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Business Perspective in Integrating Agricultural Commodity Exchange and Warehouse Receipt System: A decade of Indonesia Experience

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ABSTRACT - This exploratory research on the integration process of Agricultural Commodity Exchange (ACE) and Warehouse Receipt System (WRS) which has been launched since 2008 in Indonesia is based on a business perspective. The study is part of a comprehensive research that has been started in 2008 and is expected to continue until 2019. Data are obtained through observation, interviews with key informants implementing government policies, several WRS warehouse managers and ACE, secondary data and surveys to farmers. ACE is meant to increase famers bargaining power and WRS is to increase the price of agricultural commodities as well as part of the national logistics system that supports national food security policies. The efforts of CoFTRA to develop and integrate between ACE and WRS were never stopped since they were introduced in 2008, in fact until now they have not been well integrated. From a business perspective, so far there has not been a choice of sustainable business models for ACE and WRS as business start-ups that benefit all stakeholders, assuming without the support of government subsidies.

Keywords: *Food Security, Agricultural Commodity Exchange, Warehouse Receipt System, Subsidize Loan, Business Model*

INTRODUCTION

The Warehouse Receipt System (WRS) and Agricultural Commodity Exchange (ACE) also known as the Agro Forward Commodity Auction Market is initiated by the government to strengthen the national logistics system which is an element of the National Food Security Policy, as stated in articles 12 (1) and (5). c. Law 18/2012 which relates to the availability of food and food storage, both those controlled and managed by the Central Government, the Regional Government and the community.

Since the issuance of the WRS Act (2006) the government has allocated fiscal stimulus funds, the Special Allocation Fund (DAK) through Commodity Future Trading Regulatory Agency (CoFTRA) to build 117 WRS warehouses with a rough estimate of not less than Rp. 350 billion of total initial investment. In Central Java, 14 units of WRS warehouses are ready for operation. All WRS warehouses are in twelve (12) regencies of rice centers. But until

2013, only around 5% -10% of the installed capacity was used [1]. This gives an indication of the slow adoption by farmers or farmer groups utilizing WRS facilities.

The Warehouse Receipt System is an important part of the agro commodity auction market development, because it has at least the following functions : (1) safekeeping of goods, in terms of quality (2) as the location for delivering goods in the completion of forward contracts and (3) become a macro policy instrument - in the context of price stabilization, because WRS is transparent in terms of: the volume, value, location and owner of commodities, thereby reducing the risk of fraud through business hoarding of commodities for speculation, (4) as a means to differed selling to take advantage of the increase post-harvest prices - which have the opportunity to increase farmers' income.

Ideally, with the availability of WRS, farmers and farmer groups have the opportunity to benefit from using WRS to delay selling in order to obtain higher prices and farmers / farmer groups also have the opportunity to get interest subsidies of around 6% per year[2] with warehouse receipt guarantees through government banks such as BRI (Direksi BRI 2008) and Central Java Bank. The government's good intentions in developing WRS and ACE are not in doubt for the interests of pro-farmer national food security, namely in increasing the income of farmers. The issue is how far the integration of ACE and WRS that has been carried out after a period of more than a decade has passed. ACE and WRS are economic or business institutions as a service business unit that can last long (sustainable) if the business rules are the basis for running its business.

As an agrarian country, Indonesia has lagged behind in the development of WRS and ACE with a number of other agrarian countries, including a number of countries in Africa such as Ethiopia which was once a symbol of hunger, in 2008 it has an Ethiopian Commodity Exchange (ECX) along with warehouses for commodities such as corn and coffee. Even in the United States the WRS was promulgated on August 11, 1916, and CBOT was established on April 3, 1848 which began with agricultural commodities such as wheat and soybeans, although now 80% of those traded are financial instruments. It implies that Indonesia needs to accelerate the implementation and integration of ACE and WRS.

A lot of preliminary research on WRS has been done, including WRS research and ACE in Central Java (Sunarto *et al.* 2008) and specifically on preliminary studies on incentives to increase grain prices (Sunarto 2012). Regarding the acceleration of the WRS implementation, it is necessary to explore aspects of ACE and WRS warehouse management as well as the factors that support WRS users (especially Farmers and Farmer Groups), factors that are still a barrier to WRS implementation, as well as efforts made by various stakeholders in acceleration of the WRS implementation framework. For this reason, here is a discussion based on the relevant literature review.

Incentives and obstacles to the acceleration of WRS implementation

So far, WRS development has a complete legal basis and investment of not less than Rp.350 billion from both the National Gov't Budget: fiscal stimulus, DAK and Regional Gov't Budget for the development of WRS infrastructure in the form of supporting facilities (dryer,

[1] As one of the conclusions in the seminar held by CoFTRA and Central Java Industry and Trade Office on September 19, 2013, in Semarang, warehouse utilization is estimated to be only 5%.

[2] Market interest difference and interest that is borne by farmers are borne by the central government.

quality tester, rice mill units), training for prospective Warehouse Managers, socialization, provision of IS-Ware (WRS information system), as well as institutional elements of Warehouse Receipt issuer, etc. In other words, the CoFTRA hand in hand with the Department of Industry and Trade in the Province and District levels have sincerely (all out) prepared various WRS facilitations. Farmers / farmer groups, as WRS users, have been convinced through various socializations about the incentives for the benefits of differed selling through WRS warehousing. The intended benefits are:

1. Increase in Differed Selling Price

At the time of the harvest, the price of rice is likely to drop. By delaying selling at the WRS Warehouse, farmers will benefit from rising prices in the future by selling through: (a) Free markets outside the auction market. (b) Sold through futures contracts in the ACE using warehouse receipt instruments. Farmers / farmer groups can already sell their commodities that have obtained GE and if there has been a favorable (higher) price agreement, then the settlement can be done at the agreed time. However, at present there are still problems that the WRS and ACE are not yet integrated and not many business actors understand the transaction model, and (c) the potential for "insurance" prices - through put option transactions. **Put option** ("price insurance") as a potential instrument to guarantee the future selling price of farmers. This price insurance model has been running in developed countries, but because of the availability of commodity price references and the lack of interest from insurance companies or the government to use this model (Sunarto 2012), it is necessary to wait for time maybe someday it will be an incentive instrument for ACE and WRS.

