Exploring Economic Development Strategies towards the Sustainable Development of Kinabalu UNESCO Global Geopark: The Perspective of District Local Authorities

Jennifer Chan Kim Lian [a, *], **Masneh Abd. Ghani**[b]

[a]**Faculty of Business, Economics and Accounting**, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia.
Email: jenniferchan@ums.edu.my

[b]**Institute for Development Studies,**
Sabah, Malaysia
Email: masneh.maziah@ids.org.my

*Corresponding Author: jenniferchan@ums.edu.my

Abstract

The Kinabalu UNESCO Global Geopark is a unique park of national and international importance. With this newly conferred status, the park integrates the significant geological, biological, and cultural heritage of three districts, Kota Marudu, Kota Belud, and part of the Ranau district. The paper explores critical sustainable development issues and the roles and responsibilities of district offices within the geopark districts. Additionally, it sheds light on the rules and regulations necessary for preserving geopark resources, as well as the economic strategies that can benefit local communities. Face-to-face personal interviews were conducted from June to August 2023 with 10 respondents from the three local district authorities. The interview responses were transcribed and subsequently analysed using the thematic approach. The findings reveal that the critical issues encountered by district offices in geopark management encompass coordinating geopark management, overseeing and evaluating geopark activities, enforcing forest conservation, collaborating with local communities, planning and developing infrastructure, and facilitating education and community awareness regarding geopark resources. While specific rules and regulations for geopark resource management are not in place, district offices prioritise the utilisation of existing regulatory frameworks (e.g., Environmental Protection Enactment, Sabah Biodiversity Enactment, Forestry Enactment, Nature Protection Regulation, Geological Protection Regulations), geopark management procedures, and limits on human activities within the geopark's vicinity. Several pertinent economic strategies to bolster the well-being of local communities around the geopark districts which include the promotion of geotourism and local products as tourist attractions, enhancement of infrastructure (road, internet connectivity, and electricity) in the geopark areas, strengthening of local community skills and education concerning the geopark resources, as well as the facilitation of job creation and cultivation of new small business opportunities. The paper offers valuable insights into the development and management of the geopark, as perceived by local authorities. These findings serve as indispensable foundational knowledge for the sustainable management of the geopark through the significant roles and responsibilities held by the district offices.

Keywords: Kinabalu UNESCO Global Geopark, Kota Marudu, Kota Belud, Ranau, issues and rules in sustainable geopark, economics strategies

1. Introduction

The term "geopark" was introduced by UNESCO in 2001 to combine conservation with sustainable development while also involving the local community (UNESCO, 2010). A geopark is unique and distinct from any other park, mainly due to its possession of invaluable geological heritage resources that demand safeguarding (Chan and Haminah, 2023). As it is responsible for protecting an area's valuable natural and cultural heritage, a geopark plays a vital role in the preservation of ecosystems, landscapes, local communities, and economic well-being. Based on the geopark development framework, the three main elements in a geopark are (a) heritage conservation, (b) economic development, and (c) community development. These elements contribute to the sustainability of the geopark (UNESCO, 2010). Further, UNESCO (2010) designates a Global Geopark as a geographical zone where sites and landscapes of international geological importance are managed holistically according to the principles of protection, education, and sustainable development. Geoparks are a new strategy for achieving sustainable development and enhancing socio-economic status through the participation of local communities in continuous geopark activities (Farsani et al., 2011).

Kinabalu National Park was chosen as a World Heritage Site on 2 December 2000 and the UNESCO Crocker Range Biosphere Reserve on 14 June 2014. It was recognised as Kinabalu National Geopark on 18 March 2020 and subsequently declared as Kinabalu UNESCO Global Geopark on 24 May 2023 (Star Online, 2023). Covering an area of 4,750 square kilometres, this relatively new geopark is officially a global geotourism destination containing three districts: Kota Marudu (1,775 km^2), Kota Belud (1,386.52 km^2), and part of the Ranau district (1,588 km^2).

The Kinabalu UNESCO Global Geopark is a unique park of national and international importance. As a model for sustainable development in sensitive areas, the park adds significant value to Sabah's existing eco-tourism products and enhances socio-economic development for the local population (Sabah Park Website 2019). It contains various valuable resources, including geological, geomorphological, biological, historical, and traditional/cultural resources, that altogether constitute distinctive geological, biological, and cultural heritage. This significant scientific heritage can be developed for ecotourism and/or geotourism to generate economic benefits for the local communities within and around the park. Moreover, it offers visitors an opportunity to learn and experience the uniqueness of geological landscapes with significant scientific and aesthetic value.

