The Drifting Island:

India's Epic Geological Journey and Its Wild Legacy

Shivaprakash K Nagaraju

About Us

Swaniti Global is a social enterprise that operates at the intersection of policy, governance, and community to drive meaningful, long-term change. Swaniti works across regions to identify opportunities, unlock critical resources, and accelerate the energy transition through context-specific, collaborative strategies. Its approach is rooted in building partnerships with governments, communities, industry clusters, and civil society organizations to co- create solutions that are both innovative and impactful. By engaging with government systems to understand existing capacities and aligning them with community aspirations, Swaniti facilitates the design and implementation of integrated programs that address structural and developmental challenges.

As part of its work, Swaniti invests in high-quality research on climate and development issues and collaborates actively with policymakers, elected officials, and communities worldwide to address pressing climate concerns and harness opportunities for impactful climate action. With deep technical expertise in public service delivery systems and a strong understanding of last-mile development challenges, Swaniti specializes in orchestrating multistakeholder engagements that drive systemic change. We believe that data driven insights, drawn from this kind of research will help identify pathways for meaningful policy and program implementation.

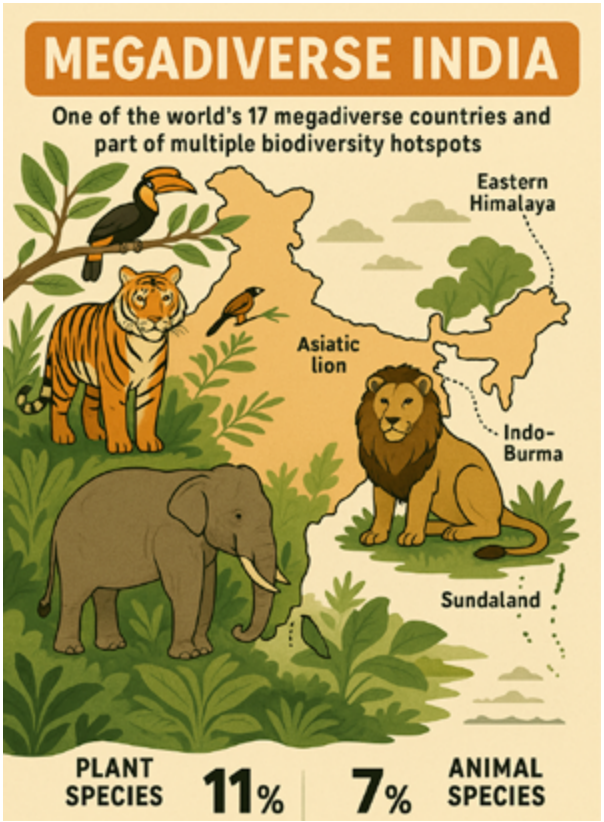
Citation: Nagaraju, S. 2025 *The Drifting Island: India's Epic Geological Journey and Its Wild Legacy. (Swaniti Global)*.

Cover and design: Abhi Vaishnav

Cover Image: Freepik.com

Published by
Swaniti Global
Houston, Texas, United States
www.swaniti.com

India is often celebrated for its vibrant culture, rich traditions, colourful festivals, and spiritual depth. But beyond the bustling cities and sacred temples lies another side of India—untamed, wild, and breathtakingly beautiful. From the snow-capped peaks of the Himalayas, often called the "Third Pole," to the golden dunes of the Thar Desert, and from the cloud-kissed forests of the Western Ghats to the tangled mangroves of the Sundarbans, India's natural landscapes are as diverse as its people.



This extraordinary natural variety is more than just scenic beauty—it's a treasure trove of life. India is one of only 17 megadiverse countries in the world and shares four (Indo-Burma, Eastern Himalaya, Western Ghats-Sri Lanka, and Sundaland) of the planet's 36 global biodiversity hotspots. Despite covering just 2.5% of Earth's land area, India is home to over 11% of the world's known plant species and nearly 7% of animal species, many of which are found nowhere else on the planet. India is the only country in the world with native populations of both tigers and Asiatic lions. It is also home for large population of Asian Elephants.

What's even more incredible is that much of India's biodiversity is still waiting to be discovered. Scientists believe that hundreds of thousands of

species—especially tiny creatures, insects, amphibians, plants, and fungi—are yet to be documented. Every year, researchers continue to find and describe new species across the country. In just the last decade, India has added about 25% more known amphibian species, 10% more reptiles, 5% more freshwater fish, and 6% more seed plants to its scientific records (Fig 1 and 2). These discoveries show how little we still know about the life around us.

