

Strategy for improving sugar palm agroindustry institutions in South Tapanuli

Strategi peningkatan kelembagaan agroindustri aren di Tapanuli Selatan

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(Received: 24 January 2024, Revision accepted: 22 March 2024)

Citation: Pulungan, S., Harahap, A. U., Aswan, N. (2024). Strategy for improving sugar palm agroindustry institutions in South Tapanuli. *Jurnal Lahan Suboptimal : Journal of Suboptimal Lands*. 13 (1): 37-44. <https://doi.org/10.36706/JLSO.13.1.2024.677>.

ABSTRAK

Salah satu produk turunan sawit yang berpotensi tumbuh di Tapanuli Selatan adalah pengolahan nira atau gula merah yang selama ini dihasilkan oleh pohon palem melalui industrialisasi pedesaan dengan menggunakan teknologi pengolahan gula aren. Pengembangan pertanian enau di Tapanuli Selatan, penting untuk mempersiapkan kelembagaan melalui ilmu pengetahuan dan teknologi dengan model persamaan struktural. Tujuan penelitian ini adalah untuk menyusun strategi pengembangan agroindustri perbaikan kelembagaan tanaman aren di Tapanuli Selatan. Penelitian ini menggunakan responden observasi yang berjumlah 112 orang produsen gula merah. Metode Penelitian menggunakan analisis deskriptif dari data observasi dengan teknik wawancara maupun kuisioner. Hasil penelitian mengungkapkan bahwa petani aren di Tapanuli Selatan mendukung peranan perempuan dalam pengelolaan kelembagaan agroindustri aren dan menyetujui bahwa perempuan akan bisa mengambil peranan dalam menyelesaikan konflik dalam kelembagaan agroindustri aren. Petani aren di Tapsel setuju peranan perempuan mendukung dalam kelembagaan agroindustri aren di Tapanuli Selatan.

Kata kunci: aren, agroindustri, kelembagaan, Tapanuli Selatan

ABSTRACT

One of the palm oil derivative products that has the potential to grow in southern Tapanuli was the processing of sap or brown sugar which has been produced by palm trees through rural industrialization using palm sugar processing technology. In developing palm oil farming in South Tapanuli, it was important to prepare institutions through science and technology with structural equation models. The objective of this research was to develop an agro-industry development strategy to improve the institution of palm trees. This research was observation respondents totaling 112 brown sugar producers. The result was to produce a statement through the perceptions of sugar palm farmers in Tapanuli, that sugar palm farmers in Tapanuli support the role of women in managing palm agro-industry institutions and agree that women will be able to take a role in resolving conflicts in sugar palm agro-industry institutions. Sugar palm farmers² in Tapsel agree that there will be many differences of opinion from people who will manage the sugar palm agro-industry and differences of opinion will affect the existence of the sugar palm agro-industry in Tapanuli Selatan.

Keywords: aren, agroindustry, development, South Tapanuli

INTRODUCTION

In the Ministry of Agriculture's 2015-2019 Strategic Plan, it is stated that there are fifteen main plantation commodities whose development is the Ministry of Agriculture's concentration, namely rubber, palm oil, coconut, coffee, cocoa, cashew nuts, pepper, cloves, tea, jatropha, sunan candlenut, patchouli, cotton and tobacco and sugar cane (Rosita, 2020). Sugar cane as a supplier of national sugar needs is often a dilemma in its development, especially related to the area of plantation area and the condition of factories that are old so that they are unable to meet national sugar needs. As a result, the government took a policy to import sugar. There is one commodity that has the potential to accompany sugar cane to supply national sugar needs, namely the palm commodity (Anantanyu et al., 2015). In fact, in several areas such as South Tapanuli Regency (Tapsel), North Sumatra Province (Sumut), sugar palm is one of the derivative product, brown sugar, has been managed from generation to generation, starting hundreds of years ago. In Tapsel, sugar palm grows naturally because there has been no effort to cultivate it. In 2012, sugar palm farmers in Tapsel had an average age that was classified as productive at 38.21 years, with the largest age group being 30-35 years at 31.58%. (Pulungan et al., 2023). His level of education is equivalent to having been in the second grade of junior high school. Even though they are not supported by proper education, when they are still at a productive age, sugar palm farmers in Tapsel should be able to produce added value to brown sugar from the palm sap cooking process. In fact, for hundreds of years the brown sugar produced has still been processed traditionally and has not been touched by changes to produce added value. However, one of the obstacles in developing the sugar palm agro-industry in Tapsel is the absence of an institution that is considered capable of managing agro-industry institutions (Indriyani et al., 2018).