2. Subsidized Loan

In 2007, Bank Indonesia issued a regulation[3] stipulating that warehouse receipts as collateral and state-owned commercial banks (especially BRI) and Regional Banks channeled subsidized loans with GM guarantees. So far, WRS in Central Java has utilized a small number of farmers / farmer groups, namely as many as 25 warehouse receipts, to postpone the sale of grain weighing 1,269,520 tons. At the main harvest beginning in 2014 until August, there were no warehouses used for WRS. The Minister of Finance also issued regulation No. 171/2009 concerning the Warehouse Receipt Subsidy Scheme (S-WRS) which stipulates subsidized credit, which is aimed at (1) farmers, (2) farmer groups, (3) a combination of farmer groups and (4) cooperatives with an interest expense of 6% p.a. The government bears a subsidy equal to the market interest difference (maximum interest of the Indonesia Deposit Insurance Corp. for Commercial Banks + 5%) with the subsidized interest of 6%. Every farmer has the right to get a loan of 70% of the warehouse receipt value which is as high as Rp. 75 million/farmer. Roughly speaking, if the farmer is able to obtain a loan of Rp. 75 million, it means that he will get a subsidy of Rp. 1,265,000 /3 months of the storage period or the equivalent of processing about 3 ha of rice fields.

Banks implementing WRS loans such as BRI and Bank Jateng can take opportunities for expanding market share of working capital loans. The benefits obtained from WRS Credit

[3] Bank Indonesia Regulation Number 9/6 / PBI / 2007 concerning Second Amendment to Bank Indonesia Regulation Number 7/2 / PBI / 2005 concerning Asset Quality Rating for Commercial Banks

are (a) for the costs of pre-planting in the next planting season, (b) meeting the routine funding needs of farmers, (c) getting better yield / differed selling.

3. Other incentives followed.

In order to achieve national food security and food independence programs, the government through various departments launched a number of additional incentives, such as, (a) subsidized rice farming insurance (Law 19/2013) since 2015, (b) Rice milling units and truck as rewards to WRS warehouse managers who were achieving good performance, (c) funds (assistance) to improve warehouse manager skills, (d) since 2016 (PP. 1/2016) , an insurance to protect the holders and recipients of Warehouse Receipts against bankruptcy of the warehouse manager which is currently implemented by Jamkrindo.

The slow implementation of WRS may be due to the driving factors that have not yet become the dominant attraction in accelerating WRS implementation and integration with the ACE because each faces a number of obstacles. Based on the opinions of WRS stakeholders, outside the farmer groups in several Focus Group Discussion meetings held by the Central Java Industry and Trade Office for several years, the constraints of WRS adoption by farmers in Central Java, especially for rice and corn commodities include, among others:

1. The tiny volume commodities due to limited rice surplus
2. Future price risk: Farmers / farmer groups are still waiting for evidence of how much profit can actually be achieved through postponing the sale because there is no price insurance (put option)
3. Cash flow problems: Farmers bonded / slash / pre-financing traders who provide working capital funds on rice fields so that they need funds immediately at harvest to cover past loans and daily needs or working capital cultivate new grain immediately at harvest.
4. Competition: Milling / traders come to the fields when harvest is more agile than WRS managers.
5. The problem of warehouse location: distance between warehouse locations and farmer's rice fields and accessibility is an excuse for not storing in the WRS warehouse, because they have to send crops by using non-free transportation.
6. Alternative warehouses, which is widely distributed grain / rice warehouses owned by farmers/farmer groups (version of the Food Security Agency), Warehouse of Logistics Agency, Rural Cooperative and property of agricultural traders.

Although the list of constraints has been supported by the experience of key informants gathered in several FGD meetings, especially from representatives of the district Trade Offices that have WRS warehouses, on the one hand these constraints are still not supported by detailed empirical data. An empirical study in Bantul District, one of the factors of decreasing transactions in the WRS Warehouse is related to the role of local government in creating synergies between stakeholders in the region (Fachruddin and Rahayu 2017) These obstacles can be part of the study in this study as a basis for providing input public policy to

the Regional Government and as a challenge needs to be shared with stakeholders including the acceleration team for implementing WRS.

Agro Commodity Auction Market and Warehouse Receipt System

In 2013, CoFTRA had an efficient development program for three organized trade pillars, namely: (1) Commodity Futures Trading implemented through the Jakarta Future Exchange (JFX has entered the age of 17 as a derivative commodity market, (2) revitalization of Agricultural commodity auction markets (ACE) which has entered the age of 12 years (since 2003) as a physical commodity market and (3) the development of the Warehouse Receipt System (WRS) which enters the effective age of 7 years (since 2008).

Warehouse Receipt System (WRS)

Warehouse receipts are securities that are guaranteed by commodities in a warehouse receipt system that is useful in marketing and financing, especially in the agribusiness sector in developed countries, with functions (Lacroix and Varangis 1996) as follows:

> There are four warehouse receipt functions in the USA: (1) as a guarantee of a 9-month tenor credit program, which is guaranteed by the government through the Ministry of Agriculture, farmers use it as financing post-harvest inventory to overcome the problem of cash flow, (2) as a commodity document stored in warehouses, including reserve commodities belonging to the US government, which are stored in private warehouses, (3) as collateral for commodities carried out by milling companies, (4) as securities that can be traded on commodity futures exchanges and can become trading instruments futures contract derivatives.

In Indonesia, the Warehouse Receipt System (WRS) was introduced to the agricultural sector to take advantage of: (1) financing instruments (trade financing), (2) marketing facilities - for example to be traded on agro auction markets, (3) as risk management instruments - through a delay in selling in order to avoid the risk of falling prices at harvest, (4) as an instrument of price stabilization policy through inventory control (commodity stock).

Some examples of developed and developing countries that use warehouse receipt systems and commodity samples in Table 1 (Arah Cipta Guna 2008):

{Insert Table 1 here}

The spirit of the Government through the Ministry of Trade c.q. CoFTRA to develop WRS, then through fiscal stimulus funds, DAK and Regional Government Budget. WRS warehouse manager is a front liner for successful implementation of WRS, but the problem is that some of the registered WRS management companies are not in the warehouse location, or do not have the personnel directly stay in the location / near the WRS warehouse. Other elements of WRS supporting institutions are even in Jakarta - although they can be reached with information technology, not all warehouses are ready with an internet connection. When the five elements of WRS implementation have not been able to work well, the sixth element emerges: Warehouse Receipt Guarantee Institution (LJRG) is still in

the process of formation. The LJRG has a role to guarantee Warehouse Receipts when the manager goes bankrupt, so that banks implementing subsidized loans become more secure (CoFTRA 2011b), as well as property owners and later buyers in ACE.

One of the most dominant obstacles in the implementation of the WRS above is that the party that has obtained permission as the WRS manager, such as PT. Pertani and PT Bhanda Ghara Reksa are not based in the WRS warehouse site, so when the prospective depositors who will place their goods in the WRS warehouse are not served. Thus the WRS is an interaction of various elements of the sub-system in the framework of issuing warehouse receipts relating to the issuance, transfer, guarantee, and settlement of Warehouse Receipt transactions.

