Economic advancement of rural communities through tourism guide services as a paradigm for sustainable business transformation in the tropics

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Abstract. Rural economies in tropical regions are undergoing complex transformations, primarily driven by increasing urbanisation that alters the socio-economic fabric of village life. This study explores the economic transition in Karang Tengah Village, which has shifted from a predominantly agricultural base to a model centred on community-based ecotourism, with a particular focus on nature trekking guide services. The research aims to develop an inclusive and sustainable rural business model. Employing a mixed-methods explanatory approach, the study integrates actor-based quantitative surveys, in-depth interviews, focus group discussions, and participatory observations. Five key findings emerge: a substantial shift in primary livelihoods towards tourism; the creation of new employment opportunities for the village's youth; the pivotal institutional role of PLGS as a community-based management entity; conflict mitigation through adaptive spatial planning; and the emergence of a village business model rooted in biological assets, institutional capacity, and inclusive entrepreneurship. The study concludes that community-based trekking services represent a viable paradigm for sustainable rural development in tropical regions, offering valuable insights and potential for replication in comparable settings.

1 Introduction

Rural economic development in tropical regions faces increasingly complex dynamics, particularly due to the continued expansion of urban areas, which exerts growing pressure on the social, economic, and ecological systems of villages. These dynamics are particularly evident in suburban areas such as Karang Tengah Village in Babakan Madang Subdistrict,

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Bogor Regency. Located close to the rapidly developing urban centre of Sentul City, this village is undergoing changes in land use and transformations in the structure of rural livelihoods. This trend is in line with findings from other regions, where land conversion and tourism growth are beginning to change the socio-economic and environmental landscape of rural communities [1].

Historically, Karang Tengah was characterised as an agrarian village, with a local economy rooted in the agricultural sector. However, over the past decade, the transformation of agricultural land into residential and tourism areas has led many residents particularly the youth to transition into the service sector, notably by engaging in nature-based tour guiding [2]. These activities leverage the area's diverse topography and ecological richness, enabling the growth of adventure tourism and environmental education.

The tour guide industry in Karang Tengah is gradually evolving into an environmentally sustainable and economically inclusive livelihood alternative. Beyond providing income to local guides, this sector has stimulated the emergence of complementary businesses such as food stalls, vehicle rentals, parking services, small scale food and beverage enterprises, and other supporting microbusinesses [3, 4]. Unlike agricultural livelihoods, which are constrained by long production cycles and vulnerable to seasonal and market fluctuations, community-based trekking tourism provides more immediate and stable daily income for villagers. Furthermore, when run according to ecotourism principles, this activity reduces environmental pressure and strengthens community-led conservation [5].

This shift reflects a broader trend of rural transformation in tropical peri-urban areas, where communities are increasingly adopting economic strategies that utilise endogenous resources [7]. Notably, this transformation has emerged organically from grassroots initiatives rather than being driven solely by external interventions. In this context, local-level social innovation becomes crucial in ensuring the sustainability of new economic activities [8].

Policy frameworks such as Indonesia's Village Law No. 6/2014 and the Village Fund scheme have further encouraged asset based rural development across the country. At the regional level, Babakan Madang has been designated as a community-based tourism zone within Bogor Regency's spatial and development planning documents (RTRW and RPJMD). Nevertheless, the transition towards a tourism driven economy is not without its challenges. These include weak institutional capacity in tourism governance, the absence of eco-friendly operational standards, and the risks of social exclusion and land use competition [9].

Moreover, increasing tourist activity has begun to exert ecological pressure, including waste accumulation, trail degradation, and disruptions to native ecosystems [10]. These circumstances underscore the urgency of conducting comprehensive research on tourism-led rural economic restructuring [11], particularly as a basis for formulating inclusive and adaptive development strategies.

This study situates trekking-based tourism as an entry point to explore models of economic transformation in tropical rural contexts. The case of Karang Tengah illustrates both the opportunities and constraints of locally managed ecotourism development [12], reinforcing prior findings that such grassroots led approaches can serve as viable pathways toward sustainable rural development [5].

2 Research methods

This research employs a mixed-methods design using a sequential explanatory approach, combining quantitative and qualitative techniques to capture both the measurable economic impacts and the institutional dynamics underlying trekking tourism at the community level. The study was conducted in Karang Tengah Village, Babakan Madang Sub-district, Bogor Regency, a key node within the rapidly expanding Sentul ecotourism corridor.

During the quantitative phase, data were collected through structured surveys administered to local tour guides and micro-entrepreneurs affiliated with the Paguyuban Lokal Guide Sentul (PLGS) a grassroots association comprising over 700 nature tourism actors in the region. The purpose of this phase was to quantify the economic contributions of guiding services, particularly regarding income generation, employment creation, and the formation of backward and forward business linkages.