Institutions can be approached from two sides, formal and informal. In rural areas, the government through extension workers has facilitated the formation of formal institutions that have permanent administration and structure

and are formed for specific purposes, such as; farmer groups, water user groups (Rachman, 2017). However, formal institutions have not been able to achieve the expected goals of formation. According to observations, one of the unique characteristics of sugar palm farmers is the difficulty of gathering sugar palm farmers in Tapsel into a group. In the framework of sugar palm development, considering that sugar palm farmers have unique characteristics, a study is needed that analyzes how existing sugar palm farmer institutions are in terms of using natural resources, what changes have occurred, how these institutions perform in current conditions, and the support needed from the government (Hastuty, 2017). Industry in Indonesia, including those related to agriculture, is generally concentrated in urban areas with consideration of adequate supporting facilities. In fact, agro-industry is an industry that uses supplies of agricultural products as raw materials, which are actually produced in rural areas. Thus, agro-industry actually has the potential to be developed in rural areas looking at the aspect of raw material availability, although there are also many obstacles in its development (Ruru & Anantanyu, 2011). Based on this study, what is the strategy for improving the institution of the sugar palm agro-industry which aimed to formulate an institutional structure within the framework of developing the sugar palm agro-industry in South Tapanuli.

MATERIALS AND METHODS

Research Location and Time

This research was carried out for eight months in South Tapanuli Regency, North Sumatra starting in July 2023 in four sub-districts which are considered representative of the fourteen sub-districts, because they are in the same area demographically. Distribution of 14 sub-districts in South Tapanuli Regency and research locations. Tapsel was determined as the research location with the consideration that there are ten sub-districts in South Tapanuli which have been centers of brown sugar production for a long time but have not been touched by agro-industrial development policies so it is still carried out traditionally because they have not been touched

by the use of technology and there are no institutions that facilitate the interests of sugar palm farmers. Therefore, it is considered feasible and supports the achievement of research objectives.

Type of research Qualitative

Based on classification, this research is classified as basic (pure) research. The nature of basic research is to find new knowledge, especially about the institutional characteristics that exist among sugar palm farmers in South Tapanuli. Meanwhile, according to the approach taken, this research is a type of survey research. "The strength of survey research is in direct observation through in-depth vmobervation using interview techniques and questionnaires which generally revolve around 1) the demographic characteristics of a community, 2) their social environment, 3) their activities in meeting life's needs, and 4) opinions and their attitudes" (Headey & Hoddinott, 2016).

Types and Methods of Data Collection

This research uses primary data and secondary data. Primary data was obtained from selected farmer respondents through in-depth observation, both oral and written interviews using a list of questions prepared in advance. Meanwhile, secondary data is obtained from related agencies and institutions in accordance with the data needed to achieve research objectives.

Respondents and Sampling Techniques

The respondents observed were sugar palm farmers who manage their own palm sugar in Tapsel, which is generally their own. Respondents were spread across various villages in the sub-districts used as samples. Distribution of data on population, families and sugar palm farmers as in Table 1.

In this research, using the Purposive Sampling technique, it was found that 112 respondents were sugar palm farmers in various villages in four sub-districts, as explained in Table 2.

Descriptive Analysis

For the first research objective, the data analysis technique used is descriptive analysis by first mapping the data from observations or interviews in the form of tables based on grouping similar and uniform data to support the achievement of research objectives. Similar data that has been grouped is then interpreted to describe the current condition of sugar palm farmers. By interpreting the conditions of sugar palm farmers, we will know the facts about the institutions that exist among farmers today, the phenomena that occur, and then identify the factors that influence the condition of sugar palm farmers' institutions. Interpretation is carried out using a Likert scale assessment of farmers' responses/answers to the questionnaire given with the indicators and assessment criteria in Table 3.

