

1. Aravallis Hills- Environment

The Aravalli range to be protected The Supreme Court's June 2025 ruling defines "Aravalli Hills" using a narrow 100-meter elevation threshold, which excludes over 90% of the range from legal protection. This definition risks accelerating desertification and ecological degradation across North-West India by opening vast stretches of ecologically fragile low-lying areas to mining.

Context- The June 2025 Supreme Court Direction

In June 2025, the Supreme Court of India issued critical directions aimed at protecting the Aravalli hills and ranges. This ruling impacts a vast geographical area spanning Delhi, Haryana, Rajasthan, and Gujarat. The primary objective was to establish a uniform definition for the region to curb ecological degradation.

The Controversy- Defining the Aravalli Hills (2025)

The core of the recent conflict lies in how the "Aravalli Hills" are legally defined. The Supreme Court adopted a specific, narrower criterion that has sparked significant ecological concern.

The New "100-Metre" Definition- The ruling defines the Aravalli Hills as any landform located within the Aravalli districts that possesses an elevation of 100 metres or more from the local relief.

Catastrophic Exclusion- This specific elevation threshold effectively excludes over 90% of the actual Aravalli range from legal protection.

Ecological Impact- Vast stretches of low-lying scrub hills, grasslands, and ridges—which do not meet the 100-metre height requirement but are ecologically vital—are now vulnerable.

Consequences of the Definition

Mining Expansion- By removing protected status from low-lying areas, the ruling inadvertently opens these lands up for large-scale mining activities.

Acceleration of Desertification- The exclusion threatens the Aravallis' ability to act as a barrier against the Thar Desert, potentially accelerating desertification into the National Capital Region (NCR) and fertile plains.

Existing Degradation- Significant areas in Haryana, Rajasthan, and Gujarat are already suffering from severe ecological damage due to stone crushing and mining; this definition may exacerbate the situation.

Comparison- The Need for a Uniform Definition

The push for a uniform definition arose from the failure of previous administrative classifications to protect the landscape.

Feature	Problem with Earlier Approach	Supreme Court's Scientific Direction
Criteria Used	States used narrow, selective definitions often based on revenue records or administrative convenience.	Mandates the use of scientific, geomorphological criteria based on natural formations rather than revenue records alone.
Forest Status	Forest classification frequently excluded degraded lands or low-height hills, leaving them vulnerable.	Aims to identify hills based on their physical reality, though the 100m threshold remains a point of contention.
Outcome	Resulted in legalised ecological destruction, permitting mining in sensitive areas.	Seeks to replace administrative convenience with a standardized approach, though the current height metric poses risks.

Significance of the Aravalli Range

The Aravallis are not just hills but a critical ecological infrastructure for North-West India.

Physical & Ecological Significance

Geological Heritage- They are one of the world's oldest fold mountains (Pre-Cambrian origin), representing immense geological value.

Desert Barrier- The range acts as a natural "Green Wall," preventing the eastward expansion of the Thar Desert into the fertile Indo-Gangetic Plain.

Climate Regulator- The mountains influence monsoon circulation and determine local rainfall patterns.

'3.5% OF HILLS TO BE TAKEN UP FOR MINING BY 2059'

RECEDING HILLS

5772.7 sq km

7.6% of total forest land in the Aravalis was flattened between 1975 and 2019

16,360 sq km

21.6% of the Aravalis will be lost by 2059 if the degradation continues, according to projections

MINING RAMPANT

1,650.3 sq km

2.2% of Aravali area where illegal mining was active in 2019

2,628.6 sq km

3.5% of the hills will be taken up for mining by 2059, according to projections



CONSEQUENCES



Desert-like conditions will expand from Thar in Rajasthan towards north India, including Delhi-NCR. Sandstorms may become more frequent.



Loss of wildlife habitat and indigenous flora of the hills.

Groundwater Repository– The fractured quartzite and weathered rock systems serve as critical aquifers, facilitating groundwater recharge for the water-scarce region.

Biodiversity Hotspot– Supports dry deciduous forests and serves as a corridor for wildlife, including leopards, hyenas, and various bird species.