{Insert Table 2 here}

Outside of the WRS's main stakeholders there are many other stakeholders, such as program credit channeling banks, CoFTRA, Regional Institutions/related offices which serve as assistants, Paddy and Rice Associations, universities as supporting in the formulation of public policies based on their research, etc.

Institutional Change & Switching Costs

The Warehouse Receipt System (warehouse receipts) is still relatively new in developing countries in general and Indonesia. From a business perspective, the ACE and WRS are actually still in a business start-up position. Research on the implementation of the auction market (ACE) in Central Java shows that farmers and farmer groups in general are not directly involved in ACE transactions, but traders are involved as sellers or buyers. On the other hand, commodities in WRS have not been traded in Central Java ACE (Sunarto et al. 2008) even until recently. The ACE can (1) act as an alternative marketing link to existing agricultural products or (2) as a complement to the existing marketing chain. It is clear that farmers/farmer groups already have a long established marketing network. When observed in the discussion on November 30, 2011, the review of WRS implementation in South Sulawesi, it appears that the implementation of WRS will face obstacles. Belly Utarja, researchers and consultants said (CoFTRA 2011a) that:

> "There will be resistance or refusal of the WRS from cocoa actors who have felt comfortable all this time, and made profits from the trading system and structure of the cocoa commodity that has been bad for years."

Head of the Kendari Plantation Office, Bambang emphasized that the current conditions, any cocoa in Sulawesi must be absorbed by the market without seeing quality. This gives a signal, that WRS that sets certain quality standards will be an element that "inhibits" the interest of farmers who are accustomed not to bother about quality.

Changing the choice of institutions from the old pattern to the new pattern through WRS and ACE, business people (farmers, traders, etc.) must calculate the benefits and costs

of transaction costs (Coase 1937), switching costs (Klemperer 1995) or opportunity costs (Brealy, Meyers, and Marcus 2001). At present, the Regional Government through the Central Java Industry and Trade Agency, covers part of the transaction costs - specifically the transportation and accommodation costs provided to ACE buyers. Like in WRS, the CoFTRA has built WRS warehouse with systematic socialization. Transaction costs for business people can be in the form of: costs of finding options and seeking information, negotiation fees, costs to ensure that contracts can be implemented (including transportation and communication). Transaction costs can also be viewed as costs consisting of two categories: (1) motivation costs and (2) coordination costs.

Very high transaction costs are a major obstacle to the development of commodity exchanges (ACE) in Ethiopia (Gabre-Madhin dan Goggin, 2005). Williamson said the determinants of transaction costs include: frequency, uncertainty, rationality limits, opportunistic behavior. Meanwhile, Klemperer (1995) one of the researchers about the problem of switching costs reviews the difficulty of consumers to move from one supplier / seller to another. The seller / producer tries to lock the consumer by increasing switching costs so that he is not easily moved in this case the seller is able to create market power. The seller can become an "oligopolistic" who blocks the entry

Farmers / farmer groups can face the same difficulty as they move to the new transaction mode (WRS). The use of information technology helps to create an orderly, transparent and transparent commodity market (Haile, Volk, and Rehermann 2017). CoFTRA as an active institution supporting the development of the Warehouse Receipt System and ACE. The socialization of the Warehouse Receipt System was carried out in various regions, by CoFTRA, Central Java Industry and Trade Agency and WRS managers such as PT. Petindo Daya Mandiri was held on November 29, 2008 in the city of Demak. In fact, Demak Regency, which has two WRS warehouses, has not functioned according to the designation.

RESEARCH METHODS

This research is an exploratory applied research and is a part of a comprehensive study on the development of the WRS and the ACE. This research has been started since 2008 and is the downstream part of applied research roadmap on food security in Indonesia.

Data is gathered through a series of interviews with key informants, namely:

a. Officials in the Commodity Future Trading Regulatory Agency (the CoFTRA) of the Ministry of Trade,
b. Officials in the Industry and Trade Agency of the Central Java Province,
c. Officers and participants of the Central Java Agro Commodity Exchange,
d. Officers and participants of the WRS in Demak, Grobogan, and Kudus regencies,

Data is also gathered through direct observations of commodity auction held in Soropadan Agricultural Expo and the daily operation of the WRS in Grobogan, Demak, and Kudus regencies. In addition, documentary data is also collected from various sources.

The collected data is then analyzed from business perspective.

RESULTS AND DISCUSSIONS

The business development of postharvest agro commodities in Indonesia has been carried out through two economic institutions, namely the Agricultural Commodity Exchange (ACE) and the Warehouse Receipt System (WRS), since 2003 and 2006 respectively. In this case, the Commodity Future Trading Regulatory Agency (the CoFTRA), an agency in the Ministry of Trade, has been acting as the driving force in the development of the two institutions. Since 2006, the CoFTRA has put some efforts to integrate the WRS and the ACE. The intention to integrate the two institutions was reinforced in 2014 by explicitly putting the integration program in the annual plan of the CoFTRA.

The number of ACE has decreased over time. Initially there were ACE in 12 regions, but then dropped to only in 5 regions. Meanwhile, the number of WRS warehouses has increased over time. As of 2018, there are 211 government-owned WRS warehouses and 59 private-owned warehouses spread throughout Indonesia as shown in Figure 1 as follows.

{Insert Figure 1 here}

The development of the ACE and WRS institutions involves various stakeholders. The WRS warehouse buildings were built with funds provided by the Central Government on land owned by local governments, which later became the assets of the local governments. The capital expenditures of the WRS warehouses have almost entirely been funded by the Central Government.

Articles 32 and 33 of both Law No. 9/2006 and Law No. 9/2011 require both the central government and local governments to set policies to speed up the development and implementation of the WRS. The number of warehouse buildings has increased significantly and can easily be observed physically throughout Indonesia. In the beginning, the implementation of the WRS has been quite impressive as evidenced by the increasing usage of the WRS storage services during the first seven years of the implementation of the WRS. However, since 2015, it seems that the usage of the WRS warehouses has been decreasing. Table 3 and Figure 2 show the transactions data of the WRS from 2008 until June 2018.