Table 1. Number of subdistricts/villages, population and family families and sugar palm farmers 2018

Subdistrict	Total				Total
	Village	Resident	Head of family	Aren Farmer (KK)	%
Sipirok	40	33,777	8,487	387	15.94
Batang Angkola	36	35,844	9,260	19	0.78
Marancar	12	10,527	2,622	262	10.79
Tanotombangan Angkola	17	16,161	4,253	46	1.89
Angkola Selatan	17	32,758	7,366	70	2.88
Angkola Barat	14	25,878	6,255	256	10.54
Sayur Matinggi	19	26,482	6,528	20	0.82
Aek Bilah	12	7,584	1,701	51	2.10
Saipar Dolok Hole	14	13,916	3,446	484	19.93
Batang Toru	23	33,642	8,508	21	0.86
Angkola Timur	15	21,043	5,124	277	11.41
Muara Batang Toru	9	15,430	3,718	0	0.00
Arse	10	8,752	2,359	532	21.91
Angkola Sangkunur	10	23,482	5,087	3	0.12
Total	248	305,276	74,714	2,428	100.00

Table 2. Number of respondents per village

Luat	Subdistrict	Village	Total Responden	Total
I	Arse	1. Nanggar Jati	9	42
		2. Aek Kamijon	5	
		3. Ujung Padang	4	
		4. Hanopan	1	
		5. Hutatonga	1	
		6. Lancat Julu	1	
		7. Arse Dolok	1	
		8. Lancat	1	
		9. Gunung Manaon	1	
		10. Lumban Lobu	3	
		11. Jonggol Jae	9	
		12. Pagaran Pisang	5	
		13. Arse Nauli	1	
II	Angkola Barat	1. Panobasan	18	34
		2. Simatorkis Sisoma	6	
		3. Pagaran Singkut	5	
		4. Panobasan Lombang	5	
III	Marancar	1. Marancar Julu	15	25
		2. Gapuk Tua	8	
		3. Gunung Tua	2	
IV	Tanotombangan Angkola	1. Panabari	2	11
		2. Aek Uncim	1	
		3. Lumban Huayan	1	
		4. Situmba	7	
			Total :	112

Table 3. Questionnaire questions are based on a Likert scale

Questionnaire Questions	Scale Likert (Indicators and Values)				
	Strongly Disagree	Don't Agree	Neutral	Agree	Strongly Agree
	(1)	(2)	(3)	(4)	(5)

RESULTS AND DISCUSSION

Palm Brown Sugar Agroindustry in Tapsel

In Tapsel, sugar palm has not been cultivated and grows wild among rubber, snake fruit, oil palm and candlenut plantations. However, recently sugar palm has become an alternative commodity for farmers to meet family needs. This is as a result of palm oil and rubber commodities no longer being the favorites because their prices are very fluctuating and detrimental to farmers. In the plantation sub-sector, farmers in Tapsel manage many

commodities. Around Sayur Matinggi District, farmers generally manage rubber and candlenuts, around Batang Toru District, farmers manage salak and around Sipirok District farmers manage coffee and candlenuts (AS et al., 2020). This commodity is a characteristic of the area besides several other plantation commodities. Comparison of the area of palm plantations with several plantation commodities, as depicted in Table 4. The existence of farmer groups in the four sub-districts that are the research locations, as depicted in Table 5.

Table 4. Comparison of Sugar Palm Garden Area with Several Plantation Commodities

Comodition	Year (ha)			+/- (2016-2015)	
	2014	2015	2016	Ha	%
Aren	973.50	770.00	797.25	+ 27.25	3.42
Karet	28,516.75	28,532.75	12,964.85	- 15,567.90	-
Salak	11,874.00	8,826.32	12,260.94	3,434.62	28.01
Sawit	5,175.25	5,189.25	1,373.75	-3,815.50	-
Cacao	4,322.75	3,672.50	3,761.00	+ 88.50	2.35
Kopi	4,252.75	1,651.09	1,646.49	- 4.60	-
Kemiri	565.50	494.00	494.50	+ 0.50	0.10
Kelapa	434.00	430.50	11,426.00	+ 10,995.50	96.23

Sources : South Tapanuli Plantation and Livestock Service

Table 5. Farmer Groups in South Tapanuli 2019

Subdistrict	Total	
	Desa	Kel. Tani
Arse	10	88
Angkola Barat	14	75
Marancar	12	61
Tanotombangan Angkola	17	99
Total :	5	323
Average :	-	6.09

