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Analysis of Land Capability for Direction of Agricultural Land Use on Ex-Mining Land in Batu Butok Village, Muara Komam, Paser Regency

Analisis Kemampuan Lahan untuk Arah Penggunaan Lahan Pertanian pada Lahan Bekas Tambang di Desa Batu Butok, Muara Komam, Kabupaten Paser

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ABSTRACT

The ex-gold and coal mining land in Batu Butok Village, Muara Komam District, Paser Regency is still in the form of landfill that have not been utilized optimally. The potential of ex-mining land can be known by conducting a land capability analysis and can be used to minimize the risk of land mismanagement. The results of the land capability analysis are expected to be a guideline for policy makers in optimally processing ex-mining land. The purpose of this study is to determine the capacity of ex-mining land and recommendations for land use direction based on the condition of existing land capabilities in the research area, applicable regional regulations, and FGD results. The guidelines for land capability analysis in this study refer to Arsyad (2010) and Regulation of the State Minister of Environment No. 17 of 2009 concerning Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning. The results showed that: 1) the land capability classes in the study area were class II and class III. Class II land capabilities are found in land unit 2 and land unit 3. Class III land capabilities are found in land unit 1 and land unit 4; 2) land use directives are based on the types of domestic plants that are usually cultivated by the surrounding community, the results of literature studies, RT/RW of Paser Regency in 2015 – 2035, and the results of FGD. On class II-III land that is not suitable for use or has not been utilized optimally, the choice of land use that can be done is: 1) annuals crop; 2) plantation crops; 3) production forests; 4) non-agricultural use. Based on the results of the FGD with residents and stakeholders in Butok Village, a decision was made that the ex-mining land would be planted with annuals and plantation crops with an integrated agricultural system. The rest of the land in the form of lakes will be used for fisheries and tourism.
Key words: ex-mining land, land capability class, land use, FGD

ABSTRAK

Lahan bekas tambang emas dan batu bara di Desa Batu Botuk Kecamatan Muara Komam Kabupaten Paser masih berupa lahan urugan yang belum dimanfaatkan secara optimal. Potensi lahan bekas tambang dapat diketahui dengan melakukan analisis kemampuan lahan serta dapat digunakan untuk meminimalisir risiko kesalahan pengelolaan lahan. Hasil analisis kemampuan lahan diharapkan dapat menjadi pedoman untuk pemangku kebijakan dalam mengolah lahan bekas tambang secara optimal. Tujuan penelitian ini adalah untuk mengetahui kemampuan lahan bekas tambang dan rekomendasi arahan penggunaan lahan berdasarkan kondisi kemampuan lahan eksisting pada daerah penelitian, peraturan daerah yang berlaku, serta hasil FGD. Pedoman analisis kemampuan lahan dalam penelitian ini mengacu kepada Arsyad (2010) dan Peraturan Menteri Negara Lingkungan Hidup Nomor 17 tahun 2009 Tentang Pedoman Penentuan Daya Dukung Lingkungan Hidup Dalam Penataan Ruang Wilayah. Hasil penelitian menunjukkan bahwa 1) kelas kemampuan lahan pada daerah penelitian adalah kelas II dan kelas III. Kemampuan lahan kelas II terdapat pada unit lahan 2 dan unit lahan 3. Kemampuan lahan kelas III terdapat pada unit lahan 1 dan unit lahan 4; 2) arahan penggunaan lahan didasarkan oleh jenis tanaman domestik yang biasanya dibudidayakan oleh masyarakat sekitar, hasil studi literatur, RTRW Kabupaten Paser Tahun 2015 – 2035, dan hasil FGD. Pada lahan kelas II-III yang belum sesuai penggunaannya atau belum dimanfaatkan secara optimal, pilihan penggunaan lahan yang dapat dilakukan yaitu 1) tanaman semusim; 2) tanaman perkebunan; 3) hutan produksi; 4) penggunaan nonpertanian. Berdasarkan hasil FGD bersama penduduk dan pemangku jabatan di Desa Butok maka dihasilkan keputusan bahwa lahan bekas tambang akan ditanami tanaman semusim dan tanaman perkebunan dengan sistem pertanian terpadu. Sisa lahan lainnya berupa danau akan digunakan untuk perikanan dan pariwisata.
Kata kunci: lahan bekas tambang, kelas kemampuan lahan, penggunaan lahan, FGD

