SUSTAINABLE ECONOMY OF PEATLAND COMMUNITIES IN RIAU PROVINCE

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ABSTRACT

Sustainable development is the process of meeting the current needs without sacrificing the needs of future generations. Economic sustainability must also be balanced with environmental sustainability. These two factors are closely related to each other, especially in peatlands. This research was conducted in the Riau Province. The sample in this study was selected using a nonrandom purposive sampling technique. The samples were from Pelalawan Regency, Indragiri Hulu Regency, and Indragiri Hilir Regency. To answer the problems of this research, respondents (key informants) were taken from the community in Rengat City, Tembilahan City and Pangkalan Kerinci City. This research is qualitative descriptive research with data sources consisting of primary and secondary data. Based on the results of observations and interviews that have been conducted, the commodity that has the potential to be developed in Indragiri Hulu Regency and Pelalawan Regency is corn, while in Indragiri Hilir Regency, it is coconut. In other words, the economic sector that can be used as the main population source based on land type is the agricultural sector.

Keywords: Peatland, Riau Province, Sustainable, Economic, Sector

INTRODUCTION

Creating economic sector specialization based on the current condition of regional land is very important because, apart from being able to support the economy, it can also preserve the land ecosystem. Specialization in the economic sector gives rise to brand marks or characteristics of a region's products or commodities, which will increase the selling value and bargaining power in the market. With specialization in the production activities of a product, absolute profits are easier to achieve (Aji et al., 2019). This also applies to peatland areas. Peatland areas can have unique products that drive the regional economy, while maintaining the balance of the peat ecosystem. Sustainability in development is important because achieving a certain level of prosperity requires continuous effort on a balanced and proportional scale. In principle, sustainable development is the process of meeting current needs without sacrificing those of future generations. Sustainability in the economy must also be balanced with environmental sustainability. These two things are closely related to each other, especially in peatlands. Economic sustainability is defined as development capable of producing goods and services continuously to maintain government sustainability and avoid sectoral imbalances that can damage agricultural and industrial production.

An environmentally sustainable system must be able to maintain stable resources, avoid the exploitation of natural resources, and function as an environmental absorber. The problem faced in economic development is the trade-off between meeting development needs and efforts to maintain environmental sustainability (Fauzi 2004). Sustainable economic sector development is the implementation of the

concept of sustainable development, which aims to increase income and the welfare of society. This is done by increasing commodity production (quantity and quality) while still paying attention to the preservation of natural resources and the environment, which, in this case, is peatland. The development of the economic sector is expected to be carried out in a balanced manner and adapted to the carrying capacity of the ecosystem, so that production continuity can be maintained in the long term by reducing the level of environmental damage to as little as possible. Sustainability analysis is important after the creation of specializations in economic sectors or commodities in an area. Creating economic sector specialization based on current regional land conditions is very important because apart from being able to support the economy, it can also preserve the land ecosystem. Specialization in the economic sector will give rise to brand marks or characteristics of a region's products or commodities, which will increase selling value and bargaining power in the market. With specialization in the production activities of a product, absolute profits will be easier to achieve (Aji et al., 2019). This also applies to areas that have peatlands. Peatland areas can have unique products that drive the regional economy while maintaining the balance of the peat ecosystem.

Peatlands, as essential wetland ecosystems, are formed by peat soil with a decomposing organic layer (Page & Baird, 2016) under waterlogging conditions and a lack of oxygen (Cole et al., 2015). Its unique ecosystem, with a complex hydrological system, plays an important role as a provider of ecosystem services, such as carbon absorption, storage, and protection of biodiversity (Stephanie et al., 2017). Peatlands also benefit from economic resources. It is estimated that the economic resource capacity of peatlands in Riau Province in 2016 was IDR 368,214.96 billion and will be IDR 380,730.41 billion in 2020. Regions with the largest peatland economic resource capacity are generally petroleum-producing areas, such as the Bengkalis Regency, Rokan Hilir, and Siak Regency, but their contribution tends to decrease. Meanwhile, non-oil-producing areas, such as the Indragiri Hlir Regency, are expected to increase. This has led to a shift in the contribution of districts and cities in Riau Province, where there is a peat hydrology unit, to the development of economic resources (Taryono, 2021). Riau Province is the second largest province in Indonesia, with a peatland area of 3,864,414 ha, or 60.1% of the peatland on the island of Sumatra. With an estimated peat thickness of less than 300 cm, the area was 1,417,762 ha (36.7%), and a thickness of more than 300 cm was 2,449,652 ha (63.3%) (Wahyunto et al., 2003). The rapid expansion of commercial agriculture and industrial plantations has created intense pressure on Indonesia's peatlands. Clearing peatlands causes peat to dry out because they can no longer absorb water and become more vulnerable to fire (Miettinen et al., 2016).

