Advances in Economics, Business and Management Research, volume 199
Proceedings of 1st International Conference on Sustainable Agricultural Socio-economics, Agribusiness, and Rural Development (ICSASARD 2021)

The Identification of Local Wisdom in *Lebak* Swampland Management (Shallow and Middle Type) and Its Relation on Rice Farmers' Household Income in Ogan Ilir Regency

Eka Mulyana*, Indri Januarti, Friska Syaiful, Dini Damayanthy*

Agriculture Faculty, Universitas Sriwijaya, Indonesia
**Corresponding Author, Email: eka.agri@gmail.com, dinidamayanthy90@gmail.com*

ABSTRACT
Lebak Swampland is a sub-optimal land that has potentially been used by the community as an integrated agricultural land, generally located in basin areas, forming in various depths and durations of inundation, so that it requires different management techniques. In its management, *lebak* swampland is widely used for swamp rice farming and fisheries (aquaculture and fisheries). In addition, land management by maintaining local wisdom is unique, different from rice farming and fisheries in general. Nevertheless, It's still an option for rice farmers in Ogan Ilir Regency. This study aimed to (1) Identify local wisdom in managing shallow and medium *lebak* swamp type; (2) Analyze the relation of local wisdom on rice farmers' household incomes. Primary data was collected through observation and interviews of 100 *lebak* swamp rice farmers in Ogan Ilir Regency. Data processing was carried out using descriptive analysis and structural equation modeling (SEM). The results of this study showed that (1) local wisdom in managing *lebak* swampland was still maintained by farmers at almost every stage of rice farming and fisheries activities (cultivation or capture fisheries); (2) local wisdom of rice farming at the preparation i.e. *ngambokhan* or *ngerancam* and maintenance stages i.e. by using a sickle had a significantly influence on rice farmers' household income.

***Keywords**: Lebak Swampland, Local Wisdom, Household Income*

1. INTRODUCTION

Throughout 2020 the COVID-19 pandemic has had a negative impact on the sustainability of the world wide economy. At least 44 countries around the world that are experiencing an economic recession, including Indonesia as a developing country [1]. In Indonesia, the second quarter of 2020 experienced a contraction of 5.32% compared to the second quarter in 2019 [2]. However, the agricultural, forestry and fisheries sectors are still one of the sectors that come through positive growth of 2.19% in the second quarter of the 2020 year on year. Even when compared to the first quarter of 2020. The agricultural sector, forestry and fisheries were able to grew 16.24% in the second quarter of 2020 [3].

Facing the new normal situation and unstable economic conditions at this time, everybody including farmers as a primary object of the agricultural sector required to be creative in managing the potential of sustainable natural resources. Therfore, the development of the agricultural sector based on swampland areas is one of the best strategies to optimally and sustainably utilize the potential of natural resources [4]. Thus, in line with the opinion of Sjarkowi (2018) which states that the management of *lebak* swampland through farming activities provides a significant contribution to farmers' household income [5].

As an agricultural country, land management in Indonesia influenced by local wisdom in each area [6]. Local wisdom is an understanding of the culture that has been passed down in a place from generation to

generation, by word of mouth. Local wisdom is also the way of thinking obtained from the accumulation of experience and deep understanding, especially related to land in certain cultures [7]. Local wisdom appears as a form of human effort to survive by interacting with the environment in a balanced way so that there is no natural damage. Most of the local wisdom is obtained from generation to generation verbally without any written rules, but is obeyed by the local community [8].

Ogan Ilir Regency is one of the areas in South Sumatra that has the potential for *lebak* swampland with a wide range of different typologies. Currently, utilizing swampland resources by farming is still the main livelihood of the community. Therefore, the novelty of this research is to determine local wisdom in the management of *lebak* swampland based on land typologies which can later be used as a force for economic development. It's also in line with classic theoretical thinking which states that the level of prosperity is determined by the ability of humans themselves as factors of production and very closely related to local wisdom also economic potential of region. [9].

