

UNESCO Global Geoparks – What do they mean for Namibia?

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Abstract :- Namibia is built upon more than 2600 million years of geological history, encompassing ancient cratons, rifted continental margins, spectacular desert landforms, volcanic remnants, and some of the oldest fossils on earth, to name but a few of its varied aspects. The country tells a compelling story of earth's evolution, yet much of this geological heritage remains known primarily to scientists, its wider value for education, communities, and sustainable development not being fully appreciated. It is within this context that the concept of geoparks, and more specifically UNESCO Global Geoparks, becomes increasingly relevant for Namibia. They are an opportunity to turn Namibia's landscapes into living classrooms that connect science, people, and national development.

Keywords :- Geopark, Earth science education, Sustainable development, Economic growth

Introduction

A geopark is a clearly defined geographical area that contains sites of geological significance. These sites are managed in a holistic way to achieve three main goals: conservation, education, and sustainable development (UNESCO, 2015). More importantly, geoparks are not only about protecting and preserving geological heritage, they are also about understanding how earth works and how people interact with their environment. Geoparks promote a living relationship between people and earth, where geological heritage supports learning, cultural identity, and local livelihoods (Herrera-Franco *et al.*, 2021).

While geoparks can be developed at national or regional levels, international experience has shown that the greatest long-term

impact is achieved, when they are embedded within a recognised global framework. Globally, geoparks have demonstrated how geological heritage can be transformed into opportunities for education, geotourism, scientific research, and community development (Drinia *et al.*, 2023). UNESCO Global Geoparks represent the highest standard of geopark development, combining scientific credibility, strong governance, community participation, and international visibility (Rodrigues *et al.*, 2025).

For Namibia, pursuing UNESCO Global Geopark designation provides not only global recognition of its geological heritage, but also access to international networks, expertise, and best practice in education, conservation, and sustainable development.

UNESCO Global Geoparks

The concept of geoparks emerged in Europe during the late 1980s as an approach to integrate the protection of geological heritage with sustainable regional development (Henriques *et al.*, 2017). Germany established the first geopark in 1989, followed by the creation of the European Geoparks Network in 2000 (Henriques *et al.*, 2017). This model subsequently expanded beyond Europe, resulting in the formation of the Global Geoparks Network in 2004 and, ultimately, the formal recognition of UNESCO Global Geoparks in 2015 (Herrera-Franco *et al.*, 2021).

UNESCO, as the only United Nations agency concerned with geoscience through the International Geoscience and Geoparks Programme (IGGP), plays a central role in promoting international scientific cooperation related to sustainable resource management, disaster risk reduction, and the conservation of geoheritage (Adiyaman *et al.*, 2018). Currently, there are 229 UNESCO Global Geoparks worldwide, spread across 50 countries, with the highest concentration found in Europe and China (UNESCO, 2015).

UNESCO Global Geoparks are built

upon three closely connected pillars. *Conservation*, focusing on safeguarding significant geological sites and landscapes to ensure their preservation for future study and enjoyment. *Education and public awareness*, seeking to improve understanding of earth processes and related issues, such as climate change, natural hazards, and the exploitation of natural resources, through educational initiatives, including school programmes, museum exhibits, guided tours, and community outreach. *Sustainable development*, connecting geological

heritage to income-generating activities, like geotourism, guiding services, crafts, and local enterprises, with the aim to enable local communities to benefit directly from the responsible use of their natural heritage. Together, these pillars ensure that geological heritage is protected, understood, and used responsibly. However, this requires strong community commitment, robust partnerships, long-term political and public support, and a comprehensive strategy that balances community goals with the preservation of geological heritage.

Geoparks and National Parks: Understanding the Difference

Although the definitions of geoparks and UNESCO Global Geoparks are clear, the use of the word “park” may create confusion. Geoparks are frequently misunderstood as a form of national park, but the two concepts differ significantly in their objectives, management approaches, and roles in conservation and development.

National parks prioritize biodiversity protection and control human activities within strict legal frameworks. Access and land use are usually reserved primarily for conservation purposes (National Policy on Community Based Natural Resource Management, 2013), while management often is based on top-down governance structures headed by government authorities.

