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The quintuple helix innovation model: a pathway to sustainable development in marginalized rural communities

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Abstract

This research is based on the empirical fact that there is an increase in the status of villages from the majority of Underdeveloped and Very Underdeveloped Villages in 2022 to Developed Villages in 2023. This research focuses on discussing the development of very underdeveloped villages in Kampar Regency in the perspective of the quintuple helix, with the characteristics of wetland areas and conservation areas that have their own challenges in village development. This research is included in the qualitative approach with the type of phenomenology. The results of this study are based on the quintuple helix model which shows the cooperation of 5 (five) important actors, namely the state (government), private sector, academics, media, and the community as well as support from the natural environment in the village. Quintuple Helix, in this study, visualizes collective interaction and knowledge exchange through five subsystems (helix): (1) the education system, (2) the economic system, (3) the natural environment, (4) the media and culture-based society (as well as civil society), (5) and the political system. It can be concluded that the quintuple helix framework in this study has involved many of the previously mentioned actors but has not provided a significant impact on village development, especially villages that were previously very underdeveloped in Kampar Kiri Hulu District, Kampar Regency.

Keywords: quintuple helix, underdeveloped village, wetland area, village development

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Introduction

Underdeveloped villages face multifaceted development challenges that are deeply rooted in socio-economic, infrastructural, and environmental factors. A significant portion of the global rural population, particularly in developing countries, remains impoverished, with rural areas often experiencing higher poverty rates than urban centers (Doloi et al., 2019). The lack of infrastructure, such as poor road networks, severely hampers agricultural productivity and access to markets, as seen in Nigeria's Ondo State, where inadequate roads lead to high transportation costs and post-harvest losses (Olorunfemi, 2020). Additionally, rural areas suffer from depopulation and aging populations, exacerbated by migration to urban areas, which further limits access to essential services (Pérez-delHoyo & Mora, 2019). The spatial distribution of poverty is uneven, with village-level factors such as access to safe drinking water and road connectivity playing crucial roles in poverty levels (Wang et al., 2019). Efforts to address these issues include the implementation of smart village models, which leverage Information and Communication Technologies (ICT)

to enhance resilience and sustainable development (Pérez-delHoyo & Mora, 2019). Programs like the IEEE Smart Village initiative demonstrate the potential of empowering local entrepreneurs to expand access to energy and education, fostering sustainable community development (Mackenzie, 2019). Moreover, the Indonesian Village Fund Program aligns local development activities with Sustainable Development Goals (SDGs), offering a model for other developing countries to localize global targets (Permatasari et al., 2021). However, challenges persist, such as economic disparities among social groups in rural India, where Underdeveloped groups remain the poorest despite benefiting from economic growth and redistribution efforts (Stringer, 2017). Improving infrastructure, encouraging local involvement, and putting in place focused development initiatives that take into account the particular requirements and potentials of rural areas are all necessary components of a holistic strategy to address these issues (Doloi et al., 2019). The research fills a gap in rural development that emphasizes the quintuple helix approach as a solution for severely Underdeveloped villages. There is a lack of research that elaborates on aspects of cross-sector collaboration in underdeveloped villages and explains the limitations of each actor.

This research is motivated by empirical phenomena that show an increase in village status based on the Village Development Index (IDM) in Kampar Regency, Riau Province. The classification of village status consists of independent, developed, developing, underdeveloped and very underdeveloped villages. Kampar Regency was recorded in 2021- 2022 as previously being Kampar Regency is the largest regency that still has very underdeveloped villages in Riau Province. The number of very underdeveloped villages in Riau Province in 2022 amounted to 24 villages, consisting of 23 villages in Kampar Regency and 1 village in Meranti Islands. However, in 2023, the status of Very Underdeveloped Villages was successfully upgraded to Developed Villages. A very significant leap beyond two levels at once from village status. This success led Kampar Regency to receive a Charter of appreciation and pinning of the Village pin from the Ministry of Village Development of Underdeveloped Regions and Transmigration of the Republic of Indonesia for its dedication to the establishment of a developing, Independent and Developed Village in 2023. Table 1 presents the village development index in Kampar Regency, Riau Province, 2021-2023:

Table 1. Village Development Index of Kampar Regency 2021-2023

Village Status	Year 2021		Year 2022		Year 2023	
	Total Village	%	Total Village	%	Total Village	%
Independent	6	2,48%	14	5,79%	88	39,36%
Developed	58	23,97%	84	34,71%	94	38,84%
Developing	136	56,20%	109	45,04%	60	24,79%
Underdeveloped	19	7,85%	12	4,96%	0	0
Very Underdeveloped	23	9,50%	23	9,50%	0	0

Source: Kampar Regency Community and Village Empowerment Office, 2023

Based on the data Table 1, it can be explained that there was an increase in the status of villages in Kampar Regency from 2021-2023. The results of the evaluation of the Kampar Regency's village development index in 2022 show that 12 underdeveloped villages and 23 very underdeveloped villages have successfully improved their status within one year. Atotal of 23 very underdeveloped villages are only located in 1 District, namely District Kampar Kiri Hulu. The success in realizing "Zero" Underdeveloped Villages and Severely Underdeveloped Villages is not only an achievement for Kampar Regency, but also the success of Riau Province. Riau Province has succeeded in completing Very Underdeveloped Villages and Underdeveloped Villages and succeeded in raising the average value of the Provincial IDM from previously developing to advance in 2023. Riau Province succeeded in raising the status of villages to become developed and independent villages with the number of independent villages reaching 590 villages and developed villages totaling 570 villages. Riau Province Village Development Index 2021-2023 as in table 2.