Based on the description above. Researchers became interested in conducting research that aims to determine local wisdom and see the regional influence on the household income of swamp rice farmers in Ogan Ilir Regency.

2. RESEARCH METHODS

This research was conducted in two villages, namely Rantau Panjang Village and Pegayut Village. The location determination was carried out intentionally, considering that the two villages have different *lebak* swampland because of typologies (shallow and middle land). In addition, the people in these two villages have a livelihood as rice farmers. Data collection activities were carried out in a month, May – June 2021. The 100 data were collected in a primary and secondary data. A primary data used snowball sampling. In managing data, researchers used descriptive analysis and Structural Equation Modeling (SEM) in which data processing was carried out using Smart PLS software. The descriptive study describes an event that Adam obtained based on the data in the questionnaire and key informants. Structural Equation Modeling is part of statistical model that can explain the relationship between variables. The Equation describes all the relationships between among constructs that construct the model [10]. The Variables of this study consisted of three exogenous latent variables, namely local wisdom in land preparation stage (X1), local wisdom in maintenance stage (X2), local wisdom in harvest and post-harverst stage (X3) also one endogenous latent variable, rice farmers' household income (Y). in this study model, there are 8 indicators (manifest variables) are used which can be seen in Table 1 and Figure 1. the following:

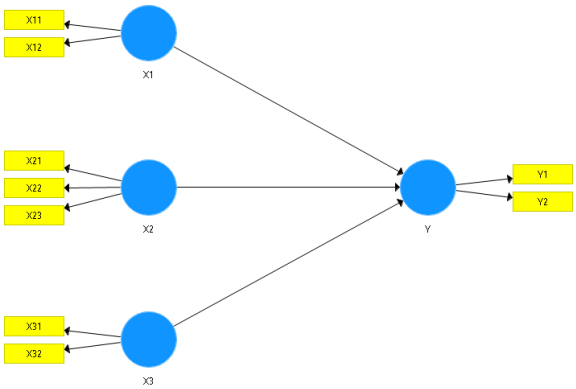

Figure 1. Structural Equation Model

3. CHARACTERISTIC OF RESPONDENT

Based on the results of this study, Table. 1 shows that the characteristics of the respondents can be classified into the following categories, namely: gender, age of the respondent, population status, latest education, number of dependents, land area and experience of rice farming in swampland. In general, most of the respondents in the study are male, are in productive age, are natives of Rantau Panjang and Pegayut sub-districts. The respondent also has last educated in elementary school, have an average number of dependents 0-3 people, have an average land area 0.6 – 1.00 ha and have experience in farming for about 10-30 years. More details can be seen in the following Table 1. bellow:

Table 1. Characteristic of Respondent

Variable	Category	Percentage (%)
Gender	**Male**	**74**
	Female	26
Age (Year)	<30	4
	31-50	**50**
	>50	46
Population Status	**Native**	**85**
	NewComer	15
Education	**ES**	**77**
	JHS	15
	SHS	8
Number of the dependents (People)	**0-3**	**73**
	4-6	27
Land Area (Ha)	0.25-0.50	22
	0.6-1.00	**65**
	>1,00	13
Farming Experience (Year)	<10	7
	10-30	**71**
	>30	22

Source: Primary Data, 2021
Description
ES : Elementary School
JHS : Junior High School
SHS : Senior High School

4. THE TIMELINE OF *LEBAK* SWAMPLAND MANAGEMENT

Based on the typology, *lebak* swamps are divided into 3 categories, namely shallow, middle and deep categories. However, in this study the research location was only based on 2 land categories, namely shallow and middle swamps. With the difference in land typology, the management of *lebak* swampland tends to be unique because it is necessary to pay attention to the situation and condition of the land first. Generally, rice farming activities in *lebak* swampland can only be carried out when the standing water on the land has begun to recede. Meanwhile, cultivation/fishing activities can only be carried out when the swampland begins to be inundated with water. The following is a timeline of rice farming activities and aquaculture/capture fisheries in shallow and middle *lebak* swamps.