The qualitative phase followed with in-depth interviews and focus group discussions (FGDs) involving key stakeholders, including village government representatives, PLGS coordinators, and tour operators. Additionally, participant observation was conducted during community-organised tourism events and regular ecotourism operations. This phase aimed to unpack the dynamics of institutional support, community empowerment, and socio-spatial negotiation between the increasingly urbanised village and the adjacent urban developments of Sentul City.

Descriptive statistics and value chain analysis were applied to quantitative data to analyse the distribution of economic value among stakeholders in the trekking tourism ecosystem. Meanwhile, qualitative data were analysed thematically using categorisation and coding techniques. This analysis is then interpreted using the Institutional Analysis and Development (IAD) framework, which enables a systematic investigation of the structure, functional roles, and performance outcomes of local institutions in managing the trekking tourism sector. To ensure credibility and validity, this study applies triangulation across data sources, methods, and researcher perspectives. Ethical considerations were maintained through informed consent procedures and respondent confidentiality protection. This approach is consistent with recent studies that integrate multi-method strategies to assess institutional dynamics and sustainability in the context of rural development [13].

3 Results and discussion

The economic transformation of Karang Tengah Village—driven by urbanisation pressures and the strategic utilisation of its nature-based tourism potential—illustrates broader patterns of structural change occurring across tropical rural regions. This study provides a comprehensive analysis of the multifaceted contributions of trekking tourism to village development, encompassing income generation, employment opportunities, youth engagement, institutional strengthening, rural–urban spatial dynamics, and the emergence of community-based sustainable business models. The following five subsections present detailed findings and analyses, integrating both quantitative and qualitative evidence, and are grounded in relevant theoretical frameworks on village development, local institutional capacity, and sustainable ecotourism.

3.1 Economic transformation and livelihood diversification

The economic transformation in Karang Tengah Village is marked by a pronounced shift from an agriculture based economy to a service oriented economic structure, catalysed primarily by the growth of trekking tourism. Survey data indicate that approximately 70% of former farmers and agricultural labourers have transitioned into trekking-related service roles and associated micro enterprises. This structural shift has significantly altered both employment patterns and household income composition.

Notably, average monthly household income has increased from IDR 2–3 million prior to involvement in tourism to over IDR 15 million, highlighting a substantial economic uplift. Over 90% of respondents reported that income from tourism services now constitutes their primary source of livelihood, signifying a process of livelihood upgrading [14], whereby rural

households improve their economic conditions through diversification into non agricultural sectors.

This transition has been accompanied by the proliferation of local micro enterprises including food stalls, parking services, camping gear rentals, and tourist photography/documentation businesses that amplify the local economic multiplier effect. These findings support [14], who argue that community based tourism, when effectively coordinated and participatory, can generate inclusive and resilient local value chains.

Beyond economic gains, the community has also demonstrated increased adaptive capacity in responding to external pressures such as land use change and agricultural uncertainty. This resilience reflects a broader capacity to convert dependency on primary sectors into context sensitive and flexible economic opportunities a key trait of rural economies in tropical regions navigating rapid transformation.

3.2 Job creation and youth engagement

Employment opportunities generated by the trekking tourism industry in Karang Tengah Village encompass both direct and indirect roles. Direct employment includes positions such as tour guides, porters, and equipment rental providers, while indirect roles involve food vendors, homestay operators, online promoters, and tour documentation services. These jobs are predominantly part time or seasonal, with peak demand occurring during weekends and public holidays.

The workforce in this sector is largely composed of individuals aged 18 to 40, with an average age of 35. Most guides are high school graduates, although a number of college educated individuals also participate, reflecting the appeal of trekking tourism as not merely a survival strategy but also a pathway for upward social mobility among rural youth. While the majority of respondents acknowledged that guiding was not their original career aspiration, they recognised that the profession has become a reliable daily source of income, contributing meaningfully to household well-being. Moreover, many guides have received formal training and certification notably from institutions such as the National Professional Certification Board (BNSP) signalling the early stages of professionalisation within the sector.

Nevertheless, several challenges persist. A significant portion of young respondents expressed concerns about the long term viability of the profession, citing potential competition from large scale investors and external capital holders. Despite this, many young people have demonstrated a strong interest in entrepreneurship, with aspirations to establish their own tourism-related ventures underscoring the emerging entrepreneurial mindset among rural youth.

3.3 Institutional innovation and governance at the local level: The role of PLGS

The *Paguyuban Lokal Guide Sentul* (PLGS) represents a critical institutional driver behind the effective management of trekking tourism in Karang Tengah. Established as a community based organisation, PLGS coordinates more than 700 local guides operating across three sub-districts. Its key functions include the organisation of trekking routes, management of integrated ticketing systems, training and certification, and cross sector coordination involving local stakeholders.

