# Transformation of Post-Mining Landscapes into Tourism: A Local-Driven Initiative in Loa Ulung, East Kalimantan

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**Abstract**

The legacy of coal mining in East Kalimantan, Indonesia, has left numerous degraded landscapes, including abandoned pit lakes that pose significant environmental and social challenges. Amidst these issues, local communities in Desa Loa Ulung have initiated a transformation, repurposing this former mining pit lake into tourism destinations. This article aims to examine the planning and implementation processes undertaken by these local initiatives. Employing a qualitative case study design, data were collected through in-depth interviews, direct observation, and document analysis with key local initiators and managers. The analysis reveals that the planning process is predominantly organic and adaptive, driven by strong social capital and personal initiatives, often navigating a void in formal legal status. This informal framework enables flexible, bottom-up innovation but also presents challenges related to incremental resource mobilization, limited infrastructure, and fragmented spatial layouts. The findings highlight how community-driven approaches reframe degraded lands into valuable assets, offering critical insights into adaptive development strategies in post-extractive contexts. This study underscores the importance of understanding local dynamics for fostering resilient and community-led transformations of challenging landscapes.

***Keywords***: *Post-Mining Landscape, Local Initiative, Planning Process.*

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## A. INTRODUCTION

The legacy of coal mining in Indonesia, particularly in East Kalimantan, is evident not only in economic statistics but also in the region's physical and social landscapes. According to the Ministry of Energy and Mineral Resources (2023), East Kalimantan holds the country's largest verified coal reserves, amounting to 38,379.61 million tons. While the province has long played a central role in Indonesia's extractive economy, this abundance has come at a significant cost: extensive land degradation, water pollution, and a proliferation of abandoned mine pits (Fitriyanti, 2016). These water-filled pits, known as pit lakes, are ecologically imbalanced and pose unique challenges compared to natural lakes. Their formation is a direct result of mining activities, where groundwater and rainwater fill the excavation sites (Soni et al., 2014). One of the greatest challenges in managing these pits is the poor water quality, as exposed mine walls often produce Acid Mine Drainage, which is harmful to the ecosystem and limits its utilization (Soni et al., 2014). Therefore, any transformation plan must be based on a scientific understanding of the lake's hydrological, chemical, and biological conditions.

Data compiled by Yulianus and reported by Kompas.id (2024) show that East Kalimantan contains the highest number of mine pits in Indonesia an astonishing

44,736 sites. This environmental degradation has also created serious public-safety hazards. Between 2011 and 2019, at least 36 deaths, most of them involving children, were linked to these abandoned coal pits (JATAM, 2019). Such incidents underscore the weak enforcement of post-mining land-rehabilitation requirements despite existing regulations (Patiung et al., 2011). Technical reclamation efforts, such as revegetation with local plants and the use of microorganisms, have been employed to restore ecosystems (Shintya Sari et al., 2022).

A range of studies has documented the negative impacts of coal mining. Fitriyanti (2016) and Nurlina et al., (2020) describe severe consequences for public health, land-use patterns, and ecological integrity. Conversely, Hakim (2014) acknowledges the industry's economic contributions, including higher local revenues, improved accessibility, and job creation. Various studies suggest that transforming post-mining landscapes into sustainable areas can not only mitigate negative impacts but also create significant social and environmental benefits (Mccandless, 2013). This repurposing can be directed towards recreational purposes, such as converting them into tourism destinations, which can create revenue to support long-term management (Gligor et al., 2024; Sinnett & Sardo, 2020)

The transformation of post-mining areas into tourism destinations is a globally recognized strategy, with successful cases documented in Germany, the Czech Republic, and Poland (Gligor et al., 2024). In Indonesia, several models of transformation have been identified. The most structured approach is often a top-down model led by government and corporate entities, as seen in the transformation of Sawahlunto, West Sumatra, into a UNESCO World Heritage (Rohaendi et al., 2022; Syafrini et al., 2020), and the development of Geosite Open Pit Nam Salu (Aryanto et al., 2022) and Wisata Setigi (Alexander et al., 2020). Another common model is the one driven by natural processes, where geological factors shape a unique landscape, with human intervention primarily focused on managing the potential (Ghefira et al., 2024). A third model is the one driven by community initiatives, as shown in the cases of Desa Wisata Perlang (Sinabutar et al., 2024) and Desa Busung (Zulfikar et al., 2021).