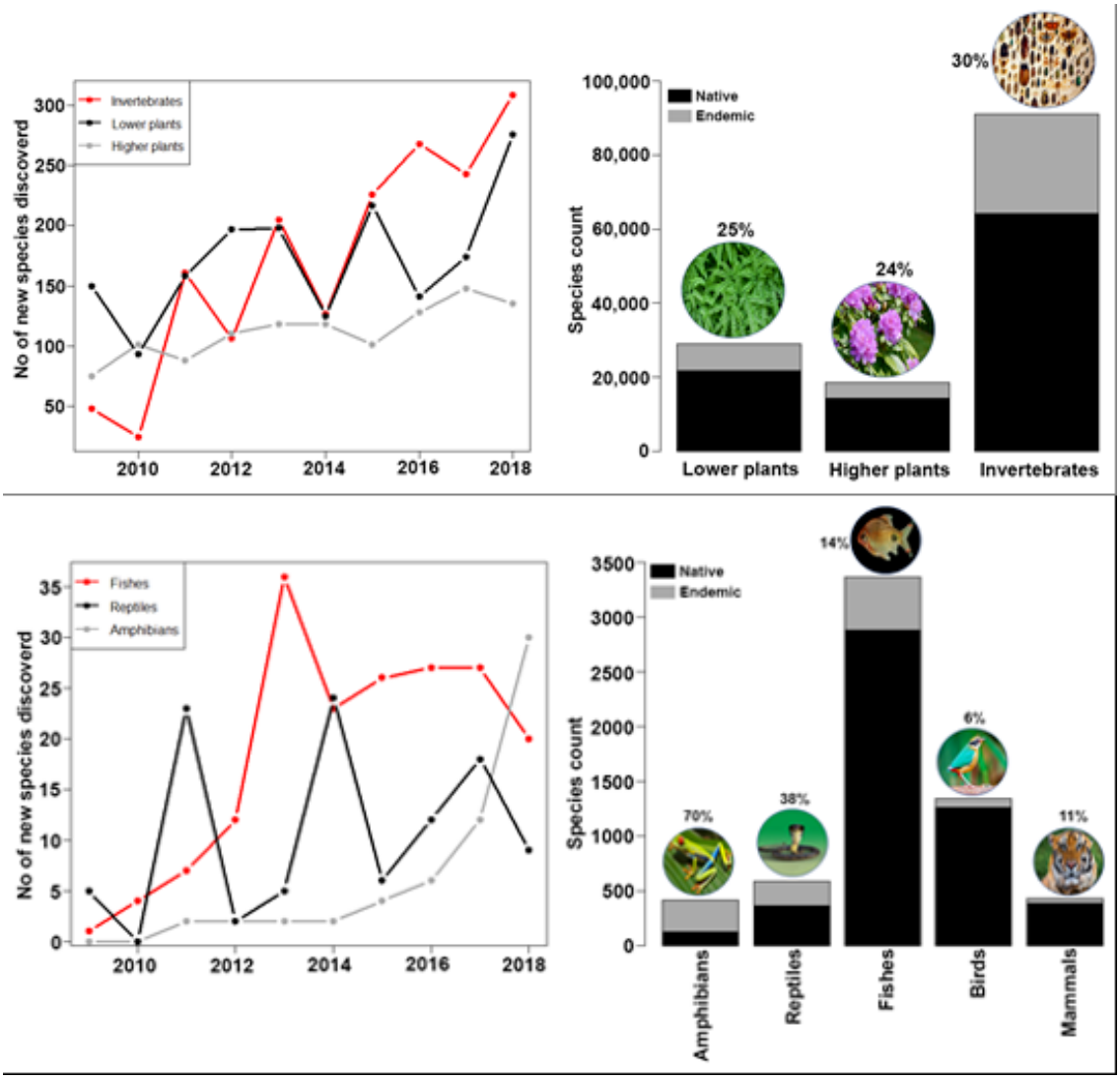


Figure 1: Graphs showing present day species diversity and new species discovery rate in India. % endemism of each group is shown above bars.

India's incredible biodiversity has fascinated scientists and nature lovers for centuries. Even Charles Darwin—the legendary British naturalist who developed the theory of evolution—was deeply interested in India's wildlife. Although he never visited India during his famous voyage on the HMS Beagle in the 1830s, Darwin regularly sought information about Indian plants and animals from British scholars living in the region. He relied on experts like botanist Joseph Hooker and zoologist Edward Blyth, and his popular books The Origin of Species and The Descent of Man include several references to India's biodiversity and Indigenous communities.

More recently, the renowned naturalist Sir David Attenborough has helped bring India's natural wonders to global audiences through his iconic wildlife documentaries. He has also been a passionate supporter of conservation efforts in India, especially those focused on protecting the Bengal tiger.

But what makes India so uniquely rich in life forms? Why does it shelter such a high number of species—many still waiting to be discovered?

The answer lies deep in time. Millions of years ago, the Indian subcontinent was a drifting island, journeying across oceans before it collided with Asia. This epic geological voyage set the stage for one of the most fascinating stories in Earth's natural history—a story that shaped not just India's mountains and rivers, but its forests, animals, and ecosystems.

This blog offers a glimpse into that story. It explores how India's ancient geological journey gave rise to its incredible biodiversity, why the country is such a global hotspot of wildlife, and why protecting this natural heritage is more important than ever. Whether you're a nature lover, student, traveller, or simply curious, this is an invitation to rediscover India—not just as a country, but as one of the Earth's most extraordinary wild landscapes.

The Epic Journey of India: A Continent on the Move

You may not realize it, but the ground beneath your feet has been on an incredible journey—one that spans over 160 million years! In fact, the Indian subcontinent has travelled nearly 9,000 kilometres from its original location near the South Pole to where it sits today in South Asia. This epic voyage is one of the most remarkable geological stories on Earth.

Continents are not fixed in place. They slowly drift over time due to the movement of tectonic plates—massive slabs of Earth's crust that float on molten rock beneath. These movements are incredibly slow, about as fast as your fingernails grow (roughly 6 cm per year), but over millions of years, they add up to dramatic changes.

India was once part of a supercontinent called **Gondwana**, which included South America, Africa, Antarctica, Australia, and Arabia. Around 170 million years ago, Gondwana began to break apart. As India broke away, it didn't just sit still—it kept moving! Over time, India split off from Antarctica and Australia (about 130 million years ago), then from Madagascar (around 90 million years ago), and finally from the Seychelles (about 65 million years ago).

