to or part of the principal agency to serve as a registry for all the collateral deposited in the warehouses, licensing and accreditation of these warehouses and issuance of the actual warehouse receipt, electronic or otherwise. These institutions, if any, are thus responsible for implementing secondary legislation concerning transfers of WHRs as a negotiable instrument, establishing transactional and operational procedures for WHRs such as storage facility charges, commodity quality parameters and monitoring protocols as well as ensuring technical competency of storage facilities.
3. The third prerequisite is establishing **grades and standards** that the institutions above adhere to for verification. Since much of the e-NWR relies on predictably and trust in the quality of the inventory and its verification, a secondary service industry to e-NWRS financing includes quality standardization and verification services for both the commodity and storage facilities. It is necessary for verification purposes that standards and grades be predetermined and established on the international commodity exchanges in order to align domestic and international parameters.
4. A fourth major pre-requisite is a set of financial instrument/frameworks, comprising **insurance, performance/ bank guarantees and/ or an indemnity fund to backstop warehousing operations**. For warehouses to credibly issue receipts and generate confidence among stakeholders, the depositor and bank must be protected against risks including theft, fraud, or negligence on that part of those managing the warehouse or its staff. The insurance coverage must be of levels that are adequate to cover the potential losses that depositors and banks may face. This includes commodity and warehouse insurance as well as that of theft, etc. If warehouses do not

have a track record or trust in the market already, other devices such as insurance bonds or letters of guarantee, or indemnity funds might be necessary to boost the trust and credibility of the warehouse. Different approaches have been adopted globally.

- a. One approach mandates that warehouse operators put in place, **bonding and insurance arrangements or offer performance guarantees**. This guarantee will provide compensation if stored goods do not match what is specified by the receipt, either due to negligence or fraud by the warehouse. Without such guarantees farmers and traders will be reluctant to store crops and banks will be unwilling to accept receipts as collateral for financing. Performance guarantees issued by insurance companies are sometimes not widely accepted, but bank guarantees may be. Performance guarantees are usually in the form of insurance bonds or letters of credit. This may be supported additionally by an indemnity fund.
 - b. An **indemnity fund** can be created through contributions from private warehouses and collected as part of the fee charged to customers. Indemnity funds protect stakeholders and can reduce the cost of acquiring insurance bonds or letters of credits and make guarantees accessible to smaller warehouses. Yet, raising the capital for an indemnity fund can also potentially deter the growth of warehouses. As a result, in some countries, governments provide the funds. The indemnity fund must be carefully designed so that it does not result in good warehouse operators paying for the mismanagement and fraud of competitors.
5. It is also essential to assess the **financial incentives and cost structure** carefully and holistically to ensure that the odds are not stacked against the e-NWRS. This involves reviewing the tax and duty structures for infrastructure such as the construction and leasing of warehouses, the prescribed fees for various services, the design of financial products and their costs, existing structures of interest rates for existing loan and insurance products for potential depositors as well as lenders.
 6. Finally, global experience suggests **that e-NWRS works well in tandem with the operation of commodity exchanges** (for example, in South Africa, Malawi, etc.). In India too a bulk of the e-NWRS are generated in transactions that are linked to commodity and futures markets. In designing e-NWRS one must factor in the different conditions for contexts without commodity exchanges.

5.3 Infrastructural requirements

1. A successful warehouse receipts scheme is predicated on the existence of a **network of warehouses and cold storages**. Such a network, experience tells us, should be **accessible** to small farmers in terms of distance and costs. Warehouses in zones where **production is clustered and in key nodes** such as ports and transport hubs would also provide the conditions. Another fundamental requirement is that these warehouses are constructed using **technologies** that ensure that the quality of produce or commodities does not deteriorate.
2. **Assaying labs** of international standards that are trusted are essential infrastructure. This is necessary for building trust within the ecosystem.
3. For e-NWRS, a key requirement is a digital infrastructure that supports an **electronic collateral registry**. These can be either centralized system or be a distributed or decentralized model based on blockchain technologies (as announced, for example by the Nigerian commodities exchange).

4. A **market price information system** that offers a public and transparent benchmark for valuation of the commodities and for decisions to sell or hold are critical. Commodity exchanges or regulated markets/ government administered prices by design offer predictable prices.

6 OPTIONS FOR BANGLADESH

In this section, we reflect on whether Bangladesh has the preconditions to implement e-NWRS and the potential barriers. We further ask if Bangladesh needs a WRS system.

6.1 Context: Does Bangladesh need a WRS?

A fundamental question to resolve is whether Bangladesh needs an e-NWRS?

While there is not much literature today on warehousing and logistics in Bangladesh, especially for agricultural commodities, according to recent reports the demand for warehouse space in Bangladesh may reach over 68.24 million square feet by 2021-22 for all commodities, up from 41.5 million square feet in 2016-17.⁸⁸ Within agriculture, the estimated storage capacity of government warehouses and silos is around 2.1 million metric tons (MT). Less is known about the scale of private warehouses. Relative to the production of storable agricultural commodities, including foodgrain, oilseeds and fibers, this is not substantial. Reports commonly highlight key infrastructural constraints – that the major challenges for the sector are absence of regulatory policy, scarcity of land for warehousing, absence of common bonded warehouses, ceiling on land holding, limited availability of structured warehouses, high cost of land in major clusters and lack of ventilation and fumigation facilities in warehouses.

Recent reports on logistics in Bangladesh note that costs are high in most sectors, ranging from 4.5 percent of sales (for leather footwear) to 47.9 percent of sales (for horticulture). Inventory carrying costs represent a significant share of logistics costs, representing 17–56, in most industries the figure exceeds 30 percent (Dappe et al., 2020).

On the face of it there are several reasons one might cite to suggest, based on global experience, that perhaps Bangladesh lacks some preconditions. First e-NWRS have not succeeded greatly in contexts where smallholders dominate. Of the total 16.88 million farm holdings 8.02 million have no land, 91.7% of farmers in Bangladesh own 0.5-2.49 acres (Agricultural Census 2019). The average area of an operational holding is 0.65 acres. Second, Bangladesh currently lacks futures markets or commodity exchanges for agricultural commodities; global experience suggests that e-NWRS typically work well when aligned with these institutions. At least one major commodity, namely rice, attracts heavy government intervention and often restrictive trade policies in the interests of maintaining food security. These would seem *prima facie* reasons for not advocating an e-NWRS.

At the same time, there are several contextual factors that would support the development of an e-NWRS.

First, Bangladesh's governance structure permits uniform laws, and its geographies permit market integration to some extent in ways that are extremely hard in a country like India for example.

Second, there are several crops that are of significant commercial interest, including foodgrains, spices, oilseeds, potato, onions, fibers and plantation crops and several processed commodities such as edible oils, oil meal and oilcakes, etc. that are on a scale that justifies investments in storage and financial linkages. Even among the more traditional crops, marketed surplus can be high. A 2002 study based on a household survey suggests that marketed surplus as percentage of total production was found highest in **potato** (64 per cent) followed by lentil (59.5 per cent), Boro paddy (57.5 per cent), mustard (52.7 per cent), Aman paddy (48 per cent), Aus paddy (38 per cent) and

⁸⁸ <https://www.thedailystar.net/business/bangladesh-needs-more-warehouse-space-wb-1575883>

wheat (14 per cent). Other commodities such as fertilizers, wheat, soybean, maize are imported on a large scale and these too are often stored by traders and importers/exporters (Table 5).

