A sustainable community empowerment model of Giam Siak Kecil - Bukit Batu Biosphere Reserve Area, Riau Province

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Abstract. Sustainable development is at the core of the conceptual approach of biosphere reserves, so the objectives of biodiversity conservation must be in line with economic development, cultural enrichment, and the involvement of local communities. This concept makes biosphere reserves as a place of learning for development in harmony with biodiversity conservation [1]. The concept of biosphere reserves is to find the best way to truly engage the local population in making decisions and implement them in actions. The meaning of this concept is to integrate the community in environmental conservation through community participation and the role of local institutions in biosphere reserve management [2]. Giam Siak Kecil - Bukit Batu (GSKBB) Biosphere Reserve is one of the biosphere reserves in Indonesia, a natural resource in Riau Province, and has become an international concentration [3]. As an ecosystem of tropical peat swamps, the biosphere reserves play an important role in regulating the ecosystem. Each element of the sub-system in the swamp ecosystem will interact to form life cycle processes, including biogeochemical cycles, food chains, hydrological and water quality dynamics [4]. The biosphere reserve area has an area of 705,270 hectares, set in 2009 as a biosphere reserve resulting from the collaboration between Indonesian Institute of Sciences (LIPI), the Ministry of

1. Introduction
Sustainable development is at the core of the conceptual approach of biosphere reserves, so the objectives of biodiversity conservation must be in line with economic development, cultural enrichment, and the involvement of local communities. This concept makes biosphere reserves as a place of learning for development in harmony with biodiversity conservation [1]. The concept of biosphere reserves is to find the best way to truly engage the local population in making decisions and implement them in actions. The meaning of this concept is to integrate the community in environmental conservation through community participation and the role of local institutions in biosphere reserve management [2]. Giam Siak Kecil - Bukit Batu (GSKBB) Biosphere Reserve is one of the biosphere reserves in Indonesia, a natural resource in Riau Province, and has become an international concentration [3]. As an ecosystem of tropical peat swamps, the biosphere reserves play an important role in regulating the ecosystem. Each element of the sub-system in the swamp ecosystem will interact to form life cycle processes, including biogeochemical cycles, food chains, hydrological and water quality dynamics [4]. The biosphere reserve area has an area of 705,270 hectares, set in 2009 as a biosphere reserve resulting from the collaboration between Indonesian Institute of Sciences (LIPI), the Ministry of
Forestry (BBKSDA, Riau), the Riau Provincial Government and the private sector (Sinarmas Forestry) [5].

Until now, the GSKBB biosphere reserve ecosystem has been utilized for various activities and interests such as forestry, fisheries, agriculture, industry, housing, and tourism. The interests of various parties who utilize this ecosystem often lead to conflict and management with narrow and unsustainable considerations [2]. If the ecosystem management is not carried out wisely, it can cause damage to the ecosystem and the resources contained in it while reducing the welfare of the people who depend on the ecosystem [6].

The communities around the ecosystem area of the GSKBB biosphere reserve have a considerable dependence on the ecosystem, and they can act as destroyers or guardians of the ecosystem. Based on this fact, there is a need to build a model of GSKBB biosphere reserve, which involves communities around the ecosystem, so that people can feel the benefits and will maintain the existence of these ecosystems [7]. Given that until now, the model of community empowerment has not been much explored [5], the purpose of this study is to develop a suitable model for community empowerment institutional management in the GSKBB biosphere reserve area.

2. Research Method

2.1. Design
This research was carried out with a qualitative approach. The researchers are directed by the inductive thinking process to find logical answers to what is being the center of attention in the research, and finally, inductive thinking products become temporary answers to research questions [8].

2.2. Time and location
The study was carried out during the period from September until December 2016. The choice of location was determined purposively, with the consideration of the broadest sub-district, the largest population, and the livelihoods of the main population in agriculture. The selected sub-districts were Bukit Batu in Bengkalis Regency and Sungai Mandau in Siak Regency, with ten villages chosen by cluster sampling. The villages chosen in Bukit Batu Subdistrict were Api-api, Buruk Bakul, Tenggayun, Sepahat, Bukit Batu and Parit 1 Api-api. The villages chosen in the Sungai Mandau sub-district were Muara Bungkal, Lubuk Umbut, Bencah Umbai and Tasik Betung. The map of the research site is presented in Figure 1.

Figure 1. Map of the research site.
2.3. **Data collection technique**

Both primary and secondary data were collected. Primary data was collected through field observations and in-depth interviews using several competent informants to obtain data and information that complements questions in more detail. Primary data collected included forms of existing local institutions and problems in their development strategies, whereas secondary data included community socio-economic data, obtained from relevant agency documents.