The management plan of the Kinabalu UNESCO Global Geopark, as presented in Figure 1, indicates that three district offices form the park’s coordination committee and task force for infrastructure development and community empowerment.

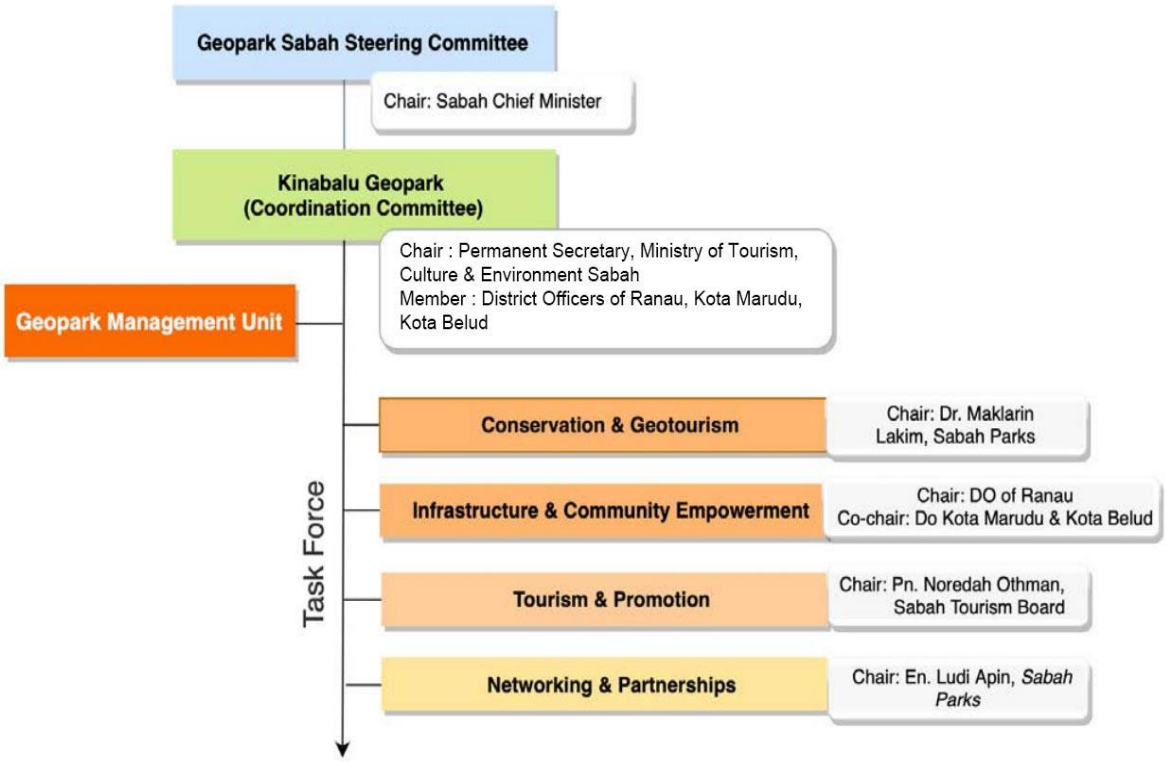

Figure 1
Geopark Management Unit (Source: https://kinabalugeopark.sabahparks.org.my)

The development of the Kinabalu UNESCO Global Geopark is geared towards the concurrent development of the economy, the community, conservation, and sustainability, in line with the United Nations' 10 priority areas for sustainable development (Laura, 2022). Notably, stimulating economic development by actively promoting a sustainable local economy is one of a geopark's key strategic objectives (Sabah Parks, 2022). However, there remains a knowledge gap in understanding sustainable development, particularly pertaining to the economy, within the recently declared Kinabalu UNESCO Global Geopark.

Therefore, this research sought to explore the sustainable development issues and economic growth strategies in the Kinabalu UNESCO Global Geopark from the perspectives of the local authorities in the three districts within the geopark. As key stakeholders, local district authorities' proactive engagement in geopark management is indispensable, particularly concerning their roles and responsibilities in managing geopark sustainability. Accordingly, this study aimed to achieve the following objectives:

1) Investigate the critical issues encountered in geopark sustainable development.
2) Outline the roles and responsibilities of district offices in geopark management.
3) Identify existing regulations and guidelines to safeguard geopark and geological resources.
4) Examine pertinent economic development strategies for geopark development.