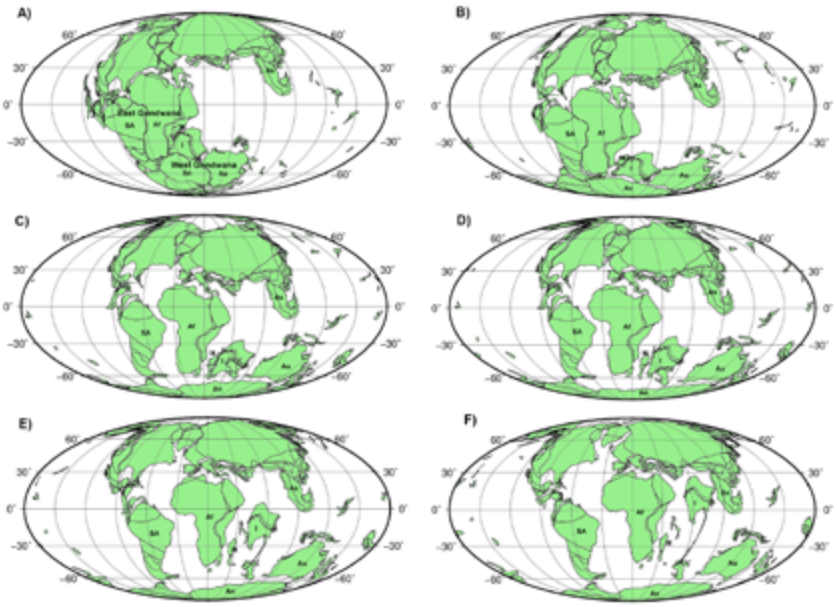


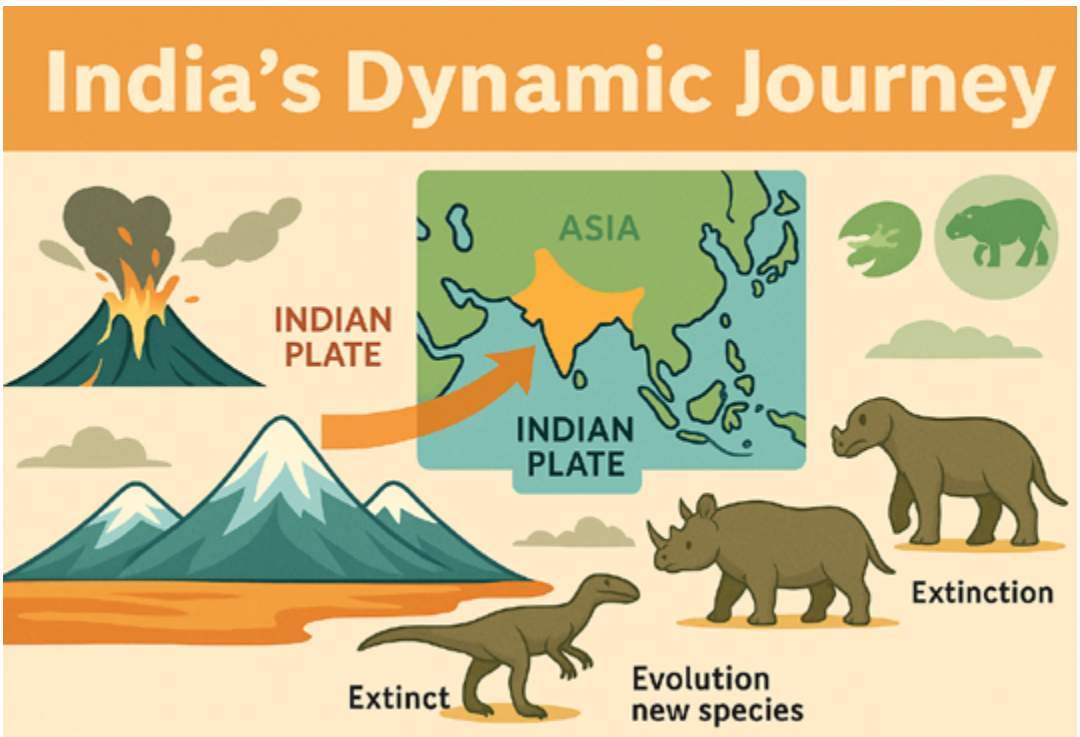
Figure 2: Geological history and evolution of Indian plate.

What's even more fascinating is how fast India moved. At one point, it was speeding northward at about 20 cm per year—making it the fastest-moving continent in Earth's history! This rapid journey brought India crashing into the Eurasian continent around 50 million years ago. That collision gave birth to one of the world's most iconic mountain ranges: **the Himalayas**, and the high Tibetan Plateau.

So, the Indian subcontinent as we know it today is the result of five major "splits" and two massive collisions. Each step in this journey was accompanied by volcanic activity and dramatic changes to climate and landscapes. It's this long and adventurous geological past that makes India not only a land of cultural diversity, but also a region of extraordinary natural history and biodiversity.

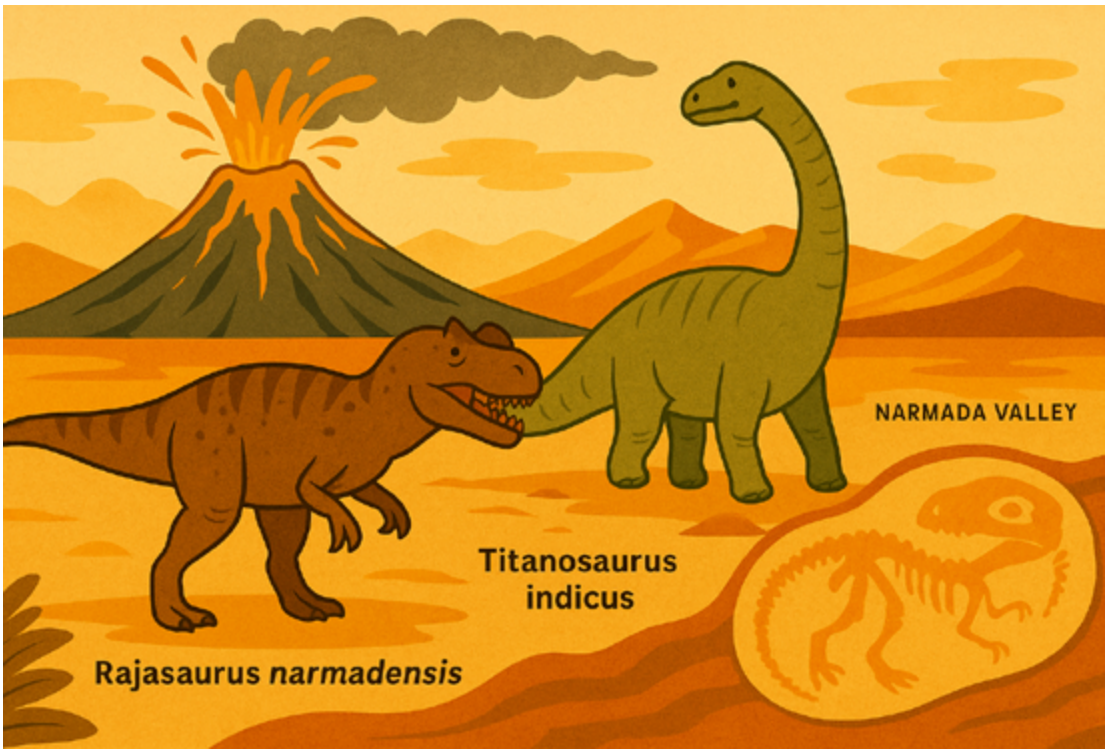
How India's Tectonic Journey Shaped Its Unique Biodiversity

