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# THE ARAVALLI JUDGMENT AND THE PRECAUTIONARY PRINCIPLE: A CRITICAL ASSESSMENT OF ENVIRONMENTAL JURISPRUDENCE OF INDIA

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## ABSTRACT

The Supreme Court of India approved a uniform definition of the Aravalli Hills on 20<sup>th</sup> November 2025 by approving the suggestion of committee that a landform must be at least 100 meters above local relief to qualify as part of the Aravalli Hills. This decision in *In Re: Issues relating to definition of Aravali Hills and Ranges*<sup>1</sup>, has created widespread controversy with regard to environmental law within India. It appears likely that this decision will take away legal protections from approximately 90 percent of the Aravalli range. The Aravalli are among the oldest mountain ranges in the world and serve as a significant natural barrier to prevent desertification. This paper examines whether the approach of Supreme Court of India in this case represents a departure from the precautionary principle that has been a cornerstone of environmental jurisprudence in India since *Vellore Citizens' Welfare Forum v. Union of India*<sup>2</sup> judgement. Specifically through this doctrine analysis the researchers will argue that by accepting an elevation based definition for what constitutes the Aravalli Hills, despite clear evidence of ecological continuity the Supreme Court raised serious concerns regarding the application of constitutional environmental principles in contemporary times.

**Keywords:** Sustainable Development, Precautionary Principle, Inter-Generational Equity, Environmental Degradation, Climate Change

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<sup>1</sup> *In re Issue Relating to Definition of Aravali Hills and Ranges*, 2025 INSC 1338 (India Nov. 20, 2025).

<sup>2</sup> *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 647 (India).

## I. INTRODUCTION

The Aravalli mountain range which is believed to be about two billion years in age is an incredible geological wonder and an important ecosystem within the North West region of India. The Aravalli ranges are spread roughly over 692 km and extend through the states of Gujarat, Rajasthan, Haryana and Delhi. They act as a natural barrier against the westward movement of the Thar desert as well as being important areas for the recharge of groundwater and home to twenty two wildlife sanctuaries that include four tiger reserves. This natural ecosystem was made the subject of a judicial decision by the Supreme Court of India on 20<sup>th</sup> November 2025 with that decision potentially changing the status of Aravalli legally and ecologically forever.

A judgement that has sparked large scale civil protests under the #SaveAravalli campaign in response to the request of Ministry of Environment, Forests and Climate Change (hereinafter as MoEFCC) a three judge panel consisting of Chief Justice B.R. Gavai, Justice K.V. Chandran, and Justice N.V. Anjaria, have agreed with the MoEFCC proposal for a standardized definition of the Aravalli Hills. The proposed definition is that only those landforms that are at least 100m higher than their surrounding terrain will be classified as part of the Aravalli Hills. According to data from the Forest Survey of India (hereinafter, the FSI) using this criteria would classify only 1,048 of the 12,081 mapped hill areas (approximately 8.7%) as part of the Aravalli Hills which could lead to the removal of legal protections from approximately 90% of the area.<sup>3</sup>

This paper provides a critical analysis of the Aravalli ruling with respect to the precautionary principle. This is the same principle which was described by the Supreme Court as being an element of Indian environmental law in *Vellore Citizens' Welfare Forum v. Union of India*<sup>4</sup>. This paper will address the following research question: Is the decision of Supreme Court to apply a limited elevation based definition for the Aravalli Hills when there has been scientific evidence of ecological continuum and functional value of low lying formations, a deviation from the precautionary principle.

## II. THE PRECAUTIONARY PRINCIPLE IN ENVIRONMENTAL JURISPRUDENCE OF INDIA

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<sup>3</sup> Forest Survey of India, *Status Report on Aravalli Hills* (Aug. 2010).

<sup>4</sup> *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 647 (India).

