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RESEARCH NOTE



Relational approaches to poverty in rural India: social, ecological and technical dynamics

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ABSTRACT

Poverty is now widely recognised as multidimensional, with indicators including healthcare, housing and sanitation. Yet, relational approaches that foreground political-cultural processes remain marginalised in policy discourses. Focusing on India, we review a wide range of relational approaches to rural poverty. Beginning with early approaches that focus on structural reproduction of class, caste and to a lesser extent gender inequality, we examine new relational approaches developed in the last two decades. The new approaches examine diverse ways in which poverty is experienced and shapes mobilisations against deprivation. They draw attention to poor people's own articulations of deprivation and alternate conceptions of well-being. They also show how intersecting inequalities of class, caste and gender shape governance practices and political movements. Despite these important contributions, the new relational approaches pay limited attention to technologies and ecologies in shaping the experience of poverty. Reviewing studies on the Green Revolution and wider agrarian transformations in India, we then sketch the outlines of a hybrid relational approach to poverty that combines socio-technical and -ecological dynamics. We argue that such an approach is crucial to challenge narrow economising discourses on poverty and to bridge the policy silos of poverty alleviation and (environmentally) sustainable development.

KEYWORDS

Rural poverty; sustainability; green revolution; technological innovation; agrarian change

Introduction

The last two decades are witness to a vigorous debate on the measurement of poverty in India and its implications for development policy and planning (Deaton and Kozel 2005). Poverty is now widely recognised as complex and multi-dimensional, highlighting the need to go beyond incomes and consumption expenditures (Hulme 2014). Studies capture multiple deprivations linked to poverty including an individual's (or household's) lack of access to schooling, healthcare, housing and sanitation as well as of opportunities for gainful employment (e.g. Alkire and Seth 2015).

Since the 1990s in India, an overall decline in poverty is noted. This decline becomes more pronounced since the early 2000s, coinciding with accelerated growth (Panagariya and Mukim 2014; Alkire, Oldiges, and Kanagaratnam 2018). Paradoxically, during the same time period, small farmers and rural workers across India are experiencing a deepening agrarian crisis (Reddy and Mishra 2010; Vasavi 2012; Chand, Srivastava, and Singh 2017). Rural protests and mobilisations proliferating in recent years highlight ongoing *processes* of chronic indebtedness, unremunerative

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farming, ecological degradation, dispossession of land and other resources, as well as inadequate job growth in non-agricultural sectors (Suthar 2018). Accounting for such processes underscores that even as poverty indicators have expanded to capture multiple forms of deprivation, they do not explain the historical processes and politics that shape actual deprivations experienced by people (Mosse 2010; Breman 2010). Indicators can thus black-box the social, ecological and technical processes through which people move in and out of poverty.

In contrast, relational approaches direct attention to the 'wider system of class and power relations' that produce poverty on the ground (Gooptu and Parry 2014; Mosse 2010; Harriss 2009; Rao 2017; Shah et al. 2018). According to Mosse (2010), relational conceptualisations help explain rather than just describe the poverty-producing effects of exploitative social relations, which constitute cultures (e.g. through gender and caste) and economic domination (e.g. through the control of markets and production processes). A new relational turn in poverty studies follows a long tradition of Marxist analyses of 'the agrarian question' that explains rural poverty, both as an outcome of 'semi-feudal' production relations and of capitalist development in predominantly agrarian societies. Unlike Marxist approaches, the new relational literature approaches gender and caste not as secondary axes of oppression (that may actually undermine collective mobilisation based on class), but rather as critical relations of power in themselves. Class, caste and gender are also not treated as reified categories but rather as intersecting social relations that co-constitute practices of governance, domination and resistance (Lerche and Shah 2018).

Additionally in India, the new relational turn is reflective of a public policy shift in rural poverty alleviation since the 1980s. Moving beyond agricultural productivism, incomes and livelihoods, attention is directed to linkages of workers with the non-farm economy and the expansion of social security nets in an era dominated by neoliberal governance (Drèze and Khera 2017; Walker 2008). Then, rural poverty politics are considered prominently in relation to struggles and negotiations for accessing welfare entitlements by oppressed groups (Roy 2014; Carswell and De Neve 2014; Pattenden 2018). While making this *political agency* of the poor more visible, the new relational approaches pay less attention to people's engagements with technologies and ecologies in maintaining or transforming (unequal) social relations. This marginalises the role of technologies and ecologies in shaping poverty and political agency.

