

SWOT

by Alfian Misran

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Swot Analysis of Peatland Utilization Assessment for Community (Case Study at Banjar Regency of South Kalimantan)

MONICA RAHARDIAN ARY HELMINA*, PUSVITA INDRIA MEI SUSILOWATI,
AND ALFIAN MISRAN

Faculty of Economics and Business, Lambung Mangkurat University, Banjarmasin, Indonesia

ABSTRACT

Peatland is a unique, marginal, and fragile ecosystem. Its utilization must be based on thorough research and planning, and it needs supports from everyone. Yards, fields, and gardens are the forms that the community generally uses to utilize peatlands. This research aims to assess community's activities in the peatlands as their source of living and income. This research was conducted in Indonesia, specifically in the Province of South Kalimantan within an area with the biggest peatland contour. Descriptive data research was analyzed using thematic, socio-economic, and SWOT analysis. Research finding showed that farming is the suitable source of livelihood in the peatlands, besides plantation and other fields. The highest income from non-land activities on the peatlands are from entrepreneurship, physical service, and animal husbandry. People's general livelihood are as farmers whose prior commodity is with bigger average income than the province minimum wage per month. This is expected to describe that income from peatlands can make the ends meet of the community. This can also increase farmer's knowledge in cultivating their lands, the choice of plant type that is suitable with biophysical conditions of the peatlands. To work on the limit of the community's knowledge, activities and solutions from the experts on how to deal with farmer's problems in cultivating peatlands, are needed. Agroforestry technique is very suitable to analyze the source of livelihood. As forms to reserve lands in a farming world, the use of husk charcoal is also suggested. It has abundant benefits. It is often used for soil loosening, even for composting. Farmers make use of it for making compost, bokashi, Takakura, planting media, and seedbed media.

Keywords: *cage aquaculture, the loading capacity, water pollution*

INTRODUCTION

South Kalimantan, one of the provinces in Indonesia, lies in Kalimantan Islands which area of approximately 3.9 million acres, where 1,8 million acres are forests, and 0,1 million acres are peatlands. One map policy is a policy regulating one map as a guideline in Indonesian development, including peatland map, which area is 14.9 million acres, according to Instruction of President (INPRES) No. 10/2011 and No. 6/2013 regarding Indicative Map of New Permit Delay at Primary Natural Forest and Peatlands. Indonesian peatlands have varieties

of thickness, ranging from 25 cm to over 15 m (Wisadirana, 2005).

The area of idle wetlands and the height of farming sectors make farming as the focus of livelihood. The people of South Kalimantan use peatlands, idle yard lands surrounding their houses, as fields or paddy fields, where it can be planted with paddy, and garden. Most of the people in South Kalimantan, who live in forest areas, live from farming, plantation, and forestry sectors, consequently, peatlands are the main production factors for their source of livelihood. The utilization of peatlands for farming is generally more difficult than the lands with regular mineral substances. It needs more inputs and ways, or a more complex water management model as well as a possibility for negative impacts on the environment (Masganti *et al.*, 2017).

Corresponding Author: Monica Rahardian Ary Helmina,
Faculty of Economics and Business, Lambung
Mangkurat University, Indonesia, email:
monicarahardian@ulm.ac.id

Problems that will occur and often happen are the utilization that is not suitable with the peatland biophysics, besides, it is caused by the planted plants which types are difficult to grow and develop well on the peatlands. It is because the root is waterlogged by acid water, and their nutrients are low (Flood et al., 2021). The problems will affect the livelihood and income received by the community. It can be seen that the economic growth rate in South Kalimantan tends to fluctuate in the past decade. After rising in 2013-2016, the economy was then slowing down in 2018-2019. In 2019, the economic growth in South Kalimantan was 4.08 percent; 5.02 percent below the national average.