1.1 UNESCO Global Geopark Development and Criteria

UNESCO Global Geoparks play an important role in achieving the United Nations' Sustainable Development Goals or SDGs (Lee and Jayakumar, 2021). The geopark concept was created to leverage the park's geological resources for economic growth through geotourism (Gray, 2004, 2008). One of the main goals of UNESCO Global Geoparks is to provide integrated sustainable development for the direct benefit of the local population (Global Geoparks Network International Association, 2021). Accordingly, UNESCO Global Geopark has defined size, setting, management, local involvement, economic development, education, protection and

conservation, and global network as key criteria of a geopark (Sabah Park, 2022). Geopark development also includes holistic approaches that address issues related to preservation/conservation, public education, community development, and sustainable development (Newsome et al., 2012; Farsani et al., 2011; Komoo, 2010; Komoo et al., 2010).

In summary, UNESCO Global Geoparks have established several criteria related to geographical areas where geological heritage sites uphold the holistic pillars of protection, education, and sustainable development. They aim to stimulate economic activity within this framework for the conservation of significant geological features (Sabah Park, 2022). This suggests that the sustainable development of natural, social, and economic environments is central to geoparks (Chan and Haminah, 2023). To achieve these goals and develop geoparks in a sustainable manner, it is vital to establish an effective management system along with program implementation (Geopark Management Toolkit, 2023). In this regard, the involvement of public authorities (district authorities), local communities, private interests, and educational institutions in geopark planning and development is crucial (Sabah Park, 2023).

As documented in the literature, Global Geoparks have been contributing to local economic development and sustainable development by attracting tourists, promoting socioeconomic activity, and demonstrating sustainable geotourism (Farsani et al., 2011; Lee and Jayakumar, 2012). Furthermore, according to Kibert, Thiele, Peterson, and Monroe (2016), numerous strategies and tools for implementing sustainable development have been developed at the local level. However, there remains a lack of a comprehensive framework for systematically evaluating sustainable geopark plans.

Geopark and sustainable development

The concept of sustainable development has been widely applied in the context of tourism destinations and more recently in UNESCO Global Geoparks. Economic, social, and environmental dimensions are well-researched and documented as the three pillars of sustainable development. However, this triad alone is insufficient to construct a comprehensive relevant framework. According to Seghezzo (2019), three additional dimensions — place, permanence (time), and person (human) — are crucial in the context of sustainable development, as the interplay between them is inseparable when it comes to sustainable practices. Including these dimensions significantly enhances the analytical perspective of sustainability issues within the sustainable development framework.

Indeed, the aim of sustainable development is to ensure the well-being of current and future generations by integrating environmental, social, and economic factors into decision-making and actions (World Commission on Environment and Development, 1987, p. 16). The sustainability concept is strongly tied to the management of the natural environment, economic activities, and socio-cultural aspects of an area (Mowforth and Munt, 2016; Weaver, 2006). The literature indicates that sustainable development strategies encompass a range of initiatives, such as conservation efforts for natural resources, projects designed to raise environmental consciousness, tourism promotion, recreational activities, rural development, and incentives for fostering distinctive local production (Burlando et al., 2011, Zouros, 2004). The pursuit of sustainable development also necessitates fostering collaboration among various stakeholders for enhancing the likelihood of achieving sustainable practices and outcomes (Komoo et al., 2022). In the economic sense, sustainable development facilitates substantial economic and employment growth while also nurturing sustainable business and community development.

Consequently, sustainable development represents a fundamental element within the comprehensive framework of geoparks. Within this framework, stimulating economic activity is a strategic objective of geopark sustainability (Geopark Management Toolkit, 2023). Specifically, sustainable economic development is one of the core pillars for developing a geopark within the UNESCO Global Geopark Network. Thus, it plays a pivotal role in

establishing and maintaining sustainability within geopark development, which is particularly crucial for the relatively new Kinabalu UNESCO Global Geopark. Indeed, the geopark has increasingly been recognised as an innovative approach for the conservation of heritage and local economic development. It is not merely a national protected area with geological heritage sites but also an integration of the concepts of protection, education, sustainable development, and tourism branding (Komoo, 2010). In simple terms, geoparks meet the compelling need for the efficient preservation of significant geological sites and the sustainable economic advancement of rural areas through the promotion of geotourism, thus enriching the value of heritage, landscapes, and geological formations (Zouros, 2010).

