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Situational Analysis of Seaweed Warehouse Receipt System Scheme in Indonesia

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Abstract

Since the issuance of the Law on the Warehouse Receipt System (WRS) in 2009, the application of WRS has not been optimally successful. Several obstacles and constraints have been identified in the implementation of WRS in Indonesia. This research was conducted through a desk study and survey approach about analysis information of several constrains on the application of WRS for seaweed commodity. Constraints on the application of WRS for seaweed commodity became the focus of this study. The constraints faced by farmers are the lack of access to information about the seaweed WRS, financing constraints due to the financial attachment to middlemen, and the quality that does not meet Indonesian National Standard (SNI) of seaweed. While the constraints faced by the warehouse manager are the time to conduct quality testing and the time for disbursing funds from bank or non-bank financial institutions. Implementation of WRS can be increased by expanding WRS information and communication to seaweed farmers, financial institutions, local government, industry and traders. A business model of seaweed WRS scheme is needed that can integrate stakeholders.

***Keywords*:** financial institution; quality testing; Seaweed farmer; Warehouse Receipt System (WRS).

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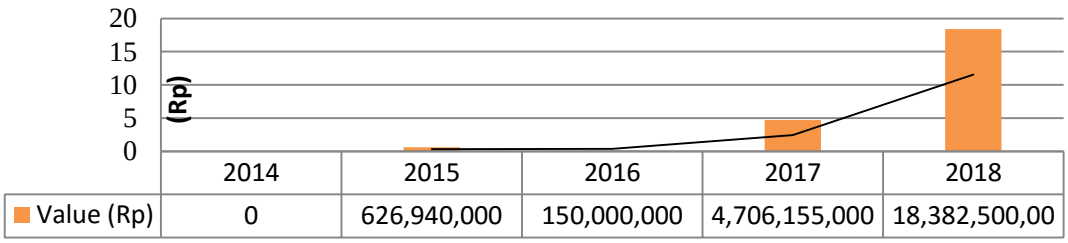
1. Introduction

The development of the agricultural sector is always faced with the classical problems, which is the difficulty of farmers to get access to capital /financing. To get fast funds, farmers usually sell their products directly during harvest time without a decent price [1]. If farmers sell their products during the harvest season, the price of the product is relatively low and often they fall on the loan sharks. Thus, the Warehouse Receipt System through the postpone selling and post-harvest financing scheme is one solution to overcome these problems. The Warehouse Receipt System (WRS) in accordance with Law Number 9 of the year 2006 in conjunction with Law Number 9 of 2011 concerning the Warehouse Receipt System states that the WRS is an instrument that repositioned agricultural commodities as an item that has economic value, which is very feasible to be used as collateral in order to obtain credit from banks and non-bank financial institutions. Warehouse Receipt is one of the important, effective and negotiable (tradable) instruments and can be exchanged in a trade finance system. Besides that, Warehouse Receipts can also be used as collateral or received as proof of delivery of goods in the context of fulfilling a derivative contract that is due, as happens in a futures contract [2]. The development of WRS nationally has become the government's commitment, one of the efforts made is to encourage the increasing number of warehouses that utilize the Warehouse Receipt System. Until 2017, 121 government warehouses have been built and there are 59 private warehouses that have been approved as WRS warehouses, but the WRS warehouses have not been running optimally. It has been determined 17 items that can be stored in the warehouse based on WRS (Minister of Trade regulation Number 33 of 2018) including seaweed. The purpose of this paper is to discuss of implementation of seaweed WRS scheme and the constrains faced especially by farmers. The following is the transaction value of the seaweed commodity warehouse receipt transaction (Figure 1).