Table 2. Riau Province Village Development Index 2021-2023

Year	Average Provincial IDM Score	Province IDM Status 2023
2021	0.6746	Developing
2022	0.7012	Developed
2023	0.7707	Developed

Source: Kampar Regency Community and Village Empowerment Office, 2023

This is important to study because the status of very underdeveloped villages in Kampar Regency has increased quite rapidly in one year. According to the results of the Study of the Potential Development of Underdeveloped Villages in 2023, several problems exist in Kampar Regency, including: (1) The challenges of geography and restricted access to villages, which are mostly riverside. (2) The facilities and infrastructure to support the economy are still restricted due to access to the villages. (3) Local resource potential management is still not utilized optimally, (4) Human resource quality is still quite low as seen from the quantity and distance of educational facilities between villages and Districts. (5) There is still weak coordination between development actors in underdeveloped regions, particularly in villages located in conservation areas and away from government centers. (6) The investment area's access to growth center’s is still limited and lacking.

The research question is how is the quintuple helix approach in rural development and what is the impact of rural development in Kampar Regency after the improvement of village status to developing? The challenges in the conservation area village development are the restricted options in undertaking development in conformity with the needs and conditions of the existing villages in which the access and importance of the village community that have existed before the area was designated as a Forest Reserve could not be rapidly accommodated, correlating with the fact that there was no change in the Status of 9 Very Underdeveloped Villages in 2022. In 2023, however, these problems will have been intervened to resolve, correlating with an increase in the status of Very Underdeveloped Villages to Developed Villages (Marta et al., 2024).

The Quintuple helic framework emphasizes the existence of Stakeholder Integration. The Quintuple Helix Framework brings together academia, industry, government, civil society, and the natural environment, creating a collaborative ecosystem that enhances innovation and sustainability efforts (Donati et al., 2023; Shkarupeta & Babkin, 2024). This integration is crucial for addressing complex societal and environmental challenges, as it allows for a comprehensive approach to problem-solving and decision-making (Barcellos-Paula et al., 2021; Romanelli, 2023). In addition, in the context of Promotion of Eco-Innovation, the framework supports eco-innovation by facilitating the rapid exchange of knowledge and resources, which is essential for overcoming challenges such as high R&D costs and the integration of sustainable technologies (Ring & Busch, 2023; Shkarupeta & Babkin, 2024). It encourages the development and adoption of sustainable agronomic practices, as seen in rural local systems, thereby triggering sustainability transitions (Donati et al., 2023). To improve Rural Development, the quintuple helix approach is very strategic to support improvements in various sectors. In rural areas, the Quintuple Helix Framework fosters sustainable development by promoting knowledge transfer and collaboration among various stakeholders, leading to increased economic activities and community independence (Abdillah et al., 2022; Bikse & Rivza, 2017; Abdillah et al., 2022). The framework's application in regions like East Luwu Regency, Indonesia, demonstrates its potential to enhance rural innovation and disaster preparedness through multi-stakeholder interaction (Abdillah et al., 2022). Addressing Socio-Ecological Challenges emphasizes the quintuple helix approach. By incorporating the natural environment as a key component, the framework aligns with sustainable development goals and social ecology, promoting eco-entrepreneurship and green growth (Carayannis & Campbell, 2010; Febrina et al., 2024; Quacoe et al., 2023). It provides a structured approach to managing socio-ecological transitions, ensuring that rural communities can adapt to and mitigate the impacts of climate change (Abdillah et al., 2022). The gap from previous research is seen from the lack of studies related to rural development in villages that are very underdeveloped and in conservation areas. This is the basis for conducting research that elaborates on Rural Development in Very Underdeveloped Villages from the perspective of Quintuple Helis.

Research Methods

The research utilizes a qualitative method. Creswell stated that qualitative research is an approach to exploratory or comprehension of the significance given by individuals or groups to a particular social or human matter (Moleong, 2007). Qualitative exploratory methods encompass a variety of approaches aimed at understanding complex phenomena through the collection and analysis of non-numeric data. These methods include participant observation, in-depth interviews, focus groups, and case studies, each offering unique insights into the subjects' perspectives and experiences (Sánchez Bracho et al., 2021; Williams & Cutler, 2020). Data processing in qualitative research is an interactive and recursive process, often involving the transcription of interviews and field notes, followed by pattern and thematic analysis to identify themes within the data (Douglas, 2022; Rodriguez, 2022).

The source of primary data was derived from interviews with informants obtained from the representations of actors from the quintuple helix, i.e. the government, the private sector, the academia, the media, and societies as well as the support from the natural environment in the rural areas. The collection of data in this research was carried out by in-depth interviews, documents, recordings of archives, interviews, and from the media online or electronic. The interview informants were selected by purposive method. Analysis of data in this research uses an interactive model (Miles & Huberman, 2014). The Interactive model in analyzing data begins with the process of collecting data, condensing data, presenting data, and describing/verify data to draw conclusion.