Research on peatlands related to economics is rarely conducted. This research, in relation with livelihood and income in the peatlands, is not yet widely published. Some of which are financial analysis of orange farming business and its contribution for the income of peatland farmers in West Sulawesi (Rina., 2009), Jelutong sap as a non-featured timber forest product commodity in the peatlands that can increase farmer's income (Surati, 2021) to increase farmer's income in the peatlands, a research on shallot farming business in Central Kalimantan had also been conducted (Firmansyah *et al.*, 2014).

According to the background description on the previous matter, researchers are interested in formulating the problem, which is, how peatland utilization activities are conducted by the people of South Kalimantan so it can become their source of livelihood and income. This writing is expected to be a recommendation for policy makers to determine the right programs and activities in order that they can become the right source of livelihood and increase community's income in the peatlands.

According to (Damsar, 2016) from etymologysearch on the word 'system' and its definition in the dictionary, it can be understood that a system is "an interaction regularity among components or parts to form

totality". Some experts have proposed their opinion about the concept of system and given boundaries about it. The definition of system by (Winardi, 1980) was proposed in his book about 'An Introduction of System and System Analysis'. According to Winardi, system is a set of independent elements which is interrelating or influencing each other. System is a conglomerate of specific things, which on the whole, forms an integrated whole.

Gabriel A. Almond (1965), stated the definition of system as an organization interacting with an environment that influences each other. In Universitas Terbuka (Open University) module of Indonesian Social System, (Lawang, 1994) describes the meaning of a system as an interdependence between a component and the other, in a constant reciprocal relationship. What is constant? Constant is what happened yesterday, and tomorrow will be repeated in the same way, and because its characteristic is constant, the interaction relationship pattern has a specific system. Within several opinions, it can be concluded that a system is an interdependent and constant group of interrelating components.

Peatlands are wetlands with a waterlogged soil layer consisting of dead and rotten plant materials. Included as peatlands are moors, bogs, mires, peat swamp forests, and permafrost tundra. The overall area of peatlands reaches half the area of wetlands in the world and covers 3% of the total earth surface area. All peatlands can be seen on many sides of the world. Wetlands are the main habitats in Kalimantan, which area covers more than 10 million acres, approximately 20% of Kalimantan land mass (Joosten, H., & Clarke, 2002).

The local community in the peatlands does not have any other choices but to try to utilize the peatlands as well as possible. To fulfill their livelihood, they plant, breed animals, catch fish, or hunt. Agricultural expertise is gained as a heritage from generations which finally encourage the local community to open the land and to widely plant them for everyday foodstuff, such as rice, sago, sweet potato, corn, etc. Knowledge inherited over

generations becomes a learning process for the next generation until it becomes an institutional custom called local wisdom.

According to The Concise Oxford Dictionary (Gregory and Altman, 2003) a system is, a complex whole, organizing related things or parts, and secondly, as a method. The source of livelihood in South Kalimantan is dominated by 36% of trading sectors; 18.72% of mining and excavation; 32% of farming, plantation, and forestry; 13.63% of process industry; and 8.30% of unemployment.

According to Rangkuti (2013) SWOT is an abbreviation of four letters consisting of S-W-O-T; Strengths, Weaknesses, Opportunities, and Threats. SWOT analysis organizes your main Strengths, Weaknesses, Opportunities, and Threats into an organized list and it is usually presented into a simple grid bar. Strengths and Weaknesses are from your internal company. The things that you can control and change. For example, who are in your team, your patent and intellectual property, and your location. Opportunities and Threats are external things that influence business and things happen outside your company, in the bigger markets. You can utilize opportunities and protect them from threats, but you cannot change them. The examples include competitors, the price of raw materials, and customer's shopping trend (Higa, C. K., Daleiden, E. L., & Chorpita, 2002).