	2014	2015	2016	2017	2018
Value (Rp)	0	626,940,000	150,000,000	4,706,155,000	18,382,500,00

Figure 1: Seaweed Commodity Warehouse Receipt Transaction Value (Rupiah)

Source : BAPPEBTI (2018)

2. Literature Review

Seaweed, or marine algae, comes in various shades of red, brown and green. Red seaweed, such as Gelidium, Gracilaria and Pterocladis, are important for human consumption and other uses. The most important extract, carrageenan, is named after the red seaweed, which has been used as a gelatin for the pet food, dairy and meat industries and, to a lesser extent, the pharmaceutical industry. Globally, the major use for seaweed has been for human consumption [3,4] with calls for increasing consumption of seaweed as a sustainable food source [5] and

for use in developing functional foods [6]. Kappa carrageenan is widely used in food additives and produces strong rigid gels. Smaller volumes of seaweed are also sold for use in animal feeds and fertilizers. Demand for contaminant-free seaweed for use in nutraceuticals and pharmaceuticals appears to be increasing. Secondary uses of seaweed include processed, powdered forms used as hydrocolloids in industrial processes for the food and cosmetic industries and as texturing agents and stabilizers [7]. Seaweed farmers are spread in rural area in Indonesia, many farmers have problem about finance cost for seaweed farming. WRS can answers the problem. Generally, WRS is a commodity financing instrument in which producers or businesses store their products during the harvest season in the WRS warehouses and guarantee their warehouse receipts to Bank/Non-Bank financing institutions. They expect that when the price of commodities increase, they would sell the product to obtain optimal profit margins. This agricultural financing provides benefits for farmers to be able to obtain funds quickly and inexpensive for operational agricultural activities. WRS related research results contribute to integrate WRS and its market for the certainty of the liquidity value of goods stored [8,9,10,11,12]. Supply chain of seaweed for the global demand for raw dried seaweed, especially for E.cottonii types, is growing because of the increased carrageenan processing, especially in China. The future market for E. cottonii is tied to the future demand for the carrageenan that is extracted from it. E. cottonii can be processed into semi-processed materials, such as alkali-treated carrageenan (ATC) in chip shapes, semi-refined carrageenan (SRC), and refined carrageenan (RC) in powder forms. In which that are potential to export to many demand countries.

3. Methods

This research was conducted through a desk study and survey approach through the distribution of questionnaires to farmers conducted in November 2018 to February 2019. The desk study method is an effort to study information, data and reports that have relevance to the research objectives [13]. This method is used for the collection and analysis of data or initial and further information relevant to the problem under study to obtain a very useful theoretical basis for enriching the conceptual framework and situational analysis of the optimal seaweed WRS scheme in Indonesia**.** Data analysis method used is descriptive qualitative and quantitative methods. Descriptive studies are conducted in order to ascertain and describe the characteristics of important variables of a situation. The purpose of descriptive research is to describe aspects that are relevant to the interesting phenomenon of an individual or organization [14]. Furthermore, [15] states that to be able to use descriptive methods, a researcher must have a repressive nature, must always look for not test, have integrative power, and the power to combine various kinds of information received into one unified interpretation. The output of this study is a situational analysis of the seaweed warehouse receipt system scheme based on field surveys and regulations related to the development of seaweed WRS. The scope of the research is concerning seaweed WRS scheme and its implementation in Indonesia and seaweed supply chain in South Sulawesi which is the biggest seaweed producer in Indonesia.

4. Result and Discussion

4.1 Data and Information Analysis in the Upstream Sector Seaweed development in Indonesia

Analysis of seaweed development data was preceded by a survey of cultivation of seaweed farmers. The survey

was carried out in Maros (geographical coordinates are 5° 0' 25" South, 119° 34' 20" East) and Takalar (geographical coordinates are 5° 23' 14" South, 119° 27' 4" East) districts for aquaculture of Glacilaria pond and marine types, and in Bantaeng district for cultivation of Cottonii seaweed in the sea area. The number of respondents interviewed was 60 people, consisting of 57% men and 43% women. The education of the majority of seaweed farmers at the high school level and equivalent, very few have graduated. The area or land ownership of 65% is self-owned and 35% is rental land or area. The average planting period in Takalar Regency for sea Glacilaria seaweed is 45 days. The frequency of harvest per year is 5 to 7 times. The number of stretches owned by seaweed farmers in Takalar Regency is between 200 and 400 stretches. Based on the survey of primary data collection that the respondents are dominated by male (57%) and female (43%), as figure **2.** Education of the respondent majority of senior high school (37%) and junior high school (32%).

