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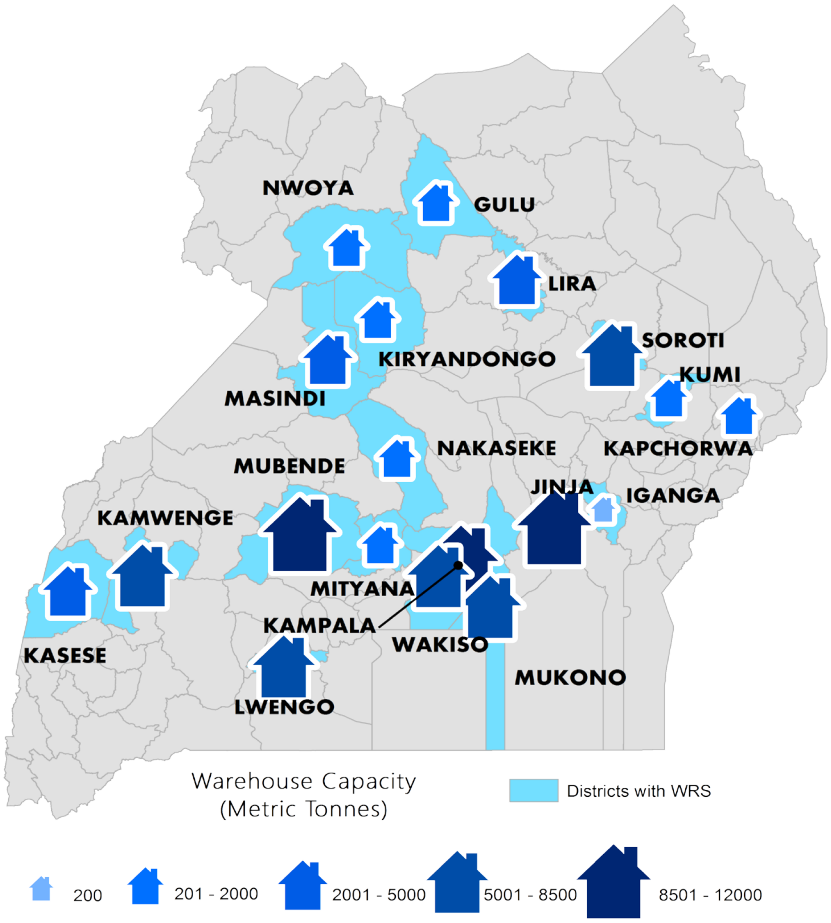
# UGANDA WAREHOUSING RECEIPT SYSTEM: IMPROVING MARKET COMPETITIVENESS AND SERVICE DELIVERY

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## ABSTRACT

Warehouse Receipt Systems (WRS) allow farmers and traders to access markets and financial Systems. While this system is not new in Uganda, as seen through both public and private efforts since 2004 during its pilot, little is known as to why it failed to ensure market access and credit. With the Uganda Warehouse Receipt System Authority in place, the government of Uganda seeks to reinstate the public warehouse receipt system with a concentration on the electronic-WRS. This study, therefore, critically reviews the evolution of the WRS, reviews the current policy support for the WRS and documents the perceived benefits and challenges of private sector stakeholders of the WRS in Uganda. This paper relies on both quantitative and qualitative analyses to respond to the objectives. The Agricultural Technology and Agribusiness Advisory Services (ATAAS) database by the Uganda Bureau of Statistics (UBOS) is used for quantitative analysis, while the Structure Conduct Performance (SCP) framework is used for qualitative analysis. The results reveal that while the market structure and conduct of the pilot WRS was implemented as theorized, it faced various barriers that led to poor market performance. Overall, the actors perceive that the benefits of the WRS are numerous, including stable and high prices, thereby reducing price exploitation, especially on smallholder farmers. They also perceive that the system will enable access to secure and stable markets using a secure and transferable warehouse receipt. However, the actors perceive that more people will be attracted to the WRS if there is mass sensitization and a revision of the costs of storage, cleaning, and other marketing costs. This paper highlights an important policy implication for the implementation of the WRS, including the need for the government to spearhead the promotion of standards, strengthen the capacity of collective action, and stress the importance of increasing the sensitization of all aspects of the WRS.

# 1. INTRODUCTION

Warehouse Receipting Systems (WRS) are mechanisms that allow farmers to access markets and financial services using their commodity as collateral. The system involves a package of innovations designed to modernize and enhance the efficiency of agricultural marketing systems. It is therefore a de-risking, mechanism-permitting tool for farmers to store and sell later when prices are high, thereby evening out their incomes (Alderman and Shiverly, 1996).

Over the years, the importance of the WRS in Uganda has been motivated by various factors. After the liberalization of markets in many Sub-Saharan countries in the 1990s, farmers faced financial challenges due to a coffee/cotton price slump, mismanagement of and corruption by marketing boards (Varangis and Larson, 1996; Masiga and Ruhweza 2007; CTA, ACP, & EU, 2013) and heavy taxes imposed on export crops (Ilorah, 2006). As such, WRS operations in the public sector have been observed as early as 1995/96, when the WRS was proposed under the current Ministry of Trade Industry and Cooperatives (MTIC). In collaboration with the Uganda Coffee Development Authority, the ministry implemented the project from 2000 to 2008.

The pilot commodities were coffee and cotton. The coffee was from Masaka and Southwestern Uganda, and the cotton was from Kasese.[1] The project was aimed at promoting privately run warehouse systems, establishing a collateralizable WRS, improving and strengthening assurance services for coffee/cotton, and developing a system of commodity trade finance based on commodity inventory collateralization. This pilot project led to the establishment of the WRS Law in 2006 and its regulations in 2007. At that time, the regulatory body, Uganda Commodity Exchange (UCE), guided the project implementation. However, there was a conflict in objectives since UCE's main priority was trading, and this partly negatively affected the implementation of the WRS[2]. Private sector efforts towards WRS are observed as early as 2004 under USAID's rural speed project, which was aimed at improving access to financial services in rural areas.

Currently, post-harvest losses are also motivating the establishment of the WRS. Indeed, studies show that WRS reduce the incidence of postharvest losses as illustrated by various studies. Under a mechanized postharvest mechanism-involved sealed storage, approximately 1-2 percent of losses occur at the storage stage compared to 5-10 percent at the open storage stage in the traditional postharvest chain (Hodges et al., 2011), which is why having a well-functioning WRS in place is among the issues prioritized for national development. Indeed, the second national development plan (NDP 2) acknowledges that limited storage capacity, particularly warehouses in the country, impedes effective post-harvest management and structured commodity trade. The result is that the country is unable to address the challenge of price volatility of agricultural products (GoU 2015).

Consequently, the government has revived the WRS by strengthening the regulatory framework. For example, 2015 saw the creation of an independent regulatory body, now known as the Uganda Warehouse Receipt System Authority (UWRSA). Its task is to promote the development of infrastructure that supports structured commodities, trading systems and value addition. In addition to the 2000-2008 MTIC project objectives, the authority hopes to develop and promote a reliable market information system, license warehouse storage facilities, and implement an E-WRS. The key private sector actors of the WRS are expected to be farmers, warehouse operators and financial institutions as well public regulatory bodies (MTIC, 2012).

Despite the above efforts, uptake for the WRS remains

1 The project utilized the existing building infrastructures of cooperatives. In Masaka, the premises used belonged to the former Masaka Cooperative Union; in Southwestern Uganda, the premises of the former Banyankole Kweterana and the Uganda Cooperative Alliance- Coffee Cooperatives Bushenyi were used. For cotton, the former premises of Nyakatonzi Cooperatives in Kasese were utilized.

2 Based on the consultative meeting with the Executive Director, UWRSA, Feb 9, 2016.

low. Studies on private sector warehousing in Uganda (such as USAID 2006) highlight the binding demand constraints from the farmers' perspective. Such constraints include the farmers' lack of knowledge and understanding of how the system operates and late payment schemes that result in many preferring immediate cash for their commodities. It is a challenge to convince farmers change their mindsets and entrust their maize crops to a public warehouse in exchange for a paper receipt (USAID, 2006). Similarly, convincing them to improve their total return by accepting a discount of the value of their maize warehouse receipt on one day and wait for prices to increase in the next few months can be difficult to achieve.

On the banking side, financial institutions are reluctant to finance agricultural-related activities given the uncertainty of external factors such as drought or floods and the fragmented nature of agriculture that makes investment too risky. Bankers need to be sure that they will have first-priority entitlement to all proceeds upon liquidation of the commodity. Ugandan banks will not be able to make loans based on negotiable warehouse receipts alone unless the laws are changed to allow creditors priority in loans against negotiable instruments, such as warehouse receipts, in the possession of the debtors (USAID, 2007).

In addition, the E-WRS will require significant effort to offer commodity handling and storage capabilities, capacity in plants and equipment at suitable locations, all of which require a level of honesty, integrity, and fair dealing that does not exist in the country. Warehouse operators are also discouraged due to the farmers' inability to meet volumes demanded by the warehouse; as a result, the program becomes costly to operate (UWRSA, 2015). Is it possible that the incentive structure is not conducive to attracting the participation of smallholder farmers? Do all stakeholders understand the WRS? What improvements in grades and standards have been made since the pilot WRS?

Considering the above discussion, this study seeks first to critically review the evolution of the warehouse receipt system to show the dynamics of how the system can effectively impact market performance in terms of value addition, grades and standards and access to finance in the country. Second, the study criticizes the existing policy and regulatory frameworks that facilitate the operation of the system and identifies the policy opportunities that WRS can leverage and the gaps that still need to be addressed. Third, this study seeks to document the perceived benefits and challenges of the key private sector actors concerning the WRS with a special focus on maize. The paper focuses on the private sector: currently, the government envisions adopting a private-public partnership in implementing the public E-WRS. We acknowledge that the government has few warehouses whose technology does not allow them to participate in the E-WRS. As such, the government must rely on the private owners of warehouses (UWRSA, 2015). The maize case study provides the means of assessing improvements in grades and standards for improved market performance. The paper relies on the maize case study because it is a commodity that is commonly traded in the East African region under the WRS. We believe that this information will be helpful to the UWRSA in aligning its activities for a public E-WRS in Uganda.

## 2. THE EVOLUTION OF THE WAREHOUSE RECEIPT SYSTEM (WRS) IN UGANDA

This section provides a detailed account of how the WRS came to exist and provides an analysis of the implications of the history of the WRS on its prospects. The structured trade under the WRS can be traced as far back as the mid-1990s, after the prompting of major structural programmes by the Bretton Woods institutions that encouraged market liberalization (CTA, ACP, & EU, 2013). At the time, the WRS was established based on the need to address the challenges that arose from privatizing the coffee

and cotton industries. Despite the fact that the coffee industry was under transformation by the private sector, financial challenges, especially access to credit, were also intensifying. This meant that local financial institutions were incapable of delivering credit to indigenous exporters (Varangis and Larson, 1996). Moreover, farmers remained incapable of managing their farms as an enterprise due to the absence of government involvement through the provision of subsidized inputs and cheap credit (CTA and EAGC, 2013). Additionally, although indigenous exporters had the alternative to seek financing from offshore buyers, they lacked established ties from their supposed financial rescuers. As such, there was a dire need for a mechanism that would increase financial access to traders/farmers (Panos and Donald, 1999).

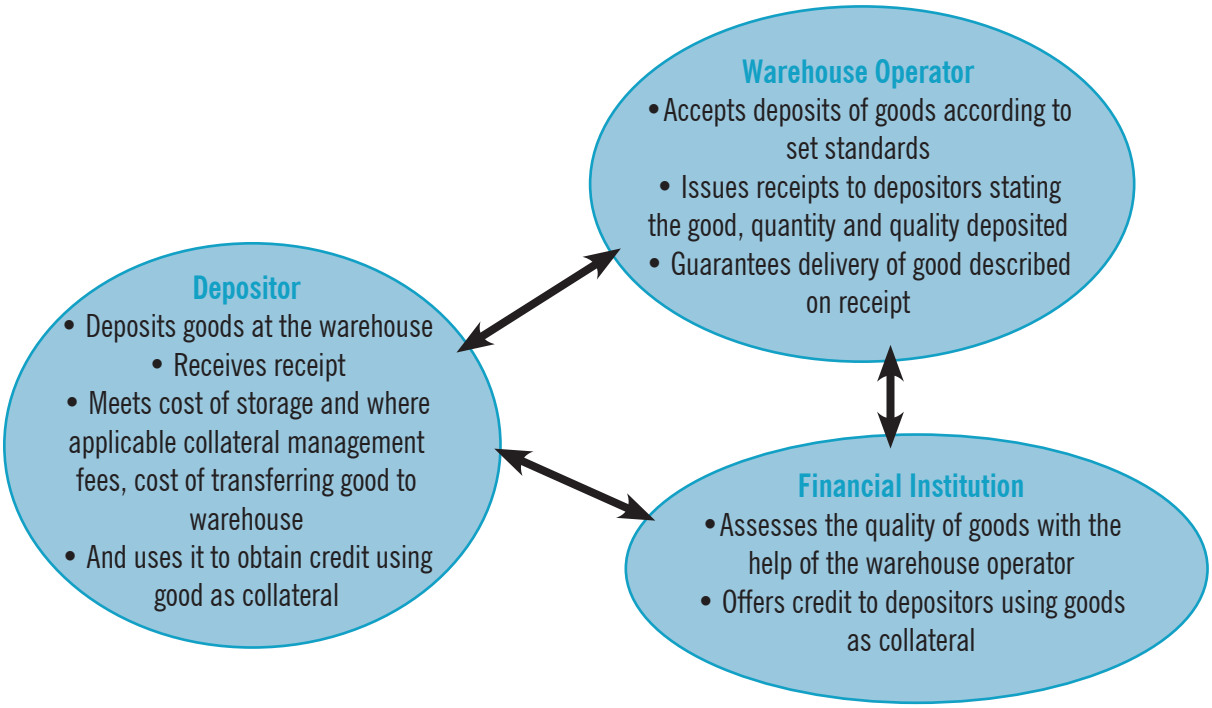
Likewise, the government of Uganda and development partners realized that the main constraint to commodity trade was the lack of a system that enabled access to trade finance using commodities as collateral. As such, a joint effort by the government of Uganda and the World Bank prepared an action plan to establish a warehouse receipt system in 1995. Consequently, the development of a WRS project was led by the then-Ministry of Trade Tourism and Industry (MTTI) in collaboration with the Uganda Coffee Development Authority (UCDA) and the Uganda Cotton Development Organization (UCDO). The project was jointly funded by the Common Fund for Commodities (CFC), the International Coffee Organization (ICO), and the Government of Uganda. Additionally, the implementers of the project sub-contracted the National Resource Institute (NRI) to guide the technical components of this project.