Many of these crops do exhibit high variation suggesting that the returns to storage may be significantly positive for a subset of these commodities (Table 5; Table 6). Figure 10 suggests significant variation across commodity groups with scope for cold storage- linked e-NWRS for horticulture; Pulses and oilseed product prices are far less volatile but do show substantive variation. As long as these variations (Table 5) can generate returns that exceed the costs, e-NWRS could work in the-ory. A growing interest in ag- and fintech from the private sector also suggests that the timing might be appropriate for shaping this sector suitably to be more inclusive and beneficial. A robust financial system catering to the last mile and widespread access to mobile money and digital services are amenable to the development of new financial products.

Table 5: Profile of key commodities for Bangladesh

Commodity group	Commodity (production)	Three-year average (2018/19 – 2020/21)		
		Production ('000 tons)	Import ('000 tons)	Export ('000 tons)
Cereals	Rice	36,867.53	795.67	9.93
Cereals	Wheat	1,043.82	5,745.90	0.00
Cereals	Maize	3,900.36	1,715.93	0.00
Pulses	Lentils (Masur)	179.41	518.03	0.00
Pulses	Kheshari	122.30	0.00	0.00
Pulses	Black gram (Mashkalai)	37.94	0.00	0.00
Pulses	Green gram (Mugh)	37.40	0.00	0.00
Oilseeds	Rape & mustard	355.53	363.06	0.00
Oilseeds	Coconut	415.44	0.00	0.00
Oilseeds	Soybean	102.24	2,220.33	2.09
Oilseeds	Groundnut	63.50	9.78	0.00
Edible oils	Palm oil	-	2,731.43	30.69
Edible oils	Rape, colza or mustard oil	-	0.26	12.64
Edible oils	Coconut oil	-	3.17	0.21
Edible oils	Soybean oil	-	1,541.76	26.21
Edible oils	Groundnut oil	-	1.18	0.00
Oilcake	Soybean oilcake	-	493.04	13.09
Potato	Potato	9,715.98	5.17	114.59
Tomato	Tomato	416.99	42.17	0.14
Onion	Onion	2,008.47	875.05	0.00
Tea	Tea	90.32	0.00	1.10

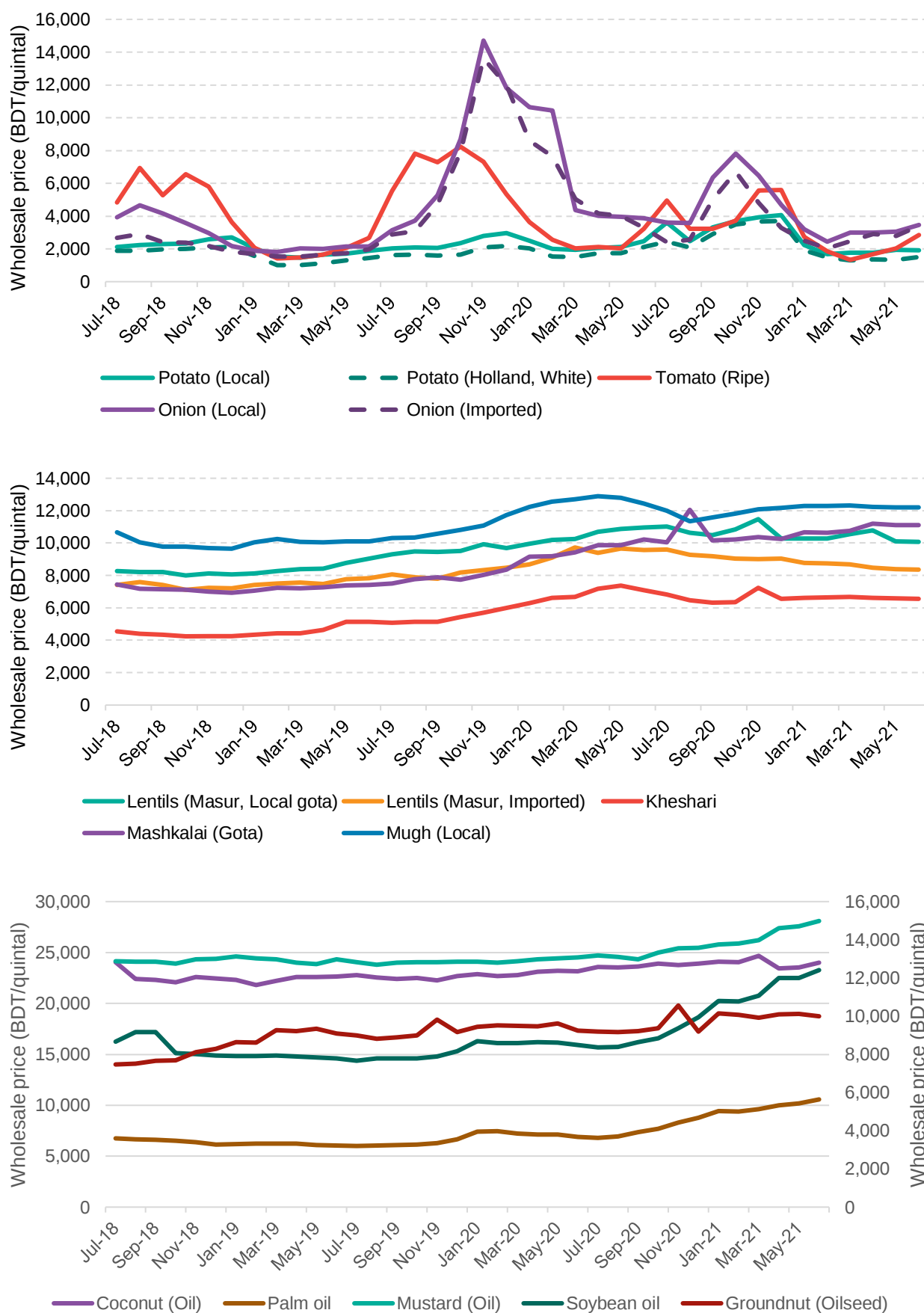
Sources: (1) Production data: Bangladesh Bureau of Statistics (BBS). Yearbook of Agricultural Statistics, 2018/19-2020/21. (2) Import / export data: BBS. Foreign Trade Statistics, 2018/19-2020/21.

Table 6: Price variation for selected commodities in Bangladesh, July 2018 – June 2021

Commodity	Coefficient of variation (CV) in price (%)
Onion (Imported)	72
Onion (Local)	66
Tomato (Ripe)	54
Potato (Holland, White)	35
Potato (Local)	28
Palm oil	19
Kheshari	18
Mashkalai (Gota)	18
Coconut	17
Soybean oil	15
Rice (Boro, Medium)	14
Coconut (Green)	11
Lentils (Masur, Local gota)	11
Mugh (Local)	10
Lentils (Masur, Imported)	10
Mustard (Oilseed)	10
Groundnut (Oilseed)	8
Maize	7
Mustard (Oil)	4
Wheat (White, Local)	4
Wheat (White, Imported)	4
Coconut (Oil)	3
Mustard (Oilcake)	3

Source: Department of Agricultural Marketing (DAM). Monthly price release, July 2018-June 2021.

Figure 10: Monthly prices for selected commodities in Bangladesh, July 2018 – June 2021



Source: Department of Agricultural Marketing (DAM). Monthly price release, July 2018-June 2021.

In conclusion, the right question to ask is which commodity sectors can the e-NWRS can be implemented. Thus far, our focus was on private players. However, an e-NWRS can also be effectively used for public procurement. Indeed, a most compelling case for investments in warehouse and digital infrastructure and regulation is in managing food security and increasingly to tackle the threats of climate change. As mentioned earlier, not only would a warehouse-based procurement system and regulation with mandatory registration enable the Government to take informed decisions on trade and food procurement policy, it can also use granular information to ensure that it is able to take food security and climate change challenges as well as those from other shocks at a sub-national regional level.