Despite these documented successes, a significant gap remains in the literature. While studies acknowledge the existence of bottom-up initiatives, few have delved deeply into the specific planning mechanisms and local dynamics that enable them to succeed. Existing research often highlights challenges such as unclear land ownership and limited human resources (Maharani et al., 2024; Zulfikar et al., 2021), but rarely examines how local actors navigate these barriers. The literature also emphasizes the importance of multi-stakeholder collaboration (Kusumah et al., 2023) and increased awareness that mining resources are non-renewable, which drives the urgency to shift to the tourism sector (Maharani et al., 2024), yet the detailed process of how these factors are mobilized from the grassroots level remains underexplored. This study addresses this gap by focusing on the unique case of Loa Ulung.

Located about 15 kilometers from Tenggarong in Kutai Kartanegara Regency, Loa Ulung experienced decades of topographical change due to coal extraction.

Originally an agrarian community, Loa Ulung began to undergo significant land-use changes in the 1980s (Shinta Pasila et al., 2021). Although early responses to the abandoned mine pits were marked by pessimism owing to the village's relative remoteness and limited infrastructure, some residents gradually recognized their potential. By 2020, grassroots initiatives had created six tourist attractions around the unreclaimed pit lakes. This shift illustrates how post-mining landscapes can evolve from liabilities into opportunities for local economic and social development.

This article examines how such transformations are planned and implemented by local stakeholders, analyzing the underlying dynamics and strategies. To guide this inquiry, the study employs the theoretical framework of Kryzia & Kryzia (2017), which identifies key parameters for sustainable post-mining land revitalization. By focusing on the Loa Ulung case, the article contributes to broader discussions on bottom-up development and offers practical insights for post-mining land-use planning elsewhere in Indonesia.

## B. METHOD

This research uses a qualitative approach with a case study design to understand the complex dynamics of the planning process in the transformation of post-mining land. This approach was chosen to provide an in-depth understanding of the phenomenon within its natural context, allowing for the exploration of participant perspectives and the underlying mechanisms of change.

The research was conducted in Desa Loa Ulung, which is located in the Tenggarong Seberang District, Kutai Kartanegara Regency, East Kalimantan Province, Indonesia. Geographically, the village is situated within a post-mining landscape characterized by several artificial lakes formed by open-pit coal mining activities. These pits were created during the operational period of PT Fajar Bumi Sakti, a coal mining company that began operating in the area in 1983.

To achieve the research objectives, data were collected using three main techniques: direct observation, in-depth interviews, and document analysis. Observation was performed in the field to examine the physical conditions of the former mining area, current tourism activities, and the infrastructure developed at each location.

In-depth interviews were conducted to explore the background stories, personal experiences, and planning processes of the local individuals who initiated and developed the tourist attractions. Key informants were selected through purposive sampling due to their direct involvement and deep understanding of the tourism development process in Loa Ulung. These informants include Hermi Kuaria (the village head and manager of Dermaga Gadis), Achmadi (the initiator of Taman Gubang), Sukarti (the owner of Taman Bugenvil), and Syafruddin Pernyata (the founder of Langit Timur).

Document analysis was carried out to trace the historical context of the mining operations and to visualize the landscape conditions before its transformation. The documents reviewed included publicly available materials such as news articles,

social media archives, and visual media (e.g., photos and videos) that depicted the conditions of the former mining pits before the emergence of tourism development.

## C. RESULTS AND DISCUSSION

### 1. Characteristics of the Planning Process

The planning process for the transformation of post-mining land into a tourism destination in Loa Ulung was driven by the interaction between individual initiatives and formal validation. The initial idea came from Achmadi, who saw the tourism potential in the lake area as early as 2011. However, his efforts to propose a development plan to the village officials were unsuccessful at that time. Sukarti, who had also occupied a plot of land on the lakeside since 2011, did not have an initial intention to open a tourism business.

A crucial turning point occurred in 2018 when Hermi Kuaria became Village Head and took a formal step by submitting a request to check the condition of the lake. She stated: "To create a lake-based tourist attraction, we have to meet the requirements. One of them is the safety and condition of the water in the lake. First, is the water safe? For example, what if a visitor falls in, or are the fish that live there safe to eat?. So, we brought in the relevant agency to check its condition". The results of the lake's safety check provided technical legitimacy, confirming that the lake was safe to be managed. This formal validation became the main driver that gave certainty to the community and the village government.

