The community-based conservation management in gunung sewu unesco global geopark cased study of Nglanggeran Geoheritage

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Abstract. Nglanggeran geoheritage is considered successful, sustainable, and get some recognition from the national and international organization. This site has established purely from the community engagement to take care of their environment by restoring the environment around the ancient volcano areas. The objective of the research is to explore the management model and community participation in conservation activities at the site. The data were collected by the field survey and interview at Nglanggeran village. The data is analyzed by descriptive analysis. The result shows the village create its characteristic strategy to conserve the geoheritage through tourism based on its local resource combined with the concept of Community-based conservation (CBC) adopting from ASEAN Community Based Tourism (CBT) Standard. Nglanggeran stakeholder was able to meet the standard, especially in Standards for conserving natural resources and Standards for conservation activities to improve the environment. The community-based conservation can contribute to the objectives of Agenda 21 at the local scale, highlighting the potential for interaction between socioeconomic development and conservation of the geoheritage natural environment. The community-based conservation is a starting point for tourism to preserve geoheritage through involving and raising public awareness of local communities.

1. Background

Community-based conservation (CBC) has been promoted throughout the developing world as a strategy to conserve natural resources and sustainably use these resources to improve livelihoods of local communities. In contrast to the centralized government management of natural resources, in CBC, the authority to manage natural resources are vested at the local level and policies are formulated by a bottom-up approach [1]. In essence, CBC is a collaborative management framework in which up to three major groups of actors share the power and responsibility to manage natural resources: (i) government agencies (national, state and local governments' bureaucracy), (ii) non-
governmental groups (non-governmental organizations, academic institutions, corporations), and (iii) local communities (tribal peoples, ethnic groups and indigenous communities).

The troublesome relation between local communities, land use, and nature conservation in Indonesia has existed for many decades. In 1945 during which Indonesian states became independent of colonial powers, nature conservation was dominated by state-dominated approaches. Local communities were predominantly seen as a threat to wildlife both inside and outside these national parks, and their rights for consumptive use were limited using strict enforcement.

Gunung Sewu Geopark was designated as Unesco Global Geopark in October 2015 [2]. The geopark covers three provinces with an area of 1,802 km². The management of the geopark includes a total of 33 geo-heritage sites of which 13 sites in Gunungkidul Regency (DIY Province), 7 sites in Wonogiri Regency (Central Java Province), and 13 sites in Pacitan Regency (East Java). The management of the geopark is under the joint agreement among three provincial administrations. At present management is the tourism office of Gunungkidul regency. The management will be rotated alternately among three regencies. However, the management of most of the geoheritage sites is under the local communities, initiated and organized by local people under the organization what the so-called Pokdarwis (community-based tourism management group).

This paper contributes to enrich the use of the local community initiative role to conserve the environment, especially in the geoheritage area. Many learn a lesson from the part of the community to preserve the biodiversity mostly from the protected area.

1.1. Community-based conservation (CBC) and Community based tourism (CBT)

Several countries have passed conservation laws, established institutions and created protected areas to address the problem of biodiversity loss. Until the 1970s, most conservation laws and designations of protected areas as national parks and wildlife sanctuaries in developing countries followed the ‘preservation-oriented’ approach, which advocated centralized-regulatory control and the exclusion of local people and their subsistence forest-based activities to protect biodiversity [3]. Indonesia's conservation law is the National Law Number 5 the Year 1990 concerning the conservation of living resources and their ecosystems. Besides, Indonesia government also ratified some international conventions concerning conservation such as United Nations Convention on Biological Diversity in 1992, The Cartagena Protocol On Biosafety to The Convention on Biological Diversity in 2000, International Treaty on Plant Genetic Resources for Food and Agriculture (IT PGRFA), the International Seed Treaty in 2002.

There have been increasing recognition that local communities must be actively involved, and their needs and aspirations considered, if biodiversity is to be conserved [4]. The 1974 UNESCO Man and Biosphere Programme, the 1980 World Conservation Strategy, the World National Parks Congresses, the 1985 Wildlands and Human Needs programme of the World Wide Fund for Nature, the 1987 World Commission on Environmental Development, and the emergence of ‘ecosystem-based management’ all emphasize the importance of integrating human dimensions into biodiversity conservation policies and programmes [4, 5, 6, 7 & 8]. These trends have encouraged the development of a new conservation paradigm of ‘community-based conservation’. To maintain the sustainability of natural resources, that diversity is one of the keys to sustainable development [9].

