

PARADISE UNDER SIEGE: Goa's Biodiversity

Plan reveals looming climate catastrophe

Experts say sea levels are rising five times faster than the global average, while super-cyclones and dying mangroves and khazans signal a tipping point for Goa's coastline. **KARSTEN MIRANDA** breaks down the explosive findings detailed in the draft Goa State Biodiversity Strategy and Action Plan



The azure waters that draw millions to Goa's beaches are silently creeping inland, swallowing coastal lands at an alarming pace while super-cyclones barrel toward the state with unprecedented fury. What emerges from Goa's first-ever biodiversity assessment reads like a doomsday thriller – except this story is devastatingly real.

The explosive findings, contained in the draft Goa State Biodiversity Strategy and Action Plan (GSBSAP) 2025-2030, shatter any illusions about Goa's environmental stability. Released for public scrutiny until July 22, this scientific bombshell – researched by 45 experts across multiple specialised committees – reveals how this sunny paradise is morphing into a climate battleground where ancient ecosystems fight for survival against relentless natural forces.

**The numbers don't lie: Goa's climate emergency**

Behind Goa's postcard-perfect facade lurks a mathematical nightmare. Sea levels have been climbing at 1.45 millimeters annually since 1969 – seemingly tiny increments that mask a terrifying reality. Within a century, this coastal jewel could witness waters rising by nearly two feet, submerging vast swaths of low-lying areas where generations have lived and farmed.

But the ocean's assault comes with backup. Goa's temperatures have spiked by over 1°C since 1900, while rainfall has exploded by 68% – turning the state's weather patterns unrecognizable from what sustained communities for centuries. The monsoons now arrive as water bombs rather than life-giving seasonal showers.

**When the Arabian Sea turned rogue**

The Arabian Sea has transformed into something meteorologists barely recognise. Since 1995, this once-predictable water body underwent what scientists call a “regional climate shift” – a fancy term for nature gone haywire. The result? A five-fold explosion in super-intense cyclones that now regularly target India's western coast with the ferocity of climate revenge.

Forty years of storm data reveal the terrifying trend: cyclones aren't just getting stronger, they're lasting longer and hitting more frequently. The past two decades alone witnessed a 52% spike in cyclonic storms, turning what was once an occasional weather event into an annual threat. Each storm carries the potential to rewrite Goa's coastline, erasing in hours what took centuries to build.

**The drowning of ancient wisdom**

Nowhere is the crisis more poi-

gnant than in Goa's khazan lands – ingenious agricultural systems that represent centuries of human adaptation to coastal living. Created by communities like the Gaudes and Kunbis using traditional engineering that would impress modern scientists, these tidal farming fields along the Mandovi and Zuari rivers showcase humanity's capacity to work with nature rather than against it.

But rising seas don't respect human ingenuity. These low-lying agricultural marvels, visible as intricate geometric patterns from hilltops, now face a triple assault: encroaching saltwater, invasive species running riot, and decades of neglect as younger generations abandon farming for tourism jobs. The surrounding mangroves that once protected these fields are themselves dying, reducing the natural buffers that kept the system functioning for generations.

Chief Minister Pramod Sawant's recent discussion of khazan restoration at the NITI Aayog meeting signals government recognition of the crisis, but experts warn that time is running short. With sea levels potentially rising 63-68 centimeters within a century, vast areas of these irreplaceable agricultural systems could disappear beneath the waves.

**Blueprint for survival**

Faced with this environmental apocalypse, Goa's response comes in the form of the most comprehensive conservation blueprint the state has ever attempted. The GSBSAP 2025-2030 reads like a manual for environmental warfare, deploying everything from government sensitization programs to traditional knowledge preservation in a desperate bid to save what remains saveable.

The strategy's brilliance lies in its recognition that conservation cannot survive in isolation from human livelihoods. Rather than treating biodiversity as a museum piece, the plan weaves ecological protection into economic opportunity, creating incentives for communities to become conservation champions rather than environmental casualties.

