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ANALYSIS OF LAND USE CHANGE IN PAGU RIVER SUBDISTRICT, SOUTH SOLOK REGENCY

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Abstract:*Land use changes are caused by the needs of local people for the survival of life. This resulted in increased land needs both for settlements and for economic source land. The purpose of this study is to 1) Know the change in land use in Sungai Pagu Subdistrict in 2010 and 2020, 2) Know the extent of changes in the use of rice fields in Sungai Pagu District in 2010-2020. In this study, the classification process was carried out using the Object Based Image Analysis method. From the results of the analysis of land use changes in The Pagu River Subdistrict in the period 2010 to 2020 it is known that the largest land use changes occurred in high land forests. Primary High Density which experienced the largest decrease in land area as much as 11,398 ha, in addition there was a change in the area of use of rice fields, both from other land uses that turned into rice fields, and initially rice fields turned into other land allocations. Shrubbery becomes the largest land use converted into rice fields with a change area of 339.67 hectares.*

Kata Kunci:*changes in land use, agriculture, rice fields.*

I. INTRODUCTION

Land use change is the increase of land use from one side of use to another followed by a decrease in other types of land use from one time to the next, or the change in the function of a land at different periods (Qiu et al., 2021). Another word for land use change is land conversion in the same sense (Maharjan et al., 2020).

Land use change is caused by the needs of local communities for survival (Perpiña Castillo et al., 2021; Yifru et al., 2021). Frequent land use is the conversion of forests into plantation crops such as oil palm, rubber, or other commodities, followed by rice fields converted into settlements, built-up land and industry (Prayitno et al., 2021; Kastner et al., 2021).Most land changes also occur in rice fields to meet the food needs of local people (kullo et al., 2021).

From the land change, of course, it has an impact on the lives of the surrounding community. These effects can be positive and also negative impacts. The positive impact of this land change can be a good building order, increased

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community resources, and many jobs for the community. As for the negative impact of reduced food, natural disasters, and others (Wu et al., 2021).

One of the areas that experienced land changes is South Solok Regency more precisely in Sungai Pagu District. Based on statistical data, in the District of Sungai Pagu last year the number of land has been converted by land and is caused by several natural factors and non-natural factors. Currently, in The District of Sungai Pagu experiencing population growth. This resulted in increased land needs both for settlements and for economic resource land (Giofandi & Nizam, 2018; Giofandi & Sekarjati, 2020; Giofandi & Umar, 2021). In order to meet the needs of life, people change land use without thinking about the future impacts, this will lead to a reduction in natural ecosystems in the area (Giofandi et al., 2020). Moreover, many people change the use of land either from rice fields to other land or other land into rice fields, but the changes in rice fields that occur are not controlled, this causes the area of rice fields that are certainly unknown (Umar et al., 2018 and Ning et al., 2021).

II. RESEARCH METHOD

This research was conducted in South Solok Regency, Sungai Pagu Subdistrict, West Sumatra Province. In this study, the object studied was land use in Sungai Pagu Subdistrict. In this study, the classification process was carried out using the Object Based Image Analysis (OBIA) method. Objects are formed through a segmentation process which is the process of grouping adjacent pixels of the same quality (spectral similarity). Determination of segmentation values based on proper delineation display to avoid under and over segmentation in the segmentation process (Safitri & Giofandi, 2019). In the next step, the smaller image object is combined into a larger object based on the selected scale, color, and shape parameters, which determine the growth of heterogeneity between the objects of the image that are adjacent.

