The Ecological Narrative in the Idea of an Energy Secure India - of Rivers and Dams, Grasslands and Solar Farms, Habitat Connectivity and Habit Diversion

Ananda Banerjee

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The narrative reminds us of the value of ecosystem services provided by nature - rivers, forests, wetlands, grasslands to mention a few. These natural resources are not infinite. How we harvest and manage natural resources is the key to our future.

India's misunderstood rivers

The mismanagement, abuse and displacement of water need to be addressed to solve the real crisis in front of us.

A polluted stretch of the River Ganga between Allahabad and Varanasi. Photo: Ananda Banerjee/Mint

It's the time of the year when everyone starts talking about the heat — how hot it was today and what it's going to be like in the coming days. The forecast by the India Meteorological Department does not bring any comfort. Scientists are predicting a below-normal monsoon because of El Niño, the weather phenomenon over the Pacific Ocean that induces atmospheric changes which disrupt the progress of monsoon rains.

This means less water for India's monsoon-dependent crops and its depleting river systems. This is a major cause of worry for the hundreds of millions in India who earn a livelihood from farming. The Indian subcontinent is home to seven major river systems with more than 400 rivers. Many originate from Himalayan glaciers that are retreating due to global warming, and from springs in forest ecosystems, and flow either toward the Bay of Bengal or to the Arabian Sea. Some 80 per cent of India's population is dependent on 14 major rivers for food and livelihood.

Hit by unseasonal weather, we promptly point the finger at climate change: how excess carbon dioxide—a major component of greenhouse gases—from burning fossil fuels is causing havoc with the weather and altering climatic patterns, making the world a warmer place.

While there is no doubt about the role played by fossil fuels in inducing climate change, the Canadian author, environmentalist and co-founder of the Blue Planet Project, Maude Vistoria Barlow, suggests that there is a missing piece to the climate puzzle that needs to be addressed if we are to properly understand the true nature of the crisis. Blue Planet works to stop the commodification of the world's water.

That missing piece is our abuse, mismanagement and displacement of water.

"What is less understood is that our cavalier treatment of fresh water is also a major cause of climate chaos and global warming and needs to be addressed," says Barlowe. "If we are to successfully address climate change, it is time to include an analysis of how our abuse of water is an additional factor in the creation of global warming and that any solutions to the crisis must include the protection of water and the restoration of rivers and watersheds."

In the past many civilizations have perished because of the mismanagement of water resources. Changes in nature don't happen overnight or in one's lifetime. "So slowly, oh, so slowly, have the great changes been brought about!" wrote the late American naturalist, John Burroughs, in his book Time and Change (1912).

The Ganga

According to veteran archaeologist Makhan Lal, the vast alluvial plains of northern India as we see them today are the result of continuous deforestation for the past four millennia.

“We have ample evidence of the Gangetic plain being covered with dense monsoon forest,” Lal said.

Today, the Ganga basin is the world’s most populous river basin. The forest has long disappeared and the Ganga has been dammed, over-drained and sullied by sewage as well as industrial waste from the numerous towns and cities which dot the river bank.

Sanwar Lal Jat, minister of state for water resources, river development and Ganga rejuvenation, told the Rajya Sabha recently that the Central Pollution Control Board (CPCB) had listed 764 grossly polluting industries discharging 501 million litres per day (MLD) of effluents into the Ganga and its tributaries.

The CPCB has also identified 144 drains along the main stem of the Ganga, discharging about 6,614 MLD of sewage. According to CPCB, urban India’s sewage generation for 2015 is estimated to be 62,000 MLD and its sewage treatment capacity is 23,277 MLD with 816 sewage treatment plants.

In June last year, to curb the pollution of the Ganga, the government launched 'Namami Gange' an integrated conservation mission. This month, the union cabinet sanctioned Rs.20,000 crore for the project focused on pollution abatement.

But river conservationists are not happy with this initiative. They say the government is just focusing on pollution and trying to find an engineering solution while ignoring the core issue, the ecological problem.

