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Development of community empowerment based on zonation in the Gunung Halimun Salak National Park, Indonesia

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ABSTRACT

Local communities surrounding Gunung Halimun Salak National Park are highly dependent on the national park area. Economic development is crucial to improve the livelihood of the local communities around the park area. Additionally, to ensure that the preservation of the national park will be supported by the surrounding communities, activities within the local communities can also align with the management of the national park. In Indonesia, national parks are managed through a zonation system, in which potential areas that satisfy the biophysical conditions will be considered for development activities that support the local communities. We analyze the biophysical condition of the area, zonation of area, and socio-economic conditions of communities to identify the types of potential community development activities. We conducted a survey of biophysical conditions, as well as interviews and focus group discussions with relevant stakeholders. The results of the study reveal five types of community development activities with the most potential, namely 1) development of tourism; 2) conservation partnership schemes; 3) cooperation on ecosystem restoration; 4) development of forest plant cultivation to provide seeds for economic benefits; 5) utilization of ecosystem services, such as water and hydroelectric power plants.

ABSTRAK

Masyarakat sekitar Taman Nasional Gunung Halimun Salak sangat bergantung pada kawasan taman nasional. Pembangunan ekonomi sangat penting untuk meningkatkan mata pencaharian masyarakat lokal di sekitar kawasan taman. Selain itu, untuk memastikan pelestarian taman nasional didukung oleh masyarakat sekitar, kegiatan masyarakat lokal juga dapat diselaraskan dengan pengelolaan taman nasional. Di Indonesia, taman nasional dikelola melalui sistem zonasi, di mana kawasan potensial yang memenuhi kondisi biofisik akan dipertimbangkan untuk kegiatan pembangunan yang mendukung masyarakat setempat. Kami menganalisis kondisi biofisik kawasan, zonasi kawasan, dan kondisi sosial ekonomi masyarakat untuk mengidentifikasi jenis kegiatan pengembangan masyarakat yang potensial. Kami melakukan survei kondisi biofisik, serta wawancara dan diskusi kelompok terfokus dengan pemangku kepentingan terkait. Hasil penelitian mengungkapkan lima jenis kegiatan pengembangan masyarakat yang paling potensial, yaitu 1) pengembangan pariwisata; 2) skema kemitraan konservasi; 3) kerjasama restorasi ekosistem; 4) pengembangan budidaya tanaman hutan untuk penyediaan benih yang bermanfaat secara ekonomi; 5) pemanfaatan jasa ekosistem, seperti pembangkit listrik tenaga air dan air.

Keywords: *buffer zone, conservation area, conservation partnership scheme, national park management, zonation*

INTRODUCTION

Gunung Halimun Salak National Park (GHSNP), which has a very high biodiversity and is a life support system for the surrounding communities, is a conservation area on the island of Java, Indonesia, (BTNGHS, 2007; JICA, 2007). Survey conducted by BTNGHS (2007) showed that there were 348 villages located in and around the GHSNP area with a population of around 99,000 people. Most of the communities around GHSNP used forest resources, such as firewood, animal feed, water, medicinal plants, bamboo, agricultural land, etc., to meet their daily needs (Widada & Darusman, 2004; Harada, 2005; Wardah, 2009). With an average income of around IDR 1,155,000/month (Adalina et al, 2015), the economic condition of surrounding communities was relatively low-income.

Sahab, Darusman, & Muladno (2015) suggest that threats faced by the GHSNP area, such as encroachment, illegal logging, illegal mining, poaching, etc., result in forest degradation and deforestation. Therefore, local community involvement (i.e., that prioritizes the welfare of the people living in and around forest areas) needs to be carried out in order to achieve sustainable forest management (Sahab, Darusman, & Muladno, 2015; Rochaedi, Priatna, & Rahayu, 2021). Economic development of local communities around this park area is crucial to ensure improvement on their livelihood. Additionally, activities that align with the management of national park can encourage surrounding communities to support the preservation of the national park. Adiprasetyo et al (2009) stated that the socio-economic situation and condition of the surrounding community is an important aspect to be considered in the management of the national park.

Understanding the socio-economic problems of the surrounding community is one of the necessary management considerations for a national park (Kadir et al, 2012). According to Junaedi & Maryani (2013), there is a close relationship between the existence of the forest and the socio-economic conditions of the community around the forest and the biophysical (environmental) conditions.

Community empowerment in GHSNP has been developed since 2006 using the Conservation Village Model (CVM) concept, or "Model Kampung Konservasi" in Bahasa. At the site level, community empowerment schemes are carried out in three villages directly adjacent to the GHSNP forest area, namely Cikiray, Mekarnangka, and Gunung Malang. In addition, various other community development programmes have been implemented to improve the standard of living of communities around the GHSNP area (Pratidina & Purnamasari, 2012; Keliwar, 2013; Sahab, Darusman, & Muladno, 2015). However, it seems that only a few programmes have succeeded in realizing development sustainable society, which is to improve the community's economy in the long term.