## A. Origin and Constitutional Foundation

The precautionary principle developed into an answer to environmental governance problems which arise under conditions of scientific uncertainty. As stated by the precautionary principle, a lack of complete scientific certainty is not a sufficient basis to delay or avoid measures to protect the environment from damage. The precautionary principle has a footing in the Constitution of India with reference to Article 21<sup>5</sup> (the right to life); Article 48A<sup>6</sup> (the obligation on the part of the state to protect the environment); and Article 51A(g)<sup>7</sup> (the fundamental duty of citizens to protect the environment).

Vellore Citizens' Welfare Forum v. Union of India<sup>8</sup> was a landmark case that formally incorporated the precautionary principle into the law of India with Justice Kuldip Singh stating that "the precautionary principle requires the State to anticipate, prevent and attack the causes of the degradation of the environment. The absence of scientific evidence of a threat of serious or irreversible damage does not provide grounds for deferring actions to prevent environmental degradation."<sup>9</sup>

The formulation also created three very important components; (1) proactive action in anticipation of environmental risks, (2) shifting of the burden of proof from environmentalists to proponent of a project, and (3) the need for action when science is uncertain about the issue at hand. In addition, the Supreme Court of India in Vellore judgement has ruled that principles of sustainable development, the precautionary principle and the polluter pays principle are all part of law in India.

## B. Judicial Development and Application

In addition to Vellore judgement, the Precautionary Principle has been utilized in a wide range of environmental issues and used as an alternative for various forms of environmental action and regulation. The Court also further clarified in A.P. Pollution Control Board v. Prof. M.V. Nayudu<sup>10</sup>, that in order to invoke the Precautionary Principle there is a need to respond to the degree of threat i.e. greater degrees of threats require greater levels of precaution. The Court

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<sup>5</sup> INDIA CONST. art. 21.

<sup>6</sup> INDIA CONST. art. 48A.

<sup>7</sup> INDIA CONST. art. 51A(g).

<sup>8</sup> Id. at 3.

<sup>9</sup> Id.

<sup>10</sup> A.P. Pollution Control Bd. v. Prof. M.V. Nayudu, (1999) 2 SCC 718 (India).

reinforced this idea when it stated in reference to environmental decision making that "the decision must be made in consultation with scientific experts and ecological factors rather than simply to achieve an administrative convenience."

Continuing judicial review of environmental decision making has been reaffirmed by the Supreme Court in Research Foundation for Science, Technology and Natural Resource Policy v. Union of India<sup>11</sup>, The Supreme Court emphasized the need for strict scrutiny and use of precautionary principles due to the irreversibility of many forms of environmental harm. Subsequent decisions have supported this principle with respect to the protection of forests; regulation of mining; and protection of biological diversity.

Notably, the Supreme Court in the case of M.C. Mehta v. Union of India<sup>12</sup>(Aravalli mining matters) had already put mining bans into place in the Aravalli area which was recognized by the court as an environmentally fragile zone with potentially irreversible negative effects due to unregulated extraction. The Court stressed that in these types of areas environmental concerns must be given priority over other forms of development thus creating a legal precedent for this type of issue currently being debated.

### **C. Functional Approach to Environmental Protection**

Environmental jurisprudence in India has always utilized a purposeful and practical approach when evaluating environmental systems. Courts in India have based their evaluations on whether an area functions ecologically regardless of how the government formally classifies it. The Supreme Court in T.N. Godavarman Thirumulpad v. Union of India<sup>13</sup>, defined forest broadly as any area that has forest like characteristics including areas that were not officially designated as forestland. Therefore the approach of courts emphasized ecological realities over administrative efficiencies.

In addition in M.C. Mehta v. Kamal Nath<sup>14</sup>, the Court employed the public trust doctrine which recognized that natural resources such as mountain ranges and forests are owned by the State as trustees for the benefit of present and future generations. As a result the public trust doctrine established fiduciary duties on behalf of the State as trustee not merely to allow private interests

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<sup>11</sup> Research Found. for Sci., Tech. & Natural Res. Policy v. Union of India, (2005) 13 SCC 186 (India).

<sup>12</sup> M.C. Mehta v. Union of India, (2004) 12 SCC 118 (India).