The establishment of a geopark is widely acknowledged as important for preserving the park's significant values and valuable resources. Equally critical is its capacity to create new job opportunities, foster new economic activities, and generate additional sources of income, particularly in remote areas (Farsani et al., 2011). Overall, a geopark's direct positive impacts on its territory include environmental protection, improved community living conditions, a stronger sense of pride and cultural development within the community, and a higher appreciation for and preservation of geological heritage. Therefore, to ensure the sustainable development of Kinabalu UNESCO Global Geopark, it is essential to design an effective management plan and monitoring system that focuses on long-term sustainable development in ecological, economic, social, and cultural aspects, as opposed to rapid, short-term development (Tay and Chan, 2014). Similarly, the management of Kinabalu UNESCO Global Geopark should use a sustainable development strategy for socio-economic growth and new tourism products, including ecotourism.

2. Research Method

Against the setting of the three districts in the Kinabalu UNESCO Global Geopark, this study adopted an exploratory qualitative design to explore the park's critical sustainable development issues, the roles and responsibilities of district offices, the rules and procedures for sustainable development, and economic development strategies. The qualitative inductive approach facilitated the understanding of individual local authorities' perspectives regarding the geopark's sustainable development. Using semi-structured interviews, data was collected between June and August 2023 from local authority representatives in the three geopark districts (i.e., Kota Belud, Kota Marudu and Ranau). Convenience sampling was utilised to select eligible respondents from the district offices and district tourism associations. The interviews were conducted at the respondents' respective district offices and lasted 45 to 60 minutes each. All interviews were recorded and transcribed. Subsequently, thematic analysis of the interview data was guided by the research objectives.

3. Findings

3.1 Demographic Profile of Respondents

A total of 10 respondents from local authorities across the three districts in Kinabalu UNESCO Global Geopark participated in the research interviews. Their demographic profile is presented in Table 1. Out of 10 respondents, five were from Kota Belud, three were from Kota Marudu, and two were from Ranau. Moreover, four of the respondents were assistant district officers, three were district officers, and three were from district tourism associations. A majority of the respondents were male and aged between 35 and 44, whereas all of them were married.

Table 1
Demographic Profile of Respondents

District	Kota Belud (KB)	Kota Marudu (KM)	Ranau (R)
Demographic	-	-	-
Age range:			
25-34	-	-	1
35-44	1	2	1
45-54	2	1	-
55-64	2	-	-
Above 65	-	-	-
Gender:			
Male	3	3	1
Female	2	-	1
Married status:			
Single	-	-	-
Married	5	3	2
Divorced	-	-	-
Occupation:			
District Officer	1	1	1
Assistant District Officer	2	1	1
District Tourism Association	2	1	-
Total	5	3	2

3.2 Critical Issues in Geopark Sustainable Development

Empirical evidence reveals a diverse array of issues encountered in the development of Kinabalu UNESCO Global Geopark in the three districts. Based on the responses of local authorities, these issues can be categorised into six critical areas related to local enforcement, accessibility (including roads, internet access, and clean water), lack of promotional activities, heritage preservation, and natural disasters. These issues significantly impact the development of the geopark, particularly the absence of local enforcement and basic infrastructure, as presented in Table 2 below.

Table 2
Critical issues in geopark sustainable development

District responses	Kota Belud (Responses and respondents)	Kota Marudu (Responses and respondents)	Ranau (Responses and respondents)	Themes
Critical issues in geopark development	The area needs entrance fee and temporary license. (KB1 and KB3) Low involvement of locals and villagers (KB1, KB2, KB4 and KB5)	Bad roads (holes, narrow, difficult conditions) (KM1, KM2, KM3) Less promotion as a geopark or tourist destination (KM1, KM2) Development status is still in	Natural disasters like landslide (R1, R2) Invasion of geopark, no enforcement (R1, R2) Development issues: only one foster village for	Local enforcement Poor accessibility Lack of tourism facilities Lack of promotion

	No geopark development plan (KB1, KB4) Bad internet signal, only two bars (KB1, KB3)	process. (KM1, KM3) The development of tourism infrastructure is lacking/ has not been developed (KM1, KM2, KM3)	cultural preservation - Bundun Tuhan (R1)	Natural Disaster Heritage preservation

The six critical issues that emerged are reflected in the responses from the respondents in the three districts. Based on the empirical evidence, it appears that local authorities in Kota Belud are concerned with the enforcement issue related to fees and licenses. The district officer pointed out that "*although there is enforcement from the District Office, overall, the enforcement is very weak*" (KB1, KB3). Similarly, there is concern about the participation of local people and villagers in the geopark area, as mentioned by all the respondents in Kota Belud: "*Limited involvement of the local people and villagers. In fact, the involvement of local people and villagers is very important in geopark management*." The respondents further stated the "*lack of a proper geopark development plan*" (KB1, KB4). Additionally, having proper internet connection is another issue faced in Kota Belud, as indicated by KB1 and KB3: "*very bad internet signal and only two bars for connectivity*."

