Journal Agrisep: Kajian Sosial Ekonomi dan Agribisnis. 23 (2): 327-350 (2024)

AGRISEP: Journal Of Agricultural Socio-Economic and Agribusiness Studies

https://ejournal.unib.ac.id/agrisep/index

DOI: 10.31186/jagrisep.23.02.327-350

RESOURCES AVAILABILITY AND INCOME ACHIEVEMENT: A DRIVING FORCE FOR COMPETITIVENESS OF RICE FARMING PRODUCTS IN TIDAL LAND, SOUTH SUMATERA, INDONESIA

Dessy Adriani[1*]; Erni Purbiyanti[2]; Serly Novita Sari[3]; M. Huanza[4]; Dini Damayanthy[5]; Merna Ayu Sulastri[6])

[1),2),3),4),5),6)] ***Agribusiness Study Program, Agriculture Faculty, Universitas Sriwijaya, South Sumatera, Indonesia***

* Corresponding Author: dessyadriani@fp.unsri.ac.id

ABSTRACT

The land conversion of rice farming could only be prevented by increasing farming competitiveness. The first step is to map the resource availability supporting paddy farming and income achievement. Therefore, this study aimed to analyze resource availability and income achievement to increase paddy business competitiveness. It used a survey method and observed two populations of farmers producing paddy seed and rice in Tanjung Lago and Rambutan Districts, Banyuasin Regency. Simple random sampling was adopted to determine 130 respondents from two populations, each with 65 rice and paddy seed farmers. The findings showed that resource availability supports farming in tidal land, though it is significantly higher for paddy seed than rice farmers. Regarding income achievements, paddy seed farmers also have higher R/C and B/C values than rice farmers. Income for rice farmers mainly comes from corn, rubber, and oil palm, while paddy seed farmers earn from their farming. This implies that the chance of land conversion into plantations and corn farming is greater for rice than for paddy seed farmers. When this happens on a large scale and in the long term, it impacts national rice production. Therefore, improved resource availability and better integration in production could sustainably increase paddy farming production in tidal land.

Keyword: Income, Index, Mapping, Resources

* Submitted: November 23, 2023
Accepted: July 8, 2024

Cite as:

Adriani, D., Purbiyanti, E.; Sari, S.N.; Huanza, M.; Damayanthy, D.; Sulastri, M.A. (2024). Resources Availability And Income Achievement: A Driving Force For Competitiveness Of Rice Farming Products In Tidal Land, South Sumatera, Indonesia. Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis, 23(2), 327–350. https://doi.org/10.31186/jagrisep.23.01.327-350

INTRODUCTION

Tidal swamplands in Indonesia have an increasingly important and strategic role in agricultural development and national food security. This is due to the land's potential and productivity as well as the availability of management technology. There is an extensive area with the potential to be used as agricultural land, especially paddy farming. Indonesia's tidal swamp land area is around 20.12 million ha, divided into 2.07, 6.72, 10.89, and 0.44 million ha of potential, acid sulfate, peat, and saline land. Furthermore, around 8,535,708 ha could potentially be used as agricultural land, of which about 2,833,814 ha has been reclaimed and 5,701,894 ha has not. Until 2015, the tidal swamp area used as paddy fields was only around 407,594 ha (Susilawati et al., 2016)

South Sumatra Province is the third-largest tidal swamp area and the largest rice-producing province in Indonesia, followed by West Java, Central Java, East Java, and South Sulawesi. Many previous research found that improvements in paddy farming technology have increased tidal land productivity, for example increased rice yields of 127% (Handayani & Isnaini, 2023; Hatta et al., 2023; Ilham, 2014).

The development of paddy farming areas in South Sumatra Province has experienced problems related to land conversion into oil palm. Land is the most efficient wealth-generating asset for farmers (Sitko & Jayne, 2014) and an important economic growth factor (Li, 2014). Land supply's limited and non-renewable nature creates intense competition between the agricultural and non-agricultural sectors. The competition causes agricultural land conversion, significantly reducing its availability and threatening the food supply. The Central Bureau of Statistics of South Sumatra (2022) showed that the paddy harvest area would reach around 10.41 million hectares in 2021. This represents a decrease of 2.30 % or 245.47 thousand hectares compared to 2020. The detail can be seen in the Figure 1.

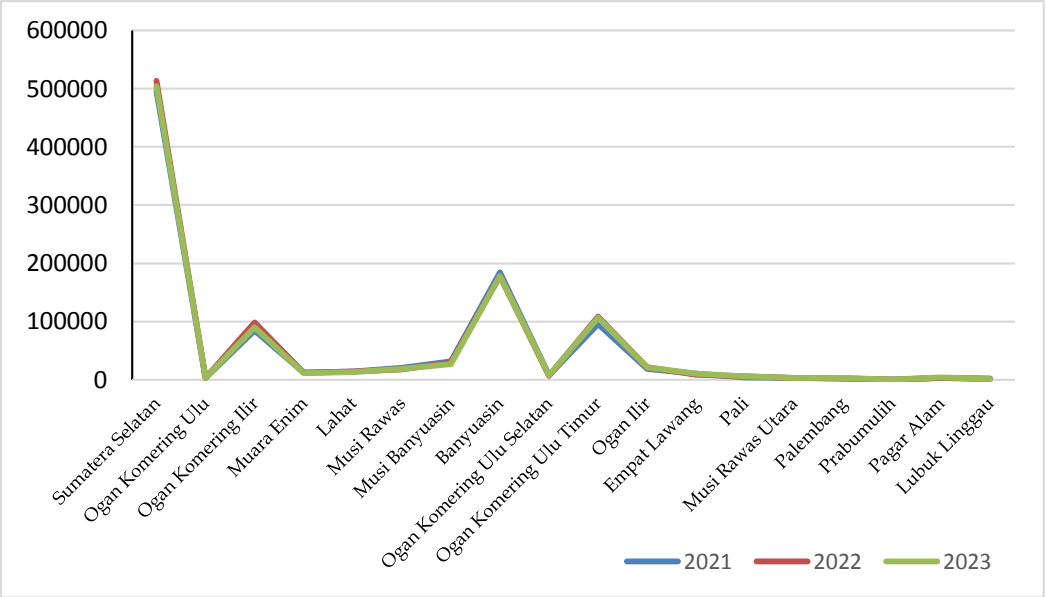

Figure 1.
The harvested Paddy Area in South Sumaetra, 2021-2023 (Harvest Area and Rice Production in South Sumatera. Central Statistics Agency of South Sumatera Province, 2021-2023)

Meanwhile, there would be 54.42 million tons of Milled Dry Grain (MDG) of paddy production in 2021. When converted to paddy, this production would reach around 31.36 million tons, a decrease of 0.45% or 140.73 thousand tons compared to 2020. This conversion also occurs in tidal areas, causing paddy farming to compete with plantation crops, residential land, offices, and factories. (Rondhi et al., 2018); (Dewi et al., 2016) and (Eriyati et al., 2015) stated that paddy farming land is widely converted due to its lower value than other plantations and non-agricultural land.