India's incredible biodiversity isn't just a result of its climate or geography—it has deep roots in the dramatic geological journey the subcontinent has taken over millions of years. As the Indian plate drifted from its ancient home in the southern supercontinent Gondwana to collide with Asia, it experienced a series of massive changes that shaped not only the land, but the life it carried.



During this epic journey, India faced volcanic eruptions, sudden shifts in speed, rising mountains, and dramatic climate changes. One of the most important events was the collision of the Indian plate with the Asian plate around 50 million years ago. This collision created the towering Himalayas and the Tibetan Plateau and triggered the birth of the Asian monsoon system—drastically changing the climate across the region. These changes, over time, led to both the extinction of many species and the evolution of entirely new ones.

Volcanic Eruptions and Dinosaur Extinction: One of the most catastrophic events during India's journey was the Deccan volcanism around 65 million years ago. These massive volcanic eruptions, combined with a global asteroid impact, led to the extinction of nearly 90% of plant and animal life—including the dinosaurs. In India, evidence of this ancient wildlife is preserved in places like the Narmada Valley in central India, where fossils of Indian dinosaurs such as Titanosaurus indicus and Rajasaurus narmadensis have been found. These creatures once roamed the land but disappeared in the aftermath of this volcanic catastrophe.



The Birthplace of Whales: You might be surprised to learn that **whales**—yes, the giants of the ocean—can trace their origins to India. The earliest ancestors of whales were deer-like land mammals that lived in the Indian subcontinent before it collided with Asia. Fossils found in the foothills of the Himalayas, such as *Himalayacetus subathuensis* (over 53 million years old), are among the oldest known whale fossils in the world and provide key evidence of how whales evolved from land to sea.

***India: A Bridge for Wildlife*:** As India drifted through ancient oceans, it acted like a floating bridge—carrying plants and animals with it and connecting distant parts of the world. Fossils and modern DNA studies reveal that many of India's plants and animals have relatives in **Africa, Madagascar, Seychelles, and Southeast Asia**. For instance:

The purple frog (*Nasikabatrachus*), found only in India, has close cousins in **Seychelles**, suggesting they shared a common ancestor before the continents split.

The **caecilians**—limbless, burrowing amphibians—found in India's Western Ghats and Northeast also have relatives in **Africa and Seychelles**, indicating a shared ancient origin.

Some tropical tree families like **Dipterocarps** (dominant trees in Asian rainforests) and **Myristicaceae** (nutmeg family) likely travelled with India from Gondwana and then spread into Southeast Asia during the continental collision.

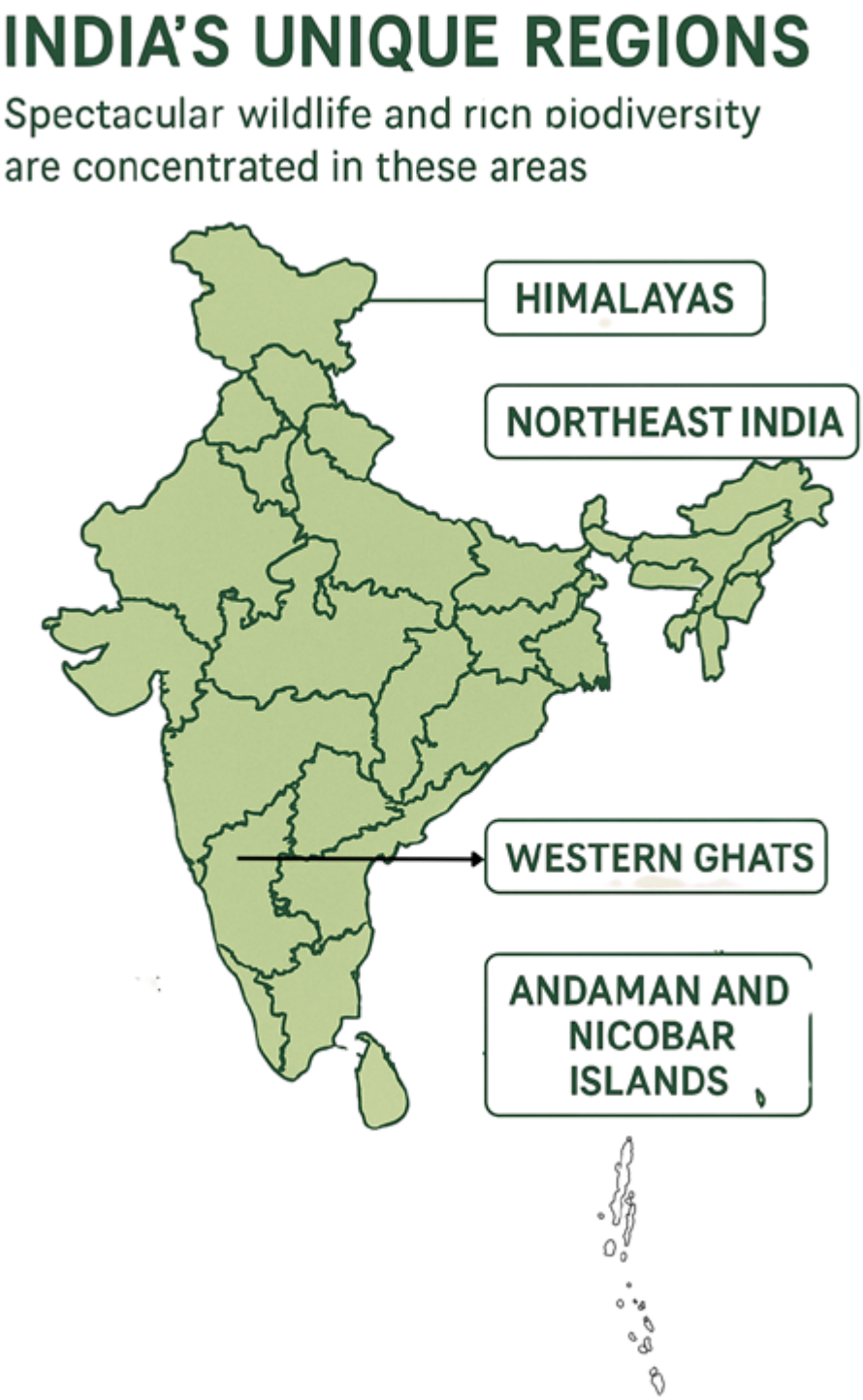
Figure 3: Unique plants and animals of novel biogeographic importance A) frog family Nasikabatrachidae B) *Gymnophiona* limbless amphibian C) and D) plant family Dipterocarpaceae and Myristicaceae respectively. All these plants and animals show Gondwanan affinity based on fossil records and DNA analysis.

