

# Development of Self-Reliant Peatland Care Villages Based on Participatory Empowerment to Support Peatland Ecosystem Restoration in Teluk Panji Iii Village, Labuhanbatu Selatan Regency, North Sumatra Province

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## ABSTRACT

The development of the Peatland Stewardship Village (DMPG) is an effort to restore the peat ecosystem that involves the community independently to increase knowledge, awareness, abilities, and skills. The construction of the DMPG carried out by the Peat Ecosystem Protection and Management Working Team (TKPPEG) Semangat Baru in Teluk Panji III Village received good appreciation from the community and regional stakeholders because of the participatory community empowerment approach in developing the DMPG. TKPPEG Semangat Baru always involves the participation of the community and related stakeholders in the DMPG development process, starting from socialization, group formation, preparation of IMAS and RKM, exposure, implementation of RKM, partnerships, and collaboration. Overall, the TKPPEG Semangat Baru institution is still included in the "Developing" category because the role of the community and support from the Provincial and Regency governments has not been maximized. The Community Work Plan (RKM) from TKPPEG Semangat Baru was successfully implemented through activities that support efforts to improve the environment, gradually improve the economic conditions of local communities, and improve social status, which impacts the restoration of peat ecosystems.

**Keywords:** Peatland, Participatory, Community Development

## I. Introduction

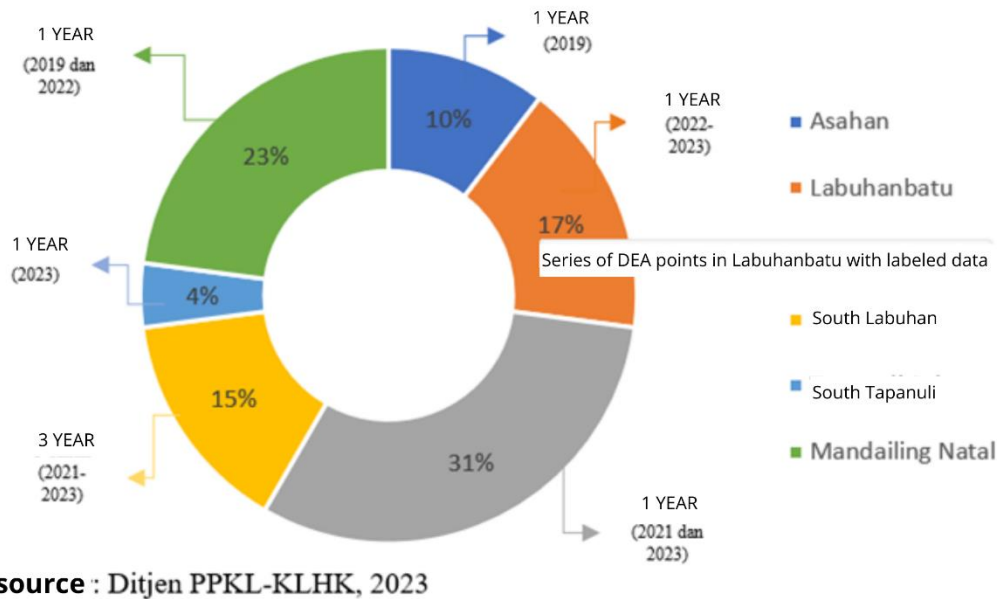
Indonesia is one of the countries with the most significant tropical peatland ecosystems. According to research by Xu J et al. (2018), globally, peatlands cover an area of 4.23 million km<sup>2</sup> or 2.84% of the world's land area. These peat ecosystems are distributed across Sumatra, Kalimantan, and Papua, with smaller areas in Halmahera and Sulawesi (Wahyunto et al., 2013). Based on the Decree of the Minister of Environment and Forestry Number: SK.129/MENLHK/SETJEN/PKL.0/2/2017 regarding the Designation of National Peat Hydrological Units, Indonesia has 865 Peat Hydrological Units (KHG) with total area of 24,667,804 hectares spread across Sumatra (9.6 million hectares), Kalimantan (8.4 million hectares), Sulawesi (63.2 thousand hectares), and Papua (6.59 million hectares).

Peatland ecosystems maintain biodiversity, carbon storage, and water regulation. Excessive exploitation of peatlands leads to uncontrollable damage to these ecosystems. According to data from the Ministry of Environment and Forestry (2017), the damaged peatland ecosystems in Indonesia reach 23.95 million hectares. Signs of peatland ecosystem degradation include artificial drainage, exposure of pyrite and quartz sediments beneath the peat layer, reduced land cover due to forest and land fires, and lowering the groundwater table in peatlands. Article 32A, paragraph (3) of Government Regulation Number 57 of 2016 concerning Amendments to Government Regulation Number 71 of 2014 on the Protection and Management of Peatland Ecosystems, and Article 9 of the Minister of Environment and Forestry Regulation Number P.16 of 2017, state that the restoration of peatland ecosystems in unlicensed areas is carried out by the Government, Provincial/District/City Governments, or the activity responsible parties according to their authority.

Peatland ecosystem restoration activities have been implemented by the Directorate General of Pollution and Environmental Degradation Control of the Ministry of Environment and Forestry since 2018 with the concept of community self-reliance in the Protection and Management of Peatland Ecosystems, known as the Desa Mandiri Peduli Gambut (DMPG) or Self-Reliant Peatland Care Village. The basic principle is water management improvement through the construction of peatland water management infrastructure, land rehabilitation and revegetation, and enhancement of community livelihoods (social, cultural, and economic), also referred to as "Rewetting, Revegetation and Revitalization of local community livelihoods (3R)." The increased role of communities involved in the independent Protection and Management of Peatland Ecosystems will be critical to the success of peatland ecosystem restoration in those areas.