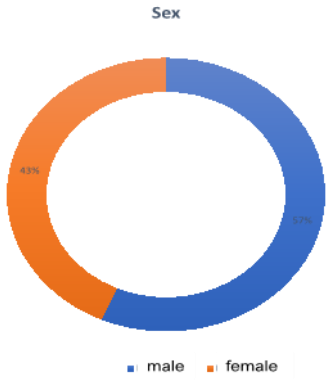


Figure 2: Gender of Respondent

Based on the survey obtained information that the process of seaweed cultivation in ponds with in the sea is different from the planter side. Seaweed in ponds is planted by spreading seaweed seeds into ponds. Ponds are usually planted with seaweed, as well as milkfish breeding. This polyculture is good because it is mutually beneficial or a mutualism symbiosis between fish and seaweed. Fish eat moss attached to the seaweed without having to be given food, while seaweed will be of good quality if there is no moss. Seaweed that is planted in this polyculture mode is a type of Glacillaria. Furthermore, seaweed in the sea both of Glacillaria and Cottonii types are planted through the mine stretch, the grass tied in the mine is given a float in the form of a used plastic bottle. The stretch is lowered into the sea tied with sacks that are given a ballast, large jerry cans and a floating styrofoam. In order to protect the coastal environment, buoys from used bottles will be replaced with buoys of mica type rubber that last for several years. The cultivation process should be carried out for 45-60 days. According to [16] Harvesting of Gracilaria seaweed is done after the plant is 3-4 months old (next harvest 2 months), depending on the fertility of the pond land, seaweed diameter (thallus) is approximately 2 mm, thallus length is 20-30 cm , and dark green or red colors. The strength of seaweed gel is influenced by the cultivation period, or according to [17] and [18], the quality of the agar gel is affected by the conditions of its production process, as well as the type, harvest season and location of cultivation. Likewise the same thing applies to Cottonii cultivation. Furthermore, seaweed is harvested and sold to actors in the seaweed supply chain. As many as 75% of farmers in this survey sell their crops directly. Seaweed supply chain can be seen in Figure 3.

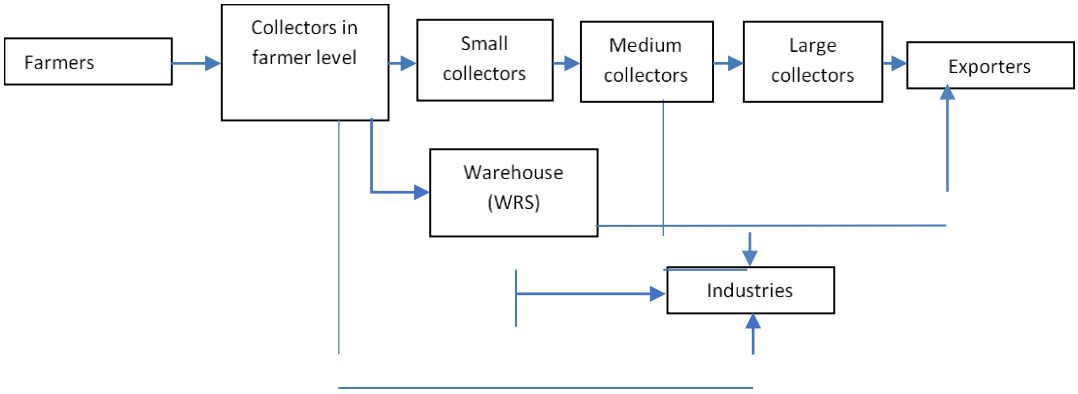


Figure 3: Structure of seaweed supply chain seaweed in South Sulawesi

Even though it is a major producer of seaweed in the world, it turns out that Indonesian seaweed has not been produced in the maximum conditions indicated by productivity that is still very low when compared to other countries. Indonesian seaweed production productivity ranges from 1.14 tons/km/ year dry seaweed. The productivity is still below the Philippines, whose productivity is 1.58 tons/km/ year dry seaweed and 4.55 tons/km in the Solomon Islands [19]. Meanwhile Tanzania, India, and the Philippines reached 2.35 tons/km, 1,665 tons/km and the Philippines 1.61 tons/km, respectively. The low productivity of seaweed is allegedly due to the lack of knowledge and skills of business actors in the field of seaweed as well as the lack of government support related to infrastructure and the application of its policies [20]. A map of the potential development of seaweed cultivation can be seen in Figure 4. Indonesia still has hopes of becoming a major producer of seaweed in the world because there are still many potential seaweed cultivations.

