Nusantara Journal of Behavioral and Social Science. 2023; 2(2): 49-54
https://doi.org/10.47679/202329
ISSN 2828-1039 (print), ISSN 2828-0733 (online)

RESEARCH ARTICLE

Spatial Planning and Policy Study of Food Estate Development on Peatland in Pulang Pisau and Kapuas Districts, Kalimantan Tengah, Indonesia

Heinrich Rakuasa[1*)], Philia Christi Latue[2]

Published online: 12 August 2023

Abstract: The development of food estates to support food security in Pulang Pisau District covering 10,000 ha and Kapuas District covering 20,000 ha continues to be implemented. The clearing of food estate land is complete, but the processing of peat agricultural land ready for planting, the construction of irrigation channels, and the preparation of human resources (HR) are targeted to be completed by mid-2021. The purpose of this paper is to examine food estate spatial planning and policies related to environmental impact analysis and propose a reliable food estate management strategy through the literature review method. The results of the analysis show that not all peatlands are suitable for agricultural land with the potential for fires, the failure of past peatland projects in the area due to poor management, the conversion of forest land will disrupt the hydrological cycle resulting in flooding and disrupting the orangutan ecosystem, and agriculture in this area does not show a sustainable ecological dimension. Land management strategies are proposed; irrigation infrastructure development, liming, improving human resource knowledge related to peatland agricultural management, management and supervision.

Keywords: food estate, planning, policy, Kapuas, management

Abstrak: Pengembangan food estate untuk mendukung ketahanan pangan di Kabupaten Pulang Pisau seluas 10.000 ha dan Kabupaten Kapuas seluas 20.000 ha terus dilaksanakan. Pembukaan lahan food estate sudah selesai, namun pengolahan lahan pertanian gambut siap tanam, pembangunan saluran irigasi, dan penyiapan sumber daya manusia (SDM) ditargetkan selesai pada pertengahan tahun 2021. Tujuan dari tulisan ini adalah untuk mengkaji perencanaan tata ruang food estate dan kebijakan terkait analisis dampak lingkungan serta mengusulkan strategi pengelolaan food estate yang handal melalui metode kajian literatur. Hasil analisis menunjukkan bahwa tidak semua lahan gambut cocok untuk lahan pertanian yang berpotensi kebakaran, kegagalan proyek lahan gambut di masa lalu di daerah tersebut karena pengelolaan yang buruk, konversi lahan hutan akan mengganggu siklus hidrologi yang berakibat pada banjir dan mengganggu ekosistem orangutan, dan pertanian di daerah ini tidak menunjukkan dimensi ekologi yang berkelanjutan. Strategi pengelolaan lahan yang diusulkan adalah pembangunan infrastruktur irigasi, pengapuran, peningkatan pengetahuan sumber daya manusia terkait pengelolaan pertanian lahan gambut, manajemen dan pengawasan.

Kata kunci: food estate, perencanaan, kebijakan, Kapuas, pengelolaan

INTRODUCTION

President Joko Widodo's plan to realize food security by developing food estates in several regions in Indonesia, including food estates in Pulang Pisau and Kapuas districts, is being implemented. Land clearing of 10,000 ha in Pulang Pisang District and 20,000 in Kapuas District is complete, the development of food estate areas continues, especially in Kapuas District with the preparation of land processing ready for planting, construction of irrigation channels and preparation of agricultural human resources, targeted for completion in mid-2021. Food security through food estates protects Indonesia's food system from increasing climate vulnerability, environmental resource pressures and pandemics (MacRae & Reuter, 2020).

