



# Enhancing Community Empowerment for Sustainability through the Tandu Raya Program under the CSR Initiatives of AFT Supadio

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## Abstract

Underutilized peatland potential and the recurring threat of land fires in Kubu Raya Regency have underscored the need for community-based solutions, leading to the initiation of the Tandu Raya program with PT Pertamina Patra Niaga.. This study employed *Participatory Action Research* (PAR), which emphasized active collaboration between researchers and local communities to integrate research with field practices. The program was initiated in response to the underutilized potential of peatlands in *Kuala Dua Village, Kubu Raya District, West Kalimantan*. As a result, unproductive peatlands had created socio-economic and environmental challenges for the community. This program, which targeted disaster-prone communities, was designed to strengthen their resilience in facing forest and land fires. By focusing on organic-based horticultural farming in peatland areas, it led to positive social, economic, and environmental outcomes. The implementation of organic farming was carried out through land clearing, planting preparation, cultivation, and harvesting. As part of these practices, fertilization was based exclusively on environmentally friendly organic fertilizers, which were collectively produced by the *Berkah Pelopor Petani Gambut* group. The findings highlight the role of CSR initiatives in promoting sustainable peatland management and community resilience.

## Keywords

Corporate Social Responsibility, Empowerment, Community

## Introduction

Indonesia, the world's second-largest megabiodiversity country, has experienced significant degradation of its natural resources in recent decades. Monoculture as a farming practice has contributed to the decline in habitat area, from 80.30 percent in 2000 to 49.70 percent in 2045 (Ministry Of National Development Planning, 2025). According to the National Long-Term Development Plan (2025–2045), improving agricultural productivity has become one of the government's priorities. To achieve this, strategies focus on strengthening farmers' capacities and

advancing social inclusion through local community empowerment.

Agriculture plays an important role in supporting food security, economic growth, and community welfare in Indonesia. Apart from mineral soils, agricultural potential also exists in the country's unique peatland ecosystems. Notably, Indonesia has 13.4 million hectares of peatlands that remain underutilized. Because of their high carbon reserves, acidic soils, and low fertility, these areas require careful management to ensure that their ecological functions are preserved. Hence, increasing productivity on Indonesia's peatlands through sustainable agriculture not only reduces soil degradation and preserves carbon reserves but also reinforces the nation's commitment to the Sustainable Development Goals (SDGs).

The peat ecosystem in West Kalimantan Province is spread across 2,8 million hectares (ha) (Bappeda Kubu Raya, 2021). At the regional level, Kubu Raya Regency has 342,984 hectares of active peatlands, or 60% of its total area (BPS, 2018). This peatlands area makes Kubu Raya Regency rank third in West Kalimantan Province (Pahlawan Gambut, 2023). This situation reflects a dual condition: on one hand, it presents promising opportunities, and on the other, it poses pressing challenges in land management. The greatest potential lies in the agriculture and livestock sectors, which contributed 5.18% to the GRDP in 2020 and achieved the highest rice production in West Kalimantan. However, the agricultural sector in this area faces challenges such as land that is highly flammable if not managed with appropriate methods. Furthermore, limited access to education and information restricts the community's ability to utilize peatlands effectively.

Within Kubu Raya Regency, Kuala Dua Village has peatlands with a depth of 7–20 meters from the ground surface. The soil depth varies depending on the geographical location, with some areas on hills, which results in more diverse soil depths. Peatlands in Kuala Dua Village cover 2,727 hectares, equivalent to 75% of the total village area. While the land is primarily allocated for settlements, plantations, and agriculture, only 34.5 hectares are used for agricultural purposes. The soil is characterized by high organic matter, a soft texture, and high porosity. The biologically active topsoil layer serves as the main zone for plant roots, soil microbes, and decomposition processes. Given these characteristics, the land has the potential to support the cultivation of various horticultural crops, such as vegetables and fruits.

However, despite these potentials, the peatlands in Kuala Dua Village, they are highly vulnerable to fire. Every year, the village experiences recurring fires that cause losses to the community, both economically and environmentally. Local farmers suffer when their productive agricultural land is destroyed. Furthermore, the environmental impacts extend beyond the village, which affect surrounding communities. Air pollution and health crises, particularly acute respiratory infections (ARIs), are two unavoidable consequences of forest and land fires (*Kebakaran Hutan dan Lahan*, commonly referred to as *KARHUTLA*).

