Planning for interpretation trail in Lalana Hill based on community at Cibadak Village, Ciampea Districk

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Abstract. Lalana Hill contains karst. Karst has a distinctive natural panorama that can be used as a tourist attraction for rock climbing, but there is no interpretation trail made in that place so that it is essential that the interpretation trail has to be made. The purpose of this study was to identify the Lalana Hill interpretation trail and facilitate the establishment of Cibadak Village tourism institutions. The research method was descriptive, with data obtained in a survey and analyzed using Quantum 2.1 software overlayed with maps of Ciampea taken from Google Earth to produce an interpretation trail. The interpretation trail that resulted from this research were nine roots, ompol flowers, Meleho, love climbs, Sawarna cliffs and peak Lalana.

Keyword: Lalana Hill, Karst, Interpretation trail

1. Introduction
Karst landscape is one of the areas formed with high diversity in ecosystems. Those are the diversity in landforms, rock stratification, vegetation and the environment. This diversity is the main attraction that makes karst as a potential area, especially in the development of the tourism sector. Karst is a landscape that specifically develops in carbonate rocks due to karstification during the available space and time [1]. Karst area is a landscape that has unique relief and drainage characteristics on the surface and subsurface of limestone, its formation through the dissolution process of carbonate rocks containing scientific, economic and humanitarian values [2].

Lalana Hill often visited by visitors aged around 14-40 years to enjoy the panorama. Lalana Hill has a height of about 385 meters above sea level so it is possible to climb for beginners. The hills contain karst which has its own uniqueness and diversity. Diversity is the main attraction that makes karst as a potential area, especially in the development of the tourism sector. Karst has a distinctive natural panorama that can be used as a recreational object for rock climbing. Lalana Hill was visited by many tourists who come from within the Bogor and outside the Bogor regency. Visitors who enjoy each attraction need more knowledge. Such knowledge can be expressed by the existence of natural interpretations in each trail.

Nature interpretation is an art in providing an explanation of a natural tourist area to visitors so that it can inspire their thoughts to know, realize, educate, and if it is possible so that visitors come to conserve [3]. Nature interpretation is an activity that aims to invite people or visitors to the area to love and preserve nature [4], while the interpretation trail is one way to enjoy the natural area so as to create a strong relationship with the surrounding environment. Interpretation trail is about information of the
area in tourism activities that increase knowledge and awareness to preserve the natural tourism area. Planning an interpretation trail that supports tourism activities requires studies that can identify trail that have the potential to be developed as a trail of interpretation and consider the characteristics and desires of visitors regarding to comfort, safety and convenience in the trail [5]. So that natural interpretations can be carried out optimally by providing benefits, added value, maximum satisfaction, and increasing awareness for visitors, it is necessary to research the interpretation planning of hiking trails in Lalana Hill. The results of this study can be used by planners in the effort to develop ecotourism, especially the interpretation of the Lalana Hill hiking trail. Interpretation trail created using the Geographic Information System (GIS) application [6]. GIS can be used to zoning tourist destinations based on regional functions. Thus, various necessary information such as geographical coordinates, topographic conditions, and position on the Lalana Hill zoning area can be known. So the purpose of this research was to identify the existing Lalana Hill trail to be developed as an interpretation trail and facilitate the establishment of Cibadak village tourism institutions.

The paper is stage within four sections. In the first section, the part elucidates the research program, including the background, problem, purpose, and objective. In the second section, researchers demonstrate the methodology of the research including population, procedure, sampling, data collection, analysis, and instrument of the study. Result and discussion are in the third section. The last section is concluded by the fourth section.

2. Method
2.1. Materials
This research was conducted at Lalana Hill from April-July 2019. The research location was determined purpustively with the consideration of the uniqueness of the tourist attraction. The uniqueness of this area in the form of hollows, the open surface looks rough, pitted and pointed. The tools and materials used are: stationery, camera, laptop, tally sheet, GPS, Quantum 2.1 sofware, and Corel draw. The location of the Ciampea districk is 106° 32’ 0” East longitude – 106° 35’ 46” East longitude and 6° 36’ 0” South latitude – 6° 55’ 46” South latitude (Figure 1).

Figure 1. Map of Ciampea Sub-District
2.2. Procedure
This research method was descriptive by describing the results obtained from the field. Coordinates of specific locations taken from the field using Global Positioning System and then analyzed using Quantum 2.1 software, which is overlaid with a map of the Ciampea sub-district taken from Google Earth to produce interpretation trail. The information obtained from the results of this Geographic Information System analysis is used as input to plan the path arrangements to be compiled and the interpretation of the resulting trail maps.

To facilitate the formation of community institutions using a Participatory Rural Appraisal. Participatory Rural Appraisal (PRA) is participatory assessment research of village conditions. Therefore, the PRA method is a method used in conducting assessments research to understand the situation or condition of a particular village/region/locality by involving community participation.