[1*)] University of Indonesia, Indonesia
[2] Herzen University, Russian Federation

*) *corresponding author*

Heinrich Rakuasa

Email: heinrich.rakuasa@ui.ac.id

Food estate land clearing in Pulang Pisang and Kapuas districts is located in the area of the former Peatland Development (PLG) project in 1997, which failed due to poor management of peat agricultural land. The development of food estates in forest areas was licensed with the issuance of Minister of Environment and Forestry Regulation No. 24/MENLHK/SETJEN/KUM.1/10/2020 on the provision of forest areas for food estates, which became a green light for clearing protected forests. The regulation states that a food estate is a large-scale food business which is a series of activities carried out to utilize natural resources through human efforts by utilizing capital, technology, and other resources to produce food products to meet human needs in an integrated manner including food crops, horticulture, plantations, livestock, and fisheries in a Forest Area. Land conversion and mismanagement of peatlands will have an impact on ecological damage and disrupt the balance of the ecosystem (Syahza et al., 2020). This has become a polemic because the conversion of forest land will bring greater environmental damage.

Spatial planning and policy studies of food estate development are needed because they analyze the impacts and strategies for realizing sustainable food estates. Sustainable peatland policy and management is important because peatlands have ecological functions to maintain biodiversity and environmental balance, economic and socio-cultural functions (Syahza et al., 2020). To realize sustainable peatland agriculture in Pulang Pisau and Kapuas districts, the ecological, economic, social, institutional, technological & infrastructure dimensions must be considered (Surahman & Shivakoti, 2018).

An area can be interpreted as core and plasma in the concept of nodal areas (Rakuasa & Pakniany, 2022). The core is a center of activity where there is a concentration of labor, the location of industry and services and the market for raw materials, while the plasma is a supporting area (hinterland) that functions as a supplier of labor in the core area, a supplier of raw materials and a market for industry and services (Ekosafitri et al., 2017). In addition, the main subjects in the development of an area are the local government, the community and other stakeholders. However, this is inseparable from the role of the central government by carrying out various approaches and regulations so as to optimize the income of every layer of society (Naping et al., 2019)

Coastal areas have very high potential in terms of development, but planning requires serious attention so that the damage that occurs later can be minimized. The implementation of development in an area has a different portion which causes an imbalance of economic activities in the region where the concentration of population in the coastal area has a diversity of service facilities and services (Arief & Pradini, 2019). In addition, in coastal areas there is a shift in the economic activities of people who previously worked in the primary sector such as fisheries (fishermen) turning into tour guides by utilizing boats to catch the fish (Fanni et al., 2014; Yapanto et al., 2021).

Coastal communities, especially those who work as fishermen, are closely related to poverty which is related to complex problems, where the cause is inequality of access and resources. The fishermen who are mostly laborers or small fishermen only get a small profit while the big economic benefits are enjoyed by the juragan (Sofianto, 2017; Gao & Cai, 2017) . In addition, the gap in the use of more sophisticated fishing technology also causes a decrease in income in the fishing community. Large and more modern boats will get more catches than small fishing boats (Naping et al., 2019). With this imbalance, there is a need for direction in the form of policies and planning for the development of coastal areas. Based on this, this study aims to analyze the development of the region and the perceptions of relevant stakeholders so that it can be expected to formulate directions for the development of coastal areas in poverty reduction.

METHODS

The methods used were literature review, analysis of the impact of planning and spatial policies on food estate development and the sustainability of peatland agriculture in Pulang Pisau and Kapuas districts based on previous research, and proposed strategies for food estate development.

RESULTS AND DISCUSSION

Not all peatlands can be used as agricultural land.

Peat that can be used for growing food crops, including vegetables, is less than 100 cm thick (Surahman et al., 2018), while the thickness of peat in Pulang Pisau varies widely. Agriculture on peatlands in Central Kalimantan is beneficial for livelihoods, but it results in land subsidence and high CO2 emissions, requiring hydrological management and the construction of permanent canals (Tata, 2019). During 2015, fires occurred frequently in forest and non-forest areas in Indonesia, 37% of which occurred in peatlands (Albar et al., 2018). Dry peatlands are very sensitive to fire, especially when the land is not wet. In Pulang Pisang District, the area with the highest level of vulnerability is the protected forest area with characteristics close to the road and peat depth of 400 - 800 cm (Rezainy et al., 2020).

