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THE STUDY OF INDIA'S EMERGING ENVIRONMENTAL CRISIS: ARAVALLI RANGE

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ABSTRACT:

*“The Aravalli Mountain Range, an ancient geological formation that predates the Himalayas is at Centre of high stakes, legal and ecological battle. The Hills have been subjected to intensive quarrying and mining in Rajasthan and Haryana. While construction and urban sprawl have shrunk them in the national capital region. Recently, the Supreme Court pause the controversy order, identifying the mountain based on their height which could have wiped out the legal protection of large part of the ranges” (nulkar, 2026). “This article situates the controversy within broader political science debates on judicial activism, environmental federalism, and the tension between sustainable development and growth-oriented capitalist environmentalism. The new definition of Aravalli accepted by the Supreme Court on 20 November 2026 effectively excludes almost 90% range from protection against mining and other development activities as per internal assessment of the forest survey of India. Critics sphere that this definition under which the Aravallis comprise any landform at an elevation of hundred metres or more above, the local relief would be hammer blow for an already degraded hill range that provides diverse ecological and environmental services to northern and north western India” (Ghanekar, 2025). “In **M.C Mehta v. Union of India** and Ors (2004) represents a pivotal moment in India's legal landscape concerning environmental protection and sustainable development. The Supreme Court of India deliberated on the environmental degradation caused by extensive mining activities in the Aravalli Hill Range, spanning approximately 448 square kilometers across the districts of Faridabad and Gurgaon, including Mewat” (Supreme Court of India's Landmark Suspension of Mining in Aravalli Hill Range: A Comprehensive Analysis, 2009). The political aspect of environmental classification is exposed by the Aravallis, which also emphasizes the necessity for a governance paradigm based on ecological integrity rather than administrative expediency.*

KEYWORDS: Aravalli Hills; Ecological Integrity; Environmental federalism; Local Relief; Ecological integrity; Sustainable development; India

INTRODUCTION:

“The relationship between humans and natural resources has been a fundamental aspect of civilization's development throughout history. The utilization of resources for economic advancement has been a consistent theme across different time periods. As human populations have grown, the demand for land has increased, leading to the expansion of settlements and agricultural activities at the expense of natural habitats such as forests and wetlands” (Baliyan, 2024). “The Aravalli are one of the oldest fold mountains in the world formed during the pre-Cambrian era due to the collision of tectonic plates of the earth crust. The 700 odd kilometre range stretches across four states that is Gujarat, Rajasthan, Haryana and Delhi and 37 districts with 560 km lying in Rajasthan alone. The present day range, however, is much erode compare to what the Aravalli’s were at their birth. The degradation is due to both natural factors and human activities yet the Aravallis Provide priceless ecological services. If the western Ghats are considered the water tower and climate regulator of Penninsular India, the Aravalli Range is an ecological shield for the plains of Northwest and North India” (Ghanekar, 2025). “There is recent controversy on the new definition of Aravallis, proposed by a committee under Environment Secretary and approved by Supreme Court on 20 Nov, 2026, any landform that is at an elevation of 100 metre or more above the local relief will be considered as a part of Aravalli hills along with its adjacent land and slopes, but the 100 mtr benchmark and the use of ‘Local profile’, the immediate surrounding of the hill as the measuring base rather than standarised baseline such as the ‘State Lowest elevation ‘would result in a very significant part of Aravalli range not being counted as Aravalli anymore. Thus, the definition, though now held in abeyance, has ignited an environmental and political firestorm, with citizens, researchers and environmental groups staging protests across the states that share the ancient range. Their chief worry is that much of the Aravallis consists of low-lying ridges and hillocks, often rising no more than 20 to 50 metres. A 100-metre cut-off would therefore strip large swathes of the range from legal protection, opening the door to unchecked mining and construction in an already beleaguered landscape” (Himanshu Nitnaware, 24 dec, 2025).