The steps in the participatory rural Appraisal assessment process include:
1) Village preparation together with village officials: determining the place and time, coordination with religious and community leaders
2) Conduct a review of the state of PRA activities and formulation of PRA results.

3. Results and discussion
3.1. Identification of Lalana Hill Interpretation Trail
Lalana Hill’s area is managed by residents of RW 06 Cibadak Village with a number of managers of around 15 (fifteen) people since October 2015. Initially the communities around Hill only used the area as a place for recreation, reducing mining lime and tree felling by the community, but after seeing that the Hill’s area has the potential to be developed as a tourist destination, residents of RW 06 who are members of the MACAKAL group began to open a path for climbing. Hiking routes made by residents are still very simple so that there is a need for the development of paths so that visitors are comfortable to travel. The selection of climbing interpretation paths is based on 2 criteria, which is a path that is mostly visited by visitors and/or climbed by climbers and has easy accessibility [6]. Location of Lalana Hill is easily achieved because of its strategic location about 1.2 km from Jalan Raya Cibungbulang. The main access to Lalana Hill is Gg. Ashibiyan km 14 Cibadak Village, Cimpea District, Bogor Regency. Access to the location can be reached by using 2-wheeled and 4-wheeled vehicles both private and public vehicles using the Angkot Department of Ciampea. Accessibility to the Cibadak Village can be reached within 1-2 hours from the city center. Accessibility is one important aspect that supports the development of tourism, where it is impossible for tourists to visit attractions if access is difficult to reach [7].

From Lalana peak, visitors are presented with a natural panorama and artistic views in the form of a typical stretch of limestone mountains. The beauty and uniqueness of these natural resources is a big capital in the effort to develop tourism in a professional manner going forward, this place is different from other tourist attractions. The rock is composed of reef limestone, crystalline limestone, coral reef limestone, and Miocene-aged clay limestone. Surface phenomena include positive formations, such as cone-shaped Hill Hills. The top of the cone can be rounded (Sinusoida) or taper (Karst conical). The curves between the limestone Hills form a dolina, both open and closed [8]. The Lalana Hill area is included in the limestone members of the Bojong Manik formation. This limestone contains mollusks. This unit is in the form of lenses in the Bojong Manik formation whose age is equivalent to the middle Miocene. Whereas based on the map of rock types for the region of West Java in 2005, the Cibadak Karst is divided into several types of rocks including the most dominant is the quaternary limestone, in addition there are plio-plistocene sedimentary rock types[9]. The results showed that the path of interpretation starts from the coordinates 6°33′23.12″S 106°41′4.68″T. The coordinates was the Registration Posts in Lalana Hill (Figure 2).
The topography of limestone mountain Cibadak Ciampea was relatively steep with a slope of 25-30%, with the highest point based on a map of the earth located at an altitude of ± 385 m above sea level (Figure 3). The slope found on the site varies between 3-65%. Based on the slope classification [10] the research sites included in the slope 0-8%, 8-15%, 15-25%, 25-40%, and > 40%. The most dominant land was land with a slope of 0-8% that is flat at 3,209,483.8 m², land with a slope of 8-15%, namely the slope has an area of 225,474.9 m², then for a slope of 15-25% was slightly steep has an area 371,144.8 m². The slope of 25-45%, namely very steep in the limestone mountain area has an area of 954,296.7 m² and for steep areas (45-65%) has an area of 3,800.8 m².

Visually the hill and steep topography becomes an attraction and variations in the formation of the limestone mountain. Mountain gave the impression of a dynamic and not monotonous so that its beauty can be exploited, besides that the height difference will provide a broad direction of view to a low area. In this area, various forms of tourism activities and supporting facilities can be developed. At the foot of limestone mountain, the slope varies between slightly sloping (8-15%) with sloping (15-30%). In this
area, the land is relatively fertile so it is sensitive to erosion. The way to overcome this problem is planting ground cover plants and forested so that this area can be used as a buffer area.

The interpretation path starts at the registration post which has a distance up to the Peak of Lalana about 552 m and can be taken for half an hour to an hour. After the registration, the stairs will be found, post one which is the first resting place. After resting at post one it will pass through the root of nine, then pass a very steep incline, called Melehoy which in Sundanese is called "Lemes" (Table 1).