The WRS project focused on promoting privately run warehouses, improving and strengthening the quality of coffee and cotton, and establishing quality assurance systems and a system of commodity trade finance that relied on using commodities as collateral (MTIC, 2016). This project was complemented by the creation of the Uganda Commodity Exchange (UCE) in 1998, whose main objective was to address inefficiencies and challenges in the agricultural marketing systems of the country. However, an evaluation of UCE in 2004 revealed that the system failed to assure buyers of the timely receipt of goods paid. One of the recommendations of the evaluation was to establish a WRS, to which the European Union responded by funding another WRS project between 2006 and 2010 (WFP, 2014).

Nonetheless, the records suggest an enactment of the 2006 WRS act whose purpose was and is to guide the licensing of warehouses and warehouse managers. The act provides a national system of warehouse bonding for the protection of depositors and guides the issuance of warehouse receipts and other related matters. At that time, the act was to be implemented by the UCE as mandated by the government. In 2007, GoU formulated the WRS regulations, which were essentially to guide the coordination of key WRS stakeholders. The regulations clearly stipulate guidelines on the professional conduct of a person or entity that manages or operates the WRS. However, records on what happened to the WRS in Uganda after 2008 are largely lacking. For example, the authors are unaware of the existence of any government effort for the WRS in terms of projects or other actions that imply the implementation of the WRS. However, in 2015, the government established the WRS authority, which is currently the regulator of the WRS in the country (UWRSA, 2015; Baine, 2015). Notably, the UWRSA aims at reinstating a public warehouse receipt system that will be inclusive of smallholder farmers.

According to the UWRSA (2015) and Baine (2015), the WRS in Uganda aims at improving access to commodity trade finance as well as encouraging investment in rural commodity trade infrastructure and improving the quality of stock. It also aims at improving price discovery, reducing market imperfections, and mitigating seasonal price variability. Through a system of balkanization of commodities, the WRS is projected to increase revenue and provide better

**Figure 1: A generic WRS model promoted by the Natural Resource Institute**




Source: Author's compilation based on WFP (2014)

business transactions for smallholder operators such as farmers and traders. Furthermore, the WRS is envisioned as improving collaboration of public and private institutions to efficiently and transparently operate in a liberalized market environment.

Overall, the stakeholders of the WRS and their roles have not changed over time. For example, NRI, the main implementer of the first WRS project in Uganda that focused on coffee and cotton, relied on a WRS model, as seen in figure 1. However, the type of depositor to the WRS has been evolving with the introduction of new players. This means that while the system began with farmers as the only depositors, it has evolved to include traders, producers, farmer group traders, exporters, processors, and/or any individual or corporate body (Baine 2015). Additionally, depositors can deal directly with the buyer to make payments to the bank that provides depositors with finance. This arrangement is different from what existed during the first WRS project by the MTIC. Despite the collapse of the public WRS, especially after 2010, the private WRS has continued as described in Baine (2015). However, given the perceived structure of the public e-WRS and the failure of its pilot, how will the new public WRS contribute to market competitiveness and service delivery (access to finance)?

## 3 THE CURRENT POLICY SUPPORT OF THE WRS IN UGANDA

This section provides detailed criticism of the existing policy and regulatory frameworks that facilitate the operation of the WRS by highlighting the opportunities on which the WRS can leverage as well as the gaps that still need to be addressed.

### 3.1 Vision 2040

Vision 2040 does not specifically mention anything about the WRS among its priorities. However, some of its components of post-harvest infrastructure, cooperatives, and standards are in line with the objectives of the WRS. For example, to enhance market access and value addition, the government prioritizes improving the capacity for regulation and enforcement of standards, improving access to credit through the development of rural financing schemes and markets,

expanding the market infrastructure, strengthening cooperatives and attracting private sector participation in value addition activities and investments.

### 3.2 Second National Development Plan (NDPII) 2015/16- 2019/20)

The NDP II is the second in a series of 5-year national development plans that aim at achieving the Uganda Vision 2040. Its goal is to push the country towards middle-income status (GOU, 2015). This plan was approved in 2015 and is implemented by all Ministries Departments and Agencies (MDAs) under the leadership of the National Planning Authority (NPA). Among the challenges highlighted in the NDP II that affect the agricultural sector is the limited storage (warehouse, silos) capacity for effective post-harvest management and structured grain trade, which would enable the country to address the challenge of the volatility of the prices of agricultural products. To address this challenge, the NDP II proposes to improve the stock and quality of trade infrastructure through the establishment of 10 silos and warehouses with a capacity of 20,000 metric tons (MTs) and 5000 MTs, respectively, at strategic border points and locations across the country. As such, the plan proposes to establish and operationalize trade information centres across the country as well as incentivize the private sector to invest in trade infrastructure development facilities such as community silos, cold storage facilities, and laboratories (GoU, 2015).

While the plan highlights the importance of warehouses and silos, especially because they contribute to trade, it does not mention the WRS. Specifically, the plan does not mention its importance, challenges or appropriate policy actions to improve it. As a result, it is inferred that whatever is mentioned in terms of post-harvest infrastructure is linked to the WRS, which may not be the case because it is well known that WRS constitutes having infrastructure (full-equipped warehouses and silos) and a system that enables farmers/traders to obtain finance while using their merchandise as collateral. Such a plan prompts speculation as to whether it considers WRS a priority.

### 3.3 The National Trade Policy 2007

The national trade policy of Uganda was approved in 2007. Its home and implementation agency is the MTIC. The policy does not prioritize the WRS. However, some of its policy actions that especially pertain to domestic trade constitutes constructs of the WRS, such as standards, value addition, sanitary and phyto-sanitary measures, and cooperatives. For example, the policy prioritizes fostering collective action through the development, strengthening, and diversification of cooperatives; encourages bulk marketing and adherence to commodity standards; and aims to develop and implement a National Sanitary and Phyto-sanitary Measures policy.

The gap in the WRS in this policy is its lack of priority for the use of receipts as a source of finance. The opportunity is that the national trade policy notes that Uganda imports cereals at a cost of USD 106.7 m. Given this, a fully-developed WRS may encourage high production of cereals by increasing the storage capacity and standards.

### 3.4 The National grain trade policy 2015

The grain trade policy of Uganda is a subsector policy under the national trade policy that was formulated in 2015 and implemented by the Ministry of Trade and Industrial Cooperatives (MTIC). Following the increasing importance of the grain sector, as evidenced by increasing consumption and utilization in the manufacture of feeds and other industrial productions, the grain sector faces multiple challenges. Most importantly, many players in the grain trade sector trade grain in an extremely broad manner. As such, information networks are required to operate on a global scale. Furthermore, this implies the need for policies and strategies to boost production by ensuring post-harvest handling and value addition. Such policies would ensure a competitive supply of higher quality grain and grain products. Hence, the national trade grain policy was formulated on this basis.

Overall, this policy explicitly highlights the WRS in its objectives, subsequent interventions, and policy actions. Its strategic objectives relate to the WRS in many ways, including promoting farmers'/traders' bulk handling and marketing of grains, improving access to credit; and promoting value addition and innovation. Basic targets of the policy in this regard include improved standard grain storage facilities from 5 percent to 40 percent; reduced post-harvest losses from 37 percent to 25 percent and increased access to agro-processing facilities from 12 percent to 50 percent.

This policy focuses on interventions aimed at improving the supply of quality grain through the adoption of good post-harvest handling practices, the use of standard storage facilities, and modern value addition facilities. Moreover, the implementation of the policy is expected to increase the countrywide network of standardized warehouses and rural storage facilities and improve the quality of grain for trade, food consumption and value-added products.

The policy proposes multiple policy actions related to the WRS, such as to create awareness and provide training that includes women and young people on the use and benefits of the WRS and commodity exchange. It proposes to promote low-cost financing options for agriculture-related credit with an emphasis on options that de-emphasize the ownership of fixed assets as a criterion for beneficiaries. It also proposed to promote the use of the WRS as a source of credit.

Furthermore, the policy has multiple strong points that are opportunities for success of the WRS in Uganda. This policy is beneficial in that it provides intervention specifically targeting women and young people, which means that the policy has prioritized well, at least in terms of demographics. The policy is also commended for including interventions that will push the WRS of the grain sub-sector forward, such as establishing traceability systems along grain value chains, establishing and enhancing district information centres and communication networks for reliable information, developing a grain information management system web portal, and strengthening the information flow amongst stakeholders.

Notably, the policy is commended for being aware of the communication challenges faced by smallholder farmers and traders and therefore has a specific intervention to that effect, as mentioned before. This further suggests that the policy was well designed, especially as it pertains to problems faced by smallholder farmers and traders. Inasmuch as the policy's focus is on grain, the policy is commended for acknowledging the importance of the WRS, and if the proposed interventions are improved, positive results from the WRS in Uganda will be clear.

However, the policy confuses the alternative sources of credit that de-emphasize the ownership of fixed assets, such as the use of guarantors with the WRS instead of having a separate and detailed intervention on the WRS. While it proposes to promote WRS as source of credit, it is deficient regarding the exact action to do so. This means that this policy is devoid of an explanation on what exactly will be done differently to ensure that the WRS provides financing, especially for smallholder farmers and traders.

### 3.5 The National Agricultural Policy 2013

This policy was approved in 2013, and it is housed and implemented by the Ministry of Agriculture, Animal Industries, and Fisheries (MAAIF). The policy acknowledges that the promotion of the WRS ought to strengthen the capacity for farmer groups to undertake joint activities, especially with respect to marketing. It also acknowledges that policy strategies on marketing, quality assurance, and control will require well-developed and well-maintained agricultural marketing infrastructure, such as warehouses and silos. Furthermore, while the policy commends effort from local governments and the private sector, which has improved the quantity and stock of such infrastructure, it is still inadequate, in poor condition and unevenly

distributed (GoU, 2013).

Only in the above instances does the policy discuss WRS. Overall, it is evident that WRS is not a priority in the policy. Additionally, its policy actions do not discuss any intervention in the WRS except that MAAIF and MTIC should collaboratively work to deepen and increase the coverage of the WRS (GoU, 2013).

### 3.6 The WRS act of 2006 and WRS regulations of 2007

The WRS act explicitly discusses the WRS authority, its governance structure, and duties. The WRS regulations were instituted to operationalize the WRS Act and are to be implemented by the warehouse receipt authority. The regulations detail guidelines for operating both private and public warehouses. They also discuss issues related to the supervision, monitoring, and maintenance of the WRS under the leadership of the WRS authority. While the act and regulations may not have any gaps concerning the implementation of the WRS in the country, strict adherence to them may minimize errors in the implementation of the WRS.

Overall, except for the NDPII, which provides some sort of target for the number and capacity of the warehouses, other policies do not have a clear implementation strategy that relates to the WRS. For example, while the National Trade Policy has a draft implementation strategy in place, it is brief and lacks mention of strategies for the WRS. The National Agriculture Policy has a detailed implementation framework but does not include strategies relating to the WRS, while the National Grain Trade Policy does not have any implementation strategy in place. Additionally, MTIC, the main implementing body of the WRS in Uganda, does not have an updated sector development plan with details on strategies for the WRS; the last available one is for the financial years 2008/09-2012/13. While the collaborative implementing body MAAIF has a sector development plan with a strategic action plan to promote value addition, post-harvest handling, storage and marketing, it lacks excerpts on the WRS and its potential to provide smallholders with finance and markets. It is important that these policies and plans have clear implementation plans/strategies with clear targets and indicators of success that relate to the WRS. While the presence of these regulatory frameworks is meant to guide the WRS authority, the perpetual absence of targets not only incorrectly guides the authority but also leads to the waste of resources. Additionally, the perpetual absence of such targets will make reviews and updates of these policies cumbersome. This means that the WRS authority ought to invest in setting achievable targets for a set period.

In summary (also provided in table 1), the regulatory framework of the WRS in Uganda is characterized by gaps and delays in implementation. The delay implies that either the government was not responsive enough to the needs of smallholders or the private sector was unable to respond in a timely manner to government efforts in this regard. However, according to a KI:

*"The WRS has always been in Uganda, as evidenced by public warehouses in Gulu, Agro-ways in Jinja and others. The delays in the implementation of the WRS are attributed to low production by the private sector, and it is therefore unable to meet the capacities of existing warehouses."*
*KIIs, May 2016*

**Table 1: Summary of the review of policies on the WRS in Uganda**

| Policy | What it says about the WRS | Gaps | Opportunities |
|---|---|---|---|
| National grain trade policy 2015 | Objectives and interventions are explicit regarding the WRS, especially those concerning grain | Lacks a detailed intervention plan for the WRS | Has set targets for the WRS; intervention includes women and young people and is aware of smallholder communication challenges |
| NDP II | Limited storage capacity impedes effective commodity trade. Country is unable to address agricultural price volatility | Does not mention interventions for availing finance through WRS | Sets target of 10 silos and warehouses with a capacity of 20,000 MTs and 5000 MTs, respectively |
| Vision 2040 | Some policy actions are in line with the WRS, especially those on market access, standards, rural financing schemes, market infrastructure, and cooperatives | Does not mention the WRS; it only implied in some policy actions | |
| National trade policy 2007 | Policy actions such as those on standards, value addition, sanitary and phytosanitary issues may relate to the WRS | The use of receipts for finance is not mentioned | Notes that Uganda imports cereals at a cost of USD 106.7m. Full development of the WRS may reduce the import bill on cereals |
| National Agricultural policy 2013 | Acknowledges the role of the WRS in building farmer groups' capacity in marketing. Warehouses and silos required for policy strategies on marketing and quality assurance | Policy actions lack intervention in the WRS | Acknowledges that MAAIF and MTIC should work collaboratively to increase coverage of the WRS |
| WRS act of 2006 and regulations of 2007 | Explicitly prioritizes the WRS authority. Expounds deeply on the WRS governance and the authority's engagement with the private sector | | If regulations are strictly followed, errors in implementing the WRS will be minimized |

Source: Authors' compilation based on multiple policy documents

# 4. LITERATURE REVIEW

This section discusses past works on the notion of warehousing (section 4.1). Section 4.2 discusses developing (mostly African) countries' attempts at instituting WRS and the reasons they failed. It also highlights some success stories of the WRS in developing countries while drawing lessons for Uganda. Overall, the aim of this section is to draw both failure and success lessons for Uganda's WRS.