Overall, our appraisal of a wide range of relational approaches to rural poverty in India, reveals that two aspects require greater attention. First, while the new relational approaches draw attention to people's own situated conceptions of poverty and well-being, further elaboration is required of *how* poor people develop and evolve collective visions of a better life, across different spatio-temporal junctures. Such understandings are crucial for expanding challenges to dominant top-down poverty alleviation agendas. Second, agency is routinely centred on human individuals or groups. Yet it is constituted by a heterogeneous web of relations that includes human engagement with (farm) ecologies including soils and groundwater as well as with technological artefacts like seeds and agricultural machinery (Latour 2005). Such relational webs are crucial for understanding how pathways in and out of poverty are constructed.

Moving beyond deterministic impact/risk assessments of technological and ecological change on poverty, mapping relational webs of agency can help approach people's interactions with technologies and ecologies as *uncertain processes*. This implies that new technologies, knowledges and associated ecological transformations are not just neutral instruments of development. Nor are technologies simply tools of domination by the powerful, which reproduce extant unequal social relations. In complex relational webs of interacting social, technological and ecological changes, specific technologies (and knowledges) produce effects that are unanticipated or suppressed by markets and institutions. Grasping these effects requires paying close attention to the myriad ways in which rural people engage with ecological and technological developments. These engagements can take myriad forms, from acceptance and learning to rejection and reconfiguration. They highlight crucial possibilities for realising sustainable development (SD), by transcending oppressive social relations and destructive ecological exploitation.

Marxist approaches to rural poverty

Using the lens of the ‘agrarian question’ (Thorner 1982; Harriss 1982; Bernstein 1996; Lerche 2013), Marxist approaches explore the unequal control and distribution of productive assets (particularly land) as well as the possible investment of agricultural surpluses in the non-agricultural economy (Vijayabaskar 2017). Studies also use the term ‘agrarian structure’ to refer to a stable set of socio-economic relations in the agrarian economy.

Marxist agrarian studies ask two main questions: (a) how are land and labour combined to generate the agrarian production and distribution arrangements that reproduce inequality; and (b) how are such arrangements stabilised so that they fail to empower sharecropper/tenant farmers and landless labourers? These are broken down into the following concrete questions (Bernstein 1996): Who controls or has access to what land and/or other means of production? Who does what in the rural social division of labour? Who gets what (in terms of income distribution)? And, what do different people do with their income, in terms of consumption and accumulation?

Marxist approaches direct attention to relations between two classes of actors – those who own land (and control other resources) and those who access it either as tenants or as agricultural labourers. Given the highly unequal distribution of land in rural India, the landowning classes can either exclude others from accessing lands or charge high (monopolistic) rents to tenants and sharecroppers (Sau 1979). Unequal relations of land and labour are thus seen as perpetuating poverty among tenants and agricultural workers, while leaving little room for understanding the political possibilities that can emerge from the agency of poor tenants and workers themselves. Unequal land and labour relations are framed as also exacerbating relations of domination in credit and output markets, thereby reproducing ‘semi-feudal’ production relations (Bhaduri 1973; Chandra 1974). A second ‘agrarian question’ is thus posed: What prevents rural capitalism from emerging and what needs to be done?

It is argued that exploitative labour (and land) relations do not offer incentives for farmers to adopt new productivity-enhancing technologies, thereby constraining the emergence of rural capitalism. The same relations constrain the investment of surplus into capitalist development within and outside agriculture. In this way, they act as ‘structural bottlenecks’ for overall economic development that is taken to depend on: (a) the surpluses generated through capital accumulation in agriculture; and (b) the movement of segments of the workforce out of agriculture into urban industrial employment (Lerche 2013). Once unleashed, development through industrialisation is assumed to facilitate the formation of a class of capitalist farmers. They re-invest their surplus into agriculture, improving productivity (e.g. by adopting new technologies). A key aspect of this development of rural capitalism is a process of differentiation in agriculture, due to the emergence of competitive markets. Small farmers unable to survive the competition, are forced to sell their lands and become wage labourers. This helps larger farmers consolidate their landholdings. Assuming that large farmers reinvest their surplus in productivity-enhancing activities (Mohanty 2016), such competition-driven consolidation is argued to generate more productive agriculture. This process is understood as increasing the monopolistic (and monopsonistic) power of the landlords, in rural labour, credit and crop markets. Overall, rural capitalism pauperises segments of the landed peasantry, who are framed as having no agency in this process (as they are ensnared into capitalist wage and surplus structures).

