



Caldera Toba UGG Yellow Card and Stakeholder Synergy Issues

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Article Info

Article history:

Received 3 July 2025

Received in revised form 5

August 2025

Accepted 5 September 2025

Keywords:

Caldera Toba UGG

Ecological Damage

Stakeholder Segmentation

UNESCO Yellow Card

Abstract

The designation of the Caldera Toba as a UNESCO Global Geopark (UGG) opens up great opportunities for Indonesia to be increasingly recognized in the eyes of the world, especially in the field of tourism. The uniqueness of the Caldera's geographical and morphological conditions is enhanced by the development and construction to promote the caldera to foreign and local tourists. However, in 2023 due to the lack of synergy between the government and local communities, UNESCO gave a yellow card as a warning to the Caldera Toba UGG. This research will argue the problems that occur in the Caldera Toba UGG and offer solutions that can be discussed again by the parties. The method used in this research is a literature study using books, reports, articles, journals, and other literature sources relevant to this discussion. Ecological damage caused by external and internal factors is the main factor in the damage and decline in tourist visits, in addition to the segmentation of power between stakeholders. These two factors are interrelated and need a balance of roles to overcome the problems of the Caldera Toba UGG yellow card.

Introduction

Indonesia is rich in geodiversity, biodiversity, and cultural diversity, which is an advantage over other countries. These three aspects are spread across several regions, one of which is the Toba Caldera which was designated as a UNESCO Global Geopark (UGG) in an executive session in Paris on July 7, 2020. This achievement opens up great opportunities for Indonesia and especially for local communities in carrying out economic, social and cultural development (Haryono et al., 2022; Muslim et al., 2022). Lake Toba is the largest volcano-tectonic lake in the world and the largest in Southeast Asia, located in North Sumatra Province. The lake measures (90 x 30 km²) and is also the largest Quaternary volcano-tectonic caldera (giant volcanic crater) in the world. This caldera was formed by the collapse process after the super volcano eruption of the ancient Toba volcano, then filled by rainwater. Lake Toba has a length of 87 km in the direction of northwest Southeast with a width of 27 km with an altitude of 904 meters above sea level and the deepest lake depth of 505 meters. In the middle of Lake Toba is Samo sir Island with an altitude ranging from 900 to 1,600 meters above sea level, which was formed due to the uplift of the lake bed after the caldera eruption that occurred 74,000 years ago (Lumbanbatu, 2025; Silalahi, 2025).

The morphology of the caldera walls forms valleys that become a caldera rim watershed with a catchment area of 3,658 km² and a lake surface area of 1,103 km² (Lebedeva, 2022). This catchment area is in the form of hills (43%), mountains (30%) with a peak altitude of 2,000 meters above sea level (27%) where people do their activities (Hidayat & Nasution, 2019). The unique geographical and morphological conditions of the caldera are also enhanced by the development and construction to promote the caldera to foreign and local tourists (Kozlov & Lebedeva, 2024; Giordano et al., 2024; Gunda et al., 2025). The tourist destination offered is The Caldera Toba Nomadic Escape with various tour options, such as overland tours to

surrounding tourist villages, glamping, and taking pictures at the best spot called Jokowi Spot. The entry of various investors is also one of the impacts of the designation of The Caldera Toba as a UGG. Unfortunately, UNESCO has given a yellow card after a two-member assessment team visited The Caldera Toba on August 31 - September 4, 2023. The warning was issued due to the local government's perceived lack of action to continue promoting the Caldera Toba and the environmental damage that occurs almost every year (Panjaitan et al., 2023; Muzambiq et al., 2021; Eriza, et al., 2024). This UNESCO yellow card restricts renewal every four years for the Caldera's Toba status as a UNESCO Geopark. If there is no improvement, the status will be revoked. Environmental damage began to be highlighted when in 2023, the Tele Forest surrounding Samosir Island experienced a 40-hectare fire in Sitio Tio, Harian, Sianjur Mula Mula sub-districts up to the border of Dairi Regency (Raihan, 2023; Smith et al., 2023; Vera et al., 2023). Forest degradation occurs due to intensive forest exploitation by licensed and unlicensed companies. In fact, according to the results of Simandjorang et al. (2022), Coordinator of the Education, Research and Development Division of Lake Toba Geopark, fires are difficult to extinguish due to the lack of infrastructure and forest fire prevention has not been carried out by the government and the community (Kennedy et al., 2023; Rosdiana et al., 2025). Socialization to the community so as not to burn land and forests is also not intensive. In addition, the lack of attention from the provincial government (mongbay.co.id).