The purpose of this study is to analyze biophysical conditions (environment) based on area zonation as well as to assess the socio-economic conditions of the surrounding communities, to identify potential community empowerment programmes that can be developed in the GHSNP.

METHODS

Location

The research was conducted between March and May 2021, in Cikiray and Mekarnangka villages, Cikidang Subdistrict, Sukabumi District. The villages are included in the management area of the Cimantaja Resort, GHSNP (Figure 1). Both villages have forest areas that were part of the GHSNP previously managed by Perhutani (a government-owned forestry company) as production areas. The Conservation Village Model ("Model Kampung Konservasi"), a community empowerment scheme implemented by the management of GHSNP in those two villages, focuses on non-land-based cultivation activities. However, the community empowerment programme since 2006 does not seem to show optimal results and has not made a significant contribution to the sustainability of the GHSNP area and the improvement of the welfare of the surrounding community.

Research Methodology and Source of Data

Research was conducted qualitatively and supported by quantitative approach (Arikunto, 2006; Sugiyono, 2009; Silalahi, 2012). Data was collected through surveys and interviews using questionnaires, deep interview with selected respondents (such as the head of GHSNP Agency, head of villages, and community leaders), as well as a focus group discussion with community members. The data consist of primary data and secondary data taken from the Agency of GHSNP, local government of Sukabumi District, as well as from the other neighboring villages.

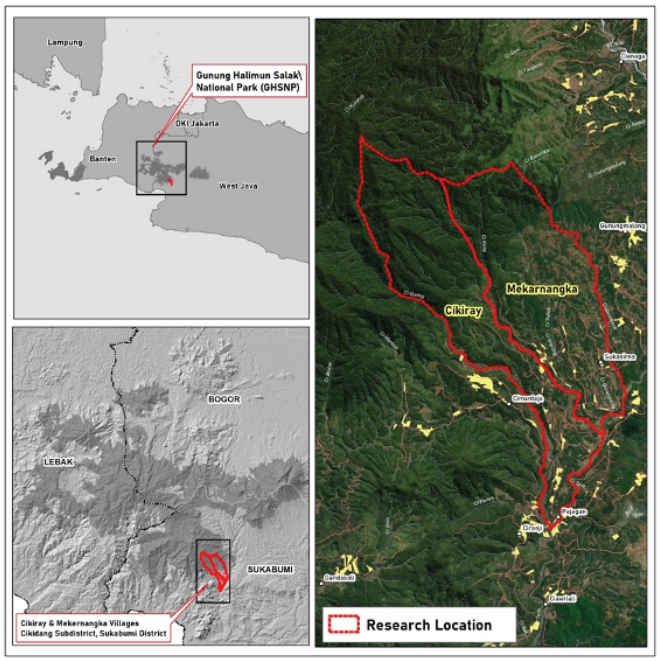

Figure 1. Study area in Cikiray and Mekarnangka villages within the GHSNP, West Java.

Data Collection

All available information and studies on biophysical data of the area available were collected through secondary data obtained from the GHSNP Agency and other related parties such as the government offices of Sukabumi District, village offices in both research locations, and the offices of neighboring villages. Other relevant scientific studies were also documented. According to Arikunto (2006), documentation is an activity to find and collect data sourced from notes, transcripts, books, newspapers, magazines, minutes of meeting, reports, agendas, etc. Secondary data collected for the purposes of this study were monographs or village profiles, as well as reports or documents containing the biophysical conditions of the GHSNP area.

Primary data were collected through field observations in the management area of the Cimantaja Resort, GHSNP (Figure 1). The results of field observations were recorded in tables and analyzed descriptively. This field observation data is needed to complete and verify the information collected from the secondary data.

Collection of community socio-economic data was carried out by interview method using a questionnaire survey, as well as in-depth interviews with selected respondents or key informants. An interview is a meeting

of two people to exchange information and ideas through question and answer so that meaning in a study topic can be constructed. Through interviews, researchers will find out various things in greater depth about situations and phenomena that occur, which are impossible to find through observation. Key informants are stakeholders or parties who are able to represent the community and have the potential to provide information about the object of the study. Respondents were determined by purposive sampling.

According to Sugiyono (2009), purposive sampling is a sampling method using certain considerations, for example, respondents are considered to have knowledge and information about what researchers need, or respondents have structural positions that make it easier for researchers to explore an object. The socio-economic aspects of the respondents studied included age, education, income, area of cultivation land, type of land cultivation, length of time the land was cultivated, the financial value of the cultivation, and their social status. Furthermore, the data were analyzed descriptively and presented in the form of tables and graphs. To describe the individual characteristics of society, it is done by using the equation between values (Supranto, 2000), with the number of classes categorized into three classes, namely low, medium, and high.

Data Analysis

All the data gathered were analyzed using methods following Sugiyono (2015), which processed and described data tabularly, and then presented them in the form of tables and graphs. From the analyzed results, a synthesis was made to identify potential programmes that could be developed for community empowerment in Cikiray and Mekarnangka villages.