Following this validation, the process of tourism development began. Achmadi, who moved to the lakeside after a fire, became a pioneer by building a pier and a stall. This initiative became the catalyst that attracted other local initiators to open similar destinations. The models of land control and cooperation also varied. Formally, the former mine pit lake is still registered under the company's name, PT Fajar Bumi Sakti. However, Hermi Kuaria explained that the land has been socially controlled and managed by the residents. The utilization of this land occurred naturally and gradually, where the manager of Langit Timur, Syafruddin Pernyata, even completed his ownership with an official deed after purchasing the land from a resident. Cooperation in land utilization also occurred between the village government and the local community, for example, Dermaga Gadis, which is managed by the village head on a revenue-sharing basis using a resident's land.

**Table 1. Characteristics of the Planning Process in Loa Ulung**

| Aspect of Planning | Descriptive Findings |
|---|---|
| Initiating Factor | Personal initiative by Achmadi in 2011, which was later adopted by the village government under Hermi Kuaria in 2018. |
| Land Safety Validation | Conducted formally by the relevant agency, which became the initial basis for development legitimacy. |
| Land Status & Legality | Dual status: formally owned by the company, but socially controlled and managed by the community. |

| | |
|---|---|
| Land Ownership Model | Varied, from personal initiatives, purchasing land from residents, to revenue sharing cooperation between the village government and residents. |

**2. Resource Mobilization and Infrastructural Challenges**

The development of tourist attractions in Loa Ulung depended on private capital and incremental investment, which reflects a grassroots entrepreneurship model. This limited the pace of facility development, such as the construction of the Taman Gubang pier as described by Achmadi: "I built it purely with personal funds. I also see that outside of Taman Gubang, they use private funds. I spent 42 million Rupiah to build a small pier".


**Figure 1. Taman Gubang Pier Construction Process**

Source: Secondary data, 2025

Similarly, the development of Langit Timur progressed slowly and according to their ability, from land excavation, pier construction, to building a swimming pool, as stated in an interview with Syafruddin Pernyata: "It was purely built with personal funds, there was no assistance. We built it slowly, according to our ability. After backfilling the land, we built a pier, then a café. The swimming pool was the last construction, because we had to gather capital first".

**Figure 2. Langit Timur Pier Construction Process**

Source: Secondary data, 2025

Although most of the capital was private, basic infrastructural challenges required external intervention. One of the main challenges was accessibility to the former mine pit lake area. This was expressed by Hermi Kuaria as the Village Head of Loa Ulung in an interview: "At that time, Pak Madi and I discussed how to make access to the lake area better, because at that time the access to the lake area was still dirt because it used to be a plantation area. Finally, I submitted a request to the DPMD (Village Community Empowerment Agency) and the serving regent at that time so that the tourism would be better. My request was approved to fix the road, and this also benefits the community. If the access is good, people can also open businesses like food stalls or UMKM". However, this improvement proved to be only sufficient for the initial stage. The narrow and limited road still hinders access for large tourist buses, which affects the type of visitors who come. In addition, the available accommodation is only owned by Taman Bugenvil, with 2 rooms. The same applies to parking facilities for several attractions, which are managed informally together.


**Figure 3. Road Conditions to the Tourist Attraction**

Source: Google Street View, 2025


**Figure 4. Width of Loa Ulung village road**

Source: Google Earth, 2025

**Figure 5. Taman Bugenvil Accomodation**

Source: Secondary data, 2025

**Table 2. Resource Mobilization Patterns and Infrastructural Challenges**

| Aspect of Planning | Descriptive Findings |
|---|---|
| Financial Capital | Personal funds of managers, no external investment. |
| Road Access | Narrow roads, inaccessible to tourist buses. Road improvements were made thanks to the village head's advocacy. |
| Accommodation & Amenities | Limited lodging, only one location with 2 rooms. Food is only available at certain times. |
| Parking Management | Informal, relies on communal land and agreements with residents. |

### 3. Spatial Dynamics and Landscape Adaptation

The spatial characteristics of the Loa Ulung lake area reveal an incremental and fragmented land-use pattern, which is a reflection of development driven by individual initiatives. Of the six main attractions, namely Taman Gubang, Dermaga Gadis, Dermaga Pelangi, Taman Bugenvil, Pandawa, and Langit Timur, five of them are concentrated on one side of the lake, with some even adjacent to each other without clear physical boundaries. This pattern is visible in Figure 3, which shows the spatial distribution of the tourist sites in Desa Loa Ulung.