INTRODUCTION

Batu Butok Village is located in the southeast of Muara Komam District, Paser Regency which has ex-mining land about one-third of the village area. Based on BPS data in 2021, rainfall in Batu Butok Village starts from 151 to 264 mm with the highest number of rainy days in September, which is 24 days. Batu Butok Village has an area of 81.30 km^2, which is 4.64% of the area of Muara Komam District. Although Batu Butok Village has a narrow area, the population density reaches 2,418 per km^2. This is because a quarter of the area of Batu Butok Village is traversed by cross-provincial roads. This main road access is the main factor that encourages the development of Batu Butok Village.

Batu Butok Village has a strategic role because it is one of the villages close to the border area of South Kalimantan Province. This village also has many potentials such as tourist attractions to the content of mineral sources. In 2023, Batu Butok Village will receive assistance from the Food Crops Office and the Regional Development Planning Agency in the form of food crop seeds, agricultural equipment, avocado and longan seeds, as well as a rice granary construction program. So it is expected that Batu Butok Village will become one of the buffer villages of Paser Regency.

At first, the majority of Butok villagers were farmers. According to (Indriatmoko et al., 2007), since 1977 along with the development gold and coal mines, many residents have shifted their livelihoods to become miners. This is supported by a greater profit factor in a short time if you become a gold and coal miner. The residents of Batu Butok Village were initially unaware of the impact of the large amount of mining land until many deforested forests accompanied by former mining pits endangered the safety of the surrounding residents. The main river flowing in Batu Butok Village, the Sei Kandilo, is also polluted by mining processing waste, thus disrupting the productivity of tilapia farmers and the daily activities of residents. Mining products are decreasing day by day, so that many residents are switching their livelihoods to become farmers. However, this change in livelihood is not easy due to the lack of knowledge of the population in cultivating ex-mining land.

According to (Direktorat Jenderal Pengendalian Pencemaran dan Kerusakan Lingkungan, 2015), this condition is complicated because the land to be processed by the community is land that has been leased for gold and coal mining activities. The majority of ex-mining land is former gold mining land while a small part is former coal mining land. After the mining activities are completed, the tenant carries out the reclamation stage and continues to return the land to the owner. Land that has been returned to its owner has different conditions depending on the previous land tenant, so there is land that is still in the form of landfill with sparse vegetation, reclaimed land that has been overgrown with wild vegetation, to reclaimed land that has been planted with stands and shrubs. The area of land that has been reclaimed but has not been used for community welfare is estimated to reach more than 1,800 ha. The age of ex-mining land varies from years to decades, there is even 25 years old ex-mining land.

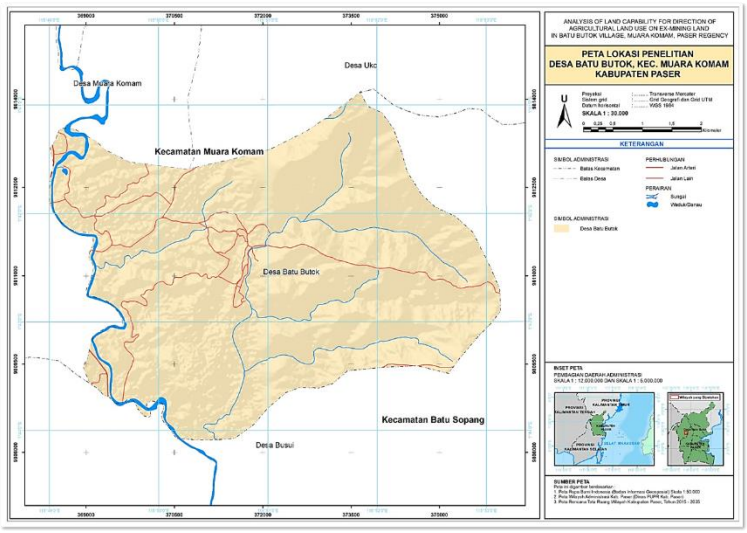
The Regional Development Planning, Research and Development Agency of Paser Regency through the Research and Development Sector in 2022 has set three focus studies, one of which is the use of ex-mining land. The land will be examined for its potential for community welfare with the type of use in the form of integrated agricultural areas, fisheries to tourism. Based on the Regional Spatial Plan (RTRW) of Paser Regency for 2015 – 2035, ex-mining land in Batu Butok Village is included in the designation for food crop cultivation, and some of the spatial patterns are for plantation cultivation. Until the land management instructions will be adapted to the provisions at RTRW. The land management instructions are also based on the farmer's planting culture around the ex-mines and the type of crops that generally grow in the area of Kampung Batu Butok. The culture of farming and local government goals will be discussed and compromised in the Focus Group Discussion (FGD). These considerations will help researchers to produce informed and efficient decisions that are appropriate for the population and the government.