The development of Self-Reliant Peatland Care Villages is based on sociological and anthropological principles, which involve empowering the local community to provide opportunities and capabilities for community groups to participate, negotiate, influence, and control community institutions responsibly for the betterment of their lives. According to Ife (2006), empowerment encompasses two key concepts: power and marginalized groups. Kindervatter (1979, p. 13, 150) defines empowerment from its outcomes as: "people gaining an understanding of and control over social, economic, and political forces in order to improve their standing in society." The values of village self-reliance to be achieved include psychosocial, cultural, and economic independence. Self-reliance in empowerment is a systematically designed development program concept aimed at making individuals or communities the subjects of empowerment. The success of community self-reliance in the activities of Self-Reliant Peatland Care Villages involves the active participation of the surrounding community.

Based on data from the Directorate General of Pollution Control and Environmental Degradation, Ministry of Environment and Forestry (Ditjen PPKL-KLHK) (2023), North Sumatra province has been the most frequent and extensive site for DMPG activities from 2018 to 2023. Labuhanbatu Regency is one of the regencies with the most village locations for implementing the Desa Mandiri Peduli Gambut program by Ditjen PPKL-KLHK. Figure 1 shows the percentage of Desa Mandiri Peduli Gambut activities from 2018 to 2023.



**Figure 1. Activities of the Desa Mandiri Peduli Gambut (DMPG) Program in North Sumatra**

Province Based on Figure 1 above, Teluk Panji III Village is one of the villages in Labuhanbatu Regency, North Sumatra Province that has been most frequently targeted by the Desa Mandiri Peduli Gambut activities by Ditjen PPKL-KLHK from 2021 to 2023. The extensive peatland area in Teluk Panji III Village requires the villagers to participate in climate change adaptation and mitigation efforts actively. Forest and land fires are the primary issues that need to be addressed by the Village Government and the Labuhanbatu Selatan Regency Government. According to SiPONGI-KLHK data (2023), from 2021 to 2023, approximately 127 hotspots with a confidence level of over 80% have been reported. A hotspot results from forest/land fire detection within a specific pixel size (e.g., 1 km x 1 km) that is likely burning when the satellite passes over in relatively cloud-free conditions using specific algorithms (Giglio, 2015). The satellites known for detecting hotspots by SiPONGI-KLHK include NOAA, Terra/Aqua MODIS, and remote sensing satellite data. Giglio (2015), in the MODIS Active Fire Product User's Guide, categorizes confidence levels into three classes as follows:

**Table 1. MODIS Satellite Confidence Levels**

Level of confidence (C)	Class	Action
$0\% \leq C < 30\%$	Low	Needs attention
$30\% \leq C < 80\%$	Normal	Alert
$80\% \leq C \leq 100\%$	High	Immediate intervention

Peatland management that is appropriate and sustainable has become crucial for the community in Teluk Panji III Village to reduce forest and land fires. The principles implemented are the 3Rs (Rewetting et al.). These activities include the restoration of hydrological functions through the improvement of water management with the construction of rewetting infrastructure and peatland water management, land rehabilitation and revegetation, and the enhancement of the community's economy. One way to enhance the community's perception is by developing the Desa Mandiri Peduli Gambut program using a

community empowerment approach. Community empowerment aims to increase the abilities and capacities of the community to utilize available resources to improve their welfare, dignity, and empowerment (Nasdian FR, 2006). According to Dwidjowijoto et al. (2007), empowerment is an effort and process of self-development to achieve self-reliance. Empowerment is a "process of becoming" rather than a "practical process." The implementation stages include awareness, capacity building, and empowerment.

Implementing the Desa Mandiri Peduli Gambut program in Teluk Panji III Village over three years is considered successful in restoring the damaged peatland ecosystem in the area. Community groups have felt various impacts from this program. The active role of individuals or community groups in disseminating knowledge about environmentally friendly peatland management, improving the hydrological function of the peatland ecosystem, increasing the economic value of the community, and protecting the peatland ecosystem's conservation areas are critical success factors in achieving sustainable peatland ecosystem management.

This study aims to: (1) Understand the process of the Desa Mandiri Peduli Gambut activities carried out in Teluk Panji III Village, Labuhanbatu Selatan Regency, North Sumatra Province. (2) Identify the inhibiting factors of the Desa Mandiri Peduli Gambut program activities in Teluk Panji III Village, Labuhanbatu Selatan Regency, North Sumatra Province. (3) Analyze the impact of the Desa Mandiri Peduli Gambut program's implementation on the restoration of the peatland ecosystem in Teluk Panji III Village, Labuhanbatu Selatan Regency, North Sumatra Province.

## II. METHODOLOGY

This research employs a descriptive qualitative method. This method aims to comprehensively understand a phenomenon observed in the field by describing the occurring events. According to Kartodirdjo (2009:129) in the book by Nugrahani (2014), the qualitative approach describes acknowledged phenomena.

Primary data were obtained through interviews with informants. Secondary data were sourced from the DMPG program documents (IMAS and RKM documents), peatland ecosystem management policies, and journals or literature on developing self-reliant peatland-aware villages. Secondary data refers to sources that do not directly provide data to the author or researcher. Data collection techniques included (1) interviews, (2) observation, (3) Focus Group Discussions (FGD), and (4) documentation. Respondents included the Village Head, community leaders, and local government representatives. Observations were used to collect data on DMPG development activities in Teluk Panji III Village. The FGD technique was also utilized, involving systematic group discussions with the TKPPEG (Peatland et al. Force) regarding particular issues.

The research location is Teluk Panji III Village, Kampung Rakyat Sub-district, Labuhanbatu Selatan Regency, North Sumatra Province. This location was selected purposively because this village has been and is currently developing as a self-reliant peatland-aware village (DMPG) under the intervention of the Ministry of Environment and Forestry (KLHK). Figure 1 illustrates the location of DMPG in Teluk Panji III Village.