RESULTS AND DISCUSSION

Existing Programme of Community Empowerment

One of the locations for community empowerment activities in GHSNP is at the management area of the Cimantaja Resort, which includes Cikiray and Mekarnangka villages, Cikidang Subdistrict, Sukabumi District, West Java. Community empowerment activities commonly used by the management of GHSNP are based on the scheme of the Conservation Village Community Model (or Model kampung Konservasi) (Pratidina & Purnamasari, 2012).

The community empowerment programme in the management area of the Cimantaja Resort of GHSNP was implemented under the "Conservation Village Model" scheme, through a land rehabilitation programme in Gunung Malang Village in 2006 and in Mekarnangka Village in 2009. Meanwhile, the silkworm cultivation programme was implemented in Cikiray Village in 2017, while the broiler cultivation programme was implemented in Mekarnangka Village in 2019 (Table 1).

Table 1. Community empowerment programme in the management area of the Cimantaja Resort of GHSNP, West Java.

Village	Programme	Year
Gunung Malang	Land rehabilitation	2006
Mekarnangka	Land rehabilitation	2009
Cikiray	Silkworm cultivation	2017
Mekarnangka	Broiler cultivation	2019

Currently, the land rehabilitation programme in the villages of Gunung Malang and Mekarnangka has been terminated. Meanwhile, the silkworm cultivation programme in Cikiray Village which was carried out in 2017 was part of the work programme of the GHSNP Agency for the period of 2015-2019. The monitoring results showed that the silkworm cultivation programme in Cikiray Village (located in Sampalan Hamlet) was not successful. Mekarnangka Village later started on a new programme - the broiler cultivation in 2019. The broiler cultivation programme is a non-land-based community empowerment programme, the implementation of which is carried out with 35 members by the Gandasoli Forest Farmers Group (or KTH-*Kelompok Tani Hutan*) in Gandasoli Village, Mekarnangka Village. The idea for this boiler cultivation programme emerged from and was the desire of community groups, who previously deliberated on the type of development of their business. Broiler cultivation begins with the purchase of livestock breeds (Day Old Chicken), which are reared and raised until they are ready to be sold to the market. The net financial profit generated from this broiler cultivation is around IDR 5 million per year. This broiler cultivation programme has entered its second year, but still has not shown significant results in improving the economic level of rural communities, especially group members.

Biophysical Condition

The biophysical conditions in the management area of Cimantaja Resort (2,976.87 Ha) are represented by six national park's zoning, namely the core zone (1,568.20 Ha), forest zone (331.12 Ha), rehabilitation zone (812.22 Ha), utilization zone (247.11 Ha), traditional zone (16.27 Ha), and special zone (1.94 Ha). Zones that can be used for community involvement, in accordance with current policies and regulations, are rehabilitation zone, utilization zone, traditional zone, and special zone. According to Gunawan et al (2007), to reduce pressure from community activities whose livelihoods are highly dependent on conservation areas, these community activities need to be accommodated in possible zones

based on environmental physical conditions and existing policies and regulations. These activities, apart from being able to improve the community's economy, can also stimulate the community to voluntarily be aware of the preservation of the national park area.

The total area of Cikiray and Mekarnangka Villages is 1,721.98 Ha, of which the entire area of the two villages is included in the management area of the Cimantaja Resort, GHSNP. The core zone is 1,027.22 ha, the forest zone is 110.57 ha, the rehabilitation zone is 373.26 ha, and the utilization zone is 210.93 ha (Figure 2). Small rivers are quite abundant and flow down to the Citarik River which then goes to the Cimandiri water catchment area. In the flow of rivers, there are small waterfalls, namely Curug Cimantaja in Cikiray Village, as well as Curug Cipeuteuy and Curug Cikiray Leutik in Mekarnangka Village.

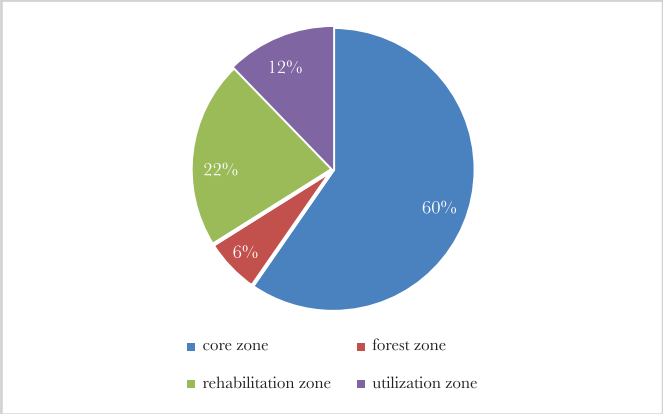

Table 2. Zonation of study site in Cikiray and Mekarnangka villages.