<sup>13</sup> T.N. Godavarman Thirumulpad v. Union of India, (1997) 2 SCC 267 (India).

<sup>14</sup> M.C. Mehta v. Kamal Nath, (1997) 1 SCC 388 (India).

to exploit these resources but to protect them from such uses and promote responsible uses.

### III. THE ARAVALLI JUDGMENT: FACTS AND JUDICIAL REASONING

#### A. Background and Procedural History

Definitional disputes arose as a result of actions in two ongoing environmental cases M.C. Mehta vs. Union of India<sup>15</sup> which monitored mining in the Aravallis in the state of Haryana and T.N. Godavarman Thirumalpad vs. Union of India<sup>16</sup> which addressed mining in the Aravallis in the state of Rajasthan. Questions were raised on 10<sup>th</sup> January, 2024 as to whether specific mining activities were being conducted either within or outside of the Aravalli Hills. A major concern was that there was no consistent definition of Aravalli Hills used by states. Rajasthan had established an elevation based definition of 100 m. back in 2006 but Haryana had no official definition for it at all.

On 9<sup>th</sup> May, 2024 the Court directed the formation of a committee composed of representatives from MoEFCC, State Forest Departments, FSI, Geological Survey of India and the Central Empowered Committee (hereinafter as CEC) to develop a uniform definition of the term Aravali Hills. In October 2025 the committee submitted their report with a recommendation to establish an elevation based definition of 100 m. Additionally the Court asked the CEC to consider if mining classifications for the Aravallis should be continued.

#### B. The Definition by Committee and Scientific Basis

Based on landform classification principles by Richard Murphy the Committee defined the term Aravalli Hills as the landforms found in Aravalli Districts that are above the local relief level of 100 m and have at least a 100 m buffer area around them. To determine the local relief the committee used the lowest contour line surrounding the landform.<sup>17</sup> In addition to this the committee defined Aravalli Range as two or more hills together in close proximity to one another i.e. less than 500m apart. The committee stated that it chose these definitions for their administrative consistency practical verifiability in the field and scientific objectivity using the previously mentioned landform classification principles of Richard Murphy.

These definitions however were not consistent with the previous recommendations made by

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<sup>15</sup> Id.

<sup>16</sup> T.N. Godavarman Thirumulpad, (1997) 2 SCC at [3].

<sup>17</sup> In re Issue Relating to Definition of Aravalli Hills and Ranges, 2025 INSC 1338, para 29 (India Nov. 20, 2025).

the FSI in its Status Report for 2010. They recommended defining Aravalli Hills based on the following criteria: (i) slope greater than  $3^{\circ}$  (ii) 100m wide buffer zone between foothills (iii) 500m wide distance between hills or width of valleys and (iv) areas contained by defined hills. Unlike the definitions of committee the FSI approach emphasized ecological connectivity and functionally related properties over simply the elevation of the landform.

### C. The Acceptance by Court and Rationale

The Supreme Court adopted the definition given by committee as it provided an element of uniformity and practicality for all states. Attorney Aishwarya Bhati stated the definition given by committee is more inclusive than the criteria given by FSI because the criteria may exclude vast areas of land from being considered for sustainable development.<sup>18</sup> The Court also acknowledged that the committee only wanted to allow mining in core/inviolate areas for critical, strategic and atomic minerals in addition to prohibit mining in wildlife sanctuaries, etc.

Citing similarities to the Management Plan for Sustainable Mining (hereinafter, the MPSM) created for the Saranda Wildlife Sanctuary the Court directed the MoEFCC to create a similar MPSM for the Aravalli hills through the Indian Council of Forestry Research and Education. The court also placed a moratorium on new mining lease applications until the MPSM is finalized, however the Court did permit existing lawfully permitted mining to occur with strict compliance.

The court cited their prior case State of Bihar vs Pawan Kumar<sup>19</sup>, stating that there are many adverse consequences when a complete ban on mining occurs these include that mining goes underground and provides opportunities for organized crime. It appears that this consideration influenced the preference of court for a sustainable mining plan rather than an outright ban.