"The government looks at a river as a channel of water and not as an ecosystem service provider. There is no understanding of river hydrology and floodplains, which form diverse habitats for flora and fauna. Here lies the root of the problem," says Manoj Misra, convenor of Yamuna Jiye Abhiyaan, a civil society consortium dedicated to reviving the river Yamuna as an ecosystem.

From bad to worse

According to Himanshu Thakkar, coordinator of South Asia Network on Dams, Rivers and People, water in India is a state government subject and water laws are state-based. The state has the constitutional power to make laws, to implement and regulate water supplies, irrigation and canals, drainage and embankments, water storage and hydropower.

There is nothing in the constitution or law that shows an understanding of what a river is, what services it provides or the conservation of rivers.

There is no legal protection for rivers in India. This is the reason various legal and institutional measures such as the Water Pollution Act, CPCB, the state pollution control boards, Ganga Action Plan, Yamuna Action Plan and the National River Conservation Plan have yielded no results.

More than two decades ago, the CPCB declared that there is not a single river in the plains of India that has bathing-quality water. “Today, one can imagine it has gone from bad to worse. Even in the mountain, rivers like Sutlej, Beas, Ravi, Chenab, Jhelum, Bhagirathi, Alaknanda, Gauri Ganga, Mandakini and Teesta are said to be disappearing at most of the locations as hydropower projects divert them into underground tunnels,” says Thakkar. Further, the Indus and Teesta are among the eight mighty rivers of the world that run dry from overuse, according to the National Geographic Society.

The biggest threats to the existence of rivers are big dams, canal diversions, hydropower projects and pollution.

"The diversion of water from dams and barrages has led to agricultural prosperity. This is in tune with the national and state policies which offer top priority for agriculture and drinking water over ecological needs. Policies do not spell out the need and the mechanism for maintaining flows in the rivers to conserve the ecosystem," says Suresh Babu S.V., director, rivers, wetlands and water policy, at WWF-India.

With no fresh water to support any aquatic life, the Yamuna, a major tributary of the Ganga, has been declared a dead river by the CPCB. The 22-km-stretch of the Yamuna in Delhi is less than 2 per cent of the river’s course but accounts for over 70 per cent of its pollution. According to The Energy and Resources Institute, Delhi receives relatively clean water and converts it into a deadly concoction of disease-bearing water for the people who live downstream.

According to CPCB, it is a similar situation with rivers across the subcontinent. In the list of heavily polluted river stretches are the Mithi in Mumbai, the Hindon river in western Uttar Pradesh, Sabarmati in Gujarat, Ghaggar in Punjab and Haryana, Musi in Hyderabad, Godavari in Nasik, Pavana in Pune, Satluj from Ludhiana to Jalandhar, Bhadra in Karnataka, and Adyar and Cooum in Chennai.

Successive governments have ignored river protection and a proposal for a river regulation zone has been gathering dust for over a decade. The new government wants to go against nature and the natural flow of rivers and interlink them to channel water from one place to another.

In April, ignoring the advice of environmentalists and water conservationists, the Ministry of Water Resources, River Development and Ganga Rejuvenation constituted a task force on interlinking of rivers comprising experts and senior officials.

Across the world, over-damming and diversion of rivers have had a severe impact on people and the landscape. Already major rivers are failing to reach the sea—in the US, the Colorado river and the Rio Grande; in Kazakhstan and Uzbekistan the Amu Darya; and in China the Yellow River.

Conservationists worry on the same lines that if interlinking of rivers is executed, most of India's rivers won't reach the sea, altering vast swathes of estuarine habitat and the lives of people in and around the region.

The quest for water, for need or greed, has blinded us from seeing what a river is; how it flows; the aquatic life and the flora and fauna that inhabit its flood plains; and how it filters and replenishes groundwater. Destroying natural processes has never helped any civilization to prosper, and rivers dying because of dams and pollution is not a good sign.

How many dams does India need?