MATERIALS AND METHODS

This research was conducted in the Province of South Kalimantan, especially in Banjar Regency. The choice of location was decided based on a phenomenon found by the researchers in Banjar Regency, where it has wide peatlands, where they become the source of people's livelihood. Banjar Regency has 20 sub districts. This research was intended to thoroughly explain how the people's livelihood system in the peatlands is. The type of this research used qualitative descriptive approach. It was where this

research was as stated by (Koentjaraningrat, 1997) that the purpose of qualitative research is to precisely describe characteristics of an individual, situation, symptom, or certain group, or to determine a system frequency or distribution or frequency of a certain correlation between symptoms and other symptoms in the society. The subjects of this research were people who were considered as capable of giving explanation on the assessed problems. The subjects were chosen based on the recommendations by the district office or people in the surrounding area when the researcher conducted observation.

Data collection technique in this research was observation, thorough interview, and documentation. Observation was conducted by the researchers by directly observing the condition in the location of the research. Thorough interview is data collection by directly communicating with the subjects to gain data from them by asking the questions made previously before conducting the interview. When conducting a thorough interview, researchers' new questions arose. Documentation is collecting data such as photos, videos, from events that the researchers found in the field.

Data analysis used matrix ranking analysis which was used in data collection according to assessment ranking from information given by the respondents. Matrix ranking analysis is an activity used to analyze and prioritize information in facilitating group discussions when opting for the best action (Gay, K., Stubbs, E., & Gonzalez, 2016), where it can be reached by utilizing qualitative priority system resulting in the right numerical value to be compared and classified (Harder, Katzarko, & Liu, 2013). The collected data was analyzed by using thematic and economic social dimension analysis (ESDA). Furthermore, Strength, Weakness, Opportunity, and Threats (SWOT) analysis was used for the development of alternative livelihood. Thematic analysis is used to analyze qualitative information and systematically, it gains knowledge and empathy on someone, interaction, group, situation, organization, or culture (Komori, 2017). Thematic analysis was used to categorize sources of livelihood.

RESULTS

General Description Research Location

The area of $\pm 4.668,50$ Km² is the third widest area in the province of South Kalimantan, after Kotabaru and Tanah Bumbu Regencies, consisting of 20 districts, 277 villages and 13 subdistricts. The topography of this area is varied, not all areas are lands. The hills and the mountains are divided in the north and east areas. The west and the east sides have lowlands and are in the form of regular and swam lands. Besides covered by sedimentary rocks and consisting of highlands, some parts of Banjar Regency are lowland areas passed by big rivers; Martapura River, Riam Kanan River, and Riam Kiwa River, as well as several small rivers where their hydrography condition is highly influenced by rainfall, especially the swamp areas. The area of Banjar Regency is mostly dominated by climate B type, which annual rainfall ranges from 2,000 – 2,500 mm, daily rainfall ranges from 9,5 – 18,6 mm/rainy day and monthly rainy-day ranges from 12,3 – 15.6 days/month. Air pressure ranges from 1.007,3 - 1.014,3 millibar and air humidity ranges from 48-100%. Meanwhile, air temperature ranges from 20°-36,2° C, and average wind velocity is 5,5 knots. The percentage of sun radiation ranges from 21-89%.

The life of the people of Banjar Regency

cannot be separated from farming lands, because they are one of the production tools that have important meaning to the farmers. The area of Banjar Regency is 4.668,50 acres, divided into 20 districts. The existence of lands means that of the farmers. Farming lands consist of several types, depending on potentials of each area. Banjar Regency is an area where the type of its farming lands is peatlands or peat areas, so farmers, in managing their lands, they bring up local wisdom and it is gained from generations then and now. People, whose livelihood majority is as farmers, are identical with the terms of mutual cooperation and help, which is a cooperation to reach their interests.