## IV. DOCTRINAL ANALYSIS: DEPARTURE FROM THE PRECAUTIONARY PRINCIPLE

### A. Scientific Certainty versus Precautionary Action

The first of a two part issues is whether the decision of court gives priority to administrative certainty or to ecological prudence. The critics say that even though the Aravalli System

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<sup>18</sup> Id.

<sup>19</sup> State of Bihar v. Pawan Kumar, (2022) 2 SCC 348 (India).

contains eroded low relief terrain that includes ridges, slopes, small hillocks and pediments which provide essential ecosystem services including groundwater recharge, erosion control of soil, habitat connectivity for wildlife and microclimate moderation, it does not meet the 100 meter criterion.<sup>20</sup>

The precautionary principle as stated in the Vellore judgement indicates that 'where there is a threat of serious or irreversible damage to the environment lack of scientific certainty shall not be used as a basis for postponing cost effective measures to prevent environmental degradation.' It would appear the court in the Aravalli judgment has reversed this logic by allowing a definition which eliminates ninety percent of the range using a single geomorphic criteria (elevation) before the court will require near scientific evidence of harm before it provides protection.

Lowland Aravalli rock formations provide an essential link between other parts of the range and are critical to the overall ecological integrity of the Aravalli Range. An expert committee appointed by the Supreme Court of India in 2018 identified that in Rajasthan 31 of the 128 Aravali hills have been destroyed in a span of fifty years as a result of unauthorized stone quarrying and the destruction has resulted in ten to twelve breaks in the continuity of the range. Many of these breaks were located in lower elevation areas less than 100 m. allowing desert sand and dust from the Thar Desert to be blown into the Delhi National Capital Region increasing poor air quality. The "State of the Haryana Aravalli: Citizens' Report" was released May 2025 documenting the complete loss of over two billion year old ecological heritage in the Charkhi Dadri and Bhiwani Districts as a result of permitted mining.<sup>21</sup>

Rather than requiring the use of the precautionary principle for this body of evidence i.e. demonstrating ecological fragility and continuing degradation to demand additional protection. As opposed to defining such areas off limits to development the court classified these areas in a manner that it admits is capable of leaving vast swaths of land potentially vulnerable to exploitation.

## **B. Formalism versus Functional Approach**

A major distinction exists between the approach adopted by the court in utilizing an elevated

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<sup>20</sup> Tanishka Shah, How the Supreme Court's New Definition of the Aravalli Redraws the Landscape of India's Oldest Hill Range, THE LEAFLET (Dec. 8, 2025).

<sup>21</sup> People for Aravallis, *The State of the Haryana Aravallis: Citizens' Report – Part 1* (May 2025).

threshold of threshold as a means of classifying areas that are subject to legal regulation of their natural resources and the functionally purposive approach previously utilized by the courts in India when dealing with environmental issues. In Godavarman Judgement, the Supreme Court of India gave priority to the ecological characteristics of the area over any administrative label assigned to the area. In addition, in previous cases involving the Aravalli region the courts focused upon the degree of ecological fragility and functional significance of the area.

The ecological significance of Aravali does not lie in an absolute height measurement however in the functions it performs as a barrier to desertification as a mechanism for recharge of groundwater through fractured bedrock as a means of regulating local climate conditions and as a habitat for species with high diversity. Member of Parliament Mr. Ajay Maken reported to parliament that the Aravallis are responsible for the recharge of approximately 2 million litres of groundwater per hectare on an annual basis. These functional attributes have no direct correlation with the 100 m. threshold.

Scientifically reducing the Aravalli system into one single geomorphic attribute has been criticized by experts for being too simplistic and overly reductive of the natural complexities that define an ecosystem. As a geologist would describe it, a mountain is defined by the geological structure and tectonic continuity not by an arbitrary elevation cut off point. Therefore a large boulder and a towering mountain are equally as much a part of the mountain range as each other if they both sit on the same tectonic plate. Former Chief Minister Mr. Ashok Gehlot stated that removing all landforms below 100m from this designation does not simply remove the name given to that area but removes a legal classification as well which results in the protection afforded by the Forest Conservation Act not applying in those areas.