Human & Environmental Services

Air Quality Control– Acts as a barrier against dust storms and serves as a carbon sink, regulating the micro-climate of the NCR, Rajasthan, and Haryana.

Resource Source– Historically provided quartzite, marble, and limestone, though the extraction of these has caused irreversible damage.

Major Ecological Challenges

The Aravallis are facing a multi-front crisis driven by human activity and policy gaps.

Shrinking Hill Area– Between 1975 and 2019, the hill system lost approximately 8% of its area (approx. 5,770 sq km). 5% of this area became barren land, and 1% was consumed by human settlements. This loss weakens the natural barrier against the Thar Desert, intensifying air pollution and irregular climate patterns.

Rampant Mining Expansion– Land under mining grew from 1.8% (1975) to 2.2% (2019). Illegal quarrying has caused more than one-fourth of the Aravalli region and 31 hill ranges in Rajasthan to reportedly vanish.

Pollution– Mining dust contributes heavily to Respirable Particulate Matter (RPM), worsening air quality in the NCR.

Urbanization & Human Settlements– Built-up areas saw a sharp expansion from 4.5% to 13.3% over four decades. This has led to severe habitat fragmentation, cutting off wildlife corridors and stressing the ecosystem.

Decline in Forest Cover– The central Aravalli range lost nearly 32% of its forest cover (1975–2019), mostly converted to agricultural land. The average annual deforestation rate stands at 0.57%, indicating persistent stress.

Water Crisis & Hydrology– Deep, unscientific mining has breached underground aquifers, disrupting natural water flow. This has dried up lakes and streams, while abandoned mining pits create artificial depressions that alter local hydrology. Rivers originating here (Banas, Luni, Sahibi, Sakhi) have either

dried up or become seasonal.

Vegetation Health- The Enhanced Vegetation Index (EVI) indicates stress (values between 0 and -0.2) in the upper central Aravalli region (e.g., Nagaur district), signaling poor vegetation health.

Future Projections (If Trends Continue)

Total Degradation- By 2059, degradation of the landscape is projected to reach 22% (over 16,000 sq km).

Mining Footprint- Approximately 3.5% of the total area (2,630 sq km) is expected to be consumed by mining.

Biodiversity Loss- Continued loss of forest cover will lead to a sharp decline in species like leopards, striped hyenas, and golden jackals, alongside increased human-wildlife conflict.

Proposed Solutions- CEC Recommendations

The Central Empowered Committee (CEC) has proposed a science-based strategy to halt the decline-

Scientific Mapping- Comprehensive mapping of the entire range across all four states.

Macro-Level EIA- Conducting Environmental Impact Assessments specifically for mining activities on a large scale.

Strict Prohibitions- A ban on mining in ecologically sensitive zones, including wildlife corridors, aquifer recharge areas, and protected habitats.

Lease Freeze- No new mining leases or renewals should be granted until proper mapping and assessments are complete.

Regulation- Tight controls on stone-crushing units that contribute to air pollution.

Legal Status of Mining

There is a complete ban. The Supreme Court has adopted a calibrated approach rather than a blanket ban.

Existing Rights- Legal mines may continue under strict regulation.

Sensitive Zones- New mining is severely restricted or prohibited in ecologically fragile areas.

Conditions for Mining- Mining is permitted only if it is strictly monitored, scientifically assessed, and environmentally justified. The goal is to balance environmental protection with economic considerations.

Government Initiative- "Green Wall Project"

To combat the degradation, the government launched a major restoration initiative in June 2025.

Goal- Restore 26 million hectares of degraded land by 2030.

Priority Zone- The Aravallis are identified as a priority ecological zone for this project.

Key Focus Areas- Afforestation and landscape restoration. Combating desertification (halting the Thar desert's advance).

Global Alignment- The project aligns with India's commitments under the UN Convention to Combat Desertification (UNCCD).

Source- <https://www.thehindu.com/sci-tech/energy-and-environment/how-is-the-aravalli-range-to-be-protected-explained/article70408703.ece>