

Aravali Biodiversity Park: Restoring Urban Biodiversity

A Case Study by Vijay Dhasmana¹

Background and Context

The Aravali Biodiversity Park is located at the Delhi-Gurugram border on the Mehrauli-Gurugram road, covering an approximate area of 392 acres with the highest elevation of 277 meters and lowest 248 meters. It was once part of the Nathupur Village of Gurugram in the State of Haryana. This area was extensively mined for over four decades for the quartzite stone and *Badarpur* sand used for construction activities in the Delhi, National Capital Region (NCR) area. A large number of small stone quarries were operational in this area. The operation of eight stone crushers, along with illegal felling of trees, cattle grazing and waste dumping had caused serious environmental degradation. The landscape of the Park is a part of the Aravali mountain range with undulating hills and comprises of several small ridges and valleys formed by seasonal streams and quarry pits.

The Aravali Range

The hills in the southern districts of Gurugram and Faridabad are part of the oldest fold mountain range in the world called Aravali. The range was formed around three billion years ago by colliding landmasses and volcanic eruptions. The Aravalis run diagonally across Rajasthan extending from Champaner in Gujarat in the south west to near Delhi in the north east for a distance of about 690 km². Most of the rocks seen in Haryana are quartzite – metamorphosed sandstone – resting on a very old base rock called Gneiss, which is part of the foundation stone of the Indian subcontinent. The elevation of the Aravali range gradually rises in the south-west direction and so the vegetation pattern and plant composition changes due to the changes in the climatic and edaphic factors. Due to its geographical location, the range has a mix of Saharan, Ethiopian, Peninsular, Oriental and even Malayan elements of flora and fauna. However, very few studies have been carried out on the ecology of this mountain system³.

The Ecological Significance

The Aravali with its lush forests used to act as a green barrier and an effective shield against desertification. It has checked the spread of the Thar Desert towards Eastern Rajasthan, into Gangetic plains, Haryana and Western UP. Today, the forests in the Aravali hills are no longer an effective green barrier. Perhaps the most degraded forests of India now, the Aravali range has lost most of its indigenous plant species, but this range still moderates the wind velocity and helps in checking transpiration and evaporation.

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² Shetty, B.V and Singh, V., 1987, Flora of India Series 2 Flora of Rajasthan Volume 1. Botanical Survey of India, Calcutta.

³ Singh, R., Ecological changes in Central Aravali Hilly range: A case study of Tonk District, Rajasthan, India. International Journal of Research in Applied Natural and Social Sciences; Vol. 3, Issue 4, Apr. 2015, 17-28.

The range creates a water-divide between the Indus basin in the North West and Ganga basin in the east and covers extensive areas of North India⁴. Any obstruction and disturbance in the natural set up will lead to large-scale changes in the areas adjoining North Indian plains and will be devastating for the environment. It will also affect eastern Rajasthan, Haryana, Malwa region, western Uttar Pradesh and Delhi.

The occurrence of normal rainfall in north- west India depends on the preservation of the lush green forest cover and resultant normal evapotranspiration process over the Aravali hills. Trees and canopy cover preserve humidity in the atmosphere and help regulate rainfall patterns. However, an increase in deforestation and soil erosion has escalated the occurrence of drought in this area. The drought subsequently affects not only the people but also the much-threatened wildlife of the area. The highly fractured, jointed and weathered quality of the rocks allows water to percolate and recharge groundwater. Calculations reveal an immense potential of about 2 million litre ground water recharge per hectare of the landscape. Water security of the surrounding towns of Faridabad, Gurugram and Sohna are dependent on this groundwater.

The Aravali hills are a rich habitat to a wide spectrum of wildlife comprising tiger, leopard, wolf, bear, blackbuck, chinkara, sambhar, fox, desert fox, migratory common cranes, cuckoos, coots, pelicans etc., in its lush green forests. The wildlife is now limited to certain patches and protected areas owing to the biotic interference and deforestation. Aravalis with forest cover is integral to the surrounding ecosystem and provides numerous resources to its inhabitants including fuel, wood, fodder, fruits, vegetables and a range of economically viable mineral products.