Optimizing the potential and addressing the existing issues in Kuala Dua Village, Kubu Raya Regency requires synergy and collaboration across sectors. As stated by Aji (2024), this collaboration involves various aspects, including community programs, environmental activities, and financial support. In the same vein, Lizana et al. (2023) argue that CSR-driven community support plays a key role in establishing a circular economy by involving communities in new initiatives and promoting responsible, environmentally friendly production practices.

In response to these challenges, PT Pertamina Patra Niaga AFT Supadio contributes to peatland management through the Tandu Raya program. The program focuses on empowering farmers to sustainably optimize peatlands, which can have positive impacts on economic, social, and environmental activities. Integrated organic farming systems is an innovative approach that

offers a promising solution to this challenge (Selvan, et.al, 2023). Moreover, Tandu Raya is expected to strengthen community resilience, enhance adaptive capacity to disasters and climate change, and promote sustainable agricultural practices.

## Methods

The approach used in this study was qualitative, employing the *Participatory Action Research* (PAR) method. This method actively and collaboratively involved both researchers and community members, ensuring integration between research and field practice (Borda, 1991). According to Creswell (2014), *Participatory Action Research* (PAR) sought to empower participants to take action on an issue defined by the group, integrating research, education and action. The study was carried out with the group to understand field conditions, plan corrective actions, execute activities, and evaluate progress for collective advancement (Chevalier, 2013). PAR is an innovative approach to economic and social change, which goes beyond usual institutional boundaries in development by actively by involving the people in generating knowledge about their own condition (1991). In accordance with this principle, Kemmis and McTaggart (2005) stated that *Participatory Action Research* (PAR) focused on active participation and direct action, aiming to positively transform community or environmental conditions through reflection on social practices.

Alongside this approach, qualitative methods emphasized capturing the entirety of human experiences and the meanings individuals attached to them, allowing for a broader understanding and deeper insight into complex human behaviors. In this study, qualitative research was based on a set of assumptions, worldviews, and the use of theoretical lenses to examine problems, focusing on the meanings individuals or groups assigned to specific social phenomena (Creswell, 2014). PAR is a qualitative research methodology that fosters collaboration among participants and researches (Mac Donald, 2012). The study was conducted from June to August 2025 in Kuala Dua Village, Sungai Raya District, Kubu Raya Regency. The research unit involved the *Kelompok Berkah Pelopor Petani Gambut* (Peatland Pioneer Farmers' Group). The location and research unit were selected using purposive sampling, based on the research problem. The focus of the study was on community involvement in the AFT Supadio CSR program to promote sustainable peatland agriculture.

## Results and Discussions

### The Tandu Raya Program in Kuala Dua Village

The Tandu Raya program aimed to enhance local communities' resilience to climate change by promoting sustainable agricultural practices. In peatland areas, climate change challenges included declining land cover, irregular rainfall and temperature patterns, and increased risks of fires and hydrological disasters such as flooding. Consequently, peatland degradation occurred, reducing agricultural productivity and endangering the stability of local ecosystems.

This program was initiated by Pertamina AFT Supadio, targeting the *Kelompok Tani Berkah Pelopor Petani Gambut* (BPPG) in Kuala Dua Village. Members of the Tandu Raya program consisted of both men and women, ranging from working-age adults to the elderly, who were considered vulnerable to disasters. Due to limited knowledge and skills in managing peatlands, the community has not been able to optimize their potential. The Tandu Raya program serves as a catalyst for transforming local peatland management.

Before the implementation of the Tandu Raya program, the community practiced conventional agriculture on peatlands, relying on chemical fertilizers. Farmers perceived this method as the quickest and easiest way to boost agricultural production. The availability of chemical fertilizers at agricultural stores made it easy for farmers to access these growing media. Nevertheless, the group lacked awareness of the long-term environmental impacts of chemical fertilizer use. This was influenced by the farmers' limited knowledge regarding the benefits and successful implementation of organic farming. As a result of these conditions, Pertamina AFT Supadio facilitated capacity building to the community, starting with education on land clearing without burning, developing skills in managing agricultural commodities, and strengthening group management systems.

The method of land clearing without burning was carried out manually using machetes to remove shrubs, grasses, and unwanted plants. The group then shredded the biomass using a brush cutter, which accelerated decomposition. The biomass was also used as mulch to cover the soil surface. Irrigation was another important aspect to consider in preparing agricultural land. The group employed a system of rainwater retention ponds, which also served as a site for cultivating catfish (*Clarias spp.*). The use of these ponds not only supported land irrigation but also provided economic benefits for the group.

