

HOW INDIA'S UNGUIDED QUEST FOR SOLAR ENERGY IS BRINGING ABOUT ECOLOGICAL AND CULTURAL ERASURE

Relevant for: Environment | Topic: Environmental Conservation, Sustainable Development, and EIA

Aerial view of the Pavagada Solar Park, spread across 53 sq. km., in Tumukuru, Karnataka. | Photo Credit: [Getty Images](#)

At the recently concluded COP26 in Glasgow, India proclaimed on the global stage that by 2030, it would elevate its renewable power capacity to 500 GW from 150 GW today, and that it would meet 50% of its energy requirements from renewable energy. Even as energy analysts scratch their heads about whether India's 50% pledge refers to capacity or generation (more on this later), one thing is clear: we are in the middle of an unprecedented expansion in the renewable energy sector.

As for solar energy, between 2014 and 2021, India increased its capacity 15-fold. The government now aims to increase the 2020 installed solar capacity of 37 GW three-fold by 2022, to a staggering 270 GW — possibly even more — by 2030. India's noble ambitions for solar energy, clearly, are soaring.

But under the sun's glare, even tall, noble ambitions can cast long, dark shadows on the land and its people. While India's intent of expanding solar energy is certainly laudable, the devil is in the detail. The scale of India's solar energy ambition, and the pace it has set to achieve this, certainly merit closer examination, particularly from an ecological standpoint, since the strongest argument in favour of these projects is environmental. We must therefore ask: how do we reconcile the putative benefits of power generation with potential ecological and human costs?

To examine this, we need to descend from the sophisticated world of technology and economics into the mundane realm of the earth and its people. To begin with, the generation of gigawatt upon gigawatt of solar power requires vast stretches of open lands blessed with year-round sunshine. In this respect, India is rather lucky. Over half of India's terrain is sunny and semi-arid, receiving 1,000 mm of rainfall or less every year. In other words, these lands are too dry to support forests with a continuous canopy.

Staggeringly diverse

Native vegetation in this zone is made up of grass, herbs and shrubs. When we recently mapped these Open Natural Ecosystems (ONEs), we discovered that they are staggeringly diverse, ranging from woodland savannas, scrublands and grasslands, to rocky outcrops, ravines and dunes. ONEs also have a remarkable assemblage of animal species, many of which, such as the black buck and the critically endangered great Indian bustard, occur only in the Indian subcontinent.

Besides being home to unique life-forms, ONEs provide valuable ecological services. Research shows that under certain environmental conditions, ONEs can sequester more carbon than if trees were planted on them. ONEs also support grazing-based livelihoods of millions of pastoralist and agro-pastoralist communities across the country. These low-density communities, with their rich cultures, have also had a long history of coexistence with these ecosystems and their unique wildlife.

Yet, India's ONEs continue to be misunderstood, misrepresented, and destroyed. Successive governments have carried forward a colonial legacy of terming ONEs as 'wastelands' and sought to make them 'productive'; they have tried to 'develop' them, thereby incentivising their erasure. Unlike with forests, there are no conservation laws that protect against diversion of biodiversity-rich ONEs. And so, these landscapes have become among the easiest kinds of lands to despoil and destroy. Renewable energy technologies — wind and solar power, in particular — are heavily reliant on open spaces. What better option for such 'development' than our 'wastelands'?

Extremely vulnerable

"The unfortunate classification of our semi-arid and arid grassland-savanna ecosystems as wastelands has made them extremely vulnerable to co-option for a range of developmental projects, including large solar farms, which are projected as green and sustainable," says Jayashree Ratnam, Director of the Wildlife Biology and Conservation Program at the National Centre for Biological Sciences, and a global authority on savanna ecosystems. "Such labels hide the significant loss of unique biodiversity, ecosystem services and ancient livelihoods that have sustained people in these landscapes for thousands of years. When these ecological and social costs are considered, it is unlikely that such benign labels will remain applicable."

The famous 17th century British philosopher, John Locke, has had a profound influence on a range of topics, from liberalism, epistemology, and political philosophy to British colonial policies on taxation and land reform. According to anthropologist Judy Whitehead, Locke's "concept of wasteland, as opposed to value-producing land, constituted a founding binary opposition that constructed how landscapes were categorized. Associated with wildness, wilderness, and savagery in the 19th century, the category of wasteland also defined who would and who would not become most vulnerable to dispossession and/or enclosure."