(Isa, 2016); (Ilham, 2014) and (Appiah et al., 2019) stated that the conversion problem increases with population that threatens agricultural land. The demand for developmental land is also strong, while its area is limited. The population's economic structure causes land use changes, affecting socioeconomic conditions and vice versa. This is in line with (Djaenudin et al., 2016) and (Munteanu et al., 2014) that land use change significantly impacts economic growth. The goods and services supply is a derived demand for the land use change dynamics. This implies that a population upsurge in an area increases the need for goods and services. As a result, additional land area is needed to amplify the goods and services production, leading to land conversion.

Several studies have shown that converting paddy farming land to other plantations and use harms farmers and reduces national paddy production (Dharmawan et al., 2007) Indonesia's food security would be disrupted by the continued land conversion from paddy to plantation crops or other uses (Wahyunto & F. Widiastuti, 2014). According to (Euler et al., 2016); (Rondhi et al., 2018); (Purbiyanti et al., 2021) and (Adriani et al., 2016) this land conversion does not increase the arable area, significantly reduces the use of labor, and increases farmers' income.

The previous research shows that land, especially tidal land, is an essential resource for paddy farmers and ensures national food security (Susilowati et al., 2012); (Wahyunto & F. Widiastuti, 2014). Paddy farming has multifunctional services including rice production, mitigating floods, greenhouse gas, erosion control, and water conservation. It contributes to biodiversity conservation and organic waste recycling, supports food security, provides jobs, maintains cultural and social systems, and creates beautiful rural views (Mukhoriyah & Rokhmatuloh, 2012); (Rondhi et al., 2018); (Purbiyanti et al., 2021).

Comprehensive efforts are needed to prevent paddy farming land conversion by implementing various strategies (Hidayati & Nurul, 2013); (Munteanu et al., 2014); (Subekti, 2015); (Isa, 2016). A more competitive paddy farming has been restructured to support the land conversion policy brief through three targeted components. The components include (1) Enhancing business competitiveness and transparency, (2) Restructuring competition institutions according to international commitments, and (3) Restructuring the rural economy by focusing on paddy value chains and a flexible fund to respond to emerging priorities regarding the land conversion restructuring program. This implies that the conversion problem could be overcome by increasing paddy farming competitiveness. (Michael, 2004); (Rodrigues, 2018).

Competitiveness include comparative and competitive advantage. This was analyzed in previous studies by the ability of products to be replaced with similar products from import and export markets (Pearson, 2015). Instead, the study tried to analyze competitiveness from a different perspective. The success of tidal rice farming is determined by inputs or resources, production, markets, and income. This mapping is essential for assessing resource support for rice farming in tidal lands. The availability of resources and the achievement of high incomes can be indicators of the high competitiveness of rice farming and the basis of policies to prevent land conversion. (Mukhoriyah & Rokhmatuloh, 2012) and (Munteanu et al., 2014) Land conversion will be stop when the resources and agricultural income meet the community needs. Conversion of agricultural land to the non-agricultural sector will continue as long as the B/C and R/C values of non-agricultural activities are higher than agricultural ones. This behavior is actually rational behavior of farmers as a form of adaptation to various economic and environmental changes.

In addition to producing rice and paddy seed, tidal paddy farmers also assess resource availability and economic potential. Thus, this study aimed to examine the performance, availability, and interaction of agricultural resources in boosting the competitiveness of the paddy industry. Based on resource availability and income, the findings are the foundation for developing policies to improve farming competitiveness for rice and seed production. Additionally, the study offers data for developing policies to end the conversion of paddy land.

RESEARCH METHOD

This study was conducted on a serious problem of paddy farming land conversion to plantations and non-agricultural uses. Several studies stated that conversion was due to the lower economic value of land use for paddy than other uses. However, the high land conversion would disrupt household food security policies. Many studies have investigated the causal factors and impacts of land conversion but hardly consider the main focus problem. This is because the studies should analyze the paddy grown on tidal land as a commodity that could compete with other crops and land use for non-agricultural activities. The resource availability and farmer's income determine paddy commodity competitiveness. (Ellis, 2000) and (Widiastuti & Inaoka, 2014) stated that in the livelihood sustainability approach, household resources include human, natural, social, financial, and physical capital. Using this approach, this study was aimed at determining paddy farming competitiveness by focusing on rice and paddy seed as the products. The study framework is presented in Figure 2.

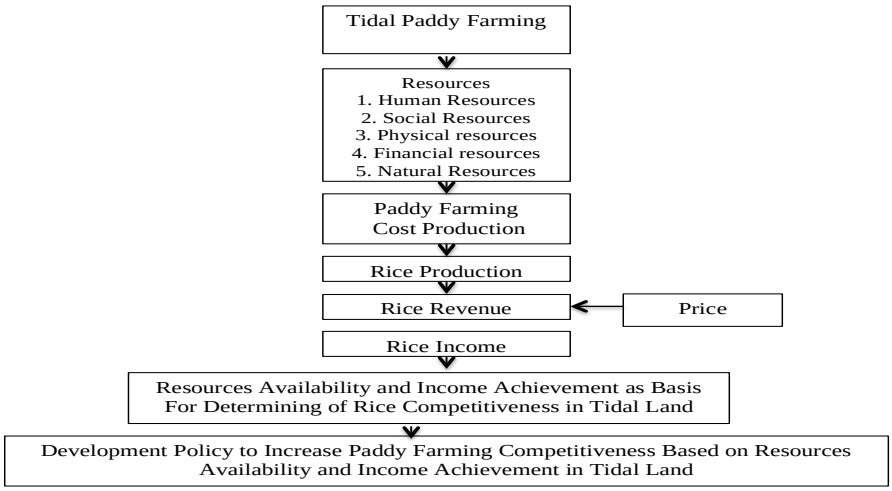

Figure 2.
Research Framework
Source: Research Documentation, 2021

The study surveyed paddy farmers producing rice and paddy seed in Tanjung Lago and Rambutan Districts, Banyuasin Regency, South Sumatra Province, Indonesia. Each location is the largest rice and paddy seed production center in the tidal land area, South Sumatra Province (Figure 3).