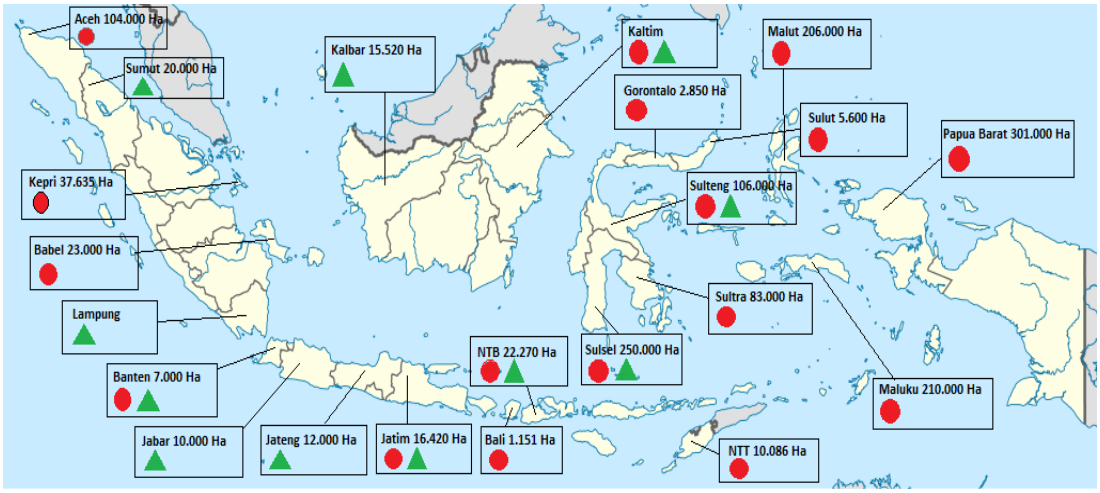


Figure 4: Potential Map of Seaweed Cultivation Areas (KKP, 2016)

Potential seaweed cultivation development areas in Indonesia are spread across 23 provinces, for cultivation of Cotonii sp. spread in 17 provinces and Gracilaria sp. For the main centers of seaweed cultivation production are in 10 provinces, namely: South Sulawesi, East Nusa Tenggara, Central Sulawesi, Southeast Sulawesi, West Nusa Tenggara, East Java, Maluku, East Kalimantan, North Sulawesi and Bali. The provinces which are the main potential for seaweed cultivation can be seen in Figure 5.

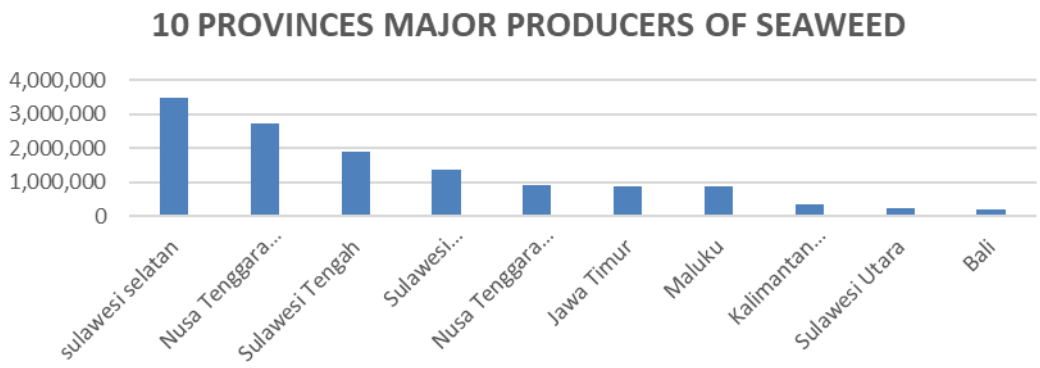


Figure 5: Trends in Wet and Dry Seaweed Production (Potential) (Ministry of Industry, 2018)

The selling price of seaweed received by farmers depends on the price determined by the traders at the farmer level. Farmers do not have access to information on the market price of seaweed. Although 63.5% of the price information was obtained from the trade and the information was obtained from electronic media and others, but the price of the traders remained, where 93.8% of the farmers surveyed said that they would immediately sell their seaweed harvests according to the price set by the trader. Farmers are only as price takers and surrender to prices determined by traders. Even so farmers are willing to sell all the harvest to local collectors/collectors because 91.5% according to the farmers, the trader gives cash to pay for the sale. Therefore, it is important to improve the warehouse receipt system procedure as an alternative financing for seaweed farming operations.