GEOGRAPHICAL AND HISTORICAL OVERVIEW OF ARAVALLIS:

“The Aravalli hills in India hold the distinction of being the oldest mountain range on Earth. Derived from the Sanskrit words "ara" and "vali", Aravalli translates to "line of peaks." With its origins dating back to the Proterozoic era, the Aravalli Range is considered one of the oldest geological features on the planet.³ Spanning across Gujarat, Rajasthan, Delhi, and Haryana, it significantly influences the climate and biodiversity of western India. Running from Delhi to the northeastern edge of Gujarat State, the range consists of detached ridges shaping inland drainage basins. It maintains a relatively continuous presence south of Ajmer” (Baliyan, 2024). “They are formed in Precambrian Era due to the collision of tectonic plates of Earth crust, this phenomenon has resulted in the Aravalli Range connecting two ancient segments of the earth's crust, namely the Aravalli Craton and the Bundelkhand

Craton. The Aravalli Craton, located northwest side of the Aravalli Range, represents a stable part of the continental lithosphere that has remained relatively undeformed over time. Similarly, the Bundelkhand Craton segment, located southeast side of the Aravalli Range, also demonstrates characteristics of an old and stable part of the earth's crust. Both cratons are integral components to the larger Indian craton, known for its resilience amidst continents merging and rifting cycle. 4 It is noteworthy that cratons are found in the interiors of tectonic plates and play a crucial role in understanding the geological history of a region. Their stability and lack of deformation provide valuable insights into the evolution of continents and the Earth's crust. Despite the Aravalli Range no longer experiencing significant growth, its geological significance remains paramount in unravelling the complexities of India's geological past” (Baliyan, 2024). The Aravalli ranges are much more than just a collection of low hills; they hold a special place in India's history and geography. As one of the world's oldest mountain systems, the Aravallis have influenced rainfall patterns and served as a natural barrier against desertification for millions of years, shaping the physical landscape of northwest India. By offering natural shelter, mineral resources, and secure settlements for ancient civilizations, these hills historically played a significant part in the development of early Indian civilization. This included the emergence of Rajput kingdoms and the first trade routes between northern and western India. They have acted as natural barriers that shield towns from excessive heat, air pollution, flooding, and land degradation, the Aravallis have grown in importance.

SIGNIFICANCE OF ARAVALLIS:

The range protects the northern plains from the western sand invasion of the Thar Desert. Additionally, it protects the quality of the air in the north. The Delhi NCR region, which is already having a hard time controlling local sources of pollution, would suffer greatly from any increasing sand intrusion. Additionally, the hills receive a healthy quantity of rainfall, which is necessary for nearby settlements' agricultural demands and drinking water supplies. According to studies, there are currently 12 significant gaps in the Aravalli due to deforestation, quarrying, and erosion. These gaps span the northernmost hillocks in Mahendragarh, Haryana, the Madhogarh Hills in Jhunjhunu district, Khetri, and the Magra Hills in Ajmer district.

Even though the Aravallis' role on water drainage and recharge is not well discussed, the hills and rock formations are crucial for replenishing groundwater levels and nutrients as well as supporting Rajasthan's and Gujarat's seasonal rivers. The Aravali landscape at the center, the documentation of the restoration action plan, and the important part the Aravalli Hills play in this regard. According to the action plan, it is one of the primary watersheds that divide the drainage of the Arabian Sea through the Mahe, Sabarmati, Luni, and other rivers from that of the Bay of Bengal by rivers like Chambal and other tributaries of the Yamuna. According to the action plan, the area is also home to significant lakes and wetlands, including as Sultanpur, Pushkar, Fateh Sagar, Jaisa Mand, and Sambhar.

Because the rocks in the Aravalli are so worn and fractured, precipitation can seep deeply into the earth rather than flowing off the surface. For the water security of quickly expanding cities and towns like Faridabad, Gurugram, and Sohna, this enormous but unseen reserve is essential. The availability of water in the area is directly and seriously threatened by any disturbance of this recharge mechanism, whether it be from mining, building, or deforestation.