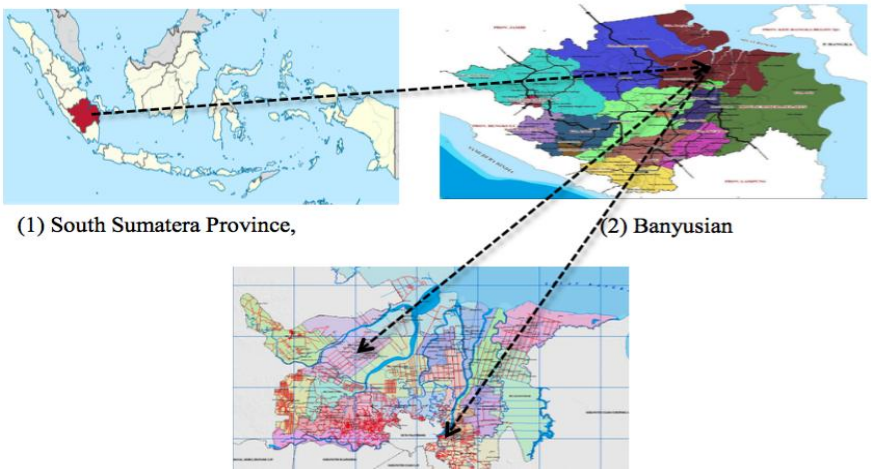

Figure 3.
Research Location (Source: Google Maps, 2021)

Data were collected in March-April 2021 from 130 respondents determined through simple random sampling. The study was conducted in the three villages producing rice and paddy seed. A response rate of 10% was obtained from the respondents determined from two groups, each with 65 farmers, with the number of population in each about 600 farmers Data were collected using a questionnaire modified by the (DFID, 1999) and (Saragih et al, 2007). The analysis followed the sustainable livelihood framework to determine the factors impacting farmers' income and to measure paddy farming competitiveness. The measure of the paddy farming household resources availability on tidal land was used to determine the competitiveness analyzed through five indicators. These indicators included (1) human capital, (2) natural capital, (3) social capital, (4) financial capital, and (5) physical capital. Each indicator is analyzed with several statements, namely (1) human capital with 6 statements, (2) natural capital with 5 statements, (3) social capital with 7 statements, (4) financial capital with 6 statements, and (5) physical capital with 10 statements. Next, each statement is measured with data on an ordinal scale based on assessment: score 1 for low criteria, score 2 for moderate criteria, and score 3 for high criteria.

The study framework was integrated by developing and applying the quantitative technique for measuring Resources Availability. Farmers' resources were analyzed using an index (Shivakoti & Shrestha, 2005); (Widiastuti & Inaoka, 2014). After scoring, the data is transformed into an indicator index. The transformation formula is:

$$Index = \frac{1}{(\sum Max\ Score - \sum Min\ Score)} x(\sum average\ score - \sum Min\ Score)$$

The indicator index value ranges from 0 to 1. The assessment criteria are divided into three classifications with an interval length of 1-0/3 = 0.33. The score values, index values, and index criteria can be seen in Table 1. Additionally, each asset was indexed across all respondents. The asset index is presented in Table 1.

Table 1. Index Range for Competitiveness

No	Index range	Criteria
1	0.00 ≤ X< 0.33	Low means low resource availability, low competitiveness
2	0.33 ≤ X< 0.67	Moderate means middle resource availability, moderate competitiveness
3	X > 0.67	High means high resource availability, high competitiveness

Source: Research Report, 2021

The farmers' responses to the resource availability were indexed and plotted in the pentagon chart. Incomes were analyzed using cost-benefit analysis, and an independent t-test was used to identify significant differences between the groups of farmers ($p < 0.05$) for each investigated variable. Also, the study examined the correlation between resource availability and income using Rank Spearman Correlation.

RESULT AND DISCUSSION

Respondent and Product Characteristics

The respondents' diversity in Table 2 shows that the two groups studied had the same age range between 26-55 years. Farmers producing paddy seed have a higher education than rice farmers. Paddy seed farmers mostly have an area of between 1-1.5 hectares, while rice farmers have less than 1 hectare. Most farmers have 4-6 family members and own the farming land from which they produce the results shown in Figures 3 and 4.

Table 2. Characteristics of Respondents (%)

Category	Paddy Seed (%)	Rice Grain (%)
Age (years)		
26 – 35	25.71	23.33
36 – 45	34.29	20.00

Category	Paddy Seed (%)	Rice Grain (%)
46 – 55	28.57	40.00
56 – 65	8.57	6.67
66 – 75	2.86	10.00
Level of Education		
Uneducated	0.00	6.67
Primary School	28.57	50.00
Elementary School	31.43	13.33
Senior High School	34.29	20.00
> Senior High School	5.71	10,0
Land Area (ha)		
< 1	2.86	46.67
1 - 1,5	60.00	23.33
> 1,5	37.14	30.00
Family members (people)		
1 – 3	17.14	6.67
4 – 6	80.00	90.00
7 – 9	2.86	3.33
Land Status		
Own Land	80.00	22.86
Rent Land	20.00	77.14

Source: Primary Data (2021)

Tidal paddy seed in this location have characteristics, that is: high of seed purity, variety purity, vitality (germination capacity and growth strength) and free from pests and seed diseases. Rice seeds are grain that is harvested for the purpose of used as input in farming. The type of seed produced by breeder farmers is *Inpari* 32. According to (Ratmini NPS & Hendra H, 2019), the *Inpari* 32 variety has several advantages such as resistance to Bacterial Leaf Blight Strain III, somewhat resistance to Bacterial Leaf Blight Strain IV, resistant to RAS 033 blast, somewhat resistance to *Tungro*, and somewhat susceptible to Biotype Brown Planthopper. 1, 2, and 3, as well as a fluffier rice taste with an amylose content of 21.8%. For producing tidal paddy seed, the farmers get seed certification by field inspection and laboratory testing from the authorized agency by meeting predetermined standards. Superior seeds are an important factor in rice production because using of superior quality seeds can increase yield by 15% compared to using of inferior seed. The more superior the seeds used in farming, the more the higher the level of production that will be obtained (Sutopo L, 2004); (Notarianto, 2011).

Figure 4.
Tidal Paddy Seed
Source: Research Documentation, 2021

The types of seeds that many farmers plant to produce rice are *Inpari* 32 and 42. The average productivity is 5 tons per planting season. Farmers in this area mostly sell their grain in the form of harvested dry grain at a selling price of IDR 3,500 per kg.

