Justice in the Shadows – Land, Labour and Migration in India's Clean Energy Transition

The Case of the Pavagada Solar Park

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Abstract

The Silesia declaration at the COP24 (2018) in Katowice catapulted 'Just Transition' to significance within climate and energy policy discussions. This was built on decades of conversations and struggle by labour unions, especially in the US, on the future and livelihoods of industrial workers and communities. Katowice heralded a new context for just transitions — especially for coal workers, post the phase-out of coal. We situate key principles of Just Transitions in the sites of cleaner technologies that are expected to replace coal in the Indian context. We use the case of the Pavagada Solar Park in India, one of the largest solar parks in the world in terms of installed capacity and land area, as the country makes rapid strides in its contributions to Agenda 2030 through ambitious Renewable Energy generation targets. The scale of these installations requires huge tracts of land which in turn could have tremendous implications on the people dependent on land-based livelihoods. A focus on making this transition to Renewable Energy (RE) just and people-centred is indeed essential. Our research demonstrated a disconnect between what is theorized in the planning of goals and targets, and what is experienced at the local level during and post their implementation. The dominant narrative is that clean energy technologies are fundamentally benign. Therefore, there is limited understanding and acknowledgement of the socio-economic consequences of the installation of large renewable energy systems. These include the loss of traditional livelihoods, changes in intra-household dynamics due to changes in employment and income generation. The lack of security in blue collar green jobs at the solar park, and the lack of an agency to demand decent working conditions specially affects social groups which are already at the margins (including but not limited to landless labourers, *Dalits*, women). While these impacts are more tangible, communities' cultural relationship with these lands are often discounted. In this paper, we try to focus on a few socio-cultural dimensions of the impacts of the Solar Park. Firstly, we look at the change in the relation between land and those who are dependent on it for their livelihoods but do not have any formal land titles. Secondly, we look at the state of migration in the village and whether the advent of the solar park has influenced it in anyway. Finally, we also briefly

touch upon the precarity of labour by looking at the nature of jobs generated at the solar park. An understanding of impacts as observed and experienced by the local communities can help inform the articulation of a just transition. Additionally, the study argues that there is a need for an expansion in the interpretation of Just Transition to include the socio-cultural impacts of renewable power installations on communities, in the Indian context. While this work cuts across multiple SDGs, our focus on livelihoods, differentiated impacts and inclusion makes it most relevant to the goals with the following specific targets: SDG5.5, SDG7.2, SDG8.5, SDG8.8, SDG10.2 and SDG10.3. By providing a critique of mainstream clean energy project development, we hope that an updated just transitions framework will resonate with the nuances and contexts that are presented in countries like India, thus also accommodating the rights of workers and local communities at the other end of the transition.

Keywords: Just Transition, Energy Transitions, Energy Justice, Solar Park, Utility-scale solar

1. Introduction

India's low-carbon transition is driven by its ambitious targets for renewable power installations in this decade. It's Nationally Determined Contributions (NDCs) included a commitment to ensure that 40% of its total installed electricity capacity is generated from non-fossil fuel sources by 2030. In 2021, the Government of India's Ministry of New and Renewable Energy announced that it had achieved this target way ahead of its promised timeline (MNRE, India achieves target of 40 % installed electricity capacity from non- fossil fuel sources, 2021). Indeed, it currently has an installed capacity of 156.83 GW from non-fossil fuel sources, constituting 40.1% of its total capacity. At CoP26, the country further improved on its previous targets with an announcement that it will aim to achieve 500 GW of installed capacity from non-fossil fuel sources by 2030. The country had also set specific targets to accelerate its uptake of renewable power. It aimed to install 175 GW of renewable power by 2022 (India, 2015). This included a revision of the targets for 2022 originally laid down in the National Solar Mission (2010), which was increased by 5-times from 20 GW of solar power installations to 100 GW (60GW utility-scale and 40GW rooftop solar) (Government of India, 2015). In 2021, this target was further revised upwards to 300 GW by 2030 (Economic Times, 2021). These ambitions are in line with SDG7.2 which seeks to "substantially increase the share of renewable energy in the global energy mix by 2030." The Government of India through its relevant ministries has been promoting the growth of renewable power through various fiscal and promotional incentives (Kumar & Majid, 2020). One of the major instruments of achieving these massive targets has been the development of utility-scale projects. As per the (U.S. Dept. of Energy, n.d.), utility-scale projects typically refer to powerplants with an installed capacity of 10 MW or more.