While India carried these ancient species north, many species also migrated **into India** from Southeast Asia after the collision—making the country a rich meeting point of both ancient Gondwanan and Asian lineages.

In short, India's unique biological richness is deeply tied to its long and dramatic geological history. From dinosaurs to whales, and ancient trees to frogs that croak underground, the story of life in India is one of movement, survival, and stunning evolutionary twists—driven by the restless journey of the land itself.

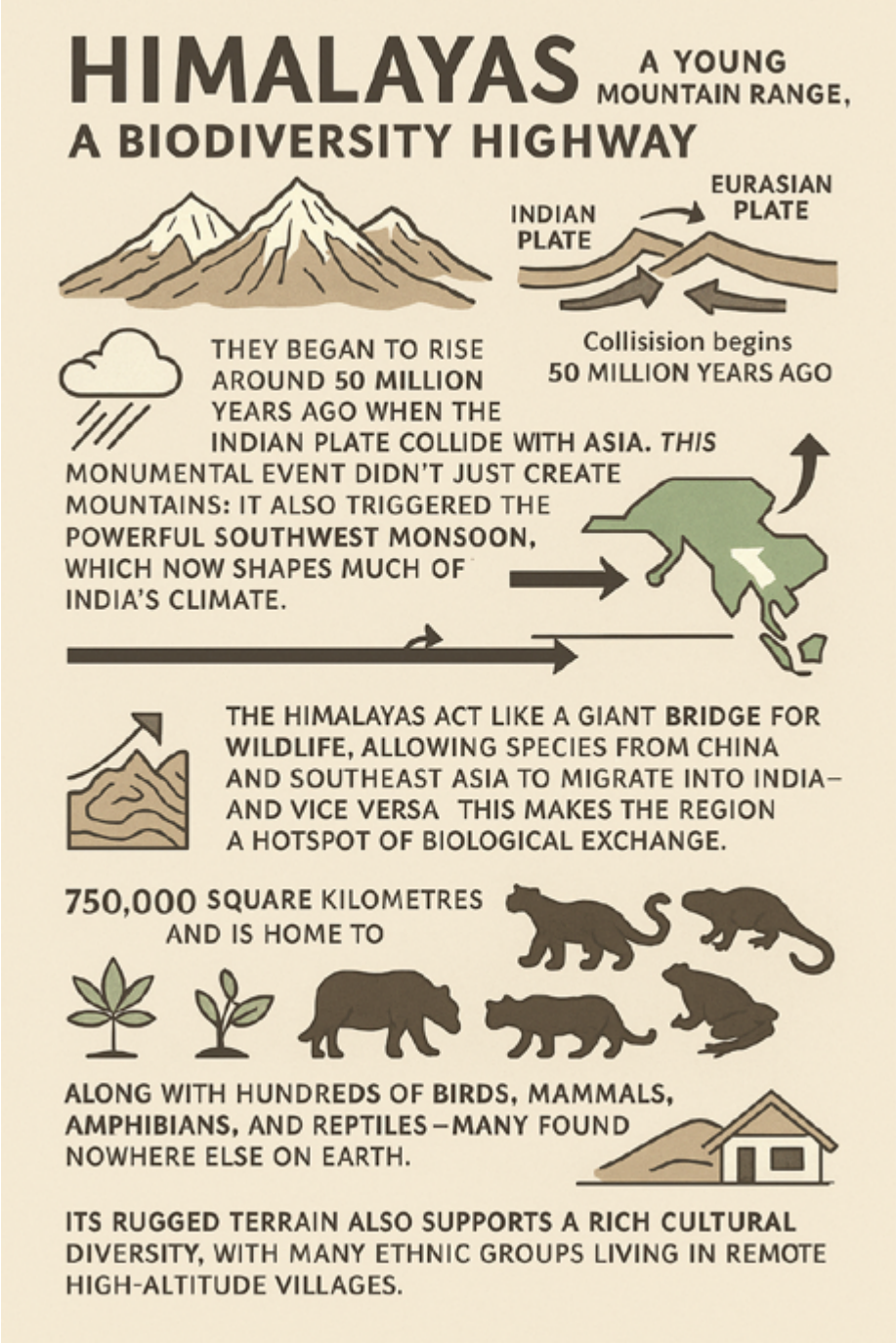
Mountains, Islands, and the Making of India's Unique Biodiversity

India's spectacular wildlife and rich biodiversity are not evenly spread across the country—they're concentrated in some truly special places. Four regions in particular stand out for their extraordinary variety of plants and animals: the Himalayas, Northeast India, the Western Ghats, and the Andaman and Nicobar Islands. What makes these areas so unique? Their deep geological history, combined with dramatic climate changes and long-term isolation, has allowed life to evolve in remarkable ways.