{Insert Table 3 here}

{Insert Figure 2 here}

Table 1 and Figure 2 show that the WRS transactions for all commodities had increased steadily during the first seven years of the operation of the WRS[4]. 2014 has been the best year in terms of performance of the WRS in which 21, 649.27 tons of commodities were stored in the WRS warehouse and 605 warehouse receipts were issued, with the total value of IDR116.5 billion. Moreover, it is worth noting that 92% of the warehouse receipts (i.e, 559 receipts) were collateralized to obtain subsidized loans with the total value of IDR75.79 billion. Although the transaction value in the peak year of 2014 is relatively small nationally,

[4] Permendag 37/2011 includes 8 commodities: grain, rice, corn, coffee, cocoa, pepper, rubber, and seaweed; Pemendag No.35/2016 includes 6 commodities: rattan, salt, gambir, tea, copra, and tins.

this data shows that there is a signal of improvement in the WRS warehousing service business.

During the first decade of the WRS operation, out of 14 types of commodities that can be stored in WRS warehouses, there were three dominant types of commodities, namely Grain, Rice and Corn (see Table 4). The three types of commodities produced 2,064 warehouse receipts (95.8%) from 91,648.1 tons of commodities (97.2%) with the total value of IDR484,346.4 million (87%, 8%) which produced subsidized loans of IDR282,984.7 million (88.4%).

From the government perspective, this WRS development program provides a positive signal in supporting food security and poverty alleviation policies through increased value added or additional income margins for farmers. It is a good signal because some farmers and farmer groups have been using the deferred selling facility in order to get a higher selling price and some warehouse receipts have been collateralized to obtain subsidized loans. Both deferred selling and receipts collateralization have yielded in a positive selling margin which means increasing the farmers' income and decreasing poverty.

{Insert Table 4 here}

The decline in warehouse receipt transactions have been occurring since 2015, while the decline in Agricultural Commodity Exchange transactions have been occurring since 2014 (see Figure 3).

{Insert Figure 3 here}

There is an impression that there is a strong correlation between WRS and ACE which means that the two institutions have been integrated. In fact, however, the two business institutions have not been integrated yet due to the fact that commodities that were sold in the ACE were not those stored in the WRS warehouse.

{Insert Table 5 here}

In the last year (Table 5), grain, rice, pepper, and corn have been the dominant commodities being traded in the ACE with the total transaction value of IDR107.78 billion that accounted for 66.4% of the total commodities. It is worth noting that that 26.5% of the transactions belong to "others" group which means that commodities being traded in the ACE were varied given that there was no constraint regarding the commodity type to be traded in the ACE.

In terms of information reliability, it seems that information content of WRS transactions is more reliable than that of ACE transactions. This is due to the fact that WRS transactions data have been properly supervised and were based on actual transactions on the bourse, not

based on the transactions settlement on the settlement date. In contrast, in the case of ACE, there was no institution with an authority to verify that transactions have been properly executed and recorded.

Before we further discuss the opportunities and constraints of the development of WRS and ACE and their integration, it is worth to take a bird eye view at the success and failure stories of WRS implementation in Cianjur and three other WRS in Central Java.

Bird Eye View: The Operation of WRS Warehouse in Cianjur and three other WRS inCentral Java.

WRS in Cianjur

The operation of WRS warehouse managed by Niaga Mukti Cooperative in Cianjur has widely been recognized as a success story. The first receipt was issued on 8 April 2011. At the early stage, the operation of the WRS warehouse in Cianjur was managed by PT Pertani. Formally, Niaga Mukti Cooperative was legalized by the CoFTRA to manage the operation of the WRS warehouse on 18 July 2013 as evidenced by the issuance of CoFTRA Decree No. 17/CoFTRA/Kep-SRG/SP/PG/06/2013. The Cooperative issued the first receipt on 25 July 2013.

{Insert Table 6 here}

Table 6 shows the performance of the Cianjur WRS managed by the Niaga Mukti Cooperative during the period of 2011 – 2016. Due to its impressive performance, the WRS has been used by the CoFTRA as the role model in developing other WRS warehouses. When the CoFTRA conducts training on WRS, in-class trainings are normally conducted in Jakarta and the fieldworks are normally held in Cianjur WRS warehouse. In addition, due to its performance, the WRS has also been granted various incentives such as dryers, rice mill units, vehicles, and separator machines. It is clear that incentive systems employed by the CoFTRA is performance based. The better the performance of the WRS, the more stimuli come. It is worth noting from the case study that the key factor behind the success story of the WRS operation is the capability of the WRS management to convince the farmers that storing commodities in the WRS warehouse is financially beneficial. Table 5 shows the financial benefit of storing commodities in the Cianjur WRS warehouse.

{Insert Table 7 here}

The abovementioned[5] calculation shows that storing commodity (grain) for three months in the Cianjur WRS warehouse has yielded gross profit margins of 9.5% and 5.9% in 2014 and

[5] Presented by Mr. Tomi Setiawan on 12 July 2018 during the socialization of WRS and ACE in Semarang.

2016 respectively. It appears that the lower gross profit margin, the lower the intention of the farmers to store their commodity in the WRS warehouse. The success story of the Cianjur[6] WRS warehouse should inspire and motivate those who want to operate other WRS warehouses. Interviews with key informants [7] shows that:

1. The operators of the warehouses should have a sense of social entrepreneurship – business minded for the interest of farmers, using efficiency criteria to choose among alternative course of actions. It is very important to have a cost consciousness, for example, when the operators have to decide whether using PLN-provided electricity or having own gen set, when deciding to use a particular insurance service provider or another, and when deciding the basis of pricing whether fixed or variable.
2. The operation of WS warehouse should be viewed as a start-up business. In the beginning of the operation of WRS, normally the expenses exceed the revenues. Therefore, it is important to provide financial supports. Governmental institutions should provide necessary supports needed by the newly established WRS. In the case of Cianjur WRS, some supports in the early stages of the development have been provided by the Cianjur Local Government and the Ministry of Cooperatives and Small Enterprises.
3. At the beginning of the operations, the WRS warehouse manager conducted intensive socialization through events to bring prospective warehouse customers and promotions through local radio and newspaper broadcasts. Managers must understand how to achieve a break-even point of warehousing service business, with supplementary businesses such as rice milling units (RMU) and dryers which are useful during the rainy season. All services could generate income. Warehouse managers should use the service standards carried out by middlemen: proactive and understand the culture of local farmers.
4. As part of national logistic systems, the determination of WRS warehouse locations is a strategic factor. Access to transportation facilities is necessary. In addition, access to internet must be secured because it is a precondition of running IS-WARE (Warehouse Receipt Information System) which will be used by the credit provider.