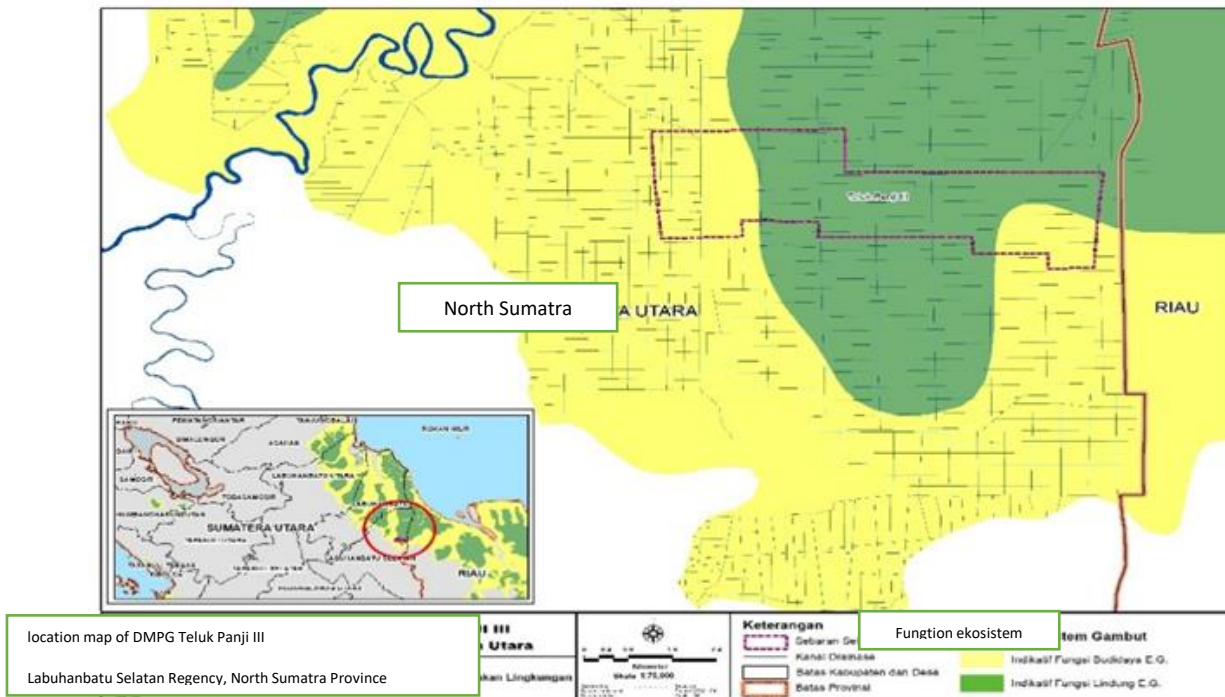


Figure 1. Location of DMPG in Teluk Panji III Village

### III. RESULTS AND DISCUSSION

#### 1. Development Process of the Self-Reliant Peatland-Aware Village (DMPG)

The peatland ecosystem restoration program is a mandatory policy directive. This aligns with the strategy to realize the "Policy Direction for Improving Environmental Quality and Low-Carbon Development," as targeted in the 2020-2024 RPJMN document. The Self-Reliant Peatland-Aware Village (DMPG) development is one of the efforts for peatland ecosystem restoration undertaken by the Indonesian government through the Ministry of Environment and Forestry from 2018 to 2023 and is still ongoing. The development of DMPG is carried out with a participatory community empowerment approach. The DMPG activities aim to develop community self-reliance and welfare by enhancing knowledge, attitudes, skills, behaviors, abilities, awareness, and resource utilization by establishing policies, programs, activities, and assistance that align with the essence of the problems and priority needs of the village community. In implementing community empowerment activities, four principles are often used: equality, participation, self-reliance, and sustainability (Najiyati et al., 2005).

The concept of DMPG development in Teluk Panji III Village develops the “concept of a self-reliant village that cares about sustainable peatland management in terms of economic development, social welfare, and ecological sustainability.” In the context of environmental sustainability, the development of DMPG in Teluk Panji III Village will assist the local government in implementing sustainable development. The Ministerial Decision on Villages, Development of Disadvantaged Regions, and Transmigration (2023) established that an environmentally aware village prioritizes the utilization of financial resources, assets, and village potentials, as well as other resources, to achieve SDG 15 (fifteen), which includes 100% restoration of peatlands.

Teluk Panji III Village has developed the DMPG for three years, from 2021 to 2023. The development of the self-reliant peatland-aware village in Teluk Panji III Village involves the following stages: (1) Initial discussions and socialization of the peatland ecosystem restoration program plan, (2) Formation of groups

and their administration, (3) Preparation of IMAS (Problem Identification and Situation Analysis) and RKM (Community Work Plan) documents, (4) Presentation and integration of IMAS and RKM documents with the activity plans of the Village/District/City government, (5) Implementation of RKM through institutional funding, (6) Scaling-up implementation, (7) Building partnerships and collaborations, (8) Achieving self-reliance. Figure 2 illustrates the scheme of the DMPG development implementation in Teluk Panji III Village.