After completing the land preparation stages, the BPPG group planted various horticultural crops using agroforestry techniques. According to Nair (1993), Agroforestry is a dynamic, ecology-based natural resource management system that integrates trees into agricultural land and landscapes, promoting diversification while maintaining crop production to enhance social, economic, and environmental benefits for all land users. In agroforestry systems there are both ecological and economic interactions among the different components (Lundgren, 1982). In terms of the environment, it helps regulate water balance, reducing the risk of droughts and fires. Economically, agroforestry allows for multiple income streams, as the combination of planted commodities can generate revenue in the short, medium, and long term. Diversification also minimizes the risk of crop failure. Socially, the approach strengthens local food security and encourages the community to continuously improve their knowledge of sustainable land management and crop diversity utilization.

The crops planted by the group included corn, guava, vegetables, *durian*, avocado, *jengkol*, and *petai*. These plants were selected for their tolerance to acidic soils and high moisture levels. The choice of avocado, *durian*, *petai*, and *jengkol* emphasized their role in soil and water retention, as they possess deep and strong root systems that help maintain peat structure and prevent surface erosion (Rotinsulu, et.al. (2022)). The agroforestry method utilized vertical space, with perennial crops occupying the upper strata while seasonal crops grew in the lower layers with a rapid harvest cycle. Crops such as avocado and durian were planted in the upper strata, whereas corn and cassava served as fast-cycling crops in the lower strata.

### **Synergy between AFT Supadio and the Community in the Tandu Raya Transformation**

PT Pertamina Patra Niaga AFT Supadio operates in the aviation fuel distribution sector at Supadio Airport in Pontianak, Kubu Raya, West Kalimantan. Besides conducting its core business activities, AFT Supadio actively implements Corporate Social Responsibility (CSR) initiatives. The company undertakes social and environmental responsibilities to increase community welfare through sustainable local economic empowerment.

Through the Tandu Raya program, AFT Supadio partnered with the Kelompok Berkah Pelopor Petani Gambut to launch the Tandu Raya initiative. Over the past three years, this collaboration has successfully utilized 34.5 hectares of peatland. The farmland acts as both a stimulus for the group and a learning hub for farmers. As a result, the BPPG group has been able to enhance its agricultural productivity. The following section details the agricultural commodities managed by the BPPG group.

**Table 1.** Productivity of the Kelompok Berkah Pelopor Petani Gambut per 1 Hectare

Commodity	Yield (Ton)	Period (Month)
Guava	1,5	1
Corn (shelled)	4	3
Cassava	7	3
Catfush	2	2

Research Data Processing, 2025

The table above presents the short-term harvest data of the group per hectare in the first semester of 2025. The group’s strategy of selecting crops with different growth periods helps reduce the risk of total crop failure and supports food security (Elfis, 2024). In addition to focusing on horticultural crops, the Tandu Raya innovation also integrates catfish farming as part of a holistic agricultural system. Nutrient-rich water from the catfish ponds can be used for irrigation, reducing farmers’ reliance on fertilizers. Economically, the existence of the catfish ponds, currently stocked with 20,000 fingerlings, provides farmers with an additional source of income.

The Tandu Raya innovation has had economic, environmental, and social impacts, particularly in Kuala Dua Village. In the first semester of 2025, the BPPG group earned a net income of **IDR 243,000,000**. This income was then distributed among 15 members, resulting in a monthly income of **IDR 2,700,000** per member. The program has successfully optimized 34.5 hectares of productive peatland through the implementation of sustainable organic farming. Socially, the Tandu Raya program has contributed to strengthening group solidarity through collaborative land management efforts aimed at mitigating forest and land fires (KARHUTLA). As a natural extension of these efforts, the program focuses on farmer groups living in fire-prone areas. In addition to increasing community income, the program serves as a social safety net, supporting disaster mitigation, emergency response, and post-fire recovery.

### **Organic Fertilizer as a Sustainable Nutrient Solution**

The *Berkah Pelopor Petani Gambut* Group has been producing organic fertilizer using simple technology, offering an alternative to chemical fertilizers. Laboratory results indicate that the solid bokashi fertilizer contains 40.33% organic carbon, 2.36% total nitrogen, and a C/N ratio of 17.09%. These result in line with the 2019 decree of the minister of agriculture of the republic indonesia, which set the minimum technical standard for organic fertilizer, indicating that these nutrient levels are ideal for peat soils, ensuring that the fertilizer is both mature and effective for sustainable agricultural use.