India is on a dam-building spree over the two largest river basins in the subcontinent—the Ganga and the Brahmaputra

Photo: AFP

India is on a dam-building spree, especially in the Himalayan states of Uttarakhand and Arunachal Pradesh, over the two largest river basins in the subcontinent—the Ganga and the Brahmaputra.

India has 5,202 large dams. According to the Central Water Commission (CWC), a large dam is one with height of at least 15m from its deepest foundation to the crest. This is not an exhaustive list as there are a number of small dams and barrages.

Since 2005, the Arunachal Pradesh government has signed at least 150 memoranda of understanding on large hydropower projects. One has been commissioned and four are under construction.

In Uttarakhand, there are 98 existing hydro projects, 41 under construction and 197 proposed projects.

The state also has 47 mini- and micro-hydropower projects that are up and running.

A PROBLEM OF PLENTY

Overview of proposed hydropower projects in Uttarakhand

Basin	Large hydro projects (above 25MW)		Small hydro projects (1-25MW)		Mini, micro hydro projects (below 1MW)		Total hydro projects	
	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)
Alaknanda	29	4,823	43	375.6	2	0.65	74	5,199.25
Bhagirathi	5	675	13	125.5	4	1.4	22	801.9
Ramganga	6	314	12	93.5	2	1	20	408.5
Sharda	26	11,920	16	101.95	6	0.33	48	12,022.28
Yamuna	17	2,670	13	110.3	3	0.55	33	2,780.85
TOTAL	**83**	**20,402**	**97**	**806.85**	**17**	**3.93**	**197**	**21,212.78**

Overview of all hydropower projects in Uttarakhand

Basin	Existing hydro projects		Under construction projects		Proposed hydropower projects		Total hydro projects	
	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)	No. of projects	Capacity (MW)
Alaknanda	32	456.97	16	1,291.1	74	5,199.25	122	6,947.32
Bhagirathi	13	1,851.5	13	1,084.75	22	801.9	48	3,737.75
Ganga sub-basin	4	173.8	2	1.75	-	-	6	175.55
Ramganga	12	210.8	-	-	20	408.5	32	619.35
Sharda	28	427.75	8	0.375	48	12,022.28	84	12,450.405
Yamuna	9	478.195	2	0.14	33	2,780.85	44	3,259.185
TOTAL	**98**	**3,598.665**	**41**	**2,378.115**	**197**	**21,212.78**	**336**	**27,189.56**

Source: South Asia Network on Dams, Rivers and People

Hydropower projects remain the second largest contributor after thermal projects among all power sub-sectors such as thermal, nuclear and non-conventional sources.

As the summer temperature soars amid power outages, it is hard to believe that India actually has surplus power but no buyers, but in April, Power Minister Piyush Goyal informed the Parliament that states are not buying power. At the same time, Prime Minister Narendra Modi has said in an interview that India will have a 24x7 power supply in the next five years.

So exactly how many dams does India actually need? There is no talk of that or even a study on it.

When the last of India's forest corridors vanish, so will the wildlife

On World Environment Day, here's a look at how highways, mines and misplaced priorities are ruining our forests.

An irrigation canal under construction running through the forests in Bramhapuri forest division adjacent Tadoba Tiger Reserve. Photo: Aditya Joshi

It's World Environment Day again (June 5), and the government has announced a massive plantation drive—the second urban forest programme—that seeks to take up the nation's forest cover from the present 24 per cent to 33 per cent in the next five years.

A galaxy of sporting icons have been roped in for this and associated sapling planting events. The government has piloted a bill in Parliament seeking nearly Rs.35,000 crore to help states green India. On Thursday, Union environment minister Prakash Javadekar said if forests can be developed, "particularly with native fruit-bearing and other trees in urban areas", they will work as a carbon sink.

There's just one small glitch: Little is known about the species to be planted and how the saplings will be looked after in the years to come—a vital piece of information because it goes to the heart of forestry statistics and, indeed, the very definition of forests.

Take, for instance, the environment ministry's statistics that 24 per cent of India is under forest cover. Environmentalists say even that is debatable as large parts of the green cover are technically man-made plantations.