Currently, Bangladesh does not have a dedicated Act for warehouses. An earlier 1959 Act, originally called The East Pakistan Warehouses Ordinance, was repealed in 2018.⁹ These have since devolved into the Bangladesh Agricultural Marketing Act, 2018. Currently the Customs Act, 1969¹⁰, the National Board of Revenue (NBR)/ the Customs Bond Commissionerate regulates bonded warehouses. While Bangladesh does not have futures markets or commodity exchanges, in 2022, the Chittagong Stock Exchange (CSE) in Bangladesh signed a consultancy contract for commodity exchange with Multi Commodity Exchange (MCX) of India. The targeted commodities to trade gold, cotton and crude oil.¹¹ The Bangladesh Securities and Exchange Commission (BSEC) is the regulator of the capital market of Bangladesh, comprising Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE). The commission is a statutory body and attached to the Ministry of Finance.

The rural lending landscape in Bangladesh has a strong presence of microfinance institutions (MFI) reaching as many as 30 million people. According to Bangladesh Bank, although there are many players, just 10 of them along with Grameen Bank represent 87% of total savings of the sector and 81% of total outstanding loans in the sector. Given that agricultural loans and seasonal loans are common, the Microcredit Regulatory Authority Act would need to be adapted to accommodate elements of any proposed e-NWRS. Currently, 599 institutions (as of October 10 2011) have been licensed by MRA to operate Micro Credit Programs while Grameen Bank operates under the Grameen Bank Ordinance, 1983.

The Government of Bangladesh also has experience with programs like the SHOGORIK scheme that involves enabling warehouse access for farmers with loans against inventories (see Appendix 6).

During FY22, BDT 288.34 billion (101.56 percent of target) was disbursed as agricultural and rural credit through all scheduled banks against the target of BDT 283.91 billion, 60% were crop loans disbursed to 3.30 million farmers (Bangladesh Bank Annual Report, 2022). Short-term loans accounted for approximately 82.84 percent of the total disbursement while long-term loans for irrigation equipment, agricultural machinery, livestock, and other purposes accounted for the remaining 17.16 percent. During FY22, credit for crop production accounted for 53.73 percent of total short-term loans. Recovery rates overall are over 95%. In 2021-22, two specialized agricultural banks (BKB and RAKUB) and six SCBs disbursed 40.57 percent of total agriculture credit disbursement of BDT 288.34 billion, PCBs disbursed 56.61 percent, and FCBs 2.82 percent. The Government of Bangladesh offers interest rates at 4.0 percent from 1 July 2010 for farmers under the interest-loss subsidy facilities of the government.

In order to promote production of specific pulses, oilseeds, spices and maize, the government reimburses banks for loans to the sector at concessional credit. The interest subsidy has been set at 4.0

⁹ http://bdcode.gov.bd/upload/bdcodeact/2020-11-09-12-51-22-324_THE_EAST_PAKISTAN_WAREHOUSES_ORDINANCE_1959_f.pdf

¹⁰ <http://bdlaws.minlaw.gov.bd/act-354/chapter-details-651.html?lang=bn>

¹¹ https://www.cse.com.bd/media/press_release/164

percent started in April 2021. During FY22, 35 banks received BDT 0.023 billion in interest subsidies of 5.0 percent and 4.0 percent (effective April 2021) for disbursement and proper recovery. Due to the outbreak of COVID-19, loans at a concessional interest rate were provided to continue food production and keep supply at the normal level. These loans would be provided at a 4.0 percent concessional interest rate (maximum) for cultivating grain crops, cash crops, vegetables and tuber crops. Against the disbursement of these loans, banks will be reimbursed at 5 percent as interest loss from Bangladesh Bank. These facilities were effective from 1 April 2020 and continued up to 30 June 2021. These interest rate policies and subsidies influence the incentives of depositors in using warehouses and e-NWRS more generally.

Bangladesh also has an evolving set of food standards that are currently being harmonized with international standards to promote food safety.¹² The Bangladesh Standards and Testing Institution (BSTI)¹³ and the BFSA, which was established under Section 5 of The Food Safety Act, 2013 are two nodal institutions responsible for quality and food safety standards.

6.2 The way forward: Creating an ecosystem for financial deepening

6.2.1 Phase 1: Consultations on a legal system for warehouse registration to make them regulatable

The first order of business is to decide whether Bangladesh would be served well by designing an architecture that can support the establishment of a nationwide regulated e-NWRS. Based on our review, such infrastructure and regulatory system for agricultural commodities do not exist in the country, even though there are two well-functioning stock exchanges. Thus, the first order of business would be to undertake a deeper analysis of the landscape and identify options for putting those infrastructure and institutions in place. Based on Indian experiences, voluntary registration is ineffective, and the country is now exploring options for making warehouse registration mandatory. This has important implications for Bangladesh, especially with regards to its food security policies in the face of weather-related disaster management and other unanticipated shocks to domestic and global markets. With an electronic platform, registration of warehouses will provide up to date information about the level domestic stocks, types of commodities, and their spatial locations—none of which currently exists—that will inform critical policy decision in terms of emergency operations, imports, and public distribution.

6.2.2 Phase 2: Designing a blueprint and a roadmap for implementation

The next phase would involve finalizing a blueprint based on the proposed design and creating a timeline and roadmap. A central and immediate task would be to draft and pass the necessary legislation and set up the institutions that are pre-conditions for an e-NWRS.

For developing a plan of action, Bangladesh can draw on the extensive global experience and a rich accumulated expertise available with multilateral agencies to develop a design and roadmap for implementation of e-NWRS. These include the European Bank for Reconstruction and Development (EBRD), the World Bank Group (WBG), especially IFC, and the Organization of American States (OAS). The United Nations Commission on International Trade Law (UNCITRAL) and the International Organization of Securities Commissions (IOSCO) will also be useful partners, as they have

¹² <https://bangladeshbiosafety.org/wp-content/uploads/2021/03/BFSA-Strategy-for-Harmonization-of-Standards-draft-V-1.pdf>

¹³ https://bsti.portal.gov.bd/sites/default/files/files/bsti.portal.gov.bd/page/b5ede8e7_a66_4651_82a4_94ee498ca073/2020-07-31-09-22-c018f06aa88d07a3c11f0951af7782ff.pdf
https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20Report_Dhaka_Bangladesh_4-15-2019.pdf



the experiences of developing models for legislating and building aspects of a WRS such as security rights, electronic transferable records, and the guidelines for storage facilities holding goods for delivery under derivatives. There are several publications that offer guidance.¹⁴ At the same time, there are plenty of examples from other transition and emerging economies around the world, many of them discussed in this report, can serve as examples.

6.2.3 Phase 3: A pilot and an evaluation

This report proposes the Government of Bangladesh identify specific clusters for 2-3 commodities where e-NWRS can be implemented. This will involve identification of location specific clusters, where some of the preconditions are met and have a healthy network of warehouses / cold storages. Pilots can be built around preexisting efforts. Some natural candidates may be considered are:

1. Linking smallholder farmers to the public procurement program. Under the IFPRP, IFPRI and its partners, the University of Illinois, and the Bangladesh Agriculture university, conducted an experiment by providing smallholders portable solar powered drying machine that can dry one-half metric ton of paddy in 3-5 hours, reducing moisture content from 22% to 12% (Alam et al., 2023). With such a technology, individual farmer or farmer group can deposit their paddy (instead of selling to traders or miller after harvest with high moisture contents) to a certified warehouse with e-NWR. Farmers can borrow against this stock and sell their stock when prices go up anytime to the government at the pre-announced minimum price.¹⁵ This can work for other commodities as well, if minimum support prices are ensured.
2. A small pilot, called SHOGORIK, initially funded by the Swiss Development Cooperation (SDC), is still in operation under the ministry of agriculture. The program still remains very small, but it may be worthwhile to explore if the experiences of SHOGORIK can be leveraged and deepened. See Appendix 6 for details.
3. The Chittagong Stock Exchange (CSE)'s efforts to build a commodity exchange for cotton for example can be leveraged, and
4. Assess the demand from large scale traders or importers for e-NWRS. Since the size of market is a critical determinant of success, bringing these large market actors in an incentive compatible way can enhance the potential for scaling up e-NWRS or commodity backed financing.