From an institutional perspective, PLGS constitutes an endogenous institution [15], emerging organically from local needs rather than being the product of top down governmental interventions. It fills the institutional vacuum left by the village government's limited role in tourism governance and serves as a collective intermediary, linking the community with public authorities and private sector actors.

Beyond routine operations, PLGS engages in capacity building initiatives, including regular training sessions, professional guide certification, and academic collaborations with universities. It also organises community events such as guide jamborees and rescue training, and partners with restaurants and villa managers through corporate social responsibility (CSR) programs enhancing its socio-economic and networking functions.

Despite its pivotal role, PLGS continues to face challenges, particularly the absence of formal legal status and restricted access to public funding. These limitations hinder its ability to scale operations and formalise its institutional legitimacy. As such, the consolidation of PLGS as a semi formal, community based governance structure is essential for the institutional maturation of tourism villages and the long term sustainability of community based ecotourism in the region.

3.4 Village-City synergy and space conflict mitigation

The spatial relationship between the urban development of Sentul City and the Karang Tengah community illustrates a model of cooperative spatial coexistence. Although many trekking routes traverse land owned by private developers, there is no evident conflict over land use. Instead, access is facilitated through functional arrangements and informal negotiations between local guides and landowners. This dynamic illustrates the framework of "negotiated space", where spatial governance is shaped not only by formal regulations, but also through adaptive social interactions and agreements.

Within this arrangement, PLGS serves as a key social intermediary, harmonising interactions between local stakeholders and external actors. This role is crucial in maintaining equilibrium between community interests and private property concerns, allowing tourism to flourish within privately held landscapes without formalised land tenure reforms.

Importantly, residents of Karang Tengah have transitioned from dependency on agriculture or state aid to self sustaining livelihoods rooted in tourism. This transformation fosters a sense of dignity, autonomy, and local agency, reducing the likelihood of social friction with the urban expansion of Sentul City. Rather than being sites of resistance, rural communities like Karang Tengah become collaborative partners in regional development.

This functional rural-urban relationship also opens pathways for economic synergies, where visitors to Sentul City can seamlessly access trekking services operated by Karang Tengah residents. The village thus transcends its traditional role as a peri-urban buffer zone and instead emerges as an active and entrepreneurial node within the broader regional tourism economy.

3.5 Towards sustainable business models for village transformation in the tropics

Based on field observations and empirical findings regarding the livelihood practices of the trekking tourism community in Karang Tengah Village, this study proposes a Tropical Village Economic Transformation Model a conceptual framework for rural economic change grounded in the utilisation of biophysical assets, institutional innovation, and community-based tourism development. Rather than being a context-specific description, the model offers a scalable and transferable approach applicable to other tropical villages with similar social ecological conditions. The model comprises four interrelated and iterative processes, forming a dynamic cycle of economic transformation based on local resources and endogenous social dynamics:

1. Activation of Natural and Social Assets : The first phase involves identifying and mobilising biophysical and social potential, such as waterfalls, forest trails, hilltop landscapes, and community cohesion. These resources are activated through

participatory mapping and inclusive village level discussions. This approach is in line with the Asset-Based Community Development perspective, which emphasises the importance of utilising local assets as the main foundation for sustainable and participatory development.

2. Institution Building and Adaptive Governance : The second phase centres on the formation of community-based institutions, exemplified by the Paguyuban Lokal Guide Sentul (PLGS). PLGS plays a pivotal role in organising tourism operations, administering certifications, managing ticketing systems, and liaising with landowners and private entities. This represents a process of institutional bricolage, wherein institutional forms are constructed through adaptive, locally embedded practices that respond to evolving governance needs and socio-economic opportunities.
3. Development of Local Value Chains and Partnerships : The third phase involves catalysing inclusive local economic linkages, with trekking tourism stimulating the growth of micro enterprises such as food stalls, homestays, transport services, equipment rentals, and digital marketing platforms. This is in line with the principle of inclusive value chain development, which emphasises the importance of involving local actors in the economic system to ensure fair distribution of benefits and strengthen community empowerment.
4. Livelihood Transformation and Economic Empowerment : The final phase results in a structural shift in livelihoods, characterised by increased incomes (from IDR 2–3 million to over IDR 15 million per month), reduced reliance on agriculture, and the proliferation of community-owned enterprises. This process embodies a livelihood transition, in which rural households diversify and upgrade their economic activities from subsistence-based agriculture to service oriented, entrepreneurial livelihoods grounded in local resource use and tourism.