## 4.1 Theories backing the WRS: a review of the Literature

The notion of the warehouse receipt system mostly stems from the theory of storage. The theory of storage was originally developed and described by Working (1933). Kaldor (1939) extended it when he introduced the concept of convenience yield. This means that processors or consumers of a commodity receive an implicit stream of benefits from the holding inventory. This stream of benefits is called convenience. An example of convenience includes the opportunity to benefit from unexpected demand and supply shocks or the opportunity to reduce costs by smoothing out the production process. The theory of storage explains the difference between a futures price and the contemporaneous spot price (the basis) in terms of the lost interest in storing a commodity, warehousing costs and the convenience yield from inventory.

The theory also implies that commodity forward prices differ from contemporaneous spot prices of the storage and interest costs of holding inventory less the benefit of convenience. For convenience assets (assets that

receive benefits from physical services in addition to expected capital gains), the theory implies that an increase in volatility of the spot price should lead to an increase in storage activity and increased inventory levels. In other words, a change in the market structure that increases the variance of the spot prices should increase the use of storage.

The theory of storage applies to any commodity that can be physically stored and entres on storage costs, the motives of stock holding on the physical market, and the price discovery function of the futures markets. The theory makes two predictions, i.e., in instances of low inventory, spot prices will exceed futures prices and spot price volatility will exceed futures price volatility. Conversely, during periods of abundance, both spot prices and spot price volatility will remain relatively subdued.

Perales (2010) tested the implication of the theory of storage based on how supply and demand fundamentals for corn and wheat affect the price dynamics of these crops in Mexico. The study used the interest-storage adjusted spread as a proxy variable for supply and demand fundamentals. The findings reveal that the variability of the spot and futures returns is statistically significant and positively related to the lagged adjusted spread, as the theory of storage predicts. The study further reveals that a widening lagged adjusted spread led to an increase in the spot and futures returns volatility for both commodities, although the variability of the spot returns is higher than the variability of the futures returns when this spread widens.

Lorton and White (2006), in a study on grain merchandizing, confirmed the theory of storage in relation to the returns from the storage of grain to be approximated by the cost of carrying grain over time. In other words, gains from storing hedged grain over time should be cancelled out by the physical and opportunity costs of storing grain. The physical costs of storing grain include warehousing, insurance and shrinkage, while the opportunity cost comprises the lost income that could have been earned by selling grain immediately and investing the proceeds (the investment or holding period would equate to the storage period) at the current bank interest rate. They find that, in reality, commodities such as corn and soybeans in certain market locations can often earn storage returns (made up of basis change) far in excess of the cost of storing grain because production in these markets is highly seasonal, occurring at an annual harvest time.

Others who have tested the theory of storage include Brenan (1958) and Cho and McDougall (1990), who quantify the role of supply and demand fundamentals in determining price volatility. Both studies find that their results are supported by the hypothesis proposed by the theory of storage in which current spot and future return dynamics are strongly related to variations in the fundamental supply and demand conditions. Susmel and Thompson (1997) analysed the relationship between natural gas price volatility and investment in storage facilities in the United States. The study focuses on the natural gas industry because it experienced regulatory changes through the 1980s and 1990s. Using an ARCH model with two states and two autoregressive terms, they find that these regulatory changes lead to an increase in volatility. They also find that investments in additional storage facilities follow an increase in volatility. Additionally, storage capacity additions are not attributed to demand growth and cost-based regulated rates as predicted by the theory of storage.

However, there have also been studies whose results partially explain the theory of storage, such as Wei and Zhu (2006). They use a GARCH model to estimate different risk premiums for the United States market. Their results reveal that the dependence of estimated convenience yields on other explanatory variables confirm the theory of storage, but it does not hold for all resulting risk premiums. Similarly, Modjtahedi and Movassagh (2005) find only partial support for

the theory of storage by analysing US data from 1993 through 2004.

### 4.2 Warehouse receipt system in developing countries

Many African countries have attempted to have a WRS in place. While some have been successful, others have not because they pertain to increasing smallholder incomes. There are multiple reasons for systems that appear to not have been successful initially. For some, the absence of a regulatory framework caused their initial failure. Indeed, according to Lacroix and Varangis (1996), the use of warehouse receipts is limited in developing countries for multiple reasons, including the lack of incentives to develop privately run warehouses, the absence of an appropriate regulatory framework and limited familiarity of the country's commercial community, especially banks with warehouse receipts.

However, instituting a legal framework appeared to have helped because such countries started registering some success in the WRS. For example, Kenya's first attempts to have a WRS in place failed, especially before 2008 (Fowler, 2008), but the country later had a regulated WRS, a focus on maize and implementing the WRS in existing institutions such as the East African Grain council, Lesiolo grain traders and others (Coulter et al. 2009).

In Zambia, the WRS has existed for a long time; however, early attempts to institute the WRS failed due to challenges in management and the reputation of the private company that first operated the system. According to Coulter (2009), the Zambian Agricultural Commodity Agency that started operations in 2000 ceased in 2006 due to management and reputation issues, an early end of donor financing and limited support from the financial sector. Other countries, such as Madagascar ,that had numerous strategies for the WRS, such as diversified loans, that failed, and these strategies could not explain the shortcomings of the system (Fraslin, 2007). While government interventions are crucial for the success of the WRS, this is not the case in some countries. For example, Mali's WRS started in 1997 but failed because of government interventions that imposed conditions and delays and hence rendered the system ineffective (Edwards, 2010).

For countries where the literature appears to suggest that they enjoyed a successful implementation of the WRS, or at least appear to have a well-run WRS, offer lessons for Uganda. These countries are chosen because they have certain attributes similar to Uganda and therefore are comparable. For example, Malawi is an agrarian economy with significant maize production, as is the case in Uganda.

In 2005, Malawi had a pilot warehouse, but it was later abandoned in 2008 because there were concerns as to whether such a complex technical venture could be implemented in the then-highly political environment (Belmont, 2007). However, after attempts to have a pilot-regulated WRS were revived after 2008, by 2011, two sites were registered. Currently, Malawi boosts of six registered warehouse receipt facilities with a combined capacity of 70,000 MTs operated by private sector actors (Van and Nordier, 2013). Malawi has registered some success since the institutionalization of the WRS. For example, the WRS has been able create markets for farmers by stabilizing market prices, especially for maize (Van and Nordier, 2013).

Malawi's successful WRS is attributed to various factors. First is that the idea of the WRS being promoted by the Auction Holding Commodity Exchange (AHCX). Initiated by the National Small Farmers Association of Malawi (NASFAM), an equally successful farmer organization, the body assists farmers in accessing credit while waiting for better prices. However, this is possible only if these farmers become active participants of the body. Only then can financial institutions extend credit to depositors of commodities. This also means that the AHCX is the main collateral manager (Van and Nordier, 2013; Hernandez, 2012).

Second, despite the fact that Malawi does not have a regulatory framework for the WRS, the system managed to build successfully on contractual relationships between grain depositors, storage operators, financial institutions, and AHCX. This working relationship not only assures financial institutions of high loan recovery rates, thereby reducing risks in business, but also enables them to increase their client base. In addition, the Malawi government is supportive of its stakeholder as it has included the AHCX in its National Agricultural policy. Similarly, the AHCX is integrated with the government's vision for agriculture. As such, there is a combined effort to make a greater impact (Van and Nordier, 2013; Hernandez, 2012).

Third, Malawi's maize production has been steadily increasing since 2006, when the AHCX was first established. Maize is Malawi's cash and food crop. Prior to 2006, Malawi experienced a maize export ban, which was lifted in 2006 due to lobbying from the Grain Traders Processing Association (GTPA). As such, growth in maize production increased from 428,000 tons in 2006 to 1.3 million tons in 2010 (Van and Nordier, 2013).

Despite these successes, farmer groups, especially the NASFAM, still lack sufficient storage space, which is essential to participating in structured trade (Van and Nordier, 2013). Nonetheless, the success of Malawi's WRS offers an opportunity for the Ugandan government to leverage the existing working relationship with the Uganda Grains Association in particular. In addition, the government of Malawi has the political will to have a private sector-led WRS without creating parallel bodies to regulate the system. Instead, the WRS has been integrated in existing policies. According to Kiriakov (2007), WRS are susceptible to failure in the absence of political will and an understanding of the benefits the system brings to participants.

The fact that creating two parallel bodies with essentially one common goal renders one party (in this case, the government) redundant prompts the following questions: What could Uganda have done instead of creating a WRS authority? Was there a thorough analysis of the options to support the private sector other than creating an authority? Given that the decision to create an authority cannot be reversed, the government of Uganda ought to have effective incentives that will convince private sector warehouse owners to work with a larger mass of smallholder farmers/traders. The government of Uganda can also coordinate the WRS; instead of operating their own warehouses, the government should lease out to the private sector.

India has a well-established WRS. This is evidenced by a strong presence in both the public and private sector. Nonetheless, unlike Malawi, where the WRS is dominated by the private sector, India's WRS has the government of India and state governments as dominant players. India's success in the WRS business is attributed to its regulatory framework, which dates as far back as 1962 when a Warehousing Corporation Act was enacted. As such, the government-owned Central Warehousing Corporation (CWC) was formed (Coulter and Ramachandran, 2000). The CWC worked and still works hand-in-hand with government-owned banks and cooperative banks to provide financing to smallholder farmers with their produce as collateral (Coulter and Ramachandran, 2000).

The CWC has garnered significant success since its inception, as seen by an increase in warehousing sites. The CWC started with 7,000 tons of storage capacity, but by 2000, it had acquired 7.5 million tons, increasing at a rate of approximately 200,000 tons per annum (Coulter and Ramachandran, 2000). The CWC operates 465 warehouses across the country with a storage capacity of 11.59 million tons and provides warehousing services for a wide range of products ranging from agricultural produce to sophisticated industrial products. Apart from storage and handling, the CWC provides services including clearing and forwarding; transportation and procurement; distribution; disinfestation services; and other ancillary

services (Coulter and Ramachandran, 2000). The CWC's success is largely due to its presence across the country, which allows it to take advantage of varied seasons and commercial activities of different states. The CWC's privileged position as a provider of warehousing services to the government and privileged access to government clientele has also allowed it to grow (Coulter and Ramachandran, 2000).

An evaluation of the effectiveness of the WRS in India showed that a developed WRS could help rural farmers realize better sales prices by reducing barriers between rural farmers, local financial institutions and the market. However, challenges including information asymmetry remained (Umali and Deininger, 2001). Nonetheless, the government of India responded to this challenge by revising the law on warehousing, currently known as the Warehouse Development and Regulatory Act of 2007. It also instituted the Warehousing Development and Regulatory Authority (WDRA) in the same year. To reduce information asymmetry, WRs were made negotiable within the act, and all warehouses were required to register with the authority. As a result, India has 390 registered warehouses, including primary agricultural co-operatives that use the negotiable WRs. However, this intervention has not reduced the problem of information asymmetry (Sasi, 2015; Mahanta, 2012).

According to the Sasi (2015), the progress of the negotiable system has been slow since its establishment in 2010. The WDRA still struggles to convince the banks, especially privately owned banks, to use negotiable instruments for agricultural funding (Mahanta, 2012) due to many structural defects within the Act. This means that banks attribute their reluctance to the fact that the negotiability of the WRs in the current content of the Act does not offer them adequate safety and assurance of repayment. For example, the WDRA has not been mandated to regulate the entire housing space, which remains the domain of various stage warehousing acts. In addition, non-negotiable receipts do not fall under the regulatory domain of the Authority. In the case of a default, the WDRA does not have the power to insulate the lender with the safe returns of the borrowed capital. In other words, the regulator has no direct control over the actions of the accredited warehouses, which may move stock around (Sasi, 2015).

Uganda has an opportunity to learn from India's successful WRS. The government ought to take advantage of the warehouses that have been established around the country. It is necessary to equip these warehouses to provide services for smallholder farmers to benefit from the varied climate seasons and crops across the country. It is also necessary to work closely with state owned banks such as the Uganda Development Bank (UDB) because receipts from the government may be more easily accepted in state-owned banks than private banks.

Another country to learn from is Tanzania, whose economy has several similarities to Uganda. Tanzania and Uganda's percentage of employment agriculture is still substantial although decreasing. According to the World Bank, employment in agriculture as a percentage of total employment decreased from 82.1 percent in 2001 to 76.5 percent for Tanzania and in Uganda from 71.6 percent in 2005 to 64 percent in 2014 (Uganda Bureau of Statistics, 2016).

The WRS in Tanzania was established after the collapse of the state-managed cooperatives in the 1980s. At that time, farmers did not have sufficient access to markets and financial services. The problem was further compounded by the liberalization and privatization of the financial sector and agricultural markets in the 1990s. Given this, the government of Tanzania and IFAD launched the Agricultural Markets Systems Development Programme (AMSDP) in 1996 to pilot the rural inventor credit scheme through the WRS for maize and paddy rice (IFAD, 2012). At that time, the main users of the system were large cash-crop producers/traders who owned or rented warehouses since they could afford the warehousing fees. The

IFAD-supported WRS under the AMSDP targeted smallholder producers and ventured into "non-traditional" cash crops. The scheme was implemented in the northern and southern rural regions of Tanzania and had immediate positive effects on household incomes (IFAD, 2012).

