The Potential of Gorontalo Province as Global Geopark

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Abstract. The extraordinary of geodiversity together with the ecological resources and profound cultural heritages provide a valuable basic of geotourism and geopark development. The purpose of this paper is to show the possibilities of geological interpretation, geotourism, and cultural heritages in the area of Gorontalo province that would become valuable basic to promote geopark. The collected data was carried out by field observation and literature review. The results of this study indicate that the Gorontalo has the potential of geopark and would serve as tourist destination in Sulawesi by applying the concept of Geotourism which accentuate natural side, by optimizing the management of destination attractions, facilities and services, and accessibilities.

Keywords: Gorontalo province; geopark; geotourism; resources.

1. Introduction

Ageopark is a territory with well-defined limits that has a large enough surface area for it to serve local economic development [1]. The Geopark comprises a number of geological palaeontological heritage sites of special scientific importance, rarity or beauty; it may not be solely of geological-palaeontological significance but also of archaeological, ecological, historical or cultural values [2].

UNESCO Global Geoparks Network (GGN) are single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development.UNESCO Global Geoparks use geological heritage, in connection with all other aspects of that area's natural and cultural heritage, to enhance awareness and understanding of key issues facing society in the context of the dynamic planet we all live on [2,3].

The policy of geopark is preservation, education, and geotourism. Geopark concept is one of the ways to be developed it yet protect the quality of the environmentand improve the economy of local community [4]. In some cases, Geopark concept has proved to bring the sustainable economic benefits and increase the conservation of nature, culture, aesthetics, heritage, and quality of life [1,4–6].This concept is relatively new, and its definition can change over time.

Today, 127 GGNs are spread across 35 countries (Figure 1), including 2 in Indonesia that is Batur and Gunung Sewu, due to their rich geological and natural heritage. Furthermore, Indonesia has Indonesia Geopark Network (IGN) that is network between many stakeholders related to the Geopark. Recently, IGNs are distributed into 4 National Geoparks and 16 National Geopark candidates (Figure 2).

The aim of this paper is to review the possibilities of geological interpretation, geotourism, and cultural heritages in the area of Gorontalo province that would become valuable basic to promote geopark.