### **C. Burden of Proof and Reversibility**

The precautionary principle reverses the burden of proof for project developers who will have to prove that low lying formations are ecologically unimportant and that removing them will cause no irreversible damage to the environment. In terms of the Aravalli judgement there is a lot of evidence pointing to the fact that this could not be proved as the low lying areas those which are likely to be removed have shown significant ecological harm.

The field research has documented large amounts of ecological damage to the low elevation areas in the Aravalli Range. The committee report states that the Aravalli Range is suffering

from escalating degradation pressures which include the loss of forest cover at an alarming rate over two decades, depletion of aquifers due to mining and loss of community livelihoods.

As stated in Research Foundation judgement, the court observed that damage to the environment is often irreparable. This is particularly true for mountain ranges such as the Aravalli which can never be restored once they have been damaged. It may take years or even centuries for water tables to replenish themselves. Similarly, biodiversity corridors once broken typically do not reconnect.

#### **D. Administrative Convenience versus Constitutional Duty**

The court has based its decision on the need for administrative consistency and workability. The additional solicitor general has also stated that allowing extraction completely will result in greater illegal mining and that the MPSM Framework will provide a balanced approach to both extractive activities and conservation. These are certainly valid administrative considerations however they should never supersede the constitutional environmental obligation of the state.

Article 48A mandates that the state protects and improves the environment. In *Subhash Kumar v. State of Bihar*<sup>22</sup>, the Supreme Court ruled that the right to life pursuant to Article 21 includes the right to have clean air and water. Therefore any governmental or regulatory framework which allows for environmental degradation is an infringement upon the constitutional rights associated with the right to life.

In light of this, the court is constitutionally required to assess the substantive effect of redefining the Aravalli Range to exclude environmentally protected lands and not simply whether it was formally lawful to do so.

### **V. CONSTITUTIONAL AND DOCTRINAL IMPLICATIONS**

#### **A. Public Trust Doctrine**

The Public Trust Doctrine as per *M.C. Mehta vs. Kamal Nath*<sup>23</sup> places the state in a position of a trustee of all natural resources for the benefit of the public today and for the benefit of future

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<sup>22</sup> *Subhash Kumar v. State of Bihar*, (1991) 1 SCC 598 (India).

<sup>23</sup> *M.C. Mehta v. Kamal Nath*, (1997) 1 SCC 388 (India).

generations. Therefore mountains, forests and areas with minerals are all subject to the public trust. When an agency has regulatory powers but uses those powers to allow private individuals to exploit these resources it is possible that the State will fail in its fiduciary duty to protect public resources.

Influenced by the mining industry the definition used by the committee may have been shaped to serve the interests of miners. In an additional affidavit submitted to the MoEFCC the Aravalli range was described as being rich in strategic and precious minerals such as lithium, tungsten, gold and lead providing substantial opportunities for future exploration.<sup>24</sup> With the emphasis on minerals as justification for the definition there appears to be some question regarding whether the State is fulfilling its fiduciary obligation to protect public assets or if the State is facilitating the ability of extractive industries to access these resources.

### **B. Article 14 and Non Arbitrariness**

As per Article 14<sup>25</sup> of the Constitution of India, state action requires to pass a test of non arbitrariness. An elevation based classification that does not consider ecological continuity and environmental impacts may fail to establish a sufficient rational nexus to meet this requirement. The Supreme Court has stated in *E.P. Royappa v. State of Tamil Nadu*<sup>26</sup>, that arbitrariness destroys both equality and the rule of law.

The 100 m. height criteria fails to provide an intelligible differentia with respect to the purpose of protecting the environment. For example two hilltops at 95 m. and 105 m. each providing the same ecological services could be classified differently under this classification. One being protected and the other vulnerable based upon height alone this classification also seems to be arbitrary when compared to the requirements for protecting the environment under the Constitution of India.

