



India's unguided quest for solar energy

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(Mains GS 3 : Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment.)

Context:

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.

Noble ambitions:

- Installed capacity of solar energy in India has increased by more than 18 times from 2.63 gigawatt in March 2014 to 47.66 gigawatt in October 2021. As a result, India's current share of non-fossil sources based installed capacity of electricity generation is more than 40 per cent.
- India is in the middle of an unprecedented expansion in the renewable energy sector as the government now aims to increase the 2020 installed solar capacity of 37 GW three-fold by 2022, to a staggering 270 GW by 2030.
- India is lucky from the point of view of the generation of gigawatt upon gigawatt of solar power which requires vast stretches of open lands blessed with year-round sunshine.
- Over half of India's terrain is sunny and semi-arid, receiving 1,000 mm of rainfall or less every year, thus these lands are too dry to support forests with a continuous canopy.

Open Natural Ecosystems (ONEs):

- The Open Natural Ecosystems (ONEs) in the Indian subcontinent have staggeringly diverse native vegetation, ranging from woodland savannas, shrublands 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 and 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 with their rich cultures and have also a long history of coexistence with these ecosystems and their unique wildlife.

Reliant on open spaces

- India's ONEs continue to be misunderstood, misrepresented, and destroyed with successive governments carrying forward a colonial legacy of terming ONEs as 'wastelands' and seeking to make them 'productive'.
- Unlike with forests, there are no conservation laws that protect against diversion of biodiversity-rich ONEs, so these landscapes have become among the easiest kinds of lands to despoil and destroy.
- Renewable energy technologies, especially wind and solar power, are heavily reliant on open spaces and for their 'development' our 'wastelands' are primarily used.
- Further, 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.

Wasteland Atlas :

- 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.
- Further atlas have deserts, sand dunes, ravines, rocky outcrops, inselbergs, and plateaus which have rich geological features that are also home to unique fauna and flora.
- The common village lands that were deemed wastelands faces significant loss of unique biodiversity, ecosystem services and ancient livelihoods that have sustained people in these landscapes for thousands of years

Targeted area:

- The largest category of 'wastelands' in India fall under the ONEs having savanna ecosystems that have been mislabelled as degraded scrub forest or degraded grazing lands on which large-scale solar expansion is targeted.
- 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.
- 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 built to buffer the cyclic or seasonal nature of power generation.

Deserve higher standards:

- The anomaly of the political economy of power generation shows from the traditional lynchpin in the renewables sector, hydroelectricity, where the public sector has controlled over 90% of both installed capacity and power generation.
- However in the case of solar, wind, biomass and waste, 95% of installed capacity and power generation is in the hands of the private sector.
- So nearly the entire gap between capacity and generation 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, these projects deserve far higher standards of ecological, social, and even energy audits.

Ecological and social footprints:

- By overlooking ecology and society, the country plans to generate hundreds of gigawatts of power at the grid-scale which might end up with ecological and social footprints of energy production that are just as massive and devastating as any large hydroelectric dam.
- For example : 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.
- 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 roof-top solar installations. Although there may be challenges in implementing grid-scale solar on residential roof-tops, there are enough large-scale 'grey' areas 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.

Dual benefits:

- The use of agrivoltaics on degraded agricultural lands and 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 agrovoltaics, it could potentially transform the rural economy of these regions.

Conclusion:

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.