Regarding wildlife and biodiversity, the mountains offer a distinctive semi-arid, dry, and deciduous environment that supports a wide variety of plants and animals. There are 22 wildlife sanctuaries in the range, including 16 in Rajasthan, where there are tiger reserves at Ranthambore, Sariska, and Mukundra. Tigers, leopards, sloth bears, sambars, chitals, desert foxes, blackbucks, hyenas, wolves, jackals, gharials, and crocodiles are among the species that can be found in this area. These plants are also essential for maintaining semi-arid scrub forests and semi-savanna forests, as those in Alwar's Sariska Tiger Reserve. Before granting new leases, the Supreme Court mandated a common high definition and management plan for sustainable mining, which must take these ecosystem services into account. The animal corridors would be reduced if the smaller Aravali hillocks were made available for mining. Due to increased human pressure and forest loss, the Aravalli's ecological richness is quickly dwindling and is currently only found in patches, protected areas, and fragmented forest. Along with supporting local livelihoods, the Aravalli region depends on its border, fruits, vegetables, medicinal plants, and fuel wood.

“The forested patches within the Aravalli range serve as essential green lungs, playing a vital role in mitigating air pollution and preventing soil erosion. This not only benefits the local environment but also has wider implications for the surrounding areas. In addition to their role in preserving the environment, the Aravalli hills also have a significant impact on weather patterns and the spread of desert regions. The hills moderate wind velocity and have effectively prevented the Indian Desert named Thar from encroaching further towards Haryana, eastern Rajasthan, Western Uttar Pradesh, and the Indo-Gangetic plains” (Baliyan, 2024). “However, the increasing urban development, including the construction of highways and railways, poses a significant threat to this delicate ecosystem by disrupting the wildlife corridor. In particular, the Haryana side of the Gurugram-Faridabad Aravalli hill forests faces challenges related to water scarcity, leading to a decrease in wildlife sightings. It is evident that the Aravalli Range is not only rich in wildlife but also faces various challenges due to human activities. However, with proactive measures and conservation efforts, there is hope for preserving this unique ecosystem for future generations” (Baliyan, 2024).

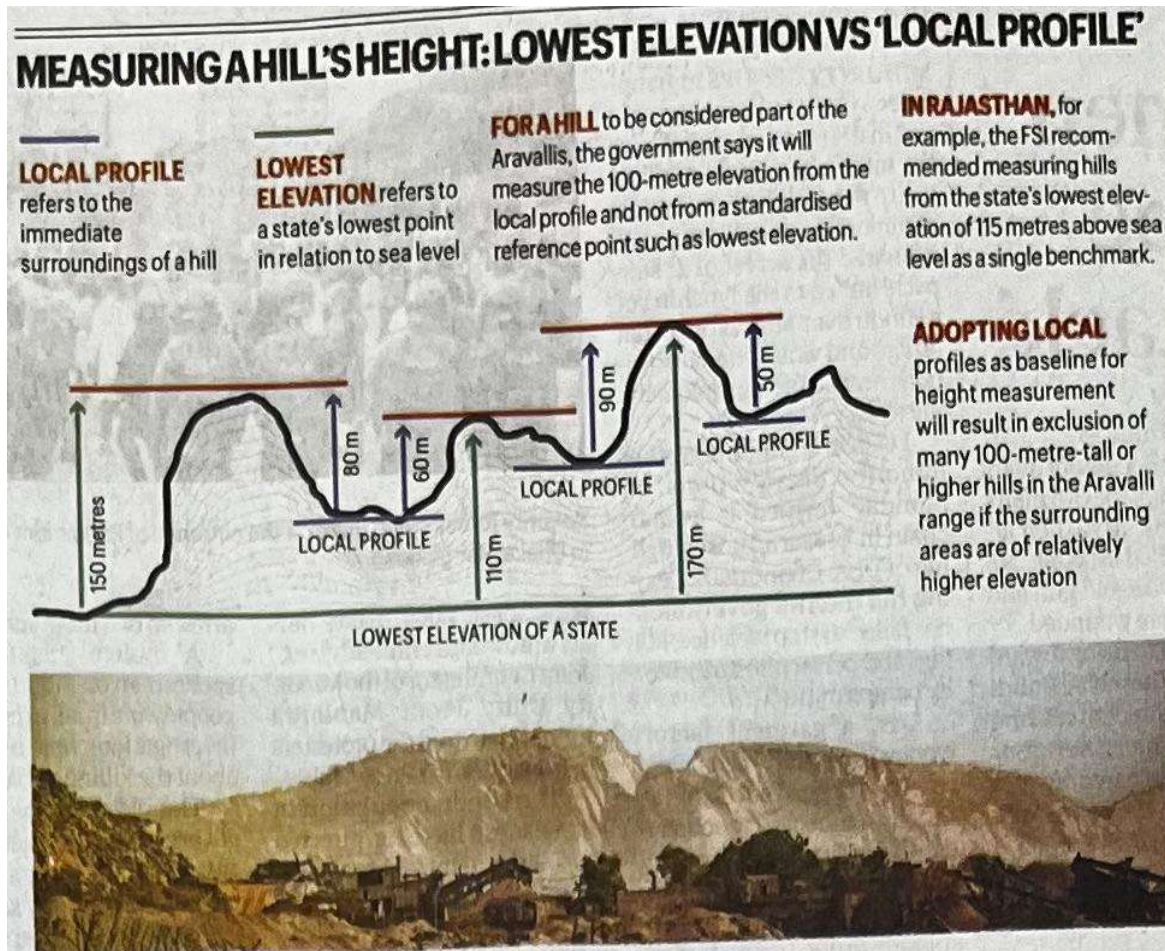
THE RECENT 100 METRE BECHMARK CONTROVERSY:

In the past, the Aravalli range was not strictly defined by height but rather by geography and ecology. However, governments encountered growing opposition from courts and environmental organizations as mining, real estate, and industrial activity increased, particularly in Rajasthan,

Haryana, and the NCR region. Authorities started looking for a precise, quantifiable, and easy-to-apply definition of the Aravallis so that construction could proceed while seeming to adhere to environmental orders. Because height is easier to measure and defend administratively, this led to the concept of adopting it as a criterion. The idea that only features reaching more than 100 meters should be classified as Aravalli hills was attempted in the late 2000s; this would automatically deny protection to large low-lying slopes, ridges, and adjacent areas. The Supreme Court first rejected this strategy in 2010, acknowledging that even modest hills in the Aravallis perform an important ecological role in this ancient, degraded, and dispersed mountain range. However, the issue persisted over time due to a lack of a clear statutory definition, pressure to permit mining and infrastructure, and frequent litigation. A height-based benchmark was ultimately approved by the court in subsequent trials up until 2025 as a means of "settling" protracted disagreements between states, the Center, and developers. Last year, the Court found that the inconsistency in criteria used to define the hills was one of the major reason for illegal quarrying in Aravallis. It asked the Union Environment Ministry to establish a committee to frame a scientifically grounded definition of mountain ranges. "The panel submitted its report in October 2025, and the Apex Court gave its imprimatur about a month later. However the new criteria to define the Aravalli hills – only landforms at an elevation of 100 metres or more should be considered as a part of mountain system- has invited controversy. Fears of destruction of the oldest mountain range have triggered protest in several parts of the nation especially in Rajasthan" (Indian express , 2025). "With over 1200 active mining hollowing out hills, it is time our policymakers " think like a mountain " -a term coined by the ecologist Aldo Leopold. In his classic, A Sand County Almanac , Leopold describe how in his youth , hunting wolves was a celebrated sport- few would mean more deer, a hunter's veritable paradise, of one such hunt, Leopold watched the "Fierce green Fire" die in the wolf eyes. It was then that realisation dawned upon him the mountain did not agree with killing wolves. As more wolves are shot ,the population of deer increases and they strip the mountain of its vegetation. The over graze mountain loose the soil to erosion and, overtime face a total ecosystem collapse" (nulkar, 2026).

"The current approach to the Aravalli hills mirrors Leopold's early mistake. Policymakers often fall into the trap of prioritised short-term objective over long-term stability. The race for construction material has left deep gouges in the mountains, which disturbs natural drainage system, uproot forests. The mountain influence the monsoon in northern India and presents a formidable barrier that arrests the eastward drift of the Thar Desert. Their fractured rock profiles recharge aquifers. Most importantly , they are biological corridors that maintain the gene pool and capture carbon. To think like a mountain, is to appreciate the profound into connectedness of an ecosystem that is a result of evolutionary interdependence. The controversy over 100 mtr definition is short-termism. Defining a hill only by height is oversimplification for the sake of convenience, and use of 'local Profile' for

measurement” (nulkar, 2026).