The Aravali forests have been the protective green lungs by converting carbon dioxide to life-sustaining oxygen, playing an important role in trapping pollutants and regulating the temperature of the region. However, due to excessive mining, the green cover has been systematically destroyed taking away this shield from its inhabitants.

Halt in Mining

In May 2004, after months of media and public protests, Hon'ble Supreme Court of India banned mining in Faridabad, Gurugram and Mewat districts in Haryana recognizing the ecological significance of the Aravalis⁵. The judgement stated, "The Government of Haryana be directed to stop all mining activities and pumping of ground water in and from area up to 5 kms from Delhi-Haryana border in the Haryana side of the ridge, *inter alia*, stating that in the larger interest of maintaining the ecological balance of the environment." In 2004, due to this order, mining and stone crushing was stopped in this area. What was left were some defunct stone crushers and many mining pits, bereft of any soil cover. As Gurugram was developing and becoming more densely populated, a lot of construction and demolition waste was dumped here. Ecologically speaking, the only little vegetation that grew was small patches of *Prosopis juliflora* or *vilayati keekar*, a very invasive exotic plant from Central America.

⁴ Rathore, N.S., 2009. The study of the environment and its impact in the Aravali Mountain Range in the study of the changing environment and its impact in the Aravali Mountain Range in the western region of India. Udaipur, Rajasthan.

⁵ <https://indiankanoon.org/doc/1896562/>

The Initiative

In 2009, the severely degraded *Panchayat* land with encroachments and dumped waste of Nathupur village was transferred to the Municipal Corporation of Gurugram (MCG). This barren site of a former quarry on the border of Delhi and Gurugram caught the attention of a local residents' body called iamgurgaon (IAG). This citizens' initiative is focused on restoring Gurugram's green habitat lost due to rampant urbanization. The organization was formed by residents concerned about the degradation of their city's green cover and fast depletion of its natural resources. IAG proposed to the MCG that this land be developed as the Aravali Biodiversity Park. The then MCG Commissioner, Rajesh Khuller, a man with immense foresight, took to the idea immediately and asked IAG to initiate the process and develop this concept further. IAG was formally assigned the tasks of carrying out conservation work, setting up a nursery of native plants, and doing carrying out relevant research over a period of eight years from 2012-2020. IAG had a vision of planting native trees and with this in mind, drew up a long-term vision to showcase the forest habitats of the Aravali range, most of which were being rapidly lost in Haryana to mining, encroachments, urbanization and the introduction of alien invasive plant species.

Noted architect Atal Kapoor and his team designed the Park's infrastructure that included the boundary wall, parking lot, pathways and an amphitheatre. The MCG also started the civil works under Mr Kapoor's guidance and supervision. The Park slowly started taking shape. MCG, IAG and the Haryana Forest Development Corporation (HFDC) came together to start the plantation work in this denuded landscape, bereft of any soil cover and infested with *Prosopis juliflora*.

The first few avenues inside the Park were prepared by HFDC in 2010. HFDC planted over 6,000 saplings of local species like *Aegle marmelos*, *Acacias senegal*, *Acacia leucopholea*, *Bauhinia racemosa*, *Tamarindus indicus*, *Aegle marmalos*, *Cassia fistula*, *Albizia procera*, *Acacia nilotica*, *Cordia dichotoma*, *Anogeissus pendula*, *Ficus religiosa* and *Ficus benjamina* in the mining pits. Flowering trees were planted along the walking trails. These included: Jacaranda, Gulmohar, and Bottle-brush, etc. This work of planting and maintenance of 6,000 saplings continued for two years⁶. The Park, nestled within the Aravali mountain range, and representative forests of the northern Aravali, such as those of *Salai* (*Boswellia serrata*), *Dhau* (*Anogeissus pendula*), *kaim* (*Mitragyna parvifolia*), were also planted in the Park. The idea was not to make it into a dense woodland but to create diverse habitats, including grasslands that would support varied forms of life, typical of the Northern Aravali.