The areas of Cikiray and Mekarnangka villages are at an altitude of 650-1,200 m asl, with a predominance of gentle and steep slopes (20-35%). In general, the topography of the area is a hilly area with an average rainfall of 200 mm/year, and an air temperature of 20-31 °C. The place with the highest elevation in this area is the peak of Mount Malang (897 m asl) and the peak of Mount Andam (1,069 m asl), both of which are included in the administrative area of Mekarnangka Village. Soil types in both villages include brown latosol, brown andosol association, brown regosol, red yellow podzolic. The rock types are volcanic rock such as breccias, basalite and andesite.

The physical condition of the environment, such as the presence of water resources in the management area of Cimantaja Resort of GHSNP, particularly in Cikiray and Mekarnangka villages, is one of the important factors affecting people's lives in the two villages. Napitupulu (2013) argues that the physical condition of the environment in sustainable development can describe the carrying capacity of an area in supporting human life. Thus, the existence of physical aspects of the environment such as water resources, soil types, and topographical conditions in Cikiray and Mekarnangka villages can also describe the carrying capacity that meet the needs of the community living in those villages.

The forest area in Cikiray and Cimantaja villages is classified as lowland tropical rain forest (500-1,000 m asl) and sub-montane forest (1,000-1,400 m asl). The lowland forest vegetation is dominated by various types of trees, such as rasamala (*Altingia excelsa*), puspa (*Schima wallichii*), saninten (*Castanopsis javanica*), kiriung anak (*Eurya accuminatisima*), and pasang (*Quercus sundaica*). Within sub-montane forest vegetation, tree species that can be found include huru bodas (*Acer laurinum*), ganitri (*Elaaeocarpus ganitrus*), kiriung anak (*Eurya accuminatisima*), kiara (*Ficus* sp.), kayu putih (*Cinnamomum* sp.), kileho (*Saurauia pendula*), and kimerak (*Weinmania blumei*) (Table 2). The diversity of wildlife found in the two villages is also relatively high, among which there are charismatic animals such as the Javan eagle (*Nisaetus bartelsi*), Javan gibbon (*Hylobates moloch*), and Javan leopard (*Panthera pardus melas*) (Table 3).

The biological diversity in the forest area within the Cikiray Village area is generally similar to that in the entire management area of Cimantaja Resort, GHSNP. The findings during observations in the forest area in Cikiray Village can be seen in Table 4.

The name of the area block is based on the presence of the Curug Cimantaja waterfall in this area. The height of this waterfall reaches 35 meters, with a pool of water about 700 m^2 below. This waterfall has the potential to be developed into a natural tourism attraction. The existing biological diversity, which is supported by other aspects, is a natural resource that can be developed in Cikiray Village. Alikodra (2012) argues that natural resources are one of the natural capitals that can be used to fulfill human needs.

Similar with the Cikiray Village, the biological diversity in the forest area within the Mekarnangka Village area resembles that in the entire management area of Cimantaja Resort, GHSNP. However, apart from the similarity in Mekarnangka, several types of plants that can be developed into non-timber forest products, such as aren (*Arenga pinnata*), bambu (*Bambusa* sp.), rotan (*Calamus* sp.), karet (*Hevea brasiliensis*), and cultivated plants like durian (*Durio zibethinus*) and pala (*Myristica* sp.) can also be found.

Field observations in Mekarnangka Village were carried out in three different observation blocks, namely Kiara Gendol, Hulu Sungai Cigandasoli, and Pasir Ampin. The area of Kiara Gendol is a hilly ridge that extends from southeast to northwest, with a rather steep to steep slopes (15-40%) at an elevation of 650-700 m asl. This area is a transition (ecoton) between primary forest and secondary forest, and is included in the utilization zone, rehabilitation zone, forest zone, and the core zone of GHSNP. Vegetation that grows in primary forest areas of Kiara Gendol, such as puspa (*Schima wallichii*),

rasamala (*Altingia excelsa*), leungsar (*Pometia pinnata*), kiara (*Ficus* spp.), saninten (*Castanopsis javanica*), kileho (*Saurauia pendula*), kimerak (*Weinmannia blumei*), etc., are typical of lowland tropical rain forests. Meanwhile, the secondary forest vegetation is dominated by puspa (*Schima wallichii*), rasamala (*Altingia excelsa*), mahoni (*Sweitenia mahagoni*), karet (*Hevea brasiliensis*), and kayu afrika (*Maesopsis eminii*), which were planted during rehabilitation land activities carried out by the previous manager (Perhutani) when this area was still a production forest.

Table 2. Species of flora found in forest areas within Cikiray and Mekarnagka villages, in the area management of Cimantaja Resort, GHSNP.