Forest fires in Kapuas District are located on peatlands, swamp scrub, near roads, near rivers and far from villages due to burning of swamp scrub and land clearing for farming (Thoha et al., 2019). Preparing agricultural land before planting using burning techniques by the community needs to be avoided to reduce the risk of fire. Peat depth also affects the amount of CO2 emissions released into the atmosphere (Qirom et al., 2018). The community must be wiser in maintaining peatland wetness for agriculture by considering irrigation infrastructure. peatland wetness is maintained, acidic and toxic substances will not spread throughout the agricultural land. To reduce crop failure and the rate of CO2 emissions from peat, planning must consider ecological, socio-economic and production principles. The difficulty of managing peatlands for agriculture requires reliable management that has been carried out by local farmers and can then be applied, for example, water conservation with a tabat system, which is a terraced irrigation with wood (Prayoga, 2016).

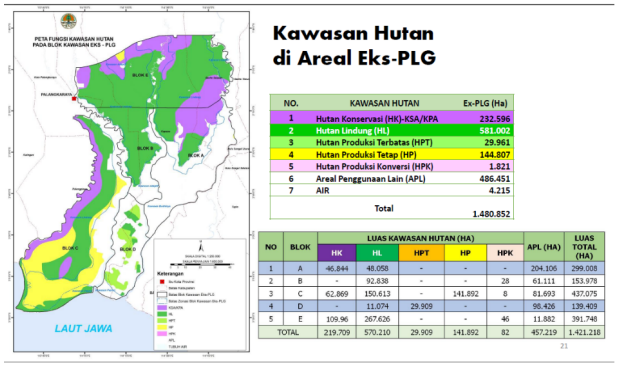
The past failure of the PLG (Peatland Development) Project was due to poor management.

It is feared that the development of food barns in Pulang Pisau Regency will repeat the past failure of the PLG Project. The history of PLG begins with the issuance of Presidential Decree No. 82 of 1995 concerning the Development of Peatland for Food Crop Agriculture in Central Kalimantan. The project succeeded in creating 10,000 hectares of rice fields and the construction of irrigation canals to achieve

this goal, along with the placement of transmigrants in the area. In 1997 there were severe forest fires and the paddy fields were halted. In 2001 the government spent 1.6 trillion on rehabilitation of the PLG. In 2015 there was another major fire, so in 2016 Government Regulation No. 57/2016 on the Protection and Management of Peat Ecosystems and Presidential Regulation No. 1/2016 on the Peat Restoration Agency were issued. In 2019, forest fires occurred again and Presidential Instruction No. 5 of 2019 was issued regarding the Termination of the Granting of New Licenses and the Governance of Primary Natural Forests and Peatlands

Forest land conversion will disrupt hydrological cycles and orangutan habitat

The conversion of forest land into a food estate will result in greater environmental and ecosystem damage. The government's plan to turn the former PLG peat forest area into a food estate by 2020, supported by the Minister of Environment and Forestry Regulation No. 24/MENLHK/SETJEN/KUM.1/10/2020 on the provision of forest areas for food estates, is a green light for clearing protected forests.



NO.	KAWASAN HUTAN	Ex-PLG (Ha)
1	Hutan Konservasi (HK)-KSA/KPA	232.596
2	Hutan Lindung (HL)	581.002
3	Hutan Produksi Terbatas (HPT)	29.961
4	Hutan Produksi Tetap (HP)	144.807
5	Hutan Produksi Konversi (HPK)	1.821
6	Areal Penggunaan Lain (APL)	486.451
7	AIR	4.215
	Total	1.480.852

NO	BLOK	LUAS KAWASAN HUTAN (HA)					APL (HA)	LUAS TOTAL (HA)
		HK	HL	HPT	HP	HPK		
1	A	46.844	48.058	-	-	-	204.106	299.008
2	B	-	92.838	-	-	28	61.111	153.978
3	C	62.869	150.613	-	141.892	8	81.693	437.075
4	D	-	11.074	29.909	-	-	98.426	139.409
5	E	109.96	267.626	-	-	46	11.882	391.748
TOTAL		219.709	570.210	29.909	141.892	82	457.219	1.421.218