The Forest Survey of India shows "dense forest cover" and "moderate dense forest cover" to be less than 3% and 10 per cent respectively. Data acquired through the Right to Information Act in 2013 by the Environment Impact Assessment Resources and Response Centre, a non-governmental group, says that India's daily average forest loss stands at 135 hectares—equivalent of at least 184 football pitches.

Scientists and conservationists argue that plantations are not true forests.

Saving a tree is more important than planting one because plantations cannot provide the same ecosystem services as an old-growth forest. In the Western Ghats, plantations are thought to be the main cause of habitat fragmentation and biodiversity loss.

The real cliffhanger is due in a few weeks' time, when the Supreme Court reopens after its summer break.

The environment ministry will then tell the court how the government defines the term 'forest'. The definition, sought by the National Green Tribunal, will let the cat out of the bag—it will indicate if there is going to be further dilution of forest land in the name of development.

Between 2004 and 2013, when United Progressive Alliance (UPA) government was in power, 4.07 lakh hectares of forests were cleared for development projects, media reports suggest.

The same area of forest land is now said to be under consideration for various project clearances.

"Today, forest protection happens against all odds. There is no economic value seen in forests, but there is value seen in the development project for which forest land is required,"writes Sunita Narain, director general of the non-profit Centre for Science and Environment, in Down To Earth magazine.

An e-book titled Development Without Destruction - A Saga of Turnaround, by the Ministry of Environment and Forest, quotes Environment Minister Javadekar as saying, "Our motto is to strike a balance between development and environment protection. This is not only desirable but perfectly possible."

Nevertheless, the government's eagerness to fast-track forest clearances for industrial and development projects around protected forest areas (National Parks and Wildlife Sanctuaries) does not match its green promises.

The example of Satpura-Maikal forest in central India is sobering. This 45,000 sq. km landscape contains 17 per cent of India's tiger population and 12 per cent of its tiger habitat.

"Human activity in and around the Satpura-Maikal forest has dramatically changed the landscape over the course of 300 years. From 1700 to 2000, the habitat underwent a 25-fold increase in urbanization," says a study by a group of scientists from the Smithsonian Conservation Biology Institute. "Human population increased 10-fold and anthropogenic activities resulted in the clearing of 78% of the forest, leaving just 32 per cent of viable habitat for leopards and tigers. The reduced and fragmented landscape makes it difficult for these solitary animals to safely move between protected reserves in search of mates and territory."

Forest clearances for development have been a contentious subject between environmentalists and industrialists—the former blames the latter for killing forests, while industrialists say conservationists are stalling economic growth.

The 16,000 sq. km Kanha-Pench corridor, one of the most important in India that facilitates tiger and other wildlife dispersal between the Kanha and Pench Tiger Reserves, has also faced the march of development. Earlier this year, Javadekar rejected recommendations from the Wildlife Institute of India (WII), a government-run institute, to counter the impact of the four-laning of NH-7 cutting through the Pench National Park. WII experts suggested three flyovers to enable wild animals to cross at vulnerable points.

Nagpur-based wildlife biologist Milind Pariwakam says a series of environmental laws were violated for the expansion of NH-7 and NH-6.

Pariwakam is fighting the case in the National Green Tribunal. For now, the tribunal has put a stay on the project and will resume hearing the case in July.

Ecologists say forests are always vulnerable in the face of human advancement. When land is required for a new industry or linear project, it's usually the forest that gets the chop.

Precious minerals such as coal lie under large tracts of pristine forest. But forests are of immense ecological importance and provide humans with the ecosystem necessary for survival—food, fresh water, climate and natural hazard regulation.

Anthropogenic pressures on forests also adversely impact the greenhouse gas emissions and the mitigation role of forests. It poses a direct threat to the forest areas and the communities that are dependent on them.

In January, at a parliamentary consultative committee meeting on environment held at

Bandipur, a forest in Karnataka, the environment minister reportedly rejected the proposal from wildlife conservationists to reduce train speeds during seasonal elephant migration to 40km/hr along forest corridors.