Even though a fully-fledged e-NWRS may not be feasible under current state of infrastructure and institution, international experiences suggest that such pilots can generate substantive insights that can lead to establishment of successful exchanges. In fact, many of the successful commodity backed financing in the world began with small pilots. Examples include cashew in Cote d'Ivoire, coffee in Ethiopia, and rice in Senegal, wheat in Bulgaria as well as chilies in Pakistan.

¹⁴ Some of these include (1) "Designing Warehouse Receipt Legislation: Regulatory Options and Recent Trends" (FAO/EBRD Guide) (2) "A Guide to Warehouse Receipt Financing Reform: Legislative Reform" (WBG Guide), (3) and OAS "Principles for Electronic Warehouse Receipts for Agricultural Products" of the OAS (OAS Principles). (4) UNCITRAL adopted the Model Law on Secured Transactions (MLST) which contains rules specifically applicable to security rights in warehouse receipts issued in paper form. (5) UNCITRAL also adopted the Model Law on Electronic Transferable Records (MLETR), which provides the legal basis for the issuance and transfer of electronic (transferable) documents of title. (6) The International Finance Corporation (IFC) of the WBG published a guide titled "Warehouse Finance and Warehouse Receipt Systems: a Guide for Financial Institutions in Emerging Economies" (IFC Guide) (7) IOSCO reports on the regulation of commodity markets and relevant storage infrastructure that informs some WRS-related aspects. (8) UNIDROIT's Model Law on Warehouse Receipts. <https://www.unidroit.org/work-in-progress/model-law-on-warehouse-receipts/>

¹⁵ Alam et al. (2023).

6.2.4 Phase 4: Revising approach and rollout

In Phase 4, the Government of Bangladesh can conduct pilot studies and based on its experience in facilitating agricultural marketing and trade, the Government can identify the issues which need to be addressed before rolling out the digital ecosystem on a larger scale. The pilots can also provide much needed information to the Government about the stocks in various regions of the country, including the warehouses at the ports where imported commodities are kept before being sent to other destinations in the country. This can enable the Government as well as the private sector to fine tune its program of imports so as to meet the domestic demand.

APPENDIX 1: A DETAILED TIMELINE OF INDIAN WAREHOUSE AND WRS POLICIES

Year	Policies/ Acts	Remarks
1930	Sale of Goods Act	Contract of sale can be drawn up for existing or future goods, document of title to the goods can be a warehouse keepers' certificate
1954	All India Rural Credit Survey	Recommended storage facilities near the point of production
1956	Agricultural Produce (Development and Warehousing) Corporations Act	Provided for establishment of warehouses to ease the flow of rural credit and strengthen agricultural marketing
1956		Under AP(DW)CA, National Cooperative Development and Warehousing Board was formed
1957		Central Warehousing Corporation (CWC) and State Warehousing Corporation in different states
1962	AP(DW)CA bifurcated into National Cooperative Development Corporation (NCDCA) and Warehousing Corporation Act	NCDCA registered corporation to plan and promoted programs for the production, processing, marketing, storage and export/import of agri produce; WCA for the incorporation and regulation of corporations to warehouse agri produce and certain other commodities
		NCDC and CWC have been working with the purview of respective state governments
		17 State Warehousing Corporations incorporated in this Act
1960s-70s	Agricultural Produce Marketing Regulations Act (APMRA) in states	Any warehousing operation should obtain licenses with Agricultural Produce Marketing Commission (APMC) renewable annually
1964	Food Corporations Act	Board of Directors of Food Corporation of India (FCI) include MD of CWC, CWC and SWCs by FCI to store stocks
2000	National Policy on Handling Storage and Transportation of Foodgrains 2000	Build-own-operate (BOO) basis capacity of 5.5 lakh MT created
2001-02	Grameen Bhandaran Yojana (GBY)	Capital investment subsidy for construction and renovation of rural godowns encourage private and cooperative structures
2003	Futures trading allowed subject to recognition by Forward Markets Commission	Trading in options disallowed
2001	Guru committee	Pushed for private investments in warehousing, WRS, e-NWRS, and a national system
10th Five Year Plan	Working Group on Agricultural Infrastructure (10th FYP) - popularize WR as collateral but no guarantee of quality	
2005	Report on the Working Group on Warehouse Receipts and Commodity Futures RBI, 2005	Noted lack of negotiability, absence of e-NWR, difficulty in stock disposal in case of default, lack of trust

Year	Policies/ Acts	Remarks
12th Five Year Plan	Agricultural Marketing Infrastructure introduced by merging GBY with Development/Strengthening of Agri Marketing Infrastructure, Grading, Standardization (AMIGS) - Now AMI is part of ISAM Integrated Scheme for Agri Marketing.	
2008	PEG (Private Entrepreneurs Guarantee)	Storage capacity for FCI via private entrepreneurs; guarantee 10 years of use to private sector
	Public Private Partnership silos with Visibility Gap Fund (VGF) - 20%	
2007	Warehouse (Development and Regulation) Act	
2011	W(DR)A regulations	
2016	Central Board of Excise and Customs introduced Warehouse (Custody and Handling of Goods) Regulations and Private Warehouse Licensing Regulations	
	W(DR)A Registration of Warehouse Rules	Permits warehouses/silos cold storages to be declared as market yards under conditions

Source: Based on Naik et al. (2022); Ramesh Chand committee report and various government documents.

APPENDIX 2: COMMODITIES NOTIFIED FOR WRS IN INDIA

The WDRA has so far notified 159 commodities including cereals, pulses, oil seeds, spices, rubber, tobacco, coffee etc for issuing e-NWR. WDRA has also notified 24 horticultural commodities for which a registered cold storage can issue e-NWRs. Nine non-agricultural commodities have also been notified. These are given below and available at <https://wdra.gov.in/web/wdra/commodities>.