Implementation will flow through Biodiversity Management Committees at panchayat and municipal levels, ensuring that conservation decisions emerge from communities rather than being imposed from above. The approach acknowledges that Goa's environmental future depends not on government diktat but on millions of individual choices made by people who call this land home.

**Race against time: The five-year challenge**

The clock is ticking with terrifying precision. Over the next five years, multiple government

**GOA'S ENVIRONMENTAL CRISIS**  
68% INCREASE in Annual Rainfall Since 1901  
52% More Cyclonic Storms in LAST 20 YEARS  
1°C TEMPERATURE Rise Since 1900  
0.48FT Projected Sea Level Rise NEXT 100 YEARS  
1.45MM Annual Sea Level RISE SINCE 1969

**MAJOR THREATS**  
RISING SEAS  
Drowning COASTAL ECOSYSTEMS AND KHAZAN LANDS  
SUPER CYCLONES

**ARABIAN SEA** turned into CYCLONE HOTSPOT.  
5X INCREASE in Super Cyclones in Arabian Sea

**MANGROVE LOSS**  
Critical habitats for crocodiles & birds vanishing

**DUDHSAGAR CRISIS**  
KARNATAKA'S WATER DIVER-SION threatens iconic falls

**FOREST FIRES**  
CLIMATE CHANGE fueling un-precedented blazes

**DEVELOPMENT PRESSURE**  
URBANIZATION destroying tradi-tional systems

**GSBSAP 2025-2030 SOLUTIONS**

**KHAZAN LAND DOCUMENTATION** Identify & protect traditional farming systems  
**TRADITIONAL KNOWLEDGE** Document indigenous conservation practices  
**REAL-TIME MONITORING** Track ecosystem health continuously  
**GoVan SUCCESS STORY**  
■ 4 centers operational  
■ 15 planned by 2030  
■ Women's self-help groups

**empowered**  
■ Sustainable forest product processing  
■ Private sector partnerships

**KEY DEPARTMENTS INVOLVED**  
■ Agriculture Department  
■ Tourism Department  
■ Fisheries Department  
■ National Institute of Oceanography  
■ Biodiversity Management Committees

**YOUR VOICE MATTERS**  
Public consultation open until July 22, 2025

The future of Goa's environment depends on citizen participation. Review the biodi-versity plan and submit your suggestions before it's too late.

departments must execute a conservation miracle that balances immediate crisis response with long-term sustainability. The Agriculture and Tourism Departments, working alongside local Biodiversity Management Committees, face the Herculean task of identifying, documenting, and protecting every remaining khazan land while simultaneously promoting eco-tourism that could provide economic alternatives to destructive development.

The plan's most innovative aspect lies in its embrace of traditional knowledge. Rather than dismissing indigenous practices as outdated, researchers will work with the Fisheries Department and Indian Council of Agricultural Research to document centuries-old techniques for bund construction and sluice gate management. This traditional wisdom, refined through generations of trial and error, may hold keys to climate adaptation that modern science is only beginning to understand.

Meanwhile, the National Institute of Oceanography and Agriculture Department must develop monitoring systems capable of tracking ecosystem health in real-time, creating early warning systems for environmental catastrophe. Success depends on

coordination between institutions that have historically operated in isolation, requiring unprecedented collaboration in the face of unprecedented challenges.

**When paradise burns: Beyond coastal catastrophe**

Climate change isn't content with drowning Goa's coasts – it's also setting the interior ablaze. Forest fires, once rare in this monsoon-soaked state, now regularly threaten bird habitats on the Pilerne and Socorro plateaus. The changing weather patterns that bring more intense rainfall also create longer dry periods, turning Goa's forests into tinderboxes waiting for ignition.

Agriculture faces its own climate reckoning. Despite decades of progress, extreme weather events regularly devastate farming communities, creating what the plan calls “distress in the farming community.” The solution lies in drought-tolerant crop varieties, but implementation requires convincing farmers to abandon traditional practices for untested alternatives – a psychological challenge as daunting as the technical one.