Land use in the research area is less than optimal, as evidenced by the extent of land that has not been processed or has been processed but not optimally. Based on observations on the existing conditions of land use in the research area, there is a tendency that farmers do not understand the condition of the land and the appropriate land use direction. Land use that does not pay attention to land potential, in addition to providing the risk of failure can also trigger environmental degradation. So that input on adaptive methods is needed and is able to be an alternative solution in an effort to advance agriculture in the research area. The objectives to be achieved from this study are 1) determine the class of land capability on ex-mining land in Batu Butok Village; 2) recommend land use directives based on the condition of land capacity and existing land use around the study area and the results of the FGD.

MATERIALS AND METHODS

This research is located in the ex-mining area of Batu Butok Village, Muara Komam District. The research was conducted on 485 ha of former mining land spread across Batu Butok Village. The location of this study was chosen because it is in the form of land that is no longer used for mining activities and has been reclaimed by mining business actors but is only overgrown by wild vegetation. The former mining land in Batu Butok Village is located to the south of the village, precisely near the cross-provincial road. This land is in the form of ex-gold and coal mining land that has been reclaimed to the stage of land landfilling. Current conditions, the ex-mining land has been overgrown by grass more than 30 cm high with high density. At some point, there are heaps that are still open and overgrown with grass with sparse density. There are fields with stands of broadleaf acacia (*Acacia mangium*) and laban (*Vitex pinnata*), while some others *Bridelia* sp. and *Macaranga trichocarpa*. There are also areas overgrown by merentanak (*Bridelia glauca*), mango (*Mangifera indica*), and anggrungan

(*Trema orientalis*). These plants are grown by miners on reclaimed land, but do not provide economic value to landowners and surrounding communities. New ecosystems have been formed on former mining land with the presence of flora and fauna where the fauna found include swamp trampling, caladi tilik, Borneo deer, striped fan, gray cinenen, hedgehog raya, small mouse, moult, rat, small-tailed squirrel, dragonfly, butterfly, rainbow water snake, and bow toad. The ex-mining land is bordered by natural forests, main roads, and rivers. The research was carried out for 6 (six) calendar months from the preparation of the initial report to the completion of the final report, namely from the second week of March to the second week of September 2022.



Picture 1. Map of the research location of Batu Butok Village, Muara Komam District, Paser Regency

The data collected in this study is in the form of secondary and primary data. Secondary data are obtained through literature study activities and collection of data, information and maps at related agencies/agencies, while primary data are obtained through direct surveys in the field and interviews with respondents using questionnaires. Primary data collection for soil characteristics and fertility is carried out through direct observation and measurement in the field as well as sampling for analysis in the laboratory. Primary data collection also uses interview methods carried out at related agencies/agencies at the district and sub-district levels as well as villages of the research location. The research procedure carried out in this study is divided into 5 steps as follows:

1. The first step to determine the land capability class of the research area is to make a map of land units. A land unit is a piece of land that has the same conditions in terms of landform, soil type, slope, and land use (Sitorus, 1985). This land unit is derived from several maps, namely soil type maps, slope maps, and land use maps. The three maps are then overlayed to produce a map of land units. The homogeneous nature of land units will facilitate the research process because the same land units will be represented by one unit.
2. Data collection is directly related to the quality and characteristics of land needed in revealing the potential of land in the research area. The quality and characteristics of these lands are then analyzed based on research guidelines. The data and analysis will provide an overview of how the class of land use capabilities contained in the research area.
3. The guidelines for determining land capability classes in this study are guidelines referred to from (Arsyad, 2010). In more detail, how to determine land capability classes can be seen in Table 1 and Table 2.