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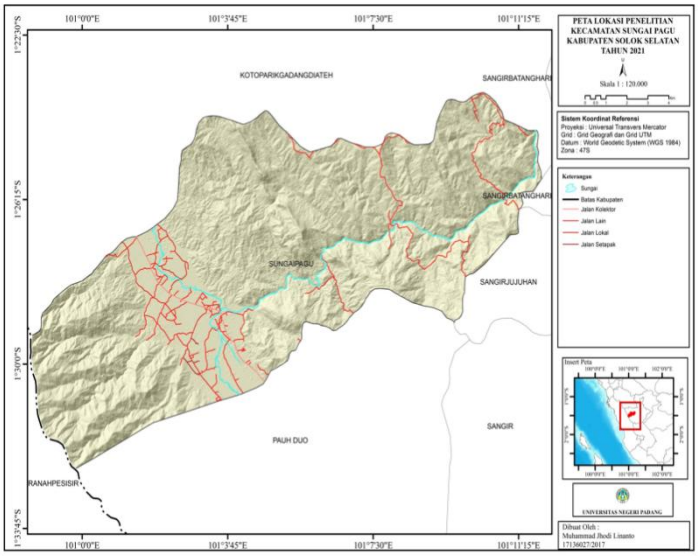

Figure 1. Research Location Map

Then to find out how land use changes in Sungai Pagu Subdistrict from 2010 to 2020 were carried out using overlay or overlap analysis. Overlay is the ability to place the graphics of one map over the graphics of another map and display the results on a computer screen. In short, the overlay appears to a digital map on another digital map and its attributes and produces a combined map of the two that has attribute information from both maps. From the results of this overlay, a map of land use changes is produced in the District of Sungai Pagu and it can be known the broad changes of each land use. from 2010 to 2020.

III. RESULT AND DISCUSSION

Land Use Change Analysis in 2010-2020

Analysis of land use changes is an activity to identify changes that occur in the land, both in terms of area and in terms of the function of the land itself. In line with opinion (Kusrini, Suharyadi, Su, 2011 and Umar & Dewata 2017) states that land use change is a transition of a form and location of old land use into a new one.

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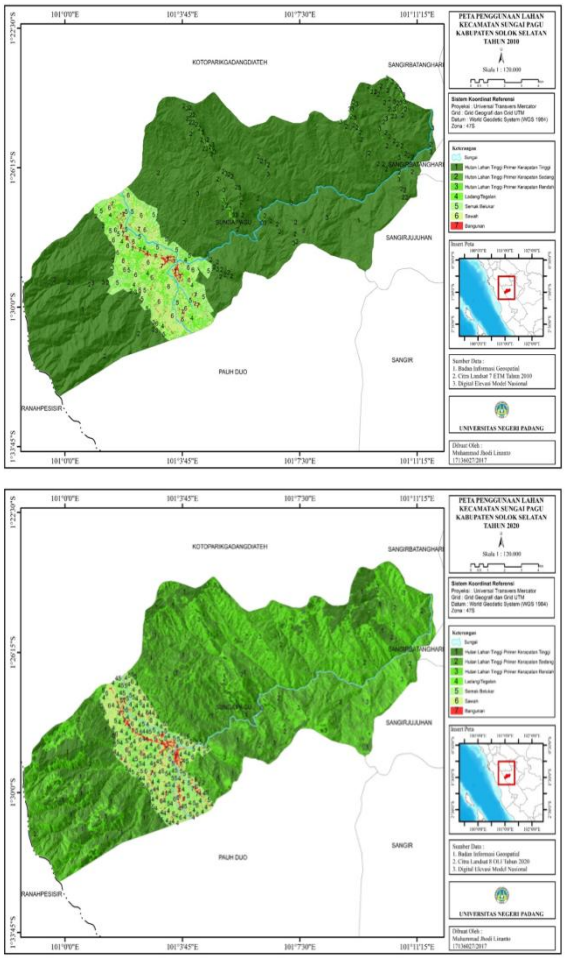

Figure 2. Land Use Map Sungai Pagu District in 2010 and 2020

Based on the classification of land closure by the National Standardization Agency (BSN) in 2014, high-density primary highland forests are forests that grow in dry land habitats in hills and mountains and highland tropical forests, and have not undergone human intervention and have a density of >70%, which belong to this type, among others, tight bamboo forests, tight pine forests, Sengon forests are tight, and dryland forests. While primary high-density land forests have a density of 41%-70% with dryland forest plant types, medium bamboo forests.