Table 1. Coordinates and distances Lalana Hill Interpretation Trail

| No | Information       | Latitude        | Longitude        | Distance | Distance (meter) |
|----|-------------------|-----------------|------------------|----------|-----------------|
| 1  | Registration Post | 6°33’23.12”S    | 106°41’4.68”T    | 0        | 0               |
| 2  | Stairs            | 6°33’19.47”S    | 106°41’4.60”T    | 118      | 118             |
| 3  | Post One          | 6°33’17.84”S    | 106°41’5.84”T    | 63       | 181             |
| 4  | Nine Roots        | 6°33’14.59”S    | 106°41’4.65”T    | 111      | 292             |
| 5  | Melehoy           | 6°33’13.32”S    | 106°41’4.16”T    | 43       | 335             |
| 6  | Love Climbs       | 6°33’11.96”S    | 106°41’3.83”T    | 112      | 447             |
| 7  | Sawarna Cliffs    | 6°33’11.60”S    | 106°41’2.69”T    | 15       | 462             |
| 8  | Lalana Peak       | 6°33’11.70”S    | 106°41’0.83”T    | 60       | 552             |

1. Registration Post

Visitors to the Lalana Hill area before climbing must register and purchase an entrance ticket. The visitors will be given directions by the officers regarding the rules and regulations as well as safety to the top of Lalana to prevent accidents and other unwanted things. The entrance ticket price was Rp. 5000 / person, motorbike parking ticket of Rp. 10,000 / motorbike and Rp. 20,000 / car. If the visitor is going to camp, then the ticket is Rp. 10,000 / person, but the entry ticket is not yet listed insurance, so the manager needs to work together with the insurance so that visitors are comfortable in doing tours. Existing facilities at the registration post are toilets, prayer rooms and meeting rooms that are still very simple. Figures 4 and 5 are the atmosphere at the registration post.
2. Stairs
The ladder is the initial track (Figures 6 and 7) with a gentle slope and slightly rocky between the thick Teak trees (Tectona grandis). Teak is a wood producer with high quality and can reach heights of around 30-40 m. The Teak’s leaves will shed in the dry season and will grow after the rainy season. Teak is the most suitable plant to grow in poor nutrient soils such as the limestone soil of [11]. The distance from the registration post to the stairs was around 118 m. Stair track was located on the coordinates 6°33’19.47”S - 106°41’4.60’’T. At this location it was good to make an interpretation board, so visitors know the types of plants and the benefits of plants that were around the location traversed.

![Figure 6. Stairs Trail](image)
![Figure 7. Tectona grandis tree on the right and left of the stairs location](image)

3. Post One
Post one was used for a short rest after unwind and after walking about 15 minutes (Figure 8). The distance from the stairs to Post one was about 63 m. The coordinates at this location are 6°33’17.84”S - 106°41’5.84’’T. At the post location one was a very simple place of rest. Post one for rest can be repaired into a post that is feasible to use (Figure 9). The facilities and infrastructure provided for visitors should be very useful because they are an important requirement for tourists. If available properly, tourists will feel comfortable doing various other activities [12].
4. Nine Roots
There are large trees that have nine roots (Figures 10 and 11), so this pathway is called nine roots. The Nine root tree was a *Ficus sp* (Banyan) tree. The coordinates on this path are 6°33’14.59”S-106°41’4.65”T. The distance from Post One to Nine roots was around 111m. On this path, interpretation boards and direction boards are needed because they do not yet exist. At the time of the interview with visitors, because there were no signposts, some visitors got lost and misdirected the hiking trail.

5. Melehoy
The track on the Melehoy track was a steep incline. Although along the lane has been fitted with a rope as a tool to pass through the lane, but the safety rope that is installed was still very simple, so it was necessary to improve safety equipment on this line (Figures 12 and 13). The distance from the Nines root path to Melehoy was around 43 m. The distance was not too far, but because the contours are quite steep, so this pathway requires a lot of energy to get to the next lane. In this pathway, the smell of wet / urine is emitted from plants that grow around the location, residents call it the flower ompol, but the scientific name of the tree is still unknown (Figure 14). The coordinates on this path were 6°33’13.32”S-106°41’4.16”T.
6. Love Climbs
This trail was called the climb of love because it was rocky steep so that it takes help from others or friends or colleagues to be able to help each other in passing the path (Figure 15). The distance from Melehoy one to the incline of love about 112 m. The coordinates on this path were $6°33'11.96''S - 106°41'3.83''T$.

7. Sawarna Cliffs
Reflections from the sun cause these cliffs to look colorful so they are called Sawarna cliffs. Also visible was the activity of long-tailed monkeys (*Macaca fascicularis*) in this area (Figures 16 and 17). The coordinates on this path are $6°33'11.60''S - 106°41'2.69''T$. The interpretation board on this path was also very simple, so an interpretation board was needed so that visitors know the information.
8. Lalana Peak

From the top of the Lalana Hill, we can see Bogor from above, and when the weather was clear, a view of Mount Salak and Gede Pangrango was also visible (Figures 18 and 19). Many also deliberately hike early in the morning to be able to enjoy the stunning sunrise view or sunset in the afternoon. However, when the weather was sunny, during the day the peak will be felt hot, plus the lack of vegetation of trees that grow on the top of this Cretaceous Hill, which is seen is only a stretch of limestone rocks that at first glance looks exotic and at first glance like rocks. Limestone in the area of Lalana, Ciampea District, is limestone with high limestone Hills of Miocene age. Miocene is a time on the geological time scale that lasted between 23.03 to 5.332 million years ago [13]. At this location, there was an area for camping with a capacity of 5-6 tents. The distance from Sawarna Cliff to the peak of Lalana is around 60 m so that the total distance from the registration post to the summit of Lalana is 552 m. The coordinates at the summit of Lalana are 6°33'11.70''S - 106°41'0.83''T.