Table 1. Scheme of relationship between land capability class and intensity and type of land use

	Land Capability Class	Increase in intensity of land use →								
				Grazing			Cultivation			
		Wildlife	Forestry	Limited	Moderate	Intense	Limited	Moderate	Intense	Very Intense
Increased limitation and hazards ↓ Decreased adaptability and freedom of choice of uses	I	■	■	■	■	■	■	■	■	■
	II	■	■	■	■	■	■	■	■	
	III	■	■	■	■	■	■	■		
	IV	■	■	■	■	■	■			
	V	■	■	■	■	■				
	VI	■	■	■	■					
	VII	■	■	■						
	VIII	■								

Note: Orange colour denotes usability of various class of land (I, II, III, etc.) with respect to various purpose viz, wildlife, forestry, grazing, cultivation, etc.

Source: (Hardjowigeno & Widiatmaka, 2011)

Table 2. Guidelines for determining land capacity

No.	Limiting Factors of Soil Properties	Land Capability Class							
		I	II	III	IV	V	VI	VII	VIII
1.	Top texture (40 cm)	t_1, t_2, t_3	t_1, t_2, t_3	t_1, t_2, t_3, t_4	t_1, t_2, t_3, t_4	(*)	t_1, t_2, t_3, t_4	t_1, t_2, t_3, t_4	t_3
2.	Bottom Texture	sda	sda	sda	sda	(*)	Sda	sda	t_3
3.	Surface Slope	A	B	C	D	E	F	G	(*)
4.	Drainage	d_0/d_1	d_2	d_3	d_4	(**)	(*)	(*)	(*)
5.	Effective Depth	k_0	k_1	k_2	k_2	(*)	k_3	(*)	(*)
6	Erosion	e_0	e_1	e_2	e_3	(**)	e_4	e_5	(*)
7	Gravel/Rock	b_0	b_0	b_1	b_2	b_3	(*)	(*)	b_4
8	Flood	O_0	O_1	O_2	O_3	O_4	(*)	(*)	(*)

Source: Modification (Arsyad, 2010); (Peraturan Menteri Lingkungan Hidup Nomor 17 Tahun 2009, 2009)

4. In the process of data analysis, this study focuses on two aspects, namely the classification of land capabilities and land use recommendations. The guidelines for determining land capacity used in this study are guidelines proposed by Arsyad (2010) and Regulation of the Minister of Environment No. 17 of 2009. The direction of processing is considered from the study of various literature related to research areas as well as ex-mining land. The direction is also based on the Regional Spatial Plan (RTRW) of Paser Regency for 2015 – 2035, the location of this research is included in the designation for the plantation cultivation, and some of the spatial patterns are for limited production forest.
5. After the direction of agricultural land use based on physical conditions and applicable regional regulations has been determined, it will continue with the implementation of Focus Group Discussion (FGD). The FGD was attended by owners of land that has been reclaimed, representatives from each farmer group whose work area is within the scope of ex-mining land, the Head of Batu Butok Village, Agricultural Extension Officers, Representatives of the Paser Regency Agriculture Office, and representatives of gold and coal mining companies as tenants of land. FGD was held 2 times at Batu Butok Village Hall with the duration of each meeting was 90 minutes. The topics of discussion at the FGD were the type of vegetation to be planted, planning the tillage system, and sources of funding in land processing. The agreement obtained in the FGD is the result of this research.