An initial list of about 200 forest species native to the rocky Northern Aravalis was drawn up. Some of them had disappeared from view but there was enough evidence to know that they were once present in this region. The challenge was to get hold of the seeds of all these species. When the next fruiting season came around, a massive collection drive for seeds was mounted along with collection of vegetative cuttings by visiting wild and semi-wild areas near and far. A drip irrigation network was established in some of the areas, where irrigation by the gardeners employed was difficult. Plants were monitored very regularly and irrigation was provided only when there was water stress noticed, not more than eight times in a year and only up to three years. This water for irrigation came from the Sewage Treatment Plants of DLF and Hotel Le Meridien.

⁶ IUCN report; Aravali Biodiversity Park Biodiversity Assessment and Action Plan, April 2017

The Park was inaugurated by the Haryana Chief Minister Shri Bhupinder Singh Hooda on June 5th 2010, on the World Environment Day. The Municipal Corporation of Gurugram ratified the vision of the Park as a City Forest showcasing native forest flora of the Northern Aravali. The ecological restoration work undertaken was guided by this vision and helped integrate ecology, urban environment and human aspirations of the city.

In 2011, the new MCG Commissioner Sudhir Rajpal suggested that Gurugram's corporates be invited to support the planting and upkeep of the Park. IAG took the lead in coordinating this effort with the MCG and began involving many corporates across the city. Other members steered the planting and volunteering activities, and also facilitated the participation of schools and school children to ensure that the young were not left out in the making of the forest. Over the last ten years, 68 corporates, more than 50 schools, thousands of children and citizens from all walks of life, have come to plant about 1,45,000 plants of over 200 species in the Park. This laid the foundation for the transformation.

In 2021, after the tenure of IAG was over, MCG did a MOU with the Hero MotoCorp Ltd. (HMCL) for ten years. The main focus in this new phase of collaboration is to create basic infrastructure in the park for the visitors such as toilets, drinking water for the visitors and viewing decks. There are also plans to create an interpretation centre and research station and develop programmes for the citizens and especially school children to get involved in understanding biodiversity of the Park. HMCL has engaged 'The Rewilders' as consultants in developing the Park infrastructure and educational and research programmes.

The Park has recently got the tag of being India's first Other Effective Area-based Conservation Measure (OECM). This is a category recognised by the Convention on Biological Diversity (CBD). However, it still does not have legal protection under the Indian legal system. It has the potential to be declared a Biodiversity Heritage Site under India's Biological Diversity Act, 2002, but due diligence would be required for the same. Dumping of construction waste in some areas in the Park is a constant threat.



Mined Valley in 2011 ©Atal Kapoor



Restored Valley in 2020 ©Vijay Dhasmana

The Present Day Scenario

Today, the area functions as a native Aravali flora and fauna repository, a water conservation and recharge zone, a carbon sink, an educational space to spread awareness about environmental issues, and a recreational space for the citizens of Gurugram. The Aravali Biodiversity Park stands apart from the typical definition of a park or a garden and brings the essence of the Aravalis as an urban forest back into a growing metropolitan like Gurugram.

A wildlife survey of the Aravali districts in South Haryana carried out in 2017, recorded 10 mammalian species⁷. Six of these can be spotted at the Aravali Biodiversity Park. These are: Golden Jackal, Jungle Cat, Grey Mongoose, Small Indian Civet, Indian Hare and Blue-bull (*Nilgai*). Some other mammalian species, such as Striped Palm Squirrel, House Shrew, Indian Bush rat, Flying Fox and few species of bats can also be spotted here. Apart from mammals, one can also see reptiles, amphibians and invertebrates. The reptiles commonly observed are; Monitor Lizard, Snakes (Common Cobras, Saw-scaled Viper, Russell's Viper, Common Krait, Rat Snake, Common Wolf Snake, Sand Boa, etc.), Skinks, Geckos and Lizards.



Indian Hare ©Amit Sharma

⁷ Habib, B., Talukdar G., Jain, P. and Bhasin A. (2017): Mapping landuse/landcover patterns in Aravallis Haryana with special reference to key wildlife species. Project Completion Report. Wildlife Institute of India, Dehradun and Haryana Forest Department. Pp97.