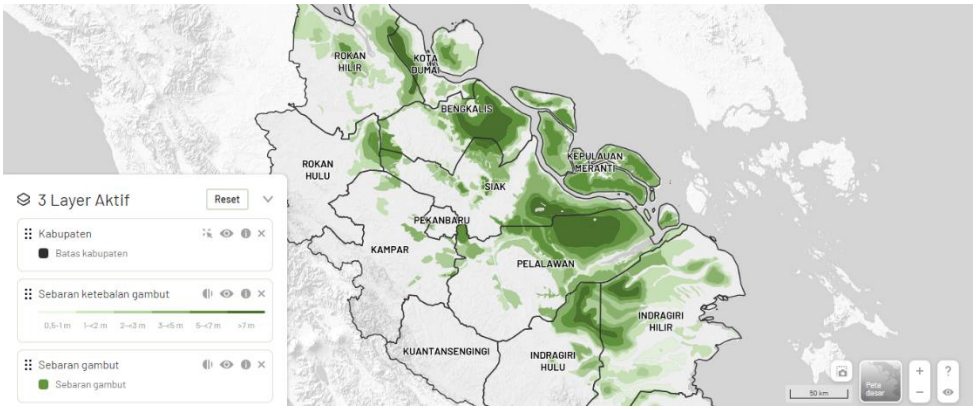

Figure. 1. Map of Peat Distribution and Thickness of Riau Province

The use and development of peatlands have always been a matter of debate. This debate was triggered by differences in views regarding the use of peatland in two aspects of interest, namely the environmental interest aspect and the interest aspect of developing peatland for strategic commodity agriculture. One of the problems that occur in peatlands that results in damage to the function of the peat ecosystem is the lack of precision in the selection of commodities or economic sectors to be developed. One example in the agricultural sector, namely, the cultivation of commodities that are not suitable for the characteristics of peatlands, will result in the draining of peat water, resulting in drought and triggering land fires. This condition requires interested parties to find a solution to achieve a balance between these two interests. One solution is economic development based on community participation and land suitability (sustainable peatland development) (Zamaya et al., 2021).

Table 1. Peatland area in Riau Province based on depth (ha)

Regency	Peat Depth (cm)				Total
	<100	100-200	200-300	>300	
Indragiri Hilir	377.714,2	5.356,1	433.675,7	181.864,4	998.610,4
Indragiri Hulu	12.247,8	4.788,9	133.191,1	71.976,3	222.204,1
Pelalawan	41.559,9	21.636,4	418.308,7	275.428,1	756.933,1
Kuantan Sengingi	4.820,6	0,0	0,0	0,0	4.820,6
Meranti	137.888,0	0,0	114.245,3	84.114,9	336.248,2
Siak & Pekanbaru	62.781,3	20.222,7	158.247,4	258.231,9	499.483,3
Kampar	40.185,5	11.976,6	19.750,4	18.419,7	90.332,2
Bengkalis & Dumai	132.166,6	42.442,8	158.296,2	470.987,5	803.891,1
Rokan Hilir	140.635,3	21.336,0	127.119,9	303.639,0	592.730,2
Rokan Hulu	4.657,0	2.904,7	19.426,0	28.499,3	55.487,0
Provinsi Riau	954.656,2	130.664,1	1.582.260,7	1.693.159,0	4.360.740,2

Reference: Mubekti, M. (2011)

As shown in Table 1, the distribution of peatland in each district in Riau Province has been arranged in terms of the area of peatland owned. There are many districts such as Indragiri Hilir, Indragiri Hulu, and Pelalawan. The table shows that the Indragiri Hilir Regency has the largest peatland, namely 998,610.4 hectares of peat area in Riau Province. Meanwhile, Indragiri Hulu Regency, which has an area of peat land, namely 222,204.1 hectares, and Pelalawan Regency, whose area is not much different from Indragiri Hilir Regency and Bengkalis & Dumai Regency, namely 756,933.1 hectares owned by Pelalawan Regency, and Pelalawan Regency. others in Riau. This is because most of Riau has peat land, it is hoped that the people of Riau can manage this peat land well, so that they can minimize the existing challenges.