4.1 Situational Analysis of Seaweed Warehouse Receipt Systems in Indonesia

The Warehouse Receipt System is an alternative financing for farmers with a post-sale method, thus the supply chain for seaweed development is added to the Warehouse manager who has obtained a permit to issue a Warehouse Receipt. Usually the warehouse manager is at the level of large collectors who are directly related to exporters and industry. Several things that were studied related to the optimization of the Warehouse Receipt System are related to product quality and the speed of the WRS issuance process. Alternative appropriate financing scheme for agricultural operational costs in the next seaweed planting period is the Warehouse Receipt System scheme [21]. Warehouse Receipt System in accordance with Law Number 9 of 2006 concerning the Warehouse Receipt System as amended by Law Number 9 of 2011, WRS is an instrument that repositioned agricultural commodities as an item that has economic value, which is very feasible to be used as collateral for obtain credit from banks and non-bank financial institutions. The law states that the purpose of the WRS is to guarantee and protect the interests of the community, ensure the smooth flow of goods, increase the efficiency of distribution costs and create a conducive business climate. In the analysis of regulations governing the quality of seaweed, it is tested by the appropriateness of quality testing agency (LPK) which is appointed and received permission from Commodity Futures Trading Regulatory Agency (CoFTRA/BAPPEBTI Ministry of Tr). LPK for dry seaweed quality testing in Makassar is conducted by the Goods Quality Standards Test Center. The testing method is carried out using SNI. Sensory test using SNI 2348: 2011, water content testing using SNI 01-2354.2.2006, impurity test / foreign objects using SNI 01-2000.2.2000. The water content in Glacillaria seaweed is at a maximum of 12% SNI, but based on the analysis of the situation in the field, the water content of 12% is

too dry, making it easy to break and not good for industrial raw materials, good seaweed for industrial raw materials is 14% which can hold up to 6 months. Similarly, for Cottonii seaweed, the good water content for industrial raw materials is 32%, which can last up to 2 years. Therefore, it is important to review the regulations related to SNI testing seaweed water content. SNI for seaweed testing is SNI 2690: 2015, quality and safety requirements for dried seaweed can be seen in table 1. The water content testing method also needs to find alternative tools that can shorten the test time and reduce costs.

Table 1: Quality and Safety Requirements of Dried Seaweed

Test Parameter	Unit	Requirements				
		Carragenophyte		(Agaro-phyte)		(Alginophyte)
		Eucheuma cottonii	Eucheuma spinosum	Gelidium spp	Gracillaria spp	Sargasum spp
a. Sensory		Min. 7 (score 1 - 9)**				
b. Chemistry						
- Water content	%	Max. 30,0	Max. 30,0	Max. 12,0	Max. 12,0	Max. 15,0
- lean Anhydrous Weed (CAW)*	%	Min. 50,0	Min. 50,0	Min. 40,0	Min. 40,0	Min. 50,0
c. Metal contamination*						
- Arsenic (As)	mg/kg	Max. 1,0				
- Cadmium (Cd)	mg/kg	Max. 0,1				
- Mercury (Hg)	mg/kg	Max. 0,5				
- Tin (Sn)	mg/kg	Max. 40,4				
- Lead (Pb)	mg/kg	Max. 0,3				
d. Physical contamination						
- Rough impurities	%	Max. 3,0				
Notes * If needed ** For each sensory parameter						