Figure 1. Map of Forest Area Functions in the Ex-PLG Block (Map source: KLHK)

Forest areas that are peatlands are not suitable for agricultural use. The suitability of peatland for sustainable agriculture, especially rice, in Pulang Pisau District is 380,261 ha (36.81%), mostly in the southern part of the watershed (Bhermana et al., 2021), see Figure 2.a. The conversion of forest land to agricultural land in the upper watershed will also disrupt the hydrological cycle due to the lack of infiltration areas. Land cover changes in the watershed from forest to non-forest will cause river flood discharge/runoff to increase (Asdak & Supian, 2018). Flood-prone areas in Pulang Pisau and Kapuas districts amount to 9% of the total food estate area of 30,000 ha by 50-year return period water discharge of more than 2 m (Muhardiono & Hamdani), see Figure 2.b.

Priorities for the development of coastal areas in Jepara Regency based on the perceptions of stakeholders in the fisheries and marine sector place infrastructure facilities as the main criteria in developing coastal areas to encourage the development of other activities in the area. The following is a diagram of alternative coastal area development based on stakeholders in Figure 3.

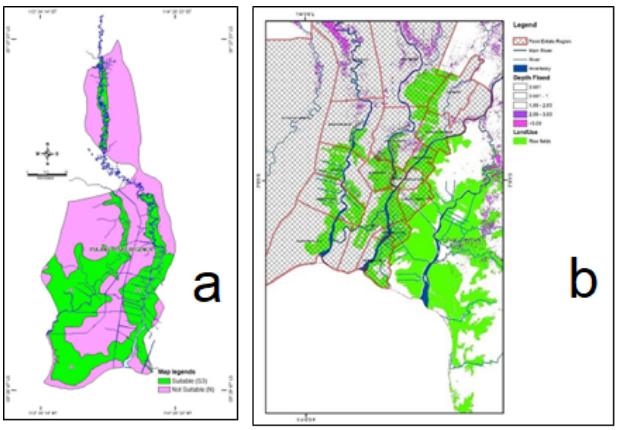


Figure 2. a. Land suitability for rice farming in Pulang Pisau Regency (Bhermana et al., 2021), b. Flood risk area Depth > 2 m (Barito, Kahayan, Kapuas watersheds) in Pulang Pisau District and Kapuas District (Muhardiono & Hamdani, 2021)

Throughout the upstream watershed in Central Kalimantan, this is one of the habitats for the orangutan (Pongo pygmaeus wurmbii), which is a place to live and find food (Saputra et al., 2017). If the forest as their habitat is converted, their existence will be threatened. Transmigration in Pulang Pisau is a challenge to develop a food estate in this area (Fitriana & Marni, 2021), adjustments to land management/local agricultural systems that pay attention to environmental sustainability are needed.

Sustainability of peatland agriculture in Pulang Pisau and Kapuas districts

Based on research conducted by (Surahman et al., 2018) explains that the sustainability index of rice farming in Pulang Pisau District and Kapuas District is 52.14% (see Table 1.) and the ecological value index is the lowest compared to other dimensions, and rice is considered as the first alternative for the development of degraded peatlands.

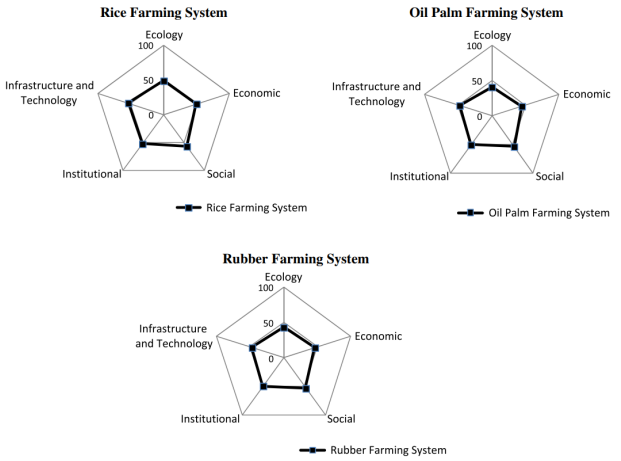


Figure 4. Flyover diagram with five dimensions representing the sustainability of peat farming in Pulang Pisau Regency and Kapuas Regency

Based on the research results, it is confirmed that the ecological dimension needs special attention through a reliable peatland farming management strategy.