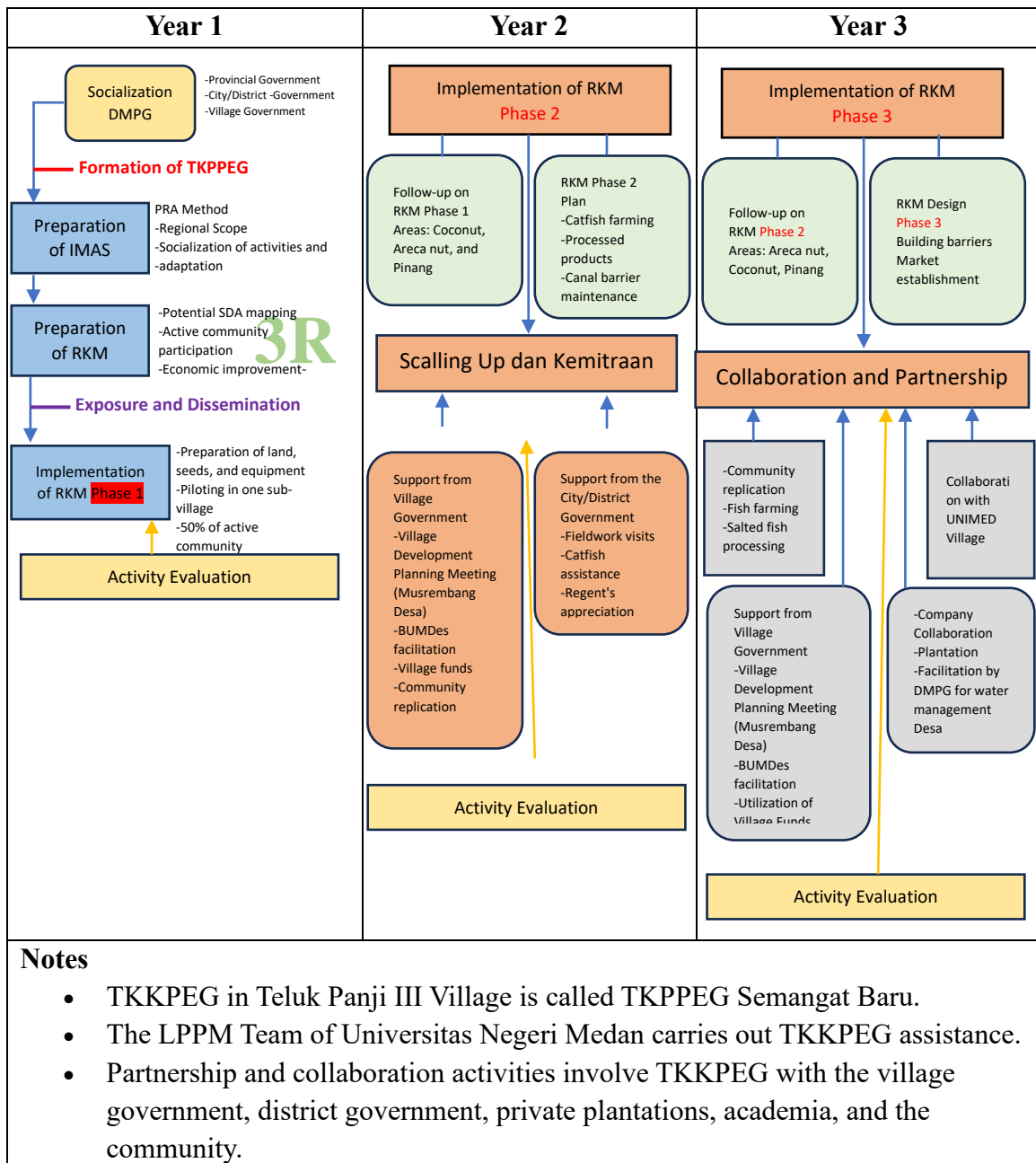


Figure 2. Development of the Self-Reliant Peatland-Aware Village in Teluk Panji III Village

The development of DMPG is community-based with a local community empowerment approach, making it essential to establish community group institutions to carry out each activity. In the context of DMPG, the formation of community groups is often referred to as the Peatland Ecosystem Protection and Management Working Team (TKPPEG). Teluk Panji III Village has formed a community group named

“TKPPEG SEMANGAT BARU.” TKPPEG Semangat Baru comprises a Chairperson, Secretary, Treasurer, and 7 group members.

TKPPEG Semangat Baru implements the peatland ecosystem's sustainable and self-reliant protection and management. Technically, in its implementation, TKPPEG Semangat Baru will be assisted by community facilitators trained by experts from the Ministry of Environment and Forestry (KLHK), and they will also be accompanied by a technical support team from Medan State University to provide technical information on adequate peatland ecosystem protection and management efforts.



Figure 3. Membership of TKPPEG Semangat Baru

The success of DMPG development with a community empowerment approach lies in the participatory and committed collaboration among stakeholders. Okello et al. (2009) mentioned that community participation in an empowerment program fosters communication, knowledge, consultation, collaboration, and partnership. Based on the above explanation, it is evident that the government collaborates with the local community to form partnerships and cooperatives to control peatland ecosystem degradation. Below is the stakeholder involvement in the DMPG development process in Teluk Panji III Village.

Table 2. Stakeholder Involvement in DMPG Development

NO.	STAGES	OUTPUT	INVOLVED INSTITUTIONS
1	Socialization of DMPG development plans and identification of village potential	Village profile document	KLHK, Provincial/City/District Government (Environmental Services), Camat, Village Head, University, Community Representatives
2	Formation of TKKPEG	TKKPEG administration document	KLHK, Village Head, University Facilitators, Community Representatives
3	Preparation of IMAS and RKM documents	IMAS and RKM documents	KLHK, City/District Government (Environmental Services), Camat, Village Head, University Facilitators,

			Community Representatives, TKPPEG Semangat Baru
4	Exposure and Integration of RKM into the Regional Work Plan	Memorandum of Understanding	KLHK, Regent, Bappeda, City/District Government (Environmental et al., KPH, Fisheries Services, Animal Husbandry Services, Plantation Services), Camat, Village Head, University Facilitators, Community Representatives, TKPPEG Semangat Baru, Private Companies
5	Implementation of RKM	RKM demonstration plot	KLHK, Village Head, University Facilitators, Community Representatives, TKPPEG Semangat Baru
6	Implementation of Scaling Up RKM	RKM demonstration plot	KLHK, Village Head, University Facilitators, Community Representatives, TKPPEG Semangat Baru
7	Building Partnerships and Collaborations	RKM sustainability	KLHK, Regent, Bappeda, City/District Government (Environmental et al., KPH, Fisheries Services, Animal Husbandry Services, Plantation Services), Camat, Village Head, University Facilitators, Community Representatives, TKPPEG Semangat Baru, Private Companies
8	Independence	RKM sustainability	KLHK, Village Head, University Facilitators, Community Representatives, TKPPEG Semangat Baru

In the implementation of DMPG development, KLHK (2023) applies several stages, namely: (Stage 1) Socialization and Village Restoration Plan Preparation, (Stage 2) Preparation of IMAS, RKM, and TKPPEG, (Stage 3) Integration of IMAS and RKM into the Village/Provincial/District Work Plan, (Stage 4) RKM Implementation, (Stage 5) Scaling Up Implementation, (Stage 6) Independence. Figure 4 illustrates the stages of the DMPG development process developed by the Ministry of Environment and Forestry.