**Figure 6. Spatial Distribution of Tourism Sites in Loa Ulung Village**

Source: Google Earth, 2025

This created visual inequality and spatial competition. Sukarti, the manager of Taman Bugenvil, highlighted this condition by stating: "Dermaga Pelangi, when it opens, they also receive tourists. But the area in front is not cleaned enough and is covered by trees, so new tourists won't see that there is a tourist attraction there. We always keep ours clean, but sometimes tourists still don't know about it. Taman Gubang is known because from the beginning of entering this lake area, Gubang is the most visible. And he was indeed the sole pioneer from the beginning". Dependence on a single communal parking area for several destinations also reflects an unplanned management pattern.

The natural environment around the lake, which was originally a degraded post-mining landscape, was adapted functionally. Sukarti described the initial condition of the lake and its surroundings as "a swamp, full of wild shrubs, and looked dirty," while Achmadi referred to it as "filled with wild shrubs and swamp". Despite this, the managers made changes by cleaning and arranging the landscape, transforming it into a recreational space.

The topography in some parts of the lakeside has mounds and hills caused by land dumps from the mining company in the past, as revealed by Syafruddin Pernyata: "The lakeside on the east side has a small mound, and there is a forest... So the soil that was excavated for the mine was dumped by the company on the east side of the lake, which then became a hill. The community also told me, and I heard directly from residents, that the excavator used to go back and forth dumping soil onto the land. Originally, everything was flat". The hydrological limitations of the lake, such as its depth of up to 20 meters in some spots, were understood as a formative force that guided the types of attractions developed by the tourism managers.

**Figure 7. The Lake Shore Before the Transformation Process into a Tourist Attraction**

Source: Secondary data, 2025

**Table 3. Spatial Dynamics and Functional Adaptation of the Landscape**

| Aspect of Landscape | Descriptive Findings |
|---|---|
| Spatial Layout | Incremental and fragmented pattern; five of six attractions are concentrated and adjacent on one side of the lake. |
| Environmental Condition | The post-mining land, which was a lake filled with swamp and wild shrubs, was later cleaned and organized. Hills were formed from residual mining dumps. |
| Hydrological Adaption | The lake's depth reaches up to 20 meters in some spots, limiting swimming activities. |

**4. Economic Shift from Agriculture to Tourism**

The absence of agricultural activity around the Loa Ulung lake is a direct legacy of the past extractive industry. This signifies a two-stage economic transformation: from an agrarian base to a mining dependency, and then to a post-mining tourism economy. The first stage, the shift from an agrarian village, occurred when mining activities gradually eliminated productive rice fields. Syafruddin Pernyata stated in an interview: “Previously, the community was a farming community, but since the

mining activities started, the community's rice fields no longer exist. The former mine pit is also not the only one in Desa Loa Ulung". The second stage began when the mining era ended and left behind an economic vacuum and degraded land.

In this context, the tourism initiators saw an opportunity. The initiative by the tourism managers to develop tourism was not a direct shift from agriculture, but an entrepreneurial response to the post-mining landscape. The choice not to return to farming was also reinforced by the perception of environmental risk, where the community was doubtful about the fertility and safety of the post-mining soil for agricultural purposes.

The finding that the planning process in Loa Ulung is dominated by an organic and adaptive approach indicates a model that is not guided by a formal framework, but rather shaped by a unique interaction between social and legal factors. The chronological flow, which begins from individual initiative to formal validation from the village government, shows that planning here is a layered process. The pragmatic risk management model, which combines technical validation from the relevant agency with local knowledge, is a smart adaptive response to resource limitations.

The main paradox lies in the legal vacuum that occurred after the mining company left without a formal reclamation or handover process. This empty space, instead of being an obstacle, became a condition that enabled bottom-up innovation. This case challenges conventional planning theories and indicates a form of "social reclamation" that precedes formal legality. The entire process is driven by strong social capital, where personal initiatives and various land ownership models, including revenue-sharing cooperation, serve as the main compensatory mechanisms in the absence of formal legal contracts and external financial capital.