The Ministry of New and Renewable Energy (MNRE) in India announced a scheme to promote the development of "Solar Parks and Ultra-Mega Solar Power Projects" in 2014. The scheme aimed to develop more than 50 solar parks with a minimum capacity of 500 MW each (MNRE, Scheme for

development of Solar Park and Ultra Mega Solar Power Projects, 2014). As of December 2021, 77% of India's solar installed capacity came from grid-connected utility-scale solar projects (JMK Research & Analytics and IEEFA, 2022). The southern Indian state of Karnataka had the second largest utility-scale solar installed capacity in India with approximately 7.5 GW installed by the end of 2021 (Joshi, 2021). The cumulative installed capacity in India was 41.5 GW as per the same report. Another 15.8 GW of utility-scale solar capacity is estimated to be added in 2022. Rooftop solar, on the other hand, has contributed a smaller share to India's transition to solar power so far, with India estimated to have a capacity of roughly 11 GW as of 2021 (JMK Research & Analytics and IEEFA, 2022).

The emphasis on justice in sustainable transitions is significant not simply because how transitions which don't benefit everyone will not be sustainable but also because the urgency of achieving these targets could discount the risks of perpetuating injustices against the already vulnerable sections of the population. This is especially true for a developing country like India as it strives to find the best pathways to an accelerated transition that balances its developmental needs and its mitigation targets. The overwhelming share of utility scale solar installations is indicative of India's approach towards clean energy deployment. The need to adopt renewable power at scale and to do so quickly is well-established (Gielen, et al., 2019) (Kumar & Majid, 2020). The commitments to such goals and their implementation in the past decade have been instrumental in India's ambitions to develop sustainably within the constraints defined by climate change. These goals, however, are sometimes defined at the macro level in numerical terms with technological references, especially in the context of the clean energy transition. There is a need to examine how they translate to sustainable development at the local level, to understand whether they do so at all, and to explore how local and national priorities could potentially inform each other. Furthermore, at the macro level, cleaner technological alternatives to fossil fuel sources seem to be assumed to be almost benign. There is lesser attention to the socio-economic and cultural implications of large-scale renewable power projects.

In this study, we look at the case of the Pavagada Solar Park in Karnataka. The Park, also known as "*Shakti Sthala*", was conceptualised in 2015, and the construction began in 2016. When it became fully operational towards the end of 2019, the 2,050 MW solar park was the biggest such installation in the world (Bhushan, 2019). It is spread over 13,000 acres of land across 5 villages in the semi-arid region of Pavagada. The Karnataka State Power Development Corporation Limited (KSPDCL) was responsible for the development of the Solar Park. This project adopted a unique land leasing model and around 3,000 farmers leased land to KSPDCL for a period of 28 years, in return for an annual rent of INR 21,000 ($313) per acre per year (starting in 2016) (Government of Karnataka, n.d.). The rental amount would be increased by 5% every two years. Such an arrangement was projected to be beneficial in that the landholders continue to retain ownership while gaining a fixed income from the lease agreement. Landholders, however, do not constitute the entire population in region. With this study, we attempt to gather evidence on how the impacts are distributed across some of the different social groups.

Firstly, we look at the change in the relation between land and those who are dependent on it for their livelihoods but without any formal land titles. Secondly, we look at the state of migration in the village and whether the advent of the solar park has influenced it in anyway. Finally, we also briefly touch upon the precarity of labour looking at the nature of jobs generated at the solar park. An understanding of impacts as observed and experienced by the local communities can help inform the articulation of a just transition, especially in the context of such transitions in India. Moreover, it encourages an exploration of justice in transitions from the perspective of impacts felt at the sites of low-carbon interventions. The three tenets framework (McCauley et al, 2013) and the eight-principle framework (Sovacool & Dworkin, 2015) are major reference frameworks in energy justice. The three tenets try to address issues of justice pertaining to both energy systems and energy policies through the dimensions of distributional, procedural and recognition justice. The framework proposed by Sovacool and Dworkin (2015) suggests that decisions relating to energy be made based on eight basic principles: 'availability, affordability, due process, good governance, sustainability, intergenerational equity, intragenerational equity, responsibility'. Their notion of justice builds on the idea that procedural and distributional justice are interconnected and hence, require a synthetic framework to be incorporated adequately. The paper uses observations from the local communities and examines them through the lenses of procedural and distributional justice.

