

MINING IN THE WESTERN GHATS

Implications and the Demand for Sustainable Management

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[**Abstract:** *Western Ghats is one of the eight 'hottest' hotspots of biodiversity in the world, and holds much ecological and cultural significance. It modulates rainfall and runoff in Southern India, and thus have a decisive role on human survival. However, the 'resource curse' of the Ghats also insinuates mining, quarrying and other related activities to be rampant in the region. Piling mounts of scientific evidence show the weakening of its terrain, further demonstrated by the recent intensification of natural disasters in the region. Yet, despite being a matter of urgency, the governance of the Ghats remains deeply contentious, as to how much of the area is to be provided protection and the manner in which its resources are to be managed, which is further displayed through the lack of symmetry and harmony amongst governmental reports. The focus of the current body of literature largely remains upon the localized impacts of human exploits within the region. Using mining as the case study, this essay presents a consolidated view upon the implications of human activities upon the entire ecosystem of the Ghats, to call for an ecosystem approach towards its conservation and management.]*

INTRODUCTION

The Western Ghats is an ecological hotspot, a water tower and a carbon sink. A UNESCO World Heritage Site that has been supporting human and non-human life forms since millennia, a complete valuation of the tangible and intangible benefits accrued by the Ghats' ecological services – for the 6 Indian states it falls within and beyond – is yet to be determined. Meanwhile, the Western Ghats is also under overwhelming anthropogenic pressure, with the International Union for Conservation of Nature (IUCN) reporting that the harm caused by human exploits in the region is far greater than what is faced by most protected areas around the globe.¹ Some of the factors attributable to its ecological degradation are deforestation, change in land uses, increasing population, monoculture plantations, hydroelectric projects, illegal constructions and rising tourism.

However, extensive unscientific mining, quarrying, and other ancillary activities remain a significant factor that is compounding the woes echoing through the Sahyadri. Apart from lack of uniformity in state laws, imprudent environmental clearances, and regulatory oversights at the state level, a key reason for this predicament is the controversial nature of the governance of the Ghats and the failure of the Central Government to consolidate conservation efforts through an ecosystem approach. This involves two Government committees spearheaded by Dr. Gadgil and Dr. Kasturirangan to be at direct odds on how this treasure trove should be managed.

The abundance of mineral resources is a crucial driver for economic growth, but it also underlines the perplexity of key environmental challenges that developing countries around the world face today: which development do they aim for and at what cost? In the context of the

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¹ IUCN, *World Heritage Outlook 2*, International Union for Conservation of Nature (2017).

Ghats, this unresolved, long-drawn-out debate does not allude to an eco-centric view that seeks to minimize all human interferences, but strikes at the very core of resource management and environmental stewardship. Using mining and extractive industries as the case study, this essay aims to shed some light on why governance of the Western Ghats is a steep and thorny path. It brings together exploratory vignettes that document the impact and implications of mining upon its landscape, to highlight the growing need to weld our approach towards its conservation and resource management.

LANDSCAPE AND SIGNIFICANCE: AN OVERVIEW

The Western Ghats is a narrow stretch of hills running along the west coast of India, from the south of Tapi River in Gujarat to the Kanyakumari.² They straddle along six Indian states – Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu – covering a rough area of 160000 km². The Western Ghats form a “practically unbroken relief dominating the western coast of the Indian peninsula”,³ with a length of 1600kms and an elevation range of 300 – 2700 metres, which offers a wide range of topographical features. The manner in which the Himalayas preside over the biogeography of India, the Western Ghats, to a large extent, is considered to preside over the ecology and biogeography of Peninsular India.⁴



Fig. 1: Profile of the Western Ghats

² Rajasri Ray, Sarjana Srivastava & T.V. Ramachandra, *Nature Conservation Legacy in Western Ghats* in LAKE 2016: CONFERENCE ON CONSERVATION AND SUSTAINABLE MANAGEMENT OF ECOLOGICALLY SENSITIVE REGIONS IN WESTERN GHATS (2016), available at – http://wgbis.ces.iisc.ernet.in/energy/lake2016/EWRG/T1_3_Lake2016_Rajasri241216.pdf (last visited on Aug. 28, 2020).

³ T.V. Ramachandra et. al., *ECOLOGY OF SACRED KAN FORESTS IN CENTRAL WESTERN GHATS* (2012).

⁴ K. Subramanyam & M.P. Nayar, *Vegetation and Phytogeography of the Western Ghats* in *ECOLOGY AND BIOGEOGRAPHY OF INDIA* 178 (M.S. Mani ed. 1974).