No	Local Name	Scientific Name	Remarks
1	Kayu afrika	*Maesopsi eminii*	Not protected
2	Anggrek besi	*Dendrobium filopuphanen*	Not protected
3	Anggrek tanah	*Spathoglottis plicata*	Not protected
4	Angrit	*Adina polycephala*	Not protected
5	Bambu tali	*Gigantochloa apus*	Not protected
6	Bingbin	*Pinanga coronate*	Not protected
7	Calik angin	*Molatus paniculatus*	Not protected
8	Canar	*Smilax macrocarpa*	Not protected
9	Cente/Canaan	*Lantana camara*	Not protected
10	Ceuri	*Garcinia diodica*	Not protected
11	Harendong bulu	*Clidemia hirta*	Not protected
12	Huru	*Actinodaphne glomerata*	Not protected
13	Huru bodas	*Acer laurinum*	Not protected
14	Huru madang	*Beilschmiedia madang*	Not protected
15	Huru payung	*Litsea accedentoides*	Not protected
16	Ilat	*Ficus callosa*	Not protected
17	Ipis kulit	*Decapermum paniculatum*	Not protected
18	Jamuju	*Dacrycarpus imbricatus*	Not protected
19	Jangkurang	*Trevesia sundaica*	Not protected
20	Jengkol	*Archidendron pauciflorum*	Not protected
21	Jirak	*Symplocos fasciculata*	Not protected
22	Kaliandra	*Calliandra calothyrsus*	Not protected
23	Kenung	*Helicia robusta*	Not protected
24	Kibeusi	*Dodonaea viscosa*	Not protected
25	Kibulu	*Ficus annulata*	Not protected
26	Kijambe	*Memecylon excelsum*	Not protected
27	Kipiit	*Picrasma javanica*	Not protected
28	Kisireum	*Syzygium lineatum*	Not protected
29	Kitapen	*Macaranga rhizinoides*	Not protected
30	Kitarasi	*Viburnum coreaceum*	Not protected
31	Kirinyuh	*Eupatorium pallescens*	Not protected
32	Leungsar	*Pometia pinnata*	Not protected
33	Mangong	*Macaranga rhizinoides*	Not protected
34	Pakis haji	*Cycas rumphii*	Not protected
35	Parengpeng	*Cliptocarea densiflora*	Not protected
36	Pasang	*Quercus sundaica*	Not protected
37	Pasang batarua	*Quercus gemelliflora*	Not protected
38	Pasang parengpeng	*Cliptocarea densiflora*	Not protected
39	Peuris	*Aporosa aurita*	Not protected
40	Pinding	*Diospyros siamang*	Not protected

41	Pohpohan gunung	*Pilea melastomoides*	Not protected
42	Puspa	*Schima wallichii*	Not protected
43	Rane	*Sellaginella* sp.	Not protected
44	Rasamala	*Altingia axelsa*	Not protected
45	Riung anak	*Castanopsis acuminatissima*	Not protected
46	Rotan bungbuai	*Plectocomia elongata*	Not protected
47	Salam gunung	*Syzygium polyanthum*	Not protected
48	Sungkai	*Peronema cenescen*	Not protected

Table 3. Species of wildlife found in forest areas within Cikiray and Mekarnagka villages, in the area management of Cimantaja Resort, GHSNP.

No	Species		Remarks
	Local Name	Scientific Name	
1	Elang jawa	*Nisaetus bartelsi*	Protected
2	Elang hitam	*Ictinaetus malayensis*	Protected
3	Elang ular	*Spilornis cheela*	Protected
4	Elang brontok	*Spizaetus cirrhatus*	Protected
5	Macan tutul jawa	*Panthera pardus melas*	Protected
6	Kucing hutan	*Prionailurus bengalensis*	Protected
7	Owa jawa	*Hylobates moloch*	Protected
8	Surili	*Presbytis comata*	Protected
9	Lutung	*Trachypitecus auratus*	Protected
10	Kijang	*Muntiacus muntjak*	Protected
11	Kukang jawa	*Nycticebus javanica*	Protected
12	Julang emas	*Rhyticeros undulatus*	Protected
13	Landak	*Hystix javanica*	Protected

Wildlife in the Kiara Gendol forest area include the Javan leopard, binturong/bear cat, Javan gibbon, grizzled leaf monkey or surili, Javan langur or lutung, long tailed macaque, Javan eagle, crested serpent eagle, black eagle, changeable hawk-eagle, black-winged kite, wreathed hornbill, rhinoceros hornbill, Javan slow loris, and Javan porcupine (Table 3).

The name of Hulu Sungai Cigandasoli was given by the community based on the existence of a spring whose water flows in the Cigandasoli River, part of the Citarik watershed. This area is hilly with steep slopes (25-40%) at elevation of 650-800 meters asl. This area is a primary forest included in the core zone of the national park, with plants including puspa (*Schima wallichii*), rasamala (*Altingia excelsa*), leungsar (*Pometia pinnata*), kiara (*Ficus* spp.), saninten (*Castanopsis javanica*), kileho (*Saurauia pendula*), kimerak (*Weinmannia blumei*), etc.

