

CHALLENGES OF PENTA HELIX COLLABORATION IN KANDUA RAYA WATERFALL TOURISM DEVELOPMENT, KEDANG IPIL

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis kolaborasi Penta Helix dalam pengembangan wisata Air Terjun Kandua Raya di Desa Kedang Ipil, Kabupaten Kutai Kartanegara. Air Terjun Kandua Raya memiliki potensi besar sebagai destinasi ekowisata berbasis alam dan budaya karena didukung oleh keindahan alam, keanekaragaman hayati, serta identitas masyarakat hukum adat. Namun, pengembangannya masih menghadapi berbagai tantangan seperti keterbatasan infrastruktur, rendahnya investasi, lemahnya koordinasi antaraktor, serta ancaman alih fungsi lahan akibat ekspansi perkebunan kelapa sawit dan pertambangan. Penelitian ini menggunakan pendekatan kualitatif dengan teknik pengumpulan data melalui wawancara mendalam, observasi lapangan, dan studi dokumentasi. Analisis data dilakukan secara tematik untuk mengidentifikasi peran, kontribusi, serta hambatan yang dihadapi setiap aktor dalam kerangka Penta Helix yang meliputi pemerintah, akademisi, sektor swasta, komunitas, dan media. Hasil penelitian menunjukkan bahwa pemerintah, komunitas, akademisi, dan media telah berperan aktif dalam mendukung pengembangan wisata, sedangkan sektor swasta masih belum optimal dan cenderung berorientasi pada industri ekstraktif. Oleh karena itu, diperlukan penguatan kolaborasi multipihak, peningkatan kapasitas masyarakat, serta kebijakan perlindungan lingkungan guna mewujudkan pengembangan pariwisata yang berkelanjutan.

Kata kunci: Kolaborasi Penta-Helix; Pembangunan Berkelanjutan; Pembangunan Ekowisata; Kedang Ipil; Air Terjun Kandua Raya

ABSTRACT

This study aims to analyze the Penta Helix collaboration in the development of Kandua Raya Waterfall tourism in Kedang Ipil Village, Kutai Kartanegara Regency. Kandua Raya Waterfall has significant potential as a nature and culture-based ecotourism destination due to its natural beauty, biodiversity, and the identity of the indigenous community. However, its development still faces various challenges, including limited infrastructure, low investment, weak stakeholder coordination, and threats of land conversion caused by the expansion of oil palm plantations and mining activities. This study employed a qualitative approach using in-depth interviews, field observations, and documentation studies as data collection techniques. The data were analyzed thematically to identify the roles, contributions, and obstacles faced by each actor within the Penta Helix framework, consisting of government, academia, the private sector, communities, and the media. The findings reveal that the government, communities, academia, and media have actively contributed to tourism development, while the private sector remains suboptimal and tends to prioritize extractive industries. Therefore, strengthening multi-stakeholder collaboration, enhancing community capacity, and implementing environmental protection policies are essential to achieve sustainable tourism development.

Keywords: Penta-Helix Collaboration; Sustainable Development; Ecotourism Development; Kedang Ipil; Kandua Raya Waterfall

INTRODUCTION

Indonesia is widely recognized as a country endowed with rich cultural diversity and breathtaking natural landscapes. These conditions have made numerous tourist destinations across the archipelago increasingly attractive to both domestic and international visitors (Suhendra et al., 2025). Nature and culture-based tourism have increasingly been regarded as a strategic sector for promoting sustainable local economic development in Indonesia. The abundance of natural resources, cultural diversity, and the unique social characteristics of local communities constitute significant assets for the development of community-based tourism destinations. Within the framework of sustainable development, tourism is no longer perceived merely as an economic activity, but also as an instrument for community empowerment, environmental conservation, and the strengthening of local identity. Therefore, tourism development requires a collaborative approach involving multiple stakeholders to ensure that economic, social, and environmental benefits can be achieved in a balanced and sustainable manner.

One of the approaches widely employed in sustainable tourism development is the Penta Helix model, which emphasizes collaboration among government, academia, the business sector, local communities, and the media in supporting tourism destination development (Mariam et al., 2022; Medlimo, 2022; Pusparani & Rianto, 2022). This concept evolved from the Triple Helix model, which highlights the importance of synergy among government, academia, and industry in knowledge-based development (Leydesdorff, 2012; Purnomo et al., 2021). The approach subsequently developed into the Quadruple Helix and Penta Helix models through the inclusion of society and media as essential actors in collaborative development processes.