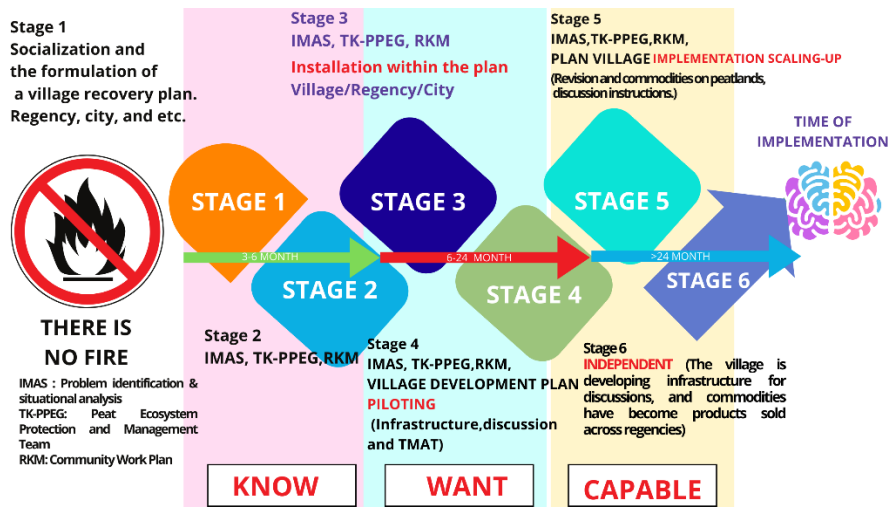
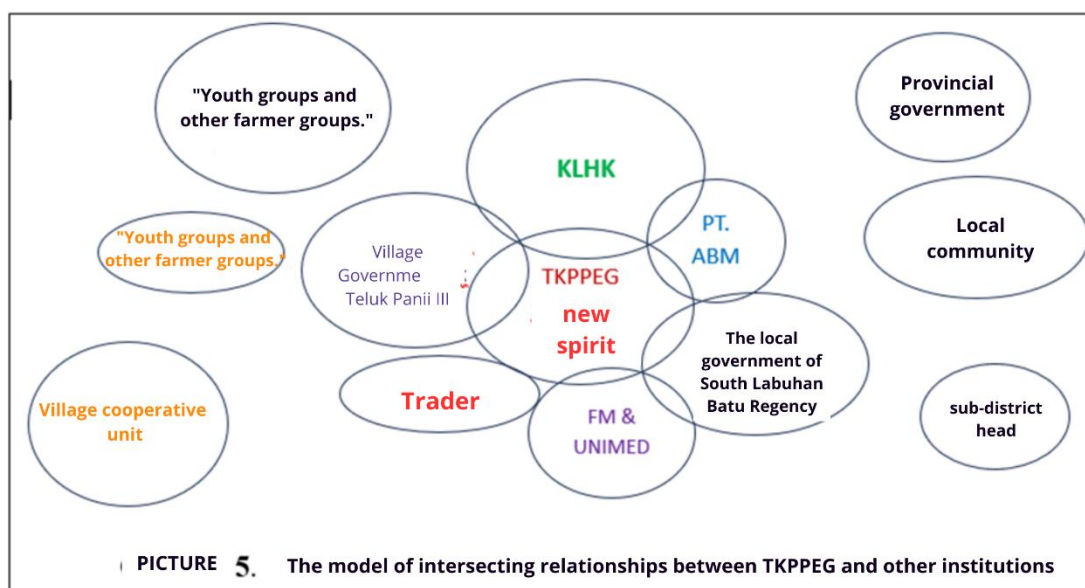


Figure 4. Stages of the DMPG Development Process (source: Ditjen PPKL-KLHK, 2023)

Implementing the DMPG program in Teluk Panji III Village requires active participation from all community elements and support from local stakeholders. The approach used in the DMPG development in Teluk Panji III Village is participatory community empowerment.

The empowerment approach developed by TKPPEG Semangat Baru aims to increase the peatland ecosystem's awareness of the environment independently, economically, and socially and to impact sustainable development. Active community participation is a measure of the realization of community independence in Teluk Panji III Village. According to Owin (2004), the main consequence and responsibility of village development programs through a participatory community empowerment approach is the community's strength in physical and material aspects, economy, institutions, cooperation, intellectual strength, and collective commitment to implementing empowerment principles. Figure 5 below illustrates the intersection model of TKPPEG's relationship with other institutions in the area.



TKPPEG Semangat Baru is a community group formed under the Ministry of Environment and Forestry's work program to protect and manage peatland ecosystems sustainably. TKPPEG Semangat Baru was

established in 2021 as part of the DMPG program development effort. The group is supported by two community facilitators and one assistant from Medan State University. TKPPEG is assisted by these university community facilitators and technical assistants to conduct problem identification and situational analysis (IMAS) and develop a community work plan (RKM) for the group's five-year work program. Preparing IMAS and RKM involves community participation and support from local stakeholders. Figure 6 illustrates the formation of TKPPEG and the preparation of IMAS and RKM documents.



**Figure 6. Formation of TKPPEG Semangat Baru and preparation of IMAS and RKM**

Based on the results of the problem identification and situational analysis (IMAS) in Teluk Panji III Village, five main issues were identified:

1. The threat of peatland fires in the community's oil palm plantation area every year because Teluk Panji III Village consists of peatland with varying depths from 2-7 meters.
2. More knowledge and understanding about sustainable peatland management beyond oil palm plantations needs to be gained from the community.
3. There is a decline in the quality of community oil palm plants during the dry season, as the plantation business is the main livelihood of Teluk Panji III Village residents.
4. Limited economic options for the community, as they depend primarily on the income from oil palm plantations.