The utilization of peatlands by the local community for farming areas is still traditional, and generally only for fulfilling their family's everyday needs. Nevertheless, peatlands become the source of livelihood of the people of Banjar Regency at the moment, where it is at the peatlands the farmers plant and sow the crops. The lands owned by the farmers are the lands acquired from the land distribution from the beginning. However, it is until the lands owned by the farmers get bigger, because they can get them by purchasing the lands of other people who sell their lands because of a certain reason. The utilization of land space in the area of Banjar Regency, according to its utilization type, consists of 14 types, they are:

Table 1. Utilization of land space in Banjar Regency Area

Land Type	Land Area (ha)
Rice Field	71,076
Moor/People's Garden	36,735
Farm/ Huma	18,857
Plantation	55,294
Land Planted with Timber/ Community Forest	16,759
Pond	44
Pond/Field/Pond	1,732
Meadow	45,320
While Not Working	45,320
Planted Yard	20,518
Houses, Buildings and Yards	16,227
State Forest	86,579
Planted Swamp	11,714
Etc	11,714

Livelihood System in peatlands

Livelihood is a human activity to make ends meet or to get a good standard of living. The source of livelihood in South Kalimantan is dominated by 36% of trading sector, 18.72% of mining, and excavation, 32% of farming, plantation, and forestry, 13.63% of process industry, and 8.30% of unemployment. The good standard of living is acquired in different ways. It is because it is in accordance with human ability, natural condition, and existing potential. However, needs fulfillment is different in each area. The people of Banjar Regency are blessed with thick forests and peatlands, where they have a high level of biodiversity. Among the natural trees growing in this village, there are rubber or palm trees. Now, palm trees are kinds of plants that are considered suitable for peatland utilization. These palm trees are the ones that make some residents in Banjar Regency have a

stable life. The people of Banjar Regency are identical with paddy, palms, and rubbers. They even have been the source of living and the pride of the people in Banjar Regency.

There were frequent fires in the forests and lands. The source was not from Banjar Regency, but it was from one of the companies in the surrounding area, so the fire went to the area of Banjar Regency. Prior to that situation, many impacts, caused by this fire, occurred. They were, smokes caused by the fire were everywhere, and there were also economic impacts suffered by the community. 20 hot spots were monitored, where they appeared in several areas like the Regencies of Banjar, Kotabaru, Tapin, Tanah Laut, and the city of Banjarbaru. Besides economic loss, there was also ecological one, which was the decrease of the forest areas and peat damage.

The damaged peats caused by the fire cannot be functionalized, because they turned dry and could not store water normally. At the same time, the

smoke caused by the fire was everywhere, they polluted the air, and as a result, the air was no longer clear. The fires happened because of many factors; the wider peat opening, the many canalizations so the forest water descended to the canal surface that streams to the sea, the lack of prohibition to humans in cultivating the lands, the many damaging human activities around and outside the forests. Fires were caused by the lack of care toward the environment, because when there was a fire, the weather condition was extremely hot, thus the impact of it would be to the community themselves. The economic loss was deeply felt by the community who made ends meet from their land production. The loss made the people lose their income and must seek another job to make their ends meet. After the fire, they started to slowly recultivate their lands. Some community's effort to prevent fires on their lands were:

1. Making Canal Blocking. Canal Blocking is a necessary effort to increase water capacity of the peats. Accordingly, by the existence of this canal blocking, the lands will be maintained and fires will not happen again.
2. Cultivating the lands by replanting in accordance with the village's local wisdom.

Paddy and horticultural plants are considered as plants that can recover peats. Consequently, planting paddy on the peatlands does not only gain economic profit for farmers at the peatlands, but also ecological benefit. Therefore, the peatlands will keep maintained. According to identification on the types of plants cultivated on the lands of the people of Banjar Regency, either on their yards, gardens, and field, plants that can contribute to people's life are palms, paddy, rubbers, durians, bananas, vegetables, herbs, fruits (pineapples, oranges, papayas) and *palawija* (corns). In Banjar Regency, paddy is a that the commodity people rely on to make ends meet.

The widely relied on plants are palms because they can fulfill people's daily needs.

The result of matrix ranking (Table 2 and Table 3) was, in Banjar Regency, it was learned

that there are three types of the most reliable farming business as the source of livelihood: paddy, palms, rubbers, and horticulture. In the plantation, there were rubbers, palms, and oranges. Meanwhile, animal husbandry in the peatlands that was turned into livelihood alternatives were ducks, cows, buffalos, and some fish. If it was seen from data of agriculture, paddy had the biggest role as the source of livelihood, followed by rubbers, oranges, *palawija*, and palms.