The number of respondents in each village was five people that chosen purposively consisting of village officials (one person), existing village institutions (two persons), village empowerment cadres (one person), community leaders (one person). The total respondents were 50 people with details of 30 people from the Bukit Batu District and 20 people from the Sungai Mandau District.

Following the data collection, focus group discussion was conducted to obtain information and input for the researchers regarding local and specific matters [9]. The data collected included the characteristics and socio-economic conditions of the community, local institutions, and institutional assessments in the biosphere reserve area.

2.4. **Data processing and analysis**

This study is descriptive research with qualitative analysis, which is a problem-solving procedure by describing data obtained from library and field observations. The data were then analyzed and interpreted to come up with conclusions [8].

3. **Results and Discussion**

3.1. **Community socio-economic in GSKBB biosphere reserve area**

Communities in the GSKBB biosphere reserve area, especially at the research sites, have good social conditions, indicated by the existence of routine village gathering and religious festivity. On average, their economic resources are from agricultural businesses (rubber, oil palm, rice, fisheries), and a small number of them engaged in livestock and trade businesses (Table 1). The average income of the communities is around IDR 11,575,500/capita/year or IDR 964,620/capita/month, which is more than the average income of villages in Riau Province, which is about IDR 10,465,000/capita/year or IDR 872,083/capita/month.

Communities in the GSKBB biosphere reserve area mostly have an educational background of secondary school level, and they are Mosleem (96.96%), Christian and Protestant (2.92%), Hindu (0.12%). Most of the people came from the Malays, then followed by the Javanese, Batak and Minangkabau tribes. Until now, the life of cooperation is still relatively okay because of the regular festivity of each village.

The most extensive plantation commodity developed by the community is oil palm, followed by rubber. Ownership of resident land is 1-3 ha, but migrants have more than 3 ha. Most of the rubber plants are not superior and old-age varieties, which began to be developed between the 1950-1960s, so they are less productive, and some of them have been converted to oil palm plantations. Most oil palm farmers are migrants who come and settle in the buffer zone and core area. They came from transmigration development areas and oil palm plantations in North Sumatra and several districts in Riau. Most of them are Javanese and Batak.

Meanwhile, the Malay community still chooses rubber plants because the costs incurred for planting are cheaper and do not require intensive maintenance like oil palms. Although less productive, Malay people still retain their old rubber plants because of capital difficulties for replanting and fear of losing their income during the 5-7 year waiting period. This is the economic entanglement of the Malay community, which needs further attention from the government.
Table 1. Village position and socio-economics at GSKBB Biosphere Reserve zoning.

| No. | Sub-district and village | Position in the biosphere reserve zoning | Community socio-economics |
|-----|--------------------------|------------------------------------------|---------------------------|
| 1.  | Bukit Batu sub-district  |                                          |                           |
|     | a. Api-Api Village       | Buffer zone                              | Malays (rubber, oil palm), Javanese (rice, oil palm) |
|     | b. Buruk Bakul Village   | Buffer zone                              | Simple life, food crops, rubber, oil palm, and fishing. Land often burns in the dry season, transportation is good |
|     | c. Tenggayun Village     | Buffer zone                              | Village festivity and heritage, Mina tourism, marine tourism, fisheries production, rubber, oil palm |
|     | d. Sepahat Village       | Buffer zone                              | Malay cultural life, simple, roads in good condition, food crops, oil palm, fishermen |
|     | e. Bukit Batu Village    | Buffer zone                              | Coastal villages, plantation farmers (rubber, oil palm), rice farmers, fishing, livestock (cattle, goats) and other services |
| 2.  | Sungai Mandau Sub-District |                                          |                           |
|     | a. Muara Bungkal Village | Buffer zone                              | The social conditions are quite good, village festivity and heritage, rubber and oil palm plantations, food crops (paddy), fishing in the river |
|     | b. Lubuk Umbut Village   | Buffer zone                              | Good social conditions, village festivity and heritage, rubber and oil palm plantations, trading |
|     | c. Bencah Umbai Village  | Buffer zone                              | The social conditions are quite good, village festivity and heritage, rubber and oil palm plantations, trading |
|     | d. Tasik Betung Village  | Core zone                                | The social conditions are quite good, village festivity and heritage, rubber and oil palm plantations, timber search/wood finder, trading |

3.2. **Institution of community empowerment in the GSKBB Biosphere Reserve Area**