The Penta Helix approach has become increasingly relevant in the development of tourism villages in Indonesia, as it enables the integration of diverse interests and cross-sectoral resources. Within this framework, the government acts as a regulator and policy facilitator, academia contributes knowledge and capacity-building, the business sector supports investment and economic development, local communities serve as the primary managers of community-based tourism, and the media functions as a channel for promotion and information dissemination. Collaboration among these actors is particularly important in addressing various tourism management challenges, including limited infrastructure, weak governance, low community capacity, and the threat of environmental degradation resulting from the exploitation of natural resources. In the context of the Sustainable Development Goals (SDGs), this approach aligns with Goal 17, namely *Partnerships for the Goals*, which emphasizes the importance of multi-stakeholder partnerships in achieving sustainable development objectives (Pahlephi, 2022).

Sustainable tourism development fundamentally requires a balance among economic, social, cultural, and environmental dimensions. Mowforth & Munt (2016) explain that the concept of sustainable tourism emphasizes the development of tourism destinations that are not solely oriented toward short-term economic gains but also prioritize environmental sustainability and the well-being of local communities. Furthermore, Fletcher (2018) argues that the successful development of tourism destinations is influenced by the integration of destination management, the quality of infrastructure, community participation, and cross-sectoral institutional support. Therefore, the development of nature- and culture-based tourism requires adaptive and collaborative governance to foster inclusive and sustainable development (As'ari et al., 2025; Muda, 2026).

In recent decades, the collaborative governance approach has gained increasing prominence in development governance. Ansell & Gash (2008) define collaborative governance as a collective decision-making process involving governmental institutions and non-governmental actors within a shared forum characterized by consensus-oriented and participatory mechanisms. This approach emerged as a response to the growing complexity of public issues that cannot be effectively addressed by governments acting alone. In the context of tourism development, collaborative governance has evolved into the Penta Helix model, which emphasizes synergy among government, academia, business sector, local communities, and the media in supporting innovative and sustainable tourism destination development.

The United Nations World Tourism Organization emphasizes that sustainable tourism development requires the active involvement of all stakeholders to maintain a balance between the needs of tourists, local communities, and environmental sustainability (UNWTO, 2020). Studies on tourism village development in Indonesia also indicate that weak coordination among stakeholders, limited funding, and low community capacity constitute major obstacles to the effective implementation of Penta Helix collaboration (Muda, 2026; Pane et al., 2025). One contemporary form of sustainable tourism development is ecotourism. Ecotourism refers to a nature-based form of tourism that emphasizes environmental conservation, education, and the empowerment of local communities. From the perspective of ecotourism, the success of destination development is not solely measured by the increase in tourist arrivals, but also by its ability to preserve environmental sustainability and improve the welfare of surrounding communities (Weaver, 2001).

Kedang Ipil Village in Kutai Kartanegara is one of the regions with significant potential for the development of nature- and culture-based tourism. The village has officially been designated as a tourism village since 2016 and possesses considerable natural and cultural tourism assets (Ansahar & Sinaga, 2022). The tourism attractions available include nature, historical, artistic, and cultural tourism, particularly within the Tenggarong area, which serves as the regional center for cultural and tourism activities (Nufus et al., 2023). One of its prominent natural attractions is Kandua Raya Waterfall, which remains relatively untouched by mass tourism (Ujarku.co, 2024). This destination has become a hidden paradise for visitors seeking tranquility and natural beauty amidst the bustle of urban life (Nusantara, 2024). The uniqueness of the waterfall lies in its cascading water flow across multiple tiers of rock formations, creating a distinctive and visually appealing landscape for visitors traveling to the site (Kaltim.idntimes.com, 2024a).

