“Gunung Api Purba Nglanggeran” welcomes UNESCO Global Geopark Reassessment in 2019

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Abstract. Coincide in 2019, Gunung Sewu UNESCO Global Geopark (UGGp) will be reassessed by UNESCO based on UNESCO’s geopark criteria. This research is conducted to evaluate one of the components of Gunung Sewu UGGp, namely Gunung Api purba Nglanggeran Geosite that is located in Nglanggeran, Patuk Gunungkidul, Yogyakarta Daerah Istimewa Yogyakarta from the geotourism point of view and UNESCO’s geopark criteria. In addition, this research also conducted to present new geotourism objects for Gunung Sewu UGGp especially in Gunungkidul, Daerah Istimewa Yogyakarta. The research methods are divided into two focuses, the field observation method and the geotourism questionnaire method on Gunung Api Purba Nglanggeran Geosite area. Field observation method consists of geomorphological observation, geological structure observation, and lithological observation in the research area. Geosite recommendations are obtained from further analysis of the field observation methods. The Geotourism questionnaire method takes up the evaluation of geotourism at Gunung Api Purba Nglanggeran Geosite based on UNESCO’s geopark criteria with questionnaire respondents from geosite visitors and residents around the geosite area. The research area consists of landscape in the form of ridge, hills, and plains that some areas potentially become new geosites at the Gunung Sewu UGGp. Based on the results of field observation analysis that refer the assessment scheme for value and basic description of geological heritage resources, the new recommended geosites are Kali Ngalang Hulu, Air Terjun Kedung Kandang, Bukit Kembang, Gunung Gentong, dan Batu Miring Oyo. Gunung Api Purba Nglanggeran Geosite is still considered to maintain UNESCO’s geopark criteria. All the results of this research are expected to be used as a simulation for the assessment of UGGp Gunung Sewu pre-reassessment by UNESCO in 2019 and as the consideration of the authorized stakeholders to add geosites to UGGp Gunung Sewu to increase visitor attraction.

Keywords. Geosite; Geopark; Geotourism; UNESCO Global Geopark; Gunung Sewu; UGGp; Gunung Api Purba Nglanggeran; Gunungkidul.

1. Introduction

Gunungsewu was designated as a part of UNESCO Global Geopark (UGGp) in 2015. Once in four
years, UNESCO reassesses every geopark which is incorporated with UGGp. So that in 2019, Gunung Sewu UGGp will be reassessed by UNESCO based on the geopark criteria by UNESCO.

This research is conducted to evaluate one of the components of Gunung Sewu UGGp, namely Gunung Api Purba Nglanggeran Geosite that is located in Nglanggeran, Patuk Gunungkidul, Daerah Istimewa Yogyakarta by the geotourism point of view and UNESCO’s geopark criteria (figure 1). In addition, this research is also conducted to present new geotourism objects recommended for Gunung Sewu UGGp especially in Gunungkidul, Daerah Istimewa Yogyakarta.

2. Data Method

The research methods are divided into two focuses: the geotourism questionnaire method on Gunung Api Purba Nglanggeran Geosite area and the field observation method.

2.1. The geotourism questionnaire method

The Geotourism questionnaire method takes up the evaluation of geotourism for the Gunung Api Purba Nglanggeran Geosite based on UNESCO’s geopark criteria with questionnaire respondents from 98 geosite visitors and some residents around the geosite area. The criteria of geopark is as followings (UNESCO, 2010):

2.1.1. Size and setting. Geopark is an area with clearly defined boundaries. Geopark is also a geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development.

2.1.2. Management and local involvement. Geopark should have effective and professional management structures, deliver policy and action for sustainable regional socio-economic and cultural development across the territory where it is located. Success can only be achieved through strong local involvement.

2.1.3. Economic development. One of the main strategic objectives of Geopark is to stimulate economic activity within the framework of sustainable development.

2.1.4. Education. Geopark must provide and organize support, tools, and activities to communicate geoscientific knowledge and environmental and cultural concepts to the public.
2.1.5. **Protection and Conservation.** Geopark must respect local and national laws related to the protection of geological heritage.

2.2. **The field observation method**

Field observation method consists of geomorphological observation, geological structure observation, and lithological observation in the research area. Objects for geotourism are recommended from further analysis by field observation methods. The analysis is based on “assessment scheme for value and basic description of geological heritage resources” (Table 1) and “potential group that should be targeted for geotourism purposes” [1] below:

2.2.1. **Education groups:** schools, colleges, universities, and adult education organizations;

2.2.2. **Interested information-seeking non-geologist:** an articulate and growing group of individuals predisposed to be sympathetic to conservation and geological sites;

2.2.3. **Thoughtful non-informatif seekers:** an articulate group more interested in the experience, rather than the meaning of geological site;

2.2.4. **Mass of general public:** generally disinterested and non-reader group for whom visiting geological sites is likely to be an accidental or social event.