Pasir Ampin Block is included in the core zone and rehabilitation zone of GHSNP. The name "Pasir Ampin" was also given by the community because the area is a plain on a ridge. The slope of the area varied from rather steep to steep (15-40%), with elevation of 600-800 m asl. The forest area in Pasir Ampin is primary forest and lowland tropical secondary forest, with various types of plants forming the same vegetation as in the forest area in the Kiara Gendol and Hulu Sungai, Cigandasoli blocks. Like the forest condition in Kiara Gendol, there are also several species of trees in Pasir Ampin planted during rehabilitation land activities, carried out by the previous manager (Perhutani) when the area was still a production forest.

Socio-economic Conditions of the Community

Administratively, both Cikiray Village and Mekarnangka Village each consist of several hamlets (Table 5). Just like the other people living in neighboring villages around GHSNP, the communities of Cikiray and Mekarnangka Villages have a strong dependence and attachment to the GHSNP area, especially those are living in the hamlets of Sampalan and Balandongan (in Cikiray Village), as well as the community living in the hamlets of Bongbang, Cibitung, Tapos, Nyalindung, Pasirnangka, Sukasirna and Gandasoli (in Mekarnangka Village).

The results of the Focus Group Discussion (FGD) conducted in Cikiray Village, which involved the

Table 4. Fauna and flora found in forest areas within Cikiray Village.

No	Location / Site	Species	
		Local Name	**Scientific Name**
1	Curug Cimantaja Block:		
	Fauna / Mammals	Owa jawa	*Hylobates moloch*
		Monyet ekor panjang	*Macaca fascilcularis*
		Macan tutul jawa	*Panthera pardus melas*
		Surili	*Presbytis comata*
		Lutung	*Trachypitecus auratus*
	Fauna / Birds	Luntur gunung	*Apalharpactes reinwardtii*
		Luntur macan	*Harpactes sp.*
		Elang jawa	*Nisaetus bartelsi*
		Elang ular	*Spilornis cheela*
		Elang hitam	*Ictinaetus malayensis*
		Srigunting	*Dicrurus* sp.
		Meninting	*Enicurus* sp.
	Flora	Pasang	*Quercus sundaicus*
		Puspa	*Schima wallichii*
		Rasamala	*Altingia excelsa*
		Leungsar/Leungsir	*Pometia pinnata*
		Kiriung anak	*Castanopsis acuminatissima*
		Benying air	*Ficus* sp.
		Kiputri	*Podocarpus neriifolius*
		Huru	*Actinodaphne glomerata*

Table 5. Hamlets are located within the administrative area of Cikiray and Mekarnangka Villages, Cikidang Subdistrict, Sukabumi District, West Java, which are directly adjacent to the GHSNP Area.

No	Village / Hamlets	Total population (N of family) in 2020
	Cikiray :	**4,649 (804)**
1	Balandongan	
2	Sampalan	
	Mekarnangka :	**3,526 (1,129)**
1	Bongbang	
2	Cibitung	
3	Tapos	
4	Nyalindung	
5	Pasir Nangka	
6	Sukasirna	
7	Gandasoli	

community from Sampalan Hamlet, showed that the community knew that the forest area in their village is currently a conservation area previously managed as a production forest by Perhutani. This understanding is evident by the absence of legal land ownership certificate documents. For the community to support cultivation activities, such as for the fulfillment of livestock feed and firewood, about 0.5-1.5 Ha/family of forest land would be needed. It means that with a total of 804 families, the community in Cikiray Village would need around 402-1,206 Ha of land. Seeing that the Cikiray Village is currently included in the GHSNP area, the community is worried that their access to natural resources in the national park will be forbidden. This would make it increasingly difficult for the community to find necessities to support their way of living. The community hopes that the GHSNP Agency can provide them access to participating in managing the area so that they can develop existing potentials for nature tourism or fruit crop cultivation to aid in the community's economic growth. At the FGD in Cikiray Village, the community also conveyed that village development programmes and arrangements for management access to the area were still in the socialization and identification stage, and was being carried out by the GHSNP Agency in the form of access to a conservation partnership scheme.

Two FGDs in Mekarnangka Village were held. The results of the first FGD involving the Gandasoli hamlet community showed that the community knew that the forest area in their village is currently a conservation area of HGSNP. The community in Gandasoli Hamlet has even been involved in conducting forest security or patrols with GHSNP Agency officers for area conservation and animal monitoring. For cultivation activities, the people in this village also need an area of 0.5-1 ha per family. This means that the 1,129 families in Mekarnangka Village would need about 565-1,129 hectares of arable land for their economic fulfilment. The community is also worried that their access to natural resources in the national park will be prohibited. Some community members have already left their cultivated land, which they have been working on since this area was managed as a production forest. As a result, the community may have found it harder to find necessities to support their way of living. The community hopes that the GHSNP Agency can provide them access to participating in managing the area so that they can develop existing potentials for nature tourism or fruit crop cultivation to aid in the community's economic growth.

The same issues were raised by the community in the second FGD in Mekarnagka Village which involved the communities of Pasir Nangka, Cibitung, and Bongbang Hamlets. In general, the community already understood that the forest area in their village is currently a GHSNP conservation area, but they do not really understand the function of the existing zones in the GHSNP management spatial planning.