Kandua Raya Waterfall tourism is expected to become a major attraction for visitors while simultaneously creating new economic opportunities for the local community (Mahakama.co.id, 2024). Kedang Ipil Village offers not only the visual beauty of its natural landscape, but also the cultural experiences that accompany it (Nagaraya.id, 2024). Another distinctive feature of Kedang Ipil Village is its status as the first Indigenous Law Community Village (*Customary Law Community / MHA*) in Kutai Kartanegara. This recognition provides a legal foundation for preserving local cultural values, including the sustainable and responsible management of natural resources (Okeborneo.com, 2024).

The Kedang Ipil Village Government is currently focusing on implementing innovative measures to further develop the Kandua Raya Waterfall tourism destination (DiskomKukar, 2024). Collaboration has become one of the key factors in advancing tourism development in Kedang Ipil Village, particularly in the

Kandua Raya Waterfall area. Cross-sectoral collaboration includes improving accessibility, providing public facilities such as parking areas, toilets, gazebos, as well as local motorcycle taxi (*ojek*) services connecting the parking area to the waterfall site (Kaltim.idntimes.com, 2024b).

The tourism potential of Kandua Raya Waterfall lies not only in its natural beauty, but also in the opportunities it creates for local economic development. The presence of tourism-related services such as motorcycle taxi (*ojek*) transportation, homestays, and micro, small, and medium enterprises (MSMEs) indicates that the tourism sector is increasingly being viewed as an alternative source of livelihood beyond traditional agriculture. In addition, the existence of the Tourism Awareness Group (Pokdarwis) as the tourism management body reflects the community's initiative in independently developing the village's potential. Pokdarwis plays a significant role in tourism operational management, destination promotion through social media, and the empowerment of communities surrounding the tourism area. This demonstrates that tourism development in Kedang Ipil Village has begun to align with the concept of community-based tourism, which positions local communities as the primary actors in managing tourism destinations (Hidayat, 2022).

Despite its considerable potential, the development of Kandua Raya Waterfall tourism continues to face various challenges. From an infrastructural perspective, supporting tourism facilities remain relatively limited, including road access to the destination, toilet facilities, parking areas, rest areas, and adequate tourism safety infrastructure. In addition, tourism promotion has not yet been conducted optimally or in an integrated manner, resulting in relatively low tourist visitation rates that are still predominantly dominated by local visitors (Utomo et al., 2020). Studies on tourism village development in Indonesia also indicate that weak coordination among stakeholders, limited funding, and low community capacity constitute major obstacles to the effective implementation of Penta Helix collaboration. In such circumstances, cross-sectoral collaboration through the Penta Helix approach becomes essential to ensure that tourism development is carried out in an integrated and sustainable manner.

Several previous studies have demonstrated that the Penta Helix approach can enhance the effectiveness of tourism destination development through the strengthening of cross-sectoral collaboration. Nevertheless, research concerning the implementation of the Penta Helix approach in the development of nature-based tourism villages and indigenous law communities in East Kalimantan remains relatively limited. Previous studies on Kedang Ipil Village have primarily focused on tourism potential, cultural preservation, and ecotourism aspects separately. There is still a lack of research that specifically analyzes the dynamics of stakeholder collaboration in the development of Kandua Raya Waterfall tourism using the Penta Helix approach.

Several previous studies indicate that the level of tourism management in Kedang Ipil Village remains relatively weak in coping with competition and therefore requires improvements in managerial capacity (Sucipto & Zulkifli, 2021). In addition, the livelihood system of the village community is highly dependent on sugar palm forests, which serve as a primary source of palm sugar production. In the context of tourism development, the government plays an important role as a facilitator in connecting the village's cultural and natural potential with tourism industry stakeholders, thereby fostering innovation in wellness experience tourism packages (Hira et al., 2024). Other studies further reveal that the tourism potential of Kedang Ipil

Village has not yet been fully optimized, as tourism promotion has not been carried out in a structured manner and the utilization of information technology remains limited (Utomo et al., 2020).