**Table 1.** Assessment scheme for value and basic description of geological heritage resources [1].

| Value    | Basic Description of Criteria                                                                 | Depiction          |
|----------|---------------------------------------------------------------------------------------------|--------------------|
| Outstanding | Unique. In terms of scientific record, special geological or landform features; significant occurrence or distribution, special ecological function; or combination of any these. | Geotope            |
| High     | Rare. In terms of scientific record, special geological or landform features; significant occurrence or distribution, special ecological function; or combination of any these. | Geosite            |
| Medium   | Contains important scientific record and suitable for education and research purposes.        | Significant geological site |
| Low      | Contains useful scientific record that enhances knowledge and suitable research purposes.     | Geological site    |

3. **Result and Discussion**

Geotourism questionnaires are processed with analytical description method which is written in “Likert Scale” (Table 2) to show the results of UNESCO Geopark Criteria assessment at Geosite Gunung Api Purba Nglanggeran. The results are summarized in Table 3 and Table 4.
3.1. The results of UNESCO Geopark Criteria assessment at Geosite Gunung Api Purba Nglanggeran

3.1.1 Criteria 1: Size and Setting. This criteria has the assessment result in ranged good-very good. According to respondents, size and setting of the Gunung Api Purba Nglanggeran are clearly defined.

3.1.2. Criteria 2: Management and Local Involvement. This criteria has the assessment result ranged in good-very good. According to respondents, residents around the geosite are already involved as geosite administrators. Besides, evaluation of tourism activities at this geosite is also held by the residents once every 35 days to develop the geosite.

3.1.3. Criteria 3: Economic Development. This criteria has the assessment result in good. According to respondents, tourism activities in this geosite collaborate with resident’s enterprises such as cotages, souvenir shops, accomodation and transportation that definately develop residents’ economical sector.

3.1.4. Criteria 4: Education. This criteria has the assessment result ranged in acceptable-good. According to respondents, scientific informations at the geosite are clear enough but hasn’t clearly distributed to the public.

3.1.5. Criteria 5: Protection and Conservation. This criteria has the assessment result ranged in good-very good. According to respondents, protection and conservation at this geosite use the local legend story as a methods.
**Table 3.** Assessments result at the Geosite Gunung Api Purba Nglanggeran by geosite visitors

| Geopark Criteria (UNESCO, 2010)                          | Respondent : Geosite Visitors |
|----------------------------------------------------------|--------------------------------|
| **Criteria 1 : Size and setting**                        | Area with clearly defined boundaries | 63% | Good |
| **Criteria 2 : Management and local involvement**        | Professional management structures | 76,50% | Good |
| **Criteria 4 : Education**                               | Communicate geoscientific knowledge and environmental and cultural concepts to the public | 65% | Good |
| **Criteria 5 : Protection and Conservation**             | Respect local and national laws relating to the protection of geological heritage. | 84% | Very Good |

**Table 4.** Assessment results at Geosite Gunung Api Purba Nglanggeran from residents around the geosite [3].

| Geopark Criteria (UNESCO, 2010)                          | Respondent : Residents Around Geosite |
|----------------------------------------------------------|---------------------------------------|
| **Criteria 1 : Size and setting**                        | Area with clearly defined boundaries | Very Good |
| **Criteria 2 : Management and local involvement**        | Professional management structures | Very Good |
| **Criteria 3 : Economic Development**                    | Stimulate economic activity within the framework of sustainable development. | Good |
| **Criteria 4 : Education**                               | Communicate geoscientific knowledge and environmental and cultural concepts to the public | Acceptable |
| **Criteria 5 : Protection and Conservation**             | Respect local and national laws relating to the protection of geological heritage. | Good |