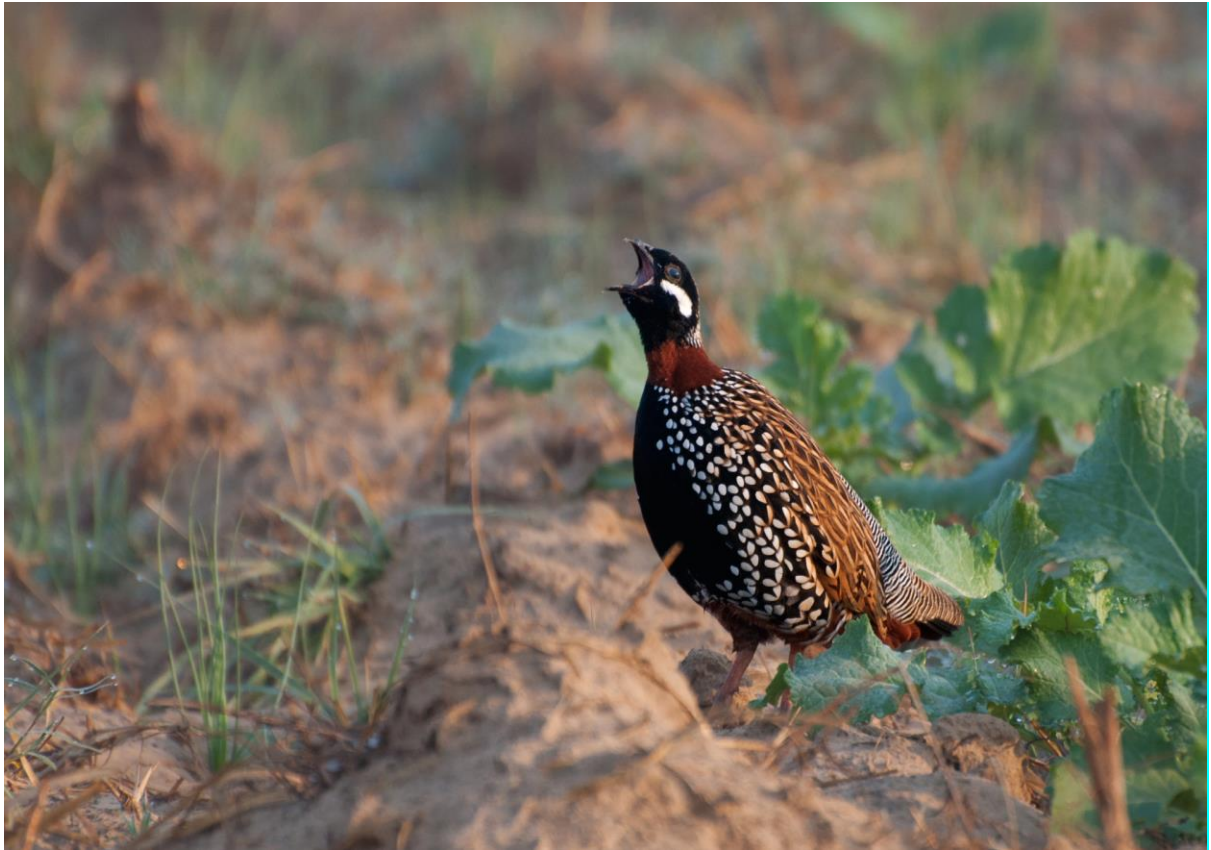


Jungle Cat ©Rajesh Shah

There is a huge surge in the invertebrate diversity and populations in the Park. They play a crucial role in this ecosystem. Some invertebrates are pollinators, such as bees, wasps, butterflies, moths and flies, some are herbivores, such as aphids, grasshoppers, crickets, cicadas, katydids and some predators, such as ants, spiders, scorpions, centipedes, praying mantis, etc. There are others who work on the soil and make nutrients available to the plants, such as earthworms and termites. Most of these invertebrates become food for birds, reptiles and mammals and play an important role in nurturing the forests.

The Aravali Biodiversity Park, is currently an important habitat, critical for survival for city dwelling amphibians. The amphibian survey conducted in Aravali Biodiversity Park during the monsoon season of 2018 shows the presence of eight sympatric amphibians and no other habitat in Delhi-Gurugram currently shows such high diversity of amphibians.