Kedang Ipil Village also possesses distinctive local cultural heritage, including traditions such as *menjamu benua*, *nutuk beham*, *tenong lawang*, the *juhan* ritual, and *beluluh*, all of which require preservation efforts and attention from local customary institutions (Indriani et al., 2022). In addition, the Kandua Raya Waterfall area holds significant biodiversity potential. A study conducted by Fadliansyah (2019) identified 14 bird families, 24 species, and 2,598 individual birds within the area, indicating strong potential for ecotourism-based development. From the perspective of destination development, improvements to road access infrastructure have gradually been initiated, while tourism attractions are being enhanced through traditional dance performances and the provision of supporting facilities such as gazebos and waste disposal facilities. In terms of hospitality, the capacity of tourism managers who directly interact with visitors also requires further improvement. Therefore, strengthening the synergy between the Tourism Awareness Group (*Pokdarwis*) and the Department of Youth, Sports, and Tourism is essential to ensure that tourism destination management is conducted optimally and sustainably (Hidayat, 2022).

Based on the foregoing discussion, this study aims to analyze the forms of Penta Helix collaboration in the development of Kandua Raya Waterfall tourism in Kedang Ipil Village, Kutai Kartanegara Regency. The study also seeks to identify the roles of each stakeholder, the supporting and inhibiting factors affecting collaboration, as well as the sustainability challenges encountered in the development of community- and environment-based tourism. This research is expected to contribute academically to the advancement of Penta Helix studies within the field of sustainable tourism, while also providing recommendations for a collaborative tourism development model that is adaptive, participatory, and sustainable.

METHOD

This study employed a qualitative approach to explore the dynamics of collaboration among Penta Helix actors in the development of Kandua Raya Waterfall tourism. A qualitative approach was selected because it enables an in-depth and holistic understanding of social phenomena, particularly the interactions among government, academia, the business sector, local communities, and the media in the development of tourism based on local potential. Qualitative research seeks to explore and understand meanings derived from social issues through the interpretation of participants' experiences, allowing researchers to examine collaborative processes, stakeholder strategies, and the challenges encountered in developing inclusive and sustainable tourism (Creswell, 2017).

Research participants were selected using purposive sampling, whereby informants were intentionally chosen based on their direct involvement, knowledge, and responsibilities in the development of Kandua Raya Waterfall tourism. To enrich the information obtained and capture a broader range of perspectives, snowball sampling was subsequently employed through recommendations from key informants. The participants represented the village government, members of the *Pokdarwis*, community and customary leaders, local business actors, academics, media representatives, and visitors with firsthand experience of Kandua Raya Waterfall. The inclusion of these participants ensured representation of all Penta Helix actors and provided comprehensive insights into collaborative tourism governance.

Data were collected through in-depth interviews, participant observation, and documentation studies. Semi-structured interviews were conducted with the selected informants to obtain comprehensive information regarding stakeholder roles, collaborative practices, tourism development strategies, and the challenges encountered in developing Kandua Raya Waterfall tourism. Interviews were conducted face-to-face, audio-recorded with participants' consent, and subsequently transcribed for analysis. Participant observation focused on the physical condition of the tourism destination, visitor activities, supporting infrastructure, environmental conditions, and community participation in tourism management. Documentation studies included the analysis of village development plans, tourism activity reports, government documents, media publications, visitor statistics, and other relevant documents to complement the interview and observational data.

The data were analyzed using thematic analysis to identify patterns, themes, and relationships among stakeholders involved in tourism development. Following Braun & Clarke (2006), the analysis consisted of four stages: (1) familiarizing with the data through repeated reading of interview transcripts, observation notes, and documents; (2) generating initial codes related to stakeholder roles, collaboration, opportunities, and challenges; (3) grouping similar codes into broader themes representing the roles of Penta Helix actors and the factors influencing tourism development; and (4) reviewing and interpreting the themes using the Penta Helix framework and collaborative governance perspectives. The analytical process was supported by the qualitative data analysis, particularly through data reduction, data display, and conclusion drawing (Miles et al., 2020).

To enhance the credibility of the findings, source triangulation was employed by comparing information obtained from interviews, observations, and documentary evidence. The findings were continuously reviewed throughout the analytical process to ensure consistency and minimize subjective interpretation. The analysis was guided by the Penta Helix framework to examine the roles, interactions, and collaborative relationships among government, academia, the business sector, communities, and the media in the development of Kandua Raya Waterfall tourism. This analytical approach enabled the study to provide recommendations for strengthening multi-stakeholder collaboration in tourism governance.