Geoparks, on the other hand, focus on geological heritage and people. They encourage community involvement, education, and legal economic activities without creating new protected status. They recognize that communities living within these landscapes and their knowledge, culture, and livelihoods are integral to heritage management (UNESCO, 2015). It is important to note that “Geopark” is a designation, not a restricted fenced off area like traditional National Parks.

Similarly, a distinction exists between national geoparks and UNESCO Global Geoparks. While national geoparks are recognized at country level, UNESCO Global Geoparks meet internationally agreed standards and undergo regular evaluation by UNESCO. The UNESCO designation brings global visibility, credibility, and opportunities for international collaboration, while still respecting national laws and local governance.

In addition to the Geopark designation, UNESCO recognises several other categories of natural and cultural heritage protection through various international programmes. *World Heritage Sites* identify places of outstanding cultural or natural value; Namibia currently has two such sites, which are the Namib Sand Sea and the Twyfelfontein Prehistoric Reserve with its ancient rock engravings. In contrast, *biosphere reserves* focus on promoting a balanced relationship between conservation and the sustainable use of natural resources; so far Namibia doesn't boast a biosphere reserve. Together, these UNESCO designations celebrate and protect the world's cultural, biological, and geological diversity, while supporting sustainable economic development.

Why UNESCO Global Geoparks in Namibia?

Namibia has an exceptional geological heritage, including some of the oldest rocks on earth, iconic desert landscapes, world-class fossil sites, and mineral resources that have shaped both the country's history and its economy. UNESCO Global Geoparks provide an opportunity to recognise and showcase this heritage beyond mineral exploration, by plac-

ing equal emphasis on education, conservation, and community development. Through geoparks, geological landscapes are transformed into learning spaces that benefit students, researchers, local communities, and visitors alike.

UNESCO Global Geoparks are particularly relevant in the Namibian context, because

they align closely with the country’s long-standing approach to community-based natural resource management (CBNRM). This approach is grounded in the principle that communities, who have recognised rights in the use, management, and benefit from natural resources, have a vested interest to conserve them sustainably (National Policy on Community Based Natural Resource Management, 2013). The participatory and bottom-up nature of geoparks reinforces local ownership, respects traditional knowledge, and promotes shared benefits. As such, UNESCO Global Geoparks can complement existing conservan-

cies and heritage initiatives, strengthening rather than replacing Namibia’s current conservation and development frameworks.

Beyond conservation, UNESCO Global Geoparks offer a strategic framework for linking geological heritage to national development priorities. They encourage diversification of rural economies, promote geotourism, and enhance public understanding of earth processes, climate change, and natural resources. In doing so, geoparks contribute to both sustainable livelihoods and informed decision-making.

The Geopark Initiative in Namibia

Namibia has been pursuing the establishment of a geopark since 2004 through an ongoing initiative led by the Ministry of Industries, Mines and Energy via the Geological Survey of Namibia. Over the past two decades, this effort has gained increasing national and international attention, reflecting growing recognition of Namibia’s exceptional geological heritage, not only in the scientific community, and its potential to support education, geo-

tourism, and sustainable development. As a result, two priority geopark initiatives have been identified, i. e. the Gondwanaland Geopark in central Namibia (Fig. 1) and the Nama-!Garib Geopark along the border with South Africa. These proposed geoparks represent some of the country’s most significant geological landscapes and are viewed as strong candidates for future inclusion within the UNESCO Global Geoparks framework.