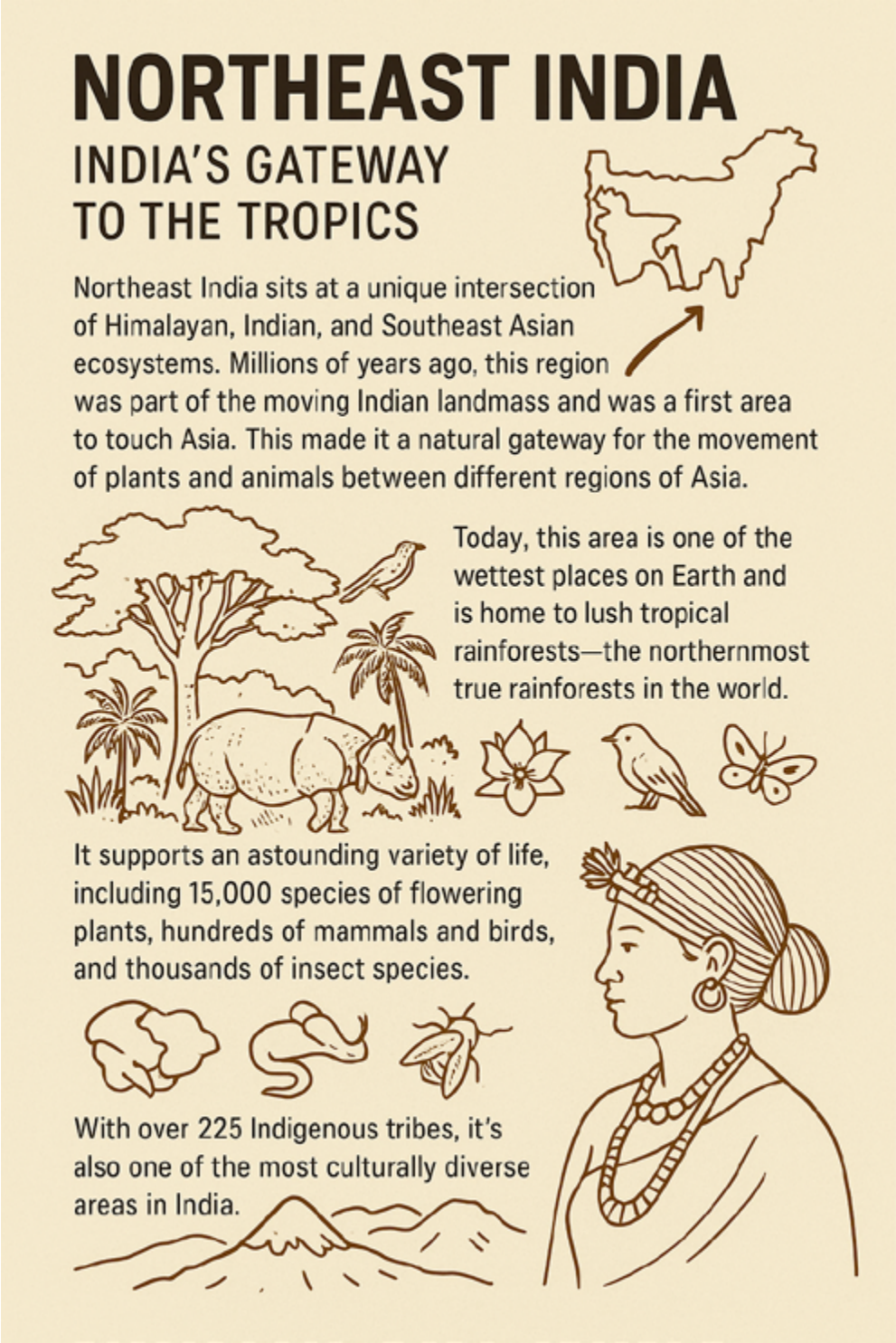
***Himalayas: A Young Mountain Range, A Biodiversity Highway*:** The Himalayas—home to the world's tallest peaks—are relatively young in geological terms. They

began to rise around 50 million years ago when the Indian plate collided with Asia. This monumental event didn't just create mountains; it also triggered the powerful **south-west monsoon**, which now shapes much of India's climate. The Himalayas act like a giant bridge for wildlife, allowing species from **China and Southeast Asia** to migrate into India—and vice versa. This makes the region a hotspot of biological exchange. Today, it stretches across 750,000 square kilometres and is home to more than **10,000 species of plants**, along with hundreds of birds, mammals, amphibians, and reptiles—many found nowhere else on Earth. Its rugged terrain also supports a rich cultural diversity, with many ethnic groups living in remote high-altitude villages.