According to members present in that meeting, the idea was deemed to be "anti-development". Besides the Kanha-Pench corridor, the Satpura-Maikal landscape has three linked forest corridors—the Achanakmar-Phen-Kanha corridor, Pench-Satpuda corridor and Satpuda-Melghat corridor.

These corridors run through fragmented forests interspersed with agriculture, human habitation, industrial development and mines. Yet, genetic studies show that there is gene flow of tigers between these corridors.

"These forest corridors are like umbilical cords, without which biodiversity will perish,"says Rajesh Gopal, who retired as the head of the National Tiger Conservation Authority (formerly known as Project Tiger) earlier this year. In his new book, Dynamics of Tiger Management in Priority Landscapes, Gopal says, "Even a good tiger population inside a tiger reserve today may become extinct if there is no forest corridor."

According to Gopal, coal and non-coal mining, thermal power, iron, steel and cement industries pose the largest threats to forest contiguity in this landscape.

On June 4, the government announced that the third round of coal block auction will take place between August 11 and 17. Ten coal blocks with 13.47 million tonne of reserves are up for sale to steel and cement firms.

Greenpeace, an environmental campaigning group, has reported on how the majority of India's untapped coal reserves lie in the central Indian landscape. All of India's major coalfields with coal reserves of over one billion tonnes fall within this area.

Corridors linking eight tiger reserves in central India—Bandhavgarh, Sanjay-Dubri, Palamau, Kanha, Achanakmar, Satkosia, Simlipal and Tadoba-Andhari—stand to be impacted in varying degrees if mining companies get their way.

A geographic information system (GIS) analysis conducted by the Ecoinformatics Lab at the Ashoka Trust for Research in Ecology and Environment (ATREE), Bengaluru, shows that mining existing forest areas will lead to the destruction of more than one million hectares of forest, of which more than 739,000 hectares is dense forest.

If the coal blocks are opened up by the government, connecting forest corridors between several of the major protected areas in central India will stand isolated.

Altogether, 13 coal fields in this landscape will impact eight tiger reserves. These reserves are home to more than 250 tigers and other endangered wildlife, and connecting forest corridors are essential for their survival.

A tiger estimation study released in May conducted by the Wildlife Conservation Trust (WCT) in areas outside protected areas of the Chandrapur district of Maharashtra revealed the presence of 48 adult tigers.

"The tiger density in some reserve forest blocks is actually higher than that of some tiger reserves of India. For instance, tiger density in the Kanhalgaon-Central Chanda block is 2.34, which is more than that of the Melghat Tiger Reserve. In the Junona-Central Chanda block, tiger density stood at 1.77, higher than that of the Sahyadri Tiger Reserve," said Anish Andheria, president, WCT.

If these corridors—parts of India's forest cover—vanish, so will the wildlife.

Wolves of the wasteland

At present, there is no population estimate for wolves anywhere in the Indian subcontinent

Think of wolves. Chances are you'd be hard-pressed to come up with an image that is positive, pleasing or happy.

You won't be alone. In Europe, there's the medieval legend of the werewolf, the man who turns into a wolf-like creature at night, with fangs and claws.

In India, wolves are supposed to steal unguarded babies, who then grow up to become wolf-boys.

In the US, former stockbroker Jordan Belfort chose to title his memoir chronicling his dark financial raids The Wolf of Wall Street.

Not to forget that cliché of horror movies-a wolf in silhouette, neck tilted up, howling away at the full moon.

For all we know, the howling wolf could well be a mythical creature from a dark and dangerous world.

But why does a wolf howl?

"A wolf will be wasting its time howling at the moon. It does so only to communicate with its pack. Every wolf howl is unique, just like every tiger has a unique stripe pattern on its body," says Bilal Habib, a scientist at the Wildlife Institute of India and an expert on wolves.

This fact—about howling—is now set to aid Habib and his team conduct a 'sound capture and recapture' experiment, the first of its kind in India to count the number of wolves. At present, there is no population estimate for wolves anywhere in the Indian subcontinent. 'Capture and recapture' is a method commonly used to estimate the size of a species' population.