Table 2. Calendar of The Activities for The Management of Shallow and Medium Swamps

Typology	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Shallow Swampland												
Medium Swampland												

Source : Primary Data, 2021

Description
: Rice Farming Activities
: Aquaculture/Fisheries Activities

Based on the data in Table 2. Knowing that rice farming and aquaculture/capture fisheries in shallow and middle swampland are different. Rice farming in shallow swamp areas is generally carried out earlier than rice farming activities in middle swamplands. This is because the deeper puddle of a swampland, the longer water will recede on the land. On the other hand, to optimize the use of *lebak* swampland, farmers usually used the swampland by carrying out aquaculture and fisheries activities. However, it can be concluded that aquaculture and capture fisheries activities in the middle *lebak* swampland tend to have a longer period than activities in the shallow *lebak* swampland. On the other hand, rice cultivation activities in shallow *lebak* swamps have a more extended period then middle *lebak* swamps.

5. THE IDENTIFICATION OF LOCAL WISDOM IN *LEBAK* SWAMPLAND MANAGEMENT

5.1. Local Wisdom in Rice Farming

Rantau Panjang and Pegayut villages have a large area of swampland and most people use these resources to carry out rice farming activities. Mostly, farmers usually manage land with an area of about 0.25 ha–2 ha. Rice cultivation activities in *lebak* swampland can only be carried out once a year for three months or when the land was in low tide. Land and weather conditions will greatly affect farmers to start rice farming activities. It was happened, in order to avoid the risk of failure of farmers in doing rice farming. Based on the data in Table 1. It can be seen that as many as 85 percent of the respondents in the study were natives from the villages of Rantau Panjang and Pegayut, thus indirectly activities in the management of rice plants are still mainly carried out with local wisdom. For more details, the local knowledge that exists at each stage of rice farming can be seen in Table 3.

The data in Table 3. shows that local wisdom in rice farming is still applied by the community in almost all stages of rice farming activities. One of the most prominent differences in local wisdom from rice farming activities in shallow and middle land is seeding. In external *lebak* swampland, seeding activities are carried out in two stages on the outskirts of their fields (the dry swampland area). The first seeding was carried out for three weeks. Usually farmers called this process is *ngerencam*. After seeding for three weeks, the seeds will be split again or a second

Furthermore, in the middle *lebak* swampland generally, seeding is generally carried out in a floating method, which is commonly called the local community by the *ngambokhan* process. In this process, the selected rice seeds are spread on woven *purun* grass and some aquatic plants such as hydrilla which have been given soil and organic matter with a thickness of about 5 cm. The next nursery can be covered with plastic or netting to avoid the bird attacks. After three weeks the rice seedlings are ready to be transplanted.

In other stages, local wisdom still exists and was combined with the use of modern technology such as in the maintenance stage. However, local wisdom is no longer found on the other stages, such as fertilization and hervesting stages. Most farmers choose to use chemical fertilizers and combine harvester machines for cost, time and effort efficiency.

Table 3. Local Wisdom in Rice Farming Management

Procces	Local Wisdom (Available/No)		Types of Swampland	
	Shallow	**Middle**	**Shallow**	**Middle**
Land Preparation	✓	✓	Using a mutual coorperation system with simple tools, such as sickles, hoes and machetes.	Using a mutual coorperation system with simple tools, such as sickles, hoes and machetes.
Seeds preparation	✓	✓	Using seeds from previous harvests.	Using seeds from previous harvests.
Seeding	✓	✓	Using a traditional method, called *ngerencam.*	Using a traditional method, called *ngambokha"*
Planting	✓	✓	Using a transpalanting system assisted by a traditional planting tool, called *penojoh.*	Using a transpalanting system assisted by a traditional planting tool, called *penojoh*
Maintenance	✓	✓	Pests controlled by scarecrows and pesticide; weed control manually using a sickle.	Pest control by nets and pesticide; weed control manually using a sickle
Fertilization	-	-	Using a chemical fertilizers as a plant nutrition.	Using a chemical fertilizers as a plant nutrition
harvest	-	-	Using a combined harvester	Using a combined harvester
Post hervest	✓	✓	All the gathered directly sold to a middleman	All the gathered directly sold to a middleman