2. Methods

This is part of a broader research study conducted by World Resources Institute India to create an empirical evidence-base of the local impacts of utility-scale solar deployment in the country specifically focusing on the case of the Pavagada Solar Park. Following a review of literature on just transitions frameworks, and past articles and studies on solar projects in India, we identified the research questions for this paper. First, we tried to understand the socio-cultural implications of the Pavagada Solar Park on the landless communities in the villages. Second, we explored whether the solar park had any impact on the migration situation in the villages. Finally, we tried to examine work at the solar park for its accessibility to villagers, and the working conditions therein. Consultations with researchers and activists working in similar areas of research helped narrow down our approach to the primary data collection stage of the study. For the primary data collection, we collaborated with a team from a local NGO, *Thamate*[1], who were based out of Pavagada. Their knowledge and familiarity with the local context and the local community helped us build trust with our respondents and identify key sources of information in the process.

The Pavagada Solar Park is spread over 5 villages – Thirumani, Volluru, Rayacherlu, Kyathaganacherlu and Balasamudra. 3 (Thirumani, Volluru, Rayacherlu) of these 5 villages were examined for this study.

[1] *Thamate* (thamate.org) is a community-based organization working since 2006 on human rights with the most marginalized groups to help them break free from the discriminatory practice of caste-based occupations and to facilitate the comprehensive development of communities.

This selection was based on the size of the villages - the 3 villages with the most households were chosen to allow for a greater sample collection. Using data for number of households at a village level available from the Census of India (2011), the sample size was estimated for the selected villages with a confidence level of 95% and a margin of error of 6%. We planned to use stratified sampling to ensure that the distinct caste characteristic of the region was captured in the sample.

The evidence collection was completed in three modes. Firstly, a standardised structured questionnaire was administered to more than 175 households to gather information about the members at the household level in all the 3 villages combined. Data from the surveys was gathered using a mobile application designed specifically for the research in collaboration with *Dhwani RIS*. Secondly, thematic Focus Group Discussions were conducted using semi-structured questionnaires to guide the discussions amongst different groups of participants including landless labourers, marginalized caste groups, workers at the solar park, etc. Finally, key informant interviews were conducted to gather detailed insights from different stakeholders varying from community representatives and *Dalit* leaders to local journalists. These interviews were again guided by semi-structured questionnaires.

Methods of analysis: Primary data from household surveys was analysed using MS-Excel and R. Qualitative data collected from key informant interviews was analysed using narrative analysis, and data from Focus Group Discussions were analysed using the emerging themes as a reference.

Limitations:

There were a few limitations to the methods employed for the study. Firstly, the language of research is different from the language in which the information was gathered. This results in a potential for losses in translation. The researcher and the data gathering team's familiarity with at least one of the two languages (Kannada, Telugu) in which information was collected mitigates the scope of errors in contextualising to an extent, but the researchers acknowledge the limitation posed by multiple levels of translation in some places – from Telugu to Kannada to English. Secondly, a lack of robust datasets for certain parameters, especially those pertaining to migration is a limitation to our attempts to capture a longitudinal image of changes in the region. Finally, the study was conducted amidst COVID19- and though we have tried to clearly segregate our inquiries, its implications on responses can be difficult to completely sieve out.