In the case of Kota Marudu, the local authorities have pointed out critical issues related to the lack of accessibility in terms of roads. The district officer mentioned that "*gravel roads are narrow, potholed, and inadequate to accommodate the number of tourists*" (KM1, KM2, KM3). Moreover, there are very limited promotional activities and development processes in Kota Marudu, as noted by KM1, KM2, and KM3 in the following statements: "*Lack of promotion activities about Kota Marudu, and tourism infrastructure and facilities are virtually non-existent. The development status and process are very slow here*." The local authorities emphasise the imperative to address these critical issues promptly to ensure the sustainability of geopark development in Kota Marudu.

In terms of sustainable development, three critical issues were highlighted by local authorities in Ranau. These include the threat of natural disasters, particularly landslides, encroachment into the geopark areas, and the development trajectory of the geopark itself. Both respondents (R1, R2) pointed out that "*frequent landslides affect accessibility and pose significant risks to the safety of tourists and local communities within the geopark*." Notably, Ranau has rapidly become a sought-after tourist destination, especially during weekends and holidays, resulting in overcrowding and associated traffic congestion. There is also a critical issue of geopark development status in Ranau, as mentioned by R1: "*Kampung Bundu is the only place designated as a host village for culture preservation activities*." The local authorities added that "*this initiative is crucial in the geopark district, but its current scale is quite limited. We should have more diverse initiatives!*" (R1, R2).

In summary, the findings indicate that critical issues in geopark sustainable development pertain to the development plan, the level of involvement of local communities, restricted accessibility due to inadequate road infrastructure and limited internet connectivity, as well as the lack of promotional activities, especially in Kota Marudu. Moreover, essential infrastructure and tourism facilities are considered pertinent issues in Kota Marudu. These are the instrumental aspects in fostering the development and economic growth of the geopark, playing a vital role in determining its sustainability. In essence, this development hinges on foundational

infrastructure, accessibility, heritage promotion and preservation, as well as active engagement of the local community in the vicinity of the geopark. These elements align seamlessly with the UNESCO Global Geopark development framework.

3.3 The Roles and Responsibilities of District Offices in Geopark Development

The key roles and responsibilities of district offices that emerged from the interview responses include involvement in village development, coordination, planning, and the implementation of relevant acts, rules, and laws. Other responsibilities consist of managing natural resources, providing education and awareness programs, cooperating with other government agencies and tourism associations, and developing infrastructure. The empirical evidence on these themes is presented in Table 3 below.

Table 3
Roles and responsibilities of local authorities in geopark development

	Kota Belud	**Kota Marudu**	**Ranau**	**Themes**
Roles and responsibilities of district offices in geopark development	Focus on the villagers and liase and work closely with the village head (KB1, KB3, KM4)	As a secretary, coordinate and follow-up and monitor activities (KM1, KM2, KM3) Perform infrastructure planning and development (KM1, KM2) Create community awareness about geopark resources (KM1, KM2, KM3) Identify "local champions" (KM1) Cooperate with other ministries and agencies (KM1, KM2) Organise visits to geo-attractive resources (KM1, KM3 Manage natural resources and monitor and evaluate. (KM1,	Execute acts. - Forest conservation - Enforcement (land) (R1, R2) Coordinate geopark development program (R1, R2)	Village development Local community involvement Continuous monitoring and coordination Education and awareness Partnership activities Action implementation

		KM2) Provide education and community awareness (KM1, KM2)		

The findings suggest that local authorities' roles and responsibilities are vital in the development, management, and protection of the geopark and its geological resources. In addition, the district authorities hold key functions in visiting geo-sites and creating awareness and educational programs to enhance the public's understanding of the geopark.