RESULTS AND DISCUSSION

Results 1

Land Capability Research Area

Determination of land capability classes in the research area is one of the first objectives in this study. The condition of land capability in the study area can be determined by several stages. The parameters used to determine land capability in this study refer to the land capability guidelines of (Arsyad, 2010), as well as the Regulation of the Minister of Environment No. 17 of 2009 concerning Guidelines for Determining Environmental Carrying Capacity in Regional Spatial Planning. Based on the division of land units at the research site, 4 different land units were obtained to be sampled in each land unit. The following details of land capabilities in the research area can be seen in Table 3 below.

Table 3. Land capability in research areas

Criteria	Land Unit			
	1	2	3	4
Top texture	t_2	t_1	t_1	t_2
Bottom Texture	t_2	t_2	t_2	t_2
Surface Slope	C	B	B	C
Drainage	d_3	d_2	d_2	d_3
Effective Depth	k_2	k_0	k_1	k_2
Erosion	e_2	e_1	e_1	e_2
Gravel/Rock	b_1	b_0	b_1	b_0
Flood	O_1	O_0	O_0	O_2
Land Capability Class	**III**	**II**	**II**	**III**

Source: Primary Data Analysis (2022)

Based on the data in Table 3, it can be seen that the land capability class in land units 2 and 3 is class II, with inhibiting/limiting factors in the form of effective depth (k), drainage (d), and gravel/rock (b). At the study site, it was found that the effective depth of the soil varied from 90 to 50 cm, with a rather poor layer of soil marked by the discovery of gray spots in the lower soil. The amount of gravel/rock under grass plants is about 20%, so it is categorized as medium, but at some points it was found that the amount of gravel/stone was only 15%.

Class II land requires careful management of soil conservation measures to prevent damage or improve water and air conditions if the land is cultivated for agriculture. Barriers in class II tend to be few but this cannot be ruled out because each obstacle is related to other obstacles. This land is suitable for the use of annuals, grass crops, pastures, production forests, protected forests and nature reserves. This is in line with what (Arsyad, 2010), said that class II land has few obstacles and the necessary actions are easy to implement, so that it is suitable for various land uses. Land in units 2 and 3 provides restrictions on use and requires heavier management. Some actions are needed in the form of special soil conservation, improved soil drainage, or certain management methods if intended for annuals or crops that require land management.

The land capability in land units 1 and 4 are class III, with inhibiting factors in the form of surface slope, drainage (d), effective depth (k), erosion (e), and flooding (o). Field findings show that the land surface of land units 1 and 4 are classified as undulating with several shallow basins. Drainage at sloping locations is good, but at basin locations, brownish spots are found near the soil surface. Erosion on sloping parts of land is quite large, mainly due to the sparseness of vegetation that grows. There were also several floodwaters which according to local residents were puddles that did not subside within 24 hours.

Class III land is classified as land with severe obstacles that require soil conservation and more difficult soil management. This land can be used for annuals and crops that require tillage, grass crops, pastures, production forests, protected forests, and wildlife sanctuaries. This is in accordance with Permen LH No.17 of 2009, class III land can be used for various uses, including for agricultural annuals, crops that require tillage, grass plants, pastures, production forests, protected forests, and nature reserves. Meanwhile, according to USDA in (Suripin, 2002), class III land has rather good capabilities but agricultural business that can be done is rather limited. To be able to carry out agricultural business, it is necessary to improve soil conditions by improving drainage and planting patterns.

Barriers on class III land limit the length of planting annuals, processing time, choice of crops or a combination of them. Cost considerations in processing land are important considerations because the cultivated land is expected to provide benefits in the long run. For non-agricultural use, class III land can be used for recreational activities and research objects. (Arsyad, 2010) stated that soil on class III land is suitable for all types of agricultural businesses with special soil preservation measures such as making terracing, crop rotation and striped planting systems. To maintain soil fertility need fertilizing. This is supported by (Pranowo & Purwanto, 2011), who stated that interstitial planting among plantation crops is one of the efforts to optimize land use to increase land productivity through crop diversification.