Results and Discussion

Pentahelix or quintuple helix model is an extension of the triple helix model of innovations which refers to a range of interactions between academia, industry and government, to foster economic and social development (Etzkowitz & Leydesdorff, 2000). Furthermore, triple helix model was changed into quadruple helix model as originally proposed by Carayannis & Campbell by including media actors in the process of collaboration (Carayannis & Campbell, 2009, 2010). The quadruple helix brings one more actor group to the model of collaboration (Malva et al., 2018). This emerged because the Triple Helix is insufficient condition for the long-term innovative growth and civil society should play an active role in the creation of knowledge and continuous growth (Malik et al., 2021).

Finally, the concept development gave emerged the Penta helix or quintuple helix model by Carayannis & Campbell that is a collaborative of 5 (five) essential actors, i.e. the government, business, academia, mass media, and the society (Carayannis & Campbell, 2010). Therefore, the Quintuple Helix conceptualises the mutual interaction and knowledge exchange within a country-state through five subsystems (i.e. helix): (1) education system, (2) economic system, (3) the environment, (4) the cultural and media-based society ('civil society'), (5) and political system. Within the context of the present study, the Quituple Helix Model in Underdeveloped Village Development will be primarily analysed.

An underdeveloped village development strategy is an effort to minimize the level of disparity by adjusting the conditions and needs in the region. The development and development strategy in question is to develop the economic potential of rural communities, explore the potential of natural resources, and build good institutions to organize the system in the village (Nasution & Hasibuan, 2023). The development of underdeveloped villages is accomplished through a variety of economic empowerment initiatives, the establishment of specific goals or target audiences, and the use of organizational elements. Underdeveloped villages might successfully develop due to environmental considerations (Febrina et al., 2024; Marta, 2021; Marta et al., 2024).

Kampar Regency with Bangkinang as its capital is the third largest regency in Riau Province after Pelalawan Regency and Indragiri Hilir Regency. Kampar Kiri Hulu sub- district is one of the Districts in Kampar Regency where several villages are in the Bukit Rimbang Bukit Baling wildlife reserve area, besides that in 2022 23 villages out of 24 villages were determined to be Very Underdeveloped Villages. The following in Figure 1 is the Population Density Map in the Kampar Kiri Hulu District.

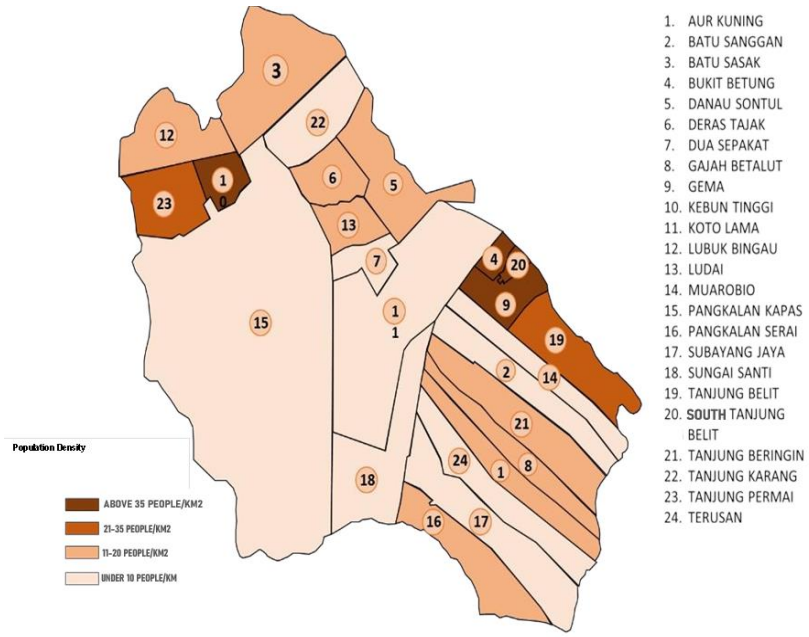

Figure 1. Map of Population Density in Kampar Kiri Hulu District, Kampar Regency
Source: Expose Report of Kampar Regency, 2023

Paragraph 3 of Article 1 of Minister of Villages, Development of Underdeveloped Regions and Transmigration Number 2 of 2016 concerning Village Development Index states that the Village Development Index is a composite index that comprises the social resilience index, environmental resilience index, and economic resilience index. The general picture of villages in Kampar Kiri Hulu District which previously in 2022 had the status of a very underdeveloped village has limitations from infrastructure, education facilities, facilities, health, electricity, telecommunications, community economy and transportation. Some of the infrastructure that connects between villages is in a very damaged condition. Most villages can only be reached by water transportation such as sampans and speed boats. Access to the villages from the District capital and district capital is quite far.

In looking at the quintuple helix model in Village Development in Kampar Kiri Hulu District, it can be seen from several indicators put forward by Carayannis where there are five subsystems (i.e., helix): (1) education system, (2) economic system, (3) natural environment, (4) media-based and culture-based society (also civil society), (5) and the political system. The discussion of each subsystem is as follows.