In the tourist destination, community-based tourism (CBT) play a significant role to bridge the development and sustainable. CBT empowers local communities to determine and secure their socio-economic futures through fee-for-service activities that usually: present and celebrate local traditions and lifestyle; conserve natural and cultural resources and foster equitable and mutually beneficial host-guest interaction. Therefore, CBT not only involves a partnership between tourism businesses and the community to deliver benefits to both but also involves the community (and external) support for environmental conservation. CBT usually caters to niche markets such as adventure tourism, cultural tourism, eco-tourism, and agro-tourism, but draws on local products and services to spread the economic benefit from engaging in tourism. The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967 also provides the document named The ASEAN Community Based
Tourism (CBT) Standard that adopted by all ASEAN member states as recommended in the ASEAN Tourism Strategic Plan [10]. There are 8 (eight) main CBT Performance Criteria as following.

a. Criterion 1: Community ownership and management
b. Criterion 2: Contribution to social well-being
c. Criterion 3: Contribution to conserve and improve the environment
d. Criterion 4: Encouragement of interaction between the local community and guests
e. Criterion 5: Quality tour and guiding services
f. Criterion 6: Quality food and beverage services
g. Criterion 7: Quality accommodations
h. Criterion 8: Performance of CBT Friendly Tour Operators (CBT FTO)

2. The Purpose
This research was conducted with the purpose;
- to know the geotourism product of Nglanggeran geoheritage
- to know environmental conservation practices based on community-based tourism (CBT)

3. Methods
The location of the research is Nglanggeran Village, Pathuk sub-district and Gunungkidul District. There are several ways of collecting primary data are in-depth interviews, documentation, direct observation, and participant observation. The data type is primary and secondary data. This study is an exploratory study with qualitative methods using the interview method. The analysis of data was conducted by descriptively. The researcher analyzed qualitatively begin to look for the meaning of objects, community activities, possible configurations, causal paths relate to environmental conservation activities.

4. Result
The Nglanggeran Village area is 762,09 ha with land use mostly being used for agricultural land, plantations, fields, and yards. Nglanggeran village consists of five hamlets (sub-village) into one government administration area. Nglanggeran Tourism Village developed rapidly after the establishment of an official management agency named Pokdarwis or Kelompok Sadar Wisata in 2013, that year is the beginning of the management of Nglanggeran Tourist Village professionally [11]. The management of Nglanggeran geoheritage run by Pokdarwis or Kelompok Sadar Wisata (local tourism group) under BUMDes or Badan Usaha Milik Desa (Village Business Enterprise). Pokdarwis is an institution at the community level where the members consist of local tourism actors who have concern and responsibility. A BUMDes is a village businesses entity formed by the local village government to utilize all economic potential, economic institutions, and the potential of natural resources and human resources to improve the welfare of rural communities. The establishment of BUMDes is stipulated by a village regulation. Pokdarwis serves to motivate, organize, and manage the community, especially tourism actors in the implementation of various tourism-related activities. The village government in Nglanggeran contributes to tourism activities, due to the management of tourism managed by Pokdarwis (organization under BUMDes/village-owned enterprises).

The total number of people who directly impacted in tourism is 380 people consisting of 50 people of Pokdarwis committee members, 140 people of guide tour and parking, and 190 of local art performer. Besides, there are also 50 people of culinary provider group, 100 people of local farmer group, 80 people of homestay provider, 3 group of art craft and 21 people of the local street vendor, 50 people of former Indonesian worker, 70 people of livestock group, and 15 people of the cocoa management group.
Based on Figure 1 shows that a fluctuating tourist number development in the year 2010-2018. Total visitor in 2018 was 149,477 people consist of 147,400 domestic and 2,077 foreign visitor. Since 2010-2014 there has been an increase in the number of visits, but since 2014-2018 there has been a decrease in the number of visits. Pokdarwis no longer any more expect to get visitors as many as possible, but they are shifting from free individuals tourist (FIT) to groups who want to do learning activities with the community, such as group tours who have interest in educational environment activities. The decline in the number of visits is part of the Pokdarwis strategy to limit the number of visits to reduce pressure on the environment. Thus the management has placed the Nglanggeran geoheritage destination, not as a mass destination but rather special interest tourism. The development of geotourism is also inseparable from the current conditions in the village.