RKM includes various programs and activities selected to address the situations and issues in managing the peatland ecosystem in Teluk Panji III Village. The RKM prepared by TKPPEG Semangat Baru comprises activities for protecting and managing the peatland ecosystem over five years. Subsequently, the RKM will be presented to stakeholders to gain support for the DMPG development embodied in the RKM. Table 3 provides details of the RKM carried out by TKPPEG Semangat Baru over three years since 2021.

**Table 3. Inventory of institutions related to TKPPEG Semangat Baru**

No.	Year of Implementation	RKM Activities	Investment Value	Evaluation
1	2021	1. Construction of 5 canal partitions	Rp. 45,000,000,-	1. The quality of canal partitions still needs improvement and lasts for two years

		2. Cattle farming: four cows 3. Red ginger farming 4. Planting mango and areca nut trees		2. Cattle farming was unsuccessful due to disease 3. Red ginger farming was not effective due to frequent floods and drought 4. Mango planting is beneficial for residents
2	2022	1. Maintenance of 2 canal partitions 2. Catfish farming six ponds 3. Processing catfish products 4. Planting areca nut trees	Rp. 55,000,000,-	1. The canal partitions are very beneficial, so maintenance is necessary 2. Catfish farming was successful due to the potential and community needs in the village 3. A marketing network for catfish products such as crackers is needed 4. Planting areca nuts is beneficial in preventing erosion during floods
3	2023	1. Construction of 6 canal partitions 2. Expansion of catfish farming to 12 ponds 3. Production of fish and livestock feed 4. Goat farming: 8 goats	Rp. 187,022,000,- (canal partition construction) Rp. 58,000,000,- (DMPG)	1. The newly built canal partitions are very effective in preventing forest fires and increasing palm oil productivity 2. Catfish meets community needs 3. Self-production of feed reduces the cost of catfish farming 4. Goat farming is well-developed in the village

The work plan of TKPPEG Semangat Baru involves every element of the community, including group members, residents of the surrounding village, the village government, and the South Labuhanbatu District government. TKPPEG Semangat Baru adopts a participatory community empowerment approach. Over the past three years, of the 12 types of RKM activities undertaken, only four have continued until 2024. According to observations, the ongoing activities are (1) Catfish farming, with catfish being highly popular in Teluk Panji III due to its competitive market price and essential role in the local diet, (2) Feed production, where TKPPEG Semangat Baru's ability to produce fish feed and other livestock feed reduces production costs for catfish farming and meets local demand for poultry and bird feed, (3) Goat farming, leveraging the availability of grass and residents' skills in goat husbandry, starting with eight goats in 2021

and growing to 16 by 2024, and (4) Canal block construction, which mitigates the impact of prolonged dry seasons and annual forest fires, while stabilizing water levels to enhance oil palm productivity.



**Information:**

- (a) Catfish farming
- (b) Livestock feed production
- (c) Goat farming
- (d) Canal partition construction

**Figure 7. Implementation of TKPPEG Semangat Baru's RKM**

Over the past three years, TKPPEG Semangat Baru has continuously worked on sustainable peatland ecosystem protection and management in Teluk Panji III Village according to the pre-established work plan. However, not all planned activities achieved their targets. The critical success factors for sustainable activities in DMPG development in Teluk Panji III Village are (1) Community awareness and active participation in developing the activities, (2) Support from stakeholders such as the village government, district government, and private sector (plantation companies) is crucial for the sustainability of TKPPEG Semangat Baru's activities, (3) Ongoing socialization and training are essential to shift the community's mindset towards sustainable peatland management, and (4) Effective collaboration and partnership among stakeholders ensure the sustainability of TKPPEG's activities.

The development of DMPG in Teluk Panji III Village through TKPPEG Semangat Baru's activities faces certain impediments that the group needs help to address. Two primary hindering factors for participatory DMPG development in TKPPEG Semangat Baru's work plan are:

**a. Internal Factors**

Theoretically, differences in age, education level, knowledge, occupation, membership closeness, income level, and involvement in development activities significantly influence community participation in empowerment activities. TKPPEG Semangat Baru and other Teluk Panji III Village community elements must receive continuous socialization, skill training, and assistance in sustainable peatland ecosystem protection and management efforts.

Internal factors hindering DMPG development in Teluk Panji III Village include community mindset and occupations. Most residents' livelihoods revolve around farming and oil palm cultivation, initiated through a transmigration program in the 1990s, making it challenging and time-consuming to change their mindset. The daily work routine, spanning 10 to 12 hours from sunrise to sunset, leaves little time for other activities, including participation in DMPG development.

### **b. External Factors**

External factors are closely related to stakeholder support and partnerships established by TKPPEG Semangat Baru. Stakeholders include the active support of the village government, the South Labuhanbatu District government, and the private sector, such as oil palm plantation companies. The village government plays a primary role in integrating TKPPEG Semangat Baru into the village's Musrembang (development planning meeting) and BPD (village consultative body) work plans, enabling TKPPEG to access village funds for DMPG development in Teluk Panji III. The South Labuhanbatu District government is responsible for expanding TKPPEG's activities and integrating programs and activities from related agencies and oil palm plantation companies like PT. Abdi Budi Mulia is expected to assist TKPPEG Semangat Baru with water management in community plantations and support the economic activities developed by TKPPEG. A top-down development approach has historically disadvantaged the community as it often fails to reflect their needs. According to Retno Susanti et al. (2019:41), "Empirical field evidence suggests that top-down community empowerment approaches are less successful because the activities often contain elements of vested interest." The ideal scenario involves tailoring development to the potential and capacity of the area while ensuring active community participation.