Beyond class: structuring caste and gender

In the 1970s and early 1980s, debates primarily revolve around whether capitalism emerged in Indian agriculture, particularly in the post-Green Revolution period. Patnaik (1986) and Omvedt (1981) also note the role of public investment in building domestic markets, which is expected to drive a shift towards capitalist agriculture. The post-colonial state, lobbied by a class of landlords in collusion with big businesses outside agriculture, is viewed as sustaining the quasi-feudal dominance of ‘upper’ caste landlords. Within this dynamic, peasants’ agency is recognised through collective

mobilisation for land reforms, and against exploitative tenancy and credit relations. For example, studies by Mencher (1978), Beteille (1972) and Rao (1994) show how mobilisation not only led to tenancy reforms in Kerala and Bengal, but also better terms of employment for agricultural workers and redistribution of some assets and incomes. They conclude that poverty can be tackled through class-based peasant mobilisation. Such mobilisation is seen to produce the added effect of countering non-capitalist (including caste- and gender-based) forms of control and power, without tackling them directly. Peasants' and workers' agency is thus framed primarily in terms of class-based collective mobilisation, of which any gender- and caste-based emancipations are by-products.

In fact, relations based on caste are often viewed as barriers to class-based mobilisation (Mencher 1974; Beteille 1972). Scholars conceptualise caste allegiances as preventing the formation of class alliances among small/marginal farmers and landless workers. This weakens collective demands for higher wages and better shares of output (for tenants). Scholars such as Rudra (1981) and Omvedt (1981) also point to the role of caste relations in perpetuating an ideology that allows semi-feudal relations to persist: Tenants may internalise the norm that they do not have the right to land due to their 'natural' low-caste status, and fail to make claims on it.

In the 1970s and 1980s, emerging farmers' movements are approached as populist mobilisations against perceived 'urban bias' of state policies (Lipton 1977). Eliding rural class and caste differences, these movements are framed as articulating the interests of rural masses as a whole. The latter interests are considered to have been betrayed by the Green Revolution (GR). The GR, despite generating some surpluses, is seen as a failed attempt in ensuring adequate returns for farmers due to adverse terms of trade between agriculture and the non-agricultural urban sectors (Omvedt 1995). Such a framing of rural-urban conflict is questioned by Balagopal (2011), who argues that the GR did allow for capital accumulation by a class of rich and middle farmers. These farmers reinvested their surplus in diversified (urban) avenues, from agricultural marketing to trade, cinema, education, real estate and politics. Commercialisation of agriculture is therefore observed to facilitate accumulation by dominant landowning castes across the rural-urban divide, allowing them to consolidate their class interests (cf. Brass 1995; Corbridge 1997).

Attempting to move beyond class, explanations of rural poverty and agrarian transformation rely on broader comparative analyses of variations in (regional) state capacities, electoral politics and interactions between different levels of government. These studies highlight socio-cultural constituencies of different state governments and political parties. They also focus on intra-elite conflicts (such as between agrarian landowning classes, industrial capitalists and bureaucrats belonging to urban middle classes), formation of alliances, and interest groups (Rudolph and Rudolph 1987; Kohli 1987; Varshney 1998). However, the formation of alliances and interest groups is still inferred from predetermined structural locations of class and caste. And agency is denied to 'subalterns' by characterising them as undifferentiated masses who could be 'mobilized, controlled, manipulated, organized, led, betrayed, handed resources, given incentives, and provided supplies' (Gupta 1989, 796).

Focusing on gender, Agarwal (1994, 2003) notes the constitutive role played by patriarchal power in the agrarian economy. She points out how gender relations are tied to differential incomes and unemployment, leading to women's lack of control over household expenditure. She argues that under patriarchy, rural poverty is better tackled by giving land rights to women. Taking issue with some Marxist scholars who viewed gender as a distraction from class-based mobilisation for land redistribution, Agarwal contends that such 'land reforms' meant little for rural women in poverty, if they failed to ensure landownership by women. Landownership, she argues, is also linked to the quality of non-farm livelihoods that women can access and to their bargaining power with state authorities for accessing welfare programmes. Individual property rights to land facilitate (collective) bargaining power of women. Women's association with land titles is thus seen as constituting their agency for building pathways out of poverty.

Rao (2017) argues that policies addressing gendered inequalities often treat assets (e.g. land) as distinct and static entities, and women as individuals. She argues that such policies are unlikely to work. For instance, policy interventions to secure land titles for women use a methodologically individualist framework that do not recognise the relational making of both gender and land through networks with others. Such networks emanate from 'local and situated notions of legitimacy' as well as from 'structural inequalities' (Rao 2017, 44–45). Rao therefore argues that individualised claim-making over land can actually throw women into conflictual relations with supportive kin, potentially leading to increased vulnerabilities under neoliberal governance.