The agricultural sector is no longer profitable because the area of land managed is getting narrow, and farming inputs are increasingly expensive because of farming subsidies being reduced and worsen by the penetration of cheaper and more massive imported agrarian products [12]. Pokdarwis made various efforts to benefit the development of the tourist village can be felt optimally by the community. The various development steps that have been done by managers such as the development of the ecotourism area. Besides restructuring the region around the construction of supporting infrastructures such as roads, parking areas, places of worship and community empowerment that focuses on the development of local culture, entrepreneurship training has also become one of the forms of tourism development. Surprisingly, continuous development had given a big impact on the environment and became a primary concern. The fundamental changes and transformation of land use, such as tourism, industrial, and primarily commercial, had caused most of the historical place to be abandoned and less respected. Although there are many exciting design concepts and well – planned development that are being introduced to each area, but current development had led to the issues towards the lack of identity and loss of historical value. A clear development plan had created a rapid growth of modern design that has contributed to the decline of identity and distinctiveness character of precious historical places. The new design and ideas will create good visual quality, but sometimes it may not consider in preserving the historical value that is important as the witness of the history of the early development around any particular area. If this phenomenon occurs, our future generation will lose their awareness of history and also missed their chance to recognize the distinctive character of their heritage value. The collaboration between Pokdarwis and the local community is very important to support the implementation of various environment and tourism-related activities. Pokdarwis serves to motivate, organize, and manage the community, especially tourism actors in the implementation of various environment and tourism-
related activities. Below is the geotourism product of Nglanggeran geoheritage managed by Pokdarwis and supported by local government and community.

4.1. The geo-tourism product
The Geotourism product focus on facilities and services designed to meet the need for tourist in geotourism site.

4.1.1. Tourism attraction
Tourism attractions in Nglanggeran Tourism Village are the attraction of the initial appearance of the appeal (the natural attractions) in the form of “Gunung Api Purba” and evolve raising other attractions. To achieve more organized and manageable activities, Pokdarwis manage many tourist attractions. First, Nature attractions which are ancient volcanic and rural natural scenery with numerous cocoa farms, rice field terraces and community forests, flora – fauna such as rare plants, medicinal plants, and rare animals and adventure activities such as rock climbing, flying fox, and rafting. Second, Culture attractions which are living in program, cultural traditional ceremony, Kampung Pitu phenomena (the group of peoples on the peak of the ancient mountain which only consists of 7 Families). Third, man-made attractions which are outbound game playground, Nglanggeran Embung, Agriculture development, package of educational activities with the community. Fourth, crafts attractions which are handicraft, wooden culinary masks, and local crafts made from agricultural potential (sticky sweets made from choco, cassava brownies, instant ginger, local snacks and the latest is processed chocolate. The village has a system for chocolate processing from upstream to downstream. Everything is based on nature “Gunung Api Purba” that serves a wonderful view. Besides, there is also spa tourism, educational and cultural tour. These attractions are presented in the form of tour packages such as travel packages agrotourism, daily live in, local arts and culture, nature adventure, and culinary. The uniqueness of geoheritage especially in Gunung Sewu Global Unesco categorized into three categories, namely the uniqueness of morphology, and the uniqueness of archeology, and also, biological uniqueness [13].

4.1.2. Amenity
The existence of complete and affordable facilities makes tourist destinations in Nglanggeran Village increase the interest of tourists to visit. Some of the facilities provided by the manager are the toilet, gazebo, homestay, hiking trails, information boards, and camping ground. The existence of these facilities provides added value for the convenience of visiting tourists.

4.1.3. Accessibility
Accessibility in the Ancient Volcanic Ecotourism Zone of Nglanggeran is an essential factor that is useful to facilitate and facilitate the mobilization of tourists from one tourist attraction to another tourist attraction. Access to Purba and Embung Volcanoes is an asphalt road while access to the summit is a path because physical development is not permitted.