METHOD, DATA, AND ANALYSIS

This research was conducted in Riau Province. Riau Province has 12 (twelve) districts and cities, the majority of which are peatlands. The thickness of the peat varies in each district or city. The thickness of peat in Riau Province is between 0.5 and >7 meters. The sample in this study was selected using a non-random purposive sampling technique, namely a sampling technique which does not give each member of the population an equal opportunity to be used as a research sample. The sample must have special characteristics that are deliberately created by the researcher so that the sample can later meet the criteria that support or are appropriate for the research. Samples were taken from districts/cities in Riau Province whose areas are covered by peat with a thickness of between 0.5 – 3 meters. The samples were Pelalawan

Regency, Indragiri Hulu Regency and Indragiri Hilir Regency. To answer the problems of this research, respondents (key informants) were taken from the community in Rengat City, Tembilahan City and Pangkalan Kerinci City.
This research is qualitative descriptive research with data sources consisting of primary and secondary data. The primary data source used was obtained directly from the source, which in this case was the community carrying out economic activities on peatlands in Rengat City, Tembilahan City, and Pangkalan Kerinci City. Secondary data sources were obtained from sub-district/village monographs, sub-district profile books, sub-districts in BPS figures, and so on. Data collection techniques were carried out through intensive observation, in-depth interviews, documentation techniques, and a literature review.

RESULT AND DISCUSSION

The use of peatlands is one of the efforts to achieve sustainable development, namely development that not only pays attention to economic aspects, but also social and environmental aspects. In general, the use of peatlands has positive and negative impacts, namely providing economic benefits, but also causing environmental damage in the form of shrinkage of biodiversity, damage to water systems, and increased CO2 emissions, which contribute to global warming. For peatland management to be more successful, in addition to considering technical aspects, it is also better to consider social, economic, and environmental aspects. (2013). If peatland management focuses on social justice and environmental sustainability, it will also have an impact on peatland productivity, which ultimately creates a sustainable economy for peatland communities in Riau Province.

Tropical peatlands have very diverse physical and chemical properties. Its characteristics are largely determined by the thickness of the peat, the substratum, the mineral soil beneath it, its maturity, and whether or not there is enrichment from surrounding river overflows. The characteristics of peatlands are usually used as a reference in their use to achieve high and sustainable productivity (Nurida et al., 2020). Peat land is land that has a layer of soil rich in organic material with a thickness of 50 cm or more. The organic material that makes up peat soil is formed from dead plant remains, whether rotted or not, because the environmental conditions are saturated with water. In this regard, peatlands are often found in floodplain areas, back swamps, shallow lakes, or basin areas with poor drainage. The process of peat formation begins with puddles in back swamp areas, shallow lakes, or basin areas, which are slowly overgrown by aquatic plants and wetland vegetation (Yusuf, 2014).

Peat soil always forms in places that are saturated with water or stagnant, for example, depressions in valleys, swamps from former lakes, or in depressions or basins on the coastal plain between two large rivers. In these basins, there are large amounts of organic material produced by natural plants that have adapted to water-saturated environments. Water-saturated and stagnant environments prevent the destruction and mineralization of organic material so that piles of organic material are formed, which are topogenic peat or groundwater peat (Wahyunto et al., 2003). Dead and decaying plants gradually form layers of peat, so that the puddle is filled with piles of peat. The peat that grows to fill the puddle is called topogenic peat because the formation process is caused by the topography of the basin area. Topogenic peat is usually relatively fertile (eutrophic) due to the influence of mineral soil. Even during major floods, mineral enrichment occurs, which increases the fertility of the peat. Certain plants can still grow on topogenic peat, and the weathering results in the formation of a new layer of peat, which over time forms a peat dome with a convex surface. Peat that develops on topogenic peat is called ombrogen peat, the formation of which is determined by rainwater. Ombrogen peat is lower in fertility than topogen peat because there is almost no mineral enrichment. (Yusuf, 2014)

The peatlands at the research location are no longer natural but have been managed previously or have undergone structural changes. Most peatlands have changed functions and are used by the community as agricultural land, fisheries, plantations, trade, and others. As a medium for growing plants, peatlands have long been used by farmers to produce food and plantation commodities (Masganti 2017). Apart from being a medium for growing plants, peatlands are also a place to live and a source of livelihood for the residents. One purpose of using peatlands is to increase the supply of food, which is triggered by the conversion of agricultural land and an increase in population. This requires efforts to increase the food production capacity of peatlands through the use and application of technology.