The results of the interview survey with 25 heads of families living in the villages of Cikiray and Mekarnangka illustrated that majority of residents only have elementary school education. Previous study by Adalina et al (2015) showed that majority (87%) of community living around GHSNP have low level of formal education. To support their families, each family head would cultivate rice in paddy fields, farm on land (cassava and vegetables), farm fruits (bananas, durians, coconuts, nutmeg, cloves, dog fruit/jengkol, and stink bean/petai), and plant sap-producing trees (rubber). From the survey results, majority of people in both Cikiray and Mekarnangka villages used their arable land to grow fruit-producing plants (44%) (Figure 3). All of these community agricultural activities were carried out within the GHSNP area.

People cultivating land in Cikiray and Mekarnangka Villages generated the highest income, between IDR 8-12 million/year (40%). Others only earned IDR 4-8 million/year (32%), with some only able to generate a maximum amount of IDR 4 million/year (28%) (Figure 4). This finding is almost similar with Adalina et al (2015), which stated that the average income of community living around GHSNP is only IDR 13.8 million/year, and it is below the minimum regional wage of West Java and Banten Provinces.

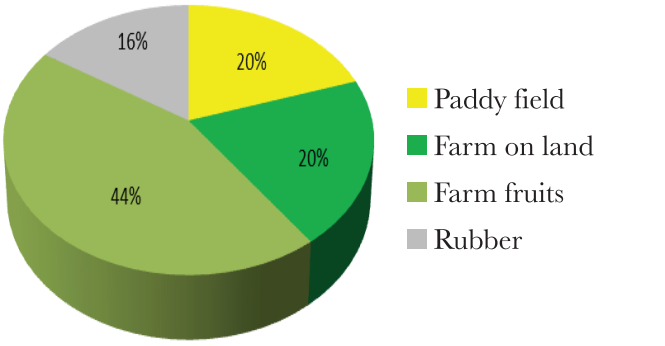

Figure 3. Classification of cultivation activities conducted the community of Cikiray and Mekarnangka Villages in the GHSNP area.

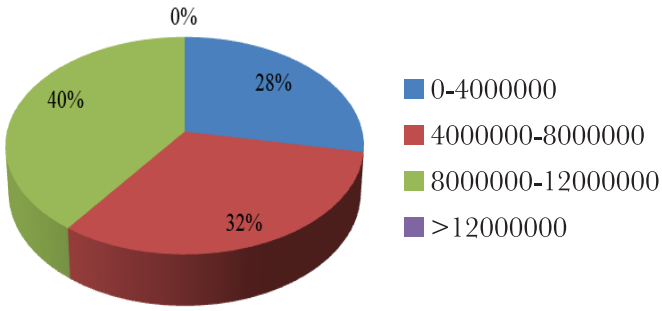

Figure 4. The average annual income (IDR) of the community living in Cikiray and Mekarnangka villages from cultivation activities on their arable lands in the GHSNP area.

Potential Development of Community Empowerment Programmes

Based on the results of the questionnaire survey, in-depth interviews, and FGDs in the villages of Cikiray and Mekarnangka, several options can be made for the development of community empowerment programmes in both villages. These programmes include: (a) nature tourism, (b) special interest tourism, (c) culture-based tourism (local wisdom), (d) traditional use, (e) ecosystem restoration cooperation, (f) forest plant cultivation as a source of seeds for economic development, and (g) utilization of environmental services (water and hydropower plant). A summary of the results of the study on the development of community empowerment programmes in the Cikiray and Mekarnangka villages is presented in Table 6.

Table 6. Opsi-opsi programme pemberdayaan masyarakat yang dapat dikembangkan di desa Cikiray dan Mekarnangka, di dalam Kawasan GHSNP.

No	Village	Hamlet	Options for development of community empowerment programmes*
1	Cikiray	Balandongan	d,e,f,g
2		Sampalan	a,c,d,e,f,g
3		Bongbang	a,d,e,f,g
4		Cibitung	d,e,f,g
5		Tapos	a,d,e,f,g
6	Mekarnangka	Nyalindung	d,e,f,g
7		Pasirnangka	d,e,f,g
8		Sukasirna	d,e,f,g
9		Gandasoli	a,b,d,e,f,g

Note: a) nature tourism, b) special interest tourism, c) culture-based tourism (local wisdom), d) traditional use, e) ecosystem restoration cooperation, f) forest plant cultivation as a source of seeds for economic development, and g) utilization of environmental services (water and hydropower plant).

Nature tourism development

Natural tourism at the waterfalls of Curug Cimantaja, Curug Cikiray, Curug Cipeuteuy, and Curug Cimantaja can be developed by encouraging the community of Sampalan and Balandongan hamlets in Cikiray Village to manage these natural tourism objects through a cooperation scheme with the GHSNP Agency. With the same scheme, Curug Cipeuteuy and Curug Cikiray Leutik can also be developed as natural tourism objects for the people of Mekarnangka Village. If nature tourism is implemented, national park managers must ensure that tourism activities are low impact and extremely well managed (Drumm et al, 2005).