Agro-Industry Institutions

The agro-industry institution in this research is the institution of sugar palm farmers in Tapsel which contributes to accelerating the development of sugar palm towards an agro-industry that uses sap as a raw material (Hidayah et al., 2019). The acceleration of sugar palm development managed by agro-industry institutions cannot be separated from the influence of the existence of several factors that determine the success of institutions that manage sugar palm agro-industry. These factors include regulations, guidance from extension workers, then the form and structure of the institution itself and how various institutions outside the sugar palm farmer institution provide support for the success of the agro-industry institution (Syam et al., 2022). With these considerations, agro-industry institutional variables will be studied with the parameters of government role, institutional capacity and external support.

1. Role of Government

In general, sugar palm farmers in Tapsel agree that a government role is needed in the existence of agro-industry institutions (Malik, 2015). This can be seen in the response of sugar palm farmers to the question that "government regulations regarding the existence of agro-industry are needed (Y1.1), where 81.25 percent agreed. To

the question that "government regulations will make agro-industry work better (Y1.2)", those who agreed were also very significant, namely 83.04 percent, even those who strongly agreed were 10.71 percent (Enirawan, 2014). The same number of 83.04 percent of sugar palm farmers also agreed that "it is important to have regular assistance from extension workers to run the agro-industry (Y1.3)", with 14.29 percent strongly agreeing. For indicator Y1.4 with the question that "training is needed for farmers who will manage the sugar palm agroindustry, 25.89 percent strongly agreed and 69.64 percent agreed (Martono, 2014). However, 16.07 percent of sugar palm farmers in Tapsel are probably doubtful (neutral) regarding "the instructor's knowledge is sufficient about palm agroindustry (Y1.5)", and 74.11 percent agree.

Recommendations that emerge from parameter Y1 include; 1) sugar palm farmers in Tapsel really need policy intervention from the government (Tatapsel Regency Government) to support the success of sugar palm agro-industry institutions, because sugar palm farmers believe that with government support institutional performance will improve, 2) farmers need training on institutional management and use of technology, and 3) although there are doubts among sugar palm farmers regarding the knowledge of extension workers regarding agro-

industry, they agree that there is a need for assistance from extension workers (Junardi, 2012).

2. Institutional Capacity

For the institutional capacity parameter (Y2), of the six indicators derived, all six indicators received significant approval from sugar palm farmers, namely the indicator that "there must be permanent management in managing the sugar palm agroindustry (Y2.1)", amounting to 76.79 percent (Muslimin, 2012). The indicator that "sugar palm managers will be able to understand their duties and responsibilities with the existence of a permanent structure (Y2.2), is 83.04 percent. For the indicator that "determination of the management structure must be determined by sugar palm farmers (Y2.3)", it was 75.89 percent. Significant farmer approval is also found in the indicator that "agro-industry institutions have formalized their existence (Y2.4)", amounting to 83.93 percent. The highest farmer approval was on the indicator that "formal institutions will make their performance better (Y2.5)", amounting to 84.82 percent. Likewise, with indicators that question the relationship between formal institutions and government support, 80.36 percent of sugar palm farmers in Tapsel agree that "with formal institutions, agro-industry will get full support from the government (Y2.6) (Paranata, 2012).

Farmers' very strong statements about institutional capacity, both regarding the management structure and the desire for institutions to be formalized, are thought to be the result of farmers' boredom with the existence of many social organizations that have been formed in the midst of farmers' lives and organizations formed by the government, which are unable to improve farmers' welfare according to their objectives. This can be seen through the indicator that "the determination of the management structure must be determined by the sugar palm farmers (Y2.3)". Another thing that may underlie the views of sugar palm farmers is that they believe that with a permanent organizational structure and formalized institutions, their existence will receive support from the government (Y2.6).

3. Farmer Participation

Farmer participation in this research is interpreted as a form of involvement and support of sugar palm farmers in the sugar palm agro-industry institutions in Tapsel in particular and in agricultural development in general. Farmer involvement is reflected in their attitudes and behavior in participating in every agro-industry institutional activity and program. The support given by sugar palm farmers can be seen from their willingness as members to comply with all institutional provisions made, including accepting sanctions if they violate existing provisions. Another form of support is his willingness to become an agro-industry manager if needed (Pulungan et al., 2023).