Relying on peatlands as a food supplier is based on various considerations, including low productivity and large areas of potentially degraded land. Peatland productivity depends on management and human actions. Peatlands are highly susceptible to changes in unfavorable characteristics; therefore, care must be taken when managing them. It is necessary to specialize in commodities or economic sectors developed in peatlands so that the peatlands are maintained. Not all commodities can grow well in peatlands. In general, agricultural commodities that can be developed in peatlands are grouped into three categories: (1) food crops or secondary crops, (2) horticultural crops, and (3) annual crops. Commodity selection is closely related to the overflow typology, season, economic value of commodities, and availability of technology. Land planning in production areas opens opportunities for cultivating commodities such as rice, corn, soybeans, oranges, vegetables, coconuts, rubber, and palm oil. For horticultural crops, peatlands with depths of 20–100 cm are suitable. consideration for cultivating horticultural plants to create centers that produce horticultural plants. Horticultural commodities (vegetables and fruits) have higher economic value than food crops but require more intensive cultivation techniques (Masganti, 2017).

Based on the results of observations and interviews that have been conducted, the commodity that has the potential to be developed in Indragiri Hulu Regency and Pelalawan Regency is corn, while in Indragiri Hilir Regency it is coconut. In other words, the economic sector that can be used as the main source of population based on land type is the agricultural sector. Optimizing canal blocking is built by both the government and the community, apart from its main function of keeping peatlands wet. The community's drive to continue producing food, meeting family (household) needs, and absorbing labor, both directly and indirectly, requires the community to cultivate peatlands well but still maintain its sustainability.

The results of this study show that each region has commodities that should be optimally developed by the community and must receive support from the local government. This optimization aims to create superior regional product specialization and increase income and welfare in the community. This potential is not limited to the main product but can continue to be developed into derivative products through micro-, medium-, and large-scale industrial activities. Sustainable development is development that focuses on the environment and natural resources, including, in this case, land resources, with the aim of providing the next generation with a better livelihood. Economic growth has always focused on the relationship between the environment and the economy, but now, the paradigm has begun to shift, where there is a decline in the quality of land, water, air, and forests due to future economic conditions and prospects. One cause of environmental damage is the ambition of economic activities to achieve optimal economic growth in the agricultural, industrial, energy, and waste disposal sectors. No one can deny that the pattern and scale of these activities are responsible for increasing pollution and the depletion of natural resources.

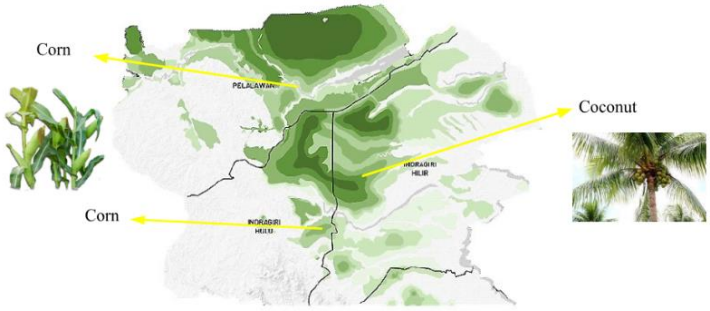

Figure. 2. Commodities for Economic Sustainability in Riau Province

The natural environment plays an important role in the economy, namely, (a) raw resources (renewable and non-renewable resources) for production and consumption, (b) processing natural waste (assimilator), and (c) as a provider of environmental services (environmental services). such as natural beauty, climate regulation, maintenance of genetic diversity, and ecosystem stability. The loss or reduction of natural resources and environmental degradation as a result of development must be considered as a loss of state or regional wealth to obtain more precise development indicators. Currently, it is increasingly seen that economic development can be increased rapidly by increasing production by extracting natural resources (such as forests, land, and oil). Economic development is always interpreted as increasing income, without considering losses. It appears that there is a debate or conflict between sustainability in the economic and ecological sectors, but what needs to be underlined is that if the economic and ecological sectors are managed well and correctly, sustainability will appear in synergy that is mutually supportive and beneficial. Successful economic development means increasing society's ability to protect its environment. Good environmental conditions increase the production capacity of the economy, which in turn provides the ability to protect the environment and improve the standard of living and welfare of the community. Efforts to unite economics and ecology are prerequisites for implementing sustainable development. The material balance of an economy is seen as a general balance that shows how the economy and environment interact in a complex manner as an integrated system (Suparmoko, 2000).

Sutamihardja (2004) states that sustainable development targets include efforts to realize: a. equal distribution of the benefits of development results between generations (intergenerational equity), which means that the use of natural resources for the purposes of growth needs to pay attention to reasonable limits in the control of ecosystems or environmental systems, is directed at replaceable natural resources, and emphasizes the lowest possible exploitation of natural resources. irreplaceable. b. safeguarding or securing the preservation of existing natural resources and the environment and preventing ecosystem disturbances in order to ensure a good quality of life for future generations. c. The use and management of natural resources is solely for the sake of pursuing economic growth in the interest of equitable, sustainable use of natural resources between generations. d. maintaining the sustainable welfare of the people (society) both now and in the future (intertemporal). e. maintaining the benefits of the development or management of natural resources and the environment that have long-term or sustainable benefits for generations. Maintaining the quality of human life between generations in accordance with their habitat.