Source: Primary Data, 2021

5.2. Local Wisdom in Aquaculture/Fisheries Management

Aquaculture/Fisheries Activities on *lebak* swampland are usually carried out by farmers to increase household income. Currently, fisheries are the best choice that farmers mostly make compared to Aquaculture. The reason is that to carry out Aquaculture, farmers need to spend more capital compared to fisheries. In addition, aquaculture activities also need to be carried out on swampland with long period of standing water. Like rice farming activities, aquaculture and fisheries activities are still influenced by local wisdom that they get from their previous ancestors, for more details can be seen in Table 4. The following:

Table 4. Local Wisdom in Fish Management in Swamplands

Types	Local Wisdom (Avaible/No)		Description (based on typology)	
	Shallow	**Middle**	**Shallow**	**Middle**
Aquaculture	✓	✓	Usually used a traditional tool, called *lebak lebung*	Usually used a traditional tool, called *lebak lebung*
Fisheries	✓	✓	Usually used a traditional tool, called *bubu*	Usually used a traditional tool, called *tangkul*

Source: Primary Data, 2021

Based on the data in Table 5. shows that local wisdom is used to manage fish resources in swampland. There are two types of fish management in *lebak* swamps, namely aquculture and fisheries. First, in aquaculture activities, both in shallow and middle land, farmers usually use *lebak lebung*. *Lebak lebung* is a place used for fish cultivation in swamps land areas and made from a combination of net and bamboo. Traditionally made after the paddy rice cultivation activities was done. Second in fisheries activities. Based on available data, there are two types of traditional fishing gear based on local wisdom are used by the community, namely *bubu* and *tangkul*. *Bubu* is a type of fishing tool that is shaped like a tube (curved), usually soaked into the water in a river flow or shallow swamp area. While, in the middle *lebak* swampland, the fishing gear commonly used is *tangkul*. *Tangkul* is a kind of raised net that is operated by hand, square in shape with all four ends on two bamboo or wooden sticks that are installed perpendicular to each other.

6. STRUCTURAL EQUATION MODELS OUTPUT

The structural equation modeling is used to determine whether local wisdom in rice farming has a relationship with farmers' household income. Here is the output path models with loading factor values:

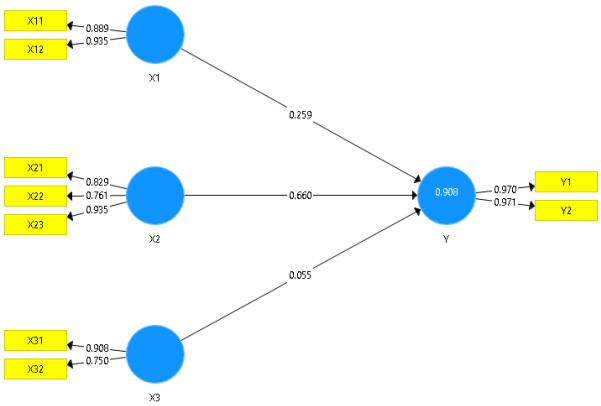

Figure 2. Path models with loading factors values

Description
X1 : Local Wisdom in Land Preparation
X2 : Local Wisdom in Maintenance
X3 : Local Wisdom in Harvest and Post-Harvest
Y : Farmers Household Income

6.1. Measurement Model Evaluation

Measurement model evaluation is carried out to see whether a construct in the model used is valid and reliable or not. There are two stages that are passed to the the convergent validity.