This project was completed in 2009; by this time, the WRS had covered 11 districts. Moreover, the farm gate prices had increased up to 300 percent, which led to an immediate positive impact on the farmers' income. The scheme also enabled farmers to improve the quality and increase the quantity of their produce, which in turn helped them increase their access to credit. Business relations between banks, SACCOs, and smallholder farmers were strengthened, resulting in more favourable loan terms for agricultural producers. Furthermore, interest rates for commercial loans were reduced from 20 percent to 13 percent. The introduction of the WRS created employment in various activities related to the WRS, such as transportation and security (IFAD, 2012).

The government of Tanzania also instituted the WRS under a technical assistance project funded by the Common Fund for Commodities in 1996. This project ran from 2002 to 2005. In the same year (2005), another WRS government project was introduced with an emphasis on cotton and coffee, and at the same time, the WRS law was enacted. The project was piloted in the Kilimanjaro, Mbeya, Shinyanga, Ruvuma, Kigoma and Arusha regions. Initially, five warehouses and three banks participated in the project. Depositors in these warehouses included primary cooperatives, farmers' business groups, traders, exporters, processors, individuals, and corporate bodies.

The government of Tanzania enacted the WRS in 2005, established the Tanzania Warehouse Receipt Licensing Board (TWLB) and released the Warehouse Receipt Operational Guidelines in 2006 (Pascal, 2010). This means that all these projects on the WRS built momentum for Tanzania's WRS legal framework and implies that their success propelled the government to enforce a WRS legal framework. Despite the success of the WRS, few financial institutions have adopted the financing model and developed products based on the principles of the WRS since 2006 (Pascal, 2010). This means that issues of trust between the shareholders remain a challenge and is negatively affecting the popularization of the WRS in Tanzania.

Tanzania's WRS journey clearly indicates that its government was at the forefront. It is also evident that Tanzania has tread consciously, as seen by a myriad of pilot programs of the warehouse receipt system in Tanzania before enacting the WRS act. Uganda's WRS legal framework also stems from the various WRS pilot projects initiated by the government, private sector, and public private partnerships (PPPs). Given this, Uganda ought to harness the success from these pilot projects by drawing upon lessons of success that can be replicated.

## 5. DATA AND METHODOLOGY

### 5.1 Data

The study relied on quantitative data to compliment the qualitative component. The Agricultural Technology and Agribusiness Advisory Services (ATAAS) database (baseline survey) constituted the basis for the quantitative analysis of this study. The baseline survey covered 112 districts in Uganda. Three modules, including households, community service and community service recipients, were administered. Of interest to this study is the household module that covered information on production, post harvesting handling, marketing and collective action. The survey employed a two-stage stratification. In the first stage, Zonal Agricultural Research Development Institutes (ZARDIs) and rural-urban location-grouped Enumeration Areas (EAs) were drawn using Probability Proportional to Size (PPS).

In the second stage, the households were drawn using

the Systematic Random Sampling technique. Overall, 900 EAs were designated using the 2012 Uganda Population and Housing Census Mapping Frame. The EAs were then distributed to 9 ZARDI Agro Ecological Zones in equal proportions while considering rural-urban domains. The survey targeted 15 households per EA, bringing the total to 13,500 households. After consideration of the degree of precision desired for the survey estimates, the cost, operational limitations, and efficiency of the design, the actual sample of the ATAAS baseline survey was 11,881 households, with a response rate of 93 percent. Rural areas had a higher response rate of 93 percent compared to urban areas at 89 percent. Weights have been attached to estimates presented in the results section to make them nationally representative.

The qualitative component of this paper relied on Focus Group Discussions (FDGs) and key informant interviews. The study areas broadly included two regions growing and stocking maize, which is Masindi at the MSGGL (Masindi Seed and Grain Growers Limited) warehouse and Jinja at the Agroways (U) Ltd warehouse. The choice of these two regions was a recommendation by the World Food Program (WFP); the two had previously participated in the WRS during a WFP-funded WRS project in 2009-2013. As such, the study relied on a purposive sampling technique.

With recommendations from UWRSA, we approached and depended on warehouse operators to provide information on the respondents attached to the facility, either as depositors or as sellers/traders of the maize grain at present and/or in the past. In each region, we conducted two FGDs, each comprising 15 smallholder farmers. Each FGD included at least six women. We interviewed three commercial farmers and three traders in each region. We also interviewed the warehouse operators. Other WRS actors interviewed included three financial institutions (FI) and five service providers (providing paid or free service to the WRS actors). The selection of FIs and service providers was determined by whether they participated in the pilot of the WRS and/or at present. Overall, the study team spoke with 44 people. The details of the questionnaires administered and the contact list of interviewees can be found in annex 1 and 2, respectively.

### 5.2 Methodology

The paper's analysis is anchored on both qualitative and quantitative methods. To analyse the perceived benefits and challenges, we assume that the presence of many benefits and absence of challenges lead to market performance, i.e., more farmers having the opportunity to sell and earn more/stable income. However, the presence of benefits and absence of challenges in the WRS are determined by the industrial structure of the WRS. Given that the WRS is an organized model of marketing, analysing benefits and challenges of key players in its operations also requires following the system's organization. As such, the suitable approach was the Structure-Conduct-Performance (SCP) model. The model has previously been used to analyse positional advantages (Porter, 1991). The alternative would be to document the perceived benefits and challenges from discussions with key players, but in the light of the operations of UWRSA, this approach would not sufficiently associate the benefits and challenges to the WRS operations.

This framework is a basic paradigm of industrial organization, which holds that the structure of the market influences the competitive conduct of firms in the market, which in turn influences market performance. It examines the causal relationship between the market structure, conduct, and performance. The market structure consists of characteristics of the organization of a market, which appear to strategically influence the nature of competition and pricing within the market. In particular, these are organizational characteristics, including the degree of the seller and buyer concentration, entry conditions, and the extent of agent and product differentiation. Specifically, it refers to the number and size distribution of firms and any entry barriers arising from the technology of the production. It therefore describes the nature of the

degree of competition and pricing in the market. A structure is a set of variables that is relatively stable over time and affects the behaviour of farmers and/or buyers (Banson, 2016)

Market conduct refers to the set of competitive strategies that a trader or a group of traders uses to run a business. In other words, market conduct focuses on traders' behaviour with respect to various aspects of trading strategies such as buying, selling, transport, storage, information, and financial strategy. In line with the literature on institutional economics, these are the rules that define the play of the game (Hai, 2003), also described as the way in which buyers and farmers behave, both amongst themselves and with each other (Banson, 2016).

Market performance refers to economic results, including product suitability in relation to consumer preferences (effectiveness), the rate of profits in relation to marketing costs and margins, and price seasonality and price integration between markets (efficiency). In sum, market performance refers to the impact of the structure and conduct as measured in terms of variables such as prices, costs, and volume of output (Bain, 1959). In other words, a well-structured system with good market conduct would imply that actors are able to benefit through increased access to finance, quality storage, and stable prices. Such a system can attract more players and become sustainable over time.

There is no unanimity regarding which indicators should be used as variables for the SCP (Harre and Pischer, 2009). A combination of variables has been used in different studies (Viaene and Gellynck 1995; Iden and Methlie, 2012). The indicators used to collect data for this paper follow the SCP model version of Waldman and Jersen (2001); see figure 1 for an overview of indictors considered.

**Figure 1: Overview of indicators used for the SCP variables**

| Market structure | Market conduct | Market performance |
|---|---|---|
| • Types and distribution of actors<br>• Linkages in the market<br>• Barriers to entry<br>• Responsibilities and roles of actors<br>• Access to commodity trade finance<br>• Price discovery<br>• Product differentiation<br>• Infrastructure | • Strategies for product differentiation<br>• Strategies to control price variability/ fluctuation<br>• Strategies for innovation | • Product suitability in relation to consumer preferences: adherence to standards and feedback from buyers of maize<br>• Product suitability in relation to consumer preferences: Access to credit<br>• Rate of profit in relation to marketing costs and margins<br>• Price seasonality and price integration between markets |

Source: Author's compilation based on Waldman and Jensen, (2001)

# 6. RESULTS AND DISCUSSION

## 6.1. Current production levels and post-harvesting technologies at the firm level

**Table 2 Distribution of warehouse facilities targeted for public WRS**

| Region | Districts | Crops stored | Capacity in MTs |
|---|---|---|---|
| North | Gulu, Nwoya, Lira | Maize, sorghum, peas, soybeans, beans | 3500-6000 |
| Central | Kampala, Lwengo, Mityana, Mukono, Kamwenge, Nakaseke, Wakiso, Mubende, | Rice, beans, maize, and sorghum, barley, millet, coffee | 1800-10000 |
| East | Kapchorwa, Jinja, Iganga, Soroti, Kumi | Maize, barley, sorghum, cotton, millet, soybeans | 200-10000 |
| West | Masindi, Kasese | Maize, beans, cotton | 500-6000 |

Source: Uganda Warehouse Receipt Systems Authority

Table 2[3] shows the distribution of potential warehouse facilities for the public WRS. While the WRS covers a wide geographical presence in Uganda, its presence is dominant in the central area and minimal in the west. Indeed, the central region has the highest distribution in terms of spread, capacity, and variety of commodities stored, while facilities in the west are quite small and store a limited variety of commodities. The presence of more warehouse facilities in the central area may be attributed to various market opportunities for grain such as millers, schools, feed producers and other markets, which may not be readily available in other regions. While the WRS is conceived to absorb many commodities, the current structure allows for the storage of grains and pulses such as rice, beans, maize and a few traditional crops such as coffee and cotton.

However, evidence of production shows that the share of households producing beans and maize is highest in the west (Kabale, Hoima, Kiruhura, Kabarole, Masindi, and Isingiro districts), as seen in table 3. This implies a policy gap. Specifically, it implies that that the government needs to rethink and place more infrastructure or facilitate the establishment of more warehouse facilities in the western region due to its maize potential.

Overall, there is a higher share of households producing beans and maize than coffee and rice. Except coffee, rice and sorghum, whose production is not as common as beans, maize and millet, the production of potential WRS can clearly be found in multiple districts. Table 4 shows the percentage share of households producing a given crop by the presence of warehouse facilities to be licensed. There are no significant differences in production between households that are located in areas with a WRS and areas without a WRS. This evidence implies that countrywide implementation of the WRS would benefit multiple households. It is noteworthy that the ATAAS could not report on every district with a warehouse facility. This analysis is unable to provide findings that can be generalized for the whole of Uganda. In fact, this table reports on districts producing target crops but do not have potential warehouse facilities.

3 With assistance from UWRSA, the authors obtained a list of potential warehouses to be licensed for the WRS. The list can be found in annex 3. According to UWRSA, only these warehouses agreed to participate in the WRS of Uganda; however, many more warehouses have not agreed to do so. We analyse the current viability of WRS based on the presence of warehouses to be licensed in particular districts versus areas without warehouses.

**Table 3: Share of households producing a given crop in 2014 by district, %**

| District | Coffee | Beans | Maize | Rice | Millet | Sorghum |
|---|---|---|---|---|---|---|
| Rakai | 43.3 | 78.6 | 87.2 | 0 | 2.4 | 0 |
| Kayunga | 49.6 | 79 | 93.1 | 1.6 | 7.7 | 0 |
| Soroti | 0 | 12.8 | 30.2 | 8 | 42.2 | 51.9 |
| Butaleja | 1.3 | 51.5 | 87.6 | 26.7 | 29.3 | 20.7 |
| Adjumani | 0 | 7.7 | 82.6 | 8.5 | 4.3 | 22.3 |
| Gulu | 0 | 73.3 | 43.7 | 12.6 | 17.3 | 45.1 |
| Amuru | 0 | 40.3 | 38.6 | 30.7 | 23 | 52 |
| Hoima | 6.8 | 79.7 | 73.6 | 26.9 | 7.7 | 2.3 |
| Kabale | 2 | 88.5 | 32.9 | 0 | 8 | 77.4 |
| Kabarole | 15.5 | 70.9 | 38.5 | 0.4 | 4.1 | 1.1 |
| Kibaale | 20.7 | 91.8 | 89.7 | 0.8 | 2.7 | 1.3 |
| Masindi | 7.4 | 84.5 | 87.1 | 7 | 5.1 | 1.8 |
| Isingiro | 9.4 | 88.7 | 31.4 | 0 | 13.6 | 14.6 |
| Kiruhura | 18.3 | 86.6 | 64.5 | 0 | 53 | 0.5 |

Source: Authors' calculations based on ATAAS dataset, (UBOS, 2014)

**Table 4: Share of households producing a given crop by presence in the warehouse receipt system (to be licensed), %**

| Crop | All | No WRS | WRS | Soroti | Gulu | Masindi |
|---|---|---|---|---|---|---|
| Coffee | 20.4 | 18.8 | 27.9 | 0.0 | 0.0 | 7.4 |
| Beans | 68.9 | 69.5 | 66.1 | 12.8 | 73.3 | 84.5 |
| Maize | 68.1 | 67.6 | 70.3 | 30.2 | 43.7 | 87.1 |
| Rice | 5.6 | 5.5 | 5.9 | 8.0 | 12.6 | 7.0 |
| Millet | 14.1 | 15.1 | 9.6 | 42.2 | 17.3 | 5.1 |
| Sorghum | 15.0 | 16.3 | 9.2 | 51.9 | 45.1 | 1.8 |

Source: Authors' compilation based on ATAAS dataset, (UBOS, 2014)

Table 5 shows production in metric tons and yield in metric tons per hectare for selected crops by season. It appears that production for districts with a WRS is lower than that for districts without a WRS for seasons one and two. The same is true for all seasons. The yield (MT/Ha) appears to be higher in areas with a prospective WRS for rice, sorghum, and ground nuts in all seasons. Coffee shows higher yields for the WRS areas in season one, while maize appears have higher yields for the WRS areas in season two. The yield of the remainder of the crops is lower for the WRS areas in all seasons. The implication of this evidence is that households growing more than one bulk-able crop or a combination of such crops are likely to benefit more from increased prices under the WRS than households growing one crop. However, this evidence is based on one year (2014) and cannot be assumed for other years.