Based on the results of the analysis of each land unit in the research area, in general, the ability of land in the research area shows quite high potential, because most of the land units are in the range of class II to class III land capabilities. These lands can be used for various uses, both agricultural and non-agricultural. Agriculture can be both traditional agriculture and modern agriculture. Modern agriculture tends to use manual agricultural equipment and requires large areas of land as in general agriculture in Paser Regency. While modern agriculture is in the form of efficient use of equipment by utilizing narrower land such as hydroponics. The findings of research on former mining sites show that the ability of land is high enough to allow land processing for agriculture, and plantations can run more intensively.

Results 2

Recommendations for Land Use Directives for Research Areas

In a land management decision, the choice to grow crops is often determined by the situation in which the decision will be made. (Larson, 1980) recommends that anyone conduct a study first before making a decision. Situational considerations often arise, such as selling prices, harvest duration, ease of caring for plants, and the scope of marketing of production products. In general, village people in their daily lives still obey the customs that have been passed down from generation to generation, so they choose to plant the types of crops that are generally planted in their area, because they have been proven to produce crops.

The area of planting land is the next consideration because there are several types of plants that require large land to grow or require large areas of land to get greater benefits on certain types of plants. Another factor is capital, where in the cultivation of each type of plant requires different costs. Farmers need careful consideration to manage their financial management where the length of the harvest period also affects the time profits can be received. Agriculture is known to generate profits more slowly than other sectors of the economy and the amount of profit is uncertain depending on the harvest.

According to (Setyowati et al., 2017), for the first period of revegetation activities, intercropping of three types of creepers, shrubs, and grasses was used. Types of plants that are generally used in the revegetation process in East Kalimantan are *Vitex pinnata* (laban), *Syzygium heteroclada* (white guava), *Bridelia glauca* (lice), *Syzygium polyanthum* (salam), and *Ficus variegata* (nyawai). Types of creepers that have great potential to live on ex-mining land are beans and *Mikania* sp. While the types of grasses that can be developed are ruzi grass, atratum grass, mini elephant grass, vetiver grass, setaria grass, and citronella. The type of plant for revegetation is cultivated is a type of plant that is economically valuable and easy

to cultivate so as to provide benefits to the community. However, the condition of revegetation plants is less economically valuable for the people of Batu Butok Village. In Batu Butok Village, people are accustomed to planting ginger and vegetables because the acquisition of seeds is easier and resistant to local weather. The demand for ginger in Paser Regency is stable because it is the main ingredient in local cuisine. The price is relatively stable even for red ginger is quite expensive.

Based on the RTRW of Paser Regency in 2015 – 2035, the majority of research locations are located in food crop designation areas, while the rest are included in plantation designation areas. Food crops that are commonly found and developed in Batu Butok Village are field rice, ginger, and vegetables. Plantation crops commonly planted are rubber, durian, and rambutan.

The appropriate direction for the use of mixed garden land is to maintain the agroforestry system which is a model of annual crop-based agroforestry land management. This is in line with what was stated by (Satibi et al., 2019) concluded that the application of physical soil conservation techniques, such as rorak making and agroforestry development by planting fruit crops and ground cover crops can further improve the hydrological function of protected forests and increase community income. Soil and water conservation techniques that can be applied include planting grass plants as reinforcement and around river flows as filters and making water drains. On steep land, the planting system is more appropriate to use an intercropping system. Intercropping or intercropping is a form of mixed planting (polyculture) in the form of the use of two or more types of plants in one planting area at the same time and somewhat simultaneously.
The following in more detail about land use directions in the study area can be observed in Table 4.

Table 4. Recommendations for land use directives for research areas

Land Unit	Capability Class	Area (ha)	Obstacle	Existing Land Use	Land Use Directions
1	III	119	Top surface texture, surface slope, drainage, effective depth, and erosion	Grass	Annuals crops and crops that require thorough tillage.
2	II	91	Drainage, and surface slopes	Grass	All types of plants and designations however require improved drainage
3	II	103	Drainage, erosion, and slope gradient	Grass	All types of plants and designations however require improved drainage as well as efficient fertilization
4	III	172	The land is undulating with moderate erosion and there are inundations at some points	Grass	Making irrigation and planting of perennial crops interspersed with seasonal crops

Source: Interpretation of Earth view Map, Field Observation (2022), Laboratory Analysis, Permen LH No. 17 of 2009

Discussion

The results of land use directives based on physical conditions and applicable local regulations are then discussed with farming communities and local officials in deciding on their implementation in the field. This is facilitated by the existence of FGD where the results can be seen in table 5 below.