4. Farmer Behavior

"The involvement of sugar palm farmers must be active in agro-industrial institutions" was agreed by 69.64 percent of sugar palm farmers in Tapsel. Even sugar palm farmers 64.29 agreed that "if palm sap is needed as raw material, then every farmer must channel palm sap" to the agro-industry. Although 8.93 refused. Regarding the existence of "rules governing the distribution of sap to agro-industry", 36.61 percent of sugar palm farmers refused to make regulations and 48.21 percent agreed to make regulations. Thus, sugar palm farmers in North Tapanuli agreed (69.64%) that all sugar palm farmers must play an active role in the sugar palm agro-industry institution and even agrees (64.29%) that palm sap should be distributed to the palm agro-industry. However, the regulation regarding the amount of sap that must be distributed to agro-industry was only approved by 48.21 percent of sugar palm farmers. Meanwhile, those who refused to make regulations were 36.61 percent. The difference in the percentage who agree and disagree is considered insignificant. So that future agro-industry managers must be careful about the sustainability of agro-industrial activities in terms of procuring raw materials. Because, in the sugar palm agroindustry, sap is the main raw material (Table 6,7 & 8).

Table 6. Percentage of Likert Scale Values for Government Role Parameters (Y1)

Scale Likert	Indicators (notation)									
	Y1.1		Y1.2		Y1.3		Y1.4		Y1.5	
	Ttl	%	Ttl	%	Ttl	%	Ttl	%	Ttl	%
1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	9	8.04	3	2.68	1	0.89	1	0.89	4	3.57
3	3	2.68	4	3.57	2	1.79	4	3.57	18	16.07
4	91	81.25	93	83.04	93	83.04	78	69.64	83	74.11
5	9	8.04	12	10.71	16	14.29	29	25.89	7	6.25
Total	112	100.00	112	100.00	112	100.00	112	100.00	112	100.00

Table 7. Percentage of Likert Scale Values for Institutional Capacity Parameters (Y2)

Scale Likert	Indicators (notation)											
	Y2.1		Y2.2		Y2.3		Y2.4		Y2.5		Y2.6	
	Jlh	%	Jlh	%	Jlh	%	Jlh	%	Jlh	%	Jlh	%
1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	5	4.46	3	2.68	1	11.6	4	3.57	2	1.79	1	0.89
3	6	5.36	3	2.68	8	7.14	0	0.00	2	1.79	2	1.79
4	8	76.79	9	83.04	8	75.8	9	83.9	9	84.82	9	80.36
5	6	13.39	3	11.61	5	9	4	3	5	11.61	0	16.96
Total	112	100.00	112	100.00	112	100.00	112	100.00	112	100.00	112	100.00

Table 8. Percentage of Likert Scale Values for Farmer Behavior Parameters (X4.1)

Scale Likert	Indicators (notation)					
	every farmer must be active in agro-industry institutions X4.1.1		if the raw material for agro-industry is sap, then every farmer must distribute sap to agro-industry X4.1.2		Regulations must be made regarding the amount of sap that must be distributed to energy agro-industry institutions X4.1.3	
	Total	%	Total	%	Total	%
1	1	0.89	2	1.79	2	1.79
2	5	4.46	10	8.93	41	36.61
3	16	14.29	17	15.18	7	6.25
4	78	69.64	72	64.29	54	48.21
5	12	10.71	11	9.82	8	7.14
Total	112	100.00	112	100.00	112	100.00

CONCLUSION

According to the perception of sugar palm farmers, the factors of education, experience and skills greatly influence the successful performance of sugar palm agro-industry institutions, so that these three factors are requirements for people who will manage sugar palm agro-industry institutions. However, sugar palm farmers support the factor that experience is more important than education. For sugar palm farmers in North Tapanuli. Regular meetings among sugar palm farmers will provide benefits, but they do not agree that at every opportunity they have to discuss sugar palm. Sugar palm

farmers in Tapsel agree that there will be many differences of opinion from people who will manage the palm agro-industry and differences of opinion will affect the existence of the palm agro-industry. However, sugar palm farmers agree that differences of opinion can be resolved within internal institutions.