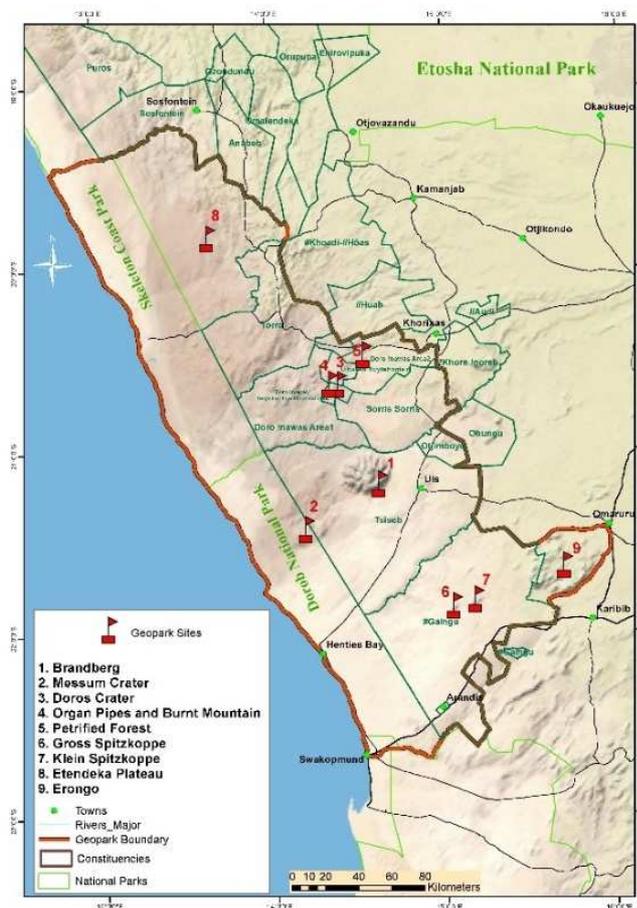


Figure 1. Locality map of the Gondwanaland Geopark and indicating geosites

Gondwanaland Geopark

The Gondwanaland Geopark is located in central western Namibia, along the Atlantic coast, and covers parts of the Kunene and Erongo Regions, totalling some 60,000 km² in area. It contains a remarkable collection of geological sites, including Brandberg (Fig. 2), Spitzkoppe and Erongo, granite massifs of both geological and archaeological significance, the Messum and Doros craters, actually mafic intrusions related to the break-up of Gondwana, the Etendeka Plateau, part of the Parana-Etendeka large igneous province, Vingerklip, an erosional remnant of ancient



Figure 2. The Brandberg granite massif contains Namibia's highest peak, the Königsstein (2573 m).

The rocks of the Gondwanaland Geopark formed deep within the earth and at its surface during dramatic geological events. Powerful forces pushed landmasses together, creating mountain belts, while volcanic activity and molten rock shaped the crust from below. Over time, these ancient mountains were worn down by wind and water, leaving behind the striking scenery we see today. One of the most important stories preserved in the geopark is the break-up of Gondwana. As the supercontinent slowly pulled apart, new oceans formed and Africa began to drift toward its

river terraces, the Petrified Forest, which hosts the biggest accumulation of large petrified logs in southern Africa, and the Twyfelfontein area of World Heritage fame (Fig. 3; Schneider and Schneider, 2004). The Gondwanaland Geopark tells the remarkable story of a time, when today's southern continents were joined together in a giant supercontinent called Gondwana, as well as its eventual break-up. The landscapes and rocks found within the geopark record hundreds of millions of years of earth history, showing how continents collided, mountains rose, oceans opened, and life evolved.



Figure 3. The rock engravings of Twyfelfontein also merited UNESCO World Heritage status.

present position. Rivers, deserts, and coastal environments developed, leaving clear evidence in layers of sandstone, volcanic rock, and fossil-rich sediments.

However, the Gondwanaland Geopark is not only about rocks, but also about people and nature. Human communities have lived in and adapted to this landscape for thousands of years, developing strong cultural ties to the land. This is showcased at the Damara Living Museum at Twyfelfontein (Fig. 4), a unique place to learn about the culture, traditional practices and language of the Damara people.



Figure 4. Cultural dance at the Damara Living Museum at Twyfelfontein

Today, the area supports diverse ecosystems, from arid zones to river corridors, hosting unique plant and animal life. Through conservation and sustainable development, the Gondwanaland Geopark aims to protect this

shared natural and cultural heritage. It offers visitors a chance to walk through deep time, where the story of drifting continents is written into the land itself, connecting earth’s ancient past to the lives and landscapes of today.

Nama-!Garib Geopark

The Nama-!Garib Geopark is located in southern Namibia in the !Karas Region, covering 2,918 km² along the northern bank of the Orange River (Fig. 5). The area offers a rare

glimpse into earth’s deep geological past. The rocks tell a story that began more than a billion years ago, when earth’s continents were joined together in a supercontinent known as Rodinia.