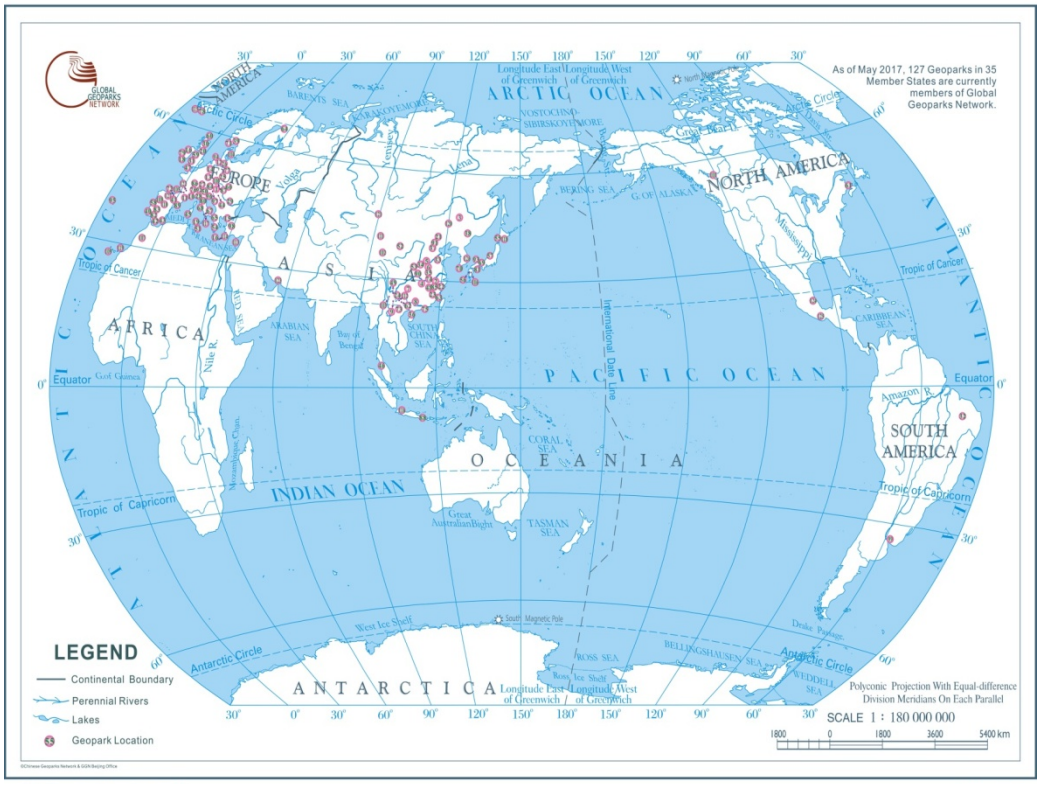

Figure 1. The distribution of the Global Geoparks Network in world[3].

Figure 2. The distribution of the Indonesia Geopark Network [7].

2. Material and Methods

Study area is Gorontalo Province located on the Gorontalo Peninsula on Sulawesi Island, precisely in the western part of North Sulawesi Province (Figure 3). The total area of the province is 12,435.00 km^2 with a population of 1,133,237 people in 2016, with a population density of 88 people/km^2 [8]. Gorontalo Province is composed of 5 regencies and 1 municipality that are Boalemo, Bone Bolango, Gorontalo, North Gorontalo, Pohuwato regencies, and Gorontalo city. Each administrative region consists of several administrative areas, subdistricts, and villages. In 2015, Gorontalo Province consists of 77 subdistricts and 735 villages.

The locations to observe geodiversity, biodiversity and culture heritage are scattered in Gorontalo province. The method of this study is to review literatures and the results of field observations.

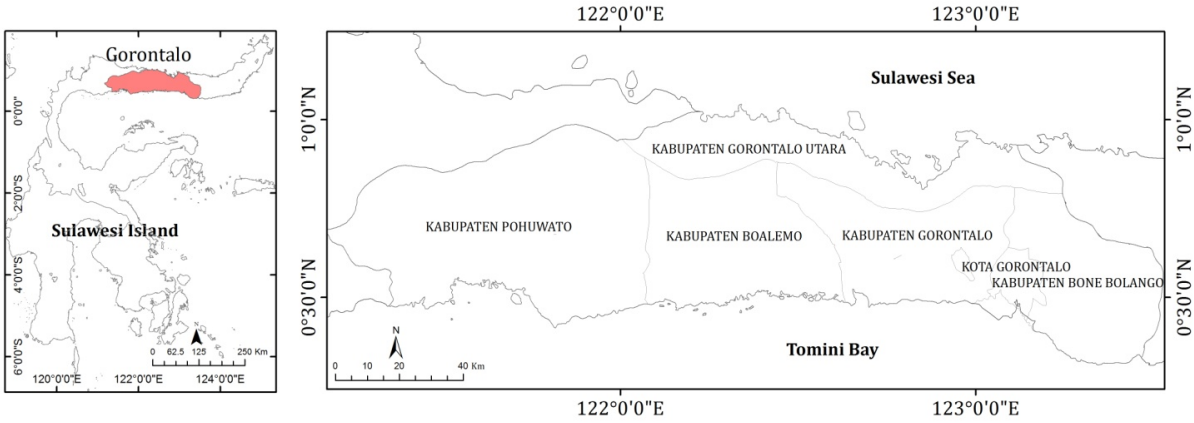

Figure 3. The location of Gorontalo Province

3. Results

3.1. Geodiversity

Geodiversity is defined as "the natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landform, processes) and soil features. It includes their assemblages, relationships, properties, interpretations and systems" [1,9]. The rich geodiversity in the Gorontalo province includes lake, waterfall, hot springs, beautiful island, bay, coast, special volcano etc. The 18 locations which can be the candidates for geosites are listed: 1 lake, 1 bay, 4 small islands, 3 waterfalls, 7 coasts, 1 hill, and 1 hot spring (Figure 4). Gorontalo province has more locations showing its great geodiversity, but many of them have not been explored, studied, or not well-established for geotourism.

Furthermore, the Gorontalo province has characteristic geology as a result of double subduction between the Celebes/Sulawesi sea plates and the Sula-Button continental and oceanic plate [10–12]. This character has given the Gorontalo province as typical of Geopark. However, research is needed to develop this area for geotourism.