The local institutions in GSKBB biosphere reserve area are Village Consultative Bodies (BPD/K), Community Empowerment Institutions (LPM), Savings and Loans - Village Economic Enterprises (UED-SP), Fire Care Society (MPA), Village Community Empowerment Cadre (KPMD), Community Protection (Linmas), Community and Police Partnership Forum (FKPM). The measurement in an institution determines the social context of the institution and their environment so that institutional arrangements will always shape what actions will be carried out by public officials. Therefore, in studying an institution (institutional assessment), it can be reviewed in four dimensions, namely: first, the condition of the external environment; second, institutional motivation; third, institutional
capacity; fourth, institutional performance [6, 10]. The results of the assessment of local institutions in this study below illustrate the following conditions.

3.2.1. External environmental conditions. The assessment of local institutions in community empowerment based on external environmental conditions in the GSKBB biosphere reserve area is still not good. This means that in carrying out its activities, the local institutions that exist in the GSKBB biosphere reserve area have not been able to function optimally and play a role following the work tasks charged. This is due to the lack of participation from the village community in the local institution's activities, the low level of human resources owned by local institutions in carrying out their duties and functions, and the low support of the private sector for the existence of local institutions.

Therefore, the right strategy is needed for the local institutions to be able to function and play a role according to their respective duties. One strategy that can be done is to provide support for local institutions in each village [11]. Wherewith the presence of assistants, each local institution can communicate and consult about the implementation of their duties and institutional functions [12].

3.2.2. Institutional motivation. The assessment of local institutions in community empowerment based on institutional motivation in the GSKBB biosphere reserve area is still not good. This means that the motivation of existing institutional managers still has not grown to carry out institutional activities independently, because the whole local institution is still waiting for direction and orders from the village government. This condition makes the institution challenging to be independent in its management. Moreover, the vision, mission, and work programs owned by local institutions are not the result of the manager's thoughts but are based on existing normative standards without fostering creativity and innovation in its implementation.

Therefore, it is necessary to stimulate or encourage all local institution managers to have more creativity and innovation in carrying out institutional activities. Besides, the low level of creativity and innovation in managing local institutions is caused by the low competence of the human resources who manage these institutions. As a result, local institutions find it is difficult to grow and develop according to the needs of rural communities [10]. Moreover, the value of local wisdom in institutions failed to be built by the management, so institutional management is only given a letter-based assignment. If the assignment letter has been completed, then the manager's assignment is completed in the institution. This fact shows that the value of local wisdom in managing institutions is not built among its members [12].

3.2.3. Institutional capacity and competency. The assessment of local institutions in community empowerment based on institutional capacity in the GSKBB biosphere reserve area is still not good. This means that existing local institutions cannot develop their strategies and work programs, but they have their budgets and establish relationships with outside parties themselves. This condition is inseparable from the low competence of human resources possessed by each local institutional manager. For the assistance staff to be provided, the institutional management can learn and increase knowledge to manage local institutions by the needs of the village community [13].

The solution to overcome the low competency of institutional human resources can be done in collaboration with outside parties such as universities or NGOs. The ability to collaborate with universities will open the opportunities for these local institutions to become a target institution whose development will always be monitored by the tertiary institution [14].

3.2.4. Institutional performance. The assessment of local institutions in community empowerment based on institutional performance in the GSKBB biosphere reserve area is still not good. The performance can be seen from the level of knowledge and target program of institutions. So far, the achievement of local institutional performance is only spontaneous based on the event of the activities carried out, or the achievement of its performance is only output based on routine activities. This
shows that the capacity of local institutions to produce satisfactory performance has not yet been realized or carried out by local institutions.

This fact explains that existing local institutions are still difficult to take a role in empowering rural communities. This reality is indeed caused by limited human resources who are competent in their fields to manage existing local institutions. Therefore, local institutions in the GSKBB biosphere reserve area need assistants who can direct the institutions to have excellent performance. The role of the existing assistants is to provide better knowledge and clear insight for the local institutional managers, so that they will have more workable targeted programs based on empowering rural communities, either in the economic or social sector [10, 11].

4. Model of Institutional Community Empowerment Management in the Reserve Area

The existence of local institutions in a society's life order is fundamental to regulate relations in carrying out community life so that they will be more organized. With the existence of institutions in the area, it will facilitate the empowerment process for the community [10]. Based on the results of the study and analysis, the model for institutional management of community empowerment in the GSKBB biosphere reserve area was proposed as in Figure 2.

![Figure 2](image-url)

Figure 2. Innovative collaboration model in managing the community empowerment institution at GSKBB Biosphere Reserve Area.