RESULTS AND DISCUSSION

The Potential of Kandua Raya Waterfall in Kedang Ipil

Kandua Raya Waterfall, located in Kedang Ipil Village, holds substantial potential for development as an ecotourism destination. Its natural waterfall panorama, complemented by a relatively well-preserved environment, serves as the primary attraction capable of drawing visitor interest. This potential is not only evident from a visual perspective but also from the opportunities for local economic development, which can be optimized through more directed and sustainable tourism management. Based on the above conditions, this article presents research findings concerning the roles and levels of involvement of various actors within the pentahelix framework, comprising government, the private sector, academia, the community, and the media, in the effort to develop the Kandua Raya Waterfall tourism site in Kedang Ipil Village.

The findings indicate that Kandua Raya Waterfall holds a strategic position as an ecotourism destination in Kedang Ipil Village. This area offers ecological beauty in the form of a tiered waterfall, natural forest vegetation, and rich biodiversity that is integrated with the cultural identity of the local customary law

community. Located within a highly pristine village forest, Kandua Raya Waterfall represents a secluded natural attraction. This tourist site presents an exceptionally pristine natural landscape, as shown in the following figures:

Figure I & II. Tourism Potential of Kandua Raya Waterfall



Source: Field documentation by the author, 2026

As previously shown, Kandua Raya Waterfall features a distinctive stepped landscape of layered rock formations and well-preserved vegetation, creating a refreshing environment. Its natural steps enable direct visitor activities such as playing, relaxing, and viewing from multiple angles, indicating considerable potential for nature-based tourism. With proper management, improved facilities, and multi-stakeholder involvement, the site can boost visitor arrivals and generate local economic benefits. One of the visitors, named Ms. W (a 22-year-old university student), stated during an interview that:

“The waterfall at this location shows considerable potential. The strong water flow provides a refreshing sensation that matches expectations previously formed through social media platforms such as TikTok. The strong current serves as the main visual attraction, making the scenery interesting. The visit was conducted with friends for holiday purposes and personal documentation. Nature tourism is perceived as offering peace, aiding relaxation, and providing a restorative experience of returning to nature. In addition, this destination is relatively affordable and located not far from the residence. Accordingly, a desire to return to this place exists” (Interview, April 14, 2026).

The Head of The Village, Mr. K and The Head of *Pokdarwis* of Kedang Ipil, Mr. A P expressed a similar view, stating that the village's natural heritage must be sustainably managed, especially the pristine Kandua Raya Waterfall, which offers substantial potential to improve community welfare. They remarked:

"This nature is the best heritage we have, so it must be protected and managed properly. Kandua Raya Waterfall has very natural potential, and if managed optimally, it can certainly provide economic benefits for the surrounding community" (Interview, March 1, 2026).

Also, in this field investigation, our team collaborated with two scholars from the International Relations and Public Administration departments at Universitas Mulawarman's Faculty of Social and Political Sciences. Despite pursuing a separate research agenda, these researchers, Mr. B.N.A. and Mr. M.R.R. underscored the substantial potential of the Kandua Raya waterfall. They attributed this potential to the site's untouched natural environment, noticeable from the entrance throughout the trail to the primary destination, and the outstanding warmth of the residents. Reflecting on their field experience, they remarked:

"While the journey to this location was quite lengthy, our fatigue faded the moment we arrived at the entrance gate. The air was exceptionally refreshing, particularly because of our morning arrival. Furthermore, the scenery was stunningly lush and verdant, giving the distinct impression of a highly preserved natural landscape. The demanding trek felt entirely rewarding once we were greeted by such a breathtaking panorama, an experience that was further enriched by the incredibly warm and helpful locals who guided us to the site." (Interview, March 1, 2026).

The Condition of Kandua Raya Waterfall in Kedang Ipil Village

The condition of Kandua Raya Waterfall in Kedang Ipil comprises physical aspects (facilities) and non-physical aspects (development challenges, including current support and threats from external parties). Field findings reveal considerable nature-based tourism potential, yet insufficiently supported by adequate infrastructure. Physically, the area features a relatively strong waterfall flow, a natural environment, and a recreation friendly atmosphere away from urban noise. However, field observations indicate limited supporting infrastructure, including poor accessibility to the site, and basic facilities such as toilets. These limitations affect visitor comfort and safety, posing challenges to enhancing the destination's competitiveness in Kedang Ipil Village.