3.2. **Recommended object for geotourism in the research area**

There are five recommended objects for geotourism in the research area based on “assessment scheme for value and basic description of geological heritage resources” and “potential group that should be targeted for geotourism purposes” from [1] that are written in table 5.
Table 5. Recommended objects for geotourism based on the assessment scheme for value and basic description of geological heritage resources and potential group that should be targeted for geotourism purposes from [1]

| Location | Location Name | Status | Classification of Geotourism Object (Komoo, 2003) | Potential Group Target for Geotourism (Komoo, 2003) |
|----------|---------------|--------|-----------------------------------------------|--------------------------------------------------|
| RG-4     | Kali Ngalang Hulu (Ngalang Upstream) | Geotourism Object Recommendation | Significant geological site | Education group |
| RG-1     | Air Terjun Kedung Kandang (Kedung Kandang Waterfall) | Geotourism Object Recommendation | Geological site | Mass of general public |
| RG-2     | Bukit Kembang (Kembang Hill) | Geotourism Object Recommendation | Geological site | Mass of general public |
| RG-3     | Gunung Geotong (Mount Geotong) | Geotourism Object Recommendation | Geological site | Mass of general public |
| RG-5     | Batu Miring Kali Oyo (Inclined Rock at Oyo River) | Geotourism Object Recommendation | Geological site | Mass of general public |

3.2.1. Kali Ngalang Hulu (Ngalang Upstream). Kali Ngalang Hulu preserves important geological information, such as lava insertion in volcanic breccia formation, lithological contact of the geological record of Nglanggran Formation with Sambipitu Formation, fault movement, bouma sequence structure, and trace fossil. At this location, visitors can view, understand, and learn about important scientific records that are suitable for research and education purposes so that this location is classified as a significant geological site according to the assessment scheme and basic description of geological heritage resources [1]. Geotourism target in this location is education groups according to classification of potential group for geotourism purposes [1].

3.2.2. Air Terjun Kedung Kandang (Kedung Kandang Waterfall). Air Terjun Kedung kandang preserves geological information in the form of Nglanggran Formation outcrops which is a stairs-waterfall form.

Figure 2. Kali Ngalang Hulu (Ngalang Upstream)
Visitors can see the morphological landscape of the western part of Gunungkidul from this site which is an east-west ridge form. Besides that, visitors can also see a lithological type of Nglanggran Formation, pyroclastic breccia. At this location, visitors can also see scientific records that enhance knowledge and are suitable for education and research purposes so that the location is classified as geological sites according to the assessment scheme and basic description of geological heritage resources [1]. Geotourism visitors target at this location is mass of general public by the classification.

3.2.3. Bukit Kembang (Kembang Hill). Bukit Kembang preserves geologic information in the form of Nglanggran Formation outcrop which is located on a ridge of the fault zone. Visitors can see morphological landscape of eastern part of Gunungkidul. Besides that, visitors can also see a lithological type of Nglanggran Formation, pyroclastic breccia. At this location, visitors can also see scientific record that enhances knowledge and suitable for education and research purpose so that the location is classified as geological sites according to the category assessment scheme and basic description of geological heritage resources [1]. Geotourism visitors target at this location is mass of general public according to classification of potential group for geotourism purposes [1].

3.2.4. Gunung Gentong (Mount Gentong). Gunung Gentong preserves geological information in the
form of the Nglanggran Formation outcrops. Visitors can see the geomorphological landscape of eastern part of the Gunungkidul. At this location, visitors can see scientific records that enhances knowledge and suitable for education and research purpose so that the location is classified as geological sites according to the category scoring scheme and basic description of geological heritage resources [1]. Geotourism target at this location is mass of general public according to the classification.

![Figure 5. Gunung Gentong](image)

3.2.5. Batu Miring Kali Oyo (Inclined Rock at Oyo River). Batu Miring Kali Oyo preserves the geological information in the form of Wonosari Formation outcrops. Visitors can see the tilted rock layers to the south due to the past geological process. At this location, visitors can see scientific record that enhances knowledge and suitable suitable for education and research purpose so that the location is classified as geological sites according to the category scoring scheme and basic description of geological heritage resources [1]. Geotourism visitors target at this location is mass of general public according to classification.

![Figure 6. Batu Miring Oyo](image)
4. Conclusions

a. The geopark criteria assessment has a result ranged in acceptable-very good. So it is concluded that Gunung Api Purba Nglanggeran Geosite welcomes UNESCO Global Geopark reassessment in 2019.

b. There are five recommended geotourism objects in the research area: Kali Ngalang Hulu, Air Terjun Kedung Kandang, Bukit Kembang, Gunung Gentong, and Batu Miring Oyo.

References

[1] Komoo, Ibrahim. 2003. Conservation Geology Protecting Hidden Treasures of Malaysia. Kemaman Printing Press Sdn. Bhd. 14-28.

[2] Vogt, W. Paul. 1999. Dictionary of statistic and methodology. Sage: Thousand Oaks, California.

[3] More UNESCO Global Geoparks Network (GGN). 2010. Guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network (GGN). access from http://http://www.globalGeopark.org2018).