1. Wheat (1)
2. Paddy(Dhan) (2)
3. Rice (3)
4. Maize (4)
5. Jawar/Jowar(Sorghum) (5)
6. Chana whole(Bengal Gram)(Gram) (6)
7. Arhar/Tur(Red Gram)split(husked) (7)
8. Urd Whole(Black Gram, Urd Beans) (8)
9. Moong(Whole)(Green Gram) (9)
10. Groundnut (10)
11. Sesame seeds(Sesamum.Gin-gelly,Til) (11)
12. Mustard Seeds(12)
13. Soyabean (13)
14. Cotton bales (15)
15. Jute Bales (16)
16. Grapes (22)
17. Onion(Fresh or Dehydrated) (23)
18. Bajra(Pearl Millet/Cumbu) (28)
19. Barley(Jau) (29)
20. Ragi(Finger Millet) (30)
21. Raw Cashewnuts (36)
22. Coconut (37)
23. Black Pepper (38)
24. Turmeric (39)
25. Cardamoms (40)
26. Cummin Seed(Jeera)/Cumin seeds (42)
27. Tea (44)
28. Coffee, Arabica and Robusta (45)
29. Fenugreek seeds /Methi Seeds (47)
30. Indian Sugar (48)
31. Arhar/Tur(Red Gram)whole (49)
32. Safflower (59)
33. Lentil(Masur)/Masoor(Len-til)whole (63)
34. Linseed (67)
35. Gur(Jaggery) (74)
36. Gur(Jaggery) in cold storage (75)
37. Taramira/Taramira seeds (76)
38. Lobia/Cowpea(Karamani) (92)
39. Matki/Moth(whole) (93)
40. Niger Seed (Ramtil) (98)
41. Cotton Seeds (99)
42. Cloves (105)
43. Nutmeg (106)
44. Mace (107)
45. Coriander seeds/Coriander Dry (108)
46. Rubber (111)
47. Horse Gram(Kulthi) (114)
48. Castor Seed (123)
49. Fennel seeds/Soanf (135)
50. Ajowan Seeds(Whole and pow-dered) (137)
51. Arecnut (Betelnut/Supari) (140)
52. Tobacco (141)
53. Carrot (153)
54. Pomegranate (190)
55. Tamarind Seed (208)
56. Cashew Kernel (238)
57. Ghee (249)
58. Isabgol (Psyllium) (256)
59. Masur/Masoor(Lentil) split(Husked)Dal (259)
60. Chana split(husked)/Dal Chana Bengal Gram Dal(Chana Dal) (263)
61. Coconut Oil (266)
62. Castor Oil (270)
63. Pasteurized Butter (272)
64. Sesame(Til or Gingelly Oil) (276)
65. Sunflower oilseed (285)
66. Sago/Sabu Dan (291)
67. Lemon (310)
68. Groundnut pods(raw) (312)
69. Cinamon/Cinnamon(Dalchini) (316)
70. Mustard Oil (324)
71. Almond(Badam) (325)
72. Almond (Kernels) (326)
73. Mahua (335)
74. Kinnow (336)
75. Saffron (338)
76. Walnuts (343)
77. Kabuli Chana(Chickpeas-White) (362)
78. Guar Seed(Cluster Beans Seed) (413)
79. Honey(912)
80. Cane Molasses(913)
81. Solvent extracted groundnut oil cake(914)
82. Frozen Spinach (915)
83. Frozen Cauliflower (916)
84. Frozen French Beans (917)
85. Frozen Green Peas (918)
86. Mustard oil cake - expressed (919)
87. Mustard oil cake - solvent ex-tracted (920)
88. Tapioca/cassava products (Ani-mal feed) (921)
89. Tapioca chips (922)
90. Neem Seed/Neem Kernels (923)
91. Neem Oil (924)
92. Neem Cake (925)
93. Oats (926)
94. Skimmed Milk Powder (927)
95. Matki/Moth split(husked) (928)
96. Dry Edible mushrooms (929)
97. Date Palm (932)
98. Tamarind (933)
99. Ginger (Fresh or dehydrated) (934)
100. Garlic(dehydrated) (935)
101. Raisins (937)
102. Sweet Lime (938)
103. Khasi/Darjeeling/NE Oranges (940)
104. Nagpur Mandarin (941)
105. Apples in CA storage (942)
106. Processing(Potatoes with CIPC application) (943)
107. Seed Potatoes (944)
108. Table Potatoes(with or without CIPC application) (945)
109. Crude Palmolein oil (946)
110. Mentha oil (947)
111. Soyameal (948)
112. Refined soyaoil (949)
113. Refined, Bleached and Deodor-ized Palmolein (950)
114. Cotton seed oilcake (951)
115. Raw Cotton (952)
116. Desi Chana (953)
117. Makhana Fried (954)
118. Makhana Powder (955)
119. Makhana (956)
120. Poppy Seeds (957)
121. Tejpat (958)
122. Curry Powder (959)
123. Compounded Asafoetida (960)
124. Sun Dried Raw Mango Slices and Powder (961)
125. Mixed Masala Powder (962)
126. Tamarind Seedless (963)
127. Sal seeds (964)
128. Sal seed Oil(Fat) (966)
129. Mahua(Mowrah Oil) (967)
130. Maize(Corn)Oil (968)
131. Sunflower Seed Oil (969)
132. Soyabean Oil (970)
133. Rice Bran Oil (971)
134. Cotton Seed Oil (972)
135. Safflower Seed Oil (973)
136. Niger Seed Oil (974)
137. Linseed Oil (975)
138. Groundnut Oil (976)
139. Common Broken Rice (977)
140. Fine Broken Rice (978)
141. Parboiled Milled Com-mon(Coarse)Rice (979)
142. Parboiled Milled Medium Rice (980)
143. Parboiled Milled Superfine/Fine Rice (981)

- | | | |
|--|---|---|
| 144. <u>Raw Milled Common</u>
<u>(Coarse)Rice (982)</u> | 148. <u>Yellow Peas(whole) (986)</u> | 154. <u>Ball Copra (992)</u> |
| 145. Raw Milled Medium Rice (983) | 149. <u>Moong split(unhusked) (987)</u> | 155. <u>Coffee beans (993)</u> |
| 146. Raw Milled Superfine/Fine Rice
(984) | 150. <u>Moong split(husked) (988)</u> | 156. <u>Black gram (Flour) (994)</u> |
| 147. <u>Rajma (985)</u> | 151. <u>Urd split (unhusked) (989)</u> | 157. <u>Guar gum (995)</u> |
| | 152. <u>Urd split (husked) (990)</u> | 158. <u>Chillies/Red Chillies (996)</u> |
| | 153. <u>Cup Copra (991)</u> | 159. <u>Rapeseed (999)</u> |



APPENDIX 3: STATE-WISE WAREHOUSES REGISTERED WITH WDRA AS ON MARCH 31, 2022

No.	State	No. of warehouses registered											Cumulative Registration	Active as on 31.03. 2022	% of active to total registered (as on 31.03.2022)
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22			
1	Andhra Pradesh	45	16	15	19	9	0	3	20	28	8	24	187	84	45
2	Assam	0	3	1	0	0	0	1	1	0	0	2	8	4	50
3	Bihar	0	0	2	0	2	1	2	4	5	6	28	50	40	80
4	Chhattisgarh	0	1	0	0	0	0	0	0	0	5	33	39	38	97
5	Chandigarh	0	0	0	0	0	0	0	0	0	1	0	1	1	100
6	Delhi	0	0	0	0	0	0	0	0	0	1	0	1	1	100
7	Gujarat	3	5	2	10	145	22	85	61	53	55	43	484	164	34
8	Goa	0	0	0	0	0	0	0	0	0	1	0	1	1	100
9	Haryana	15	0	0	0	8	0	2	8	6	4	14	57	27	47
10	Himachal Pradesh	1	0	0	0	0	0	0	0	0	0	3	4	3	75
11	Jharkhand	0	0	1	0	0	0	0	1	0	1	1	4	3	75
12	Karnataka	0	14	1	3	19	13	9	6	2	4	6	77	31	40
13	Kerala	11	1	8	1	0	1	3	0	3	6	2	36	16	44
14	Madhya Pradesh	17	20	10	53	153	102	41	197	66	46	44	749	403	54
15	Maharashtra	22	14	0	8	56	40	35	66	32	32	30	335	117	35
16	Nagaland	0	0	0	0	0	0	0	0	0	0	1	1	1	100
17	Odisha	1	0	0	0	0	0	0	2	0	3	16	22	21	95
18	Punjab	4	9	0	1	0	0	0	8	0	5	15	42	26	62
19	Puducherry	1	0	0	0	0	0	0	0	0	0	0	1	1	100
20	Rajasthan	48	4	14	10	116	28	67	59	46	35	148	575	255	44
21	Tamil Nadu	52	0	14	128	71	5	3	126	757	81	77	1314	1064	81
22	Telangana	0	0	0	0	2	0	7	18	2	6	23	58	45	78
23	Uttarakhand	0	0	0	0	0	0	0	0	0	5	1	6	6	100
24	Uttar Pradesh	20	5	0	1	6	1	2	27	5	30	80	177	139	79
25	West Bengal	0	0	0	0	1	1	1	2	0	2	19	26	24	92
26	Tripura	0	0	0	0	0	0	0	1	0	0	0	1	1	100
Grand Total		240	92	68	234	588	214	261	607	1005	337	610	4256	2516	59
BY OWNERSHIP TYPE															
CWC		135	25	15	3	2	5	14	84	21	81	104	489	344	70
SWCs		87	28	9	1	16	44	0	37	59	01	218	500	315	63
Private		18	26	14	81	500	163	241	386	194	141	202	1966	830	42
PACSS/FPOs		0	13	30	145	70	2	1	97	723	84	77	1242	982	79
Cold Storage		0	0	0	4	0	0	5	3	8	30	9	59	45	76
Total		240	92	68	234	588	214	261	607	1005	337	610	4256	2516	59