Ecological problems will continue to occur if there is no synergy between stakeholders and local communities (Eikelenboom & Long, 2023; Awa et al., 2024). The need for a balance of roles between the government and local communities, so that there is no domination of power that can damage the Caldera Toba environment. For this reason, the recovery agenda for the Caldera Toba area must involve ecological and social perspectives, to ensure that it is not only saving traditional village forest (Lumbanbatu, 2025; Panjaitan et al., 2023; Sibarani et al., 2025). But also, as a landscape. In addition to focusing on ecological issues, local communities are also expected to play a role in the development of Caldera Toba tourist destinations as an effort to improve the economy and social community. The entry of various foreign investors will be uncontrolled if the economic sector is also not balanced by the economic sector whose actors are local communities. The area must pay attention to protection, development of education, science, culture, and socio-economic values (Hariram et al., 2023; Azadi et al., 2021). In addition, UNESCO empowers local people and communities in developing cohesive partnerships. UNESCO Global Geoparks are designated through a bottom-up process that involves all relevant local and regional stakeholders and authorities in the region (e.g. landowners, community groups, tourism providers, indigenous peoples, and local organizations). This process requires strong commitment from local communities, strong local partnerships with long-term public and political support, and the development of a comprehensive strategy that will meet all community objectives while showcasing and protecting the geological heritage of the area (Masuda et al., 2022; Rijal, 2023). Therefore, this research focuses on discussing the changing ecological conditions of the Caldera Toba, examining the synergy of the roles of the government and local communities in the development of the Caldera Toba UGG, and the efforts that can be offered between the government and local communities to improve the yellow card status given by UNESCO.

Methods

This research is literature study research whose main sources are books, journals, articles, and other research reports which will later be integrated, analysed, to answer research questions. The limited time to go directly to the field is the main reason this research uses literature studies. This technique is carried out to reveal various theories that are relevant to the problems being faced or studied as reference material in the discussion of research results. The data

analysis used is an analysis of the ecological conditions of the Caldera Toba UGG and the local knowledge of local communities used to harmonize the policies that need to be carried out to improve development and development in the Caldera Toba UGG.

Results and Discussion

The findings obtained from digital media, especially digital news platforms such as kompas.com and voaindonesia.com, that the status of the Caldera Toba as a UNESCO Global Geopark (UGG) is threatened with revocation because it received a yellow card from UNESCO. The causes of UNESCO giving a yellow card during the first evaluation and validation visit in August 2024, namely: 1) Suboptimal governance, especially in terms of institutions, human resources, and budget, 2) Environmental damage, especially in the Lake Toba area, 3) The absence of significant participation from local communities in geopark management (Elazhari et al, 2024). Other findings were also published in mongbay.com digital news that there has been environmental damage caused by fires and floods in 2023. An area of 40 hectares was burned and the effects were sustained, such as being prone to landslides and flooding. Environmental damage in the Caldera Toba UGG area itself has actually occurred since 1983, the main cause of which is mining. At present, the impact of environmental damage that has started since the 1990s is still continuing (Jie et al., 2023; Al Mubarak et al., 2024; Chang et al., 2023). This condition is further exacerbated by the rampant development of tourism and other infrastructure, such as hotels, restaurants, and others that do not consider the development and protection areas of the Caldera Toba UGG area. The above problems are complicated and difficult to handle because of the lack of cooperation between the central government, local governments, and local communities, making these ecological problems difficult to handle.

Ecological damage to the Caldera Toba UGG area

Environmental damage to the Caldera Toba UGG area has started since the arrival of investor PT Inti Indorayon Utama (IIU), which is now better known as PT Toba Pulp Lestari, TPL, since they obtained a license from the Investment Coordinating Board (BKPM) at the end of 1983. This opportunity provided a great opportunity for PT TPL to work on as much forest as possible. In 1984, the Ministry of Forests gave permission to work on 86 hectares of pine forest in North Sumatra and the following 2 years the opportunities provided by the ministry became even more widespread. Forest Concession Rights (HPH) were granted to PT TPL covering an area of 150 hectares, almost double the size of the first grant. This was also supported and difficult to intervene by indigenous peoples even though by right, the forest belonged to Ulayat traditional village, because at that time the New Order political system in Indonesia silenced the voices of the people. In 1988, PT TPL began operations on 200 hectares of land in Sosor Ladang, Parmaksian sub-district and based on an audit by Labat Anderson Incorporated, a US consulting firm commissioned by the government (to be precise: Bapedal) announced the results of its audit in 1996 that in addition to pulp and rayon (an essential element for textiles) they were also producing large quantities of chemicals for their own use (Source: Walhi, the people's movement alliance to close PT TPL).