4.2. Environment Conservation Activities
Management of tourism carried out in tourist areas in Nglanggeran Village applies the principle of CBT, which is one form of sustainable tourism. To find out the condition and quality of a tourist destination, it is necessary to have an assessment that can know the extent to which the destination is managed. The assessment can be done with the object of research in the form of tourism actors, especially the Nglanggeran tourism conscious group as the tour manager of the Nglanggeran Purba Volcano Ecotourism Region. The principle used to adopt the principle of the ASEAN CBT standard. Of the 8 criteria of the ASEAN CBT standard, that are directly related to environmental activities in Criterion 3, which is a contribution to save and improve the environment. CBT initiatives conserve and improve the quality of environmental assets and values. The Sub-criterion of this criteria is natural resources are being conserved and conservation activities to improve the environment.

For Sub-criterion of natural resources are being conserved in Nglanggaraean geoheritage, the local community realizes that the natural resources and environmentally sensitive sites and their community significance are identified, planned, documented and endorsed by relevant communities.
It also some funding exists to support community-based conservation programs and actions. Some conservation programs exist to present the value of natural resources to the local community well-being. Some local rules and regulations exist relevant to the protection of nature. The local community and local government also manage the critical land by establishing the fruit garden with the area are 7 hectares in 2013 and 6 hectares in 2014 by planting the durian, avocado, and banana. The local community also set up the community forest with the area is 200.25 hectares. It also, the community is also doing the preservation of the reservoir.. Water reservoir at Fruit Garden in Nglanggeran Village has an area of 0.34 Ha, used as irrigation for many fruit vegetation especially monthong durian and litchi (*Dimocarpus longan*). This water reservoir is the first Water reservoir located on the top of the hills across in Yogyakarta province, built in mid-year 2012 and inaugurated by the Governor of D.I. Yogyakarta province on February 19th, 2013. A long before the area of water reservoir was bare area and no vegetation, it was only the stone, grass, and bush. The community is willing to preserve the environment, and the benefit can provide enough value both for the improvement of their economic and environment. The reservoir environment is the ancestral heritage that is preserved from generation to generation as a source of life. To maintain the existence of the reservoir, it has been approved by the local community through voluntary work regularly. Pokdarwis is also active in conducting activities that attract tourists so that they are not only traveled but also educated to do conservation. Some of the events carried out are the sak uwong sak uwit program (1 person plant 1 tree) which is carried out during the earth day.

For Sub-criterion of conservation activities to improve the environment. The Pokdarwis and local governments are working together by providing the fund to support community-based environmental improvement action. In terms of geoconservation activities, geoconservation is a growing activity with more participants and a greater profile now than ever before [14]. The local community also manages the critical land by establishing the fruit garden with the area are 7 hectares in 2013 and 6 hectares in 2014 by planting the durian, avocado, and banana. The local community also set up the community forest with the area is 200.25 hectares. The conservation forest initiated by local people and it adds water catchment areas, as well as producing useful oxygen for life. Some of the trees are considered a sacred tree and cannot be cut due to certain reason. The local people maintain environmental hygiene, as well as give an offering or ‘ngguwangi’ (Javanesse language: send offerings to spirit). The offerings given by the people at a time of celebration is intended to protect them not to be disturbed by evil spirits. In term of local flora diversity, this research found 24 species consist of *Eugenia sp.*, *Durio sibethinus*, *Theobroma cacao*, *Musa sp.*, *Gnetum gnemon*, *Nephelium lappaceum*, *Coffea canephora*, *Pometia pinnata*, *Leucaena glauca*, *Pterocarpus indicus*, *Swietenia mahagoni*, *Manihot utilissima*, *Tectona grandis*, *Albizia falcataria*, *Hibiscus rosasinensis*, *Gliciridia sepium*, *Citrus aurantiifolia*, *Cocos nucifera*, *Syzygium aromaticum*, *Muntingia calabura*, *Santalum album*, *Carica papaya*, *Artocarpus communis*, *Gossypium hirsutum*.

For Sub-criterion of Locally appropriate wastewater management uses technologies that minimize risk to human health and environmental impact. Mostly, both in attraction facilities or homestay already meet the standard of SNI (Indonesian Sanitation Standard) wastewater treatment which is a process used to remove contaminants from wastewater or sewage and convert it into an effluent that can be returned to the water cycle with minimum impact on the environment. The local community houses have the toilet standard also. The pokdarwis and local government manage a locally appropriate solid waste management system exists that applies to avoid, reduce, reuse, recycle principles and hygienic handling of putrescible waste example composting. This is important to reduce the impact of negative damage to the environment is by managing solid waste, especially waste. For waste, the efforts carried out are still limited to the surface, such as doing garbage cleaning in the ecotourism area twice a week. Then separate the waste between plastic waste, paper waste, and organic waste. In other words, waste in the ecotourism area of Nglanggeran has implemented 3R (Reuse, Reduce, Recycle). From Nglanggeran itself, every month they can collect 100 kg in average. In addition to garbage collection, there are also other efforts made by the manager to install related
signs which are prohibited from littering. So, the households in both the treatment and the control communities had access to improved sanitation and the environment.