Source: Annual report of WDRA for 2021-22.

APPENDIX 4: PROCEDURE FOR REGISTRATION OF WAREHOUSES WITH WDRA AND RELAXATIONS PROVIDED TO FARMER-BASED ORGANIZATIONS

Relaxation provided to PACS in infrastructure requirement

1. In case the warehouse is located on a raised well drained site not liable for flooding / inundation and is away from a place likely to be affected by seepage water a plinth height of at least 30 cm may be accepted.
2. The minimum limit for capacity to be registered in case of PACCSs warehouses is only 100 MT.
3. Availability of parking and maneuvering space for vehicles shall not be insisted upon in case of PACCS warehouses as these are small capacity units operated for the benefit of the member farmers.
4. The warehouse should have a stack plan drawn leaving reasonable space for alleyways.
5. Other than the Secretary of the society one more staff of the PACCS shall be engaged (on full or part time basis) for storage and preservation of the goods in the warehouse. Availability of security guards may be desirable but not insisted upon for registration of the warehouse.
6. Availability of a pucca boundary wall / barbed wire fencing shall not be insisted upon. However, the warehouse should have adequate arrangement for locking of godown and safety/security of stocks.
7. PACCSs warehouses up to 500 MT capacity shall have at least one fire extinguisher (of requisite type) and six fire buckets. For warehouses having capacity more than 500 MT, the prescribed norms for other warehouses shall be followed, which is three fire extinguishers and fifteen fire buckets for capacity up to 1,500 MT.

Source: Annual Report of WDRA for 2021-22); See also <https://www.cooperation.gov.in/about-primary-agriculture-cooperative-credit-societies-pacs>; https://wdra.gov.in/documents/32110/36811/Procedure+for+Registration+of+warehouses+converted_2019-04-26.pdf/f8409bee-4baf-5207-4040-e3ce7db78121.

APPENDIX 5: ESTIMATES OF FARM AND POST-HARVEST LOSSES IN INDIA

Serial Number	Commodity	2015 CIPHET study		2010 CIPHET study	
		Loss in farm operations	Loss in storage channel	Total loss	Total loss
1	Wheat	4.07	0.86	4.93	5.93
2	Paddy	4.67	0.86	5.53	5.19
3	Potato	6.54	0.78	7.32	8.99
4	Soybean	8.95	1	9.96	6.26
4	Tomato	9.41	3.03	12.44	12.47
5	Mango	6.92	2.24	9.16	12.74
6	Apple	9.08	1.31	10.39	12.26
7	Eggs	4.88	2.31	7.19	6.55
8	Inland fish	4.18	1.05	5.23	6.92
9	Poultry meat	2.74	4	6.74	3.65
10	Milk	0.71	0.21	0.92	0.77

Source: Report on assessment of quantitative harvest and post-harvest losses: ICAR-CIPET, March 2015

APPENDIX 6: CHARGES FOR NERL OPERATIONS

In terms of Byelaws and Business Rules of the National E-Repository Limited and in partial modifications of our circular no. NERL/OPERATIONS- 001/2019/001 dated January 07, 2019, regarding 'Transactions on migrated commodities – NCDEX', the NERL charges for NCDEX market with effect from September 1, 2020, will be as given below:

Bill Head	Revised charges
Booking charges	Rs. 4 per MT. To be levied only to those cases wherein deposits are not done against the requested booking quantity.
eNWR generation charges	Rs. 25 per MT of deposits as per NCDEX norms. No booking charges would be applicable if eNWR generation charges are levied.
Client Negotiated trade (Off market transfer)	0.03% on the value of commodity. These charges will be applicable to both buyer and seller. These charges will also be applicable for the ownership transfer transaction done between same PAN numbers.
eNWR holding charges	Rs.5 per MT per month on pro - rata basis
Withdrawal Charges without transaction	eNWR extinguishment charges @ 0.15% on the value of commodity at the time of withdrawal (DOW) These charges will be applicable for eNWR that were deposited and withdrawn without any transaction like CNT, Pledge or Settlement.
Withdrawal Charges for transacted quantities	eNWR extinguishment charges @ 0.04% on the value of commodity at the time of withdrawal (DOW). Withdrawal Charges without transaction would not be applicable in this case.
Space occupancy charges	NIL
Pledge Transaction – Creation *	Rs 50 per Lot
Pledge Transaction – Closure *	Rs 50 per Lot
Pledge Transaction – Invocation *	Rs 50 per Lot
AMC – Client *	Rs 500

* There is no change in these charges compared to the existing structure.

APPENDIX 7: THE SHOGORIK SCHEME IN BANGLADESH

Origin of the scheme:

The Bangladesh-Swiss Agricultural Project (BASWAP) was initiated through a joint venture by the Bangladeshi and Swiss Governments. The aim of the project was to provide grain storage (for food commodities and seeds), price support and loan facility against stored grain on easy terms to the small and marginal farmers of Bangladesh. The project activities included proper warehousing of foodgrains in remote areas, providing bank loans to farmers to meet their cash needs, marketing of stored foodgrains and transfer of warehouses to farmers for self-management. Phase I of the project was completed in 1978-1987 and Phase II was completed in 1988-1992. After the successful completion of these two pilot phases, the Government of Bangladesh (GoB) decided to take it up as an expanded project.

Note that from July 1992 to June 1995 the project was implemented directly by the Ministry of Agriculture and later through the Directorate of Agricultural Marketing from July 1995 to June 1997. Considering the success of the project, the period was extended for another five years i.e., from July 1997 to June 2002. Although the project period ended in June 2002, the implementation period of the project was extended till June 2004. Considering the ongoing and permanent nature of the Grain Warehouse Credit Program (SHOGORIK), it was run as a special program in the revenue budget from July 2004 to June 2008, which was subsequently extended again and ended in June 2010. In 2010, the ongoing program was transferred by creating posts in the revenue budget of the Directorate of Agriculture Marketing along with manpower and since 2010, the program has been running with the aim of increasing the income of small and marginal farmers and getting fair prices for the produce through the Directorate of Agriculture Marketing.