The wastes generated from the factory's activities pollute the water of the Asahan River, which is the source of water for households and agriculture (Fashae & Obateru, 2021; Anggraeni et al., 2023; Mumtaz et al., 2023). Lack of clean water also has an impact on dead agricultural land so that farmers fail to harvest. Not only is the water polluted, but also the air is polluted with chemicals so that the skin becomes itchy, and tragically, the zinc roofs become holes. For the record, around 34,817 hectares of PT TPL's concession are located in the Lake Toba catchment area (DTA). DTA is an area or point where rainwater is captured and accommodated

and the most important part of a watershed area. This rainwater will later flow through the hillsides and move towards the river and will form a watershed area. The natural forest in the Lake Toba watershed has been converted into eucalyptus plantations. In the last 30 years, the water level of Lake Toba has also shrunk. Currently, the average water level of Lake Toba is 903.30 meters above sea level, which has shrunk by about 1.7-2 meters (Kompas.com, 10/10/2016). This is influenced by the destruction of forests in the upper reaches of Lake Toba, which directly reduces the water supply of hundreds of surrounding rivers. The impact is not only ecological. The social and economic life of the community is also affected. The need for water is increasingly disrupted and the need for agricultural irrigation is threatened. According to local farmers, in the 1970s and 1980s, their rice harvest was sufficient for six months. But now it only lasts 2 months because agricultural businesses are experiencing a water crisis. The irrigation system that used to be managed by *Raja Bondar* is no longer functioning because the water source is drying up (Drobitko et al., 2025; Madesh et al., 2024; Cardoso & Bodnar, 2022).

Forests were cleared and replaced with water-consuming *eucalyptus* plants. *Eucalyptus* plants were chosen as monoculture plants to maximize and accelerate the need for raw materials for pulpwood production. According to Old et al. (2003 in Winarni, 2009) that *eucalyptus* plants have a fast growth rate even in critical places these plants can grow. The forest, which was originally a biodiverse ecosystem, has now become monocultural. Flora and fauna species eventually cannot adapt so they will most likely die or be forced to look for safer habitats. This impact will continue, Lake Toba is fed by polluted water, the water catchment area becomes crisis, damaged, even destroyed. As a result, the surface of the largest lake in Southeast Asia continues to decline. In the period May 1984 - June 1998 it had already receded by 2.86 meters, according to LAPAN; now it is much worse. On the other hand, landslides and flash floods are increasingly looming. On October 7, 1987, for example, two landslides occurred (3 hours apart) in Tampean Hill, Silaen District. As a result, 18 people were killed. The landslide was caused by the haphazard opening of a road connecting Silaen with the villages of Sianipar (I and II), Natumingka, and Dolok Jior, by Indorayon. (Source: Walhi, people's movement alliance to close PT TPL). The hills are increasingly deforested and expanding, in 2021 in the month of May, flash floods entered the tourist town of Parapat. It seems that the communities around the Caldera Toba UGG area are forced to be prepared and adapt to floods and landslides that cannot be predicted when they will come.

Not only do floods and landslides occur almost every year, but so do fires. The domino effect caused by years of environmental degradation has gradually caused nature to run wild, such as fires. The ecological condition of the Caldera Toba UGG area, which is surrounded by the Tele Forest, has suffered environmental damage due to forest fires. Almost every year Tele Forest experiences fires, this is caused by forest exploitation by licensed and unlicensed companies. A number of extractive companies operating in the Tele Forest in the Lake Toba region are PT Toba Pulp Lestari, PT Aquafarm, PT Allegrindo, PT Gorga Duma Sari, PT EJM, and PT Gunung Raya Timber. Research related to Tele Forest has been conducted by Hutan Rakyat Institut (HaRI), Fachrizal Sinaga, Fellow Researcher of HaRI, explained that forest exploitation carried out by licensed and unlicensed companies in the Lake Toba region and around, causes environmental imbalance (mongbay.co.id).