The reliance on private capital for tourism development demonstrates community resilience, but it also creates a fragile economic foundation. This finding is consistent with the research by Baqeri et al., (2023) in Iran, who state that a lack of investment is a major challenge. The incremental nature of development is a logical consequence of this limitation. While social initiatives successfully started the transformation, their growth is now hindered by limited infrastructure. Narrow roads, minimal facilities, and informal parking management have reached their capacity limits. As explained by Kryzia & Kryzia (2017), infrastructure must evolve dynamically with a destination's growth. In the case of Loa Ulung, the need for more structured intervention and larger investment is becoming increasingly crucial to overcome these limitations.

The fragmented and uncoordinated land-use pattern is a direct consequence of the organic planning process. Since each manager acts based on their own land and momentum, the resulting space is a patchwork of interests, not an integrated plan. This creates visual disparity and spatial competition, which could potentially threaten the sustainability of the ventures themselves. This finding supports the argument from the research by Tao et al., (2024), which highlights the importance of coordinated spatial planning. On the other hand, the community also demonstrated a clever adaptation to the existing landscape. The land, which was objectively degraded, was

reframed as an asset, and hydrological limitations were understood as a formative force that guided the types of attractions to be developed.

This analysis shows that the absence of agricultural activity around the former mining pit lake in Loa Ulung is not a coincidence, but a fundamental causal context that gave rise to the tourism planning process. This economic shift is a historical prelude that justifies why tourism initiatives became the only viable option in the area. The analysis reveals two chapters of the village's economic transformation. The first was the shift from an agrarian village to one dependent on the mining sector. As Syafruddin Pernyata stated, “The community used to farm, but since the mining activities started, the community’s rice fields no longer exist.” This condition gradually erased the community’s agrarian economic base and left a profound economic vacuum after the mine closed.

The second chapter began when the local initiators, with diverse professional backgrounds, responded to this post-mining economic vacuum. The planning process they undertook, instead of being a conventional effort at agricultural rehabilitation, was directed toward creating new professions through tourism. The choice not to return to agriculture was reinforced by a perception of environmental risk, as the community was doubtful about the fertility and safety of the post-mining soil. Thus, the planning process analyzed in this study is not merely about land management but a creative effort to give new economic value to a landscape that had lost its original productive function due to industrial history.

## D. CONCLUSION

This article has thoroughly examined the planning and implementation processes undertaken by local initiatives in transforming post-coal mining landscapes into tourism destinations in Loa Ulung, East Kalimantan. The findings reveal that this transformation is characterized by an organic and adaptive planning approach, largely driven by local agency in response to the unique socio-environmental context. This process is distinctly shaped by a pragmatic risk management strategy, blending initial formal validation with long-standing local knowledge and observation to ensure site safety. Crucially, the planning unfolds within a legal vacuum, where the absence of clear formal land status paradoxically enables flexible, bottom-up innovations, albeit leading to long-term vulnerabilities in legal certainty and access to formal resources. The entire initiative is significantly propelled by strong social capital, including personal initiatives and collaborative networks, which compensate for the lack of formal structures and external financial capital.

These findings extend the understanding of planning processes in post-industrial land transformation by highlighting a model where informal, community-driven planning precedes and largely dictates outcomes, rather than being guided by conventional, top-down blueprints. Unlike traditional planning theories such as Kryzia & Kryzia (2017) which often assume a clear legal and structured framework, the Loa Ulung case demonstrates a unique "social reclamation" process where

communal legitimacy establishes the initial foundation before gradual formalization. This study contributes by showing how the dynamics of informal planning influence resource mobilization, resulting in an incremental development heavily reliant on private capital, leading to infrastructural challenges that impede further growth. Furthermore, it illustrates how such organic planning creates fragmented spatial layouts and drives functional adaptation of degraded landscapes, transforming them into new economic assets. The study also sheds light on the economic re-framing of post-mining land, where the historical absence of agriculture directly shapes the emergence of tourism as a new livelihood opportunity, driven by entrepreneurial response to the degraded landscape.

While this study offers valuable insights into the dynamics of local-driven planning, it is limited to a single case study in Loa Ulung. Future research is necessary to explore the generalizability of this organic planning model in other post-mining contexts, particularly in diverse regulatory and socio-cultural environments. Comparative studies could provide deeper insights into the specific challenges and successes of such informal planning processes, as well as strategies for formalizing social legitimacy to ensure long-term sustainability and access to broader development resources

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