Figure III & IV. Tourism Facility Conditions





Source: Field documentation by the author, 2026

The above figure indicates that numerous facilities require attention and improvement from the village government or tourism managers. Nevertheless, tourism development remains in a transitional phase, as the substantial potential is not yet fully supported by ideal collaborative governance. The Head of The Village, Mr. K, affirmed in an interview that tourism development represents a primary strategy for the village's future economic development. He stated:

“Kandua Raya Waterfall is not merely a recreational site but represents the village's economic future. With serious management, this tourism destination can create employment, preserve local culture, and improve community welfare. The greatest challenges come from oil palm plantations and mining activities that continue to pressure the village area, including land use conversion by companies operating near the tourist site” (Interview, April 1, 2026).

Mr. K further noted that local authority efforts include administrative support for *pokdarwis*, basic access, institutional strengthening, and district level promotion, but limited investment hinders tourism development. He stated:

“The local authority has a vision to open Putak Waterfall as a new destination, but without investment and private sector support favoring tourism, development will be slow. Furthermore, inadequate facilities prevent visitors from fully enjoying the surrounding scenery” (Interview, April 1, 2026).

A local visitor similarly expressed the need for facility addition and development by the local authority or other parties. An interview with Mrs. L (53, housewife) stated that:

“The tourist site has minimal facilities, including nonfunctional vendor stalls, insufficient photo spots, and poor cleanliness. Access from parking to the waterfall is unsafe, consisting of dirt pathways with numerous plant roots” (Interview, February 14, 2026).

Mr. A P, the head of *pokdarwis* added that, tourism development at Kandua Raya Waterfall faces limitations, including minimal investor involvement, weak supporting facilities, and lack of business support, leaving the *pokdarwis* as the frontline manager with inadequate resources. Local economic services such as homestays, motorcycle taxis, and UMKM vendors are available but operate suboptimally due to fluctuating visitor numbers dominated by weekends (approximately 50 on Saturday and 100 on Sunday).

Despite emerging economic potential, tourism development at Kandua Raya Waterfall is limited by non-physical constraints (institutional weakness, low investment, poor collaboration) and external pressures from oil palm and coal mining expansion since early 2024. The waterfall's nature-based appeal depends on forest preservation, but land conversion threatens environmental quality and visitor comfort. Although Kedang Ipil Village became a customary village in late 2025, this status does not ensure forest protection. Additionally, some customary leaders engage in land release for corporate concessions, creating internal contradictions. Hence, threats are both external (investment expansion) and internal (weak community consolidation).

Mr. K acknowledged that these issues pose a major challenge to village tourism development. He stated:

“The biggest challenge now is not only tourism facilities, but how to keep the forest sustainable. Since 2024, oil palm and mining land clearing activities have begun approaching the tourist area. This is a serious concern because Kandua Raya Waterfall depends heavily on its surrounding natural conditions. Although the village has become a customary village, the reality on the ground remains difficult because some community land has been released for corporate interests” (Interview, April 3, 2026).

In addition, some community members face an economic dilemma due to offers of land conversion to oil palm plantations, which are perceived to provide faster returns than long term tourism development. This situation reveals a strong tension between conservation orientation and economic pragmatism. Numerous efforts by the local authority and *Pokdarwis* members to establish communication with companies have often received no constructive response. Kuspawansyah asserted:

“Companies are more focused on oil palm and mining. Tourism is not yet considered an attractive investment for them” (Interview, April 3, 2026).

This phenomenon is further intensified by the economic pragmatism of some community members, who are tempted by the prospect of quick financial returns through land sales or cooperative schemes with plantation companies, and several traditional leaders have reportedly been exploited by external parties as intermediaries in land transactions within potential tourism areas, despite the village government having issued appeals to protect strategically important zones.

According to the explanation above, the study found that Kandua Raya Waterfall has significant potential to be developed as an ecotourism destination due to its natural beauty, preserved environment, and strong cultural value. Visitors described the waterfall as peaceful, refreshing, and affordable, while local stakeholders believed that sustainable tourism could improve the welfare of the surrounding community. However, the development process still faces several challenges, including inadequate infrastructure, limited facilities, weak investment support, and minimal private-sector involvement. In addition, the expansion of oil palm plantations and mining activities threatens the environmental sustainability of the area. Therefore, stronger collaboration among stakeholders, improved facilities, and better environmental protection are essential to support sustainable tourism development.