This fire burned 40 hectares of forest, which in turn made it difficult for the soil to capture water, during the rainy season it will cause flooding and during the dry season it will be difficult to find water. This year, a few months ago on July 15, 2024, a severe fire hit the protected forest area of Siarubung, Dolok Sijonaha, Sipitu Dai Village, Sianjur Mulamula District, Samosir Regency, North Sumatra. Data from the Environment and Forestry Service of North Sumatra Province shows that the burned area reached 300 hectares. Environmental

degradation, which began in the 1980s and whose impacts are still ongoing, is a response to nature, which is increasingly fed up with the greedy and selfish nature of humans without considering nature as a resource provider. The series of natural damage events is an accumulation of nature's anger. Since the establishment of the Caldera Toba UGG area, the government has been aggressively improving and developing tourism destinations. The plan starts with good intentions, but again, good intentions do not always produce good goals if the policies and strategies used are only concerned with one side. Tania Li in her book *"The Will to Improve"* provides a relevant picture of how governmentality as the ruler of policy, often creates various problems for the environment. The government in designing various developments in the Caldera Toba UGG area is not matched by strategic policies, for example the artistic bridge funded by the 2020 - 2022 State Budget (APBN) worth Rp 157 billion, this canal is certainly groomed to support the Lake Toba super priority tourism program. The lake area is decreasing. This has encouraged the "privatization" of beaches for the construction of hotel facilities, settlements, and agricultural areas. In addition, the decline in lake water levels has also disrupted national electrical energy needs in North Sumatra because hydropower plants in the downstream Asahan River are difficult to operate optimally.

In addition to ecological problems, based on research conducted by Hari, the unclear regulations and authority regarding a number of villages that are included in the forest area make the village government lose the authority to organize development in their area. Without rules that protect the interests of the community and the environment, investment flows will take away community management space. As a result, it creates a new social-ecological crisis and make worse the situation.

Government and Local Community Synergy

The role of the government and local communities is key to the sustainability of the development and progress of the Caldera Toba UGG area (Orpha & Gandhi, 2021; Naibaho & Su, 2025). The establishment of the Caldera Toba UGG area as one of UNESCO's world heritages is the pinnacle of success and a challenge for all elements of the local community. UNESCO provides bottom-up policies to the local caldera community in regulating and making policies that prosper from social, economic, and cultural aspects. Local knowledge and local indigenous government have an important role in resolving this polemic. Policies made must consider local knowledge that is in accordance with the culture and ecology of the Caldera Toba. Referring to Camelia Dewan's ethnographic work entitled *"Misreading the Bengal Delta"* which suffered damage due to errors in setting policies, key factors such as the government, NGOs and consultants have an important role in development programs in the coastal areas of Bangladesh. Unfortunately, with the involvement of various actors and their interests, there are errors in the production of knowledge in the Bengal Delta because the narrative is formed and made in general without looking at the context and conditions that actually occur in the Bengal Delta.

Development that tends to simplify complexity exacerbates environmental risks and the vulnerability of local communities. Therefore, this could also happen in the Caldera Toba if local knowledge from the community is not taken into consideration. The polemic of environmental damage is the main challenge to improve at least try to minimize the ecological damage that continues to occur. Elazhari et al (2024) in their discussion with the manager of the Caldera Toba UGG area explained their field results that the yellow card status given by UNESCO to the Caldera Toba UGG area was due to environmental damage and the lack of local community participation in the development of this area. According to his discussion, the lack of socialization and understanding of the Caldera Toba UGG area is the basis for the lack of local community participation. Meanwhile, the government, which has a higher position

with various good intention plans that are trying to be realized, is superior in making decisions and policies. Tania Li in her book *"The Will to Improve"* should open our eyes to see "development" as a realistic object in the field with various polemics in it. Tania explains the bitter side of a good intention based on the desire to prosper the lives of many people, not necessarily the good intentions are realized, instead bringing prolonged and sustainable misery. During the New Order era, efforts made to prosper the lives of many people were commonly called "development". Tania explained that the gap between intentions, plans and promised prosperity can arise due to three things: The prosperity program itself is not value-free, the people to be built are not empty spaces without values, without will, without movement, and can be filled by anyone. And the groups that want to build (government, religious organizations, NGOs, etc.) are also not free from group interest. Neither the group that wants to develop nor the one that is the object of its will is a single entity. Rather, they are multiple social entities with different plans and views, which may conflict with each other. For example, the government's plans may conflict with those of donor agencies. Miscalculations, lack of information and wrong assumptions due to the inherent paradoxes in the development planning process, which Tania calls the "technicalities of problems". All elements of society are controlled because it makes it easier to implement development programs. At the same time, these three factors can crowd out essential factors within the community itself. Therefore, the government and local communities should not be separate entities but merge in the same interest, for the entire community of the Caldera Toba UGG area. Local knowledge is important and the basis of the solution to this problem, understanding the importance of local knowledge, traditions and practices that exist in the community. The need for support and positive responses from local governments to local knowledge policies and the synergy of local government policies will create meaningful change.