As one of the eight "hottest hotspots" of biological diversity,⁵the Ghats is a crucial ecological region. Due to its considerable gradient of altitude and climatic conditions, it sustains a diverse range of habitats, ecosystems and life forms⁶ – with much of the treasure trove still being explored and discovered.⁷Biogeographically, the Ghats are highly species-rich, with over 400 biological species and 7 distinct vegetation types,⁸including endangered species found both in the aquatic and terrestrial ecosystems.⁹In totality, the Ghats cover 39 of India's national parks, wildlife sanctuaries and reserved forests.¹⁰ It also characterizes high levels of 'endemism', referring to those species that are restricted entirely within its region and not found anywhere else in the world.¹¹Supporting a unique ecosystem, the ecology of the Ghats also supports numerous medicinal plants as well as genetic resources.¹² Its presence further creates major precipitation gradients and has great impact upon the rainfall patterns of the entire country, and has nearly 40% India's of river-drained areas.¹³It has also been reported to neutralize 4 million tonnes of carbon dioxide every year, totalling to the tune of 21% of the carbon sequestered in the country.¹⁴

MINING IN THE GHATS AND ITS IMPACTS

Mining and mineral extraction is quintessential for economic development, and is used in industries ranging from agriculture, construction, defence, energy, ICTs, health, transportation, etc. The six coastal states that constitute the Ghats are densely mineral-rich, and have a significant contribution to overall mining production in India. For instance, major reserves of haematite iron ore are available in Karnataka (11% of total reserves) and Goa (5%).¹⁵ Karnataka also has India's largest magnetite iron ore reserves (72%), while Tamil Nadu has 5% and Goa has 2%.¹⁶ A considerable portion of these resources are abundantly available in the Western Ghats, due to which mining is and has been rampant in the region.

⁵ Norman Myers et. al., *Biodiversity hotspots for conservation priorities*, 403 NATURE 853 (2000).

⁶ ATREE & CEPF, *Five year Assessment of the CEPF Investment in the Western Ghats Region of the Western Ghats and Sri Lanka Biodiversity Hotspot*, (2013) available at – <https://www.cepf.net/sites/default/files/western-ghats-special-report-five-year-assessment-2013-english.pdf>.

⁷ For instance, within the span of a mere week (from October 1, 2020 to October 7, 2020), scientists discovered two new plant species, a new family of bony fish, two new species of pipeworts, three new damselfly species and three new tiger moth species.

⁸ Utkarsh Ghate, N.V. Joshi & Madhav Gadgil, *On the Patterns of Tree Diversity in the Western Ghats of India*, 75(6) CURRENT SCI. 594 (1998).

⁹ T.V. Ramachandra & A. Suja, *Sahayadri: Wesern Ghats Biodiversity Information System* in BIODIVERSITY IN INDIAN SCENARIOS 1 (N. Ramakrishnan ed. 2006).

¹⁰ UNESCO, *Summary Record*, World Heritage Committee 36 WHC-12/36.COM.INF.19 (2012).

¹¹ Sydney Anderson, *Area and endemism*, 69 Q. REV. OF BIOLOGY 451 (1994).

¹² *Supra* note 6.

¹³ A.K. Verma, *Western Ghats, a vital carbon sink is under threat*, DECCAN HERALD (Feb. 18, 2018 01:39 IST) <https://www.deccanherald.com/content/660260/western-ghats-vital-carbon-sink.html> (last visited on Aug. 24, 2020).

¹⁴ *Id.*

¹⁵ Indian Bureau of Mines, *Iron Ore*, INDIAN MINERALS YEARBOOK: MINERAL REVIEWS, MINISTRY OF MINES (2018), available at – <http://ibm.nic.in/writereaddata/files/09272019111122Iron%20ore%20 2018.pdf> (last visited on Aug. 20, 2020).

¹⁶ *Id.*

In Goa, the Western Ghats section comprises of 5 taluks – Sattari Darbandora, Sanguem, Quepem and Canacona – that are extensively mined for iron, manganese, late rite and basalt.¹⁷ For ease of understanding, the extent of mining for the rest of the 5 states is demonstrated through the following info graphic:

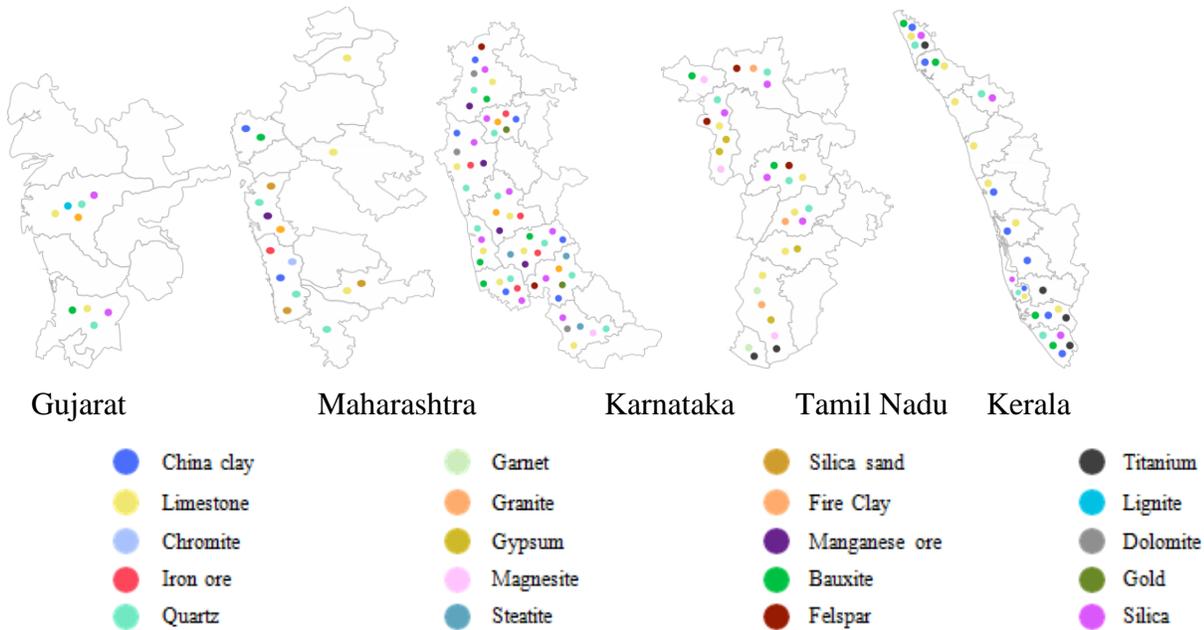


Fig. 2: Mining Districts of the Western Ghats

Source: Author¹⁸

Environmental impacts

Beyond its necessity within the economic landscape, the nature of mining itself is such that it leaves – more often than not – a devastating effect upon the environment as well as social wellbeing.¹⁹ The effects are sorely localized, with the degree of impact depending upon on the “mineral worked the method of working, and the location and size of the mine”.²⁰Such impacts can be witnessed while the mine is operational as well as years after it is shut down, especially in the case of open cast mining.

¹⁷ Directorate of Mines & Geology, *Mining Areas*, Government of Goa, available at – <https://www.dmgoa.goa.gov.in/miningarea.php>; F.M. Nadaf, *Western Ghats of Goa State: A Geographical Diagnosis*, Shree Mallikarjun College of Arts & Commerce, Canacona-Goa (2015).

¹⁸ The graphical representation consists of data extracted and compiled from several sources: Indian Bureau of Mines, *Indian Minerals Yearbook 2018*, Ministry of Mines (2018); WGEEP, *Report of the Western Ghats Ecology Expert Panel*, Ministry of Environment and Forests (2011).

¹⁹ Fernando Carvalho, *Mining Industry and Sustainable Development: Time for Change*, 6(2) FOOD AND ENERGY SECURITY 61 (2017).

²⁰ Fred Bell & Laurance Donnelly, *MINING AND ITS IMPACT ON THE ENVIRONMENT* (2019).

Mining poses as a major threat to the fragile ecosystem of the Western Ghats; in the wake of the torrential floods that engulfed the state of Kerala in the years 2018 and 2019, scientists regard the ecological degradation of the Ghats caused predominantly by uncontrolled mining to be one of the biggest causes for the increase in the frequency and intensity of natural disasters.²¹ Mining, quarrying and other connected activities have been regarded to have weakened the terrain and triggered landslides,²² and have caused severe ecological degradation that may have lasting impacts for the region. For the sake of specificity, few of the major environmental impacts have been discussed in this section.

Water scarcity and toxicity

The Ghats ecology is a “significant source of moisture for rainfall over parts of India that are constantly struggling for water for agriculture as well as domestic and industrial use”.²³ A recent study puts a finer point on the value of this region, by citing the example of Tamil Nadu, where the Ghats provide moisture as high as 40% to the total precipitation in many of its regions. Tamil Nadu is currently water-deficit due to a variety of reasons, and a further reduction in its forest cover may aggravate the precipitation cycle over Peninsular India.²⁴ Moreover, the contamination of groundwater due to mining activities in the Western Ghats region further exacerbates the problems of water scarcity.²⁵

Runoff from mining has heavy toxic chemical constituents, capable of changing the geomorphology of rivers and estuaries, if they get mixed in the water bodies. Additionally, in downstream sites, it leads to sedimentation and silt load, which reduces the water holding capacity of the river.²⁶ Several studies have attempted to study the impact of mining upon the water quality of various rivers, basins and reservoirs of the Western Ghats, and have found dismal results. For instance, the Bhadra River in Karnataka has high levels of iron concentration due to the old mining site in Kudremukh, which makes it unfit for drinking as well as irrigation purposes.²⁷ Another study found more than 50% of the suspended sediment load in both the Bhadra River and Bhadra reservoir to be due to iron ore mining.²⁸ Bauxite mining in the upper catchment areas of rivers in southern Maharashtra has also been found to have caused the

²¹ T.V. Padma, *Mining and dams exacerbated devastating floods*, NATURE (2018) available at – <https://www.nature.com/articles/d41586-018-06145-2> (last visited on Aug. 28, 2020).

²² Rajagopal Kamath, *Save Western Ghats from demolition men*, THE ASIAN AGE (2018) available at – <https://www.asianage.com/india/all-india/080918/save-western-ghats-from-demolition-men.html> (last visited on Aug. 21, 2020).

²³ Supantha Paul, et. al., *Moisture Supply from the Western Ghats Forests to Water Deficit East Coast of India*, 45(9) GEOPHYSICAL RES. LETTERS 4337 (2018).

²⁴ *Id.*

²⁵ T.H. Patel, et. al., *Impact of Iron and Steel Industry on Ground Water Quality of Tungabhadra River Water in Bellary District, India*, 3(1) INT’L J. OF ADVANCED RES., IDEAS & INNOVATIONS IN TECH. (2017).

²⁶ Divya Krishnan, *Impact of Kudremukh Iron Ore Mining on Bhadra River Ecosystem*, National Conference on Innovative Research in Agriculture, Food Science, Forestry, Horticulture, Aquaculture, Animal Sciences, Biodiversity, Environmental Engineering and Climate Change (2015).