ACKNOWLEDGEMENTS

The author would like to thank the Directorate General of Higher Education, Ministry of Education and Culture, for funding this research under the Beginner Lecturer Research scheme with contract number: 033/LL1/AL.04.03/2023;

429/UGN.RKT/PP/2023. This research was carried out together with the South Tapanuli Regency Agriculture Service, LPPM UGN, and the Faculty of Agriculture, Graha Nusantara University, Tor Simarsayang Campus District, Padangsidimpuan City, North Sumatra, Indonesia.

REFERENCES

- Anantanyu, S., Sumardjo, S., Slamet, M., & Tjitropranoto P. (2015). Factors Affecting the Effectiveness of Farmer Institutions (Case in Central Java Province). *Journal of Extension*, 5(1). <https://doi.org/10.25015/penuluhan.v5i1.9803>
- AS, S. H., Barchia, M. F., & Simarmata, M. (2020). Analysis of Rice Field Function Change Factors, Control Strategies and Their Influence on Rice Production in Lebong Regency. *NATURALIS - Journal of Natural Resources and Environmental Management Research*.
- Enirawan. (2014). Institutional Model of Food Security in West Nusa Tenggara Province. SPS IPB Bogor. (Dissertation).
- Junardi. (2012). Strategy for Development of Rubberized Coconut Fiber Agroindustry (Sebutret). (Case Study in Sambas Regency). SPS IPB BOGOR. Thesis.
- Hastuty, S. (2017). Identify the driving factors for agricultural land conversion. In: *Proceedings of the National Seminar*.
- Headey, D. D., & Hoddinott, J. (2016). Agriculture, nutrition and the green revolution in Bangladesh. *Agricultural Systems*, 149, 122–131. <https://doi.org/10.1016/j.agsy.2016.09.001>
- Hidayah, N., Hermawan, A., Suseno, S. H., Suryadarma, P., & Nugroho, D. A. (2019). Identification of Sugar Palm to Map the Potential of Sustainable Ant Sugar Raw Materials in Gunungsurat Hamlet, Pekalongan. *Journal of the Center for Community Innovation*, 1(1), 1–6.
- Indriyani, N. M. D., Wartini, N. M., & Suwariani, N. P. (2018). Stability of Pandan Fruit Coloring Carotenoids (*Pandanus tectorius*) at Initial Storage Temperature and pH. *Journal of Agroindustrial Engineering and Management*. <https://doi.org/10.24843/jrma.2018.v06.i03.p04>
- Malik, H. (2015). Build Village Industries to Save the Nation. PT. IPB Press Publisher. Bogor.
- Martono, M. (2014). Sociology of Social Change. PT. Raja Grafindo Persada. Jakarta.
- Muslimin. (2012). The Influence of Technology and Institutional Applications on Rice Farming Efficiency and Income in South Sulawesi Province. SPS IPB Bogor. Dissertation.
- Paranata. A. (2012). Unraveling Farmer Welfare Models. *Trace Journal*, 5, 1.
- Pulungan, S., Syahni, R., Nofialdi, N., & Nazir, N. (2023). The Perceptions of Sugar Palm Farmers in Relation to the Institutional Development of Sugar Palm Agro-Industry. *International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBA)*, 3(1), 125–134. <https://doi.org/10.54443/ijevas.v3i1.632>
- Rachman, B. (2017). Characteristics of Palm Sugar Farmers and Marketing in Banten. *Agro Economic Research Forum*, 27(1), 53. <https://doi.org/10.21082/fae.v27n1.2009.53-60>
- Rosita, R. (2020). The Influence of the Covid-19 Pandemic on MSMEs in Indonesia. *BUSINESS LANTERN JOURNAL*. <https://doi.org/10.34127/jrlab.v9i2.380>
- Ruru, J. M., & Anantanyu, S. (2011). Empowerment of Palm Sugar Farmers in Wanga Amongena Village, East Motoling District. *Journal of Public Administration*, 5(80), 68–74.
- Syam, R. N. A., Edwina, S., & Maharani, E. (2022). Analysis of the Sugar Palm Agribusiness System in Kiyap Jaya Village, Bandar Seikijang District, Pelalawan Regency. *Journal of Agribusiness*, 24(2), 184–198. <https://doi.org/10.31849/agr.v24i2.839https://doi.org/10.31849/agr.v24i2.8398>