### **C. Cooperative Federalism**

Environmental regulatory system in India works within the cooperative federal system. The Supreme Court of India has also held that states are entitled to implement additional or more

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<sup>24</sup> Additional Affidavit of the Ministry of Env't, Forest & Climate Change, In re Issue Relating to Definition of Aravali Hills and Ranges, W.P.(C) No. 202 of 1995 (Sup. Ct. India 2025).

<sup>25</sup> INDIA CONST. art. 14.

<sup>26</sup> *E.P. Royappa v. State of Tamil Nadu*, (1974) 4 SCC 3 (India).

stringent regulations as needed for the ecological conditions of their regions. In addition uniform definitions that limit state level protection may result in environmental protections being brought down rather than improving.

Prior to this ruling some states were taking a more protective approach toward the environment. While Haryana was initially without definition it actually allowed greater flexibility with regards to protecting the environment through an ecological assessment of each case individually. Imposing a cap of 100 m. rather than a base line for what is considered adequate protection by each state limits the ability of states to establish greater levels of protection based upon regional ecological knowledge and local community needs.

#### **D. Intergenerational Equity**

The obligation to preserve natural resources for the benefit of future generations is a legal requirement in India based upon its jurisprudence regarding sustainable development. Therefore it is upon all generations that currently exist to conserve the Aravalli Range which is over 1.8 billion years old for future generations.

Allowing large scale mining in these ancient formations will violate the principle of preserving for future generations. Further while the court has required that an MPSM be developed prior to awarding new mining leases. This does not protect against potentially irreparable damage that can occur during the time between the decision and when an MPSM is developed. Although new mining leases are being frozen at present some ongoing mining continues as do other existing mining operations and the definition excluding ninety percent of the Aravalli range from consideration may provide encouragement to further exploitation in non Aravalli locations.

### **VI. COMPARATIVE ANALYSIS WITH INTERNATIONAL JURISPRUDENCE**

Comparative jurisprudence with international environmental law can provide a useful guide. In the Rio Declaration on Environment and Development of 1992, Principle 15 the precautionary principle is defined: 'Where there are threats of serious or irreversible damage lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation.'<sup>27</sup>

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<sup>27</sup> Rio Declaration on Environment and Development, princ. 15, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I), annex I (Aug. 12, 1992).

In Europe, the European Court of Justice has repeatedly ruled that environmental action should be taken under the precautionary principle therefore the burden of proof rests with those who wish to weaken such action. The courts of Europe have overturned policies dealing with the conservation of biodiversity and climate change that give preference to economic interests rather than ecological necessity when science has created uncertainty about an issue.

The Constitutional Court of Columbia has recognized rights for ecosystems and natural environments as such, requiring developers to assess and ensure ecological sustainability of their projects. The Supreme Court of Nepal in *Prakash Mani Sharma v. Government of Nepal*<sup>28</sup> applied the principle of precaution to protect the Himalayan ecosystem and stated that administrative definitions of environmental systems must be grounded in ecological realities. These cases reflect a global trend of environmental protection by courts through application of functionally based scientific approaches.

## VII. THE GOVERNMENT'S DEFENSE AND ITS LIMITATIONS

Following the judgement, Union Environment Minister Bhupender Yadav made public statements in press conferences to reduce the fears among people. In his statement he said that only 0.19 percent or 277.89 square kilometers out of 143,577 square kilometers of the Aravalli landscape can be mined and that 90 percent remains protected. He further stated that this is only for mining purposes and that no new leases will be granted before the MPSM has been finalized.

While this clarification is welcomed there are still a number of issues that need to be addressed. Firstly, the Minister's statement that only 0.19 percent of the Aravalli landscape is available for mining is a mixing of the currently leased area and potential vulnerable area. Secondly, while the Minister states that 90 percent of the hills have been excluded from the definition and therefore will lose their protection as per the Forest Conservation Act etc. and will therefore be at risk of being exploited in the future. This is a legal precedent for the exclusion of other areas that could potentially be similarly excluded in the future and not just those currently leased.