²⁷ N. Mahesh, Nusrath Asima & C.P. Sajan, *Impact of Iron Ore Mining on Sedimentation Load in Bhadra River: A Case Study*, 6(2) MY SCIENCE 20 (2011).

²⁸ Jagdish Krishnaswamy, et. al., *Impact of Iron Ore Mining on Suspended Sediment Response in a Tropical Catchment in Kudremukh, Western Ghats, India*, 224(1) FOREST ECOLOGY AND MGMT. 187 (2006).

degradation of both groundwater as well as surface water.²⁹ Along the same fault line, over 300 mining leases granted in the state of Goa are located close to water bodies.³⁰ Most of them are in close proximity to Mandovi and Zuari rivers and their estuaries, which have approximately 90% of Goa's mineral ore being transported through them.³¹

Loss of biodiversity

The Western Ghats region has witnessed a gradual yet significant loss of forest cover in the recent years,³² however, the extent to which the same is attributable to mining and its related activities remains largely undocumented. A total loss of 2500 hectares of Western Ghats' forestlands was estimated to have been due to mining in the period between 1988–1997,³³ however, no study to assess further losses and attribution has been conducted since.³⁴

The situation in Goa may however exemplify the impact of mining on the Ghats ecology. A 2018 report by the Indian Space Research Organisation regarded unscientific and illegal mining in the state to be one of the causes for severe ecological degradation and desertification.³⁵ 50 per cent of the total mines in Goa are located in two talukas, Bicholim and Sattari,³⁶ wherein vegetative degradation due to mining is grossly prevalent.³⁷ Moreover, most mining leases in the state are located in and around forest areas (Fig. 2), some as close as 1km from the protected areas, which is bound to cause disturbance to the natural habitats. In Karnataka, for instance, Sandurhad a sizable population of sloth bears that are no longer found in the area due to habitat displacement and dwindling numbers, owing largely to mining.³⁸ A careful screening of the available literature on the Western Ghats ecology shows the gradual change the region has undergone from inventory and observation based accounts to “species and habitat ecology, ecosystem services, population dynamics, disturbance assessment and conservation status”.³⁹

²⁹ Rohan J. Lad & Jay S. Samant, *Studies on the Impact of Bauxite Mining Activities on Environment in Kohlapur District* in PROCEEDINGS OF INTERNATIONAL CONFERENCE SWRDM (2012) available at – http://www.unishivaji.ac.in/uploads/journal/Journal_42/42.pdf (last visited on Aug. 28, 2020).

³⁰ Xavier Pascaul, et. al., *Iron Mining in Goa, India*, Universitat Autònoma de Barcelona (2013) available at – https://www.recercat.cat/bitstream/handle/2072/223218/PFC_IronMiningGoa.pdf?sequence=1 (last visited on Aug. 28, 2020).

³¹ S.N. de Souza, *Effect of Mining Rejects on the Nutrient Chemistry of Mandovi Estuary, Goa*, INDIAN J. OF MARINE SCI. (1999).

³² Sudhakar Reddy, Chandra Shekhar Jha & Vinay Kumar Dadhwal, *Assessment and monitoring of long-term forest cover changes (1920-2013) in Western Ghats biodiversity hotspot*, 125(1) J. OF EARTH SYSTEM SCI. (2016).

³³ TERI, *Area environmental quality management (AEQM) plan for the mining belt of Goa*, Directorate of Planning Statistics and Evaluation, Government of Goa (1997).

³⁴ *Supra* note 18.

³⁵ Indian Space Research Organization, *Desertification and Land Degradation Atlas of Selected Districts of India*, Ministry of Environment, Forest and Climate Change (2018) available at – <http://moef.gov.in/wp-content/uploads/2017/08/India2.pdf> (last visited on Aug. 28, 2020).

³⁶ *Supra* note 17.

³⁷ *Supra* note 35.

³⁸ Aravind Gowda, *Bellary turns graveyard for wild animals*, INDIA TODAY (Apr. 01, 2010) <https://www.indiatoday.in/india/story/bellary-turns-graveyard-for-wild-animals-70688-2010-04-01>.

³⁹ Rajasri Ray, M.D.S. Chandran & T.V. Ramachandra, *Biodiversity and ecological assessments of Indian sacred groves*, 25 J. OF FORESTRY RES. 21 (2014).

Fig.3: Eco zones, Mining Areas and Protected Areas of Goa⁴⁰

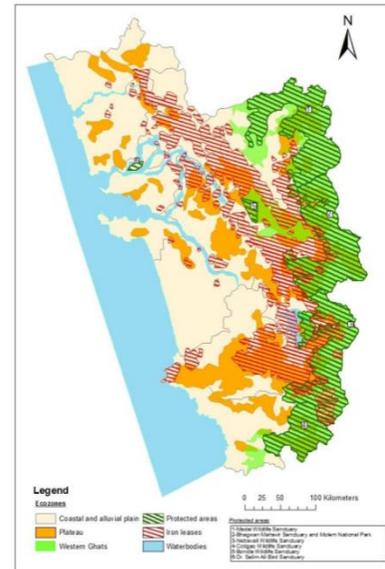
Due to increased sedimentation and turbidity caused by mining, the survival of aquatic animals in the Ghats has also been documented to be at great risk. Studies have unequivocally stated that iron-ore mining and associated activities in the Kudremukh region have induced habitat fragmentation and loss in species diversity and distribution, especially amphibians.⁴¹ Fish, in particular, are “subject to morphological damage by the iron present in the water”, which not only causes them diseases but may also “cross the species barrier when these fish are eaten by other animals”. Such habitat degradation was clearly distinguishable from sites which were left untouched by humans.⁴²