3. Results and Discussion

1) Land relations and Caste

Approximately 26% of the households in the surveyed villages do not have any land titles. A breakdown of this into the caste identities of these families reflects the traditional social hierarchy in these villages. 88% of the so-called "upper" caste households have some land ownership whereas close to 41% of the *Dalit* families or the most backward communities in the villages do not have any land ownership. The

direct benefits from the solar park accrue to those who have leased land to the solar park. Therefore, the benefits may be disbursed equally on a numerical basis (fixed amount per acre per year), but do not percolate to different social groups equitably since the privileged castes tend to own larger quantities of land while small landholders and landless labourers tend to hail from marginalised caste groups.

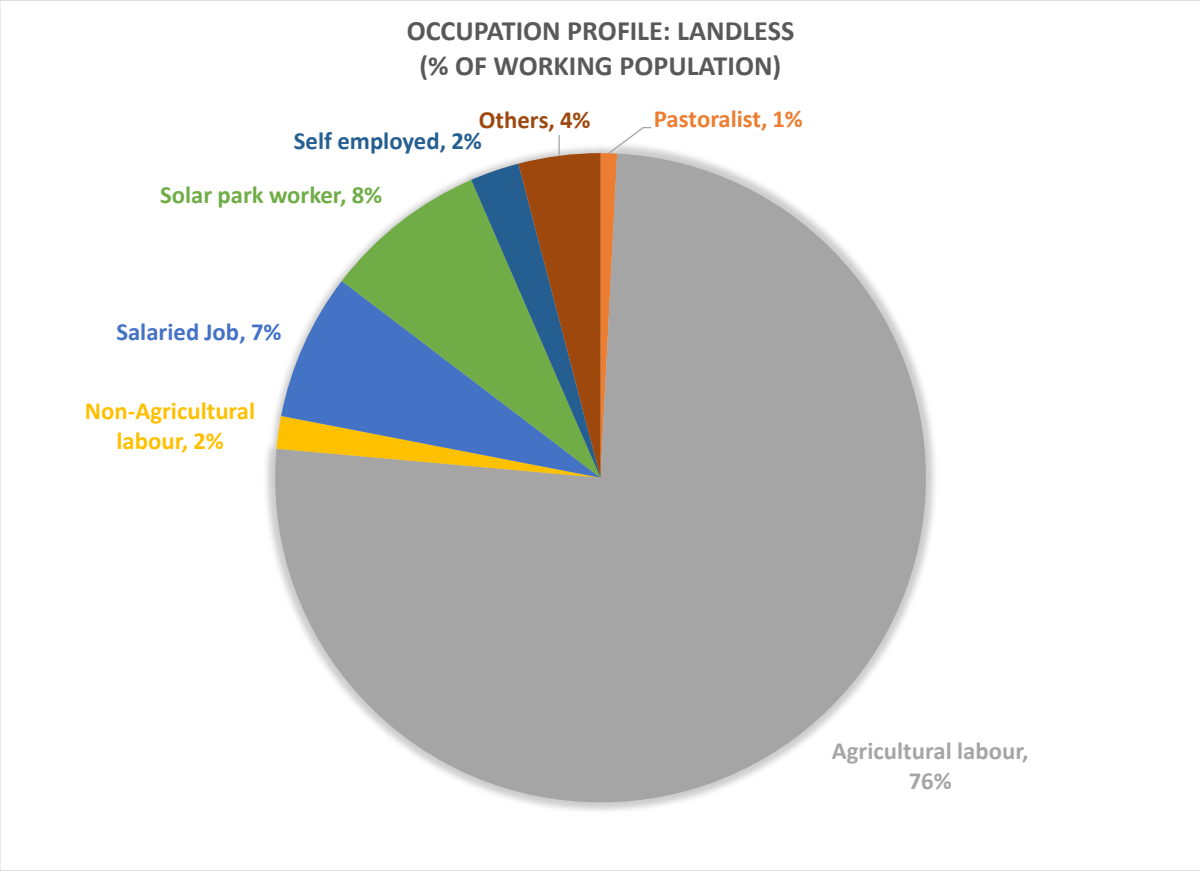

Figure 1. *Occupation profile of landless individuals*

Approximately 76% of landless workers were engaged in agricultural labour. Of these, 71% belonged to the Scheduled Caste (35.5%) and Scheduled Tribe (35.5%) communities[2]. Agriculture in Pavagada is rainfed, and workers from these families depended on this seasonally available agricultural labour. Several families of workers had been working on the same stretches of land for years and had relations with the landholding cultivators. Based on this relationship of trust, they could negotiate access to informal credit or advance payments which the landless families could use to meet their urgent needs in difficult times. A significant area of land which was previously under agriculture is now being used to host the solar park. In our sample, there was an 88% reduction in the amount of land under agriculture in the surveyed villages since 2015. This reduction has affected the lives of the landless workers in three ways:

[2] Scheduled Caste (SC) and Scheduled Tribe (ST) are groups officially recognized by the Constitution of India as among the most disadvantaged socio-economic groups in the country.

i) No monetary or material compensation: No land titles has meant that they have had no share in the direct benefits from the land lease mechanism.

ii) Lost opportunities to work as agricultural labourers in the same villages: Landless labourers in the villages where the solar park has been installed have to compete amongst each other for the drastically reduced labour available in the village. They must now travel to other villages in search of work.

iii) Breakdown in relations with the land-owning cultivators, which has resulted in a loss of access to informal streams of financial assistance.

All three factors leave the landless families without direct access to their traditional sources of income and worsens their financial vulnerability. Their financial security is further weakened as they are unable to seek advance payments or credit from the landowning families with whom they do not have a working relationship to leverage anymore. With no other major alternatives available locally, the landless labourers have no choice but to look for opportunities elsewhere – either in the neighbouring villages or in towns and cities.

2) Migration

Pavagada has been declared drought affected 54 times in the last 60 years (Rao, 2019). Reducing rainfall in the last three decades has seen a fall in the agricultural productivity of the region, and a corresponding reduction in the number of families practicing agriculture as it has become less viable over time. The region was categorised as one of the "most backward" in Karnataka by the Dr. Nanjundappa Committee set up by the State Government (Nanjundappa et al., 2002). One of the outcomes of the extreme weather conditions and low economic growth has been an increasing trend of migration away from Pavagada (The News Minute, 2018).

Typically, families were involved in agriculture and allied activities in the monsoons and cultivation ended in the months of November and December. In the non-agricultural seasons, the labourers would migrate to neighbouring towns and cities in search of temporary jobs. Children, elderly family members and caretakers would be left behind. Seasonal migration was common in families which could rely on agriculture to generate income for parts of the year. Permanent migration, on the other hand, involved entire families moving out to settle in another place permanently. They would leave behind their houses in their villages to work and live in other towns and cities.

In an in-depth interview with a local social worker, G, who has been actively working for more than 2 decades, they claimed that a minimum of 25 to 30 families in every village have migrated. Most of the migrating families belong to the Scheduled Caste (SC) community and a few to the Scheduled Tribe (ST) community. Roughly 40% of SC families and 30% of ST families in our sample did not have any land titles. We have seen above that 3 in 4 landless workers relied on agricultural labour. With land now under the solar park, there is a reduction in availability of such labour in the agricultural season.

Seasonal migrants are now increasingly getting converted to permanent migrants. With fewer alternatives available, workers from these marginalised communities migrate to seek subsistence.

From more interviews with key informants, limited land and asset ownership, absence of access to capital, absence of safety nets from the government or benefits from existing schemes, and fewer options for non-agricultural employment emerged as some of the reasons for the migration. An inquiry into the kinds of opportunities sought by the migrating workers led us to the finding they ended up doing one or more of the following jobs, all of which are unskilled or semi-skilled labour activities:

i. Daily wage construction labour/ masonry – which they also referred to as 'cement' work/ 'builder' work
ii. Painting
iii. Plumbing
iv. Garment factory – which mostly employ women
v. Restaurants/ canteens – as waiters, helpers
vi. Security personnel