Education System

Qualified human resources determine a region's development success. One strategy to raise the caliber of these human resources is through education. Education is a very important thing for the nation's children. Education indicators can be seen from school participation measured through three indicators, namely the School Participation Rate (APS), Gross Participation Rate (APK), and Pure Participation Rate (APM). In 2023 the APM of Kampar Regency based on education level is as follows: SD/MI/equivalent 99.05, SMP/MTs/equivalent 85.50, SMA/SMK/MA/equivalent 64.35. Meanwhile, the APK of Kampar Regency is SD/MI/equivalent 106.65, SMP/MTs/equivalent 94.92, SMA/SMK/MA/equivalent 81.01. The results of the APK and APM of Kampar Regency have increased in 2023 compared to 2022, but from the education level it has decreased, especially the junior and senior high school education levels, this is also related to learning

motivation, availability of educators, ease of access and support from the environment around the community. In general, educational facilities in Kampar Kiri Hulu District are available where the distribution of locations can be seen in the following table 3:

Table 3. Number of Schools and Location Distribution in Kampar Kiri Hulu District in 2022/2023

No.	SchoolLevel	Schools	Teachers	Students	Location Overview
1.	Kindergarten	9	28	213	Several Villages in Kampar Kiri Hulu District
2.	Elementary	28	223	1255	Spread across all villages in Kampar Kiri Hulu District
3.	Junior High School	8	77	300	Spread in Aur Kuning Village, Batu Sanggan Village, Gema Village, Koto Lama Village, Ludai Village, Kebun Tinggi Village, Batu Sasak Village and Subayang Jaya Village
4.	MTS	2	19	138	Only in Gema Village and Tanjung Karang Village
5.	Senior High School	1	19	268	Only located in Gema Village

Source: Kampar Kiri Hulu District in 2022/2023 Figures (BPS Kampar, 2023)

Based on the data above, it is illustrated that all levels of schools exist in Kampar Kiri Hulu district but still have limitations in terms of the number of schools, especially junior and senior high schools and access to schools. Road and bridge access to schools is very difficult because most of the villages in Kampar Kiri Hulu District are located on the banks of the Subayang river and some villages are also located in the Bukit Rimbang Bukit Baling Wildlife Reserve area. These access constraints ultimately affect community motivation and participation in education. Therefore, most children in Kampar Kiri Hulu district only reach junior highschool.

In addition to access, studying the education system cannot be separated from the welfare of educators/teachers in remote/very Underdeveloped areas. The allowance, which is a form of appreciation for teachers in remote or special areas, is regulated under Government Regulation No. 41/2009. The allowance motivates teacher attendance. The intensity ofteacher attendance in the classroom has an influence on improving the quality of students, especially in remote/underserved areas. After the increase in village status, a new problem arose, namely related to the welfare of educators/teachers in the Kampar Kiri Hulu sub- district where teachers no longer received the special allowance. Demonstrations were also carried out by teachers in Kampar Kiri Hulu District after the determination of the village status. Teachers demanded the Kampar Regency Government due to the access challenges that must be faced and not in accordance with the amount of salary and/or allowances received.

Economic System

Six factors—the economy, human resources, facilities and infrastructure, financial capability, accessibility, and regional characteristics—can be used to identify areas in Indonesia that are classified as extremely underdeveloped (Usman et al., 2023). The availability of village markets, post offices, and logistics services, public banking institutions, and BPRs, the availability of credit for villagers, the availability of modes (public

transportation, regular routes, and operating hours), the availability of roads that are accessible by four-wheeled motorized vehicles or more, and the quality of village roads are all indicators of the economic dimension measured by IDM. In general, community economic facilities in Kampar Kiri Hulu district are available and can be accessed between villages. In addition, the economic center in the district is in Gema Village. To access these economic facilities, the mode of transportation does not only rely on two wheels but also through river transportation, namely sampan or speed boat.

The economic system still depends on access and weather conditions. Professions or occupations of the community are around 80% trading, fish farmers, palm oil farmers, rubber farmers. Employment options are still very limited due to these access challenges. Communities in the Kampar Kiri Hulu District are very dependent on natural conditions and seasons. During the rainy season, the community's economy is hampered, this is also influenced by the community's dependence on access through the river. In addition, when the water discharge is high, it makes it difficult to catch fish. In addition, in terms of profession, people in very underdeveloped villages still have difficulties in fulfilling their needs due to limited access and the availability of electricity. The availability of electricity in several villages in Kampar Kiri Hulu District is only available for 2-4 hours a day with a power of 300 Watts for each house which comes from hydropower and solar power plants. Some villages are in blank spot locations or do not get telecommunications networks.

The government's effort to improve access and economy, especially in conservation areas in Kampar Kiri Hulu District, is the construction of an interpretation road. The construction of the interpretation road involves the collaboration of several OPDs such as the PUPR Office, BAPPEDA and others along with the Riau Province Natural Resources Conservation Center. Previously, a cooperation MoU was also carried out between BBKSDA Riau and the Kampar Regency Government Number: NK. 372/K.6/BTU/KUM.3/03/2019 and 414.4/BUP KPR/2019/07 Dated March 13, 2019, In an attempt to reduce poverty in the communities within the 16,400-hectare Bukit Rimbang Bukit Baling Wildlife Reserve area, which spans nine villages, limited nature tourism is being developed as a result of the construction of interpretation roads and the development of indigenous peoples' roles.