In this case, scientists will record samples of wolf howls in a habitat in one season. Say they record 100 different howls. Later, in the next season, another sample is recorded, say now, the scientist gets 150 wolf howls and among these, 50 are found to have been previously recorded-then the total population size is 300, using the following formula: Total = original number tagged x total recaptured ÷ number tagged on recapture.

In 2003, genetic studies established that the Indian subcontinent supports three distinct wolf lineages. Two are ancient and unique to the subcontinent. The peninsular Indian wolf lineage (Canis lupus pallipes) came into being 400,000 years ago and is found across Gujarat, Rajasthan, Uttar Pradesh, Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh.

The Himalayan wolf lineage (Canis lupus chanco), which evolved about 800,000 years ago, making India the cradle of modern wolf evolution, is found in Jammu and Kashmir, Himachal Pradesh, Uttarakhand and Sikkim.

The third Indian wolf (Canis lupus chanco, or the Tibetan wolf), found in the Himalayan mountains of Kashmir, belongs to the wolf-dog clade (species descendant from a common ancestor) that stretches across the rest of Eurasia and North America.

At the time these studies were conducted, there were thought to be around 350 Himalayan wolves in the wild and between 1,000 and 3,000 peninsular Indian wolves. Peninsular Indian wolves are creatures of the savannah, a unique grassland ecosystem that is found throughout peninsular India and in Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh and Odisha.

Central to the wolf's universe is its pack, and howling keeps the group together. According to Habib, wolves—like dogs—also bark, whine, whimper, snarl, yelp and growl more often than they howl. But it is howling that defines the wolf. The pack that howls together stays together.

Wolf packs range over vast areas for food; on an average a pack occupies an area of around 180-200 sq.km, so howling is the only way to communicate over great distances in open grasslands. This unique feature allows wolves to identify each other, locate and reunite, as well as mark out territory to keep out rival packs.

GRASSLAND AREA

State	Grassland area(sq km)	State total area(sq km)	% grassland
Andhra Pradesh	11,706	276,424.65	4.23
Karnataka	3,886	191,349.24	2.03
Maharashtra	39,475	309,000.12	12.77
Madhya Pradesh	24,305	307,555.62	7.90

Note: Rajasthan and Gujarat also have substantial grassland cover which is not covered under this project

Source: Atree

Grasslands support a vast proportion of India's agro-pastoral community and many rare, endangered and endemic bird and animal species. But since these vast areas are devoid of any tree cover, the government has classified them as wasteland.

"Dry grasslands do not receive attention from conservationists or policymakers, resulting in lack of protection for endangered and endemic wildlife which occupy this unique habitat. Unfortunately, government policy declares these grasslands, scrub and thorn forests as waste or unproductive land," says Abi Tamim Vanak, principal investigator from Ashoka Trust for Research in Ecology and Environment's (ATREE) Indian Savannah Project.

The Indian Savannah Project aims to create a countrywide map of dry grassland ecosystem at the district level for the states of Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra (see box) and design conservation management plans for the protection and sustainable use of grasslands.

Wolves, the top predators in the grasslands, have been hunted throughout history for livestock depredation. Once the most common species after humans in the northern hemisphere, the wolf is now extinct in Japan, Bangladesh, the UK and many European nations. In British India, wolves were declared vermin and, according to historian Mahesh Rangarajan, 200,000 wolf skins were collected between 1875 and 1925.

In Karnataka's Chitradurga district, pastoral communities have been protesting against the planned diversion of around 10,000 acres of ancient grasslands, known as the Amrithmahal Kavals in Challakere taluk, for industrial, defence, institutional and infrastructure projects. Land has been allocated to institutes such as the Defence Research and Development Organization, Indian Institute of Science, Bangalore, Indian Space Research Organization and Bhabha Atomic Research Centre.

Environmentalists have challenged these plans in the Karnataka high court and the National Green Tribunal (NGT)-southern zone, Chennai.

"As our population continues to grow, there is increasing demand and pressure on grasslands marked as wastelands to be converted for development. This will further reduce old habitats of the wolf," says Vanak.