The application of an innovative collaboration model is the solution given to deal with problems in playing the role and function of the village institutions. The management of community empowerment institutions in villages in the GSKBB biosphere reserve area can be carried out if all existing actors can collaborate according to their roles, tasks and functions. Exemplified village institutions in community empowerment in the GSKBB biosphere reserve area are "Ekominawisata Institutions." Embryo from the Ekominawisata Institute is developing all the potential in the village, such as agriculture with rice products, fisheries with local fish products, forestry with honey products, tourism with coastal tourism products, religious/cultural/historical tourism, education tour, and so on. This innovative collaboration model offers the solution given to deal with problems in playing the role and function of the village institutions, as described in the matrix of the innovative collaboration model (Table 2).
### Table 2. The innovative collaboration model matrix in the management of community empowerment institutions at GSKBB Biosphere Reserve Area.

| Stages                        | State (Local Government)                                                                 | Civil Society (Village community)                                                                 | Private Sector (Village Care Community)                                                                 | NGO (Village Care Community)                                                                 |
|-------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| The role of actors            | Regulators are the role played by local governments to prepare policy regulations which needed to develop village institutions in empowering village communities | The implementor is the role played by village communities to operate village institutions in empowering village communities | Promoters are the role played by the local private sector in providing budgets and financing in the management of village institutions and promoting each product | The advisor is a role played by independent institutions concerned about rural communities to guide, direct and assist village institutions so they can produce products needed |
| Task and function of the actor| Institutional motivation is a task and function carried out by regulators to have a strong drive, commitment and consensus in operationalizing institutions so that the village institutions formed can carry out their activities | The performance and institutional values are the tasks and functions carried out by the implementor to produce maximum quality and quantity of work in the institution and have values that can bind the implementor | The institutional budget is the duty and function of the promoter so that each program and strategy prepared by the implementor can be applied to empower the community in the village | Institutional capacity is the task and function carried out by the advisor to prepare HR or implementors of village institutions so that they can operationalize each program and strategy that has been prepared and aid village institutions carrying out their activities |
| Actor's collaboration         | Local governments that have representatives in the village must place their human resources to be directly involved in managing village institutions | Village communities as the subject and object of village institutions must also be involved in managing institutions that are formed to empower village communities | As a form of social responsibility towards the environment, the private sector must involve itself in village institutions that will be formed to support village institutional budgets | Academics and NGOs must take on roles and participate in village institutions to provide additional knowledge and expertise in managing village institutions to empower village communities |
| Actor's creativity and innovation | Ideas and thoughts that are oriented towards joint consensus in village institutional management | Ideas and thoughts and product creation in operationalizing village institutions in the realization of village community empowerment | Ideas and thoughts for promoting products produced by village institutions | Ideas, thoughts and technologies that can be used, utilized and adopted by the implementers of village institutions |
Actor’s productivity

The success of regulators in forming a joint consensus in village institutions

The success of the implementor in empowering rural communities in the economic and social fields

The success of promoters in implementing their social responsibility and maintaining their corporate image

The success of advisors in developing the potential of communities and villages for economic and social empowerment

This overall potential is managed in an innovative collaboration with the roadmap as follows. First, the identification of the complete infrastructure of eco-tourism institutions in each sector. Infrastructure skills such as roads, lodging, markets, restaurants and others. Second, compile and map tourism trips in developing eco-tourism in the GSKBB biosphere reserve area. Third, prepare innovation products that will be promoted and marketed as economic support for rural communities in each sector, for example, forest honey products, local fish products, local rice products, local souvenir products, etc. Fourth, determine and establish a forum for eco-tourism in a strategic location in each village in the GSKBB biosphere reserve area. Fifth, promote the tourism potential of the GSKBB biosphere reserve area, either regionally, nationally, or internationally in print or online media.

5. Conclusion
The socio-economic aspects of the buffer village communities in the GSKBB biosphere reserve area are mostly engaged in the plantation sector, including rubber, oil palm, wetland rice, trade and services. The community empowerment program in the economic sector in the buffer village of the GSKBB biosphere reserve area is a business capital savings and loan program through the UED-SP institution, village fund budget program (ADD), community development program (CD) or corporate social responsibility (CSR). The management of community empowerment institutions in buffer villages, which is judged by external environmental conditions, institutional motivations, institutional capacity, and institutional performance, is still poorly running so that it runs stagnant and is not dynamic in its management. Therefore, it is necessary to construct the new model of community empowerment institutional management in the GSKBB biosphere reserve area, which was named "innovative collaboration model."

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