In the capital sector, there are interventions carried out both in the form of People's Business Credit (KUR), the provision of productive economic business assistance to the community carried out by multiple parties, assistance and training in managing village potential both environmentally sound in conservation areas and their surroundings, such as the development of environmentally friendly energy and ecotourism development, especially those carried out by NGOs, as well as increasing banking networks through BRI-Link. But again, the pattern of economic system development has not been optimized due to limited access, lack of supporting infrastructure and information technology that is not yet available in the village.

Natural Environment

In the Quintuple Helix perspective, the natural environment is considered one of the most important pillars. The integration of the natural environment in this model emphasizes the importance of maintaining ecosystem balance and sustainability in every innovation and development activity including in Underdeveloped Villages (González-Martinez et al., 2021). Kampar Kiri Hulu District has great natural potential. Besides being in

a conservation area, there are also the Subayang and Bio rivers that cut through the hilly forests in the Bukit Barisan Sumatra region. The Subayang and Bio rivers have shallow water. Their depth ranges from 50-150 centimeters. These rivers have many troughs, commonly called holes, with a depth of about 3 meters. The hole holds the potential for freshwater fish that is managed based on local wisdom such as the tradition of "mencokau" (The tradition of taking fish in "Lubuk Larangan" once a year). Daily, fish in the prohibited hole should not be taken, if they are taken, fines and social punishment will be given. Large fish will be auctioned, and the funds go to the village treasury, while small fish will be distributed evenly to residents by paying "andel" (agreement money) IDR 15,000 per resident who wants to eat fish (library.menlhk.go.id). In the dry season, the water flow of the Subayang river decreases, making it difficult for boats to pass through some locations. The combination of rocky river water, clear water, and natural forest on the edge of the hill cliff wall is a special attraction and could become a prima donna of natural attractions and ecosystems that are still natural.

Despite this natural potential, some villages in the Kampar Kiri Hulu district have access challenges that affect village development. The most underdeveloped villages are Aur Kuning Village, Dua Sepakat Village, Pangkalan Serai Village and Permai Village. To get to these villages from the district center, the distance that must be traveled is estimated to be up to 8 hours. In addition, the difficult access between villages can only be passed by special motorbikes / dirt bikes and can only be passed by people who are accustomed to the path. In addition, for daily activities, the community uses river routes, both for schooling, fulfillment of daily life, work, and others that rely on boats or other names called *johnson* and robin. In addition to natural potential, there are also threats to environmental damage that occur in the Kampar Kiri Hulu District such as deforestation (Forest Encroachment) due to illegal clearing of oil palm plantations, threats to ecological damage, and threats to illegal capture of protected animals and sanctuary crises, especially in the Rimbang Baling Conservation Area. This occurs due to the lack of supervision in areas that are difficult to access and the lack of public awareness in the management and protection of the environment in Kampar Kiri Hulu District.

Media-Based and Culture-Based Society (As well as Civil Society)

Overall, culture-based communities in the Quintuple Helix perspective serve not only as beneficiaries of innovation, but also as active contributors who enrich the innovation process with local knowledge, values and practices. This integration can ensure that the results of innovation are more relevant, sustainable, and in accordance with the existing social and cultural context (Carayannis & Campbell, 2019). In the Quintuple Helix model, mass media also plays an important role in shaping and influencing the innovation process and sustainable development (Prasetyanti & Kusuma, 2020). Kampar Regency is one of the regencies in Riau Province that has a very large customary forest spread across several Districts. In addition, Kampar Regency has the potential to be used as a location for custom-based natural resource management, where there is an indicative potential of 203,000 ha of customary forests spread across various regions (Marta et al., 2020). The lack of optimal data collection related to customary land and the existence of indigenous peoples is still a problem so that not all policies related to the recognition of indigenous peoples and customary land have been accommodated.

Customary law communities live simply, which is one of the characteristics of

customary law itself. A very progressive response related to the recognition of the existence of indigenous peoples and customary land in Kampar Regency by the Kampar Regent with theissuance of a decision in the form of Regent Decree No. 660LH-IV.2/32 of 2018 concerning the Establishment of a Registration Team for the Determination of Customary Law Communities, Customary Territories and Customary Forests in Kampar Regency. Kampar Regent Decree No. 664/DPMD/IX/2023 on the Establishment of the MHA Committee subsequently superseded the decree. The registration team's makeup, which includes government representatives, NGOs (WRI, Bahtera Alam, Yayasan Pelopor Sehati, and AMAN Kampar), the media, indigenous peoples, academia, and the commercial sector, demonstrates collaboration that highlights the engagement of numerous elements. In 2019, the Kampar Regent's decree on the recognition of indigenous peoples and customary land rights of several Kenegerians in Kampar Regency, particularly those in the Kampar Kiri Hulu District, was successfully initiated by the Registration Team for the Determination of Indigenous Peoples (Febrina et al., 2021)(1) Kampar Regent Recognizing Customary Law Communities and Customary Land Rights of Kenegerian Batu Songgan Caliphate Batu Songgan Village Batu Songgan District Kampar Kiri Hulu Kampar Regency, Decree No. 660-490/X/2018. (2) The Kenegerian Gajah Bertalut Caliphate of Batu Songgan, Gajah Bertalut Village, Kampar Kiri Hulu District, Kampar Regency, has recognized customary law communities and customary land rights by the Kampar Regent's Decree No. 660-489/X/2018. (3) The Kenegerian Aur Kuning Caliphate of Batu Songgan, Aur Kuning Village, Kampar Kiri Hulu District, Kampar Regency, has recognized customary law communities and customary land rights under the Kampar Regent's Decree No. 660-326/IV/2019. The recognition of customary law communities and customary land rights in Kenegerian Terusan Caliphate Batu Songgan Terusan Village, Kampar Kiri Hulu District, Kampar Regency, is governed by Kampar Regent Decree No. 660-327/IV/2019.