Things that must be considered when climbing are:

- Obey the rules and direction from the manager
- Do not litter and bring trash back to be disposed of in its place
- Bring enough food (prone to be seized by monkeys)
- Use comfortable equipment (clothes and appropriate footwear)
- Follow the rules and directions from the manager
- Pay attention to the directions and signs that are available
• Always be careful and take care of yourself and others

3.2. Facilitate the establishment of Cibadak Village tourism institutions

The participation of the Cibadak village community was very good in managing ecotourism karst of limestone mountain. At present the karst ecotourism of Gunung Kapur, Cibadak Village, Ciampea Subdistrict, Bogor Regency is managed by residents of RW 06 Cibadak Village with a total of 15 (fifteen) managers since October 2015. Initially, the communities around EKGK only used the area as a place for recreation but after seeing that EKGK Cibadak has the potential to be developed tourist tourism RW 06 people who are members of the MACAKAL group began to open up routes for climbing.

Community participation is very important in terms of ecotourism management, especially people who are in direct contact with the tourist area. Community participation will arise, if nature provides benefits both directly and indirectly. In order to provide benefits, nature must be managed and maintained so that public participation is important for the success of ecotourism in a tourist destination. Community-based ecotourism is an ecotourism business that emphasizes the active role of the community. This is based on the fact that the community has knowledge about nature so that community involvement is needed. The pattern of community-based ecotourism does not mean that the community will run its own ecotourism business but rather collaborate with other parties such as villages and Perum Perhutani [14]. Community-based tourism management will not succeed if the legality of the tourism area is still illegal. The Cibadak EKGK still faces problems in licensing because tourist sites must pass through Kopassus's land (Figure 19).

At present, the manager form Cibadak Village Community Forest Institution (LMDH) but still has legal issues from the location that must pass the Kopassus location. The manager will propose the Institution and have submitted the legality of management through the mechanism of management cooperation with the management of the forest area, in this case Perum Perhutani, Forest Management Unit (KPH) Bogor, West Java and Banten Regional Division. Cooperation has not been realized because to reach the location of tourist areas must pass through areas controlled by the army or Kopassus. To facilitate the formation of community institutions using a participatory rural situation study, which is a picture of the problems faced by the community, potential and development opportunities. This result is the basis for the stages of the community empowerment process, namely the formation and development of groups and the preparation and implementation of activity plans by the community. To resolve this problem, the Participatory Rural Appraisal (PRA) was held on July 13, 2019, between Kopassus, Perhutani Public Corporation, Tourism Area Managers, Residents, Village Administrators (Lurah) and from the University of Nusa Bangsa (Figures 20). The application of the Participatory Rural Appraisal (PRA) method is one strategy to empower the community. PRA emphasizes in the process of empowerment and increasing participation in community involvement in overall planning activities for
the development of the Ciampea ECGK. The result of the PRA was that the Manager will make sketches or photographs of Kopassus land use that will be used for the construction of tourist facilities such as parking lots, camping ground, places to sell, and other infrastructures that are deemed necessary. The sketch or photo will be made a report by the village office and will be reported to the Kopassus. After obtaining approval from Kopassus, an LMDH will be formed in collaboration with Perum Perhutani (Table 2)

Table 2. Results of the Land Resolution Meeting

| No | Rated aspect                          | Solution from PRA results                                                                 |
|----|---------------------------------------|------------------------------------------------------------------------------------------|
| 1  | Settlement of land issues with Kopassus | • The Kopasus will study the proposal that each tour manager will make together with the Village. The proposal to be made by the tour manager with the village is complete with photographs or land area that will be used as tourist attractions  
  • The villagers and tour operators immediately make a proposal regarding land use for complete tourist attractions along with photos |
| 2  | LMDH Formation                        | • The villagers, in this case the Cibadak villagers, will process the formation of the LMDH with the Notary if the land problem with the Kopassus has been resolved (the Kopassus agreed to the land application from the proposal made by the tour and village manager) |

Figure 20. Situation of PRA activities

4. Conclusion

1. Lalana Hill interpretation trail were nine roots, ompol flowers, Melehay, love climbs, Sawarna cliffs and peak Lalana.
2. Facilitation has been made in the formation of village tourism institutions by holding a PRA on July 13, 2019
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