For Sub-criterion of Practices ensure that all rules, regulations, and laws relevant to environmental protection are followed. The management of Pokdarwis has a strong commitment to follow formal or informal regulation including the implementation of local wisdom. The local community in Nglanggeran realize the importance of caring for the environment around them to create a community that is healthy, happy and prosperous, through collective agreements by the indigenous peoples as part of local wisdom that carried out regularly in the village until today relate to conservation activities. Activities of communal work called 'Gotong royong' (working together voluntarily) for the environment has become a tradition. This community service activities include cleaning up the environment, create new roads, repairing roads, building places of worship, clean the reservoir, water sources and build public facilities that conducted the community together. Since the ancestors to the present culture of mutual cooperation are still active and growing in social life. The presence of modern culture potentially shifts the local culture in the village. This is a threat to the spirit of mutual cooperation in the community. The examples of gotong royong are the preservation of the environment of the tomb and Sambatan (help to renovate the house). Formerly the tomb is spooky and haunted. Each corpse was given a cupola or a small house. The location of the tomb became dark with almost no light. Now, most of the tombs without a cupola, and the environment is overgrown with shrubs and grasses. The tradition of cleaning the cemetery became a custom and tradition since the ancestors until now. Not only to clean up the environment around the tombs, but people also pray for the souls of their ancestors. This habit is done in conjunction with the apostleship or clean villages. For Nglanggeran village, clean the tomb is held in conjunction with the apostleship based on the Javanese Calender namely on Wednesday pon, Monday Pahing, and Thursday Legi and Friday legi or Friday Wage. People plant Frangipani flower in the tomb, even the caretaker of the tomb plant crops for his family living. Meanwhile, Sambatan is a social movement after being asked by one of the community to help work like building a house, set up a cage, harvest, transport crops and transporting other goods. During the implementation of community work that has been commissioned by the prayers of the community, not rewarded, but food and drink provided by the hots.

The local community of geoheritage in Nglanggeran is not only organizing tourism in site but it involves many elements that must be always in close connection with geopark’s vision such as education, conservation, interpretation, local development, attraction, and facilities for geotourism diversification in Nglanggeran (Figure 2.). Learning lesson from the management of Nglanggeran geoheritage that the community-based geoconservation can contribute to the objectives of Agenda 21 at the local scale, highlighting the potential for interaction between socioeconomic development and conservation of the geoheritage natural environment. The community-based geoconservation is a starting point for geotourism and geotourism activities can preserve geological heritage through involving and raising public awareness of local communities.

![Figure 2. Geoheritage related element for tourism](image)

Based on the above information, this paper found that the village creates its characteristic strategy to conserve the environment based on its local resources. The research contributes to enrich the use of local initiative role to conserve the environment, especially in the geoheritage area. The studies of the role of the local community in conserving environment can be found at Sobrevila, Curtin, and Gibson.
& Marks [15, 16, & 17]. This research also indicates that the lack of resource can also create opportunity based on local resource harmonious interaction. This interaction creates communities that live in harmony, tolerance, and a strong sense of brotherhood are expected to maintain their balance [18].

5. Conclusion
The expectation and effort of the local community to achieve both environmental conservation and economic development (via geotourism) is strongly determined by involving local communities working together with other stakeholders. The village creates its characteristic strategy to conserve the geoheritage through tourism based on its local resource combined with the concept of Community-based conservation (CBC) adopting from ASEAN Community Based Tourism (CBT) Standard. The strategy of the local community is to develop a common dream to live better in the future, to enhance the awareness of local potency, to conduct program socialization to all stakeholders, to establish collaborative networks, to do innovation, to accelerate the distribution process and to conduct a continuous evaluation. Nglnggeran Geoheritage management is able to demonstrate the responsible, inclusive and sustainable tourism destinations, products and behaviors in Nglnggeran Geoheritage.

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