Tabel 5. Recommendations for land use directives for research areas after FGD

Land Unit	Capability Class	Land Use Directions	Recommendations Based on FGD Results
1	III	Annuals crops and crops that require thorough tillage.	Integrated farming between durian, rubber and rambutan
2	II	All types of plants and designations however require improved drainage	Integrated farming between durian with ginger or tubers/ rubber with ginger / rambutan with tubers
3	II	All types of plants and designations however require improved drainage as well as efficient fertilization	Integrated farming between durian with ginger or tubers/ rubber with ginger / rambutan with tubers
4	III	Making irrigation and planting of perennial crops interspersed with seasonal crops	Integrated farming between durian, rubber and rambutan

Source: Interpretation of Earth view Map, Field Observation (2022), Laboratory Analysis, Permen LH No. 17 of 2009, Focus Group Discussion

Batu Butok Village farmers choose to grow annual crops in the form of durian, rubber, and rambutan. Durian is a local plant that is easy to grow in the Batu Butok Village area, as well as rambutan. The selling price of durian and rambutan is quite high with abundant harvests so that the profits obtained are quite high. The age of durian and rambutan plants is long enough, so that the harvest period is longer and will definitely bear fruit every year. The cultivation of rubber plants was originally a program of the agriculture department, but along with the decline in rubber prices, many farmers turned to mining. Currently, rubber prices are quite stable and rubber tree care is quite easy so farmers choose to plant rubber again. The acquisition of seeds will be sought from the cooperation of the agricultural service and mining companies. Tillage will be assisted by field extension workers from the agriculture department as well as representatives from coal mining

companies. Funding for the processing of former mining land in Batu Butok Village will be borne by the coal mining company as a responsibility in restoring the condition of the land after it is mined.

The acquisition of avocado and longan seeds will be planted around the planting land with a limited number. This is because farmers do not know how to care for avocado and longan plants. Grass plants that grow on former mining land will be reduced and replaced with ginger plants and root crops. The reduction of grass plants is because farmers do not use it for animal feed but its existence is still important to reduce erosion on steep slopes. Tubers are quite popular with the people of East Kalimantan, so the selling price is quite stable. Tuber processing is quite diverse, both the tubers and young leaves are taken for sale.

Basin areas that are often flooded will have their drainage system improved and then planned to be planted with rice, fields, ginger, and vegetables. Basin areas often hold water, but the irrigation system is poor so that an appropriate irrigation system will be made, so that the soil is not easily flooded. Vegetable planting is planned using two systems, namely the conventional system by processing land, while the second is a hydroponic system. Farmers will be given training and funding related to the hydroponic planting system so that they are expected to utilize the remaining former mining land.

An additional result of the FGD is that the remaining land in the form of unanalyzed water bodies will be used as fisheries and tourism locations in accordance with the Regional Development Planning, Research and Development Agency of Paser Regency through the Research and Development Field in 2022. Further utilization and continued suitability for fisheries and tourism will be carried out with other research.

CONCLUSION

1. The land capability classes found in the former mining land of Batu Butok Village are class II and class III. Class II is available in units 2 and 3. Class III is found in grades 1 and 4.
2. Land use directions are adjusted to the existing conditions of land units, namely in land units that have not been utilized optimally, land use options that can be done are 1) annuals and crops that require tillage; 2) plantation crops; 3) production forests; 4) non-agricultural use. Meanwhile, the land use directives resulting from FGD are 1) integrated agriculture between durian, rubber, and rambutan; 2) integrated farming between durian with ginger or tubers/rubber with ginger/rambutan with tubers; 3) planting of field rice, ginger, and vegetables. The body of water located adjacent to the research land will be used for fisheries and tourism.

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