From the results of the analysis of land use changes in The Pagu River Subdistrict in the span of 2010 to 2020 it is known that the largest land use changes occurred in the High Density Primary High Land Forest which experienced the largest decrease in land area by 11,398 ha. Meanwhile, land area changes that experienced the highest increase in the period 2010 to 2020 occurred in the land use of Medium Density Primary High Land Forest with a change area of 7,273 ha.

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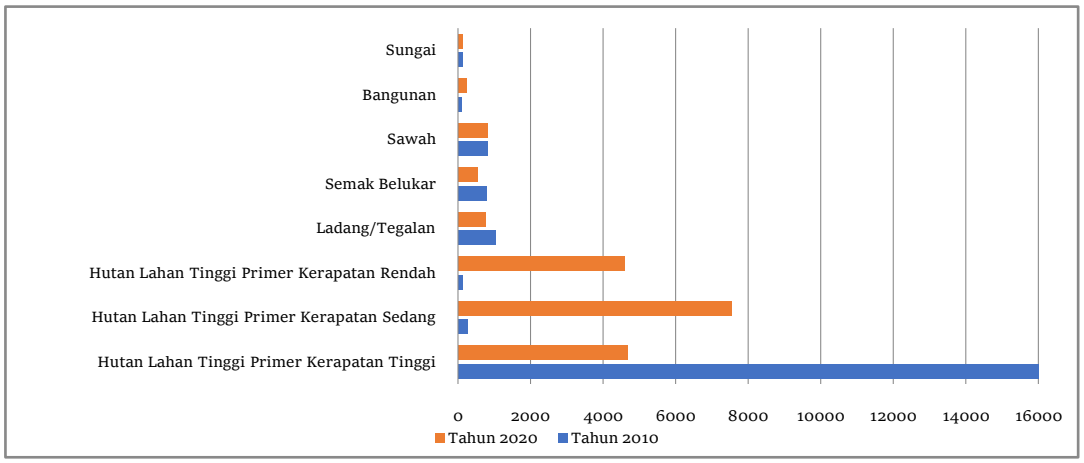

Figure 3. Graph of Land Use Change of Sungai Pagu Subdistrict

Table 1. Land Use Change of Sungai Pagu District

No	Land Use	Broad (Ha)		Change (Ha)
		2010	2020	
1	High Density Primary High Land Forests	16058	4660	-11398
2	Medium Density Primary High Land Forests	259	7532	7273
3	Low Density Primary High Land Forests	110	4601	4491
4	Field	1038	764	-274
5	Shrubbery	779	537	-242
6	Paddy	798	825	27
7	Building	105	228	123
8	River	112	112	0
	Broad	19259	19259	

Source: Analysis, 2021

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Table2. Land Use Code

No	Land Use	Code PL
1.	High Density Primary High Land Forests	01
2.	Medium Density Primary High Land Forests	02
3.	Low Density Primary High Land Forests	03
4.	Shrubbery	04
5.	Field	05
6.	Sawah	06
7.	Rice	07
8.	River	08

Source: Analysis, 2021

In addition, land use that experienced an increase in land area included Low Density Primary High Land Forests experienced an increase of 4,491 Ha, rice fields increased by 27 Ha, and buildings as much as 123 Ha. Meanwhile, other land use that has decreased, namely fields / moors that decreased by 274 ha and shrubs decreased by 242 ha

Changes in The Area of Rice Field Use in 2010-2020

Rice fields are a land used for planting that requires water. Menurut Hochman et al., 2013, Umar et al., 2017 and Umar et al., 2019) rice fields are all agricultural activities in wetlands characterized by a pattern of ripening. Rice has a great contribution to meeting food needs around the world. Most of the rice is consumed in developing countries. Most people in Indonesia choose rice as a staple food and the main source of carbohydrates (Nurliani & Rosada, 2016, Umar ., 2018 and Umar et al., 2019b). From the results of the analysis it is known that the rice fields of Sungai Pagu District, South Solok Regency also experienced changes in land area 2010-2020 which will be spelled out in the following table.