First, by looking at the value of outer loading. The outor loading owned by each indicator. By looking at the outer loading value, it can be seen whether the indicator is valid or not. The indicator is declared valid and able to measure the latent variable in the study. If the value is > 0.7. If the value is <0.7, it means that the indicator is not valid so it is not appropriate to measure the variable and of course it must be discarded first so that the analysis can be continued.

Construct reliability can be seen from its composite reliability value, while construct validity can be seen from its AVE value. Based on the data in Table 5. It can be seen that the constructs in the model are valid and reliable. While discriminant validity is used to see whether the constructs used in the model are really different from other models.

6.2 Evaluation Structural Models

Structural model evaluation is used to see how the relationship between latent variables is measured from two indicators, namely R-Square and F-Square. Based on the data in Table 5. It can be seen that the R-Square value is 0.908. this shows that the ability of the local wisdom variable in preparation, care and harvest can explain the variable of farmer household income by 90.8%. While the remaining 9.2 percent is explained by other variables besides on the model.

Furthermore, the F-Square test used to see each realationship between exogenous latent variables with edogenous laten variable. Based on Table 5 we can see that thevalue shows that only local wisdom on treatment has a strongly influences on farmers' household income.

6.3. Estimating Parameters

Estimating parameters is carried out to see the relationship between indicators and their latent variables (significant or not). the indicator that should measure the variable, the correlation value must be greater than the correlation of the indicator to other variables. The characteristics if the model has good discriminant validity is seen from the value of its cross loading.

The data in table 5. shows that all hands have a substantial connection to the latent variable.

Table 5. The Output of Structural Equation Model

Measurement Model Evaluation (Outer Model)	**Validity and Reliability**	**Variable**	**CR (>0.7)**	**AVE (>0.5)**		
		X1	**0.908**	**0.8317**		
		X2	**0.881**	**0.7135**		
		X3	**0.818**	**0.6934**		
		Y	**0.970**	**0.9426**		
	Discriminant Validity	**Variable**	**X1**	**X2**	**X3**	**Y**
		X11	**0.889**	0.814	0.618	0.725
		X12	**0.935**	0.897	0.767	0.931
		X21	0.828	**0.829**	0.599	0.729
		X22	0.594	**0.761**	0.759	0.642
		X23	0.925	**0.935**	0.754	0.928
		X31	0.734	0.832	**0.908**	0.789
		X32	0.517	0.493	**0.750**	0.500
		Y1	0.864	0.919	0.782	**0.970**
		Y2	0.926	0.923	0.770	**0.971**
Evaluation Structural Models (Inner Model)	**R-Square Test**	**Latent Variable**		**R-Square**		
		Y		**0.908**		
	F-Square Test	**Path**	**F-Square**	**Criteria**		
		X1-> Y	0.083	Week		
		X2 -> Y	**0.413**	**Strong**		
		X3 -> Y	0.010	Week		
Estimating Parameters		**Path**	**Original Sample**	**T-Statistic**	**Description**	
		X11	0.889	14.422	Significant	
		X12	0.935	49.888	Significant	
		X21	0.829	11.442	Significant	
		X22	0.761	8.829	Significant	
		X23	0.935	85.31	Significant	
		X31	0.908	37.716	Significant	
		X32	0.750	8.79	Significant	
		Y1	0.970	59.508	Significant	
		Y2	0.971	67.739	Significant	

Source: Primary Data Analysis, 2021

Description

X11 : Seeding
X12 : Land Management
X21 : Seed
X22 : Fertilizer
X23 : Pesticide
X31 : Harvest
X32 : Post-Harvest
Y1 : Household income
Y2 : Other Income

6.4. The Relation Between Local Wisdom in Rice Farming and Household Rice Farmers Income

The data in Table 6. shows that local wisdom in the preparation and maintenance (X1 and X2) significantly influences on the farmer's household income. Meanwhile, local wisdom in harvesting and post-harvesting (X3) has no significant effect on farmers' household income. It is because at this time local wisdom is no longer applied by farmers at the harvest and post-harvest stages. For example, a combine harvester machine for rice harvesting activities.