POLITICS OF PROTECTED & EXCLUDED AREA:

“Parts of Aravalli are designated as tiger reserves, national parks, sanctuaries, eco-sensitive zones around these protected areas, wetlands and plantations under the compensatory afforestation scheme. These areas remain out of bounds for mining or development, unless permitted specifically under the relevant wildlife and forest Acts, irrespective of their status as Aravalli Hills. Even such protection is not necessarily permanent. As reported by The Indian Express on June 22, 2025, the ministry and Rajasthan attempted to "rationalise" the boundaries of the Sariska tiger reserve, which would have allowed mining now barred in the vicinity of the reserve limits, until the Supreme Court intervened” (MAZOOMDAR, 2025).

“It is important to note that the new Aravalli benchmark does not exclude all landforms under a 100-metre elevation from the range. It identifies all landforms rising at least 100 metres from the local profile as Aravalli Hills. And it is only when two such hills are less than 500 metres apart that the intervening stretch - irrespective of its elevation— will also be counted as part of the range” (MAZOOMDAR, 2025).

The Forest Survey of India's (FSI) 3-degree slope formula, which counts all areas above the minimum elevation of an Aravalli state—115 meters in the case of Rajasthan—with a slope of at least

3 degrees as Aravalli, will exclude large tracts that have been identified as belonging to the Aravalli range under the new parameters. Almost two-thirds of the mountain range is in Rajasthan. In addition, several districts have been removed entirely from the 34 Aravalli districts—which are spread throughout Gujarat, Rajasthan, Haryana, and Delhi—that the Environment Ministry sent to the Supreme Court. The Sawai Madhopur district of Rajasthan, for instance, is not on the list despite being well-known for the Ranthambore tiger reserve, which is situated where the Aravalli and Vindhya hill ranges merge. The district of Chhitorgarh, a UNESCO World Heritage Site and well-known for the fort erected atop a high Aravalli crag, is also absent. The Forest Survey of India classified 1,110 sq km of the Nagaur district of Rajasthan as Aravalli; this area is likewise not included. According to the minister, mining areas barely comprise 0.19% of the "144 lakh sq km" that make up the Aravalli. However, 144 lakh sq km encompasses nearly the whole area of all 34 Aravalli districts on the ministry's list, hence the Aravalli extent is exaggerated.

JUDICIAL ACTIVISM & ENVIRONMENTAL PROTECTION:

“From its Aravalli ranges to its mangroves, India is at the same moral crossroads that Amitav Ghosh captures “The Hungry Tide”, where the tides remember what the law chooses to forget. If environmental justice continues to be diluted in the name of development, the Constitution of India risks becoming a silent witness to ecological loss, where the consequences, like the tide itself, will return with unforgiving force” (Faizan Mustafa, 2026). The Aravalli traditionally acknowledged as the ecological backbone of north-western India, play a vital role which includes checking desertification, enhancing the recharge of groundwater, controlling micro-climates and maintaining biodiversity.

“In **M.C. Mehta vs Union of India and Ors. (2004)**, a ban was imposed on mining in the Aravalli region.,later orders that culminated in the year 2010 admitted that unregulated mining in the area had had irreparable effects on the environment , the 100m norm was discarded in 2010 on an ecological basis” (Faizan Mustafa, 2026) .Hills and ridges at a low altitude are of significant importance in the preservation of groundwater and soil stability in the semi-arid landscapes. The Aravalli are not just a cluster of isolated peaks but are a geomorphological system.

“It was due to the need to circumvent this reductionist strategy that the Court relied on the precautionary principle, in **Vellore Citizens’ Welfare Forum vs Union of India and Others (1996)**, rejecting the idea of any artificial limit” (Faizan Mustafa, 2026).

The strange acceptance by the top court of the 100-metre definition, in **In Re: Issue Relating to Definition of Aravalli Hills and Ranges (2025)**, marked a clear departure from the position taken in 2010. In trying to keep landforms above a predetermined elevation as the sole subject of legal protection, the Court has efficiently deprived the Aravalli ranges of any statutory and judicial protection over large portions.