Figure 5.
Tidal Rice Grain
Source: Research Documentation, 2021

Resource Availability Analysis for Competitiveness of Paddy Product in Tidal Land, South Sumatera

The analysis results of competitiveness data from the resources available for paddy farming are presented in Table 3. From the availability of human resources, paddy seed and rice grain competitiveness are moderate. The indicators for the health level and informal education are in the high category. Formal education is categorized as moderate, but indicators of availability and labour force participation are low. This result reinforces (Adriani et al., 2016); (Adriani et al., 2017) that the labour force participation rate in tidal farming is

lower than the paddy farming in the swamp and irrigated land, and tends to decrease. Therefore, this must be a concern when the government wants to develop. The low availability and workforce participation are consistent with (Susilowati et al., 2012) and (Kauffman1, 1999) that many factors make agriculture not engaging for the young and educated. Moreover, most youths consider working in the agricultural sector not prestigious due to the cultural value system. They preferred moving to the cities and working as construction labours, merchants, or civil servants, a common phenomenon in all regions of Indonesia. The results also showed a shortage of agricultural sector workers in tidal areas.

The competitiveness of the natural resources' availability is also moderate for the two populations studied. An analysis found that paddy seed farmers have a high land ownership, while most rice grain farmers leased their land. It implies that most rice farmers do not own land. Indicators of the land and water resources are categorized as moderate, similar to competitiveness of the planting index indicator. This is because most people only carry out paddy farming once a year due to the tidal land's ecological problems (Jos T. A. Verhoeven & Tim L. Setter, 2010). The natural resource availability is categorized as high, indicating good land and water resources for farming. However, the low crop index for paddy seed farmers suggests that there might be ecological or logistical challenges that limit the number of cropping cycles per year.

The results showed high resource availability, indicating it supports paddy farming products and seeds, and the competitiveness has the potential to be developed. This result is in line with Kusnadi et al. (2011) and Antriyandarti (2015) that paddy farming has higher competitiveness in Sumatra than on Java Island. Table. 4 presents the differences in competitiveness index in the availability of financial and physical resources. Financial and physical resources are included in the human-made resources category. The results show that the competitiveness index for the availability of financial resources is higher for rice than for paddy seed farmers. This higher index is caused by more access to loans not vice versa. In contrast, paddy seed farmers' physical resource competitiveness index is higher. Farmers must meet high physical condition requirements to produce paddy seed. Consequently, physical resources are better in drainage and communication facilities, roads, mechanization, and markets, in line with (Dharmawan et al., 2007) and (Sitko & Jayne, 2014).

Table 3. Indicator for Resource Availability for Paddy Competitiveness Index with Various Products in Tidal Land, South Sumatera

No	Indicators	Competitiveness Index					
		Paddy Seed (n=65)			Rice Grain (n=65)		
		Mean	SD	Degree of Assessment	Mean	SD	Degree of Assessment
Human Resources		0.65	0.10	Moderate	0.61	0.62	Moderate
1	Labour force Availability	0.37	0.11	Moderate	0.35	0.08	Moderate
2	Education Rate	0.70	0.27	High	0.61	0.30	Moderate
3	Labour force Participation Rate	0.43	0.19	Moderate	0.37	0.11	Moderate
4	Health Rate	0.88	0.23	High	0.82	0.24	High
5	Formal Training Frequency	0.63	0.17	Moderate	0.60	0.23	Moderate
6	Informal Training Frequency	0.91	0.14	High	0.88	0.22	High
Natural Resources		0.78	0.08	High	0.68	0.53	High
1	Land Status	0.99	0.06	High	0.91	0.17	High
2	Crop Index	0.25	0.28	Low	0.49	0.22	Moderate
3	Land Resources Availability	0.83	0.17	High	0.77	0.25	High
4	Water Resources Availability	0.84	0.19	High	0.83	0.28	High
5	Other Environment Support	0.71	0.14	High	0.42	0.15	Moderate
Social Capital		0.84	0.36	High	0.74	0.69	Moderate
1	Farmer Participation	0.98	0.06	High	0.95	0.11	High
2	Network Cooperation	0.87	0.16	High	0.82	0.22	High
3	Exchange of Knowledge	0.90	0.15	High	0.80	0.22	High
4	Sharing Information	0.97	0.08	High	0.82	0.28	High
5	Media for Sharing Information	0.78	0.16	High	0.63	0.12	Moderate
6	Solidarity	0.99	0.06	High	0.83	0.22	High
7	Social Problem	0.37	0.08	High	0.33	0.06	Low

Continue....

No	Indicators	Competitiveness Index					
		Paddy Seed (n=65)			Rice Grain (n=65)		
		Mean	SD	Degree of Assessment	Mean	SD	Degree of Assessment
Financial Resources		0.62	0.75	Moderate	0.56	0.66	Moderate
1	Source of Income Variety	0.55	0.20	Moderate	0.69	0.13	High
2	Capital Adequacy	0.75	0.20	High	0.67	0.18	High
3	Saving	0.65	0.25	Moderate	0.49	0.22	Moderate
4	Government Loan Opportunity	0.66	0.21	Moderate	0.40	0.18	Moderate
5	Bank Loan Opportunity	0.60	0.17	Moderate	0.52	0.30	Moderate
6	Loan Repayment Rate	0.54	0.20	Moderate	0.52	0.30	Moderate
7	Receiving Loan Frequency	0.57	0.17	Moderate	0.65	0.29	Moderate
Physical Resources		0.79	0.63	High	0.87	0.49	High
1	Drainage for Paddy Filed	0.58	0.14	Moderate	0.33	0.06	Low
2	Mechanization	0.90	0.15	High	0.93	0.18	High
3	Village Road Infrastructure	0.96	0.09	High	0.95	0.11	High
4	Status of Place Residence Infrastructure	0.95	0.16	High	0.95	0.17	High
5	Condition of Place Residence Infrastructure	0.80	0.24	High	0.86	0.24	High
6	Road Infrastructure for Paddy Field	0.66	0.18	Moderate	0.57	0.15	Moderate
7	Infrastructure for Public Transportation	0.90	0.15	High	0.95	0.11	High
8	Access to market	0.75	0.15	High	0.98	0.06	High
9	Access to Drainage	0.70	0.16	High	0.87	0.25	High
10	Infrastructure for Communication	0.76	0.16	High	0.92	0.13	High
	Competitiveness Index	0.74	0.38	High	0.68	0.59	High

Source: Primary Data (2021)

Table 4. The Differences of Resource Availability for Paddy Competitiveness Index with Various Products in Tidal Land, South Sumatera

No	Variable	Competitiveness Index		*p-value*
		Paddy Seed (n=65)	Rice Grain(n=65)	
1	Human Resources	0.65	0.61	0.05458**
2	Natural Resources	0.78	0.68	0.00005*
3	Social Resources	0.84	0.74	0.00001*
4	Financial Resources	0.62	0.56	0.09160**
5	Physical Resources	0.79	0.83	0.03010*
	Competitiveness Index	0.74	0.68	0.0001*
	Competitiveness criteria	Moderate	Moderate	

Note: * The result is significant at α = 0.05; ** The result is significant at α = 0.10
Source: Primary Data (2021)

Farmers producing paddy seed have better resource conditions than those producing rice. The competitiveness indices are 0.74 and 0.68 for paddy seed and rice farmers, respectively. This happens because paddy seed production requires various qualifications and certification requirements. Furthermore, the average mean value test indicated that the resource availability for paddy farming producing seeds is significantly better than paddy products. Table 3 explains significant differences in the competitiveness index for rice and paddy seed farmers. Figure 5 is the pentagon graph of the Competitiveness Index based on resource availability.