3.4 Rules and Procedures for Geopark and Geological Resource Protection

The findings from the interview responses indicate that current rules and procedures to protect geopark resources include the improvement of regulations for nature and geological protection, waste management, nature protection regulations like the Sabah Biodiversity Enactment and the Forest Enactment, and geopark management procedures. Interestingly, the findings also suggest the need for the district office to act as the chairman of the Council with the power to enforce law in the context of protecting geopark resources. The findings, as detailed in Table 4, reflect that geopark regulations are required to provide for the social and economic needs of the local community while protecting the landscape in which they live and conserving their cultural identity.

Table 4
Rules and procedures for geopark and geological resource protection

	Kota Belud	**Kota Marudu**	**Ranau**	**Themes**
Rules or procedures in place to protect geopark resources	General rules, no specific ones for geopark and geo resources (KB1, KB2, KB4)	There are no rules and procedures yet, but there are suggestions (KM1, KM2, KM3) Nature protection regulations for conservation, geopark management (KM1, KM3) Geological protection regulations for geological heritage, geological protection zone (KM1, KM2,	No specific rules for geopark (R1, R2) Environmental Protection Enactment, Sabah (R1) Biodiversity Enactment and Forest Enactment (R1, R2) District office as chairman of the Council with power to enforce law. (R1)	General rules only Improve regulations for nature and geological protection. Improve waste management regulations. Enforce district office's role as chairman of the Council

		KM3) Geopark management procedures (US impact assessment; waste management) (KM1, KM3) Restrictions on human activities (no-access zones; regulations on the use of natural resources) (KM1, KM2)		

The empirical evidence reveals that there are no specific rules for geopark and geo resources, as indicated by the respondents from the three district offices. Consequently, all the district offices emphasised the need to establish rules for geopark and geo resources. Based on the responses, it appears that Kota Mardu has more relevant rules and procedures for the protection of geopark and geo resources, including for nature and geological protection (geological heritage), as well as geopark management procedures. In the case of Ranau, environmental protection, Sabah biodiversity, and forestry enactments are considered vital for protecting geopark and geo resources. Importantly, the idea of making the district office the chairman of the District Council emerged from the respondents in Ranau. This underscores the importance of the district office in geopark management and development. In summary, these rules and procedures are regarded as essential in the development and management of the geopark.

3.5 Economic Development Strategies

The interview responses in Table 5 below reveal a multitude of economic development strategies within the geopark. These strategies can be classified as the creation of new tourism products, poverty alleviation, enhancement of basic infrastructure, education and training initiatives, job opportunities, and local community engagement. Therefore, the economic development of the geopark should take into consideration both economic benefits and community engagement.

Table 5
Economic development strategies for geopark sustainable development

	Kota Belud	**Kota Marudu**	**Ranau**	**Key Themes**
Economic development strategies	Development of new tourism products and small business enterprises (KB1, KB3, KB4, K5) Overcome the poverty line of	Tourism development (development of tourist attractions) (KM1, KM2, KM3) Development of local products (KM2, KM3)	Development of four infrastructure enablers (roads, electricity, water and broadband) (R1, R2) Income and job opportunities	New tourism products Poverty alleviation Improvement of basic infrastructure and clean water

	RM790 (KB1, KB3) Internet upgrade and clean water (KB1, KB3)	Education and skills training (KM1, KM2) Development of infrastructure and accessibility (KM1, KM2, KM3) Involvement of local community in geopark development process (KM1, KM2)	(R1, R2)	availability Education and training Local community involvement Income and job opportunities

The findings reveal that economic development strategies are associated with the development of new products and tourist attractions in both Kota Belud and Kota Marudu. However, in the case of Ranau, local authorities emphasise that economic strategies should focus on establishing four essential infrastructure enablers (road access, electricity, internet, and water supply), along with job opportunities and increasing income levels. These factors are crucial for geopark development and local community enrichment. Evidently, these economic development strategies significantly improve the well-being of the communities in the vicinity of the geopark. Furthermore, these strategies contribute to the sustainable development of the geopark by generating economic benefits through the development of new products, as highlighted by the respondents from Kota Belud and Kota Marudu, underscoring the importance of developing new products and tourist attractions.

In short, the findings show that geopark development necessitates proper physical development, which includes accessibility, amenities, and the availability of attractions. It must also consider the local community and provide opportunities for them to be active participants in the tourism industry. For example, the local community can create value by developing resources from geological, biological, and cultural sites as unique ecotourism products and destinations. This is closely related to de Satge's (2002) three key components of the livelihood framework (capabilities, assets, and activities), which can encompass physical capital, human capital, social capital, financial capital, and natural capital.