Recognition and protection of the indigenous people of kenegerian aims to: (1) Provide protection and legal certainty for the existence of indigenous peoples, customary territories and customary forests in Kenegerians in Kampar Regency. (2) Strengthening and protecting the rights of Kenegerian Indigenous Peoples to access land, water and natural resources within their customary territories. (3) Realizing sustainable management of customary territories based on customary law. (4) Improving the welfare of the Kenegerian Indigenous People. (5) Realizing regional development policies that recognize, respect, protect and fulfill the rights of Kenegerian Indigenous Peoples. (6) Protecting the value system that determines the social, economic, political, cultural and customary law institutions of Kenegerian. (7) Realizing dispute handling that is based on recognition andrespect for the rights of Indigenous Peoples institutions of Kenegerian Customary Law and its customary laws (Febrina et al., 2021).

Recognition of other customary territories still encounters obstacles including legality that has not been owned by the village related to MHA, *Ulayat Rights* and Customary Forests in several areas, not optimal mapping and data collection of the area, unclear boundaries of customary territories, and overlapping village maps, especially in conservation areas where there are differences in views between MHA and BBKSDA. In addition to problems related to recognition, there have also been changes in land use in the upstream watershed conservation areas that have turned into oil palms, and Lubuk

Larangan has begun to be damaged due to illegal mining. So, the need for cross-sector collaboration to protect indigenous peoples or culture-based communities.

Specifically related to telecommunications, the Kampar Government took a role in fulfilling the primary need aspect, namely the internet network. The assistance provided was only realized in Gema Village. In other villages, the network is still disconnected due to blank spots that are still in the data collection process. In addition, the government also formed a community information group as a bridge between government and community information. In 2023, 2 community information groups have been launched and will focuson village promotion and documentation, especially in the Kampar Kiri Hulu District.

Political System

The political system in the quintuple helix model serves as a regulator, facilitator and enabler of various innovation and sustainable development processes. Effective engagement of the political system can help create an enabling environment for collaboration, sustainability and innovation that benefits society at large (Abdillah et al., 2022).

The political system in the quintuple helix dimension in this research focuses on the innovation of sustainable efforts arranged by the Government in the development of underdeveloped villages. In Kampar Kiri Hulu Subdistrict, currently there are 20 km of interpretation roads along with 3 iron bridges and suspension bridges and 824 electricity poles installed. In addition to the interpretation path, there is a plan to build a power grid from Tanjung Belit Village to Pangkalan Serai Village for approximately 30 km with a total of 1,056 poles, but it is still hampered due to the difficulty of material transportation to the location and geographical conditions to get to the village location. Access to the village location is only a river route, making one hole for electricity poles takes two days due to rocky soil conditions. In addition, the construction of the interpretation route was stopped due to the Covid-19 pandemic so that much of the budget was diverted to handling duringthe pandemic (Amin et al., 2022).

By mid-July 2023, Riau Province will no longer have Very Underdeveloped Villages and Underdeveloped Villages based on the village classification conducted by the Ministry of Villages and PDT RI in 2023. Riau Province has succeeded in completing the Highly Underdeveloped Villages and Underdeveloped Villages and succeeded in raising the status of villages to Developed and Independent Villages with the number of Independent Villages reaching 590 villages and Developed Villages totaling 570 villages. Riau Province's Village Development Index (IDM) status as the status of village development has increased from Developing village status in 2022 to Developed village status in 2023. The success achieved during the leadership of Governor Samsuar has significantly improved the ranking from 17 to 6 out of 36 provinces in Indonesia. Kampar Regency, which in 2022 had the highest number of Very Underdeveloped Villages in Riau Province, in 2023 there are only villages with developing status, in addition to the status of developed villages and independent villages. The following are the forms of Government and Regional Government interventionin village development in Kampar Regency. Table 4 overview about development interventions for very underdeveloped villages to developed villages and underdeveloped villages to developed villages in Kampar Regency in 2022-2023

Table 4. Development Interventions for Very Underdeveloped Villages to Developed Villages and Underdeveloped Villages to Developed Villages in Kampar Regency in 2022-2023