The Tropical Village Economic Transformation Model thus captures the cyclical and endogenous nature of rural development in peri-urban tropical settings. It illustrates how villages can reposition themselves from passive buffer zones into active economic agents within broader regional systems, through a synergy of ecological potential, institutional agency, and entrepreneurial participation. The model is depicted in Figure 3.

The proposed model offers several advantages, particularly in terms of community participation, institutional flexibility, and adaptive capacity in responding to external pressures such as urbanisation and climate change. The experience of Paguyuban Lokal Guide Sentul (PLGS) further highlights the critical role of community-based governance in simultaneously advancing economic, social, and ecological sustainability.

Nevertheless, the model also faces notable challenges. These include the limited regulatory and legal support from government institutions, the underrepresentation of women in key sectors of tourism activity, and the risk of social exclusion if benefit-sharing mechanisms are not transparently and equitably managed. Addressing these limitations is essential to ensure the long-term viability of the model.

As such, the sustainability and scalability of this transformation model hinge on several enabling conditions: the formalisation of community institutions, capacity building for local actors, and integration into village development planning frameworks and regional policy agendas. Without these supports, the model risks stagnation or co-optation by external interests, thereby undermining the very principles of inclusivity and resilience upon which it is built.

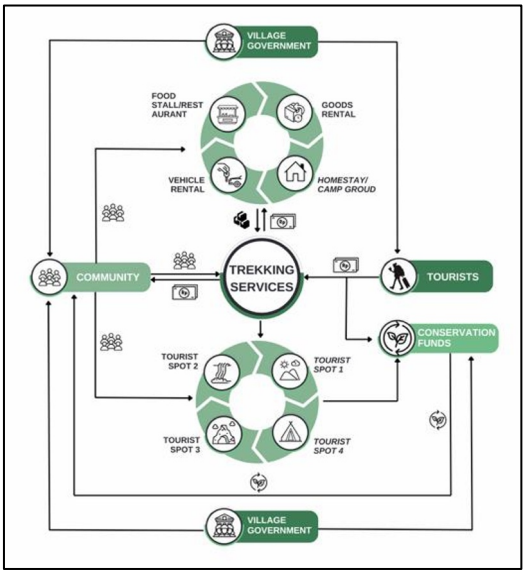

Fig. 1. The tropical village economic transformation model can be used as a model of economic transformation.

4 Conclusion and recommendations

4.1 Conclusion

This study provides compelling evidence that the transition from an agrarian-based rural economy to a nature-based service economy is both feasible and sustainable in tropical contexts, particularly when supported by effective local institutions, adaptive use of ecological resources, and strong community participation. The case of Karang Tengah Village illustrates how the development of community-based trekking tourism facilitated by the Paguyuban Lokal Guide Sentul (PLGS) has significantly increased household incomes, opened up livelihood opportunities for younger generations, and strengthened social cohesion. The Tropical Village Economic Transformation Model developed from this research identifies four fundamental pillars of sustainable rural change: the mobilisation of biophysical potential, the establishment of strong community institutions, the growth of service oriented and MSME driven economies, and the advancement of household level economic autonomy. Moreover, the cooperative relationship between rural Karang Tengah and the adjacent urban area of Sentul City highlights the potential for spatial synergies that minimise land use conflict and foster mutual economic benefits. While grounded in a specific context, the model is highly adaptable and offers a strategic framework for other tropical villages experiencing similar pressures from urbanisation and tourism development. As such, it contributes meaningfully to the discourse on inclusive, place-based, and sustainable rural transformation in the Global South.

4.2 Recommendations for future research

While this study has generated important insights and advancements in rural development research, several opportunities remain for further inquiry to support, extend, and replicate its findings. First, a longitudinal analysis of the economic resilience of community-based

trekking tourism is needed to better understand its macroeconomic contributions to village economies, as well as the seasonal dynamics and income stability associated with tourism based livelihoods. Second, a gender focused analysis of rural tourism value chains is essential, particularly in addressing the marginalisation of women in core tourism service roles. Although women are predominant in support sectors, a more inclusive development model requires in-depth research into the opportunities and structural barriers that affect women's empowerment and participation. Third, the success of PLGS as a local institution underscores the need to develop a standardised institutional capability index for evaluating community-based ecotourism organisations an instrument that could support the scaling and replication of similar models in other contexts. Fourth, comparative research across tropical regions, including Southeast Asia, East Africa, and Latin America, is necessary to assess the robustness and adaptability of the transformation model across varied socio spatial configurations. Lastly, to translate this conceptual model into practical spatial development frameworks, further policy-oriented research is required to explore how it can be integrated into village level planning instruments such as the Village Medium Term Development Plan (RPJMDes), Village Government Work Plan (RKPDes), and District Spatial Plans (RTRW). Collectively, these future research pathways will enhance the theoretical depth and applied relevance of the tropical rural transformation framework proposed in this study.

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