None of the jobs listed above provided the workers with any security or guaranteed them an income which was enough to gather monthly savings. Daily wage labourers were stuck in a vicious cycle where they would survive on weekly payments with no scope to break free from the cycle by saving enough to do something different. Those with a relatively better education such as diploma or industrial training holders would work in factories and industries, but they too were employed on a contractual basis, and they did not have any guarantee that they would be employed throughout the year. Most of the migrants go to one or more of the following places to find work:

i. Bangalore
ii. Tumkuru
iii. Ramanagara (Bangalore)
iv. Mysuru
v. Doddaballapura
vi. Chikkaballapura
vii. Hindupur (state of Andhra Pradesh) factory – 50 kms from Pavagada
viii. Coffee estates in Coorg, Chikkamagaluru, and as far as the neighbouring state of Kerala

As mentioned earlier, with the installation of the solar park, the amount of land under cultivation and the number of households employing agricultural labour has come down. This has meant that those who possess little or no land, who relied on agricultural labour for income have now lost access to an immediate source of income. These labourers now must either look for agricultural labour in other villages in the taluka during these months or migrate elsewhere for alternative opportunities altogether.

Indeed, the advent of the solar park has seen families gradually convert from seasonal migrants to permanent migrants. The number of jobs generated at the solar park is currently not equivalent to the number of people left without a livelihood. Besides, there was an agreement in principle to give a preference in solar jobs to those who have leased land to the solar park at the initial stages of the project development (KSPDCL, 2018). This further keeps the landless labourers at the margins. Reliance on unskilled labour and on informal contractual agreements means that they are perennially at risk. Apart from minor changes in skillsets adapted to suit their specific jobs, there is no mechanism for systematic skill development in place that could help them secure a stable livelihood.

Women labourers face specific new challenges as they address changes in livelihood opportunities introduced post the installation of the solar park. Unlike their male counterparts, they had limited options to migrate to farther distances for agricultural or other labour. They were expected to fulfil their socially defined role of caretaking and be available to tend for children and elderly family members. This entailed a reduction in income generating work opportunities for such women. There were women who still travelled as a group on daily basis to surrounding villages for agricultural labour, whenever it was available which was just a few months a year. Female agricultural labourers were paid roughly 60% less wages than male agricultural labourers. In the surveyed sample, the average wages for a female labourer were INR 250 per day and the corresponding figure for a male labourer was INR 400 per day. From interviews with a female social activist and a teacher in the village, it was gathered that there was a general lack of agency for women in the village to participate in discussions and contribute to decisions. It reaffirms the need for measures to drive SDG 5.5 which aims to "ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life."

3) Precarity of labour

The solar park has created new jobs too. These include workers working as engineers, technicians, security personnel, grass-cutters and panel cleaners, among others. The average level of education in the surveyed villages is 5th to 6th Grade. Only around 7% of the population have an undergraduate degree or higher. A low level of educational qualification in general means that most of the villagers are not eligible for skilled positions or "white-collar" jobs. Indeed, the solar park workers that we met during the household surveys were mostly employed as security guards or involved in grass cutting and solar panel cleaning work. These positions were contractual in nature, and the contracts themselves were not formally designed. Large landowners competed amongst each other for Operations & Maintenance contracts granted by private solar park developers. Once they had the contract, the contractors could hire workers from anywhere to get the work done. This left the workers at the mercy of the landholders. It was common for workers to need what they called influential "References" or "Recommendations" to land a job at the solar park. More than 80% of the workers at the solar park in our survey belonged to households which had some land ownership.

Work wasn't always available for wage labourers; they would only be occupied for a few days a month. Additionally, it was learned from interviews with solar park workers that delays in payments were common. Grass cutting workers mentioned the lack of safety equipment and regulations given the risks of snakebite in the early hours of the morning or the evening when they typically went about their work. No grievance redressal mechanisms or platforms to voice their concerns, and no associations and very little bargaining power to stake their claims for better working conditions sums up their precarious situation.

This component speaks broadly to the motives of SDG 8 which seek to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". More specifically, they throw more light on matters relevant to SDG 8.5 which advocates for "decent work for all" and SDG 8.8 which promotes "safe and secure working conditions for all workers, specifically for those in precarious employment".