**When States clash over water**

As if climate change weren't enough, Goa faces an additional ex-

istential threat from its neighbour. Karnataka's decades-old plan to divert water from the Mhadei river system threatens to turn Goa's magnificent Dudhsagar waterfall from a thundering cascade into a seasonal trickle. The proposed diversion of 3.85 TMC feet from the Katla and Palna tributaries – the very arteries that feed Dudhsagar – represents not just an environmental catastrophe but an economic one.

The waterfall draws lakhs of tourists annually, providing the primary livelihood for entire villages. Without adequate water flow, this tourism engine could grind to a halt, forcing communities into poverty while destroying ecosystems that took millennia to develop. The biodiversity plan's stark warning about reduced water availability, increased competition for bio-resources, and altered prey-predator relationships reads like an ecological obituary written in advance.

Karnataka's additional plans for 1.06 TMC feet from other Dudhsagar sources compound the threat, potentially reducing one of India's most spectacular waterfalls to a shadow of its former glory. The interstate water dispute has already lasted decades, but climate change and development pressures are accelerating the timeline for irreversible damage.

**GoVan: Where conservation meets commerce**

Amid the environmental chaos, one initiative offers hope that conservation and commerce can coexist. The GoVan project, launched in 2021 as the Goa State Biodiversity Board's flagship program, represents a revolutionary approach to environmental protection – making biodiversity preservation profitable for local communities.

The genius lies in its simplicity: instead of asking rural communities to sacrifice income for conservation, GoVan creates economic incentives for sustainable practices. Women's self-help groups harvest cashew, jackfruit, bimbila, mango, kokum, and coconut using non-destructive techniques, then process these into value-added products like pickles, dried fruits, and traditional delicacies including Fenori, a beloved Goan sweet snack.

The state's decision to involve private players in expanding from four existing centers to 15 multi-product processing centers signals ambitious scaling. Private operators must develop comprehensive strategies ensuring long-term viability through innovative financial and revenue-sharing models. The challenge lies in maintaining the program's sustainability focus while achieving commercial success – a balance that could determine whether environmental protection remains economically viable in the long term. The sys-

tematic approach, from careful harvesting through eco-friendly packaging, creates a complete value chain that supports both environmental conservation and community empowerment. As climate change accelerates environmental degradation, GoVan offers a model for how communities can profit from preservation rather than destruction.

**Citizen action: Goans must step up**

As Goa stands at this environmental crossroads, the power to shape its future rests not with politicians or scientists, but with ordinary citizens who must live with the consequences of today's decisions. The public consultation period ending July 22 represents more than bureaucratic process – it's a moment when democratic participation could literally determine whether future generations inherit a livable planet.

The biodiversity plan's emphasis on wetlands' recreational, aesthetic, and cultural significance acknowledges that environmental protection isn't just about species counts or climate data – it's about preserving the landscapes that define Goan identity. But citizen engagement remains frustratingly low, despite the plan being available online for review and comment.

Success demands unprecedented coordination between government departments historically known for working in silos, local communities often skeptical of official promises, research institutions focused on academic rather than practical outcomes, and private sector partners motivated primarily by profit. The plan's integrated approach – treating ecosystems as interconnected systems rather than isolated components – reflects the holistic thinking necessary for survival.

Yet time is the enemy. Climate change operates on its own timeline, indifferent to human planning cycles or political considerations. The window for effective action narrows daily as sea levels rise, storms intensify, and ecosystems reach tipping points beyond recovery. Whether Goa can implement its biodiversity strategy quickly enough to matter remains the billion-rupee question on which the state's environmental future hangs.

The consultation period represents a rare moment when citizens can influence their environmental destiny. With climate change accelerating and development pressures mounting, the stakes couldn't be higher. The choice facing Goans is stark: engage now in shaping conservation policy, or watch helplessly as paradise transforms into a cautionary tale of environmental collapse.