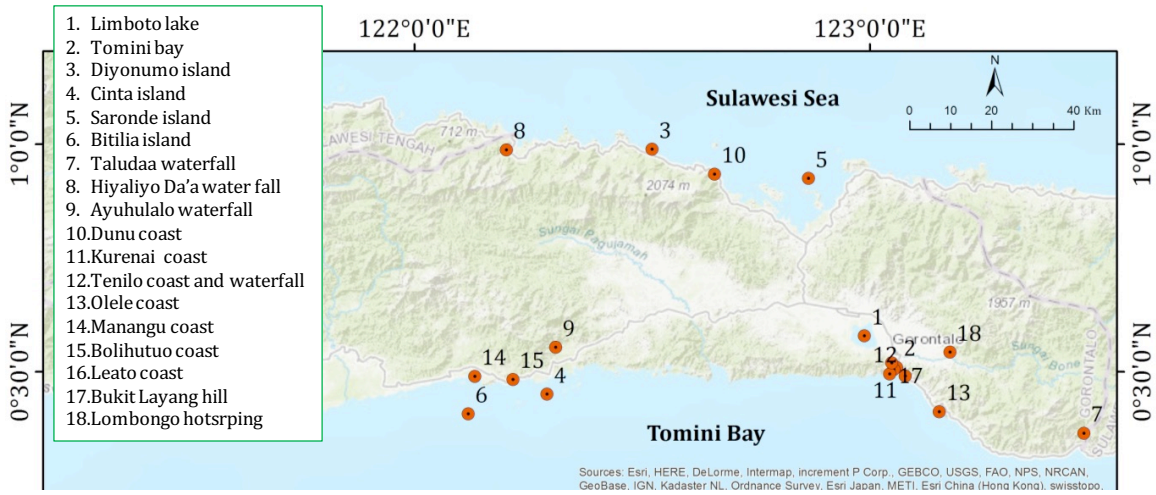

Figure 4. Location of geosite candidates in the point of view of geodiversity in Gorontalo Province