There has also been a noticeable loss to plant life. For instance, the district of Kohlapur is mined extensively for bauxite, with 8 ongoing, 1 abandoned and 4 potential mines. A study found the entire mining area and its connected roads to be heavily polluted by dust, leading to dust deposits on the “surrounding vegetation which has caused stunted growth and even death of some trees”. This problem gets exacerbated during the summers, due to scarcity of water in the region.⁴³ The removal of overburden wastes in the mines of Chitradurga district also led to the removal of beneficial microbes from the soil, which play a significant role in the rehabilitation and reclamation of iron ore mines.⁴⁴

Dumping of waste

Mining leads to discharge of millions of tons of waste rock, with soils called ‘mine spoils’ being dumped over millions of hectares as wastelands, with the Ghats being of no exception. Copious amounts of such waste are piled up in dumps and abandoned mines, such as in Goa where 1 billion tonnes of such overburden are disposed every year. The Ghats of Goa also have a unique feature of having a high overburden to ore ratio at 3:1. This means that with “every tonne of ore mined, three tonnes of soil is also extracted”, which leads to “large waste accumulation per tonne of ore mined”.⁴⁵

Dumps in Goa are also located close to water bodies, leading to 280,000 tonnes of mine tailings found to settle in the estuarine zone in Mandovi and Zuari region every year.⁴⁶ This problem is exacerbated at the time of heavy monsoons – a distinct feature of the Ghats – when the dumping



⁴⁰ *Supra* note 30.

⁴¹ S.V. Krishnamurthy, *Amphibians assemblages in undisturbed and disturbed areas of Kudremukh National Park, Central Western Ghats, India*, 30(3) ENVTL. CONSERVATION 274 (2003).

⁴² *Supra* note 26.

⁴³ *Supra* note 29.

⁴⁴ V. Mohan, et al., *Exploration of Diversity Status of Beneficial Microbes in Iron Ore Mines in Bellary and Chitradurga Districts, Karnataka State*, 6(2) J. OF ACAD. AND INDUS. RES. (2017).

⁴⁵ Dnyandeve C. Talule & Guruprasad R. Naik, *Overall Impacts of Mining on the State Economy of Goa: A Comparative Perspective of Pre and Post-Mining Ban Periods*, 8(6) ASIAN J. OF SCI. AND TECH. 5012 (2017).

⁴⁶ *Id.*

leads to silt runoff.⁴⁷ In such cases, untreated mining waste then gets washed down by rivers, which not only leads to sea and groundwater pollution, but also toxicity of the waste to enter agricultural fields, which lie in close proximity to the mine fields in Goa.⁴⁸

Apart from the legal mandate,⁴⁹ the location of mines in the ecologically fragile Western Ghats makes it all the more necessary for the operators to ensure mine closure as well as mine restoration and rehabilitation. Be that as it may, mining operators in the Ghats region have been known to evade the liability to restore the exploited region to condense the damage, either through pit-refilling or reforestation. Abandoning mines further leads to the growth of invasive coastal plants, which leads to decay of biodiversity and weakens the estuarine systems.

Air pollution

Air quality monitoring data obtained by the CAG from the Karnataka State Pollution Control Board also revealed “consistent increase” in the air pollution in the district of Bellary, Karnataka.⁵⁰ In one of its mining taluks, Sandur, mining activity has been reported to have drastically increased the cover of dust particles in the air as well as high aerosol optical thickness, indicating high levels of air pollution.⁵¹ In Bellary, layers of air-borne dust from mining were found to reduce air quality, which had a negative impact on the crop productivity of neighbouring fields.⁵²

Socio-economic impacts

Studies have concluded that mining brings more socio-economic problems than benefits, the same being applicable to the context of the Ghats.⁵³ The Ghats are also riddled with the failure to implement the community forest resources provisions of the Forest Rights Act, 2006, which exacerbates the plight of the locals and leads to disgruntlement when forcibly evicted from their lands for mining purposes.⁵⁴ Despite adequate safeguards in place, child labour has also been permitted on mines. In the mines of Bellary, as per the CAG, “prosecution against 123 employees under Child Labour Act in Hospet and Sandur circle involving 167 children was indicative of employment of children below 14 years of age in mines”.⁵⁵ In this regard, Kerkar (2010) states that much of these social impacts generally get overlooked “when one hears of the

⁴⁷ WGEEP, *supra* note 18.

⁴⁸ Dnyandev C. Talule, *supra* note 51.

⁴⁹ Mining lessees are to mandatorily submit the Progressive Mine Closure Plan as well as Final Mine Closure Plan in accordance with the Mineral Concession Rules, 1960, Mineral Conservation and Development Rules, 1998. Mine Closure Policy of 2003 as well as the National Mineral Policy of India, 2008 also require the mines to be restored post-mining.