WRS in Three Regencies in Central Java

There have been 14 government-owned and 8 private-owned WRS warehouses in Central Java. Initially, there were two private-owned WRS operated by PT. Petindo Daya Mandiri. But, the two WRSs has stopped operating. Meanwhile, three WRSs out of the 14 government-owned WRS have never started at all and the remaining 11 WRSs have operated intermittently. Actually, the potential for the operation of WRSs is quite high because there is a potential for rice deferred selling. The Government of Central Java Province states that Central Java region has a rice surplus every year. For example, as of October 2018, there will be rice surplus of 3.7 million tons[8].. On the other hand, there are some other factors that have been contributing to the failure of the WRSs in Central Java in which the dominant factors are varied amongst locations. The other two operators of WRSs in Central Java are PT Pertani and PT Bhanda gara Reksa which operates 11 and 4 WRS warehouses respectively. Despite the licenses that have been granted to the two companies to operate

[6] August 15, 2018 at the WRS Cooperative and Warehouse Office of the Niaga Mukti Cooperative.
[7] July 12, 2018 at the Office of Industry and Trade, Semarang and August 15, 2018 at the Niaga Mukti Cooperative Office
[8] Yuni Astuti, Head of the Central Java Provincial Agriculture and Plantation Service, Suara Merdeka September 27, 2018, p. 8

WRSs, the two companies have not effectively operated the WRSs. Partly, this is due to their reluctant to deploy personnel in the WRS warehouse locations. As a result, the Government had to appoint local operators to operate the WRS warehouse in each location, although most of them have not been qualified in terms of capital requirement. For example, WRS Sidorejo warehouse, Kedung Tuban Blora, formally is managed by PT. Pertani but in fact it is delegated to Sinar Tani Cooperative. Once upon a time, the WRS warehouse issued a warehouse receipt for 10.01 tons of grain with a total value of IDR52.05 million and generated IDR35 million subsidized loan from Jateng Bank. The next year, however, there was no more transaction due to the fact that the deferred selling had resulted in the lower price thereafter. Such a bitter experience has been a negative campaign that downgraded the value of WRS. Moreover, there is also another problem related with access to the WRS warehouse, i.e. the warehouse is located far from the main roads and the roads are generally broken.

In August 2018, we conducted some interviews and observations in three WRS warehouses in Grobogan, Demak, and Kudus regencies. We found that the three regencies are not actually regions with the highest rice surplus in Central Java. The fact that WRS warehouses were built in the three regions has been questionable from business perspective. One of key informants even stated that he did not know decision process to build those warehouses. He thought that the decision might be based on political rather than business considerations. The difficulties to implement WRS warehouses in the three regions could be described in the following anecdotal stories.

In Kudus, Demak, and Grobogan regencies, the WRSs were formally managed by PT Pertani and PT Bhanda Ghara Reksa. In reality, however, the warehouses were operated by local rural cooperatives. In Demak, Dempet warehouse was operated by KUD Mintorogo and then KUD Dorowati, and Mulyorejo warehouse was operated by KUG Pringgodani. Once, Dempet warehouse issued two receipts for 109.0 tons of dry grain with a total value of IDR526.3 million, while Mulyorejo warehouse issued two receipts for 34 tons of dry grain with a total value of IDR154 million. Thereafter, the management of Mulyorejo warehouse was transferred to PT Bhanda Ghara Reksa that once issued one receipt for 22.25 tons of dry grain with a total value of IDR129.05 million and produced IDR75 million subsidized loan from Jateng Bank. At this moment, the two warehouses have stopped operating because the operator have resigned. The Mulyorejo warehouse is now rented by PT Bulog to be used as a storage and Dempet warehouse is now locked.

As with warehouses in Demak, the two warehouses in Kudus were formally managed by PT. Pertani, but in fact were operated by local cooperatives. Once, Medini warehouse issued two receipts for 62 tons of dry grain with a total value of IDR256.2 million and one of the two receipts produced IDR75 million subsidized loan from Jateng Bank. Meanwile, Klaling warehouse issued one receipt for 11.7 tons of dry grain with a total value of IDR57.3 million and produced IDR40 million subsidized loan from Jateng Bank. At this moment, the two warehouses have stopped operating.

In Dapurno, Grobogan, the warehouse is formally managed by PT. Pertani, but operated by KUD Anugerah. Dapurno warehouse has issued receipts three times. In 2012, 12 receipts were issued for 1,607.67 tons of dry grain with a total value of IDR11.57 billion and ten of the eleven receipts produced IDR6.7 billion subsidized loan from Jateng Bank. In 2013, 13 receipts were issued for 77.2 tons of dry corn with a total value of IDR231.68 million and

produced bo subsidized loan from Jateng Bank. In 2015, 5 receipts were issued for 35 tons of dry grain with a total value of IDR147 million and three of the 5 receipts produced IDR130 million subsidized loan from Jateng Bank. KUD Anugerah has resigned and will be replaced by a new operator.

It appears that warehouses in the three regions are still at start-up business stages. The customers of the three warehouses have enjoyed the financial benefits of deferred selling services. However, the warehouses are still operating under break-even point. From business perspective, this situation is not attractive to the operators.

The integration between WRSs and ACE has not happened yet. Since its inception in 2008, there has not a single commodity stored in WRSs been sold in the ACE. There have been, however, some efforts to integrate WRSs and ACE. The CoFTRA keeps its commitment to improve farmers' welfare by means of deferred selling program.

A New Version of Agricultural Commodity Exchange

The CoFTRA introduced a new version of application to facilitate commodity exchange on the ACE in July 2018. The new version has been improved to enable online exchange. It seems, however, that the exchange participants (seller, buyer, and auction leader) have not been familiar with the new application.

The latest commodity exchange was conducted in Soropadan in July 2018. It seems that the execution of the exchange was very similar with the previous exchanges although some improvements have been made. We observed that:

1. The auction process was carried out with one to one bargaining mechanism between sellers and buyers guided by a senior auction guide, Mr. Sugeng Wardojo, as in the previous years
2. During the price formation, there is no bargaining process between one seller and many buyers. When the auction guide announced the bid price and one buyer came to agree, no new bidder submitted a higher price.
3. The auction was not integrated with any WRS warehouse
4. The auctions tend to be ceremonial
5. Even though the provincial government had reduced transportation facilities to and from the auction site, it turned out that some participants had the support of the local government
6. Hours and auction sessions have not been set strictly and the transaction process was still like the previous years.