4. Conclusions

The evidence presented in this paper challenges the notion that clean energy is fundamentally benign, especially when propagated through the medium of utility-scale projects. Specific inquiries into the Pavagada Solar Park in this study shed some light onto the experiences of the most marginalized groups in the project villages. It was observed that the landless workers in the villages were at a disadvantage. The compensation mechanisms which were directly linked to land ownership discounted the dependence of the landless families on land-based livelihoods. A reduction in the livelihood opportunities in the villages and a breakdown of long-standing relationships between workers and cultivators further added to their vulnerability. Migration had been common in the past few decades in Pavagada due to a decline in agricultural productivity and low economic growth. The Solar Park aimed to create new jobs and develop economic opportunities in the region. Yet, as per several in-depth interviews, migration of landless families has increased in the years after the installation of the solar park as more and more workers moved away in search of livelihood opportunities. Again, this was most common among the most marginalized sections of the population who had little or no access to financial, social or human capital. Furthermore, these workers mostly ended up working in insecure, contractual jobs or as daily wage labourers on unsustainable incomes. Women in the surveyed villages had limited options for migration as they were expected to remain available at home to fulfil domestic care responsibilities. Finally, the lack of suitable qualifications and skills in the local working population has meant that their employment at the solar park is limited to roles such as grass cutters, solar panel cleaners and security personnel. All the solar park workers considered in this study's sample were hired as contractual labour (by contractors who operated as intermediaries between the Solar Park Developers and the workers) thus keeping them out of the purview of employment benefits and safety

nets, occupational health and safety regulations or any bargaining power to demand for decent working conditions.

These findings highlight the risk of exacerbating the plight of vulnerable and marginalized communities in the absence of methods to recognize, understand and account for their differentiated needs and vulnerabilities in the path to a low-carbon future. It is essential that the local power relations are understood on a case-to-case basis, especially between classes of landowners and those without land, between different caste groups and between genders, at the planning stage of such projects. These efforts must also recognise and respect the agency and knowledge of the local communities in contributing to these at a project-level, as well as the broader low carbon vision. Further research should work towards understanding approaches of how the institutionalised decision-makers can work in collaboration with the local communities. Such an approach would be appreciative of participatory and democratic processes to ensure that the differences in interests of each of these social groups are understood and negotiated. Achieving justice in this context, necessitates attention to historical injustices propagated by existing social and institutional structures. Policy and legal instruments may enable addressing structural concerns, at a multi-scalar level, that such technology-centric approaches to the clean energy transition demand.

Each social group had unique experiences. This case study emphasizes the impacts on the landless labourers (who typically belonged to underprivileged caste groups), women and workers at the solar park. Some of the impacts of the Pavagada Solar Park have forced a few workers to reorganize their livelihood strategies. Its role in inadvertently accelerating the migration of people from the underprivileged communities, out of Pavagada, needs to be examined further. Research to understand the range and intensity of impacts on different social groups in the project villages must be conducted after the installation of the solar park. Such research must engage with the local communities to find ways to redistribute the costs and benefits in an equitable manner and limit the perpetuation of inequalities and vulnerabilities. Villagers working at the solar park as contractual workers could benefit from accountability mechanisms for employers to uphold workers' rights to safe and fair working conditions. Interventions aimed at strengthening the villagers' capabilities and ability to negotiate with the project developers for their rights as workers also need to be developed.

Caste plays a significant role in social and land relations in India. Understanding caste dynamics, and the subsequent power relations it perpetuates is a prerequisite to envision an equitable sharing of the consequences of large-scale green infrastructure such as the Pavagada Solar Park. The most underprivileged intersection of caste (*Dalits*) and class (landless households) bear a disproportionate share of risks and disadvantages in Pavagada. It was also seen that women at this intersection were further marginalised owing to their reduced access to livelihood options, domestic care responsibilities, and their lack of freedom to choose alternatives. These dimensions must guide our understanding of

vulnerabilities in greater detail and inform approaches to understand how the consequences of low-carbon interventions are distributed between the various stakeholders.

Finally, we propose that we build on this case to expand the conceptualization of Just Transitions within the electricity sector to include those affected by the installation of cleaner alternatives, especially large-scale green infrastructure. Including the socio-cultural implications of the Solar Park by factoring in the interests of farmers, workers and other local communities whose lives and livelihoods have been altered would be a vital addition to the existing scope of the Just Transitions discourse.

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