No.	Village Development Interventions	Underdeveloped Villages to Developing Village	Underdeveloped Villages to Developed Villages	Very Underdeveloped Villages to Developing Village
1	Availability of Disaster Early Warning Systems for Natural Disaster Mitigation in the Village	2	9	22
2	Provision of Safety Equipment as a Natural Disaster Mitigation Facility in the Village	3	8	23
3	The village's provision of evacuation facilities as a means of mitigating natural disasters Handling routes and averting forest fire disasters	3	9	23
4	Handling/preventing forest fire disasters	2	1	1
5	Availability of the Village Library and Community Reading Gardens	3	4	19
6	Access to Public Spaces for All Citizens Without Charge	3	5	13
7	Activate Sikamling Residents	1	5	15
8	Additional credit facilities in thevillage (KUR/KUK/KKPE/UnitSP, BUMDesa)	1	3	3
9	Provision of Community Learning Center for Study Groupof Packages A, B and C in the Village	0	0	0
10	Provision of Course Center or Specialized Skill Training Centers in Villages	3	4	11
11	Assignment of at least 1 person Doctor to the Village	3	2	10
12	Assignment of at least 1 health worker other than a doctor and Midwife in the Village	2	1	4
13	Construction of Markets withSemi-Permanent Buildings	1	1	2
14	Increase in Micro/SME IndustrySize to >=0.4% number of households in the village	0	0	0
15	Development of Logistics Servicesand Post Office	0	0	0
16	Bank Development Facility Public/Private	0	0	5
17	Recognition of Savings BusinessUnit BUMDesa Borrowing as BPR	0	0	2

Source: Processed Data, Expose Head of the PMD Office of Kampar Regency, 2024

The increase in status is also supported by an increase in the 3 indicators that determine the status of the village in the IDM application of the Ministry of Villages, PDTT, namely the Economic Resilience indicator, the Social Resilience indicator and the Environmental Resilience indicator, all of which are getting better in Kampar Regency, especially in the Kampar Kiri Hulu District (https://www.teraskampar.id/2024/05/pemkab-tak-lagi-kategorikan-desa-di.html). In addition, there are improvements in filling in IDMdata that were previously not filled in by the Village Government, then completed so that theaccumulative value of each village has increased in value, and in the end the item determines the status of a village to become a developing village. The increase intervention was carried out in a marathon manner by the Provincial and District Governments so that in a short period of time the achievement of increasing the status of the village from a very underdeveloped village jumped sharply to a developing village without going through the level of underdeveloped villages first. Of course, this is an assessment that has caught the attention of many parties. Criticism has sprung up in various media, because of the increase, it has an impact on the community where the real condition of the community has not shown any significant improvement from the previous year. In addition, the increase can affect the implementation of several national priority programs aimed at alleviating extreme poverty in Very Underdeveloped Villages, which are no longer felt by the community in the Kampar Kiri Hulu District. The government believes that the various forms of intervention and government work programs carried out in these villages every year certainly correlate to an increase in community welfare which correlates to an increase in the IDM value.

The Quintuple Helix model, which includes the academic sector, private/industry, government, civil society, and the natural environment, can be effectively adapted for villagedevelopment. The application of this model in the context of village development involves the integration of all these sectors to create innovative and sustainable solutions that suit the needs and characteristics of the village. The innovation is contained in the role and authority of each element in advancing previously underdeveloped villages and stabilizing them into developed and developed villages. The roles can be mapped in the following table 5.

Table 5. The Role of Stakeholders in the Development Process of Underdeveloped Villages and Very Underdeveloped Villages in Kampar Regency

Actor	Actor Roles	Limitation Actor/Aspect
Government	– The government accelerates the development of Underdeveloped and extremely underdeveloped villages outside of conservation areas and creates laws and regulations concerning village development and village community empowerment in nature reserve regions. – In the Wildlife Reserve Area and other nearby villages, the government makes infrastructure accessible and supplies sufficient facilities and services to promote the establishment of an environmentally sound village economy and the satisfaction of the needs of the village community.	Budget Limitations, Complex Bureaucracy, Lack of Inter-Agency Coordination, Limited Human Resources in Village Government

	– Establish government collaborations with the commercial sector, academia, media, and civil society to evaluate, empower, and improve village communities both inside and outside of conservation areas. – Make the best use of available resources and actively contributing to institutional development in order to boost capacity and capability in the creation of laws or policies.	
Academics	– Conducting work programs within the Tri Dharma of Higher Education and allocating human resources to underdeveloped Villages and VeryUnderdeveloped – Villages. Academics in the process of developing underdeveloped villages and very underdeveloped villages play a role by conducting scientific studies and various research and community service related to developing the potential and reducing the vulnerability of villages in the area and outside the conservation area The results of scientific studies and community service conducted by academics can be used to support the success of the development of underdeveloped villages and very underdeveloped villages. development by collaborating and communicating with academics in the agritourism development process.	Limited Access and Research in the Field and limited accurate data for analysis. Academic research often focuses on theoretical approaches that may not match the real conditions on the ground. The results of academic research are not always translated or implemented into practical policies that are relevant for the development of Underdeveloped villages.
Private	- In the process of village development, the private sector, or business world, is crucial to operating a company that values ethics and is sustainable, professional, and responsible. Through activity programs as part of the execution of Corporate Social Responsibility (CSR), the corporate sector assumes a profit-oriented role in ensuring environmental sustainability.	Unpromising Profits, Inadequate infrastructure, as well as the low purchasing power of the community, are often barriers for them to invest. Lack of Incentives from the government, Lack of Understanding of Local Conditions so the projects or investments implemented do not always match the needs of the village community.
Civil Society	- Community members and non-governmental organizations (NGOs) contribute to policy advocacy and development for underprivileged villagers. One of the goals of this NGOs' project movement is to realize equitable village development through partnerships, advocacy frameworks, and participatory assessment.	Limited Resources and Funding, Dependence on Government or Donor Agencies, and Lack of Capacity of Community Organizations to effectively plan and manage development projects.