### **3. Impact of the Development of Peatland Care Independent Village (DMPG)**

#### **Information:**

1. The measured parameters consist of 7 aspects along with their values: Organizational/Institutional Aspect (8.2), Administrative Aspect (12.4), Demo Plot Activity Aspect (13.6), Productive Business Activity Aspect (9.5), Capital Aspect (5.5), Networking Aspect (4.3), and Human Resources Aspect (2.7).
2. The assessment categories are divided into Growing (1.0–33.33), Developing (33.34–66.67), and Self-Reliant (66.68–100) categories.
3. TKPPEG Semangat Baru obtained a total score of 56.2 points across all parameters, thus categorizing it as "Developing."
4. The monitoring method was issued by KLHK (2021).

Since the initiation of DMPG development in Teluk Panji III Village in 2021 through the work plan of TKPPEG Semangat Baru, significant changes have been observed in the protection and management of the peatland ecosystem in the village. The results of the institutional evaluation analysis of TKPPEG Semangat Baru indicate that the group is categorized as "Developing" with a score of "56.7 points." Below is Figure 8, showing the Results of the institutional monitoring analysis of TKPPEG Semangat Baru.


 FORM PEMANTAUAN KELEMBAGAAN TK-PPEG					
Nama Lembaga TK-PPEG : ... Tanggal, Hm, Thn : 2021 - 2021 Desa Kelurahan : ... Waktu penulisan : 2021 - 2021 Kecamatan : ... Metode : ... Kabupaten/Kota : ... Pelaksana : ... Provinsi : ... Paraf : ...					
NO	ASPEK	KINERJA dan BEHUK			KET
		TUMBUH	KEMBANG	MANDIRI	
		0-100	101-200	201-400	
<b>A</b> Organisasi lembaga					
1.	Struktur Organisasi		1,5		
2.	Peran dan Tugas Pengurus	1,2			
3.	Atas & Bawah	1,1	1,2		
4.	Sekretariat				
5.	Legalitas	2,5	2,5	0	1,2
	Jumlah		2,2		
<b>B</b> Administrasi					
6.	Buku Kegiatan			2,8	
7.	Buku Kas			2,8	
8.	Buku Sarana	1,0			
9.	Buku Yama		2,5		
10.	Buku Kriteria	1,0	2,5	2,5	1,2
	Jumlah			2,5	
<b>C</b> Kegiatan Kelompok Pengelola Sarana Prasarana (Salah satu dan Dampak)					
11.	Pemantauan			2,5	
12.	Pelembagaan			2,0	
13.	Pemeliharaan Sarana		1,5		
14.	Monitoring dan Evaluasi		1,7	2,7	
15.	Pengembangan Sarana	0	2,4	10,2	15,6
	Jumlah			2,5	
<b>D</b> Kegiatan Usaha Produktif					
16.	Kegiatan Usaha Produktif			2,5	
17.	Pemasaran Hasil Usaha		2,5	2,5	
18.	Penghasilan Usaha	0	2,5	2,5	2,5
	Jumlah			2,5	
<b>E</b> Pemondasian					
19.	Forum Anggota/Swadaya		1,7	2,8	
20.	Bantuan Hibah			2,8	
21.	Pinjaman	1,0	1,7	2,8	2,5
	Jumlah			2,8	
<b>F</b> Jaringan Kerja					
22.	Jaringan Kerja Internal Desa		1,5	2,8	
23.	Jaringan Kerja Eksternal Desa	0	1,5	2,8	2,8
	Jumlah			2,8	
<b>G</b> Sumber Daya Manusia					
24.	Pelatihan Pengurus/Anggota	1,2	1,5		
25.	Kerjasama/Pelatihan/Sarbanumber	1,2	1,5		
	Jumlah			2,7	
		Jumlah akhir (A+B+C+D+E+F+G)			56,2
Keterangan: (Tumbuh = 1,2-2,5) (Kembang = 2,6-40,5) (Mandiri = 65,6-100)					

Figure 8. Institutional Monitoring Analysis of TKPPEG Semangat Baru

Based on the institutional monitoring analysis results, TKPPEG Semangat Baru has shown considerable progress over the past three years, categorized as "Developing." The transition of TKPPEG to the "Independent" category can be realized if TKPPEG Semangat Baru can overcome the issues and obstacles encountered in the DMPG development in Teluk Panji III Village. The DMPG development efforts through the work plan of TKPPEG Semangat Baru have impacted the development of Teluk Panji III Village. There are four impacts of DMPG development on the efforts of peatland ecosystem protection and management in Teluk Panji III Village, as follows:

**a. Governance Aspect**

Since the start of DMPG development in 2021, there has been a shift in the mindset of Teluk Panji III Village's governance towards the protection and management of the peatland ecosystem. The initiation of the Peatland Care Independent Village (DMPG) development is a concrete form of achieving village development as mandated by laws and national policies. TKPPEG Semangat Baru has established commitments with the village government, the South Labuhanbatu District government, and the oil palm plantation company (PT. ABM) regarding the protection and management of the peatland ecosystem in the village. Table 4 below details the governance efforts of TKPPEG with various stakeholders.

Table 4. Governance Efforts of TKPPEG with Various Stakeholders

No.	Type of Stakeholder	TKPPEG Activities	Stakeholder Response
1	Government of Desa Teluk Panji III	- Involvement of village officials as TKPPEG members - Socialization and training on TKPPEG activities by the Ministry of Environment and Forestry (KLHK)	- Support from the Village Head - Village Head issues regulations and policies to prevent forest and land fires by maintaining the groundwater level - Involving TKPPEG in village development planning

			meetings (Musrembangdes) to plan village activities
2	Government of Labuhanbatu Selatan Regency	- Socialization of protection and management of the peatland ecosystem in Desa Teluk Panji III - Exposure and evaluation of TKPPEG Semangat Baru activities every year	- Support from the Head of the Environmental Office - Visit by Mrs. PKK, Deputy Regent of Labuhanbatu Selatan - Assistance of 2 goats and catfish seeds from the Agriculture and Livestock Department
3.	Palm Oil Plantation Company (PT. ABM)	- Involvement in the planning and construction of canal partitions - Socialization and exposure of RKM TKPPEG Semangat Baru activities	- Participation in determining the location of the canal partition construction - Inclusion of TKPPEG programs and activities in the CSR plan for 2025

**b. Social Aspect**

The active involvement of Teluk Panji III residents in supporting the work plan of TKPPEG Semangat Baru is critical to enhancing social values in the village. The equitable distribution of TKPPEG membership across various community representatives is an effort by the central administrators of TKPPEG Semangat Baru to promote social equity. Social support for activities such as catfish farming and goat raising is increasing, with many residents replicating these activities due to their affordability and the creation of new purchasing locations in the village. A similar trend is seen with the construction of canal blocks in the villagers' oil palm plantations, where many residents have started building canal blocks by filling dry canals with soil bags.