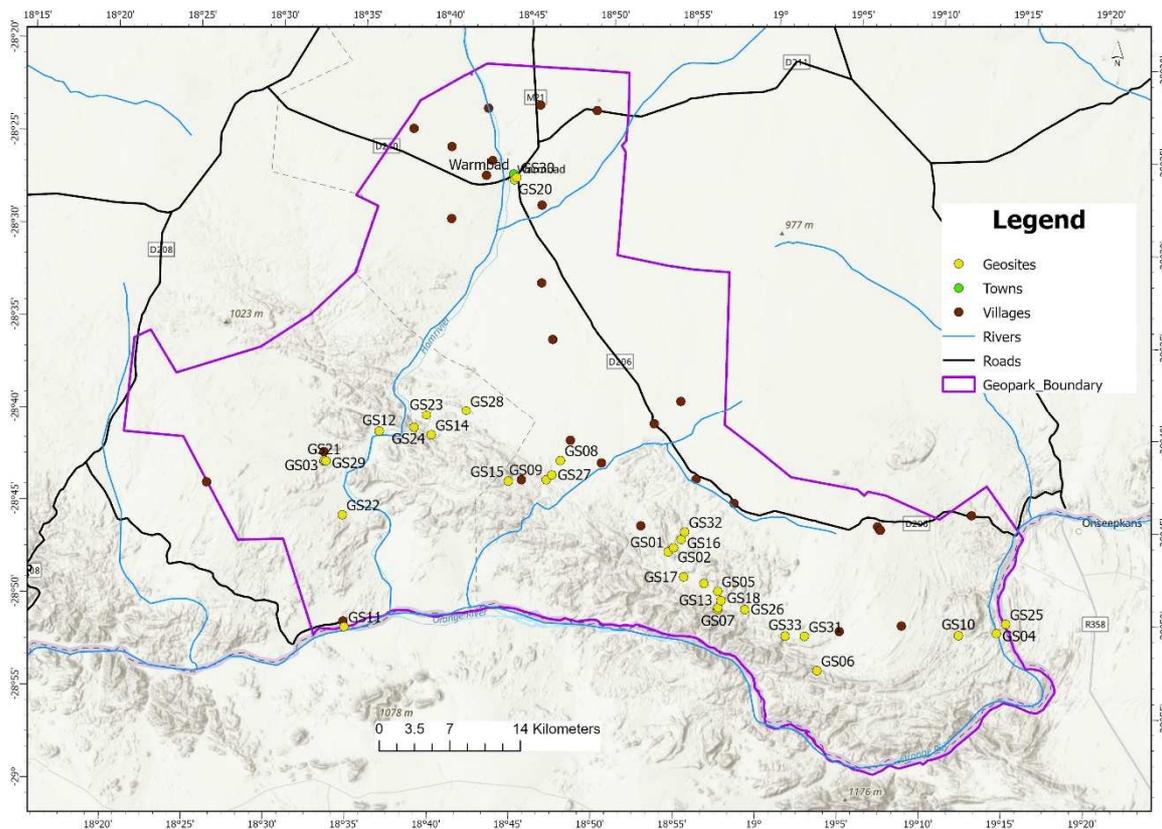


Figure 5. Locality map of the Nama-!Garib Geopark indicating geosites

Geologically, the area lies within the Namaqua–Natal Metamorphic Province, a broad belt of ancient rocks that formed along the edge of one of Africa’s oldest landmasses. Over millions of years, powerful earth movements squeezed, stretched, and heated the crust, welding pieces of the continent together. By the end of this process, the land had stabilised to form the Kalahari Craton, an important building block of the Rodinia supercontinent.

What makes the Nama-!Garib geopark special is that these ancient processes can still be seen in the rocks of today. Huge layers and slabs were pushed over one another along major thrust zones (Fig. 6), and long scars in the

earth’s crust mark where rocks slowly slid past each other deep underground. Molten rock forced its way into cracks created by this movement, later cooling to form striking bands of lighter-coloured rock. The Orange River has since carved its bed into this landscape, to reveal some of these features in even more spectacular natural outcrops.