Mass Media	– Through the use of rapidly accessible networks and publication medium, the media contributes to the dissemination of knowledge and the advancement of inclusive village potential. By providing accurate and unbiased information based on statistics, the media aims to be in line with the local community.	The mainstream media often pays less attention to the issues of underdeveloped village development, the media also often highlights the problems or obstacles that exist without highlighting the positive potential or successes that occur in underdeveloped villages, and limited access to accurate and reliable information related to underdeveloped villages, especially in hard-to-reach areas
Natural Environment	– Environmental aspects can be integrated in the form of making decisions and producing innovations that always consider the ecology in the village. – Develop policies/regulations that are oriented towards the protection and sustainable management of the environment in the Village. – Community participation in villages included in conservation areas and around them can encourage environmental conservation, strengthen awareness and education on environmental issues. – Environmental management is also integrated into local knowledge and wisdom so that it is easy to integrate into sustainable practices and maintain local culture. – Adapting to climate change and developing environmentally friendly technologies that correlate with community resilience.	Limited Community Knowledge and Skills, Limited Infrastructure and Access to Technology, Environmental Degradation and Ecosystem Damage, and Dependence on Vulnerable Natural Resources.

Source: (Marta et al., 2024) and Research Data, 2024

In the process of developing underdeveloped and highly Underdeveloped villages in Kampar Regency, each stakeholder has a significant and complementary role in achieving inclusive and sustainable development goals. The government is responsible for formulating policies, strengthening institutions, and providing infrastructure and facilities that support environment-based village economic development, both inside and outside conservation areas. The government also plays a role in establishing partnerships with various parties. Academics contribute through scientific research, community service, and empowerment of village potential based on scientific studies. Collaboration between academics and other stakeholders supports the development of competitive and resilient villages. The private sector plays a role by integrating corporate social responsibility (CSR) into sustainable and environmentally friendly business activities. Civil society, including communities and non-governmental organizations, supports through policy advocacy and participatory approaches to realize equitable and inclusive village development. Mass media acts as a provider of information and promoters of village potential, focusing on

presenting accurate fact-based data to support village communities. The natural environment is a key element in decision-making and innovation that considers ecological sustainability. Environmental management based on local wisdom supports sustainable practices and strengthens local culture. Through the synergy between these actors, the development of underdeveloped and highly Underdeveloped villages can run more effectively, while maintaining a balance between social, economic, and environmental needs.

Conclusions

The number of very underdeveloped villages in Riau Province in 2022 amounted to24 villages consisting of 23 villages in Kampar Regency and 1 village in Meranti Islands. However, in 2023, the status of very underdeveloped villages was upgraded to developing villages. A very significant leap beyond one level of very underdeveloped village status becomes underdeveloped villages. From the aspect of the education system, it is found thatthe change in status has an impact on the welfare of educators who no longer receive special allowances for Underdeveloped or isolated areas. In addition, the condition of educational facilities is still faced with difficulties in access and availability of educational facilities, especially at the high school level, which only exists in one village in Kampar Kiri Hulu District. In terms of the economic system, the change in status has not affected thechoice of work or the economic level of the community considering that the community's livelihood still relies on the natural sector and access through river transportation in marketing production to meet daily needs. In addition, telecommunications constraints are also still felt due to the unavailability of internet networks and even blank spots in several villages that are difficult to access.

In terms of the natural environment, the villages in the Kampar Kiri Hulu sub-district have great potential, which is still natural and managed based on local wisdom and inconservation areas. However, it cannot be denied that the threats of deforestation, illegal mining, illegal trade in protected animals and other ecological threats are still found in villages that have developed status. Aspects of culture and civil society can be seen with the recognition of indigenous peoples, customary rights and *Ulayah* land in several *Kenegerian* in the Kampar Kiri Hulu District, but this recognition has not been able to encourage better management of customary territories. In terms of the political system, the increase in the status of the village to developing led the district government and provincial government to receive a Charter of appreciation and pinning of the Village pin from the Ministry of Village Development of Underdeveloped Regions and Transmigration of the Republic of Indonesia for their commitment in building a developing, Independent and Developed Village in 2023. This achievement is considered very politically charged considering the condition of the community that has not experienced significant changes, and the unsuccessful intervention carried out by multi-stakeholders to advance the villages that were very underdeveloped before. It can be concluded that the quintuple helix framework in this research has involved many of the actors mentioned earlier but has not yet had a significant impact on village development, especially villages that were very underdeveloped in Kampar Kiri Hulu District, Kampar Regency.

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