This fact also proves that classic theoritical states The level of prosperity is determined by the ability of humans themselves as factors of production and very closely related to local wisdom also economic potential of region is true.

Table 6. The Result of Hypotesis testing

	***Original Sample* (O)**	**T-*Statistics***	**P-*Values***
X_1 => Y	0,259**	1,505	0,133
X_2 => Y	0,660***	4,143	0,000
X_3 => Y	0,055ns	0,571	0,568

Source, Primary Data Analysis, 2021
Notes:
*** Significant at the level of trust 99%
**Significant at the level of trust 95%
nsNot Significant

7. CONCLUTIONS

Based on the results of this research, it can be concluded in several ways, as follows:

1. Most of the people living in Rantau Panjang and Pegayut Villages are local natives, so local wisdoms are still exists and is maintained by the people of Rantau Panjang and Pegayut Villages in managing Lebak swamp land resources.
2. Local wisdom used in almost process of rice farming and fisheries management activities in the Lebak swamp, especially at the stage of seeding and planting rice. In fishery activities, local wisdom is still found in the techniques and tools that farmers use.
3. From the three exogenous variables, there is only one variable, which is local wisdom variable at the preparation and maintenance stage has a substantial connection to the household income of Lebak swamp rice farmers. It is because of both stages are still local wisdom that farmers apply**.**

REFERENCES

[1] *Trading Economics. 2020. https://tradingeconomics.com/#.*(diakses pada Tanggal 26 Januari 2021).

[2] M. M. Aji, Nurin, Sektor Unggulan di Era Pandemi Covid 19 Wilayah Regional Sumatera. Media Pemerhati dan Peminat Statistika, Ekonomi dan Sosial, Vol 6 (11), 2020.

[3] Badan Pusat Statistik. 2020. Pertumbuhan Ekonomi Indonesia Triwulan III-2020 No.85/11/Tahun.XXIII, 5 November 2020.

[4] Edizal, Pendapatan dan Alokasi Pengeluaran Rumah tangga petani Petani Padi Haryanto, J. T. 2014. *Kearifan Lokal Pendukung Kerukunan Beragama PadaKomunitas Masyarakat Tengger Malang Jatim*, 2017, 201-213.

[5] E. Purbiyanti, F. Sjarkowei, D. Adriani, M. Antoni, I Alamsyah, N Yudhistira, G. Utami, Water-system changes in swampy rice agro-ecosystems area and their economic impacts on farmers in South Sumatra, Indonesia. IOP Conference Series:Earth and Environmental Science. Vol 800 (1), 2021.

[6] A. Damayanti, et al, The local Wisdom and Land Use of Paddy Field in Sukarame Vollage, Cisolok Sub-district, Sukabumi Regency. Jurnal Pendidikan Geografi: Kajian, Teori dan Praktik dalam BidangPendidikan Ilmu Geografi, Vol. 25 (1), 2020, 17-24. DOI: 10.17977/um017v25i12020p017.

[7] R. Ngara, Shangwe music for spiritual rituals: A symbolical enactment. Studies of Tribes and Tribals [Internet]. [cited 2019 September 17];, 2, 2013, 127-133. Available from: https://www.researchgate.net/publication/321218385_Shangwe_Music_for_Spiritual_Rituals_A_Symbolical_Ena ctment

[8] E. Widodo, Kearifan lokal dalam mengelola sumberdaya lahan pertanian di lembah sungai sileng purba kecamatan borobudur. SOCIA: Jurnal Ilmu-Ilmu Sosial, 14(1), 2017.

[9] B. Sutikno and J. Batoro, Analisis Kearifan Lokal Terhadap Pembangunan Ekonomi Hijau di Kabupaten Pasuruan, Jurnal Ekonomi Islam. Universitas Brawijaya, Vol. 8 (2), 2017.

[10] M. Gunarto, Analisis Statistika dengan Model Persamaan Struktural. Bandung: Alfabeta, 2018