**c. Environmental and Ecological Aspect**

Forest and land fires are among the most significant ecological issues affecting peatland. In Teluk Panji III Village, peatland fires in the villagers' oil palm plantations occur in almost every dry season. According to Hooijer (2012), continuous peatland fires impact the physical properties of peat soil, including peat thickness, groundwater table height, bulk density, and moisture content.

The development of DMPG in Teluk Panji III Village through a participatory community empowerment approach has effectively involved many residents in sustainable peatland ecosystem protection and management. The DMPG development via the TKPPEG Semangat Baru work plan has provided options to minimize and prevent peatland fires in Teluk Panji III Village. The village head's policy to maintain the groundwater table height and TKPPEG's plans for canal block construction are actions aimed at sustaining the groundwater table height in the villagers' oil palm plantations. Interviews with TKPPEG Semangat Baru revealed that a stable groundwater table in the peatlands can increase the productivity of oil palm plantations by 7% per hectare with each harvest.

**d. Economic Aspect**

The paradigm of village development is very dynamic, requiring a balance between economic, social, and environmental interests. The Peatland Care Independent Village development model implemented by TKPPEG Semangat Baru aligns environmental interests with social and economic needs. The ongoing activities of TKPPEG Semangat Baru have contributed to social welfare, positively impacting environmental sustainability. The economic value of TKPPEG's work plan activities has increased significantly over the past two years. Table 5 below outlines the annual increase in the economic value of TKPPEG Semangat Baru's sustainable activities.

**Table 5. Annual Increase in the Economic Value of TKPPEG Semangat Baru**

No.	RKM Activities	Year	Investment Value	Production Value	Profit
1	Catfish Farming	2022	Rp. 12,000,000; - Construction of 6 bio floc ponds - Catfish seeds	Rp. 8,000,000; - Salary for TKPPEG members - Catfish feed	Rp. 9,000,000 (already deducted from investment installments and production costs)
		2023	Rp. 15,000,000; - Construction of 4 bio floc ponds and two stone ponds - Catfish seeds	Rp. 6,000,000; - Salary for TKPPEG members - 50% Catfish feed	Rp. 15,000,000 (already deducted from investment installments and ten active ponds)
	Total TKPPEG Cash for Catfish Farming				Rp. 24,000,000;
2	Animal Feed Production	2023	Rp. 6,000,000; - Purchase of feed machine	Rp. 2,000,000; - Production materials	Rp. 4,000,000 (in the form of a 50% reduction in the production value of catfish feed)
	Total TKPPEG Cash for Feed Production				- (not yet available as each development for other animal feed)
3	Goat Farming	2023	Rp. 16,000,000; - Construction of a pen and three goats (sale of cows in 2021) - Purchase of 5 goats (RKM 2023)	Rp. 6,000,000; - Salary for goat herder - Grass feed costs	Rp. 35,000,000 (10 goats already sold and eight goats still young)
	Total TKPPEG Cash for Goat Farming				Rp. 35,000,000;



4	Canal Partition Construction	2023	Rp. 187,022,000; (6 canal partitions)	Rp. 3,000,000 (canal partition maintenance)	Rp. 45,000,000 (investment value of 7% per year for the community's 120-hectare plantation)
	Total TKPPEG Cash for Canal Partition Construction				Rp. 59,000,000;

Based on the results above, the development of DMPG presents a rational solution to address the issues of participatory protection and management of peatland ecosystems in community areas. Strategic village development planning programs need to be integrated with the development of DMPG as a long-term sustainable intervention solution aimed at balancing economic benefits with environmental carrying capacity.

#### IV. CONCLUSION

Overall, the development of the Village Mandiri Peduli Gambut (DMPG) in Teluk Panji III Village, carried out by TKPPEG Semangat Baru, has received positive appreciation from the community and stakeholders. TKPPEG Semangat Baru has successfully implemented empowerment principles in its work plans: equality, participation, self-reliance, and sustainability. TKPPEG Semangat Baru employs a participatory community empowerment approach to develop DMPG in Teluk Panji III Village. Throughout the DMPG development process, TKPPEG Semangat Baru consistently involves the community and relevant stakeholders, from socialization, group formation, preparation of IMAS and RKM, exposure, and RKM implementation to partnership and collaboration.

To support the institutional performance of TKPPEG Semangat Baru from the "Developing" to "Independent" category, the working group must overcome various issues and obstacles encountered during the DMPG development in Teluk Panji III Village. Socialization activities, community capacity building, and intensive mentoring are effective ways to change the community's mindset toward sustainable peatland ecosystem protection and management. The support role of stakeholders is crucial to be maximized in the partnership and collaboration approach. This support will benefit the sustainability of the DMPG program and its future activities.

The concept of developing the Village Mandiri Peduli Gambut in Teluk Panji III Village is defined as a village that independently cares about sustainable peatland management and develops good governance practices. The development of DMPG in Teluk Panji III Village, through the work plans of TKPPEG Semangat Baru, has successfully carried out activities that support environmental improvement, enhance the economic value of the community, and improve social status, impacting the peatland ecosystem restoration activities in Labuhanbatu Selatan Regency.

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