⁵⁰ Comptroller & Auditor General of India, *Controls and Systems for Sustainable Mining in Karnataka*, Performance Audit Report 2 (2012) available at – <http://iced.cag.gov.in/wp-content/uploads/2013/02/1.%20Mining%20in%20Karnataka.pdf> (last visited on Aug. 28, 2020).

⁵¹ B.V. Suresh Kumar, R.K. Sunil Kumat & K.N. Prakash Narasimha, *Air Quality Assessment by MODIS Satellite Data in and around Sandur Taluk, Bellary District, South India*, 1(2) INT’L J. OF GEOLOGY AND EARTH SCI. (2015).

⁵² Srinivasa SasdharPonnaluru, *Empirical analysis of the impacts of mining dust on crop productivity in Bellary district in India*, 7(6) INDIAN J. OF ECON. AND DEV. (2019).

⁵³ *Supra* note 30.

⁵⁴ *Supra* note 18.

⁵⁵ *Supra* note 50.

value that mining contributes to the gross state domestic product”.⁵⁶ Apart from the aforementioned failures, two key negative social externalities of mining have been discussed henceforth in this section.

Health

Mining activities expel copious amounts of toxicities into the environment, which has a negative impact upon human health. Such detrimental influence has been extensively documented for the Bellary-Hospet-Sandur mining region, such as a CAG report that highlighted the liberal contribution mining has made to the air pollution of the region, which has had direct implications on the increase in the number of respiratory diseases in the area.⁵⁷ Another recent study observed 75% of the mine workers to be suffering deterioration in their health, with diseases such as asthma, skin problems, eye burning, cold and cough to be a common concern.⁵⁸ 20% of the children in this region were said to be suffering from asthma, due to the “excessive air pollution caused by rampant mining over the last two decades”.⁵⁹

Livelihood

The employment opportunities provided by mining are often claimed to promote the socio-economic well-being of the local populace. However, a study conducted in Kohlapur, which predominantly is mined for quartz, silica sand and laterite, found the employment potential from mining to be “much less than claimed”, with only few locals to be actually benefitting from it. Much of the taskforce was found to be comprised of non-locals and migrants who, in turn, had caused “increased pressure on the locally available natural resources such as water, fuel wood etc.”⁶⁰

It is to be noted that this increase in labour mobility is primarily due to the recent mining boom in India, which has led to a structural shift in the labour market. Due to this shift as well as the increased wages earned in mines or in ancillary activities like transport, repair works, etc., a study conducted in Bellary observed a reduction in the importance of the primary sources of livelihood in the Ghats, such as fishery and agriculture.⁶¹ Such rampant mining had resulted in farmers and farm labourers to engage in mining activity thus “neglecting agricultural operations” and “leaving the fields barren”.⁶²

These traditional sources of livelihood are at further risk due to other negative externalities of mining, such as land grabbing, air and water contamination. A case in point is Chikkamagaluru where, due to the toxicity of the Bhadra River caused by extensive mining, a study reported a reduction in the daily catch of fish “from 20kgs to around 2-3kgs” as well as a decrease in their

⁵⁶ Rajendra Kerkar, *Mining – Goan Konkan (social and ecological aspects)*, WGEEP Commissioned Paper, available at – <http://www.westernghatsindia.org/commissioned-papers/> (last visited on Aug. 28, 2020).

⁵⁷ *Supra* note 50.

⁵⁸ Nayak L.T., *Socio-Economic conditions of the mining workers from the Bellary-Hospeth-Sandur iron ore mining region, Bellary District, Karnataka: An empirical study*, 49(1) INDIAN J. OF REGIONAL SCI. 98 (2017).

⁵⁹ Vanu Dev, *The horrific cost of illegal mining: Children of Bellary are paying the price*, INDIA TODAY (Aug. 22, 2012 10:08 IST) available at – <https://www.indiatoday.in/india/south/story/mining-causes-asthma-in-20-percent-of-kids-in-sandur-region-of-bellary-114025-2012-08-22> (last visited on Aug. 28, 2020).

⁶⁰ *Supra* note 29.

⁶¹ Basanth Kommadath & Binayak Rath, *Mining Boom, Structural Changes and the Dynamics of Labour Market Transitions in Bellary Region of Karnataka*, 5(2) INT’L J. OF ECON., COM. AND RES. 1 (2015).

⁶² *Supra* note 50.

species variety.⁶³ Agriculture has been severely affected in the Western Ghats “due to extraction of ground water, vast areas being covered by siltation and mining dust, thus destroying farms and livelihood”.⁶⁴ An example is of the Goan agricultural village of Colomba, where 75% of the village is now occupied by mines.⁶⁵ A decrease in availability of grazing land, contamination of water sources and fodder and increase in susceptibility of respiratory, digestive and reproductive diseases in livestock has also been observed.⁶⁶ As per Kerkar (2010), agriculture and mining are “pitted against each other” in Goa, exacerbated by the inadequate compensation offered to those “whose land and livelihood is taken away by mining”.⁶⁷

LEGAL INTERVENTIONS: ANALYSIS AND REFLECTIONS FOR THE FUTURE

The past and future of mining in the Ghats is riddled with policy challenges. Forests and wildlife being under concurrent jurisdiction as per the Constitution of India has led to the fragmentation in the legislative and administrative state control. Not only do the laws vary within and across states, the Government of India has also tipped the scale towards the developmental activities despite mounting evidence of it putting pressure on the environment.