Table 1. Sustainability index from Multidimensional Scaling (MDS) analysis and Monte Carlo (MC) analysis in Pulang Pisau and Kapuas districts (Surahman et al., 2018)

Dimension	Rice			Oil Palm			Rubber		
	MDS	MC	Diff	MDS	MC	Diff	MDS	MC	Diff
Ecology	48.51	48.44	0.07	40.60	40.60	0.37	42.83	42.78	0.05
Economis	49.65	49.52	0.13	45.23	45.23	0.55	46.69	46.69	0.21
Social	56.71	56.50	0.21	53.61	53.61	0.03	53.17	52.91	0.26
Instituational	52.25	52.06	0.19	49.99	49.99	0.50	49.12	48.64	0.48
Tecnology & Infrastructure	53.59	53.6	0.01	47.9	47.9	0.08	46.74	46.28	0.46
Sustainability Index	52.14	52.02	0.12	47.47	47.47	0.09	47.67	47.46	0.21

CONCLUSIONS AND RECOMMENDATION

The implementation of a policy to convert forest land into food estate areas in Pulang Pisau Regency and Kapuas Regency based on the Minister of Environment and Forestry Regulation Number: 24/MENLHK/SETJEN/KUM.1/10/2020 will have an impact on ecological damage. Peatlands are very vulnerable, to realize sustainable agriculture an ecological approach is important so that peatland management can be improved for better productivity and reduce environmental impacts (Surahman et al., 2018). In connection with the opening of a 30,000 ha food estate in Pulang Pisau and Kapus districts, we propose the following food estate management strategy through an ecological approach:

1) Infrastructure development in the form of reliable irrigation channels combined with local irrigation systems (tabat) and ensuring that the peat remains wet.
2) Improving the suitability of peatlands as food estate areas by ameliorant fertilization and limestone application.
3) Increasing crop productivity on peatlands can be done by irrigation, fertilization and selection of appropriate plants.
4) Increase farmers' knowledge of greenhouse gases through training and supervision. For example, preparing agricultural land without burning the land.
5) Empower farmer groups to increase agricultural productivity, capital, marketing and integrated pest control.
6) Improving and disseminating technology for peatland farming systems, especially for soil and water technology.

ACKNOWLEDGMENT

The author's sincere thanks and highest appreciation goes to all those who have helped directly or indirectly in the context of publishing this paper, may god reward them all with double kindness, Ameen.

REFERENCES

Albar, I., Jaya, I. N. S., Saharjo, B. H., Kuncahyo, B., & Vadrevu, K. P. (2018). Spatio-temporal analysis of land and forest fires in Indonesia using MODIS active fire dataset. In Land-Atmospheric Research Applications in South and Southeast Asia (pp. 105-127). Springer, Cham. DOI: 10.1007/978-3-319-67474-2_6

Asdak, C., & Supian, S. (2018). Watershed management strategies for flood mitigation: A case study of Jakarta's flooding. Weather and climate extremes, 21, 117-122. DOI: 10.1016/j.wace.2018.08.002

Bhermana, A., Agustini, S., Irwandi, D., & Firmansyah, M. A. (2021). Spatial landuse planning for developing sustainable food crop areas using land evaluation approach and GIS application (a case study of Pulang Pisau Regency, Central Kalimantan). In IOP Conference Series: Earth and Environmental Science (Vol. 648, No. 1, p. 012011). IOP Publishing. DOI: 10.1088/1755-1315/648/1/012011

Fitriana, E., & Marni, M. (2021). Transmigran sebagai Modal Sosial dalam Pengembangan Food Estate di Kabupaten Pulang Pisau. SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora, 7(1), 1-14. DOI: 10.30738/sosio.v7i1.8771