Thirdly, the claim of the Minister that the definition does not weaken protections is contrary to the plain language of the judgment and the relevant environmental laws. Areas that are excluded from the definition of the Aravalli Hills cannot receive the same level of protection

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<sup>28</sup> *Prakash Mani Sharma v. His Majesty's Gov't Cabinet Secretariat, Ref. No. 3027 of 2009 (Sup. Ct. Nepal Dec. 10, 2007).*

afforded to the Aravalli Hills. The blanket protection of the 1992 MoEFCC Aravalli Notification and the declaration of NCR Planning Board of the Aravalli Hills as a natural conservation zone are now replaced by the current framework which designates certain areas as protected and others as unprotected.

Fourthly, the reliance of the government upon the use of clear definitions to combat illegal mining is undermined by the evidence documented in the citizens report that illegal mining continues openly in spite of the existence of current regulations. Clarity of definitions without the presence of effective law enforcement and the prioritizing of ecology over economics will not adequately address the issue of the mining mafia.

## **VIII. ALTERNATIVE APPROACHES AND RECOMMENDATIONS**

### **A. Functional Ecological Definition**

The 2010 recommendation by the FSI functionally based on slope, foothill buffer, inter hill distance and enclosed areas is a better measure of ecological continuity. This method views environmental value based upon function and not simply upon elevation. An updated definition could combine the functional methodology used by the FSI with geological mapping to provide comprehensive identification of the Aravalli System.

Alternatively the definition of the Aravalli Hills could be modified using a landscape approach which defines the Aravali Hills as one continuous ecological unit as opposed to separate hills. This view would be consistent with global best practices for protecting mountain ecosystems. For example the European Alps and the Himalayan Mountains are being protected as part of an overall mountain range interdependent not just as individual peaks, valleys and foothills.

### **B. Tiered Protection Framework**

In place of simply being either included or excluded, a multi-tier system is proposed that will offer different levels of protection based on different criteria. The core zones are defined as having high biodiversity these are also those areas where there is significant groundwater recharge as well as being highly susceptible to erosion. In all of these cases they should be afforded absolute protection regardless of the level at which they are situated.

The buffer zone would afford the opportunity for sustainable use however this would need to

occur under the watchful eye of regulatory agencies. The transition zone would have the ability to allow activities to occur on a regulated basis provided there was a cumulative impacts assessment conducted.

This approach has been used in biosphere reserves and has proven successful in balancing both environmental conservation goals as well as the needs of local communities. Perhaps most importantly it would not limit 90 percent of the species range from receiving basic protections while still allowing for flexible approaches to management.

### **C. Strengthening the MPSM Process**

The MPSM framework is based in the Saranda model and could be effective provided that it is rigorously implemented. The Saranda model was applied to a relatively small forested area. The Aravalli Hills cover a vast expanse of land across four states and contain different ecological zones which are also being encroached by cities, agricultural lands and watersheds.

The MPSM process will need to consider: (1) complete geologic and ecologic mapping of all formations not just those above 100 m; (2) cumulative impacts assessments which account for climate change, water scarcity and urban growth impacts; (3) public participation, including local community members impacted and environmental groups; (4) scientific oversight independent of ICFRE; and (5) regular publicly available monitoring reports.

### **D. Judicial Review and Course Correction**

A decision of this magnitude is always subject to appeal. Because of the environmental significance and the constitutional issues at hand. The Supreme Court can decide whether to re examine this issue as a result of an appeal or as part of their review in MPSM. The Court could also establish that the 100 meter definition creates a floor of mandatory protection however it does not create a ceiling which would prevent lower forming rock layers from being protected.

In addition to establishing what types of lower forming rock layers will be considered under the MPSM authority, the Court can also make certain that the MPSM addresses the ecological importance of these lower forming rock layers and provides adequate protection for them. In doing so there is precedent for such adjustments as with the Godavarman judgement, the Court has continually monitored the implementation of forest conservation and issued clarification on the basis of the reality on the ground.