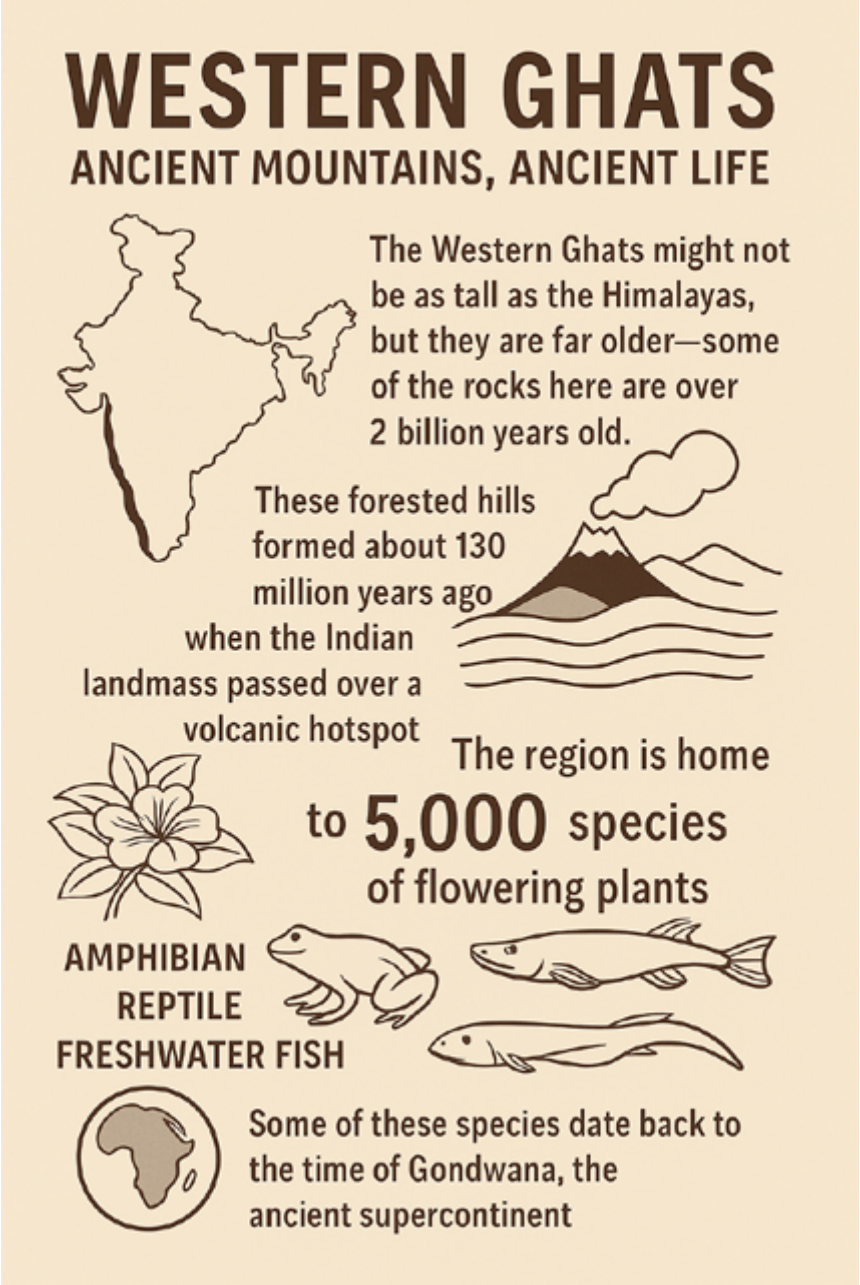
***Northeast India: India's Gateway to the Tropics*:** Northeast India sits at a unique intersection of **Himalayan, Indian, and Southeast Asian ecosystems**. Millions of years ago, this region was part of the moving Indian landmass and was the first area to touch Asia. This made it a natural gateway for the movement of plants and animals

between different regions of Asia. Today, this area is one of the wettest places on Earth and is home to lush tropical rainforests—the northernmost true rainforests in the world. It supports an astounding variety of life, including **15,000 species of flowering plants**, hundreds of mammals and birds, and thousands of insect species. With over **225 indigenous tribes**, it's also one of the most culturally diverse areas in India.