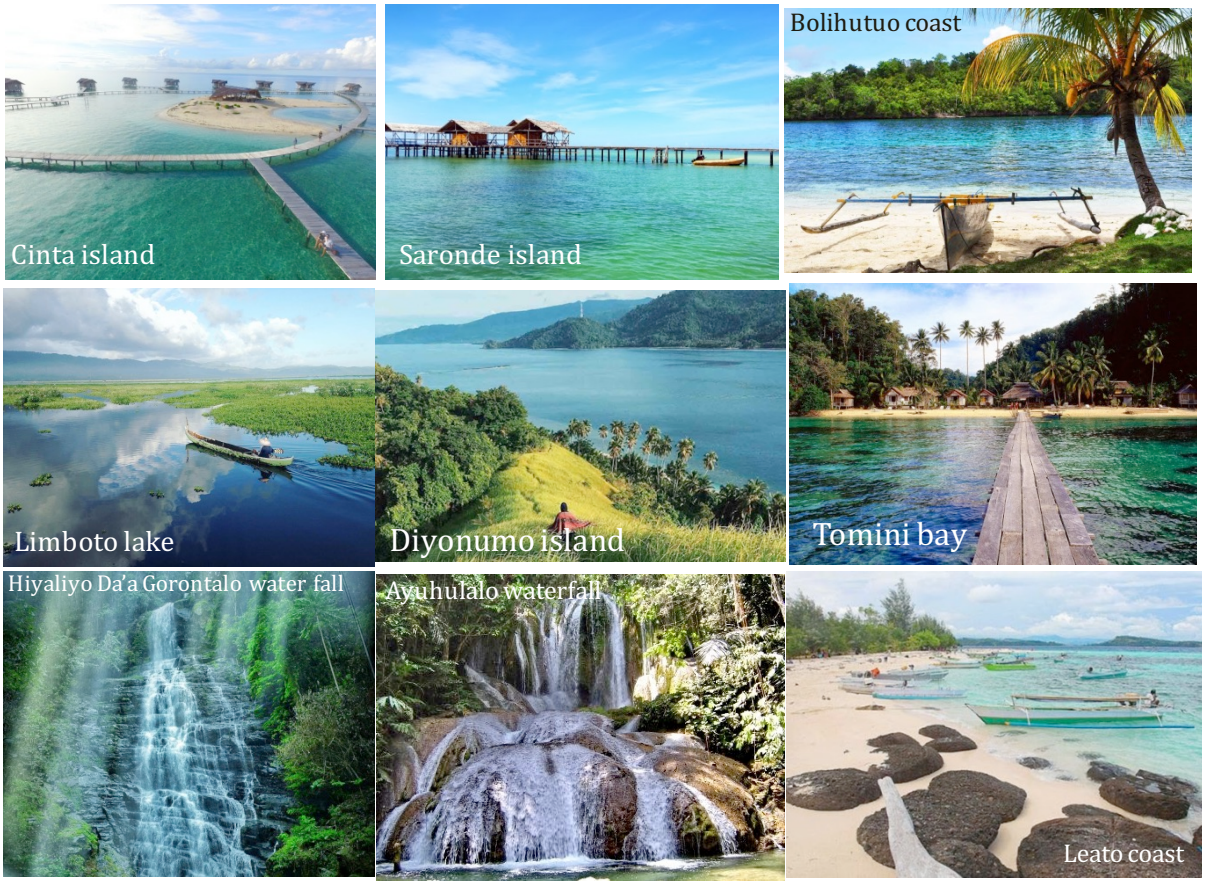

Figure 5. Photos of the variant geodiversity in Gorontalo Province (Source photo:[13–15]).

Figure 6. Several photos of biodiversity in Gorontalo Province (Source photo:[13–16])

3.2. Biodiversity

Biodiversity is the variety of life in the world, a particular habitat, or ecosystem. Gorontalo province has potential of the variant of flora and fauna. In the forest of Gorontalo has a good vegetation with distinct elevation distribution provides good habitats for wild animals.

Gorontalo has one national park, the Bogani Nani Wartabone national park, which conserves the Sulawesi's rich and unique flora and fauna with its protected 2.871.15 km^2 in area [17]. In this national park hosts a variety of species of animals, such as mammals (24 species), poultry (125 species), reptiles (11 species), amphibians (2 species), butterflies (38 species), beetles (200 species) and fish (19 species). In this park, we can find several endemic species of animals and plants that are protected because of endangered. The endangered protected animals area burung maleo (*Macrochepalon Maleo*), monyet yaki (*Macaca Heckl*), bone kelelawar (*Bonea bidens*), kuskus kerdil (*Phalanger Celebensis*), cinnabar boobook (*Ninox Ios*) and kuskus beruang (*Phalanger Urnisus*)[17,18]. Burung maleo (Figure 6) and kelelawar bone are the animals that became the mascots of this National Park [8,16,17].

In the grove of this forest, we can find plants of various types such as trees (400 species), high plants (241 species), nail plants (120 species), lichen plants (100 species), and orchids (90 species). Among them we can also find endemic plant species and rare plants in this park. For example; matahari matayangan (*Pholidocarpus ihur*), kayu besi (*Intsiaspp*.), kayu hitam (*Diospyros celebica*), kayu kuning (*Arcangelisia flava*), and Flower Carcasses (*Amorphophallus companulatus*) [8,16,17].

Furthermore, in the ocean of Goronatlo province, we can find the Bahari whale shark, sea turtle, and beautiful coral. This area attracts many domestic and foreign tourists (Figure 6). In some cases, the government and local people involve the preservation of geodiversity. Whale shark, for instance, are the great sources for tourism, but the Maritime Affairs and Fisheries Minister has supported the preservation of 17 whale sharks in the Gorontalo area with new rules [19]. The local community also shows the positive manner to preserve the biodiversity with releasing baby sea turtles, which decreases their number caused of illegal poaching [20].

Figure 7. Photos of the representative of culture heritage in Gorontalo Province. a. Masjid Walima Emas; b. Gorontalo home custom; c. Religious Bongo village;d. Benteng Otanaha; e. Kerawang traditional clothes; and f. Binte Biluhuta [13–15].

3.3. Culture Heritage

The purpose of a geopark is to explore, develop and celebrate the links between geological heritages and all other aspects of the natural, cultural, and intangible heritages [1]. Cultural diversity is as necessary for humankind as biodiversity in nature (UNESCO 2015). The geopark area should include not only geological heritages but also areas of relevant biodiversity, archaeological heritages, and areas where the historical and cultural sites that have a connection with local geodiversity.