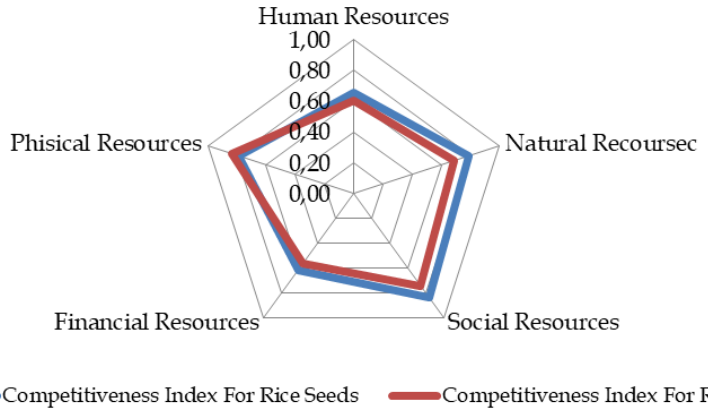

Figure 5.
Pentagon Graph for Resource Availability Analysis for Paddy Competitiveness Index with Various Products in Tidal Land, South Sumatera
Source: Research Documentation, 2021

Income of Paddy with Various Products and Source of Farmers Income in Tidal Land, South Sumatera

Income achievement also determines rice farming competitiveness. Table 5 presents the income achievements of rice and paddy seed farmers. The results show that rice production costs were lower than paddy seeds, which was only IDR 7,604,902.59. The cost of producing paddy seeds was more expensive at IDR 12,554,751.00 due to the relatively long and complicated stages. Almost 80% of all variable cost components are for labour costs. However, the income of farmers producing paddy seed is higher due to the high selling price of their products. The results also show that paddy seed farmers have R/C = 4.21 and B/C = 3.21, higher than rice grain farmers with R/C = 2.51 and B/C = 1.50. the research shows that paddy seed farming is more profitable. It also shows that paddy seed farming have a competitive advantage in price and revenue, thus allowing potentially converting farming (rice grain farming into paddy seed farming) to gain greater profit. The data can be seen in Table 5.

Table 5. Income of Paddy Farmers with Various Products in Tidal Land, South Sumatera

No.	Variable	Unit	Kind of Products	
			Rice Grain	Paddy Seed
1.	Fixed Cost	IDR/Ha/Year	1,768,330.6	180,107.67
2.	Variable Cost	IDR/Ha/Year	5,836,572.03	10,415,359.62
3.	Total Cost	IDR/Ha/Year	7,604,902.59	10,595,467.29
4.	Product	Kg/Ha	5,002.62	5,251.00
5.	Price	IDR/Kg	3,800.00	8,500.00
6.	Revenue	IDR/Ha/Year	19,009,952.38	44,633,500.00
7.	Income	IDR/Ha/Year	11,405,049.79	34,038,032.71
8.	R/C		2.50	4.21
9.	B/C		1.50	3.21

Source: Primary Data, 2021

This research shows that paddy seed farming is more financially profitable than rice grain farming. With this consideration, it is better for tidal land farmers to produce rice seeds rather than rice. However, in its application in the field, financial considerations are not enough to encourage farmers to carry out paddy seed farming. Many other considerations make farmers still prefer rice-grain farming. Doing rice grain farming is a culture that they have been doing for generations. Changing his farming business from rice grain farming to paddy seed farming is also related to changes in farming behavior. Farmers who prefer to produce rice grains in the field in the field stated that they did not want to produce paddy seeds because the production process was long and complicated.

It takes longer work time and a level of patience to be able to produce paddy seeds according to the desired conditions.

Table 6 shows differences in sources of income between the two observed groups. Rice farmers' main source of income is 74.82% from corn, rubber, and oil palm. Paddy farming is only the second source of income for rice-producing households at 22.63%. Furthermore, some farmers with no rubber and oil palm plantations still cultivate paddy once a year and corn in the following season. On average, farmers with rubber and oil palm plantations only farm paddy in one growing season a year.

Table 6. Source of Paddy Farmers Income in Tidal Land, South Sumatera

No	Source of Income	Unit	Kind of Products			
			Rice Grain	%	Paddy Seed	%
1	Paddy Farming	IDR/Year	11,405,049.79	22.63	34,038,032.71	68.32
2	Non-Paddy Farming	IDR/Year	37,698,538.00	74.82	12,217,295.00	24.52
3	Out-Farming	IDR/Year	1,283,332.00	2.55	3,562,857.00	7.15
	Total	IDR/Year	50,386,919.79	100.00	49,818,184.71	100.00

Source: Primary Data, 2021

Paddy seed farmers earn 68.32% of their income from farming, which is different from rice farmers. On average, rice farming is carried out once a year, but farmers do not conduct many other farming activities due to higher productivity and product prices. This finding related to Prasekti (2018)

Based on the diversity of income sources, paddy farming competitiveness is lower for farmers producing rice than seed. Therefore, the chances of converting paddy land belonging to rice farmers into plantations or corn farming are greater than those of paddy seed producers. A large-scale and long-term land conversion would increase national rice production. This result are also in line with Mamondol (2017) and Mekuria et al (2018)

The Relationship of the Competitiveness Index and the Income of Farmers with Various Product on Tidal Land

This section analyses the magnitude of the relationship between the competitiveness index and income achievement using Rank Spearman's correlation. The result of the analysis shows that financial resources positively affect farmer income because paddy seed farmers need more capital to run their businesses. The challenge that farmers often face when implementing morning farming is limited capital. This capital limitation also occurs because opportunities to obtain loans from the government and banks are still very limited. Apart from that, this research also found other challenges in the form of low levels of credit repayment by farmers, for farmers who had the opportunity to obtain

loans. So regarding this financial issue, education for farmers regarding the mechanism for applying for farming working capital credit must also be accompanied by education on changes in behavior for farmers related to farmer loyalty in developing the credit that has been given.