DISCUSSION

Daily and major needs of the people in Banjar Regency were fulfilled by the produce of paddy plants. Contributed commodities on the annual income were paddy and palms. In terms of cultivating the plants, paddy was considered as the easiest, although sometimes the water acidity in the lands disturbs the paddy growth.

Nonetheless, because of the river irrigation surrounding the lands, the land acidity decreases. At the same time, palms were slightly difficult to manage. They needed special treatment to grow. The daily needs of the people in Banjar Regency in the peatlands were also fulfilled by the produce of oranges and *palawija*. The marketing of paddy, rubbers, and palms was very easy, where generally wholesalers, collectors, or the head of the village will come directly to the farmers and some were managed by BumDes (Village-owned Business Entity).

In supporting the rise of farming produce as a community's livelihood, besides farming counselor officer and farm village medics, farming groups and their combination were established to streamline the adoption of farming technology in Banjar Regency. The farming groups were divided based on the level of skill. There were four class distributions: beginner, intermediate, advanced, and expert. There were 904 groups in the beginner class, 1033 groups in the intermediate class, 102 groups in the advanced class and 3 groups in the expert class, in the districts of Sungai Tabuk, Aluh-Aluh, and Gambut.

Alternative Source of Livelihood in the Peatlands

The produce achieved by farmers in cultivating peatlands was not maximum. This was caused by the problems in farming, such as biophysical condition, pest attacks, and plant diseases, the knowledge limitation of farmers to cultivate their lands, the choice of plant types according to the biophysical condition of the peatlands. To solve the problems of people's knowledge

limitation, it is necessary to provide activity choices and sources of livelihood for the community in the peatlands, by using agroforestry techniques that are suitable with their biophysics. Some agroforestry techniques had been practiced at Tumbang Nusa Forest area with special purpose (KHDTK), Central Kalimantan Province (Harun, 2015). Learning results of various agroforestry patterns attempted since 2003 in KHDTK Tumbang Nusa were aimed to create farming practices that were lasting and resistant, where they had been develop-

Table 2. Matrix of livelihood source

District Name	An area (km2)	Type of farming										
		Agriculture					Plantation			Fishery	Farm	
		Paddy	Potato	Veg	Pea Nut	Corn	Rubber	Lemon	Palm Oil		Duck	Cow
Aluh-aluh	82,48	1								1	1	
Gambut	129,30	1										1
Kertak	45,83	1										
Hanyar												
Tatah	35,47	1										1
Makmur												
Sungai Tabuk	147,30	1	1			1		1		1		
Martapura	42,03											
Martapura Timur	29,99	1		1				1				
Martapura Barat	149,38	1	1	1								
Astambul	216,50	1		1			1	1	1		1	
Aranio	1166,35	1			1		1	1		1		1
Sungai Pinang	384,40	1	1		1	1	1	1	1			
Paramasan	560,85	1	1		1	1	1		1			
Pangaron	433,25	1	1	1	1	1	1		1			1
Sambung Makmur	134,65	1	1	1	1	1	1		1			1
Mataraman	149,38	1					1	1	1			
Simpang Empat	453,30	1	1	1	1		1		1		1	
Telaga bauntung	158	1	1	1	1	1	1		1			
Karang Intan	215,35	1		1			1	1	1	1	1	
Beruntung Baru	61,42	1									1	
Cinta Puri	500		1		1		1	1	1		1	1
		18	9	8	8	6	11	8	10	4	8	4

ed since 2004 by the technique. According to SWOT analysis from the alternative source of livelihood, the strategies that were an intermediary of strengths/supporters with opportunities were: Peatlands cultivation were conducted by the supports of all parties, either the government or other related parties, aiming to

increase people's economy and ecology sustainability in the peatlands; agroforestry technique development by diversifying plant types of forestry, plantation, and agriculture; and household industry development from main commodity produces in the peatlands. *Jelutung*-based agroforestry is combined with seasonal plants, such as corns, palms, and paddy (Wardie, 2016;

Wardie & Sintha, 2017). One of *palawija* plants planted on the peatlands is corn (Malta, 2011).