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Table3. Widespread Change in Rice Field Use 2010 to 2020

No	Changes in Rice Field Use 2010 to 2020	
	Change Code	Broad (Ha)
1.	01 to 06	0.1
2.	04 to 06	204.23
3.	05 to 06	339.67
4.	06 to 04	131.72
5.	06 to 05	281.32
6.	06 to 06	280.49
7.	06 to 07	44.37

Source: Analysis, 2021

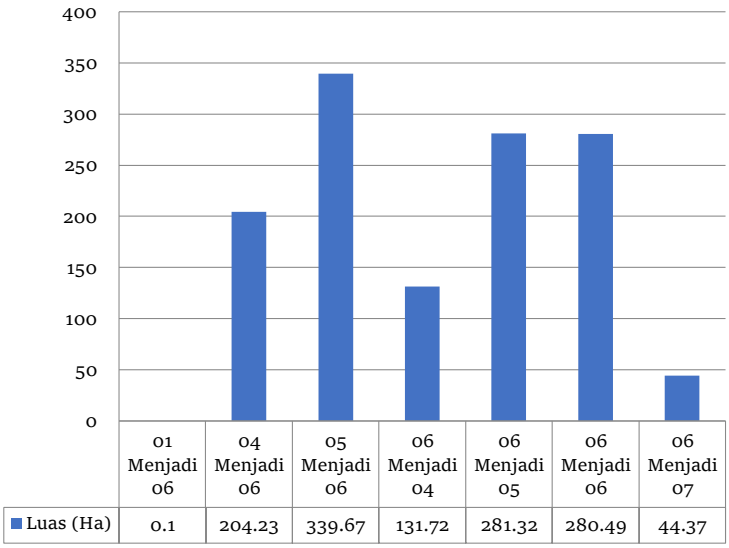

Figure 4. Broad Graph of Changes in Rice Field Use 2010 to 2020

From the table above it is known that in the period 2010 to 2020, there was a change in the widespread use of rice fields, both from other land uses that turned into rice fields, and those that were originally rice fields turned into rice fields other land.

In addition to other land uses that have changed to rice fields, it is also known that there are uses of rice fields that undergo changes such as the use of rice fields into shrubs with an area of change of 131.72 hectares, then from rice fields to fields / moors with an area of change of 131.72 hectares. 281.32 hectares, and from the use of rice fields turned into the allocation of buildings with a change

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area of 44.37 hectares. In the results of the analysis it is also known that the High Density Primary High Land Forest undergoes a change into rice fields of 0.1 hectares, fields / moors converted into rice fields of 204.23 hectares. In addition, Shrubbery becomes the largest land use converted into rice fields with a change area of 339.67 hectares.

Furthermore, rice fields also undergo changes in land use into settlements, this happens because of the increase in population that requires the expansion of settlements that are also close to the population. with rice fields.According to (Umar & Dewata., 2018 , Dewata & Umar., 2019 and Clarke et al., 2021) the habits of rural residents who have a dominant agroecosystem of rice fields are generally much higher than dryland agroecosystems, so that population pressure on land is also higher, many rice fields are located adjacent to urban areas, due to development patterns in the area. In the past, the infrastructure of the rice fields was generally better than the dry land area.

IV. CONCLUSION

The conclusion presents a summary of the description of the results of analysis and discussion, referring to the resolution of community service problems. Based on these two things developed new points of mind that are the essence of the findings of community service. The largest land use change occurred in High Density PrimaryHigh Land Forests which experienced a decrease in land area as much as 11,398 Ha. Meanwhile, land area changes that experienced the highest increase in the period 2010 to 2020 occurred in the land use of Medium Density Primary High Land Forest with a change area of 7,273 ha. While in the period of 2010 to 2020, there was a change in the widespread use of rice fields, , both from other land uses that turned into rice fields, and initially rice fields turned into other land allocations. The change in rice field area in 2010 initially amounted to 798 ha increased to 825 ha in 2020.

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