Root of the Problem of Transaction Decrease and Business Model

Deferred selling transactions in the WRSs have decreased during the last four years. According to the CoFTRA[9], there are some factors that have contributed to the decrease, namely:

1. Bank confidence in WRS has decreased due to several cases of negligence of WRS managers

[9] Results of interviews with five officials at the Bureau of Guidance and Supervision of the Warehouse Receipt System and Commodity Auction Market on 27 July 2018

2. PT Pertani has suspended its activities in WRS warehouses due to inavailability of personnel, which has resulted in the termination of operations of 15 WRS warehouses in Sumatra, Java, Bali and Sulawesi
3. There was an increase in agricultural commodity prices in 2015-2017 due to the import ban policy and weather anomalies which caused deferred selling to be unattractive
4. Nine SRG warehouses have experienced difficulties due to the Permendagri 19/2016 which states that the SRG warehouse is owned by the local government, and therefore the warehouse manager is required to pay rent to the local government
5. State-owned enterprises that formally were assigned to manage the WRS warehouses have suspended their activities for financial and operational reasons. On the other hand, it is difficult to find reliable substitutes.

The CoFTRA is still committed to address the existing problems and hopes that the regional governments support the national food security policy while increasing farmers' income, price stability and reducing poverty in rural areas. The CoFTRA continues to provide training and mentoring facilities to warehouse managers. CoFTRA believes that the development of WRS and ACE needs to be continued using a business approach. Therefore, the CoFTRA offers four business models of WRS as follows:

{Insert Table 8 here}

The abovementioned rough simulation scenario is an attempt by CoFTRA to encourage prospective WRS warehouse managers. If WRS only performs warehouse functions, then the Cooperatives or companies will not be interested to manage WRS warehouses. Choice of business models III or IV may be more interesting because the payback period is around 3 years.

The cause of the decrease in the ACE transactions has not been identified because the CoFTRA has not conducted any in-depth study addressing the issue. Some factors that might be the cause are professionalism of ACE managers, the absence of a building (property or rent) as a trading floor to hold an open outcry auction market, and the decrease in operational funds provided by the local government

CONCLUSSIONS

As it is proven by Ethiopia Commodity Exchange (ECX) established in 2008, an efficient and reliable agricultural commodity exchange can provide agribusiness producers (farmers) in emerging markets with a competitive edge. Inspired by such an experience, the CoFTRA has put some efforts to develop ACE in Indonesia since 2003. It seems that the efforts have been on the right track. The CoFTRA has embraced new technologies in order to reduce transaction cost and time. It is important to embrace new technologies because distance and time really matter. There have also been some efforts to integrate WRS and ACE with the latest information technologies. Despite its good developments, however, it has to be admitted that ACE in Indonesia has not operated in full capacity. Some more efforts need to be done in order to increase the usage level of WRS and its integration with ACE. Integration

WRS and agricultural commodity exchange do create value added by linking smallholder farmers, financial institutions, traders through a better supply chain management. Learning from Cianjur WRS success story and the fact that there are some regions with commodity surplus, it is hopeful that WRS and ACE could be developed to the next level.

REFERENCES

Arah Cipta Guna, PT. 2008. “Kajian Pemanfaatan Resi Gudang Dalam Perdagangan.” presented at the Sosialisasi Sistem Resi Gudang CoFTRA, July 9.

CoFTRA. 2011a. “Kelembagaan Petani Pintu Masuk WRS.” *Bulletin Kontrak Berjangka*, Desember 2011.

———. 2011b. “LJRG Dongkrak Pembiayaan Resi Gudang.” *Bulletin Kontrak Berjangka*, Agustus 2011.

Brealy, Richard A, Stewart C Meyers, and Alan J Marcus. 2001. *Fundamental of Corporate Finance (Vol. 3rd).* Boston: McGraw-Hill.

Coase, Ronald. 1937. “The Nature of the Firm.” *Economica* 4 (16): 386–405.

Diederen, Paul, Hans van Meijl, Arjan Wolters, and Katarzyna Bijak. 2003. “Innovation Adoption in Agriculture: Innovators, Early Adopters and Laggards.” *Cahiers d’economie et Sosiologie Rurales*, no. 67.

Direksi BRI. 2008. *Kredit Modal Kerja Dengan Jaminan Resi Gudang Atau Warehouse Receipt (KRG)*.

Fachruddin, Achmad, and Lestari Rahayu. 2017. “Evaluasi Prasarat Keberhasilan Sistem Resi Gudang Di Kabupaten Bantul.” *Journal of Agribusiness and Rural Development Research* 3 (2): 103–11.

Haile, Abenet Bekele, Ariane Volk, and Thomas Rehermann. 2017. “Creating Agricultural Market: How the Ethiopia Commodity Exchange Connects Farmers and Buyers through Partnership and Technology.” *EM Compass IFC*, April.

Klemperer, Paul. 1995. “Competition When Consumer Have Switching Costs: An Overview with Applications to Organization, Macroeconomics, and International Trade.” *The Review of Economic Studies* 62 (4): 515–39.

Lacroix, Richard, and Panos Varangis. 1996. “Using Warehouse Receipt in Developing and Transition Economics.” *Finance and Development*, no. September.

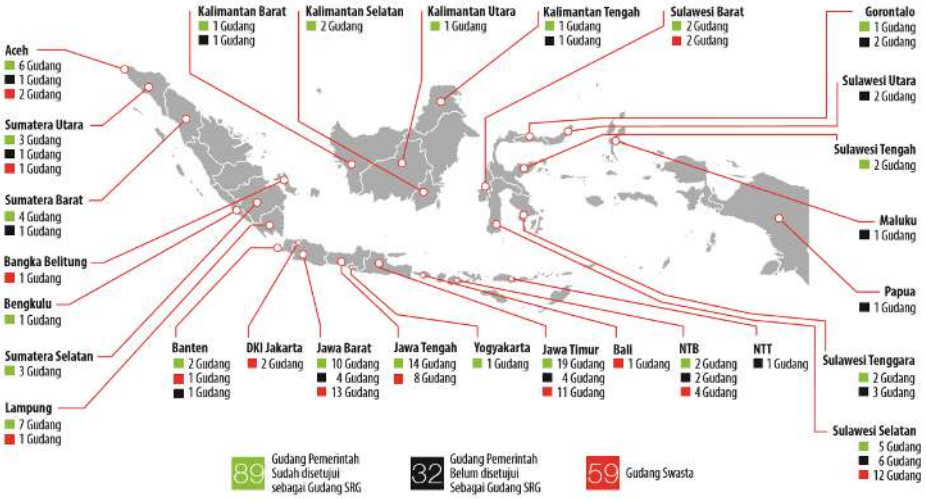
Sandee, Henry. 1995. *Innovation Adoption in Rural Industry : Technological Change in Roof Tele Clusters in Central Java, Indonesia.* Vrije Universiteit, Amsterdam.