According to SWOT analysis of alternative source of livelihood in the peatlands, strategies that becomes intermediary between strengths/supporters and opportunities are:

1. Conducting peatland management by the supports of all parties, either regional government or other related parties, aiming for enhancing the people's economy and the ecological sustainability in the peatlands.

2. groforestry technique development with diversification of the plant types of forestry, plantation, and agriculture; and

3. Household industry development from the main commodity produce in the peatlands.

Diversification of the plant types of forestry, plantation, fruits, and seasonal can be conducted in agroforestry techniques to increase land productivity as well as to make ends meet for the farmers through harvest diversification daily,

Table 4. SWOT analysis

Internal	<p>Strengths</p> <ol style="list-style-type: none"> a. A lot of peatlands have good land contour b. The existence of farming groups is according to ability class (beginner, intermediate, advanced, expert) c. Producer of qualified seeds of paddy, rubber, and palm with good quality d. Farmer's knowledge of farming at the peatlands is adequately high e. Center of Minapolitan district 	<p>Weaknesses</p> <ol style="list-style-type: none"> a. The limitations of farmer's knowledge to cultivate their lands and to choose the types that are suitable with biophysics. b. The lack of knowledge and technology availability on the process of post-harvest. c. Small scale farming, so the produce will only be used to make ends meet for the family. d. Need a big capital.
External	<p>Strengths-Opportunities</p> <ol style="list-style-type: none"> 1. The purpose of peatland management is to increase the community's economy and for ecological sustainability in the peatlands. 2. The development of agroforestry technique by diversification of the types of forestry, plantation, and farming plants. 3. The development of household industry from main commodity produce in the peatlands. 	<p>Weaknesses-Opportunities</p> <ol style="list-style-type: none"> 1. Human resource development with trainings in relation with peatlands cultivation and posts-harvest processing. 2. The development of agroforestry technique that is suitable with communities traditional wisdom 3. The development of household industry from the main commodity produce in the peatlands by giving access to the capital.
Threats	<p>Strengths-Threats</p> <ol style="list-style-type: none"> 1. Peatland management by the supports of all parties 2. The development of agroforestry technique with the types that are suitable with the biophysics of the peatlands. 3. The strengthening of farming group institutions with knowledge related 	<p>Weaknesses-Threats</p> <ol style="list-style-type: none"> 1. The importance of flood countermeasures, adaptation and climate change mitigation, the right solution in order not to be damaged. 2. The utilization of the pit lines that is suitable with the land biophysics and featured commodity.

e. Unstable commodity price.	to the process of crops storage to cope with the decline of the price after the harvest and pests.	3. The development of household industry of the harvest results
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weekly, monthly, and annually. The strength of this technique was to produce foodstuff. Community's traditional wisdom on various agroforestry patterns at the thin to deep peatlands can become a learning process to increase farming resilience in the peatlands. In the farming world, using husk charcoal was also suggested. It has abundant benefits. It is often used for soil loosening, even for composting. Farmers make use of husk charcoal as making compost, bokashi, takakura, planting media, and seedbed media. Indeed, in some places, rice husks are considered as waste. Husk charcoal is made from paddy husk partial combustion, subsequently, 20%-30% of its milling process will be discarded in the form of paddy husks. Biologically, loosened soil is a good media for the growth and the development of living organisms. Chemically, it has important nutrient content such as, Nitrogen (N), Phosphor (P), Potassium (K), Calcium (Ca), and Magnesium (Mg).

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7. The charcoal from paddy husks does not contain salts that can harm plants, and it does not bring pathogenic microorganisms.