Pentahelix Collaboration in Developing Kandua Raya Waterfall

Government Role. Within the pentahelix framework, Kedang Ipil local authority plays a significant role in Kandua Raya Waterfall tourism development as the regulator, facilitator, and coordinator, consistent with pentahelix and collaborative governance theory (Ansell & Gash, 2008) Essential measures undertaken include institutional strengthening, *Pokdarwis* support, basic access construction, district promotion, customary community advocacy, and the designation of the village as a customary village in late 2025. Also, according to Sari et al. (2022), local government plays a central part in planning, facilitating, and coordinating pentahelix-based tourism village development, particularly in the early phases. A pentahelix collaboration forum can be established because each actor has the capacity and openness to collaborate. Consensus grows out of motivation, and consultation happens when people are willing to share their knowledge and experiences on building a tourism village.

Community Role. In terms of community contributions, Wahidah & Suherman (2022) and Pane, Nasution, Susanto, & Rafi (2025) stated that they are right at the center as the driving force behind development. They are the ones running operations on the ground, keeping things socially sustainable, and making sure that growth truly reflects local needs. For Kandua Raya Waterfall tourism, the *pokdarwis*, traditional leaders, village youth, and small business owners are the most active element in practice. Their daily involvement includes managing visitor services, preserving cultural traditions, and offering local products, all of which ensure that tourism development remains grounded in what the community values and needs.

Figure V & VI. Community-based initiatives



Source: Media Etam, 2020



Source: Kaltimpost, 2026



Source: Berita Borneo, 2026

This situation aligns closely with Community Based Tourism (CBT) concept, which emphasizes that local communities must be the main subjects in tourism development. The high level of community self-reliance reflects a collective awareness that tourism can serve as an economic alternative beyond traditional agriculture (Naranjo Lluport, 2022; Tryasnandi et al., 2023). However, the study also identified serious challenges, including a lack of professional human resources, weak investment support, economic pragmatism driven by pressure from oil palm and mining sectors, and the threat of land conversion. Therefore, the Kedang Ipil community can be considered to have successfully played a strong role as a social accelerator, although it still requires capacity building, policy protection, and creative economy development to ensure tourism sustainability.

Academia Role. Academia assumes the roles of conceptual designer, knowledge producer, technological innovator, and scientific validator, thereby supplying the evidence base required for policy and practice (Kagungan et al., 2021; Maulana et al., 2023). Academics in Kedang Ipil, primarily from Mulawarman University, have contributed substantially to tourism development through empirical research, community engagement, tourism asset mapping, cultural documentation, customary community profiling, digital platform development for the tourism village, and institutional facilitation for formal recognition of the indigenous legal community.

Such contributions are consistent with Knowledge Based Development concept, which holds that sustainable development depends on robust scientific knowledge foundations (Haq, 2012; Carrillo, 2015). From the discussion above, we can find that academics have significantly enhanced the scientific legitimacy of Kedang Ipil's tourism, cultural assets and advanced research driven governance. Yet, contributions remain largely conceptual and programmatic, with suboptimal implementation of research recommendations. Consequently, while academia has succeeded as knowledge producer, knowledge translation into practice needs strengthening to yield tangible on-site benefits.

Media Role. As an expander, media amplifies visibility, builds the destination's image, enhances public awareness, and consolidates tourism branding (Wahidah & Suherman, 2022; Lino et al., 2024). In the case of Kandua Raya Waterfall, social media like Instagram: @desawisata_kedangipil, TikTok: Desa Wisata Kedang Ipil, and official website such as <https://www.kutakartanegara.com/> have been key in publicizing the site. Narratives focusing on its natural scenery, secluded allure, and local cultural heritage have effectively attracted regional and long-distance visitors. However, while media's role is consistent with Destination Branding concept in shaping public perception (Tran & Rudolf, 2022), its function in Kedang Ipil remains limited to basic promotion and visitor growth, not yet extending to investment attraction, business networking, or professional sustainable branding. Hence, media works as an effective initial promoter but needs strengthening for structural economic impact.

