NCAP-COALESCE
CarbOnaceous AerosoL Emissions, Source apportionment & ClimatE impacts
Understanding scientific complexities related to carbonaceous aerosols focussing on issues underlying their origin and fate, and their role as drivers of regional climate change over India.

Research BRIEFS

Crop residue as a bioenergy resource in India

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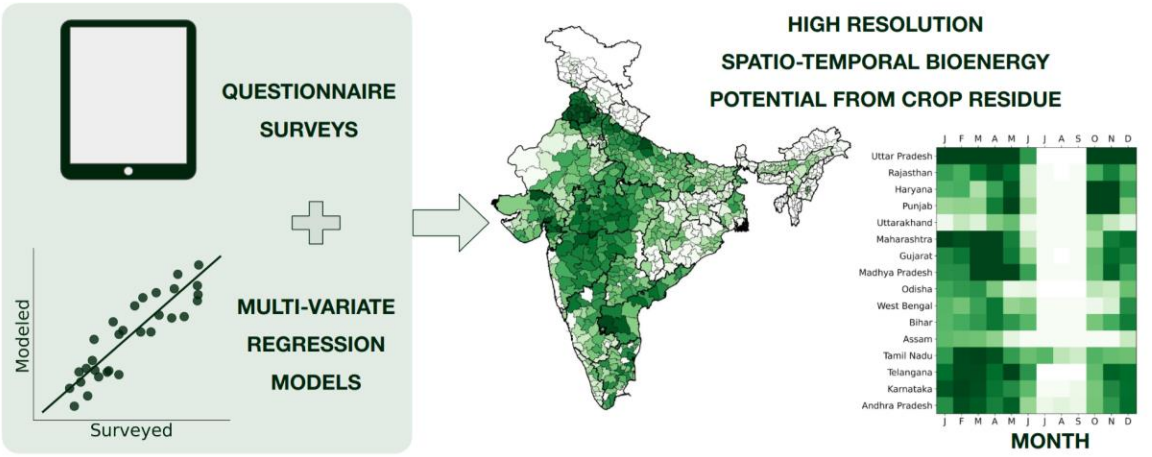


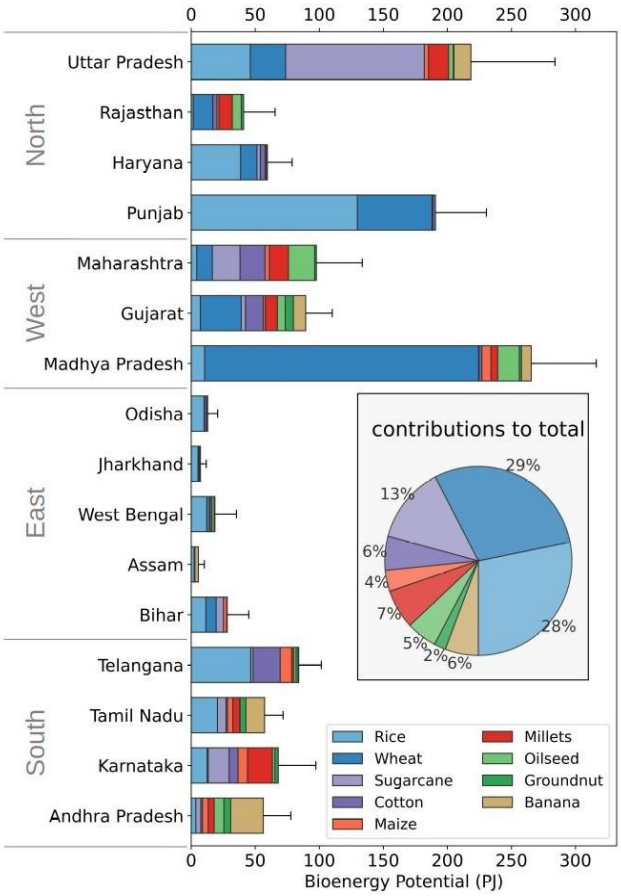
Key highlights:

- Multivariate regression modeling using field-surveyed surplus residue fractions
- Estimated residue burned, 77 Tg/year, lower than previous estimates
- Potential to increase present bioenergy capacity by 82%
- Harnessed by co-firing with coal in power plants (8% potential) or by tripling present biogas potential
- High-resolution spatio-temporal information from this study can be useful to develop efficient supply-chain mechanisms for its utilization

Summary of your Research:

Second-generation bioenergy, a carbon neutral or negative renewable resource, is crucial to achieving India's net-zero emission targets. Crop residues are being targeted as a bioenergy resource as they are otherwise burned on-field, leading to significant pollutant emissions. But estimating their bioenergy potential is problematic because of broad assumptions about their surplus fractions. Here, we use comprehensive surveys and multivariate regression models to estimate the bioenergy potential of surplus crop residues in India.

These are with high sub-national and crop disaggregation that can facilitate the development of efficient supply chain mechanisms for its widespread usage. The estimated potential for 2019 of 1313 PJ can increase the present bioenergy installed capacity by 82% but is likely insufficient alone to meet India's bioenergy targets. The shortage of crop residue for bioenergy, combined with the sustainability concerns raised by previous studies, imply a need to reassess the strategy for the use of this resource.



Take away/conclusion :

- Multivariate regression models have been prepared using surveys as input and socio-economic, livesck, fie count and land cover type information as proxy.
- The estimated nation-wide bioenergy potential of crop residue in India in 2019 is 1313 PJ (903–1723 PJ, 95% CI), which corresponds to 8327 MW of power and signifies an 82% increase from the present installed capacity of 10176 MW .
- The high-resolution spatio-temporal information provided in this study can help to develop efficient supply chain mechanisms to drive down costs of transportation that is a major inhibitor of its present usage.
- The estimated bioenergy availability is lower than previous estimates, which may have inspired the ambitious targets of crop residue utilization as a bioenergy source in India. Hence these targets may not be met exclusively by surplus residues; sizeable crop residue reserves are needed for that.

Research Article

Citation

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