**Table 5: Production (MT) and yield (MT/ha) of selected crops**

| | Season 1 | | | Season 2 | | | All seasons | | |
|---|---|---|---|---|---|---|---|---|---|
| | All | No WRS | WRS | All | No WRS | WRS | All | No WRS | WRS |
| Production (Mt) | | | | | | | | | |
| Rice | 57,271 | 39,250 | 18,020 | 54,930 | 42,421 | 12,510 | 112,201 | 81,671 | 30,530 |
| Maize | 871,330 | 726,878 | 144,452 | 991,964 | 795,116 | 196,849 | 1,863,295 | 1,521,994 | 341,301 |
| Millet | 43,805 | 37,658 | 6,146 | 63,606 | 56,977 | 6,629 | 107,410 | 94,635 | 12,775 |
| Sorghum | 78,890 | 71,829 | 7,061 | 81,839 | 70,490 | 11,349 | 160,728 | 142,319 | 18,409 |
| Beans | 264,828 | 221,067 | 43,762 | 274,733 | 237,715 | 37,018 | 539,561 | 458,781 | 80,780 |
| Coffee | 86,079 | 59,445 | 26,634 | 130,001 | 94,639 | 35,362 | 216,080 | 154,085 | 61,996 |
| Yield (Mt/ha) | | | | | | | | | |
| Rice | 0.94 | 0.88 | 1.12 | 1.01 | 0.92 | 1.51 | 0.97 | 0.90 | 1.25 |
| Maize | 1.15 | 1.19 | 0.99 | 1.37 | 1.35 | 1.50 | 1.26 | 1.27 | 1.23 |
| Millet | 0.57 | 0.57 | 0.57 | 0.62 | 0.66 | 0.41 | 0.60 | 0.62 | 0.47 |
| Sorghum | 0.46 | 0.45 | 0.79 | 0.52 | 0.51 | 0.63 | 0.49 | 0.47 | 0.68 |
| Beans | 0.47 | 0.48 | 0.47 | 0.59 | 0.61 | 0.47 | 0.52 | 0.54 | 0.47 |
| Coffee | 0.44 | 0.43 | 0.46 | 0.63 | 0.67 | 0.55 | 1.06 | 1.09 | 1.00 |

Source: Authors' calculations based on ATAAS dataset (UBOS, 2014)

Table 6 shows the percentage incidence of the household use of postharvest handling or marketing information for selected crops of maize and coffee. Within the WRS districts, most households obtain information on drying, output prices, and finding markets, which is largely the same as non-WRS districts. While post-harvest handling and marketing information is regarded as critical for the success of the WRS, there are surprising results between households near a WRS and those that are not. Maize-growing households near a WRS appear to have more information on drying methods, which is expected, but this is not the case with coffee-growing households in the same areas. Thus, 38 percent of maize-growing households in non-WRS areas appear to have this information versus 42 percent in WRS areas. On the other hand, 46 percent of coffee-growing households in non-WRS areas have information on drying methods versus 40 percent in districts with WRS. While more households in the WRS areas appear to have information on threshing/shelling and sorting, fewer households have information on storage facilities in areas with a WRS compared to those without a WRS for both crops. The latter is true for all information on pest control methods, output prices, finding markets, and collective marketing. This evidence provides an indication of where the URWSA should align its activities in its promotion of the WRS.

Collective action, particularly memberships in farmer groups, supports the WRS through its potential for marketing. Table 7 shows the percentage incidence of households that belong to farmer groups. Overall, there are more households (24 percent, 21 percent) in non-WRS districts that are part of farmer groups than in WRS areas (18.6 percent, 15.5 percent) in 2011 and 2014, respectively, which is disappointing. However, membership increased between 2011 and 2014 in both non-WRS and WRS areas. There are no significant differences in membership in farmer groups in both areas and for both years. Gulu and Masindi are districts with the WRS and have equal numbers of memberships to farmer groups across both genders. However, Soroti (also a WRS area) had fewer women in farmer groups (19.9 percent) than men (48.1 percent) in 2014. The evidence reveals that despite the presence of existing structures for collective action, it is important for the capacity of farmer groups to be strengthened.

## Table 6: Incidence of household use of post-harvest handling/marketing information for selected crops, %

| | Maize | | | Coffee | | |
|---|---|---|---|---|---|---|
| | All | No WRS | WRS | All | No WRS | WRS |
| Drying methods | 39.0 | 38.3 | 41.9 | 44.3 | 45.8 | 40.2 |
| Threshing/shelling | 9.2 | 7.8 | 15.2 | 13.2 | 12.1 | 16.0 |
| Storage facilities | 46.2 | 46.8 | 43.3 | 27.4 | 30.2 | 20.1 |
| Pest control methods | 7.0 | 7.2 | 6.0 | 2.6 | 3.0 | 1.4 |
| Sorting | 25.9 | 24.6 | 31.3 | 20.4 | 20.0 | 21.4 |
| Output prices | 20.3 | 20.3 | 20.2 | 36.3 | 39.7 | 27.3 |
| Finding output markets | 24.6 | 25.1 | 22.6 | 35.7 | 37.9 | 29.8 |
| Collective marketing | 3.2 | 3.2 | 3.0 | 1.6 | 1.3 | 2.6 |

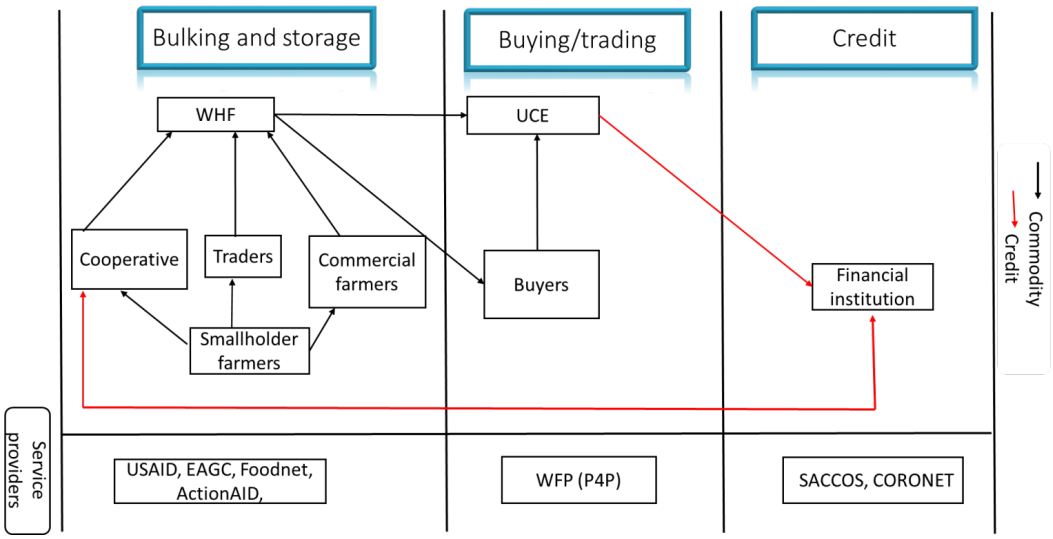
Note: Calculations based on only households that harvested a given crop. Source: authors' calculations based on ATAAS data (UBOS, 2014)

## Table 7 Incidence of HH belonging to a farmer group, %

| | Incidence of HH in farmer group | | Gender of HH member in a farmer group | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2014 | | | 2011 | | |
| | 2014 | 2011 | Male | Female | Both | Male | Female | Both |
| Uganda | 23.0 | 20.0 | 36.6 | 33.6 | 29.8 | 35.9 | 34.6 | 29.5 |
| Without WRS | 24.0 | 21.0 | 37.8 | 37.2 | 25.0 | 37.9 | 35.4 | 26.6 |
| With the WRS | 18.6 | 15.5 | 39.3 | 29.8 | 30.9 | 34.7 | 32.3 | 32.9 |
| | | | | | | | | |
| Rakai | 20.3 | 17.6 | 15.5 | 55.7 | 28.8 | 23.7 | 45.1 | 31.2 |
| Kayunga | 22.2 | 21.4 | 49.5 | 30.4 | 20.1 | 50.2 | 29.9 | 19.9 |
| Soroti | 18.1 | 13.7 | 48.1 | 19.6 | 32.3 | 51.0 | 24.7 | 24.3 |
| Butaleja | 22.0 | 18.2 | 46.1 | 34.4 | 19.5 | 46.5 | 31.2 | 22.2 |
| Adjumani | 36.0 | 23.9 | 37.3 | 54.2 | 8.5 | 38.2 | 55.2 | 6.6 |
| Gulu | 27.2 | 26.0 | 26.4 | 28.1 | 45.4 | 28.8 | 29.4 | 41.8 |
| Amuru | 28.5 | 26.9 | 27.9 | 23.8 | 48.3 | 25.3 | 17.6 | 57.1 |
| Hoima | 10.4 | 10.8 | 43.6 | 14.0 | 42.4 | 38.9 | 23.7 | 37.4 |
| Kabale | 34.9 | 36.1 | 25.0 | 51.0 | 24.0 | 21.6 | 51.8 | 26.7 |
| Kabarole | 17.7 | 16.1 | 38.8 | 37.9 | 23.2 | 38.3 | 35.2 | 26.5 |
| Kibaale | 24.1 | 27.0 | 38.8 | 19.1 | 42.1 | 34.7 | 27.4 | 37.8 |
| Masindi | 12.9 | 12.5 | 42.1 | 32.0 | 25.9 | 45.0 | 34.7 | 20.4 |
| Isingiro | 31.0 | 31.4 | 29.4 | 38.2 | 32.5 | 29.1 | 39.7 | 31.3 |
| Kiruhura | 40.6 | 41.2 | 25.5 | 40.8 | 33.7 | 25.6 | 34.5 | 39.9 |

Source: Authors' calculations based on ATAAS dataset, (UBOS, 2014)

**Figure 2: Illustration of the Warehouse Receipt Systems in Uganda: stages and linkages among actors**




Source: Authors' compilation based on FDGs and KIIs, June 2016

## 6.2 Perceptions of key actors towards the WRS

### 6.2.1 Market structure

6.2.1.1Actors of the WRS

The study covered a range of proposed actors, including farmers (small and commercial), cooperative, traders, warehouse operators, FIs, the public sector (UCE/UWRSA), NGOs/donors, and other private organizations. Figure 2 illustrates the whole flow of the WRS. Overall, the WRS is composed of three stages: bulking/storage, selling/buying and accessing credit.

6.2.1.2 Stages of the WRS: roles of the actors

The bulking/storage stage is dependent on farmers, cooperatives, and traders. The cooperative collects from individual farmers before they deposit as a group. The trader and commercial farmer may deposit but can also sell to the warehouse through the smallholder farmers. Sometimes the commercial farmer collects from smallholders to attain large quantities. The warehouse operator acknowledges receipt of the deposits and issues a certificate of goods received or a WRS receipt in case the depositor wishes to access a loan through the bank.

The selling/buying/trading stage is dependent on a trading platform supervised by UCE/UWRSA. It is also dependent on all WRS users (if quantities are tradable under the e-WRS). Trading maize in a typical WRS is undertaken from a trading platform commonly known as a commodity exchange. It is a requirement that all buyers and sellers of maize be registered under the commodity exchange — in this case, registered by UCE. As such, buyers and sellers of maize can view receipts on this online trading floor. In the absence of the WRS, the warehouse operator purchases maize from traders, commercial farmers, and cooperatives. Sometimes the warehouse accesses markets on behalf of the farmers — for example, WFP, which is currently the largest buyer of maize. This is the case with farmers in Jinja (and the surrounding districts of) Kamuli and Iganga, who indicated that Agroways (U) Ltd has helped them access the WFP market. In Masindi, farmers also indicated that MSGGL has in the past and continues to help them access various markets for maize.

The third stage is access to credit through a participating FI. This stage is dependent on all WRS users requiring credit. The banks stipulated certain

requirements, including a threshold of Ugx 10 M or 10,000 MTs in the case of Stanbic Bank (the threshold differed from bank to bank), a discount of 60-70% of the value of the maize that is granted to the borrower through a savings/current account in the same bank, and a commodity stored in a certified warehouse facility. Although participation by banks was originally restricted to only commercial banks, Savings and Credit Co-Operatives (SACCOs) have supported the system to accommodate smallholder farmers who were/are excluded from accessing credit from commercial banks due to stringent requirements, particularly the high interest rates (24-30 percent per annum) and low production levels.

From the SACCO, smallholders may access loans for production and discounted loans that use maize as the collateral. These loans range from as low as UGX 300,000 to UGX 3 million at a monthly interest rate of 2-5%. The process of accessing the loan through a WRS from the SACCO is as follows. After the warehouse issues a goods received note/warehouse receipt, the warehouse operator presents this receipt to the SACCO with the name of the depositor (can be an individual or cooperative) requiring a loan and the quantity and quality of the commodity deposited. The SACCO discounts up to 60% of the prevailing market price of the commodity. The SACCO's marketing specialist is then tasked with searching for a market for the maize in the warehouse on behalf of the depositor. The depositor may also search for his/her maize market. The stored maize is sold off once the farmer/group accepts the price offered by the buyer. Regardless of the source of the market, the payment of the maize/grain is made through the warehouse, which writes a cheque for the SACCO to remove the loan repayment. The rest of the money from the sale of maize is deposited into the depositor's account.

The WRS is supported by a plethora of service providers ranging from development partners to the private sector. NGOs/donors include groups such as USAID, Action Aid and the East African Grain Council (EAGC) — a private sector organization that provides WRS actors with training in Post-Harvest Handling (PHH) and grain standards. The EAGC collaborates with other organizations such as the Regional Agricultural Train Intelligence Network (RATIN) to provide its members with market information. It also connects its members to markets within the East African Region. WFP supports the building of various warehouses for bulking maize and provides a stable market for good quality maize, especially in Jinja and surrounding districts.

The collateral manager (at that time, CORONET) links the depositor and the bank by reducing risks that come from a lack of trust, especially because maize trade is susceptible to corruption and fraud. Unlike the aforementioned service providers who offer a pro-bono service, the depositor pays the collateral manager's fee.