The LPK approval regulation for commodity quality testing is determined by BAPPEBTI, Ministry of Trade (Law no. 9 of 2011), but in its implementation the location of the quality testers is quite far from the WRS Warehouse, so it needs an effort for the warehouse manager to become an LPK that can issue quality test certifications through accreditation by the Institution appointed by BAPPEBTI. Law number 9 of 2011 and Government Regulation number 1 of 2016 concerning the WRS Guarantee Agency, mandates the establishment of an WRS Guarantee Agency to protect the rights of warehouse receipt holders and / or recipients of collateral rights in the event of failure, inability and / or bankruptcy of the warehouse manager. PT Jamkrindo has been appointed as an implementing agency, but until now the agency has not been able to operate due to the lack of approval in its funding, so this institution needs to be immediately supported so that it can run in order to create the trust of WRS businesses and provide attraction for banks / financial institutions to provide warehouse receipt financing. The process of issuing warehouse receipts on seaweed cannot be done one day service as can be done on grain and rice commodities. Warehouse receipt issuance time including credit disbursement is now 8-10 days. The length of time the issuance of receipts prevents farmers from getting working capital in the next planting period. Ideally, the time to issue a Warehouse Receipt until the optimum credit disbursement is 3 days. This has an impact on the application of WRS which is still below 50%, for example the application of WRS in Takalar as in Figure 6. Whereas the optimization of seaweed WRS can have an impact on improving the welfare of farmers. Farmers get financing from banks easily and cheaply in a relatively short time. This is to avoid the trap of intermediaries who acts as a loan shark. This is clearly seen in Takalar, where farmers have followed the Warehouse receipt scheme, farmers collect crops at the Cooperative, and within 1 week, farmers get financing for operations. The general warehouse receipt system scheme can be seen in Figure 7.

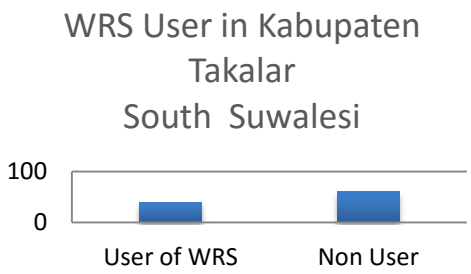


Figure 6: WRS users in Takalar, South Sulawesi.

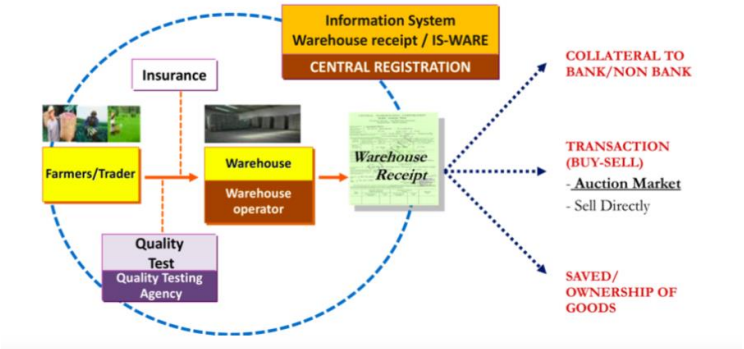


Figure 7: Warehouse Receipt System Scheme (Bappebti, 2018)

According to [22] states that the constraint in implementing the warehouse receipt system is that its implementation is still lacking in socialization, especially to farmers / farmer groups. The socialization carried out so far is still limited at the elite level (agriculture service officials in the province / district). Likewise, the farmers still lack socialization as shown in Figure 8. Based on the survey results, there are still many farmers who do not know about WRS information as much as 58.7% do not know and understand the financing schemes through WRS, only 41.3% of farmers surveyed have known WRS, although not all of them use the WRS scheme.

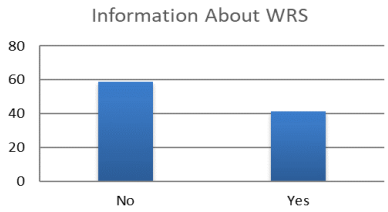


Figure 8: Information about WRS at Farmer level

Thus, socialization is not only aimed at farmers, but also more intensive to commodity players both at the trader and exporter level as well as bank and non-bank financing institutions. For time efficiency in the issuance of warehouse receipts, an important thing to do is technical education for warehouse managers to assess the quality of goods, or even managers to make their own divisions as quality testers for goods in the warehouse. The key