Given the ecological sensitivity and significance of the Ghats and the intricate nature of its geology, the Ministry of Environment and Forests established Western Ghats Ecology Expert Panel (WGEEP) headed by Prof. Madhav Gadgil in 2010. The Panel was approached to recognize Ecological Sensitive Areas (ESAs) along the Western Ghats, and to recommend the manner in which they could be managed and regulated. Based on extensive survey and consolidation of data, the WGEEP recommended 64% of the Western Ghats as ‘ecologically sensitive’, and dissected the entire region into three classes of Ecologically Sensitive Areas, in the order of varying degrees of ecological affectability. For mining, the Committee recommended an “indefinite moratorium” on new environmental clearance applications in ESZ 1 & ESZ 2. Further, it advised for the phasing out of mining from ESZ 1 by 2016, as well as all existing mining activities in ESZ 2 to be under strict regulations as well as subject to regular social audit.⁶⁸

However, the Gadgil Report was labelled too ‘environmentally-friendly’ and deaf to the cause of economic development. Subsequently, the Ministry of Environment and Forest constituted a High Level Working Group (HLWG) under Dr. K. Kasturirangan, which was mandated to receive inputs upon the ESZs demarcated by the Gadgil report from all the relevant states as well as to formulate its implementation.⁶⁹ Submitted in 2013, the Kasturirangan Report tagged 37% of the Ghats as an ESA. With respect to mining, the Panel still recommended a total ban upon such activities, and granted existing operations leeway to continue operating until their lease expired.⁷⁰ No leases in the ESA, however, would be renewed.

⁶³ *Supra* note 26.

⁶⁴ *Supra* note 56.

⁶⁵ *Supra* note 18.

⁶⁶ *Supra* note 60.

⁶⁷ *Supra* note 56.

⁶⁸ *Supra* note 18.

⁶⁹ *Supra* note 22.

⁷⁰ HLWG, *Report of the High Level Working Group on Western Ghats*, Ministry of Environment and Forests (2013).

Gadgil Panel Recommendations	Kasturirangan Panel Recommendations
<ul style="list-style-type: none"> ✓ Convert entire Western Ghats Region into Eco sensitive Zone (ESZ) ✓ Western Ghats region must be treated separately as per the respective States. ✓ Demarcation of ESZ's must be based on inputs from local communities and local bodies ✓ For the sustainable development and promoting transparency Western Ghats Ecology Authority should be established as Statutory Body. ✓ No new environmental clearance for mining ✓ Phasing out of mining by 2015 from ESZ's ✓ Existing mining under strict regulation and social audit ✓ No new red and orange industries (heavily polluting industries) 	<ul style="list-style-type: none"> ✓ 90 percent of the natural landscape Western Ghats should be protected. ✓ Business and livelihood should be allowed to continue by providing better incentives to move businesses / livelihoods towards greener and more sustainable practices ✓ Establishment of a Decision Support and Monitoring Centre ✓ A ban all polluting industries (including mining) ✓ Implementation of rights of dwellers on forest resources. ✓ Strict control for Hydro-power projects. ✓ Projects will be allowed only after the approval of the Gram Sabhas concerned villages.

Fig. 4: Comparison of both Western Ghats Panel Reports⁷¹

This HLWG Report became the basis for a draft notification released by the Ministry of Environment, Forest and Climate Change which seeks to declare one-third of the Ghats as ecologically sensitive.⁷² Although the Kasturirangan Report had a similar perspective upon the negative impacts of mining and quarrying in the Western Ghats, yet the whittling down of the total area declared as ESA only grants an illusory protection to the Ghats from the extractive industries. Environmentalists regard the Report to be “biased and pandered to entrenched lobbies and dubious elements”, which was drafted after primarily relying upon satellite pictures, as opposed to the years of fieldwork undertaken by the WGEEP.⁷³ Despite prohibitions, reports show that state governments are permitting private miners to operate⁷⁴. The conservation debate upon the management of the Ghats continues with no consensus in sight, while the noises of mining and quarrying continue to echo in the mountains.

The regard with which the WGEEP sought to protect the Ghats rightly acknowledged its fragility and sensitivity. Irrespective of how fragmented the Ghats currently are, they have been proven to have the capacity to support the rich repertoire of species and their habitat.⁷⁵ The conservation is more urgent in the case of endemic species, as they can only be protected through in situ

⁷¹ *Supra* note 17.

⁷² Ministry of Environment, Forest and Climate Change, Draft Notification, S.O. 667(E) (2018) available at – <http://moef.gov.in/wp-content/uploads/2019/05/western-ghats.pdf>.

⁷³ *Supra* note 22.

⁷⁴ SC MKU, *Mines make noise again in Western Ghats*, NEWS KARNATAKA (Mar. 15, 2019 04:10 PM) <https://www.newskarnataka.com/shimoga/mines-make-noise-again-in-western-ghats>.