Sunarto, Hari. 2012. “Merancang Put Option Dalam Sistem Resi Gudang Sebagai Elemen Pasar Lelang Forward Agro.” In *Capturing Opportunites for ASEAN Economic Community 2015,*. Salatiga: Fakultas Ekonomika dan Bisnis, Universitas Kristen Satya Wacana, Salatiga.

Sunarto, Hari, Sonny Heru Priyanto, Sri Sulanjari, Bayu Wijayanto, and Ronny Prabowo. 2008. *Pengembangan Pasar Lelang Sub Terminal Agribisnis Soropadan Provinsi Jawa Tengah*. Salatiga: Bank Indonesia Semarang & Cemsed feb UKSW.

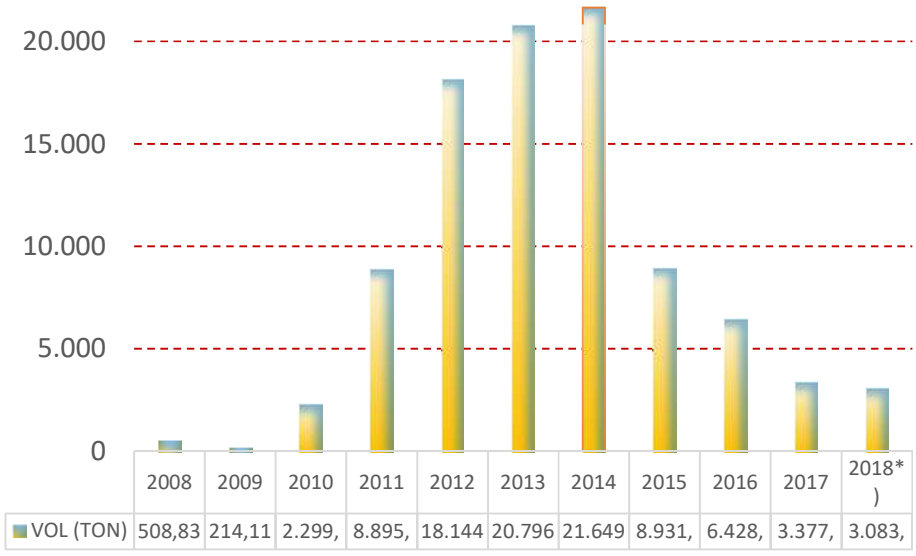
Supplementary Data

Figure 1: The Number and Distribution of Government and Private owned WRS Warehouses in Indonesia as of June 2018



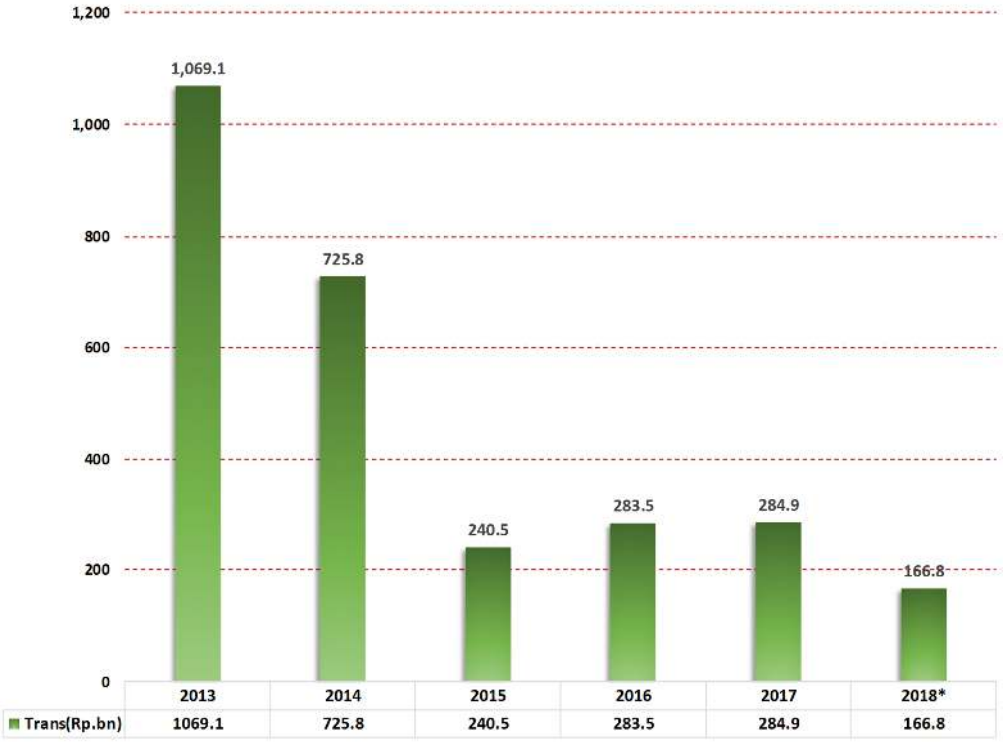
Source: Adapted from COFTRA, July 2018.

Figure 2: Volume of Transaction of Warehouse Receipt System in Indonesia During 2008-June 2018 (Ton)



Seource: Table 1

Figure 3: Transaction Volume of Agricultural Commodity Exchange in Indonesia Period 2013-June 2018 (IDR billion)



Source: CoFTRA, July 2018

Note: data on the transaction volume in the ACE is not available for the period of 2003 to 2013

Table 1. The Use of Warehouse Receipts System and Commodities sample in some Countries

Developed countries	**Developing countries**
United States (Cotton, Wheat, Soybeans, Peanuts) Canada (Grains) England (Tin) South Africa (Corn, Wheat)	India (agricultural commodities, livestock) Philippines (Grains) Malaysia (Pepper) United Arab Emirates (Gold, Oil) Ethiopia (Coffee, Grains) Tanzania (Coffee, Cotton) Uganda (Coffee, Cotton) Zambia (shelled corn)

Source: CoFTRA, 2013, other sources.