4. Conclusion, Contributions and Limitations

The paper provides an in-depth analysis of the perspectives of local authorities regarding sustainable geopark development and economic development in the context of the newly declared Kinabalu UNESCO Global Geopark. Specifically, it unveils the critical issues encountered in geopark development, the roles and responsibilities of district offices, the regulatory framework for geopark protection, and pertinent economic development strategies for the geopark.

The findings indicate that the critical issues faced in the development of the geopark are associated with local enforcement, accessibility (road and internet), promotional activities, heritage preservation, and natural disasters. Enforcement is vital to conserving and preserving the geopark and geo resources, while road accessibility and internet facilities are essential elements in the geopark. Likewise, promotional activities will enhance awareness of the geopark, as it is still new and unknown to many communities. Heritage preservation is pivotal for the geopark as a valuable asset and must be well addressed within the local communities.

More importantly, frequent natural disasters such as floods and landslides require mitigation actions, especially in Ranau and Kota Belud.

In terms of the key roles and responsibilities of district offices in geopark management, this study has established that district offices hold important functions in the planning, development, and the growth of the geopark, particularly in village development, infrastructure coordination, geopark development programs, and cooperation with other government agencies and tourism associations. However, the findings suggest that at present, there is a lack of specific regulation governing geopark development. Currently, district offices rely on existing general regulations and protocols related to nature and geological preservation, environmental protection, and the Sabah Biodiversity and Forestry Enactment. This underscores the necessity of formulating pertinent and distinct rules for safeguarding both the geopark and its geological resources across the three districts. The findings also point to the crucial roles of district offices in taking the lead in enforcing these laws in addition to fulfilling their existing roles and responsibilities.

Finally, the findings demonstrate that the creation of new tourism products, poverty alleviation, enhancement of basic infrastructure, education and training initiatives, job opportunities, and increased local community engagement are key economic strategies for geopark development. These findings contribute significantly to the policy framework for sustainable geopark management.

This study carries substantial practical implications for the sustainable planning and development of Kinabalu UNESCO Global Geopark, along with the overall well-being of the communities residing within its three districts. To begin, the findings underscore the imperative to resolve the identified critical issues, notably the absence of essential infrastructure (e.g., internet accessibility, road access, and clean water) which constitute fundamental prerequisites for both community welfare and tourism development. Furthermore, these results highlight the pivotal role of district offices in geopark management, encompassing their responsibilities and the formulation of essential rules and procedures for protecting the geopark and its geological resources. The significance of relevant economic development strategies is also recognised in this study to bolster geopark growth while enhancing economic benefits for the local communities.

Overall, the findings contribute to the enhancement of geopark development and serve as significant guidelines for the management of Kinabalu UNESCO Global Geopark to strengthen its current status. Essentially, addressing the identified critical issues, strengthening the roles and responsibilities of district offices, implementing necessary regulations and protocols to safeguard geoparks and geological resources, and promoting sustainable economic development activities not only contribute to the sustainable development of the geopark, but also fulfil the UNESCO Global Geopark criteria. Beyond Kinabalu, the research findings serve as invaluable baseline information for improving the management of Global Geoparks elsewhere.

Nevertheless, the findings have some limitations. The small sample size, restricted to the local authorities of the three districts, may constrain the analysis of this stakeholder group’s perspectives regarding sustainable geopark development. Moreover, qualitative exploration of the three districts under the geopark may limit the generalisation of the results. More research work should be conducted on other locations, such as Langkawi Island, and other geoparks in Malaysia. It is also strongly suggested for future research to adopt mixed methods to provide more well-rounded findings.

5. Acknowledgements

This paper reports part of the findings of a research project funded by University Malaysia Sabah under the research grant “Developing Kinabalu Geopark as a Sustainable Geotourism Destination: Value Creation and Sustainable Model” (Code: SDK0096-2019) from 2019-7-1 to 2023-11-1.

6. References

Burlando, M., Firpo, M., Queirolo, C., Rovere, A., & Vacchi, M. (2011). From geoheritage to sustainable development: Strategies and perspectives in the Beigua Geopark (Italy). *Geoheritage*, 3, 63–72. https://doi.org/10.1007/s12371-010-0019-4.