As of June 2020, the total number of bird species sighted at the Aravali Biodiversity Park, Gurugram, is 201. This is as per the sighting records submitted over six years by birdwatchers on eBird, the world's largest citizen science initiative maintained by the Cornell lab of ornithology. Aravali Biodiversity Park, Gurugram is the wintering grounds for many migratory birds as well, arriving from their breeding habitats in the Western Himalayas, Central Asia and beyond. The Eurasian Wryneck, Common Kestrel, Black Redstart, Common Stonechat, Variable Wheatear, Red-breasted and Taiga Flycatchers, five species of Wagtails and Pipits and at least 10 species of Warblers are sighted in the Park during the winter months. There are also birds, not common to the region, that have been spotted here. These include: the Himalayan Griffon Vulture (November 2019), Hair-crested Drongo (November 2019), Rufous-tailed Scrub-Robin (August 2018), and Spotted Flycatcher (May 2016). These sightings have ensured continued interest of the birdwatching community in the Park and detailed documentation of its birdlife.



Black Francolin ©Abhishek Gulshan



Signature Spider ©Vijay Dhasmana

Over 380 acres of a once severely degraded mining site have been completely restored into an urban forest with over 300 plants, trees, shrubs, creepers and grasses. Over one lakh saplings have been planted since 2011 after uprooting the exotic *Prosopis juliflora*. The planting has a survival rate of 85-95%. Many of these species were a reintroduction to Haryana, a few of these fall under the rare or endangered categories as per the IUCN red list. The Park is becoming a small sanctuary of endangered and rare plants of the Northern Aravalis, most of which Haryana is losing rapidly to development and encroachments.

Programmes to engage the city with this wilderness have been taking shape. Nature walks have become popular and are widely attended. A programme to involve school children with nature awareness is usually packed with enthusiastic learners. Corporates find enough space in the Park for team-building and volunteering activities. Business teams are seen unwinding while clearing up garbage, composting leaves or planting saplings in the nursery.

In times of severe water crisis in Gurugram, with the groundwater depleting at 5ft per year as the city pumps out 300% more groundwater than it recharges, the Park serves to recharge over 320 million (32 crores) litres of water annually.

The Centre for Environmental Research and Education (CERE) undertook a study of the Park in 2018⁸. The study covered the biodiversity aspects, value addition through carbon dioxide sequestration, oxygen generation, value of the trees, green space per capita in Indian cities and ground water potential.

The study shows that the Park potentially supplies 7.07% of the oxygen requirement for Delhi NCR. The report emphasizes the importance of spaces such as the Park for general well-being of people. It also showcases the model as an exemplary one to follow which has brought together MCG, Corporates and citizens together.

While summarising the value-added assessment of the Park, the report highlighted the following⁹:

1. The Aravali Biodiversity Park plays an invaluable role in improving the air quality of Gurugram, Delhi and the entire NCR region, providing water security by recharging the groundwater table and extending a host of ecosystem services through its rich biodiversity.
2. Amidst the rapid urbanization and industrialization in NCR, an urban forest such as the Aravali Biodiversity Park also helps in maintaining the ecological balance for human well-being and helps mitigate the effects of global warming.
3. The Park is presently contributing towards maintaining the UN standard of green space per capita which is 9 m² /capita.
4. The Park showcases a unique social model where local communities are an integral part of governance and have worked closely with the government in order to develop the green lungs for the city of Gurugram. This urban forest has also received support from the corporate world which has invested heavily in developing a green community space.
5. This Park has been developed based on the principle of 'of the people - for the people - by the people'.

⁸ Aravali Biodiversity Park: A Value Creation, Centre for environmental research and education, Oct 2018

⁹ Aravali Biodiversity Park: A Value Creation, Centre for environmental research and education, Oct 2018

Hence, this can be an exemplary model which should be encouraged in other parts of the country.



The Park as venue for Nature Education ©Vijay Dhasmana



Children's support in Restoration ©Vijay Dhasmana

Conclusion

Though a relatively young forest, the Park is well on its way to becoming an ecological heritage site in Gurugram. It is one of the rare stories of eco- restoration in our country where an NGO, citizens, corporates and the local administration have converged their efforts to bring a natural forest landscape back into the heart of the city for people of all walks of life to enjoy. The transformation that began 10 years ago unfolds beautifully in every breath that the city forest takes today.