Table 2: List of Direct Stakeholders for the Implementation of the Warehouse Receipt System

1. Some Warehouse Managers, among others: (1) PT. Bhanda Graha Reksa (Persero) (2) Bidara Tan Farmers Cooperative (3) PT. Pertani (Persero) (4) PT. Petindo Daya Mandiri (5) PT. Sucofindo (6) PT. Reksa Guna Interservice (7) PT. Pos Indonesia	**4. Commodity Quality Test** (1) PT. Sucofindo (Persero) (2) PT. Beckjorindo Paryaweksana (3) Appointment of grain test LPK: Surabaya BPSMB, Makassar BPSMB, Surakarta BPSMB, Medan BPSMB, and all UB. Jastama Perum Bulog
2. Conformity Assessment Agency (LPK) (1). PT. Bhanda Ghara Reksa (Persero) (2). PT. Sucofindo (Persero) (3). PT. Sawu Indonesia	**5. Quality Management Certification** (1). PT. Sucofinda (Persero)
3. Registration Center PT. Klilirng Berjangka Indonesia (Persero)	**6. Warehouse Receipt Guarantee Institution** Perum Jamkrindo (2017)

Source: CoFTRA 2017 and 2017 Futures Contract Bulletin

Table 3. Recapitulation of Warehouse Receipt Transaction in Indonesia during 2008 – June 30 2018

Year	Issued			Collateralized			
	Receipt (lbr)	Volume (Ton)	Value (Rp bn)	Receipt	Prop	Value (Rp.bn)	Prop
2008	16	508.83	1.40	6	38%	0.30	21%
2009	13	214.11	0.50	5	38%	0.10	20%
2010	57	2,299.94	8.60	35	61%	4.20	49%
2011	271	8,895.62	40.00	218	80%	24.00	60%
2012	379	18,144.16	93.10	334	88%	58.65	63%
2013	532	20,796.23	108.94	446	84%	66.99	61%
2014	605	21,649.27	116.51	559	92%	75.79	65%
2015	300	8,931.92	81.17	208	69%	45.59	56%
2016	250	6,428.69	42.64	135	54%	15.59	37%
2017	165	3,377.18	27.25	109	66%	15.89	58%

2018*)	129	3,083.40	31.07	76	59%	13.82	44%	
TOTAL	2,717	94,279.35	551.53	2,131	78%	321.06	58%	

Source: CoFTRA/Coftra, July 2018.

Notes: *) as of June 2018

Table 4. Volume and Value of Commodity of the WRS stored in the WRS warehouses during the period of 2008 – 30 June 2018

No	Commodity	Receipts		Volume (tons)		Value (IDR)		Financing (IDR)	
		Unit	%	Tons	%	IDR 000.000	P%	IDR 000.000	Prop
1	Grain	2,315	85	76,708.97	81.0	395,044.2	71.6	236,084.5	73.8
2	Rice	163	6	9,050.82	9.6	69,402.5	12.6	35,609.1	11.1
3	Corn	126	5	5,888.34	6.2	19,899.7	3.6	11,291.1	3.5
4	Coffee	55	2	833.57	0.9	52,011.1	9.4	31,352.8	9.8
5	Seaweed	41	2	1,644.00	1.7	14,064.6	2.6	6,669.8	2.1
6	Cacao	1	0	3.14	0.0	78.5	0.0	0.0	0.0
7	Rattan	3	0	31.16	0.0	264.5	0.0	0.0	0.0
8	Salt	3	0	111.73	0.1	295.5	0.1	0.0	0.0
9	Pepper	10	0	7.62	0.0	469.4	0.1	61.0	0.0
	TOTAL	2,717	100	94,279.35	100.0	551,530.1	100.0	320,068.3	100.0

Source: CoFTRA, July 2018

Table 5. The Value of Commodity Traded in the ACE during the period of January – June 2018

NO	Commodity	Transaction (IDR Bio)	%
1	Grain	77,82	49,4
2	Rice	10,10	5,7
3	Pepper	8,25	4,7
4	Corn	7,02	4,0
5	Coconut	4,59	2,6
6	Seaweed	2,80	1,6
7	Fertilizer	2,49	1,4
8	Ginger	2,45	1,4
9	Biofrok Pool	2,40	1,4
10	Coffee	2,20	1,3
11	Others	48,93	26,5
	TOTAL	166,84*)	100

Source: CoFTRA, July 2018.

Tabel .6. Factsheet of Cianjur WRS 2011-2016

No	Description	2011	2012	2013	2014	2015	2016
1	Number of operator (Unit)	1	1	1	1	1	1
2	Warehouse capacity (Ton)	1,000	1,000	1,000	1,000	1,000	1,000
3	Volume (ton)	261.00	1,573.25	1,275.03	2,151.71	1,647.57	756.71
4	Receipt issued (Lbr)	17	59	39	84	66	36
5	Value (IDR million)	1,453.60	9,007.54	7,722.24	3,474.63	10,287.05	4,690.09
6	Loan disbursed (IDR million)	1,011.50	5,823.08	5,405.57	9,409.74	tad	tad
7	Commodity	Grain	Grain	Grain	Grain	Grain	Grain
8	Estimated Farmers' Revenue (IDR million)	172.26	1,038.34	841.52	1,420.13	187.39	497.20

Source: Niaga Mukti Cooperative, Cianjur, July 2018

Note: Estimated farmers' revenue as the gross margin, which is the net of incoming and outgoing price times grain volume.

Tabel 7: Calculation of profit margin of deferred selling in Cianjur warehouse.

Items	2014			2015			2016		
	Price	Vol	Sub Total	Price	Vol	Sub Total	Price	Vol	Sub Total
Revenue	**Rp./kg**	**Kg**	**Rp.**	**Rp./kg**	**Kg**	**Rp.**	**Rp./kg**	**Kg**	**Rp.**
Incoming price	5,900	18,000	106,200,000	6,000	18,000	108,000,000	6,100	17,500	106,750,000
Outgoing price	6,700	18,000	120,600,000	6,700	18,000	120,600,000	6,700	17,500	117,250,000
Difference			**14,400,000**			**12,600,000**			**10,500,000**
Expenses									
Interest (3 months)	1.5%		1,593,000	1.5%		1,620,000	1.5%		1,601,250
Storage and testing expenses									
Quaility and logistic	150	18,000	2,700,000	150	18,000	2,700,000	150	17,500	2,625,000
Total expenses			4,293,000			4,320,000			4,226,250
Price Difference									
Total of difference			10,107,000			8,280,000			6,273,750
Difference Per Kg			562			460			359

% Difference per Kg						
Incoming price	5,900		6,000		6,100	
Difference Per Kg	562	**9.5%**	460	**7.7%**	359	**5.9%**
Cimmulative per year						
Average margin IDR/kg	550	**1,173,486,600**	450	**741,404,250**	359	**270,445,470**
Cimmulative Receipts Issued per year	2,133,612		1,647,565		753,330	

Source: CoFTRA July 2018

Table 8: Four Scenarios of WRS Business Model

Business Model	Business Type	Investment (IDR mio)	Payback period (year)
I	Food storage services	2.240,0	28,8
II	Food storage services plus	2.690,0	25,6
III	Food trading services	2.240,0	3,1
IV	Food trading services plus	2.690,0	3,7

Source: CoFTRA, 2017