This shows that social conditions could determine paddy farming competitiveness. The result supports (Aldaibat & Al-Daibat, 2017) and (Odeh & Belal, 2014) that relational, structural capital and cognitive, social capital significantly affect competitive advantage. Conversely, the competitiveness index is low for financial resources availability. This indicates that fulfilling financial needs is still a problem in paddy farming. The results support Najim et al. (2007) and Rondhi et al (2018) that increasing farming competitiveness is often hindered by a lack of financial resources, which accelerates the negligence of paddy lands. Therefore, the farmers could be self-sufficient in the paddy schemes by establishing a corporation with financial institutions.

Table 7. The relationship of the Competitiveness Index and the Income of Farmers with Various Products on Tidal Land

Kind of Product	Variable		Competitiveness Index				
			Human Resources	Natural Resources	Social Resources	Financial Resources	Physical Resources
Rice Grain	Income	Correlation Coefficient	.206	.308**	.383*	.125	.158
		Sig. (2-tailed)	.275	.097	.036	.511	.403
		N	65	65	65	65	65
Paddy Seed	Income	Correlation Coefficient	.268	.452*	.356*	.403*	.198
		Sig. (2-tailed)	.119	.006	.036	.016	.253
		N	65	65	65	65	65

Source: Primary Data, 2021

Table 7. presents the relationship of the Competitiveness Index and the Income of Farmers with Various Products on Tidal Land for rice grain farming, farmer income is significantly related at = 0.1 percent to natural resources and social resources. This shows that these two resources determine income. This shows that for farmers who undertake rice grain farming, they do farming even without financial institutions' capital support, physical human resources are limited. This further strengthens that carrying out rice grain farming is a culture passed down from generation to generation from farmers. They can start farming using only rice seeds from the production of the previous planting season, even without fertilizer and other supporting inputs. The opposite happens for paddy seed farming; the farmer's income is not only significantly related at the 0.05

percent level to natural resources and social resources in society, but also significantly related to financial resources. This is because to run paddy seed farming, farmers need more capital than rice grain farming.

Policy Development to Increase Rice Farming Competitiveness Based on Resources Availability and Income Achievement in Tidal Land

The results show a difference between the competitiveness of paddy farming producing rice and seed. Therefore, the solution to increasing competitiveness must be specific and contain local wisdom as also linier on (IPSARD, 2017); Cooper et al., (2000); Djaenudin et al., (2016); Wahyunto and Widiastuti (2017); Dinata et al., (2021) as presented in Table 7. The fundamental problem in paddy farming is the population's low interest in working in the agricultural sector. When this continues, the agricultural sector would be short of the workforce in the future. Using agricultural mechanization could be a short-term solution to the decreased interest in agriculture. However, a long-term solution is a need for literacy policies for the farming profession.

Table 8. Policy to Increase Rice Farming Competitiveness Based on Resources Availability and Income Achievement in Tidal Land: *A Driving Force*

No.	Kind of Resources	Policy	
		Rice Grain	Paddy Seed
1.	Human Resources	• The increase in literacy of the farming profession and its prospect	• The increase in farmer's knowledge on the paddy seed production process
2.	Natural Resources	• The increase in cropping index through land improvement and ecological facilities	• Preparation and improvement of environmental ecology related to location requirements for seed production
3.	Social Resources	• The use of media for sharing agricultural innovation information and extension, such as brochures, radio, television, and newspapers	• Settlement of various social problems in farming activities
4.	Financial Resources	• The increase in literacy towards credit and its requirements from formal financial institutions	• The use of media for information sharing about financial funding • Providing easy access to credit from formal financial institutions
5.	Physical Resources	• The increase in drainage channel facilities	• The increase in drainage channel facilities and infrastructure

Source: Primary Data, 2021

CONCLUSION AND SUGGESTION

Conclusion

The farming competitiveness for paddy seed and rice farmers is moderate, as indicated by indices of 0.74 and 0.68, respectively. The results also show that paddy seed farming competitiveness is significantly higher than rice farming in human, natural, social, financial and physical resources. The rice production costs are lower than paddy seed, which goes through relatively long and complicated stages. However, the income of paddy seed farmers is higher due to the high selling price of their products. Paddy seed farmers have higher return on investment (R/C ratio) and benefit cost (B/C ratio) values than rice farmers. The income source for rice farmers mainly comes from corn, rubber, and oil palm, while paddy seed farmers earn primarily from their farming.

Farming competitiveness is lower for rice farmers than for paddy seed. Therefore, the chances of converting paddy land into plantations or corn farming are greater for farmers than paddy seed farmers. A large-scale and long-term land conversion would impact national rice production.

There is a relationship between the natural, social, and financial resource competitiveness index and farmers' income. The competitiveness index of natural and social resources positively relates to rice farmers' income. In comparison, the competitiveness index of natural, social, and financial resources positively relates to paddy seed farmers' income. Paddy farming is strongly affected a nation's competitiveness in utilizing human, capital and natural resources. Therefore, investment in farmer education and development, access to capital and ensuring sustainable management of natural resources are important to regulate in government policy.

Suggestion

These results suggest that competitiveness and paddy farming are necessary but insufficient. Increasing crop production alone cannot support food security and solve the land conversion problem. Therefore, improved resource availability and better production integration could sustainably alleviate human food demands in tidal lands. For this, we need specific policy, thus:

1. The government (central and regional) needs to improve further good will in efforts to accelerate farming on tidal land through macro-instruments (policies and regulations), medium instruments (institutions and programs development), and micro instruments (innovation and entrepreneurship).
2. The government (central and regional) needs to encourage to the assistance program subsidies for production facilities and

equipment/machinery agriculture, as well as the assessment and verification of technology for produce location-specific technology.

3. Increasing the capacity of extension institutions and other supporting institutions to support effectiveness of on-farm activities and commodity marketing agriculture, and finance.
4. Continue to educate farmers to encourage changes in farmer behaviour, not just carrying out rice farming as part of a hereditary culture and lack of innovation.