factors for farmers' interest are the clarity of the market and the fast funding support and the benefits of postponing the sale so that there is no doubt farmers in implementing the WRS due to the fast process of disbursing funds from the WRS scheme. Farmers who use the Warehouse Receipt scheme can benefit from an increase in selling prices within 2-3 months. The percentage increase in profit is obtained from the percentage increase in price minus the percentage of interest costs (1.5%/3 months) and the cost of managing goods in the WRS warehouse (0.015%). For example, a 25% price increase for Gracillaria dried seaweed (Rp. 6,000 to Rp. 7,500) provides an attractive profit for farmers in 3 months by 23.5%. This is an advantage for farmers who postpone selling and utilizing the WRS scheme. Thus farmers will get additional benefits from future price fluctuations when prices rise in three months. In addition, while waiting for prices to improve, farmers do not have to sell their goods that get financing from banks with inex subsidized interest at 6% per year (0.5% per month) where the funds can be used for working capital for the next harvest and finance some of their daily needs so that they are not expected to fall to middleman. Besides that, this WRS trains farmers / cooperatives / SMEs to produce with good quality seaweed according to the standards in the WRS that will benefit them in terms of price and also profitable for buyers (traders/ exporters) and processing industries that require commodities with a guaranteed quality of goods in the WRS.

5. Conclusion

WRS is an instrument that repositioned agricultural commodities as an item that has economic value, which is very feasible to be used as collateral to obtain credit from banks and non-bank financial institutions. Warehouse Receipt is one of the important, effective and negotiable (tradable) instruments and can be exchanged in a trade finance system. Besides that, Warehouse Receipts can also be used as collateral or be accepted as proof of delivery of goods in the context of fulfilling a matured derivative contract. The application of WRS in seaweed commodities has an increasing trend, so research for the utilization of WRS in seaweed farmers is important to do. This is considering that the potential development of seaweed cultivation in Indonesia will continue to be developed and improved, towards Indonesia as the main seaweed producer in the world. The research is centered in South Sulawesi because it is the main producer of seaweed in Indonesia. Based on the results of situational analysis through surveys to farmers, it is found that WRS is still not optimally utilized by farmers as an alternative operational financing for seaweed cultivation. Some of the obstacles faced are regarding the socialization of WRS that is still at the elite level of the Ministries and the local government, not yet reaching farmers, collecting traders or even providers of funds both banks and non-banks. Another obstacle is the time of issuance of warehouse receipts that are still longer than the loan from middleman. The ideal time is less than 1 week, which is around 3 days.

6. Recomendation

Implementation of WRS can be increased by expanding WRS information and communication to seaweed farmers, financial institutions, local government, industry and traders. A business model of seaweed WRS scheme is needed that can integrate that stakeholder. In addition, the constraints on the length of time for issuance of warehouse receipts and credit disbursement need to be reviewed with the following recommendations: 1). The warehouse and conformity assessment institution are closer to the warehouse; 2).

Warehouse Managers are given education regarding testing of product quality, 3). Further studies need to be done regarding revision on national standard for testing dried seaweed, 4). Electronic integration system need to be done among the owner of commodity/farmer, warehouse operator, financial institution (banks and non-banks) and standby buyer.

References

[1] Buschmann, et al. "Seaweed Production: overview of the global state of exploitation, farming and emerging research activity". European Journal of Phycology, vol. 52(4), pp. 391-406, 2017.

[2] Mahanta D. "Review of wirehouse receipt as an instrument for financing in India". International Journal of Scientific and Technology Research. 1(9):42-45, 2012.

[3] McHugh, D.J. "A guide to the seaweed industry". FAO Fisheries Technical Paper. Rome, Vol. 441. pp. 95-105 2003.

[4] Cottier-Cook, E.J., N. Nagabhatla, Y. Badis, M. Campbell, T. Chopin, W. Dai, J. Fang, P. He, C. Hewitt, G.H. Kim, Y. Huo, Z. Jiang, G. Kema, X. Li, F. Liu, H. Liu, Y. Liu, Q. Lu, Q. Luo, Y. Mao, F.E. Msuya, C. Rebours, H. Shen, G.D. Stentiford, C. Yarish, H. Wu, X. Yang, J. Zhang, Y. Zhou, C.M.M. Gachon. "Safeguarding the future of the global seaweed aquaculture industry". United Nations University (INWEH) and Scottish Association for Marine Science Policy Brief. ISBN 978-92-808-6080-1. 12pp. 2016.

[5] Forster, J. and R. Radulovich. (2015). "Seaweed and food security 2015. Chapter in Seaweed Sustainability: Food and Non-food applications", edited by B.K. Tiwari and D.J. Troy. Elsevier, Amsterdam.