#### 6.2.1.3 Capacity of warehouses

While the WRS was piloted for coffee and cotton, we find that the facilities currently handle cereals and pulses. In terms of capacity, Agroways has a total capacity of 10,000 MTs with 900 MTs of that reserved for deposit, while the MSGGL warehouse has a total capacity of 1800 MTs. Despite the expectation that these warehouses ought to fill up every season, this is not the case for MSGGL. During the pilot of the WRS, only 750 MTs were utilized per season, with highest utilization at 1550 MTs; currently, less than 500 MTs are used per season.

#### 6.2.1.4 Barriers to entry and sustainability of the system

Barriers to depositing in the warehouse are largely tied to requirements shown in box 1. Adherence to these requirements often comes at a high cost of approximately UGX 100 per kilo that most players are unable to meet. Unfortunately, the absence of adequate PHH technologies such as moisture meters, tarpaulins and seal bags means that the few smallholder farmers who continue to deposit and sell

### Box 1: Requirements to deposit, sell and attain credit through the WRS

To have a functional WRS, the warehouse facility needs to meet certain specifications for it to be certified. An acceptable WRS facility should be well ventilated, have a concrete floor, be properly marked for storage, be easily accessible without leaks/openings for bats/birds to enter, not be in a waterlogged area or near a river/stream, etc. Depositor/trader selling through the warehouse is required to bulk good-quality maize of grade 1 and grade 2; otherwise he/she pays the cost of converting maize to the required standard as shown below.

| | Grade I (m/m) | Grade II (m/m) |
|---|---|---|
| Moisture content | 13.5% | 13.5% |
| Inorganic Matter | 0.25% | 0.5% |
| Insect Damaged | 1.0% | 3.0% |
| Broken grain | 2.0% | 4.0% |
| Discolored | 0.5% | 1.0% |
| Shriveled | 1.0% | 2.0% |
| Diseased | 2.0% | 4.0% |
| Foreign matter/Filth | 0.1% | 0.1% |
| Live weevils | fumigated free | fumigated free |
| Total defective grains | 4.0% | 5.0% |
| Aflatoxin (per EAS) | 10ppb incl. max 5 ppb B1 | 10ppb incl. max 5 ppb B1 |

To sell grain through a structured WRS, the farmer, traders and buyer are required to register with the UCE.

Source: Authors' compilation based on FGDs and KII, June 2016

through the warehouse rely on rudimentary means such as feeling the maize in one's palm, observation, and better judgment among others to ensure that they meet the required maize standard. As such, many are excluded from using the system.

Another excluding factor is that farmers constantly suffer financial emergencies. However, this is because of low productivity and often relying on one major cash crop. As such, they are susceptible to exploitation from traders who are able to give them quick cash. While collective action protects smallholders from exploitation, most farmer groups/cooperatives interviewed cited governance challenges such as disagreements regarding the right time and price at which to sell. Governance issues were most prominent with the MSGGL cooperative in Masindi, which cited that the loss of a founding member destabilized the leadership of the cooperative. Governance challenges also largely contributed to the collapse of another cooperative — the Nyakatonzi warehouse facility in Kasese, according to one key informant.

Factors excluding users from accessing credit stem from banks' stringent requirements and the inadequate coverage of banking facilities. Banks have requirements such as appraisal reports from the collateral manager; the fact that applicants were required to apply for credit before the harvest season and the high interest rates were challenging to most farmers and traders. In addition to the unaffordable high interest rates (20-24 percent per annum), the collateral managers demanded exorbitant fees, which reduced anticipated profits from the sale of maize. As such, the users of the WRS, especially traders, turned to alternative sources of credit, which often required other types of collateral such as land, houses, and vehicles, while farmers either made do without or turned to Micro Finance Institutions (MFIs). The few farmers that received credit received it at a high cost because they had to travel to the capital city because participating banks were inadequately networked in the country at that time. This required them to have transport fare and accommodation when the loan processing took multiple days. Hence, many were

discouraged by the system for accessing credit.

Other general barriers are that users being computer illiterate and strong competition from the informal maize market. The majority of users were discouraged from using the E-WRS because the system was too complex for them, requiring good knowledge of the internet and computers. Thus, they had to rely on warehouse operators and the UCE to transact on their behalf. Moreover, warehouse facilities have to compete with a large informal market of maize (comprised of traders from across the region). The informal market does not appreciate good grades and standards for the product and offers farmers quick money. This often distorts the formal market and excludes many from using the system.

### 6.3.1 Market conduct: strategies employed by WRS to remain competitive

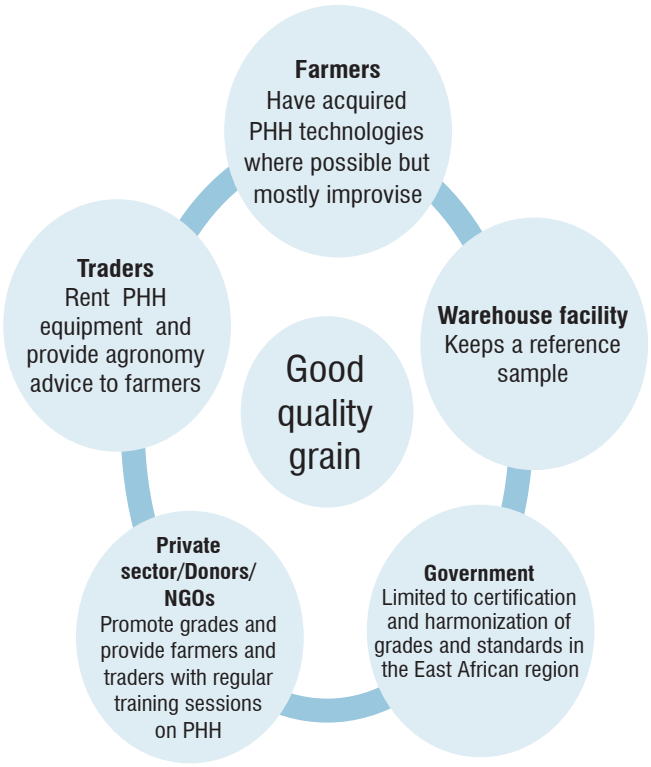
#### 6.3.1.1 Strategies to maintain good quality grain

Different players of the WRS have adopted various strategies for storage, quality of products and market access to be able to compete better. Figure 3 illustrates that strategies include but not limited to training in PHH and agronomy practices, collective bulking, and marketing, among others. The WRS pilot and market linkages with a warehouse facility motivated farmers to ensure proper PHH to the extent that some farmers improvise by drying grain on their clothes in the absence of tarpaulins. Farmers have formed farmers' groups, such as the Nakalama Area Co-operative Enterprise and Kyatine producer group in Jinja and Masindi, respectively, for the purpose of bulking, collective marketing, and negotiating better prices. In addition to strategies illustrated in figure 3, some traders in Masindi maintain a good quality product by buying maize while it is still in the fields; it is at this point that they provide farmers with agronomy advice and advance them credit to ensure high productivity.

Despite the farmers' meticulousness to ensure good quality grain, our assessment suggests that the majority of farmers do not understand the composition of these grades. While we attempted to quiz them on the difference between grades 1 and 2 required by the facility, many could not differentiate them correctly. Indeed, the warehouse operator at Jinja affirms that most farmers lack sufficient knowledge on the grades required despite their efforts, particularly from the private sector, to promote them. Additionally, Uganda performs poorly at the regional level in ensuring the quality and standard for grain, although some districts attempt to meet these standards, as noted by a KII. However, the traders have better knowledge of the required standards.

Regrettably, our findings were unable to identify the role of the Ministry of Agriculture, Animal Industries, and Fisheries (MAAIF) in these contexts. As shown in figure 3, government support so far is from MTIC and its subsidiary bodies — UCE and Uganda Bureau of Standards (UNBS). These have collaborated with the private sector to promote grain grades and standards.

**Figure 3: Strategies to maintain good quality grain**




Source: Authors' compilation based on FGD and KIIs, 2016

6.3.1.2 Strategies to control price fluctuations and the market

We found various strategies to control price fluctuations, including bulking, selling at the farm gate, and selling to the warehouse facility. Farmers prefer to sell at the farm gate to avoid incurring higher costs of travelling to another market or succumbing to even lower prices, given that most are unable to obtain price information on a regular basis. However, farmers organized in groups received more information from price changes than those who sold the grain themselves. Price information is provided for by private organizations such as the EAGC through RATIN and Food Net. Some farmer groups and commercial farmers, especially in Jinja and the surrounding areas, sell to the warehouse facility whose price is stable. A few farmers continue to deposit with the purpose of attaining higher grain prices.

Traders, on the other hand, engage in bulk purchasing year-round and create cartels to control price fluctuations and the market. The cartel found in Masindi uses various methods such as threats to stop farmers from selling maize to traders other than those in this group. Like traders, warehouse facilities buy grain year-round from various suppliers including traders, cooperatives, and commercial farmers, which is bulked and sold when prices are high. Despite these challenges, facilities attract depositors to the WRS by creating linkages between the farmers and service providers.

FIs participating in the WRS and commodity trade finance have invested in price and weather monitoring to control price fluctuations. To take control of the market, large commercial banks not only finance traders with high volumes of at least 10,000 metric tons but finance smallholder farmers attached to an off-taker farmer[4]. The off-taker receives and repays the loan on behalf of smallholder farmers. The bank is able to reduce transaction costs synonymous with small loans and are simultaneously able to finance many farmers. The SACCOs, such as MADIFA, increased their credit portfolio by introducing a production loan offered to smallholder farmers using maize as collateral. FIs also provide other free services to their clients such as facilitating training sessions in financial literacy, PHH and agronomy through other organizations. For example, Stanbic Bank has facilitated training on multiple occasions in PHH through Enterprise Uganda and ABI trust both during the pilot WRS and at present. Banks, such as Housing Finance, have attempted to solve the challenge of limited network/few branches by collaborating with banks near their clients. Banks also rely on collateral managers, who reduce risks in trading.

The public sector's way of controlling the market was through UCE, which was able to relay market information, including existing buyers and the price offered to farmers through the warehouse. The government instituted the regulatory framework (WRS act and regulations) for proper implementation of the WRS. UCE, through various donors, generated awareness of the WRS and promoted grades through training.

NGOs/donors and the private sector have a common strategy for controlling the WRS market. These groups play a supportive role that ensures that the WRS market works as theorized. They promote grades and standards through capacity-building services in PHH, agronomy practices and provide farmers with PHH equipment such as tarpaulins, shellers and moisture meters. For example, EAGC has trained some farmers and traders in agronomic practices, such as fertilizer application, as a way of helping them improve maize quality. The FICA, Uganda, and NASECO seed companies have taught the Kyatine producer group in Masindi how to produce good quality maize.

6.3.1.3 Strategies on innovation.

We did not find any strategies on innovation in the WRS except in one warehouse facility, Agroways in the Jinja

4 An off-taker farmer is one who produces over 10,000 metric tons per season.

District. We find that Agroways revamped one of its silos, making it computerized. The MSGGL warehouse still operates manually handled silos.

6.4.1 Market Performance for competitiveness

6.4.1.1. Product suitability in relation to consumer preferences: Adherence to standards and feedback from buyers of maize

The effectiveness of the WRS can be determined through its ability to offer the right services in accordance to consumer preferences. Services usually demanded by consumers include storage, processing, transport, grading and financing. These consumers attach different scales to these services. When commodities are stored at the warehouse, they are cleaned, dried, graded, bagged, and then fumigated regularly to maintain the standard required at the facility. Regionally/internationally acceptable grades for the market are grades I, II and III. The warehouse facilities in Jinja and Masindi adhere to these grades and standards, although they only allow storage of grade I and II maize. EAGC is the regulating body for grades and standards of grain in the East African region.

In terms of knowledge of the required standards, smallholder farmers are incapable of differentiating between grades I and II. They rely on the judgment of the quality controller at the warehouse facility. Moreover, the intensity of use and extent of adherence to grades and standards were significantly higher in Masindi than in Jinja. Indeed, traders in Jinja stated that maize from Masindi is of a superior quality, far different from that of the Kamuli and Iganga districts.

Commercial farmers and traders endeavour to adhere to grades and standards. One commercial farmer in Masindi claimed to have higher bargaining power when negotiating for a higher price for his premium quality maize and that this has enabled him stay in business. However, their adherence is non-binding due to the large informal market for maize. One trader in Jinja admitted to reselling maize rejected by Agroways to maize millers in industrial areas. Smallholder farmers also receive several buyers at the farm gate, especially those from Sudan, Kenya, and Kampala, who are less mindful of the quality of maize.

We also assessed whether WRS users received feedback on the quantity and quality supplied and how they reacted to the feedback. The responses varied from positive, negative (which is assumed especially when the buyers did not return) and no feedback. The respondents stated to having improved the quality when the comment was negative or to have maintained the quality where the feedback was positive.

6.4.1.2. Product suitability in relation to consumer preferences: Access to credit

Overall, only two cooperatives (one in each study area) were able to obtain credit from the two participating commercial banks (Stanbic Bank and Housing Finance Bank). We did not find any commercial farmers or traders attesting to having received credit during the pilot WRS. While commercial traders indicated to have known about the possibility, traders did not. Despite having received credit, one cooperative faced challenges in repaying the loan due to the governance issues mentioned before. The cooperative leader in Jinja reported,

> *"That only those who needed the loan signed up for it. However, after receiving the loan, members who had previously seen no need for it suddenly became interested and wanted some of it. The sharing of the money became challenging and subsequently affected the mode of repayment", FGD, June 2016*

Stanbic Bank discounted over 25 warehouse receipts[5] during that time at a 26 percent interest rate annually. While the discounted loan was seen as the most appropriate for the WRS, high interest rates,

5 Includes those participating in the pilot WRS, not just for the study areas.

unaffordable collateral management fees (including its misconception and fraudulent activities), inadequate bank networks and low volumes, especially from smallholders as mentioned, discouraged many from utilizing the WRS. Smallholders resorted/still resort to SACCOs to fill the gap. The SACCO in Masindi is preferred by farmers due to the perceived lower interest rate of 2 percent per month.