The organic fertilizer produced by the BPPG group is made from agricultural waste, including banana stems, rice husks, wood powder, and sugarcane residues, which are mixed with dolomite, a naturally occurring mineral from sedimentary rocks and fermented for 21 days. The composting of food waste and green waste is a vital component of organic waste management strategies (Pajura, 2024). This organic fertilizer is used by the group to fertilize horticultural crops. Its advantage lies

in the content of macronutrients (N, P, K), which are released gradually and sustainably. The need to find alternative sources of P to maintain sustainable agriculture has turned organic waste composts and sewage sludge into a nutrient source to reduce the use of inorganic sources (Bohorquez, 2024). The integration of organic fertilization with long-term land management through agroforestry methods serves as a sustainable agricultural strategy that gradually enhances nutrient resilience in peatlands (Wijayanti et al, 2025)

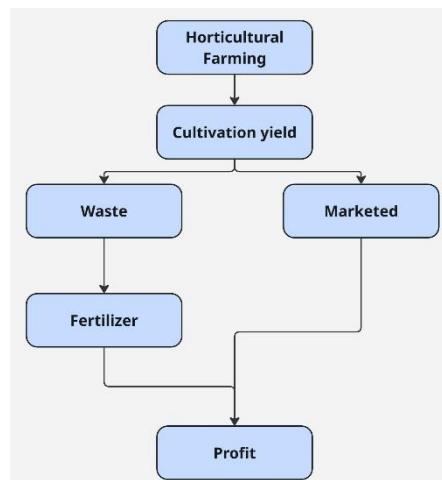


**Figure 1.** Organic Fertilizer Production  
Source: Research Documentation, 2025

The role of organic fertilizer as a substitute for chemical fertilizers has contributed to cost efficiency in crop cultivation. In maize cultivation, farmers were able to save approximately IDR 3,000,000 per hectare on fertilizer expenses. Utilizing agricultural waste sourced from the community significantly reduces the overall cost of fertilizers. By valorizing organic waste through organic fertilizer, stakeholders can contribute to waste diversion, resource conservation while promoting community engagement and economic development (Bremaghani, 2024).

### **Circular Economy in the Tandu Raya Program**

The Tandu Raya program not only focuses on improving environmental quality and food security but also promotes resource efficiency through sustainable waste management. This innovation fosters a circular economy for the group by converting agricultural waste into a productive resource with minimal waste, increase product value, and reinforces the economic stability of farmers.. Circular economy approach aims to achieve optimal production levels through the efficient use of natural resources (Utami, 2024). The adoption of a circular economy and sustainable agriculture can improve environmental resilience while boosting farmers' incomes if there is support from various stakeholders, ranging from policy to funding (Hilmi, et.al, 2024).



**Figure 2.** Circular Economy in the Tandu Raya Program  
Source: Research Data Processing, 2025

The circular economy process starts with the organic horticultural farming activities, generating harvests as the main product. Crops that meet market quality standards are sold directly as a source of farmers' income. Meanwhile, harvest residues that do not meet market standards are classified as organic waste. Under the circular economy model, organic waste is composted into fertilizer, which can be reused in future farming cycles, thereby cutting down on chemical fertilizer usage and related expenses.

The synergy between income from crop sales and the economic value derived from waste management generates dual economic benefits, making the agricultural production process more efficient, environmentally friendly, and sustainable (Mohring, et.al, 2024). This approach not only enhances resource use efficiency but also helps preserve the environment and strengthens the long-term economic resilience of farmers (Raveloaritiana, E., & Wanger, T.C., 2024). The transition to a circular bioeconomy is expected to inevitably involve trade-offs between profits for producers, low-cost goods for consumers, and lower environmental impacts (Kanna et.al, 2024)

## Conclusions

Through the Tandu Raya CSR program, AFT Supadio has demonstrated that sustainable peatland management is both possible and beneficial. By empowering the BPPG farmer group who are vulnerable to annual forest and land fires (KARHUTLA), with knowledge, skills, and support, the program transforms peatlands from a perceived challenge into a valuable resource. The synergy between the company, government, and community not only enhances agricultural productivity but also strengthens local economic resilience, promotes social cohesion, and protects the environment. This model shows that collaborative efforts in sustainable agriculture can create lasting positive impacts for both people and nature.

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