In the report Forfeiting Our Commons submitted to an expert committee set up by NGT-southern zone, petitioner Leo Saldanha, trustee and coordinator, Environment Support Group, a non-governmental organization, writes: "Karnataka state was home to nearly 400,000 acres of Amritmahal Kavals at the time of independence. Now the state is left with only 60,000 acres. Of this remaining Kaval area, a substantial portion has been encroached or is in various states of degradation. The state has directly been the agency for such massive loss of grassland ecosystems. The Amritmahal Kavals, since time immemorial, have provided a variety of ecological and livelihoods services to the local communities of this region."

The case is scheduled in the NGT for a final hearing in July.

"One of my most enduring memories of a wolf encounter was when late one evening in the grasslands of Nannaj, Maharashtra, I saw two wolves sneak up on a shepherd and make off with one of his sheep. When the shepherd started chasing after them, the wolves dropped the sheep, which was still alive. The shepherd picked up the sheep but both the wolves started following

him. The shepherd occasionally turned around and waved his staff at them, as if shooing away a pesky dog. Soon the wolves gave up and wandered off towards the top of a hill where they continued to keep a close watch on the flock till the shepherd led them back home," says Vanak.

Although wolves have been given the highest protection under the Wildlife (Protection) Act, 1972— listed as a Schedule 1 species—the goal is less popular than saving the big four endangered animals: the tiger, lion, elephant and rhinoceros.

Across the world, environmentalists have begun warning about the dangers of focusing conservation money and efforts around the big four, and other so-called 'charismatic species'—often at the expense of other less popular but endangered species.

There are other considerations.

"Wolves cannot be protected by the forest department as it requires looking after large areas. Protecting such big areas is impossible, especially in a country like ours. A pack is effectively two animals—the alpha male and female which rule and breed. Considering each pack needs around 200 sq. km, there is no place for dispersal and forming newer packs in the ever shrinking landscape. The best ways to protect the species is through public awareness and by dispelling myths. If only we could accept wolves like we have accepted dogs on our streets, then wolves can hope to have a brighter future," says Habib.

Compensation to owners who lose their livestock to wolves also needs to be looked at. The Maharashtra forest department's compensation scheme, begun in 2001, has not helped either livestock owners or wolves.

Unlike other carnivores, the wolf does not return to its kill if it is disturbed, which means it will forfeit the animal it has killed and hunt again, aggravating its conflict with humans. Also, the owner needs to produce the carcass of the kill or part of it as proof in order to claim compensation from authorities.

The Maharashtra forest department has asked conservation biologists from the Wildlife Conservation Society-India to look into grasslands, wolves and pastoralists who use the entire grasslands landscape in the state.

Meanwhile, the wolves in the Trans-Himalayan region remain in taxonomic confusion even after 170 years since they were first described to science.

There is ambiguity over their status as a subspecies or separate species. Habib and his team are in the process of an extensive genetic sample collection survey to come up with clear results in this challenging mountain landscape.

The wolf today is vilified and hunted, struggling to find a habitat. This is a far cry from the wolves of legends that raised orphaned children-from Romulus and Remus who built Rome to Mowgli in Rudyard Kipling's The Jungle Book. Will the wolf survive the brunt of human development? Ed Bangs, responsible for restoring the grey wolf species in the US, says, “I’ve always said that the best wolf habitat resides in the human heart. You have to leave a little space for them to live.”

About the author

Ananda Banerjee is a conservation journalist, graphic designer andphotographer based in New Delhi, India. He writes on natural history conservation in Mint (www.livemint.com). He is author of, Common Birds of the Indian Subcontinent, Nature Chronicles of India - Essays on Wildlife and Wild Trail in Madhya Pradesh.

Banerjee is a FEJI - ATREE media fellow (Forum of Environmental Journalists of India and the Ashoka Trust for Research in Ecology and the Environment) and merit awardee Asian Environmental Journalism Awards (AEJA), Singapore Environment Council, 2014.

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