⁷⁵ Hari Sridhar, T.R. Shankar Raman & Divya Mudappa, *Mammal persistence and abundance in tropical remnants in the southern Western Ghats, India*, 97(6) CURRENT SCI. 612 (2009).

planning and conservation.⁷⁶ Continuation of mining may cause contamination of air and water bodies, and its cessation may increase the quality of water as well as biodiversity improvements.⁷⁷ The importance of the Ghats puts immense legislative pressure to effectively ban ecologically-destructive activities such as mining, as well as to revive the landscapes which have already damaged through it. The Gadgil Report must be revisited again to understand the environmental consequences of mining in order to minimize the impending hazards, which will get exacerbated by climate change.⁷⁸ As highlighted by the Hon'ble Madras High Court in *S. Kumar v. The District Collector*, the precautionary principle, as “one of the pillars of foundation upon which the edifice of Environmental Law is built”, should be applied while granting mining licences and clearances.⁷⁹

The extent of lawlessness that prevails in India's mining industry also cannot be exaggerated, and illegal mining is also major cause of concern. This alludes to situations wherein miners extract resources that they have no legitimate authority to or consent for. Bellary, Karnataka, for instance, was once treated as a hotspot for mining, yet the flagrant violations of the MMRDA Act 1957, the EPA 1986 and the Forest Conservation Act 1980 lead to the cancellation of mining activities in the environmentally ravaged region.⁸⁰ However, what drew attention to this predicament was the connivance of officials at all levels, regardless of their associations with “police, mining, forest, revenue, weights and measurements, commercial taxes, labour and the Karnataka State Pollution Control Board”.⁸¹ Parallels can also be drawn in the case of illegal mining in Goa. These events necessitate the policy to decentralize as well as establish a stronghold on ground to check instances of flouting of rules and regulations, internally as well as externally.

Mining projects are required to mandatorily assess the ecological and social risks of their proposed and ongoing operations. However, past instances have demonstrated that the inputs received during public hearings of such assessments regularly ignored or the information is not made freely accessible to the populace in the relevant vernacular, prompting significant levels of social disappointment and disagreement. A case in point made by the Gadgil report is of the unanimous opposition by the Gram Panchayat of Sindhudurg to a proposed mining project, due to the water contamination of the Kalane river, which was overlooked by the Maharashtra Government to grant clearance to the mine.⁸² Such failure to ensure an inclusive, transparent and fair decision making process runs counter-intuitive to the goals of the Environmental Clearance process. Hence, there is a need for the mining sector, which is often demonized in this respect, to coordinate with all the relevant stakeholders to ensure satisfactory legal and social approval.

Lastly, it must also be borne in mind that the Ghats' ecological significance coincides with human settlements, where the people are profoundly dependent upon its biological resources for subsistence and livelihood. This makes distributional equity and environmental justice to be

⁷⁶ Alison Stattersfield, et. al., ENDEMIC BIRD AREAS OF THE WORLD: PRIORITIES FOR BIODIVERSITY CONSERVATION (1998).

⁷⁷ *Supra* note 27.

⁷⁸ TV Ramachandra & Setturu Bharath, *Carbon Sequestration Potential of the Forest Ecosystems in the Western Ghats, a Global Biodiversity Hotspot*, 29 NAT. RESOURCES RES. 2753 (2020).

⁷⁹ W.P. No. 19493/2018.

⁸⁰ Kumar Sambhav Shrivastava & M. Suchitra, *How Bellary was laid waste*, DOWN TO EARTH (Aug. 31, 2011), <https://www.downtoearth.org.in/coverage/how-bellary-was-laid-waste-33862>.

⁸¹ *Id.*

⁸² *Supra* note 18.

significant concerns in this debate, whereby the interests of the locals cannot invariably be presumed to be morally inferior to the urgency of conservation – highlighting the need for environmental protection to itself be more socially and economically inclusive. A key way to release from the cycle of ‘development by imposition’ and ‘conservation by imposition’ is to increase public participation within conservation strategies, not only to grant democratic legitimacy to environmental decisions but also to improve the quality and efficacy of such decisions. In the case of the Ghats, this necessitates recognition of both formal and informal modes of protection, “so that all stakeholders can participate actively in the endeavour”.⁸³Carvalho (2017) suggests engaging the local community “in reforestation and remediation efforts in parallel with mining activity”.⁸⁴Another instance is of recognizing sacred groves and sacred kan forests under the Biodiversity Act, 2002, that have historically and extensively been a traditional form of conservation in the Western Ghats which, if provided due acknowledgement, would not only lead to biodiversity preservation but also decentralize and democratize conservation planning.⁸⁵

CONCLUSION

The aim of this essay is to highlight the lessons from past mining activities in the Western Ghats, and to stress upon the need for adoption of ‘good governance’ for the region. While mining continues to respond to societal and developmental needs of India, a streamlined, responsible management of resources as well as strict compliance of rules is the need of the hour to preserve the environmental integrity of the Ghats. After nearly ten years of publication, the Madhav Gadgil report remains highly relevant in this context – necessitating a long-overdue revisit to its ecologically motivated recommendations for the extremely fragile zones. The environment vs. development debate may soon become redundant for the Western Ghats, as the detrimental collateral effects on environment and public health are already being demonstrated. Simultaneously, it is imperative to democratize the mining sector by engaging local communities as well as provide them better access to the economic benefits of mining and post-mining rehabilitation and remediation efforts. Informal methods of conservation must duly be recognized, and the wealth of mining must be duly shared with the local communities to leave a positive effect upon their lives.

⁸³ *Supra* note 2.

⁸⁴ *Supra* note 19.

⁸⁵ *Supra* note 2; *Supra* note 3.