Thus, common village lands that were used for pastoralism and that were essentially untaxable, were deemed wastelands. India, in its 75th year of independence, gloriously holds on to this relic of colonialism. Every few years, the government commissions the *Wasteland Atlas of India*, to map areas that are currently not productive and can be 'developed' and made 'productive'. The *Atlas* has some logic-defying categories: waterlogged areas and marshes, which are essential for groundwater recharge; mountains under permanent snow, the source of our greatest rivers; savannah grasslands and pasturelands, on which depend the livelihoods of millions of pastoralists; deserts, sand dunes, ravines, rocky outcrops, inselbergs, and plateaus, rich geological features that are also home to unique fauna and flora.

Mislabeled

The largest category of 'wastelands' in India fall under the ONEs. Most of these are savanna ecosystems that have been mislabelled as degraded scrub forest or degraded grazing lands. And these are the very same lands that are now being targeted for large-scale solar expansion.

Just as the ecological and cultural values of ONEs are downplayed, the public benefit of India's renewable energy projects too are often heavily overstated. Figures from the Central Electricity Authority's General Review 2020 are revealing. While comprising nearly 19% of the installed capacity, renewable sources (excluding hydroelectricity) account for just 8% of the power generated. In contrast, hydro accounts for 11% of capacity and 9% of generation, while thermal power accounts for 69% of capacity, but 80% of generation. Capable of producing power only for parts of a day, solar and wind projects require additional power generation capability — or worse, grid-scale storage — built to buffer the cyclic or seasonal nature of power generation.

The political economy of power generation makes this anomaly even more interesting. With the traditional lynchpin in the renewables sector, hydroelectricity, the public sector has controlled over 90% of both installed capacity and power generation. With the new entrants — solar, wind, biomass and waste — however, 95% of installed capacity and power generation is in the hands of the private sector. And so, nearly the entire gap between capacity and generation — or in other words, the gap between ambition and reality — is accounted for by private sector projects. Given that their promoters rack up sizable gains from incentives or concessions related to land, infrastructure and finance (while making rather modest contributions to energy) these projects deserve far higher standards of ecological, social, and even energy audits.

Such calls for scrutiny often perplex the public, who support renewable energy unconditionally in the belief that they are 'green' technologies, and therefore always good. It bears repeating that it is not the technology of an energy option, but the scale and nature of its implementation that decides its ecological footprint. The photovoltaic panel, which might be downright benign at the rooftop scale, can be significantly less so when implemented at the gigawatt scale. With plans to generate hundreds of gigawatts of power at the grid-scale, we end up with ecological and social footprints of energy production — even with wind and solar technologies — that are just as massive and devastating as any large hydroelectric dam.

As both ecology and society are overlooked, murmurs of discontent have spiralled into overt conflict. As one of India's most charismatic birds, the great Indian bustard, is being displaced by these projects and killed in collisions with overhead power lines, the Supreme Court has had to intervene, much to the chagrin of governments and energy companies. Elsewhere, in Kutch for instance, communities displaced from their traditional grazing lands by renewable energy projects have been protesting these projects.

Roof-top alternative

An alternative solution to grid-scale solar on ONEs lies in the government's own policy on rooftop solar installations. Although there may be challenges in implementing grid-scale solar on residential roof-tops, there are enough large-scale 'grey' areas — places that have already been built-up or designated for industrial purposes — where largescale production of solar is possible. For example, the Maharashtra Industrial Development Corporation has a land bank of over 2.5 lakh acres. If even 20% of this area was used for solar power generation, it would generate nearly 16 gigawatt hour/year. Given that these industrial zones are major consumers of power, such localised generation and utilisation will cut transmission losses. Rooftops of public buildings can also offer a superb opportunity for solar installations, as has been done with railway stations in some cities.

Another alternate scenario involves the use of agrivoltaics on degraded agricultural lands. Deploying solar panels in a manner that allows for cultivation below them has dual benefits. The shade from the solar panels reduces evapo-transpiration and saves water, and the panels themselves benefit from increased efficiency due to the cooling effect from the plants growing below them. The Alliance for Reversal of Ecosystem Service Threats has identified 11 million hectares of degraded agricultural lands in the semi-arid and sub-humid regions of India. If such areas were used for agrivoltaics, it could potentially transform the rural economy of these regions.

While it is true that renewable energy projects are well-meaning and seek to reduce our reliance on an energy economy pivoted on fossil fuels, more attention needs to be paid to how and where these projects are established. Sadly, so far they have remained ill-conceived and poorly implemented efforts, paying little heed both to the ecological riches and diversity in the ONEs, and to the human livelihood and cultures that these lands support.

Madhusudan is a conservation scientist with the National Centre for Biological Sciences, Bengaluru, and Vanak is an ecologist and Senior Fellow at ATREE, Bengaluru.

[Our code of editorial values](#)

We are in the middle of an unprecedented expansion in renewable energy. But it comes at a huge ecological and human cost

END

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS.com