To strengthen the above point, it is also important to build a structured village tourism media system (Dahana et al., 2023), including a digital promotion calendar, regular documentation of tourism activities, and the use of data analytics to map visitor trends and preferences. With such an approach, media would serve not only as a promotional tool but also as a strategic instrument for destination positioning, enhancing the competitiveness of Kandua Raya Waterfall tourism at both regional and national levels.

Role of Private Sector as a Suboptimal Enabler

The private sector acts as an enabler by providing investment, infrastructure, corporate social responsibility programs, amenity development, and economic innovation that all help sustain the tourist destination (Susenohaji et al., 2026). However, research findings in Kedang Ipil Village reveal that the business sector is the weakest actor, almost contradictory when it comes to tourism development. Companies around the village are far more focused on extractive industries like oil palm plantations and coal mining than on supporting tourism through green investment or productive CSR. Various attempts by the local authority to build partnerships with the private sector have gone largely unanswered. In fact, the private sector's economic orientation threatens the tourist area through pressure from land conversion and natural resource exploitation.

This finding contradicts Sustainable Tourism Development concept, which positions the private sector as a key strategic partner (Dwyer, 2023). Without productive private sector engagement, the Pentahelix collaboration in Kedang Ipil has become lopsided, closer to a quadruple helix where four actors perform well while business fails. Hence, restructuring private sector roles toward sustainable investment and green economy is urgently needed for the village's tourism future.

In summary, the application of the Pentahelix framework to the development of Kandua Raya Waterfall tourism indicates that the government, community, academics, and media have each contributed substantively to the establishment of the social, cultural, promotional, and institutional foundations of village tourism. Nevertheless, the absence of the private sector as a strategic investment actor has prevented tourism development from attaining the ideal collaborative configuration envisioned by pentahelix model. This finding underscores that the long-term viability of Kedang Ipil Village as a sustainable tourism destination depends critically upon the capacity of all stakeholders to enhance multi-party synergy, promote green investment, maintain environmental conservation, protect indigenous cultural heritage, and establish a governance framework that harmonizes economic, social, and ecological dimensions.

CONCLUSION

Kandua Raya Waterfall has strong ecotourism potential due to its natural beauty, biodiversity, and cultural integration. Visitors find it refreshing and affordable, while locals see tourism as a path to prosperity. Yet this potential remains unrealized because of physical problems such as poor roads, lack of toilets and parking, and unsafe trails, as well as non-physical problems including weak institutions, low investment, scarce skilled workers, and poor collaboration. Since early 2024, oil palm and coal mining expansion has intensified land conversion near the waterfall, with some customary leaders even selling land to companies, creating a sharp conflict between conservation and quick profit.

The performance of Pentahelix actors is uneven. The village government acts as regulator and facilitator but lacks funds, investment, and control over external threats. The community, especially the Pokdarwis, youth, and small businesses, is the most active, running daily operations and aligning with Community Based Tourism, yet it suffers from low skills, no investment, and pressure from land conversion. Academics from Mulawarman University produce knowledge and maps but remain largely conceptual, with few recommendations implemented on the ground. Media raises awareness via social media but only for basic promotion, not for strategic branding or investment attraction. Most critically, the private sector is the weakest and most damaging actor: companies focus solely on oil palm and mining, ignore all partnership offers, and actively threaten the waterfall through land conversion. This absence makes Pentahelix collaboration lopsided, effectively a Quadruple Helix at best.

The study confirms the relevance of collaborative governance and sustainable tourism theories but exposes their fragility when one critical pillar, the private sector, is missing or hostile. Even strong community self-reliance and academic support cannot compensate for destructive extractive pressures. Therefore, five urgent actions are needed: strengthening village government capacity in budget, land control, and enforcement; building community professional skills, creative economy, and legal protection; turning academic knowledge into real projects; upgrading media into a strategic instrument using data analytics and professional branding; and forcing private sector reform through green investment incentives,

mandatory CSR tied to tourism, and binding no-conversion agreements. Without these actions, Kandua Raya Waterfall's considerable potential will remain underutilized, and the village's aspiration for tourism-led prosperity will be overtaken by the relentless expansion of oil palm and mining.

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SHORT PROFILE

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