Under the grain warehouse loan program of the Department of Agriculture Marketing, loans are provided to farmers against the grain stored in the warehouses through scheduled banks under the control of Bangladesh Bank. A land survey for identification of nearest banks and warehouses is conducted within 2/3 kms of the warehouse area. Simultaneously, farmers lists, renovation of warehouses and training of farmers/warehouse keepers are also conducted. After proper execution of the above tasks a warehouse is opened/launched. Local banks with experience of disbursing agricultural loans are selected through the Bangladesh Bank (central bank). Currently, local government banks such as, Janata Bank, Rupali bank, Agrani bank, Bangladesh Krishi Bank, and Rajshahi Krishi Unnayan Bank offer up to 60-80 % loan on the value of produce at the individual bank's discretion.

Implementation period:

1. BASWAP: November 1978 to June 1992
2. Approved Shoshyo Gudam Rin Prokalpo (SHOGORIP): July 1992 to June 1997
3. Approved extension of the SHOGORIP project: July 1997 to June 2002
4. Approved extension of the 2nd phase of the SHOGORIP project: July 2002 to June 2004
5. Approved as program and incorporated into the revenue budget (renamed SHOGORIK): July 2004 to June 2008

Appendix Table 1: Manpower list for the SHOGORIK program

Sl. No.	Name of the post	Manpower from 2004-05 and 2007-08			Posts recommended for recruitment under the revenue budget
		Total posts allowed	Existing posts	Empty positions	
1	Project Director	1	1	-	-
2	Deputy Director	1	1	-	1
3	Senior Assistant Director	1	1	-	1
4	Regional Project Manager	4	3	1	3
5	Administrative cum Liaison officer	1	-	1	-
6	Accounts officer	1	1	-	-
7	Assistant Director	2	2	-	1
8	Field officer	17	15	2	15
9	Trainer	3	3	-	3
10	Cashier	1	1	-	-
11	Storage Motivator	4	4	-	4
12	Computer Operator	1	-	1	-
13	Field Surveyor	5	4	1	-
14	Training Assistant	4	3	1	-
15	Office Assistant	1	1	-	1
16	Steno-typist cum Accounts assistant	4	3	1	3
17	Driver	4	3	1	3
Total		65	56	9	35

Source: Department of Agricultural Marketing (DAM), Ministry of Agriculture.

Appendix Table 2: Budget for the project (2004-08)

Fiscal year	Total allocation (in lacs)	Revised allocation (in lacs)	Budget spent (in lacs)	Financial progress (%)	Physical progress (%)
2004-05	149.74	103.64	78.41	76%	89%
2005-06	149.90	134.35	116.85	87%	97%
2006-07	149.41	136.64	126.27	92%	95%
2007-08	150.00	135.51	128.19	95%	95%
Total	599.05	510.14	449.72	88%	94%

Source: As reported by Department of Agricultural Marketing (DAM), Ministry of Agriculture.

Objectives of the program:

The main objective of this program is to expand the activities of small and medium farmers by providing a warehousing system, institutional credit facilities and marketing support against stored grains. In addition, the specific objectives of the program are as follows:

1. To protect the small and medium farmers from distress sale at low prices during the harvest season by expanding the warehousing system;
2. Creation of a system that provides direct institutional credit to farmers on easy terms against foodgrains stored in warehouses;
3. To provide support to small and medium farmers in enhancing crop marketing skills, so that they are encouraged to increase production;
4. To provide assistance in obtaining good quality seeds at low cost during the crop sowing season;
5. Enhancing the skills of registered small and medium farmers by imparting training on grain storage management;
6. Helping to develop food security system locally;
7. Transfer of warehouse management and governance at local level.

Beneficiary criteria: Owners of up to 5 acres of land under cultivation in the warehouse area can enlist in the program. The scheme also includes small and marginal farmers, landless, tenant farmers and farmer cooperatives. This scheme would give more preference to poor farmers.

What crops can be stored under the program:

Foodgrains such as rice, wheat, maize and cowpea, oilseeds such as mustard, sesame, linseed, black cumin and pulses such as lentil, gram, mashkalai, kheshari (Grass pea/Indian pea) etc. can be stored in the warehouse. However, other agricultural crops/produce which are not likely to be damaged in storage may also be stored in the warehouse with the approval of the Warehouse Advisory Committee in view of the recommendations of the local Warehouse Management Committee.

What amount of dry grain should be deposited:

Appendix Table 3: Moisture content of foodgrains

Foodgrain	Moisture content (%)
Paddy	14%
Wheat	12%
Wheat seeds	10%
Foxtail millet	14%
Mustard	6%
Lentil	8.9%
Sesame	6%

Source: Field Monitoring Report (2002). Implementation Monitoring and Evaluation Division, Ministry of Planning.

Note: Collected from Department of Agricultural Marketing.

How long grains can be stored:

Food grains can be stored for 6 months and seeds for a maximum of 9 months. However, the grain must be removed within the date specified in the calendar. If the grain is not released on time, the warehouse committee can negotiate with the advisory committee and collect the loan by selling the grain at auction.

Actors associated with the project/scheme implementation:National Advisory Committee members:

1. Secretary, Ministry of Agriculture: Chairman
2. Chairman, Bangladesh Agricultural Development Corporation (BADC): Member
3. DG of Department of Agricultural Extension (DAE): Member
4. General Manager of Agricultural Credit Department, Bangladesh Bank: Member
5. Chief Engineer, Local Government Engineering Department (LGED): Member
6. DG of Department of Agriculture Marketing (DAM): Member Secretary

Warehouse Advisory Committee members:

1. Upazila Nirbahi Officer (UNO) (warehouse area-wise): Chairman
2. Upazila Agriculture Officer (warehouse area-wise): Member
3. Bank Branch Manager (warehouse area-wise): Member
4. Warehouse Management Committee Chairman: Member
5. Warehouse Duty officer: Member Secretary

Warehouse Management Committee members:

1. Area-wise warehouse elected farmer: Chairman
2. Area-wise warehouse elected farmer: Member
3. Area-wise warehouse elected farmer: Member
4. Area-wise warehouse elected farmer: Member
5. Area-wise warehouse elected farmer: Member
6. Area-wise warehouse elected farmer: Member
7. Area-wise warehouse elected farmer: Member Secretary

N.B. The farmers are selected from 7 regions and they are representatives of the warehouses in their areas.

Program operations:

Once the selection of warehouses and banks, preparation of list of farmers, renovation of warehouses and training of farmers/warehouse keepers are carried out, the warehouse is officially launched. According to the progress report from 2017-18, rent is being collected from the farmers against grain deposit at the rate of Tk. 10 per quintal to meet the running cost of the warehouse.

However, if there is a need to increase the salaries of the warehouse keepers and/ or night guards, in that case, the warehouse rent against the grain deposit in the warehouse may be increased. Proposal from the Warehouse Management Committee regarding the salary increase will be put forth to the Advisory Committee, who will then forward the proposal to the Directorate of Agriculture Marketing (DAM). The income generated from the warehouse rents will go towards handling the warehouse expenses. Any surplus after handling the expenses will constitute the warehouse fund. Support will be provided to make the warehouse financially self-sustainable for the first 24 months from the time of opening of the warehouse so that the farmers/agri-entrepreneurs become proficient in warehouse management and manage the warehouse themselves. After 24 months, the warehouse management will be transferred to the Warehouse Management Committee. All the activities will be managed by the committee with the help of the Advisory Committee.

Under the scheme, farmers/entrepreneurs enrolled in warehouses can avail a maximum of 80% of bank loan against the depreciated value (20%) of the grain stored in the grain warehouse as per the farmer's quota (maximum 20 quintals). After the off-season, if the market price increases, the farmer/ entrepreneur will get an opportunity to sell their grain from the warehouse and sell it in the market by paying the bank loan along with the warehouse rent of the deposited grain.