[6] Mendis, E. and S-K Kim. "Present and future prospects of seaweeds in developing functional foods". Advances in Food and Nutrition Research Vol.64, pp. 1-15, 2011.

[7] Bixler H.J. and H. Porse. "A decade of change in the seaweed hydrocolloids industry". Journal of Applied Phycology Vol. 23, pp. 321-335, 2011.

[8] Sarinah dan T. Djatna. "Analisis Strategi Penanganan Resiko Kekurangan Pasokan Pada Industri Pengolahan Rumput Laut: Kasus di Sulawesi Selatan". Agritech, Vol. 35(2), pp. 223-233, 2015.

[9] Elias. "Recent electronic warehouse receipts developments in Mexico". Arizona Journal of International & Comparative Law. Vol. 33(1), pp.199-204, 2016.

[10] Onumah. "Implementing Warehouse Receipt Systems in AfricaPotential and Challengest. the Fourth African Agricultural Markets Program Policy Symposium organized by the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA) of the Common Market for Eastern and Southern

Africa (COMESA)". September 6-7,2010, Lilongwe, Malawi, 2010.

[11] Dahuri. (2011). "Mengembangkan Industri Rumput Laut Secara Terpadu". Samudra, Edisi 93.

[12] Tosun D, Savran K, Niyaz OC, Keskin B, Demirbas N. "The evaluation of the warehouse receipt system for agro-food products in Turkey". Anadolu Journal Agricultural Science. Vol. 29(3), pp.240-247. Doi: 10.7161/anajas.2014.29.3.240-247, 2014.

[13] Hikmah. "Strategi Pengembangan Indsutri Pengolahan Komoditas Rumput Laut E.Cotonii untuk Peningkatan Nilai Tambah di Sentra Kawasan Industrialisasi". Jurnal Kebijakan Sosek Kelautan Perikanan, Vol. 5(1), pp. 27-36, 2015.

[14] Sekaran. (2000). "Research Methods For Business: A Skill Building Aproach 3rd ed". John Wiley and Sons: Inc.

[15] Hasan, M. I. (2002) Pokok-Pokok Materi Metodologi Penelitian Dan Aplikasinya, Ghalia. Indonesia, Bogor, Indonesia.

[16] Febriko S.D., Agus Suriawan., Sofiati., M.A Rahman. "Peningkatan Produksi Rumput Laut Gracilaria verrucosa di Tambak Dengan penambahan pupuk". Makalah disampaikan pada "Seminar Indonesia Aquakultur" tanggal 17 Nopember 2008 di Yogyakarta, Indonesia, 2008

[17] Marinho-Soriano E., Bourret E. "Effects of Season on The Yield and Quality of Agar from Glacilaria Species (Glacilariaceae, Rhodophyta)". J. BioTech. Vol. 90, pp.329-333, 2003.

[18] Ashari. "Prospek Sistem Resi Gudang (WRS) sebagai Alternatif Pembiayaan Sektor Pertanian". ICASEPS Working Paper No. 102. Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian. Bogor. Indonesia. 2010.

[19 Valderrama, D., J.Cai., N. Hishamunda., and N. Ridler. "Social and economic dimensions of carrageenan seaweed farming". Fisheries and Aquaculture Technical Paper. Vol. 580, 2013

[20] Wahyudin, Y. "Nilai Sosial Ekonomi Rumput Laut: Studi Kasus Kecamatan Tanimbar Selatan dan Selaru, Kabupaten Maluku Tenggara Barat, Provinsi Maluku". Majalah Ilmiah Globe Vol.15 (1), pp. 77-85, 2013.

[21] Towo, N.N dan Kimaro, P.J. (2013) ."Warehouse Receipt System: A Solution towards Smallholder Farmers Financial Constraints". Tanzania. Moshi University College of Cooperative and Business Studies,

[22] Ashari. "Potensi dan Kendala Sistem Resi Gudang (WRS) Untuk Mendukung Pembiayaan Usaha Pertanian di Indonesia". Forum Penelitian Agro Ekonomi. Vol. 29 (2). Pusat Sosial Ekonomi dan Kebijakan Pertanian. Indonesia. 2011.