Beyond its geological importance, the area is rich in living heritage. The indigenous Nama people have a deep cultural connection to the land and possess generations of knowledge that has enabled them to survive in this harsh environment. The Nama-!Garib Geopark is also home to remarkable biodiversity, espe-

cially rare and endangered succulent plants, and forms part of the unique Orange River–Karoo ecosystem.

Today, conservation initiatives in the area are helping to restore natural landscapes, protect wildlife (Fig. 7), and support local

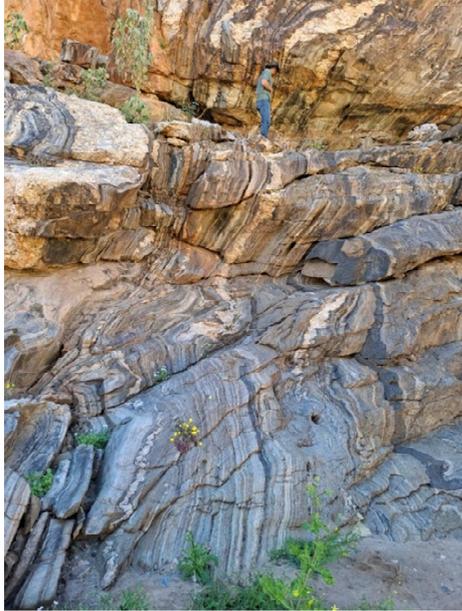


Figure 6 (left). One of the proposed geosites features an exposed thrust zone of late Namaqua-age (~1000 Ma).

Figure 7 (above). The geopark is also home to a variety of wildlife.

Benefits of Geoparks in Namibia

The establishment of Geoparks in Namibia, as has been seen in other countries, is expected to deliver wide-ranging social, economic, and environmental benefits. By promoting geotourism, geoparks can support sustainable economic growth in rural areas that have traditionally been underdeveloped, creating employment opportunities and encouraging new, local-based businesses. Moreover, geoparks strengthen local communities. Communal conservancies gain the ability to protect, manage, and promote their own natural heritage, generating income through activities such as campsites, guided experiences, and craft production - revenues which can be reinvested into community priorities, including education, infrastructure, and social development projects. Geoparks also serve as important platforms for learning and discovery. They support educational programmes for schools (Fig. 8), universities, and the public, while also providing valuable opportunities for scientific research. Through these activities, geoparks help raise awareness of the earth sciences, environmental stewardship, and sustainable land use (Fig. 9).

Internationally, recognition as part of the

communities. Together, the rocks, cultures, and ecosystems of the Nama–!Garib Geopark make it a formidable example of how earth's ancient history continues to shape life and landscapes today, making it an excellent candidate for a UNESCO Global Geopark.

UNESCO Global Geopark Network would significantly enhance Namibia's profile as a destination for earth heritage tourism, attracting visitors interested in landscapes, culture, and deep-time history. At their core, geoparks treat the landscape as an open-air museum, where ancient rocks tell the story of earth's evolution while simultaneously supporting modern livelihoods. For scientists, geoparks offer more than research sites, they provide spaces for long-term data collection and management, collaboration across disciplines, and meaningful engagement with the public. Research undertaken within geoparks may directly yield educational materials and local exhibitions, as well as initiate community dialogue, thereby helping to bridge the gap between science and society.

For local communities, geoparks create practical economic opportunities, including guiding, cultural storytelling, crafts, and small businesses linked to heritage interpretation. Training, skills development, and local employment are central to the geopark approach, ensuring benefits remain within the community and are not reaped by outside investors. Perhaps most importantly, geoparks nurture a

sense of pride and ownership. People who recognise the global importance of their local landscapes, become committed custodians of that heritage, actively contributing to its protection and sustainable use. UNESCO Global Geoparks therefore offer Namibia a powerful opportunity to rethink how geological heritage



Figure 8. Earth science education at schools is one of the main aspects of geoparks.

is valued and shared. By bringing together science, culture, education, and community development, geoparks can transform ancient landscapes into living classrooms and drivers of sustainable growth, ensuring that the stories written in stone continue to benefit society for generations to come.



Figure 9. Crop farming at the proposed Nama-!Garib Geopark

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