“There is a direct connection to the right to a clean and healthy environment, which has been

widely interpreted in the context of **Article 21**. In situations when the judiciary's interpretation of the law can encourage rather than protect ecological exclusion, **Article 48A** which mandates that the state maintain the conservation and enhancement of the environment, is now a meaningless declaration. The discriminatory protection some landforms in relation to height creates an absurd classification that has no rational nexus to ecological goals” (Faizan Mustafa, 2026).

SUSTAINABLE DEVELOPMENT VS CAPITALIST ENVIRONMENTALISM:

In the context of modern environmental regulation in India, the new height-based redefining of the Aravalli range offers an engaging empirical location to examine the theoretical conflict between capitalist environmentalism and sustainable development. According to international environmental law and constitutional jurisprudence, sustainable development is based on the ideas of ecological integrity, intergenerational equality, caution, and acknowledging nature as a life-supporting system rather than just an economic resource. Capitalist environmentalism, on the other hand, does not completely reject environmental protection; rather, it reframes it to be consistent with market efficiency, capital accumulation, and infrastructure growth. This is frequently accomplished through the use of technocratic tools, selective conservation, and regulatory flexibility.

An example of this change is the 100-meter height-based definition of the Aravalli, which simplifies a complicated, old, and geomorphologically degraded mountain system into a limited, administratively useful term that gives measurable elevation precedence over biological function. Large areas of low-lying slopes, ridges, hydrological corridors, and forested landscapes are thus left out. Thus, the Aravalli instance illustrates how scientific and legal languages are used to create what seems to be regulatory clarity while really making it easier to access property for infrastructure, real estate, and mining .Hence, the Aravalli controversy raises important issues regarding environmental justice, constitutional accountability, and the future of ecological protection in India by serving as a stark example of how sustainable development runs the risk of being diluted and repurposed within a capitalist framework.

POLICY NEED FOR SAFEGUARD:

“The Aravalli’s are already under immense pressure, and have faced degradation over the years due to urbanisation, industrial clusters and mining, both legal and illegal. The union government has itself accepted the large scale degradation in its action plan under the “Aravali green wall” project. The Aravalli Range faces increasing threats due to deforestation, mining, grazing and human encroachment. Forest lands around Sariska wildlife sanctuary were diverted before the 1980s. However, these challenges are only said to rise: the Aravalli, after all our recognised the repository of metals and minerals, including critical minerals. Even as a Supreme Court has placed him, moratorium of sorts on new mining leases until a detailed mining plan, study is undertaken, it has accepted centres recommendation to make an exception for critical minerals. The mountain range is home to lead, zinc,

copper, gold, tungsten, and has reserves of critical minerals like Molybdenum, niobium, nickel and rare earth elements. Although the centre says the new definition is only for mining purposes, how it plays out for the real estate sector remains to be seen. These pressures call for stricter protection of mountain range, which is already under stress” (Ghanekar, 2025). “As Leopold’s philosophy implies, prioritising for immediate gain of yields danger in the long run. If our leaders do not learn to think like a mountain, our future will be ecologically poorer, and that would be most unfortunate for the people of mega diverse country like India” (economics, 2026).

From the historic ruling in the MC Mehta case, which placed a strong emphasis on the severe protection of the polluters' rights. The court has been a strong advocate for ecological issues since last year, acknowledging that individuals have a right to be shielded from the devastation of nature. The Supreme Court should keep doing what its own experts have emphasized, which is to protect the mountain range, in the aftermath of the standoff on what exactly makes up the Aravalli.

CONCLUSION:

A significant change in India's environmental governance from ecological preservation to administrative convenience is highlighted by the definition of the Aravalli ranges, which is based on heights of 100 meters. Previous Supreme Court decisions rejected limited, height-centric interpretations and acknowledged the Aravalli as an integrated geomorphological and biological system, most notably in M.C. Mehta v. Union of India. This jurisprudence has recently changed with the adoption of the 100-meter standard, which leaves out huge ecologically valuable areas that have been identified by scientific organizations such as the Forest Survey of India. The new definition significantly reduces the Aravalli' statutory and legal protection, despite its intention to clarify long-standing issues. The Supreme Court's selective actions, such blocking efforts to weaken protected areas, highlight an unresolved conflict in environmental decision-making. The Aravalli run the risk of becoming a legal construct rather than being protected as an essential environmental system unless ecological science and caution are reinstated as guiding principles in future legal approaches.

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