Government and Community Response

The yellow card status given by UNESCO in the first evaluation and validation assessment in the Caldera Toba UGG area became a turning point reflecting the efforts of the government and the community in jointly maintaining UNESCO's world heritage status. Factors that cause UNESCO to give a yellow card warning include (Elazhari et al, 2024): Environmental damage in the Caldera Toba Caldera UGG area. Suboptimal governance, especially in terms of institutions, human resources and budget. The geopark management institution is still attached to the North Sumatra Provincial Culture and Tourism Office. Human resources for geopark management are still inadequate, especially in terms of expertise and experience. The budget for geopark management is also still limited. In response to this problem, several efforts have been made to improve and maintain UNESCO's world heritage status. Based on research conducted by Elazhari (2024) the results of discussions with the manager of the Caldera Toba UGG area, the following efforts have been made in fixing this problem, namely: Reorganizing the management body.

The management body of the Caldera Toba UGG has been reorganized into an independent body. This is expected to increase the effectiveness of geopark management. Improving human resource capacity. The Caldera Toba UGG area manager has made various efforts to increase the capacity of human resources, including through training and internships. Budgeting special funds for geopark management. The North Sumatra Provincial Government has allocated special funds for the management of the Caldera Toba UGG area. This is expected to increase the budget for geopark management. Conduct socialization to local communities about the geopark. These efforts cannot be relinquished to just one party, the government or the community. However, all elements between the government and the community must work together to improve the Caldera Toba UGG area for mutual prosperity. The research shows an

effort to engage with theoretical perspectives by referencing Tania Li's notion of *governmentality* and Camelia Dewan's idea of *policy misreading*. However, these references are currently employed more as decorative citations rather than as analytical tools. They are briefly mentioned but not systematically applied to interpret the findings. As a result, the discussion risks remaining descriptive rather than critical, since theory does not fully shape how ecological degradation, governance failures, and community exclusion are explained.

The will to improve by Tania Li might have been mobilized more rigorously to expose how tourism projects promoted by the state in the Caldera Toba UGG, in spite of their development-related rhetoric, exacerbate ecological contradictions and make local communities even more marginalized. Likewise, the policy misreading framework proposed by Dewan may help understand how national or international policies may fail to capture local social-ecological realities and thus result in ineffective or even harmful interventions. In the absence of this further integration, theoretical references are decorative, but not informative frameworks, against which to interpret and critique evidence.

The analysis ought to be reinforced by a coherent and consistent analytical prism, like political ecology, socio-ecological systems theory, or governance analysis to frame findings. Examples of this would be political ecology which would relate ecological decline to structural power relations, industrial exploitation, and state control over resources. A governance approach may point to how shared power, fragmentation of institutions, and marginalization of local players continue to perpetuate crises in the management of the geopark. Integration of one of these frameworks would assist the findings to go beyond description of problems to explanation of the institutional and structural power that perpetuate ecological and social predicaments in the Caldera Toba UGG.

Conclusion

The end of this discussion leads us to see the reality on the ground with various development plans and progress of the Caldera Toba Caldera area. Environmental degradation, which is the main factor and still continues, is the result of human greed. Nature and humans are interrelated and interdependent, the phenomenon of floods, water crisis, fires, air and water pollution, shows the imbalance between nature and humans. The granting of yellow status by UNESCO to the Caldera Toba UGG area is also a reflection for all of us that we need to work together, embrace all elements of society, not just the government alone who has the power to design and decide various policies with all its "good intentions". However, it is necessary to include local communities with their local knowledge to improve and advance the Caldera Toba UGG area. Overlapping power that ultimately benefits one party, while local communities are hobbled to maintain their authority.

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