The concept of sustainability can be broken down into three aspects of understanding: (1) economic sustainability, which is defined as development that is capable of producing goods and services continuously to maintain government sustainability and avoid sectoral imbalances that can damage agricultural and industrial production. (2) Environmental sustainability is defined as an environmentally

sustainable system that must be able to maintain stable resources, avoid exploitation of natural resources, and function as an environmental absorber. This concept also concerns the maintenance of biodiversity, airspace stability, and other ecosystem functions that are not included in the category of economic resources. (3). Social sustainability is defined as a system capable of achieving equality through the provision of social services including health, education, gender, and political accountability. Economic sustainability, which consists of macroeconomic sustainability and sectoral economic sustainability, is one aspect of economic sustainability from a development perspective. In macroeconomic sustainability, the three elements needed are economic efficiency, sustainable economic prosperity, and increased equality and distribution of prosperity. This will be achieved through appropriate macroeconomic policies in a structural process that includes fiscal and monetary discipline. Meanwhile, sectoral economic sustainability, which is macroeconomic sustainability, will be realized in the form of specific sectoral policies. Macroeconomic sustainability is the basis for implementing various policies to fulfill basic rights. Macroeconomic policies are directed at creating a conducive environment for business development and opening up broad opportunities for improving the capabilities of poor communities. In order to fulfill basic rights, macroeconomic policies need to take into account four interrelated objectives, namely maintaining economic stability, increasing economic growth, expanding employment opportunities, and reducing disparities between regions. The three main elements of macroeconomic sustainability are economic efficiency, sustainable economic prosperity, and increasing the equality and distribution of prosperity.

Each village has commodities that should be optimally developed by the community and must be supported by the local regional government. This optimization aims to create regional superior product specialization and increase income and welfare in the community. Of course, this potential is not limited to the main product but can continue to be developed into derivative products through micro, medium, and large-scale industrial activities. This economic development is based on community participation and land suitability (sustainable peatland development) (Zamaya et al., 2021). Sustainability analysis is important to carry out after obtaining the results of mapping commodities and economic sectors that have the potential to be developed in an area. This is important because achieving this level of social welfare requires continuous effort on a balanced and proportional scale. This sustainability analysis can also see what the prospects for commodities resulting from mapping the potential of the economic sector in Rengat District are in the future and whether they have the potential to continue to be developed from an economic and environmental sustainability perspective.

The results of this research show that there is currently no outreach or direction from the local government regarding commodities that are suitable for planting on peatlands. Regional governments have also paid little attention to peatland farmers. The problem faced by farmers in peatlands is the unequal distribution of knowledge about soil acidity (PH) levels, irrigation systems, fertilization systems, good planting methods, pesticide spraying procedures, and what commodities are best on peatlands. Qualitatively, corn and coconut are the most profitable commodities in peatlands, both in terms of plant resilience, ease of planting, efficiency in maintenance costs, and minimal risk.

CONCLUSION

Economic sustainability is defined as development that is capable of producing goods and services continuously to maintain government sustainability and avoid sectoral imbalances that can damage agricultural and industrial production. Peatland productivity depends on management and human actions. Peatlands are very susceptible to changes in unfavorable characteristics, so care must be taken in managing them. It is necessary to specialize in commodities or economic sectors developed in peatlands

so that the peatlands are maintained. The commodity that has the potential to be developed in the Indragiri Hulu Regency and Pelalawan Regency is corn, while in the Indragiri Hilir Regency, it is coconut. In other words, the economic sector that can be used as the main source of population based on land type is the agricultural sector. The commodity that has the potential to be developed in Indragiri Hulu Regency and Pelalawan Regency is corn, while in Indragiri Hilir Regency, it is coconut. In other words, the economic sector that can be used as the main source of population based on land type is the agricultural sector.

Sustainable development is development that really pays attention to the environment and natural resources, including, in this case, land resources, with the aim of providing the next generation with a better livelihood. Previously, economic growth always focused on the relationship between the environment and the economy, but now the paradigm has begun to shift, where there is a decline in the quality of land, water, air, and forests due to future economic conditions and prospects. One of the causes of environmental damage is the ambition of economic activities to achieve optimal economic growth in the agricultural, industrial, energy, and waste disposal sectors. No one can deny that the pattern and scale of these activities are responsible for increasing pollution and the depletion of natural resources.

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