The benefits of husk charcoal are:

1. Husk charcoal is useful to repair physical Chemical and biological structure of the soil.
2. Besides, the material can increase soil porosity, so it becomes loosened and able to absorb water. Husk charcoal is rich with carbon content that is needed in the process of composting.
3. In some research, husk charcoal ability is also known as an adsorbent that can suppress the number of pathogenic microbes and dangerous metal in composting. Therefore, the produced compost is free from diseases and dangerous chemical substances.
4. It can stimulate the growth of microorganisms where it is very useful for plants.
5. Arrange soil pH in a certain condition.
6. Keep soil humidity.
7. Able to fertilize soil and plants.

In plantation, business in the plantation sector also becomes one of the featured potentials in Banjar Regency. The types of plantation commodities that are mostly developed by the farmers are rubbers and palms. Both Commodities were developed by state enterprise, private enterprise and people's plantation and become the main plantation sector in Banjar Regency. In the Province of South Kalimantan, there are 33 CPO factories spread in some regencies, such as Banjar, Tapin, HSS, Tabalong, Tanah Laut, Tanah Bumbu, Kotabaru and Barito Kuala which installed capacity is 1,500 ton/hour. There are also two refineries located in Kotabaru Regency; PT. Smart Tbk which capacity is 3,000 ton/day and PT. Golden Hope Nusantara which capacity is 2,500 ton/day.

The success of plantation development throughout this time was supported by some entities of plantation agrobusiness actors. They are 48 plantation cooperatives, 212 farming groups, five commodity farmer association institutions, and plantation profession organizations, such as GAPKINDO (Rubber Association of Indonesia) and GAPKI (Indonesian Palm Association). The outstanding partnership program that is still going on in South Kalimantan is inti-plasma partnership, such as PIR program for rubber plants and cooperative credit program for members (KKPA) for palms.

CONCLUSION

The livelihood in Banjar Regency is varied. According to assessment through matrix ranking, it is acknowledged that there are for farming businesses that are relied on as the source of livelihood. They are paddy, rubbers, palms, and horticulture. Generally, people's income can be categorized into two categories: land-based income and non-land-based income. People's land-based income is from the plant cultivation business of farming, plantations, forestry, and other forest produce. On the other hand, the non-land-based income includes livestock farming, labor services, entrepreneurship, etc. Income from the plantation is mainly from rubbers and palms, where they give the biggest contribution to farmer's household income, so people in both areas have livelihoods as planters.

According to SWOT analysis, the ones that become supporting factors or strengths are the relatively fertile lands that are partially with peats, the existence of farming groups according to commodity (Palawija, rubbers, palms, etch). Problems that become obstacles are problems of climate change and flood, causing the peatlands to be waterlogged, the growth of palms in the peatlands that is not really good, biophysical condition and the attack of plant disease pests, and

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unstable commodity price. The obstacles/threats can be solved mutually by the support and the commitment of all parties who aim for the increase of the community's economy and ecological sustainability in the peatlands.

Agroforestry can be applied to diversify the types of forestry plants, plantation plants, fruit plants, and seasonal plants in order to increase land productivity as well as for the farmers to make ends meet through harvest diversification daily, weekly, monthly, and annually. The good thing about this technique is that it can produce foodstuffs. Community's traditional wisdom on various patterns of agroforestry from thin to deep peatlands becomes a learning process to increase farming resilience there.

In the farming world, using husk charcoal is also suggested. Husk charcoal has abundant benefits. It is often used for soil loosening and even for composting. Farmers make use of it to make compost, bokashi, takakura, planting media, and seedbed media. Consequently, paddy husks are considered as waste in some places. Husk charcoal is made from paddy husk partial combustion, then 20-30% from its milling process will be discarded in the forms of paddy husks. Biologically, loosened soil is a good media for the growth and the development of living organisms. Chemically, it contains important nutrients. Charcoal from paddy husks does not contain salts that harm the plants and does not bring pathogenic microorganisms.

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