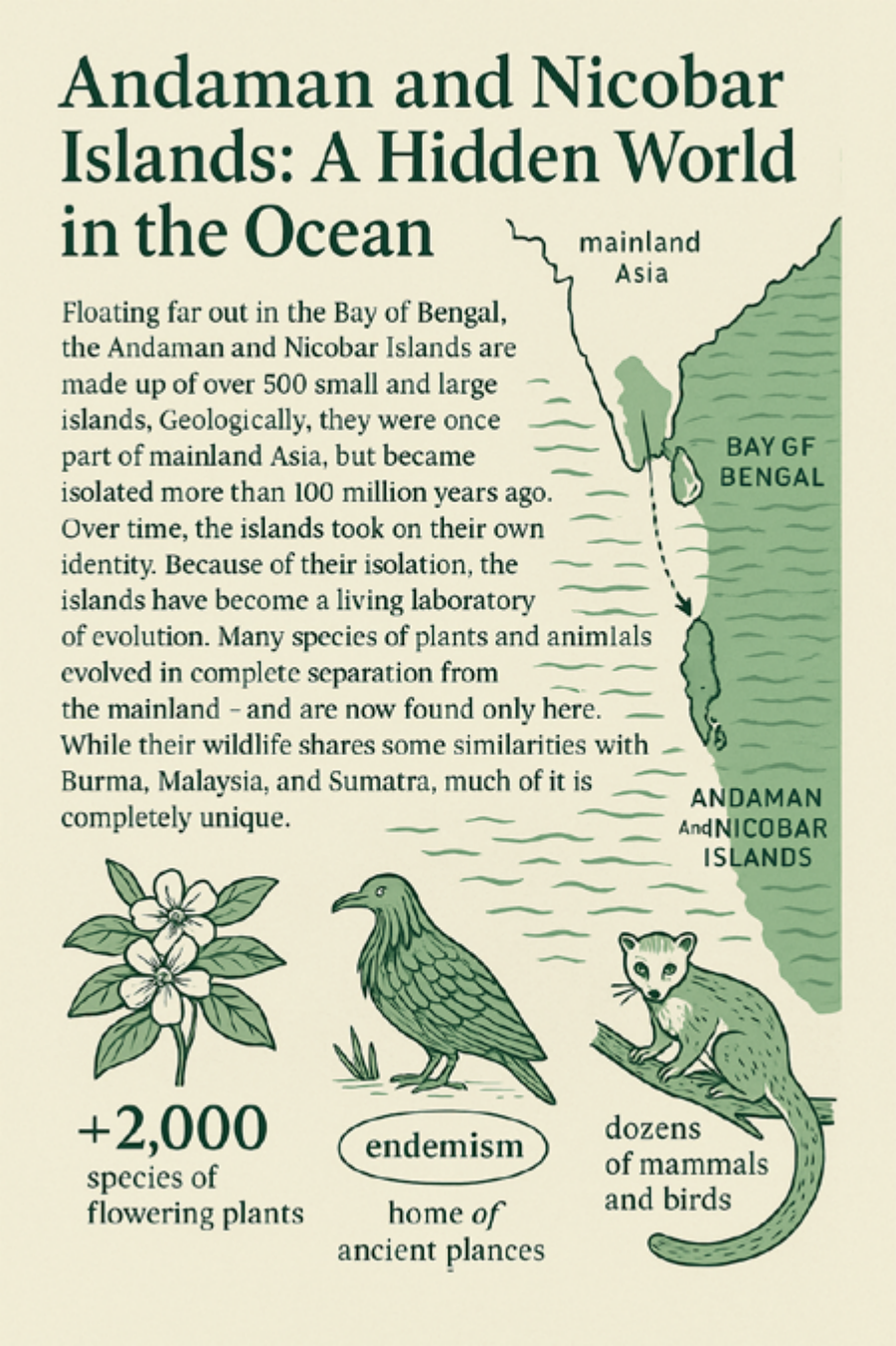


***Western Ghats: Ancient Mountains, Ancient Life*:** The Western Ghats might not be as tall as the Himalayas, but they are **far older**—some of the rocks here are over **2 billion years old**. These forested hills formed when the Indian landmass passed over a volcanic hotspot during its journey northward about 130 million years ago. This ancient range, which runs parallel to India's west coast, is a treasure trove of ancient plant and

animal lineages. It is one of the best examples of how **isolation and old age** can create rich biodiversity. The region is home to over **5,000 species of flowering plants**, and a high percentage of amphibians, reptiles, and freshwater fishes found here are found nowhere else in the world. Some of these species date back to the time of **Gondwana**, the ancient supercontinent.



***Andaman and Nicobar Islands: A Hidden World in the Ocean*:** Floating far out in the Bay of Bengal, the **Andaman and Nicobar Islands** are made up of over 500 small and large islands. Geologically, they were once part of mainland Asia, but became isolated more than **100 million years ago**. Over time, the islands took on their own identity. Because of their isolation, the islands have become a **living laboratory of evolution**. Many species of plants and animals evolved in complete separation from the mainland—and are now found only here. While their wildlife shares some similarities with **Burma, Malaysia, and Sumatra**, much of it is completely unique. The islands host over **2,000 species of flowering plants**, dozens of mammals and birds, and high levels of endemism—meaning many species live here and nowhere else.



Together, these four regions show how India's landscapes—shaped by **volcanoes, continental drift, climate change, and isolation**—have created one of the most remarkable biodiversity stories on Earth. Understanding and protecting these ancient, vibrant ecosystems is key to preserving India's natural heritage for generations to come.

Final thoughts

India is not just a crowded landmass—it is a subcontinent created over millions of years by the forces of nature. As one of the only landmasses in Earth's history to journey more than **9,000 kilometres across an ocean**, India's geological voyage is nothing short of epic. Over more than **100 million years**, this drifting continent broke away from Gondwana, carried with it ancient life forms, and finally collided with Asia, giving rise to the towering Himalayas and transforming the climate of an entire region. This extraor-

dinary journey shaped India into one of the most biologically rich and unique regions on the planet. It is a **living museum of evolution**, where ancient lineages of plants and animals—some with ties to Africa, Madagascar, Seychelles, and Southeast Asia—still thrive. India has served as both a **refuge** for species from deep evolutionary pasts and a **gateway** for new species to spread and evolve across Asia.

To lose India's biodiversity would be to erase a critical chapter of Earth's natural history. Every forest, river, and mountain here tells a story of survival, adaptation, and migration across continents and eras. The richness of life we see today did not appear overnight—it was sculpted slowly, across millennia, by shifting continents, volcanic eruptions, climatic upheavals, and evolutionary chance. Preserving India's biodiversity is not just about protecting wildlife; it's about honoring a remarkable journey that continues to shape life far beyond its borders. This legacy took over **a hundred million years to create**. The responsibility to protect it—for ourselves, for the planet, and for future generations—rests with us now.

References

1. Briggs, J. C. (2003). The biogeographic and tectonic history of India. Journal of Biogeography, 30(3), 381-388.

2. Chatterjee, S., Goswami, A., & Scotese, C. R. (2013). The longest voyage: tectonic, magmatic, and paleoclimatic evolution of the Indian plate during its northward flight from Gondwana to Asia. Gondwana Research, 23(1), 238-267.

3. Ali, J. R., & Aitchison, J. C. (2008). Gondwana to Asia: plate tectonics, paleogeography and the biological connectivity of the Indian sub-continent from the Middle Jurassic through latest Eocene (166–35 Ma). Earth-Science Reviews, 88(3-4), 145-166.

4. Biju, S. D., & Bossuyt, F. (2003). New frog family from India reveals an ancient biogeographical link with the Seychelles. Nature, 425(6959), 711-714.

5. Kamei, R. G., Mauro, D. S., Gower, D. J., Van Bocxlaer, I., Sherratt, E., Thomas, A., ... & Biju, S. D. (2012). Discovery of a new family of amphibians from northeast India with ancient links to Africa. Proceedings of the Royal Society B: Biological Sciences, 279(1737), 2396-2401.

6. Implementation of India's National Biodiversity Action Plan An Overview (2019) http://nbaindia.org/uploaded/pdf/IndiaNationalBiodiversityActionPlan2019.pdf

Website: www.swaniti.com