REFERENCES

Adriani, D., et al. (2017). Technological Innovation And Business Diversification: Sustainability Livelihoods Improvement Scenario Of Rice Farmer Household In Sub-Optimal Land. *Russian Journal Of Agricultural And Socio-Economic Sciences*, 9(69), 77-88. doi: 10.18551/rjoas.2017-09.10

Adriani, D., et al. (2016). Modal Sosial Rumah Tangga Petani Tanaman Pangan: Mampukah Meningkatkan Pendapatan Petani Di Lahan Pasang Surut. *Prosiding Seminar Nasional Lahan Suboptimal 2016*, (pp. 415-431). Retrieved from Modal Sosial Rumah Tangga Petani Tanaman Pangan : Mampukah Meningkatkan Pendapatan Petani Di Lahan Pasang Surut? - PDF Free Download (adoc.pub)

Aldaibat, B. (2017). The Role of Social Capital in Enhancing Competitive Advantage. *International Journal of Business and Management Invention*, 6(4), 66-78. Retrieved from: https://europub.co.uk/articles/the-role-of-social-capital-in-enhancing-competitive-advantage-A-406632

Antriyandarti, E. (2015). Competitiveness And Cost Efficiency Of Rice Farming In Indonesia. *Journal of Rural Problems*, 51(2), 74-85. doi: 10.7310/arfe.51.74

Appiah, D.O., Asante, F., Nketiah, B. (2019). Perspectives On Agricultural Land Use Conversion And Food Security In Rural Ghana. *SCI*, 1(1), 1-14. doi: 10.3390/sci1010014.v1

Cooper, L., & Ellent. (2000). Public Participation And Social Acceptability In The Philippines Eia Process. *Journal Of Environmental Assessment Policy And Management*, 2(3), 339-367. doi: 10.1142/S1464333200000400

Dewi, R., Kastolani., & Eridiana, W. (2016). Pengaruh Konversi Lahan Pada Pembangunan Jalan Tol Cisumdawa Terhadap Perubahan Status Sosial Dan Ekonomi Petani Di Kecamatan Rangcakalong Kabupaten

Sumedang. *Jurnal Antologi Pendidikan Geografi*, 4(2), 12-25. Retrieved from https://repository.upi.edu/26170/

DFID. (1999). Sustainable Livelihoods Guidance Sheets. Department for International Development. United Kingdom. Retreived from livelihoodscentre.org/documents/114097690/114438878/Sustainable+ livelihoods+guidance+sheets.pdf/594e5ea6-99a9-2a4e-f288-cbb4ae4bea8b?t=1569512091877

Dinata, K. (2021). Strategi Peningkatan Indeks Pertanaman Padi Sawah Di Kabupaten Lebong. *Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis*, 20(2), 305–320. doi: 10.31186/jagrisep.20.2.305-320

Djaenudin, D., et al. (2016). Modelling Of Land Allocation Behavior In Indonesia. *Procedia Environmental Sciences*, 33(1), (pp. 78-86). doi: 10.1016/j.proenv.2016.03.059

Ellis. (2000). *Rural Livelihoods And Diversity In Developing Countries*. Oxford. Oxford University Press. England. Retrived from: https://global.oup.com/academic/product/rural-livelihoods-and-diversity-in-developing-countries-9780198296966?cc=us&lang=en&.

Eriyati., Rosyeti., & Sari, L. (2015). Analisis Faktor-Faktor Penentu Konversi Lahan di Provinsi Riau. *Jurnal Ekonomi*. 23(3), 134-142. doi: 10.31258/je.23.3.p.134-142

Euler, M., et al. (2016). Oil Palm Expansion Among Smallholder Farmers In Sumatra, Indonesia. *Journal of Agricultural Economics*, 67(3), 658-676. doi: 10.1111/1477-9552.12163

Ganesh, S., & Shrestha, A. (2005). Analysis Of Livelihood Asset Pentagon To Assess The Performance Of Irrigation Systems. *Water International,* 30(3), 363-371. doi: 10.1080/02508060508691877

Handayani, E. P., & Isnaini, S. (2023). Analysis Of Chemical Soil Properties And Social Economic Study Of Swampland Rice Productivity. Malaysian *Journal Of Soil Science*, 27(1), 186-195. Retrieved from https://msss.com.my/mjss/Full%20Text/vol27/V27_15.pdf

Hatta, M., et al. (2023). Food Self-Sufficiency: Managing The Newly-Opened Tidal Paddy Fields For Rice Farming In Indonesia (A Case Study In West Kalimantan, Indonesia). *Heliyon*, 9(3), 1-10. doi: 10.1016/j.heliyon.2023.e13839

Hidayati, H. Nurul, & R. A. Kinseng, (2013). Konversi Lahan Pertanian Dan Sikap Petani Di Desa Cihideung Ilir Kabupaten Bogor. Sodality: *Jurnal*

Sosiologi Pedesaan, 1(3), 222-230. Retrived from https://media.neliti.com/media/publications/180248-ID-none.pdf

Ilham, K. (2014). *Konversi Lahan Pertanian di Pantai Utara*. Jakarta: Pustaka LP3ES

IPSARD. (2017). *Policy Brief on Paddy Land Conversion. Institute of Policy and Strategy for Agriculture and Rural Development* (IPSARD). Australia. Retrieved from http://aus4reform.org.vn/en/Library/Restructuring-of-the-Rural-Economy/Publications/policy-brief-on-paddy-land-conversion-437714/

Isa. (2016). *Strategi Pengendalian Alih Fungsi Lahan Pertanian. Badan Penelitian dan Pengembangan Pertanian*. Kementrian Pertanian. Jakarta: Badan Penelitian Dan Pengembangan Pertanian doi: 10.12962/j2716179X.v16i1.8726

Jos T. A, et al. (2010). Agricultural Use Of Wetlands: Opportunities And Limitations. *Ann Bot*. 105(1), 155–163. Retrieved from https://academic.oup.com/aob/article/105/1/155/245730

Kauffman, N. S. (1999). Credit Markets And Land Ownership For Young And Beginning Farmers. CHOICES: *The Maganize Of Food, Farm, And Resources Issues 2nd Quarter,* 28(2), 1-5. Retrieved from: http://www.choicesmagazine.org/UserFiles/file/cmsarticle_308.pdf

Kusnadi, N., et al. (2011). Analisis Efisiensi Usaha Tani Padi Di Beberapa Sentra Produksi Padi Di Indonesia (Rice Farming Efficiency Analysis In Some Rice Producing Areas In Indonesia). *Jurnal Agro Ekonomi*, 29(1), 25–48. doi: 10.21082/jae.v29n1.2011.25-48

Li, J. L. (2014): Land Sale Venue And Economic Growth Path: Evidence From China's S Urban Land Market. Habitat Int., 41(1), 307–313. doi: 10.1016/j.habitatint.2013.10.001

Mekuria, W, et al. (2018). Competition For Land Resources: Driving Forces And Consequences In Crop-Livestock Production Systems Of The Ethiopian Highlands. *Ecological Processes*, 7(30), 1-15. doi: 10.1186/s13717-018-0143-7

Michael E. P. (2004). *Building The Microeconomic Foundations Of Prosperity: Findings From The Business Competitiveness Index*. New York: Harvard University. Retrieved from https://www.choicesmagazine.org/UserFiles/file/cmsarticle_308.pdf

Milstein, A, et al. (2005). Characterization Of Water Quality In Shrimp Ponds Of Different Sizes And With Different Management Regimes Using Multivariate Statistics Analysis. *Aquaculture International*, 13(2), 501-518. doi: 10.1007/s10499-005-9001-6