Chan, J.K.L.and Talib, H (2023) Community Participation and Geo-Resources in the Kinabalu National Geopark, conference paper presented at International Heritage and Cultural Conservation Conference - *InHERIT* 2023,16-18 August 2023, Sibu, Sarawak Organized by the School of Built Environment, University of Technology Sarawak

De Stage, R. (2002) Learning about livelihoods: insights from southern Africa. Contributing authors, Ailsa Holloway et al. *South Africa: Periperi Publications*; Oxford: Oxfam, 2002

Farsani, N. T., Coelho, C., & Costa, C. (2011). Geotourism and Geoparks as Novel Strategies for Socio-economic Development in Rural Areas. *International Journal of Tourism Research*, 68-81. http://dx.doi.org/10.1002/jtr.800

Geopark Management Toolkit. (2023). *Sustainable Economic Development – Geopark Management Toolkit*. Word Press. https://www.geoparktoolkit.org/sustainable-economic-development/#SED5

Global Geoparks Network International Association. (2021). *Global Geopark Network. | UNESCO Geoparks GGN* |. Visit Geoparks. https://www.visitgeoparks.org/

Komoo, I., Azman, N., Ahmad, N., Ali, C.A., Munif, A & Bukhari, M. (2022). An Integrated Geoproduct Development for Geotourism in Langkawi UNESCO Global Geopark: a Case Study of the Kubang Badak Biogeotrail,*Geoheritage* (2022) 14:37, https://doi.org/10.1007/s12371-022-00664-1

Komoo, I., Mokhtar, M., & Aziz, S. (2010). Pengenalan: Geopark dan Pembangunan Lestari Wilayah.*Akademika*, 80, 3-7. http://www.ukm.my/penerbit/akademika/ACROBATAKADEMIKA80/jademik80-lock-Bab1.pdf

Komoo, I. (2010). Geopark sebagai peraga pembangunan lestari wilayah. *Akademika*, 80 (Disember), 9-18.

Laura. (2022, November 4). Geoparks as pioneers of sustainable development. *Lauhanvuor-Hämeenkangas Geopark.* https://lhgeopark.fi/en/geoparks-as-pioneers-of-sustainable-development/

Lee, Y and Jayakumar, R. (2021) Economic impact of UNESCO Global Geoparks on local communities: Comparative analysis of three UNESCO Global Geoparks in Asia, *International Journal of Geoheritage and Parks*, 9 189–198

Mowforth, M., & Munt, I. (2016). *Tourism and sustainability: Development,*

globalisation and new tourism in the third world (4th ed.). New York: Routledge.

Newsome, D., Dowling, R., & Leung, Y.F. (2012). The nature and management of geotourism: A case study of two established iconic geotourism destinations. *Tourism Management Perspectives,*19-27. http://www.sciencedirect.com/science/article/pii/S2211973611000122

Online, S. (2023, May 26). Kinabalu National Geopark declared UNESCO Global Geopark. *The Star.* https://www.thestar.com.my/news/nation/2023/05/26/kinabalu-national-geopark-declared-unesco-global-geopark.

Sabah Parks. (2022). *Geopark Criteria | Kinabalu UNESCO Global Geoparks*. Aspiring Kinabalu UNESCO Global Geoparks. https://kinabalugeopark.sabahparks.org.my/geopark-criteria

Sabah Park. (2023). Aspiring Kinabalu UNESCO global Geopark. Home | Aspiring Kinabalu UNESCO Global Geoparks. https://kinabalugeopark.sabahparks.org.my/aspiring-kinabalu

Seghezzo, L. (2009). The five dimensions of sustainability, *Environmental Politics*, Volume 18 (4), page 539-556. DOI: 10.1080/09644010903063669

Tay, K. X., and Chan, J.K.L. (2014). Tour operator perspectives on Responsible Tourism Indicators of Kinabalu National Park, Sabah, *Procedia, Social and Behavioural Science*, Volume 144, page 25-34.

UNWTO. (2004). Indicators of Sustainable Development for Tourism Destinations: A Guidebook. Madrid, Spain: World Tourism Organization.

UNESCO. (2010). Guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network (GGN).

Weaver, D. (2006*). Sustainable tourism: Theory and practice.* Oxford: Elsevier Butterworth-Heinemann

World Commission on Environment and Development. (1987). *Our common future* (Oxford paperbacks). Oxford: Oxford University Press.

Zouros (2010). Geodiversity And Sustainable Development: Geoparks - A New Challenge for Research and Education in Earth Sciences. *Bulletin Of the Geological Society of Greece*, 43, 159-168.

UNESCO (2006). Guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network, Paris, January 2006. Internal document, 10 p.