#### 6.4.1.3. Rate of profits in relation to marketing costs and margins

We assessed whether the actors would be comfortable with profits from using WRS in relation to the costs incurred. Despite depositors having sold at higher prices, farmers and traders in Masindi and Jinja claimed that the high prices came with the high cost of storage, which lowered profits. There were complaints about hidden costs (unexplained costs associated with sealed storage). Farmers from the Nakalama Area Cooperative in Jinja did not understand that storage costs were charged on a monthly basis and hence referred to them as "hidden costs." They claimed that even though they sold the product at a higher price after storage, the proceeds after deducting the costs were only UGX 10 more compared to those that sold at the farm gate and therefore were discouraged from utilizing the system for storage.

Nonetheless, the actors admitted that the system enhances market performance in terms of better access to markets with higher prices. Farmers that stored their crops with MSGGL sold maize at higher prices of UGX 500-750 per kilogram compared to those offered by local traders at the farm gate (UGX 350-500). Agroways also offered/offers slightly higher prices than the market price to traders and farmers, which enabled it to remain competitive in the market and enabled farmers to earn higher profits. As such, most traders in Jinja preferred to sell to Agroways instead of storing at the facility. However, due to the price volatility in the maize market, the rate of profit of the given costs incurred at the warehouse is not sustainable, and only those with high turnover enjoy greater chances of large profits.

#### 6.4.1.4 Price seasonality and price integration between markets

In both study areas, the farmers agreed that storing at the warehouse protected them from drastic price changes and exploitation from traders. Price volatility is attributed to the seasonal nature of production and the liberalized market for maize. Prices are usually lower and unstable (they change on a daily or weekly basis) during the first two months after the harvest (July and August for the first season and December and January for the second season), which leads to an increase in the number of deposits made at the warehouse facilities in anticipation of higher prices. Smallholder farmers experienced lower prices at harvest time and when the schools open for the new term. Prices are higher during the last month of the harvest.

The effectiveness of the system is also determined by consumers' accessibility to price information for stored grain. Indeed, the actors readily access this information through the warehouse facilities. Those in Masindi continually receive this information through MADIFA SACCO, which announces commodity prices on radio. Smallholder farmers highlighted that the SMS mechanism, communication from the warehouse facility, and traders buying at the farm gate are the most effective and important forums of accessing price information. Traders and commercial farmers rely mostly on price information given to them from fellow traders across the country.

### 6.5.1 Gender dynamics

The participation of women within the system is limited to production, and few are engaged in the trading and marketing of maize because female traders face various prejudices from their male counterparts and fellow women. Indeed, one female trader in Jinja stats,

*"few women are involved trading maize because this is considered a "dirty job", since it involves heavy lifting and*

*travelling to the remotest areas with a lot of cash and no security and also without basic necessities like clean water. The business is not for literates especially for the young women who prefer to go for white collar jobs." KII, June 2016*

Trading in maize requires funds (cash preferably) and knowledge of market prices and buyers, to which most women lack access because women are traditionally confined to gardens and men engage in business activities, such as the bulking, marketing, and trading of maize. The few that participate in maize trading are susceptible to severe market exploitation through lower prices because they sell at the farm gate and have limited exposure to the market. Women are also more likely to be exploited than men because they are perceived as being less stative in regard to price negotiation. Most female smallholder farmers do not make decisions on the marketing of maize, and when they insist on it, violence in the home ensues. Indeed, one female farmer group leader observed increased cases of domestic violence at harvest time. She stats:

*"Due to the high family burden that is left to the women and the need to compensate for the hard labour at planting season, women stealthily sell stored maize without the men's notice. This causes violence when the men find out."* FGD, June 2016

Indeed, women are susceptible to exploitation by traders because they have to hurriedly sell off their produce. However, this is only the case for illiterate women or women who do not belong to a cooperative group and those that rely on their male counterparts for their wellbeing.

With cooperatives, there is less discrimination against women in maize trading. Women can form their own groups or can be in same group with men. For example, the Nambale Farmer Organization in Iganga started as a women's group but expanded to include men. As of June 2016, membership is up to 886 members. Within this organization, the smallest group has approximately 20 members, with 11 males and 9 females, and the largest is an all-female group of 35 members. In Masindi, most groups had more female members because of the two women: two youth: one man ratio enforced by the Trade Empowerment Project funded by Action Aid Uganda.

Women's utilization of the warehouse was found to be lower than that of men. According to the Agroways warehouse operator, of the 20 depositors received at the warehouse per season, women make up only 30 percent of that number. For the case of the MSGGL warehouse in Masindi, women deposit less despite the fact that they constitute the largest number in the cooperative: only two females deposited maize into the warehouse in the previous season. This has been attributed to women's traditional role of tending to gardens; inadequate land for commercialization; and lack of finances to access agricultural inputs, such as fertilizers, and facilitate maize marketing through the WRS. The high WRS costs and low volumes have discouraged women from bulking at the facility because they do not allow for higher returns from selling maize.

The idea of using the warehouse receipts as collateral was welcomed by female farmers and traders. However, while the Nambale farmers' organization was offered the opportunity to access finance through the WRS, they feared the risk. The group's female leaders stated that they did not know how to share the loan and did not know how to repay it. The high interest rates from commercial banks also discouraged them. This, however, did not mean that they did not have use for it; it implies that women-dominated farmer groups are risk averse. Despite this, women constitute the largest number of recipients for the WRS discounted loan at an individual level according to MADIFA SACCO's manager because the discounted loan product favours women more since they have less access to property,

such as land, which is usually required for a loan through commercial banks. Similarly, of the 16 groups issued discounted loans the previous season, female-only groups comprised the majority.

Women-only groups in Masindi (and the surrounding areas of) Kiryandongo and Hoima, on average, obtain UGX 600,000 in both production and discounted loans, while men obtain UGX 800,000 because women have less volume stored. However, women are better clients, with a repayment rate of 80%-90% compared to 70%-80% for men because men have a tendency to divert the loan from income-generating activities, which is not the case with women. Women prefer to pay off the loan than go to prison in the event of default.

### 6.5. Discussion and policy recommendations

While the results from the quantitative analysis may not be representative of the whole nation's production capacity of targeted WRS commodities, it provides evidence that current WRS infrastructure is not in tandem with the production capacities of different regions. Although this is solved by the purchase of grain across the country, a mechanism employed by traders, this leads to exploitation of smallholders because traders have to pay for transport and marketing. Moreover, the absence of storage facilities may also inflict a financial emergency on farmers, causing even more exploitation, especially if they are not aware of prevailing market prices.

Nonetheless, suitable distribution of warehouses across the country may reduce exploitation of farmers and enable them to have secure access to markets. As indicated in the literature review, Uganda should learn from India by upgrading existing warehouses that have been established around the country. For example, notwithstanding the intra-governance challenges of MSGGL, this warehouse requires upgrading to a standard similar to Agroways. There, multiple warehouses that have been established with help from either the government or development partners, if revamped, could improve the implementation of the public WRS.

The limited storage of commodities calls for expansion of warehouse facilities to accommodate beyond the current rate. This means that the government ought to create an enabling environment that will allow for the creation of warehouse facilities that allow the storage of various agricultural and non-agricultural commodities.

The industrial organization of the WRS, reflected by the SCP framework, highlights various benefits and challenges. Overall, the actors perceive that the benefits of the WRS are numerous, including stable and high prices, thereby reducing price exploitation, especially for smallholder farmers. They also perceive that the system will enable access to secure and stable markets using a secure and transferable warehouse receipt. Unfortunately, severe challenges as reflected in the market structure do not enable adequate performance of the maize market under the WRS.

Adequate market performance would have entailed that all interviewed would have frequently deposited in the warehouses, received sufficient profit to encourage them to continue using the system and received credit from the commercial banks. As seen in the results section, this was not the case. The challenges imply that not all key WRS players understood the WRS. They had numerous expectations of the WRS that were not met, and they were probably not adequately sensitized to the operations of the WRS. Therefore, mass sensitization of all aspects of the WRS to all actors is recommended as a starting point to address these challenges. Market performance will also be assured if specific barriers to credit are tackled. We are aware that access to credit under the WRS is largely tied to production levels — the more the better. This calls for improvements in the productivity of smallholder farmers through intensification and commercialization, all of which require the use of agricultural inputs.

While we recommend participation from MFIs and

SACCOs in the WRS, this should take place with caution because they are known to have higher interest rates than commercial banks. A more sustainable approach to credit access would be for commercial banks to have a dialogue with smallholders to find innovative ways of providing them credit. Moreover, the government should incentivize commercial banks through subsidies, which would encourage more participation in the WRS from many banks. Additionally, fast tracking the draft policy on agricultural finance would provide an opportunity and guarantee that issues related to credit access through the WRS are resolved and streamlined. Sustainable market performance of the WRS would also entail that key players of the system be offered capacity building sessions in ICT because the E-WRS requires a good understanding of ICT rather than reliance on the warehouse operator and the collateral manager to transact on behalf of farmers and traders.

Our assessment concerning the farmers and traders' knowledge leads us to conclude that actors are challenged with differentiating between grade I and II maize. Although a plethora of strategies has been established to maintain grades and standards, the government is not at the helm of it, leaving a significant proportion of this responsibility to the private sector. While we are aware that UNBS, in partnership with EAGC, played an important role in harmonizing grain standards in the East African region, it still unknown whether MAAIF has had an impact on maintaining grades and standards of grain. There is confusion as to who should be at the forefront for the promotion of grain standards. Is it MAAIF, UNBS (MTIC), EAGC, or a partnership of the three? A significantly large informal grain market implies limited appreciation of what is presently produced in Uganda and an indication of the need to strengthen the enforcement of standards that will sustain the WRS.

Nonetheless, our results provide an indication of where the UWRSA should align its activities in the promotion of the WRS. It is imperative that the government, especially MAAIF, spearhead the promotion of grades and standards and not leave this responsibility to the private sector. This recommendation has also been supported in prior work, where it was noted that public authorities ought to provide leadership in setting up the necessary infrastructure (CTA, ACP and EU, 2013). Most notably, it is of immense importance that the roles of mandatory bodies tasked with promoting grades and standards are clearly stipulated and that these bodies are held accountable.

The results have revealed that farmer groups remain challenged with governance issues. We therefore recommend capacity strengthening of farmer groups, particularly in the areas of finance, marketing, and decision-making. It is important that groups learn to be self-sustaining and outlive their founding members.

## 7. CONCLUSION

The paper set out to critically review the evolution of the warehouse receipt system to discuss the dynamics of how the system can effectively affect market performance in terms of value addition, grades and standards and access to finance in the country. Second, the paper set out to criticize the existing policy and regulatory frameworks that facilitate the operation of the system and to identify the policy opportunities that the WRS can leverage and the gaps that still need to be addressed. Third, the study intended to document the perceived benefits and challenges of the key private sector actors concerning the warehouse receipt system, with a special focus on maize.

The paper uses multiple techniques to address the objectives. These include a desk review of the related literature and a quantitative analysis based on the UBOS ATAAS survey complemented by a qualitative approach. The qualitative approach follows the SCP model, commonly used to analyse agricultural commodity markets.

The results on the critical review of the WRS suggest that while the government was committed to addressing

market and financial challenges of the private sector after the privatization of the coffee sector through the establishment of various public WRS pilots, the journey of the public WRS has suffered severe implementation challenges, as seen by lags in the regulatory framework. Indeed, the current policy support for the public WRS remains inadequate, as seen by the low prioritization given to it in the policy documents reviewed. WRS is prioritized in Uganda's national plan, NDP II 2015/16-2019/20, and in policy documents of the national grain trade policy. However, most of these policy frameworks lack an implementation strategy and in some cases are obsolete. The literature review of countries that have implemented the WRS also offers important lessons for Uganda. These lessons include implementing effective incentives that convince the private sector to work with a larger mass of smallholders, exploiting existing warehouses in the country, equipping them to the capacity that can provide services to small scalers, and exploring how to leverage the varied climatic seasons of the country for the success of the WRS.

The results from the quantitative analysis suggest an unbalanced distribution of potential public warehouse facilities. The distribution of these warehouses is not in tandem with the production capacities of regions in Uganda. Current warehouse facilities support the aggregation of cereals, pulses and a few traditional commodities, yet the public WRS is designed for the balkanization of various commodities and are not limited to agricultural commodities. Overall, households engaged in the production of two or more commodities are likely to benefit from the WRS. There are no significant differences in access to postharvest and marketing information between households in a WRS district and those in a non-WRS district. Overall, collective action is on the rise but are most prominent in non-WRS districts.

The results from the qualitative analysis reveal that the market structure of the pilot WRS was characterized by many players, including smallholder farmers, commercial farmers, traders, warehouse operators,

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# ANNEXES

## ANNEX 1: QUESTIONNAIRES USED TO COLLECT QUALITATIVE DATA

ECONOMIC POLICY RESEARCH CENTRE

The Uganda Warehousing Receipt System: Improving Market Performance, and Service Delivery- 2016

Commercial Farmer/Trader interview guide

| 1: DETAILS OF FOCUS GROUP | |
|---|---|
| a) Date of interview | |
| b) Location of interview (i.e. name of the district and parish) | |
| c) Name and details of the actor(if or not and how long have they been participating in WRS and for what crop,) | |
| d) Gender of actor | |
| e) Volumes produced and volumes stored in the warehouse | |
| f) Please describe the WRS to the best of your knowledge (operations and requirements- e.g. receipts, prices, packaging, grades and quality demanded)<br>g) If No part of the WRS, why not | |

(Please respond in details and illustrations to the following questions)

Market structure, conduct and performance

1. From where do you sell your produce? (Name of place, distance, quantity sold, grade and price) Expect multiple answers.
2. How do you see the marketing of produces before and after WRS?
3. What costs do you incur in marketing your produce to the various markets?
4. If sells to the warehousing facility, Please tell us of the activities you undertake to meet the requirements of the warehouse receipt system

| *Activity* | *Details (what and who is involved)* | *Challenges (rank)* |
|---|---|---|
| | | |

5. At what point(s) in their activities do they interact with the WRS?

| *Nature of the interaction?* | *Benefits of the interaction?* |
|---|---|
| | |

6. INTERACTIONS WITH SERVICE PROVIDERS: Fill out the table below based on information provided by the interviewee. Add more rows as necessary.

| *Service provider (name and location) e.g. EAGC council, USAID, NAADS, UWRSA, Financial service providers e.t.c.* | *Support received (e.g. credits, market information) – be as specific as possible and avoid general terms such as 'financial services'* | *Benefits* | *Challenges* |
|---|---|---|---|
| | | | |

7. Are you contracted to produce/deliver for a warehouse facility? (probe: who contracts, what are the terms, benefits, contract challenges)

| *Contractor* | *Terms* | *Benefits* | *Challenges* |
|---|---|---|---|
| | | | |

8. Are you able to consistently meet the quantities and grades demanded by the facility?
9. What does it require to meet the standards? (Costs such as fees charged, procedures, etc.), If not able to meet the standards, explain why?
10. Where do you get information on standards? (describe)
11. Does the WR facility offer any value-added services to the depositors (probe: linking with buyers, banks, marketing information)
12. Do you get any feedback about your maize quality from the buyers your maize? (probe: kind of feedback, actions on the feedback)
13. What is your main source of market information? How is this source important in marketing your produce?
14. If in a group, has the group helped you access markets? (Explain)
15. How do arrive to the prices charged for your produce?
16. When do you experience price changes in this area? (probe for causes in price changes)
17. How do the price changes affect you in supplying and using the WRS?
18. How are you able to overcome the price fluctuations?
19. Do you think you are exploited by the buyers of your produce?
20. Who of the buyers exploits you the most and why?
21. Do you think the WRS shall minimize the exploitation and effects of change in prices? If yes how?
22. Do you perceive more people to be attracted in using the WRS after observing how you are performing? (Probe: explanation for response)
23. Do you perceive more people to be attracted in using the WRS after observing how you are performing?