## IX. CONCLUSION

The Aravalli ruling of the Supreme Court marks a watershed moment in the history of environmental law of India. While the court accepted an elevation based approach that excludes almost 90 percent of the mountain range. The decision has clearly favoured administrative consistency over ecological integrity, formal classification over functional protection and procedural regimes over substantive safeguards. This research paper put forward that the decision represents a shift away from the precautionary principle as articulated in Vellore Citizens' Welfare Forum judgement and as further developed in other environmental law decisions where the precautionary principle establishes that actions may be taken in advance of complete scientific certainty regarding the potential harm to the environment places the burden of establishing proof of absence of harm on the proposer of a project and requires consideration of ecological functions rather than administrative expediency.

The Aravalli decision reverses these principles by requiring near absolute certainty regarding potential harm to the environment prior to taking protective measures, places the burden on those advocating for the preservation of the environment not the proposer to establish that the area is ecologically significant and gives priority to a single morphological characteristic elevation while dismissing functional considerations. As noted above the inconsistencies in the application of precedent extend beyond the precautionary principle to encompass the public trust doctrine. The requirements of non-arbitrariness under Article 14, the right to a healthy environment under Article 21 and the positive obligation of State to protect the environment pursuant to Article 48A. The Aravalli decision also has the potential to create perverse incentives. Mining companies can now pursue targets outside of the protected zone regulatory compliance is made increasingly difficult as the number of zones to protect and enforce increases and the fiduciary responsibilities of state to act as trustee of natural resources are undermined.

The environmental implications of the Aravalli decision are very serious. The Aravallis perform multiple vital ecological functions including: (1) limiting the expansion of the Thar Desert to the east; (2) recharging aquifers that support millions of people; (3) moderating the regional climate; (4) serving as a habitat for many species of plants and animals; and (5) functioning as green lungs for the Delhi National Capital Region. Scientific research demonstrates that low lying formations now potentially unprotected are essential components

of the overall ecological system. Furthermore field research documents severe environmental degradation specifically in the low lying areas below 100 m. Specifically 31 hills have already been lost and numerous breaches in the hillsides allow massive amounts of dust to enter urban centers.

There are a number of options available for correcting the course of events. The Court can issue clarifying opinions or guidance to the MPSM regarding the exclusion of lower lying formations from the definition of protection. The government can improve the effectiveness of the MPSM process by mandating comprehensive ecological mapping and assessments of the cumulative impacts of projects and provide meaningful opportunities for public input and participation. States can utilize their own authority to develop their own more protective standards. Additionally civil society organizations can continue to advocate for their positions through both litigation and grassroots organizing. Ultimately the Aravalli controversy reflects some of the deep seated contradictions within environmental legal framework of India. These include contradictions between economic development and environmental protection contradictions between the need for administrative simplicity and the need to address the complexities of science contradictions between short term economic benefits and long term sustainability and contradictions between formal abstract legal definitions and the everyday lived experiences of environmental reality.

Constitutional environmentalism of India demands that when such conflicts arise, courts should always choose caution, protection and the precautionary principle. The Aravalli decision regardless of its administrative merits represents a step back from that constitutional commitment. At a time when climate related vulnerabilities are increasing, groundwater is being depleted at alarming rates and ecosystems are collapsing at unprecedented levels, India cannot afford to reduce environmental protections through restrictive definitions. The precautionary principle is not limited to situations in which scientific certainty exists. Rather, it is precisely because environmental systems are complex, interdependent and uncertain that the precautionary principle is most necessary. As the Supreme Court itself recognized in Vellore judgement "When there is a state of uncertainty due to lack of data or materials concerning the nature of the damage or pollution likely to be caused then in order to maintain the ecological balance the burden of proof that the said balance will be maintained must necessarily rest on the industry or the unit which is seeking to establish a new plant."