MacRae, G., & Reuter, T. (2020). Lumbung nation: metaphors of food security in Indonesia. *Indonesia and the Malay World*, *48*(142), 338-358. DOI: 10.1080/13639811.2020.1830535

Muhardiono, I., & Hamdani, A. (2021). Flood vulnerability impact for food estate potential in Central Kalimantan, Indonesia. In IOP Conference Series: Earth and Environmental Science (Vol. 648, No. 1, p. 012025). IOP Publishing. DOI: 10.1088/1755-1315/648/1/012025

Prayoga, K. (2016). Pengelolaan Lahan Gambut Berbasis Keraifan Lokal di Pulau Kalimantan. In Prosiding Seminar Nasional Lahan Basah Jilid (Vol. 3).

Qirom, M. A., Yuwati, T. W., Santosa, P. B., Halwany, W., & Rachmanadi, D. (2018). Potensi Simpanan Karbon pada beberapa Tipologi Hutan Rawa Gambut di Kalimantan Tengah. Jurnal Ilmu Kehutanan, 12(2), 196-211. DOI: 10.22146/jik.40150

Rezainy, A., Syaufina, L., & Sitanggang, I. S. (2020). Pemetaan Daerah Rawan Kebakaran Di Lahan Gambut Berdasarkan Pola Sekuens Titik Panas Di Kabupaten Pulang Pisau Kalimantan Tengah. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan (Journal of Natural Resources and Environmental Management)*, *10*(1), 66-76. DOI: 10.29244/jpsl.10.1.66-76

Saputra, F., Perwitasari-Farajallah, D., Utami-Atmoko, S. S., Ariyanto, T., & van Noordwijk, M. A. (2017). Monthly range of adolescent orangutans (Pongo pygmaeus wurmbii) based on fruit availability in Tuanan Orangutan Research Station, Central Kalimantan,

Indonesia. Biodiversitas Journal of Biological Diversity, 18(4), 1445-1452. DOI: 10.13057/biodiv/d180420

Surahman, A., Soni, P., & Shivakoti, G. P. (2018). Are peatland farming systems sustainable? Case study on assessing existing farming systems in the peatland of Central Kalimantan, Indonesia. Journal of Integrative Environmental Sciences, 15(1), 1-19. DOI: 10.1080/1943815X.2017.1412326

Syahza, A., Bakce, D., Nasrul, B., & Irianti, M. (2020, October). Peatland Policy and Management Strategy to Support Sustainable Development in Indonesia. In Journal of Physics: Conference Series (Vol. 1655, No. 1, p. 012151). IOP Publishing. DOI: 10.1088/1742-6596/1655/1/012151

Tata, H. L. (2019). Mixed farming systems on peatlands in Jambi and Central Kalimantan provinces, Indonesia: should they be described as paludiculture?. Mires & Peat, 25.

Thoha, A. S., Saharjo, B. H., Boer, R., & Ardiansyah, M. (2019). Characteristics and causes of forest and land fires in Kapuas District, Central Kalimantan Province, Indonesia. Biodiversitas Journal of Biological Diversity, 20(1), 110-117. DOI: 10.13057/biodiv/d200113

Keputusan Presiden No. 82 Tahun 1995 tentang Pengembangan Lahan Gambut Untuk Pertanian Tanaman Pangan di Kalimatan Tengah

Peraturan Pemerintah No. 57 Tahun 2016 tentang Perlindungan dan Pengelolaan Ekosistem Gambut

Peraturan Presiden No. 1 Tahun 2016 tentang Badan Restorasi Gambut

Intruksi Presiden No. 5 Tahun 2019 tentang Penghentian Pemberian Izin Baru dan Tata Kelola Hutan Alam Primer dan Lahan Gambut

Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor: 24/MENLHK/SETJEN/KUM.1/10/2020 tentang penyediaan kawasan hutan untuk food estate yang menjadi lampu hijau bagi pembabatan hutan lindung