Special interest tourism development

The high potential for biodiversity in the Kiara Gendol Block can be developed into a research location that involves the community (especially the Gandasoli Hamlet community) as interpreters or guides for researchers. The success of nature tourism depends in large part on the abilities of naturalist guides to interpret the environment in ways that inspire and educate visitors (Drumm, 2005). The Kiara Gendol Block can be designated as a research station whereby researchers can observe the rich biodiversity of the area. This activity can generate financial benefits for the community, and can stimulate the community to care more about the existence of protected wildlife.

Culture-based tourism (local wisdom) development

The people of Sampalan Hamlet in Cikiray village still carry out various activities that make use of their local wisdom in their daily lives. For instance, the people in this hamlet continues to perform the "Seren Taun" ceremony, an annual traditional ritual executed to express the village's gratitude to God for the gift of an abundant harvest. The village community also maintains the skills for constructing their unique residential buildings, and the tradition of storing rice in "Leuit", a type of vernacular rice barn used to store rice after harvest for future daily use. All of these can be packaged into a culture-based tourism, which may have an impact on improving the community's economy.

Traditional use development

There are various species of forest plants surrounding the villages of Cikiray and Mekarnangka. However, there are also many plant species due to community cultivation on land within the GHSNP Area. Agricultural cultivation activities (rubber, durian, cloves, dog fruit/jengkol, sugar palm and nutmeg) have been carried out by the community for a long time, long before their village area became part of the GHSNP area. Through existing regulations, collaboration and community empowerment, a traditional utilization-based conservation partnership scheme can be implemented.

Development of ecosystem restoration cooperation

The lands in the villages of Cikiray and Mekarnangka included in the management area of Cimantaja Resort, GHSNP, are not entirely covered by forest vegetation, as there are agricultural lands belonging to the people from both villages. Therefore, to restore the land functions in compliance with the GHSNP zonation, a community-based ecosystem restoration cooperation scheme can be executed (Rochaedi, Priatna, & Rahayu,

2021). The community can work on area restoration activities by planting native species such as rasamala (*Altingia excelsa*), puspa (*Schima wallichii*), huru (*Actinodaphne glomerata*), saninten (*Castanopsis javanica*), aren (*Arenga pinnata*), etc., or by planting other species associated with native species, so as to produce an economic source for the community.

Forest plant cultivation as a source of seeds for economic development

Many species of forest plants in Cikiray and Mekarnangka villages have the potential to improve the community's economy. However, the most prominent species being cultivated in the community currently is the aren or sugar palm (*Arenga pinnata*) plant. In addition to its high abundance, aren trees are also easy to cultivate inside and outside the forest area. Aren trees can produce sap (or locally called "air nira") that can be processed into brown sugar, a commodity that has a very wide market. In one year, one aren tree can generate an average economic value of IDR 2.8 million (Aulin, 2019).

Development of utilization of environmental services (water and hydropower plant)

Another potential that exists in the forest area in the villages of Cikiray and Mekarnangka is the abundance of rivers and tributaries that goes into the Citarik sub-watershed. Through a community-based scheme, the rivers and their tributaries can be developed to fulfill the community's need for clean water. This programme will be able to minimize the community's expenses in obtaining clean water for their daily needs. Additionally, cultivation of various species of native fish can also be done in the rivers to improve the community's economy. Hydropower plants can also be developed in several locations on a microhydro scale to meet the electricity needs of the community.

CONCLUSION

Considering the biophysical conditions of the area of Cikiray and Mekarnangka villages, the community empowerment programmes that can be developed in both villages include nature tourism, through the development of the potential of the waterfalls of Cimantaja, Cikiray Leutik, and Cipeuteuy. Special interest tourism can also be developed, namely research nature tourism in the Kiara Gendol Block. The development of cultural-based nature tourism (local wisdom) can also be implemented in Sampalan Hamlet, Cikiray Village. Interested community members can be trained and prepared to become interpreters or guides. The development of traditional uses can be carried out through a conservation partnership scheme, to develop agricultural and plantation commodities (e.g., rubber, durian, cloves, dog fruit/jengkol and nutmeg) that have the potential to increase the economic level of the community.

The collaboration between the community and the GHSNP Agency to restore forest ecosystems can be carried out by involving the community in the rehabilitation of the area through the cultivation of tolerant intercrops planted as forest restoration trees. Sugar palm or aren (*Arenga pinnata*) is a forest plant that currently has the potential to be cultivated in the villages of Cikiray and Mekarnangka, both inside and outside the forest area.

The rivers and their tributaries in the Cikiray and Mekarnagka villages can be utilized to fulfill the need for clean water, managed as part of the community-based scheme. Apart from that, the cultivation of various species of native fish can also be developed to improve the community's economy. Hydropower plants can be developed in some locations with a microhydro scale, which can be used to meet the electricity needs of the community.

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