Mukhoriyah, R. (2012). *Kajian Nilai Ekologi-Ekonomi Lahan Sawah Dan Kaitannya Dengan Rencana Tata Ruang Di Kota Depok*. (Tesis, Program Pasca Sarjana

Universitas Indonesia). Jakarta. Retrieved from https://lib.ui.ac.id/detail?id=20315204

Munteanu, C., et al. (2014). Forest And Agricultural Land Change In The Carpathian Region-A Meta Analysis Of Long-Term Patterns And Drivers Of Change. Land Use Policy, 38(1), 685-697. doi: 10.1016/j.landusepol.2014.01.012

Najim, M., et al. (2007). Sustainability Of Rice Production: A Malaysian Perspective. *Journal Of Agricultural Sciences– Sri Lanka*, 3(1), 1-12. doi: 10.4038/jas.v3i1.8138

Notarianto, D. (2011). *Analisis Efisiensi Penggunaan Faktor-faktor Produksi Pada Usahatani Padi Organik dan Padi Anorganik (Studi Kasus: Kecamatan Sambirejo, Kabupaten Sragen)*. (Skripsi, Universitas Diponegoro, Semarang, Indonesia). Retrieved from: http://eprints.undip.ac.id/29749/

Odeh, B. (2014). The Role Of Social Capital In Achieving A Competitive Advantage. *Alanbar University Journal For Administrative And Economic Sciences*, 6(11), 255-272. Retrieved from https://issuu.com/invention.journals/docs/i0604026678

Pearson, S., Gotsch, & Bahri. (2005). *Aplikasi Policy Analysis Matrix Pada Pertanian Indonesia*. Jakarta: Yayasan Obor Indonesia

Prasekti, Y. H. (2018). Analisa Ekonomi Usaha Penangkar Benih Padi Ciherang (Di Kelurahan Tamanan Kec. Tulungagung Kab. Tulungagung). *Jurnal AGRIBIS*, 4(2), 1-11. Retrieved from http://journal.unita.ac.id/index.php/agribisnis/article/view/38

Purbiyanti, E., et al. (2021). Water-System Changes In Swampy Rice Agro-Ecosystems Area And Their Economic Impacts On Farmers In South Sumatra, Indonesia. *In IOP Conference Series: Earth and Environmental Science*, 800(1), (pp. 1-8) doi: 10.1088/1755-1315/800/1/012030.

Ratmini N. P. S., & Hendra H. (2019). Productivity Of Tidal Swamp Rice Varieties In Diferent Types Of Flooding. In: Herlinda S et al. (Eds.), *Prosiding Seminar Nasional Lahan Suboptimal 2019*, (pp. 559-566). Palembang: UNSRI Press. Retrieved from:

https://conference.unsri.ac.id/index.php/lahansuboptimal/article/view/1671.

Rodrigues A. M. M. (2018). Resource Availability And Adjustment Of Social Behaviour Influence Patterns Of Inequality And Productivity Across Societies. *PeerJ*, 6(3), 1-15. doi: 10.7717/peerj.5488

Rondhi, M., et al. (2018). Agricultural Land Conversion, Land Economic Value, And Sustainable Agriculture: A Case Study In East Java, Indonesia. *Jurnal Land*, 7(4), 1-19. doi: 10.3390/land704014

Saragih, S., Lassa, Jonatab., & A. Ramli. (2007). Kerangka Penghidupan Berkelanjutan (Sustainable Livelihood Framework). Jakarta: Center For Development Research. Retrieved from https://www.zef.de/uploads/tx_zefportal/Publications/2390_SL-Chapter1.pdf

Sihaloho, M., et al. (2007). Konversi Lahan Pertanian Dan Perubahan Struktur Agraria. *Jurnal Sodality Jurnal Sosiologi Pedesaan*, 1(2): 253-270. doi:10.22500/sodality.v1i2.5928

Sitko, N. J., & Jayne, T. S. (2014). Structural Transformation Or Elite Land Capture? The Growth Of "Emergent" Farmers In Zambia. *Food Policy*, 48(2), 2-9. doi: 10.1016/j.foodpol.2014.05.006

Subekti. (2015). Perlindungan Lahan Pertanian Dalam Mengantisipasi Alih Fungsi Tanah Akibat Pengadaan Tanah Bagi Pembangunan. *Jurnal Yustisia*, 4(2), 439-455. Retrived from https://jurnal.uns.ac.id/yustisia/article/%20viewFile/8662/7750.

Susilawati, A., Nursyamsi, D., & M. Syakir. (2016). Optimalisasi Penggunaan Lahan Rawa Pasang Surut Mendukung Swasembada Pangan Nasional. *Jurnal Sumberdaya Lahan*, 10(1), 51-64. Retrieved from https://epublikasi.pertanian.go.id/berkala/jsl/article/view/3363/3396

Susilowati, et al. (2012). Panel Petani Nasional (Patanas): Dinamika Indikator Pembangunan Pertanian Dan Perdesaan. Research Report. Indonesian Center For Agricultural Socio Economic And Policy Studies. Ministry

Of Agriculture. *Agro Ekonomi*, 28(1), 19-31. Retrieved from https://kmc-pengairan.bappenas.go.id/knowledge-management/244

Sutopo, L. (2004). *Teknologi Benih*. Jakarta: PT. Raja Grafindo Persada

The Central Bureau Of Statistics Of South Sumatra. (2022). *The Central Bureau Of Statistics Of South Sumatra*. Retrieved from https://sumsel.bps.go.id/publication

Wahyunto & F. Widiastuti. (2014). Lahan Sawah Sebagai Pendukung Ketahanan Pangan Serta Strategi Pencapaian Kemandirian Pangan. *Jurnal Sumberdaya Alam,* 12(1), 17-30. doi:10.2018/jsdl.v8i3.6479

Widiastuti, I., & Inaoka, T. (2015). Small-Scale Freshwater Aquaculture Practices In Indonesia (Farmers' Livelihood And Impacts On Environment). *People And Culture In Oceania*, 30(30), 73-88. Retrieved from https://www.jstage.jst.go.jp/article/jsos/30/0/30_73/_pdf/-char/ja

Wijayanti, N., Syahdi, M., & Siti, N. (2023). Marketing Strategy of Sumbawa Forest Honey in Sumbawa Regency . *Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis*, 22(02), 285–302. doi: 10.31186/jagrisep.22.02.285-302

Zahri, I., et al. (2018). Comparing Rice Farming Appearance Of Different Agro-Ecosystems In South Sumatra, Indonesia. *Bulgarian Journal Of Agricultural Science*, 24(2), 189–198. Retrieved from https://www.agrojournal.org/24/02-03.pdf