Cultural sites in the Gorontalo province include custom home, religious district, historical place, and food (Figure 7). Some religious districts and historical places such as Masjid Walima Emas, Religious Bongo village, Benteng Otanaha, and Suku Bajo village could attract domestic and foreign tourists. All these cultural sites, needless to say, demonstrate their cultural values to local and foreign visitors with the local assistance, and and are related to geodiversity and/or biodiversity. For instance, Benteng Otanaha, the Otanaha Fortress which was built on the hill in 1552, was constructed with local sand, calcium, and eggs of Maleo birds [21]. The geological setting which are relatively close to the coast with abundant sand and coral and the inhabitance of local birds have supported the building materials of Benteng Otanaha.

Kerawang as traditional cloths could be a pride and an icon of Gorontalo to the world. Binte Biluhuta, a corn soup of local Gorontalo, has raised from the background of the one of the largest corn producers in Indonesia. These tangible and intangible heritages are already parts of local and foreign tours;

however, this study suggests that local people should have better understanding the values of heritages and keep the tradition orpride of Gorontalo, without mixingthe foreign culture.

4. Conclusion

- The extraordinary geodiversity together with the ecological resources and profound cultural heritages provide a valuable basic of geotourism and geopark development.
- Gorontalo province has the potential to become a global geopark
- Suggestion from this research as follows:
  - To study and collect the data of geodiversity, biodiversity, and culture heritage.
  - To make local committee for Geopark: local governments, universities, and geological agencies.
  - To develop the destination management, facilities, services, and accessibilities.
  - To establish the bottom-up approach to solve the local problems and to develop the wide variety of contents in nature.

References

[1] Han J, Wu F, Tian M and Li W 2017 From Geopark to Sustainable Development: Heritage Conservation and Geotourism Promotion in the Huangshan UNESCO Global Geopark (China) *Geoheritage* 1–13
[2] UNESCO 2014 Guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network (GGN)
[3] UNESCO 2006 Global Geoparks Network *Earth* 6
[4] Ginting N, Rahman N V and Sembiring G 2017 Tourism Development Based on Geopark in Bakkara Caldera Toba, Indonesia *IOP Conf. Ser. Mater. Sci. Eng.***180** 12086
[5] Dowling R K 2011 Geotourism's Global Growth *Geoheritage***3** 1–13
[6] Errami E, Margaret B and Semeniuk V 2015 *From Geoheritage to Geopark: Case Studies from Africa and Beyond* (Springer)
[7] Indonesia Geopark Network Indonesia Geopark Network
[8] Badan Pusat Statistik Provinsi Gorontalo 2016 *Gorontalo Province In Figures 2016*
[9] Gray J M 2004 *Geodiversity : valuing and conserving abiotic nature*
[10] Seismic Atlas of SE Asian Basins 20 North Sulawesi Basin
[11] Zhang Q, Guo F, Zhao L and Wu Y 2017 Geodynamics of divergent double subduction: 3-D numerical modeling of a Cenozoic example in the Molucca Sea region, Indonesia *J. Geophys. Res. Solid Earth***122** 3977–98
[12] Walpersdorf A, Vigny C, Manurung P, Subarya C and Sutisna S 1998 Determining the Sula block kinematics in the triple junction area in Indonesia by GPS *Geophys. J. Int.***135** 351–61
[13] Aneka Wisata Seru 31 Tempat Wisata di Gorontalo yang Wajib Dikunjungi -
[14] Mytrip123 15 Top Tempat Wisata Di Gorontalo Yang Wajib di Kunjungi
[15] THE COLOUR OF INDONESIA Flora dan Fauna Gorontalo
[16] Go Celebes Taman Nasional Bogani Nani Wartabone
[17] Ministry of Forestry of Indonesia 2015 "Bogani Nani Wartabone National Park"
[18] Rasmussen P C 1999 A new species of hawk-owl Ninox from North Sulawesi, Indonesia *Wilson J. Ornithol.***111** 457–64
[19] Suhari S H M 2016 Gorontalo whale shark site reopens, with new rules *Jakarta Post*
[20] Suhari S H M 2017 Baby turtles released in Gorontalo conservation event *Jakarta Post*
[21] Napu N 2016 *Translation in tourism: understanding the quality of translation across multiple perspectives* (University of South Australia)