Goods storage and loan borrowing process:

The farmer brings the grain to the warehouse for storage. The warehouse keeper first crosschecks the identity with the beneficiary list. After that, the warehouse keeper inspects the quality and moisture content of the foodgrain. Upto 10, 20, 30, 40 and maximum of 50 kgs of grain can be stored in a bag. After passing the inspection, the farmer is then given a pass book and a receipt. This pass book contains farmer's name, code number, address, amount of grain deposited and other information. To avail the loan from the bank, the grain deposit receipt along with the pass book and loan application form are submitted. The bank issues the loan amount as per the approved loan level in the application form. It should be noted that according to the rules of the bank, when taking a loan, a certain amount of stamp duty has to be paid for obtaining the loan. And every time a marginal farmer or small farmer takes a loan in a particular season, they have to pay stamp duty for the loan acknowledgment letter. This stamp duty can be more or less based on the loan amount. Bank interest rate is 12%. However, the interest rate varies depending on the bank, but not more than 12%.

Amount of loan received through deposited crops:

In the case of all the crops for which the government purchase price is determined, 80 percent of the loan is given in the case of food crops and maximum 90 percent in the case of seeds. In those cases where the official purchase price of the crops has not been determined, the loan level is determined by the advisory committee on the recommendation of the warehouse committee by considering the current local market price along with the market price of the last 2-3 years.

Appendix Table 4: How farmers benefit financially from the SHOGORIK scheme

Total cost	=10 quintals x 4375 tk.	=43750 Tk.
Bank loan	=60% rate (2625 x 10)	=26250 Tk.
Bank loan interest in 4 months	=10% rate	=1458 Tk.
Warehouse rent (for 4 months)	=10 quintals x 12.50 tk x 4	=500 Tk.
Other costs (transport + labor + bank stamp + photocopies etc.)	=250 + 125 + 60 + 10	=445 Tk.
Selling price due to increase in market rates (after 4 months)	=10 quintals x 4750	=47500 Tk.

Total cost	=10 quintals x 4375 tk.	=43750 Tk.
Actual profit (selling price – production season price) – Total cost	= (47500 – 43750) – 445	= 3305 Tk.
Farmers get this surplus by keeping their crops in the warehouse		= 3305 Tk.
Actual cost to the farmers (Total cost – bank loans)	= 43750 – 26250	= 17500 Tk. The farmer's profit is 3305 Tk. after storing 17500 Tk. worth of crops (mustard).
Profit per 1 quintal of crop	= 3305 Tk./10q	= 330.50 Tk.
∴ By keeping 1 quintal of mustard crop in the warehouse, a farmer receives	= 4375 – 2625	= 1750 Tk. extra profit

Source: SHOGORIK Progress Report from Manikganj, FY 2017-18.

Note: (a) The calculations are based on the market price of the mustard during harvesting season. The costs vary from commodity to commodity. Mustard, rice, and maize are mostly grown in the Manikganj area. Mustard crops bring in the highest profits. (b) Collected from Department of Agricultural Marketing.

How long grains can be stored:

Food grains can be stored for 6 months and seeds for a maximum of 9 months. However, the grain must be removed within the date specified in the calendar. If the grain is not released on time, the warehouse committee can negotiate with the advisory committee and collect the loan by selling the grain at auction.

Warehouse rent:

Monthly rent of Tk 10 per quintal (100 kg) of grain. Rent is calculated for half a month from 1 to 15 days and for full month from 16 to 30 days. This rule has been introduced to simplify the calculations.

Progress and impacts:

Until the FY 2007-08, the program was ongoing in 115 selected warehouses in 104 unions of 79 upazilas under 32 districts. Among them, the number of unused renovated warehouses of LGED were 103 and the number of warehouses constructed under the project by Directorate of Agriculture Marketing were 12. LGED's warehouse capacity is 250 MT and the average capacity of DAM warehouses is 115 MT. Annual grain storage capacity through the program is about 27130 MT. Although the program has proved to be very successful for small and marginal farmers, its scale was considered inadequate compared to the needs of the country.

Farmer participation was the highest during FY 2007-08 when the number of warehouses were 115 and since then the participation had been gradually decreasing. The participation was the lowest in FY 2016-17 and FY 2017-18. Due to the lack of beneficiaries, the ministry decreased the number of warehouses to 81. Non-expansion of new warehouses, gradual closure of warehouses due to poor physical state, lack of need amongst the farmers, and lack of active campaigning were identified to have reduced farmer participation in the program.

Appendix Table 5: Seven year-wise storage capacity utilization

Region	No. of warehouses	Functional capacity limit (past 5 years)	Utilization (%)
Dhaka	20	25,000	25.21%
Khulna	13	16,250	33.17%
Barishal	1	250	3.84%
Rangpur	36	34,800	29.07%
Rajshahi	11	13,750	35.27%
Total	81	90,050	25.31%

Source: SHOGORIK Progress Report, FY 2017-18. Collected from Department of Agricultural Marketing.

Appendix Table 6: Capacity of regional warehouses in Bangladesh

Region	No. of warehouses			Total capacity (in MT)
	Project-owned warehouses	Rented from LGED	Total	
Rangpur	12	35	47	9,710
Magura	-	16	16	4,000
Sherpur	-	17	17	4,250
Barisal	-	1	1	250
Total	12	69	81	18,210

Source: SHOGORIK Progress Report, FY 2017-18. Collected from Department of Agricultural Marketing.

Appendix Table 7: Warehouse income-expenditure analysis

Fiscal Year	Total amount of the crops stored (in quintals)	No. of Participating Farmers	Total income (In Lacs)	Total Expenditure (in Lacs)
2009-2010	84,522	9,129	35.20	31.49
2010-2011	95,600	9,832	35.39	30.56
2011-2012	108,090	9,523	45.14	35.67
2012-13	92,682	6,519	46.10	35.59
2013-14	61,628	5,424	36.57	27.54

Source: SHOGORIK Progress Report, FY 2017-18. Collected from Department of Agricultural Marketing.

Appendix Table 8: Progress for five years (2013-2018)

Fiscal Year	No. of beneficiaries	Amount of crops stored (in quintal)	Loans disbursed (in lacs)	Repayment rate	Training	No. of warehouses
2013-14	5,424	6,163	1,403.07	99%	0	115
2014-15	5,399	5,805	639.27	98%	0	115
2015-16	6,995	8,506	1,018.26	98%	0	115
2016-17	3,399	3,783	469.80	97%	0	81
2017-18	4,388	5,005	702.11	97%	0	81
Total	25,605	29,262	4,232.51	98%	0	

Source: SHOGORIK Progress Report, FY 2017-18. Collected from Department of Agricultural Marketing.

Based on the field inspection reports collected by the DAM regional staff, it was observed that out of 81 warehouses, 14 warehouses were not storing any type of crop. It was noted that 6 warehouses in the Dhaka division, 2 warehouses in the Khulna division and 6 warehouses in the Rajshahi division were not accumulating any crops from 2015-16 FY. The reason being due to overdue loans and lack of renovations. As of 2023, it is not clear about the current status of the project.

Detailed problems/Challenges identified during program implementation:

1. 81 warehouses required urgent renovation/repair/construction.
2. Lack of manpower and necessary logistics.
3. Low salaried warehouse keepers were reluctant to operate warehouses.
4. Changes in current market price movements.
5. The changing position/status of small and marginal farmers in current agriculture.
6. Incorporation and utilization of warehouses of LGED by Directorate of Agriculture Marketing.
7. Banking problems (reluctance to provide loans, non-disbursement of loans to defaulting warehouses, account opening and loan stamps etc. taken, non-remittance of canceled warehouse proceeds to emergency relief fund, etc.) require resolution.
8. Changes to the deposit quota is required.
9. Fall in prices of stored crops.

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