**Warehouse receipts/ financial services**

24. How do utilize the warehouse receipt *(probe: benefits, loans, receipt sell, challenges to sell or acquire loan with receipt)*
25. How can the warehouse receipt system be improved to attract more farmers to participate?

The Uganda Warehousing Receipt System: Improving Market Performance, and Service Delivery- 2016

Research Agenda - Farmers' FGD Field Guide

| 1: DETAILS OF FOCUS GROUP | | |
|---|---|---|
| Date of Focus Group Discussion | | |
| Location of Focus Group Discussion (i.e. name of the district and parish) | | |
| Name and details of the group<br>○ when established,<br>○ what is the main aim of the group<br>○ if or not and how long have they been participating in WRS and for what crop,<br>○ how many farmers are participating in the WRS,) | | |
| Women' s Group/Men's Group | | |
| # of participants in this focus group discussion | | |
| If part of a group how many are in members in the cooperative/ group (women/men) | Number of WRS users | Number of WRS Non-users |
| Volumes produced and volumes stored in the warehouse – ***fill in the matrix below*** | | |
| WR User or ever used | N on-WR user | |

| Participant (***indicate either male or female***) | Volume produced | Volume to the WR | Volume produced |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| 13. | | | |
| 14. | | | |
| 15. | | | |

Instructions: (1) Probe for how and why where applicable; (2) Specific probes are in italics and brackets

<table>
<tr><th>Thematic area</th><th>Key questions</th><th>Methodology</th><th>Respondents</th></tr>
<tr><td>Background</td><td>▪ Are you aware of the WRS? (If yes please describe the WRS to the best of your knowledge (probe: operations and requirements- e.g. receipts, prices, packaging, grades and quality demanded)<br>▪ How did get to know about the WRS? (probe: sensitization agencies – government and private sector)<br>▪ (Describe the WRS facility to the participants before asking)Where is the nearest WRS facility (probe: distance, operator, size of the facility)</td><td>▪ Listing</td><td>▪ Farmers (8-12)</td></tr>
<tr><td>Market structure, conduct and performance</td><td>▪ What are the agricultural produces in this area?<br>▪ What are the three main agricultural produce in this community and why?<br>▪ From where do you sell your maize? (Probe: Name of place(s), distance, quantity sold, grade and price) inquire about warehouses if not mentioned.<br>▪ What costs do you incur in marketing your maize to the various markets? (probe: transport, storage, loading, market dues, etc)<br>▪ If uses or ever used the WRS facility;<br>o What are requirements of the warehouse receipt system, (Probe: Costs fees charged procedures, etc.)<br>o How do you meet these requirements(probe if there is any other actor who helps to meet these requirements – list and probe what support is given, what was the benefit of the support)<br>o If not able to meet the standards, explain why?<br>o What are the challenges in meeting these requirements? List and prioritize three main challenges<br>o How do the three main challenges affect men and women?<br>o What the possible solutions to the three main challenges?<br>▪ For those not using or never used the WR facility, probe for why?<br>▪ How do you see the marketing of maize before and after WRS?<br>▪ Given the costs that you incur and the revenue that you get do you perceive yourself staying in this line of business (continuing to supply maize to the Warehouse or using WRS?<br>▪ Are you contracted to produce/deliver for a warehouse facility? (probe: who contracts, what are the terms, benefits, contract challenges)
<table>
<tr><th>Contractor</th><th>Terms</th><th>Benefits</th><th>Challenges</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table></td><td>▪ Listing/sorting<br>▪ Gender analysis<br>▪ Raking<br>▪ Listing & Venn diagram for actors</td><td>▪ Farmers (8-12)</td></tr>
</table>

| | | | |
|---|---|---|---|
| | ▪ Are you able to consistently meet the quantities and grades demanded by the facility? *(Probe: minimum quantity, type of grading(s) if no why?*<br>▪ Where do you get information on standards? (describe)<br>▪ Do you get any feedback about your maize quality from the buyers your maize? *(probe: kind of feedback, actions on the feedback)*<br>▪ What are the sources of market information? *(list all and rank three main, probe why are the main three)*<br>▪ If in a group, has the group helped you access markets? *(probe: how, benefits, challenges and solutions)*<br>▪ Does the WR facility offer any value-added services to the depositors *(probe: grading, packing, reducing moisture, linking with buyers, banks, marketing information)*<br>▪ How do arrive to the prices charged for your maize?<br>▪ When do you experience price changes in this area? *(probe for causes in price changes)*<br>▪ How do the price changes affect you in supplying and using the WRS?<br>▪ How are you able to overcome the price fluctuations?<br>▪ Do you think you are exploited by the buyers of your maize? Explain *(probe who is more exploited men or women and why)*<br>▪ Who of the buyers exploits you the most and why?<br>▪ Do you think the WRS shall minimize the exploitation and effects of change in prices? If yes how?<br>▪ Do you perceive more people to be attracted in using the WRS after observing how you are performing? *(Probe: explanation for response)* | | |
| Warehouse receipts/ financial services | ▪ Were you able to get a warehouse receipt when you stored your commodity at the warehouse? If not why?<br>▪ How do utilize the warehouse receipt *(probe: benefits, loans, receipt sell)*<br>▪ Have you been able to access a loan using the receipt? If yes from where and what was the size of the loan in relation to the proportion of the commodity? If no why not? *(probe: interest rate, paying back the loan after selling off the receipt)*<br>▪ *What are challenges to sell or acquire loan with warehouse receipt)*<br>▪ How can the warehouse receipt system be improved to attract more farmers to participate? Listing | ▪ Listing<br>▪ Ranking | ▪ Farmers (8-12) |

The Uganda Warehousing Receipt System: Improving Market Performance, and Service Delivery- 2016

Warehouse Operators- Interview Guide

| 1: DETAILS OF ACTOR | |
|---|---|
| Date of interview | |
| Location of interview (i.e. name of the district and parish) | |
| Name, position and details of the actor (role, age, how long has been working in the, if or not and how long have they been participating in WRS and for what crop,) | |
| Gender of actor | |
| Facility<br>○ when established,<br>○ actual size/capacity versus utilization,<br>○ commodity stored<br>○ services provided versus what is demanded | |
| Describe the WRS to the best of your knowledge (operations and requirements- e.g. receipts, prices, packaging, grades and quality demanded) | |
| Status of registration/inspection of the facility to provide WRS services (does it satisfy all requirements) | |

**Activity**

**Market structure, conduct and performance**

1. How many depositors are using this facility? Probe: by gender
2. If part of the WRS, how many depositors are participating and what is the total volume deposited per month?
3. What is the number of receipts expected to be issued per month?

| Months | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expected number of receipts | | | | | | | | | | | | |

4. Provide the actual number and total value of receipts issued per month

| Months | Grade | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Actual number of receipts | A | | | | | | | | | | | | |
| | B | | | | | | | | | | | | |
| | C | | | | | | | | | | | | |
| Volume | A | | | | | | | | | | | | |
| | B | | | | | | | | | | | | |
| | C | | | | | | | | | | | | |

5. What are the demands of the depositors that use the warehouse?

| INTERACTIONS WITH SERVICE PROVIDERS: describe service providers that you interact with in delivering the WRS | | | |
|---|---|---|---|
| *Service provider (name and location) e.g. EAGC council, USAID, NAADS, UWRSA, Financial service providers e.t.c.* | *Support received (e.g. credits, market information) – be as specific as possible and avoid general terms such as 'financial services'* | *Benefits* | *Challenges* |
| | | | |

6. When do the depositors use the facility the most? Give reasons
7. How do the depositors utilize the receipts?
8. Does the WR facility offer any value-added services to the depositors (probe: procedures and process, market linkages-linking with buyers, banks, marketing information)
9. What are your expectations of the system? How do you think these can be realized?
10. Will the WRS help you compete better against other players? How?
11. How do farmers/depositors respond to quality and standards issues? Explain?
12. How do you see the marketing of maize before and after WRS?
13. Challenges experienced and how they may be addressed (probe for storage risks)
14. Is the storage facility insured? If yes, to what extent, if no why and how would deal with eventualities such as fire etc
15. Given the cost operations and revenues, can you be able to sustain the WRS in the future

## ANNEX 2: LIST OF KEY INFORMANTS

| | |
|---|---|
| 1 | Ross Smith, Head of programme-World Food Programme Uganda, ross.smith@wfp.org |
| 2 | Gideon Badagawa, Executive Director- Private Sector Foundation |
| 3 | Deborah Kyarisiima, Executive Director-Uganda Warehouse Receipt Systems Authority, butdebbie@gmail.com |
| 4 | Mathias Okurut, Operations- Uganda Warehouse Receipt Systems Authority- okurutmathias@yahoo.com |
| 5 | Christian Baine, Uganda Country Director- Collateral Management International, +256 772262869, christain.baine@cmint.co.za |
| 6 | Richard Wangwe, Head of Agribusiness-Stanbic Bank, +256 772642977, wangwer@stanbic.com |
| 7 | Patrice Kerner, Head of Agricultural Credit- Housing Finance Bank, kernerpat@gmail.com |
| 8 | Tumwoboneire Emmanuel, General Manager- Aponye Uganda Ltd, +256782 453658, emutumweboneire@gmail.com |
| 9 | Benjamin Aijuka, Programmes officer- East African Grain Council, 0782857058, baijuka@eagc.org |
| 10 | Richard Ibengo- Warehouse Operator- Agroways Uganda Ltd, +256 782391354, richard.ibengo@agroways.ug |
| 11 | Godfrey Muhingo- Warehouse Operator- MASGA warehouse Masindi, +256 772636456, asiigod@gmail.com |

## ANNEX 3: LIST OF POTENTIAL PUBLIC WAREHOUSE OPERATORS IN UGANDA

| NAME OF COMPANY | REGION/DISTRICT | Crop/commodity | Capacity of warehouse | Average volumes of commodities |
|---|---|---|---|---|
| Aponye (U) Limited (2 Locations) | Kampala, Lwengo | Rice, maize, beans, and sorghum | Lwengo-6000mt, kla-10000mt, mubende-10,000mt | |
| Farmers Centre | Lira | Maize, beans, sorghum, peas, soyabean | 3500mt | Depends on season over and above. 4000mt |
| AFGRI-UGANDA (4 Locations) | Ndese, Gulu, Kigumba, Nwoya | Kigumba & ndese-maize, but plan to do soybeans sorghum , rice | 6000mt-Ndese warehouse | |
| KACOFA | Kapchorwa | Maize, barley and sorghum | 2000mt | Maize-70% sorghum- ready market. |
| MSGGL | Masindi | Maize, beans | 1500mt | Most of the time it is empty. When it is not 200mt depending on season. |
| Joseph Initiatives (2 Locations) | Masindi, Kasese | maize | 6000mt | |
| Nyakatonzi Union | Kasese | Maize and cotton, (10) | 2000mt | Depends, approximately 300mt. |
| Savannah Commodities | Mukono | Have silos (9)<br>Maize, beans, barley millet and soya , coffee | Coffee-7000mt, | alfred@savannah.co.ug. |
| Tonga Investments Limited | Mityana | Beans and maize, times sorghum | 1800mt (3) | Don't usually stock, contracts for WFP or send to SS. Store for a few days |
| KCDP Limited | Kamwenge | Maize, beans | 6000mt | |
| NAPIL | Nakasake | Maize, beans | 2000mt (1) silo | Buy and stock 1000-2000 depending on the season. |
| Mutuma Commercial Agency | Iganga | Cotton, maize | 200mt 3 | 1000-2000kg,- cotton,<br>Maize-not yet next season |
| CODE-Uganda | Kasese | Maize, beans | 500mt | |
| KAM Suppliers Limited | Wakiso, bulobakasero | Maize, sorghum, dry beans, | 7000mt silos- | Depends on season |
| ACILA Enterprises Limited | Soroti | Majorly maize, sorghum, beans, soybean, green gram, millet | 800mt | 500mt-maize,<br>2000-sorghum,<br>Beans- 150mt,<br><br>Millet-300mt,<br>Green gram-300mt.<br>Cowpeas-no market but 150mt. |
| AKUKU Farm Seeds Limited | Kumi, Kampala, Soroti | Buy and sell, sorghum both | 10,000mt (all warehouses)<br><br>6000mt -Soroti<br>2000mt-Kumi and<br>2000mt- Kampala | |
| Agro-ways | Jinja | Maize, sorghum | 10,000mt | |
| Zigoti | Namanve, Mityana road | Coffee (private sector, may not be licensed) | | |

Source: Uganda Warehouse Receipt Systems Authority

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