Building on research on gender and caste, Pattenden (2016) criticises rigid structuralist approaches to class relations, for failing to account for the complexity of 'actually existing' relations of dominance and exploitation. Class, gender, and caste relations intersect and shape each other. Developing the notion of 'dominant classes' who control land and are net buyers of others' labour, Pattenden argues that the control and dominance of these classes is extended through the state, and legitimised through local and non-local caste (and gender) relations. In addition, he outlines a hierarchy of waged labour groups, from those with permanent contracts in the formal sector at the top and those in some form of neo-bondage at the bottom. The relationship between these segments of labour, according to Pattenden, can only be understood by analysing how capital links them up for surplus extraction. Crucially, under patriarchy, he points out that all these classes of labour are reproduced through 'invisibilised' and unpaid labour of women in households. As a result, unequal gender relations are critical to the reproduction of all classes of labour. More recently, Pattenden (2018) illustrates how collective action by fragmented labouring classes is shaped by the zones of social reproduction within which they circulate. He shows how struggles can take different forms depending on the socio-political configuration of 'working spaces' and 'living spaces' across the rural-urban divide.

Similarly, observing the lack of emergence of an equitable trajectory of economic development, Shah et al. (2018) highlight that Dalits and Adivasis remain disproportionately represented among the poor. To understand what they call 'conjugated oppressions' of caste, class and gender, they note the importance of analysing the struggles and lives of labouring classes across rural-urban and agrarian-non agrarian divides. Breman's (2007, 2016) ethnographic work in Gujarat spanning pre- and post-liberalisation eras shows how the expulsion of landless workers from the agrarian economy is connected to the politics of exclusion in the urban informal economy. As Breman (2010) argues, while the majority of landless workers may be better off as compared to the 1960s, in terms of access to food, housing, clothing, education and health, the government stopped intervening to protect the interests of labour in the post-liberalisation era (since the 1990s). The post-liberalisation policy framework then, for Breman (2016), is a crucial step in the historical trajectory of dispossession of landless castes and workers. It has constrained poor people's bargaining power to demand better conditions of employment. This follows on from the blocking of access to land, to resource commons and to other means of production in earlier decades. In fact, the reforms combined with the ascendancy of Hindu nationalism are viewed as an 'elite revolt' against the political mobilisation by lower castes (Corbridge and Harriss 2000). Such analyses move away from asserting either caste or class as the primary axis of agrarian relations. Instead they aim to understand how caste, class and gender are deployed together to constitute wider political processes that seek to subsume claims for redistributive justice within mobilisation of majoritarian religious identity.

From structures to networks

In the post-liberalisation era since the 1990s, poverty studies have taken a relational turn. Arguably, the most widely adopted relational approach in poverty studies focuses on social networks of poor people, which can potentially enable pathways out of poverty (Krishna 2010; Narayan 1999). Such networks are seen as conveying information about access to resources and opportunities which can alter aspirations and help build livelihoods. Research highlights the importance of decentralised

and participatory interventions (e.g. self-help groups, community-driven development) for poverty alleviation (Woolcock and Narayanan 2000; Mansuri and Rao 2004). However, studies often reify the benefits associated with network participation, treating the benefits as *social capital of individuals*. They can thus shift attention away from unequal (power) relations and hierarchical structures that keep people poor (Harriss 2001), also through processes of 'adverse incorporation' and 'social exclusion' (Hickey and du Toit 2007; Mosse 2007).

By neglecting processes that exclude certain groups of people from beneficial networks (and how such networks are formed/reproduced), and processes that produce adversity rather than well-being from network participation, social capital approaches end up taking politics out of poverty and its alleviation (Harriss 2001; Cleaver 2005). A more political approach may treat social capital as an uncertain outcome of complex relational processes shaped by power. Also, some networks can be 'downward levelling' (Portes 1998): their membership may actually yield little useful information about opportunities to poor people, thereby helping to maintain poverty.

Krishna (2008, 2010), in particular, has made important contributions through diachronic analyses of individuals and households moving into and out of poverty. He highlights diverse pathways among households even within the same village despite similar resource endowments. According to Krishna, illness, death and ensuing inability to repay debt pushes some households deeper into poverty, while social networks in urban areas can enable some poor households to move out of poverty. Therefore, he emphasises a chain of 'ordinary events' that are below the radar of policy making, as critical in accounting for (the diversity of) pathways out of and into poverty. Some ordinary events, such as a good yield or entering a boom crop circuit, can be (temporarily) positive. Other events can be negative, such as death or illness. Although events have their structural correlates including the collapse or absence of public healthcare systems and social norms that warrant huge expenses for weddings and funerals, Krishna argues that it is critical to understand the *action* (or inaction) of individuals and households to better understand poverty dynamics.

However, in this emphasis on agency, Krishna treats individuals and households as *independent* entities trying to cope with shocks and developments that are at times macro-structural. Other events may be highly localised or even household-specific. Such a framing marginalises an account of the historically formed relational webs in which people are embedded. These relational webs are constituted not only by intersecting structures of class, caste and gender, but also by the technologies and ecologies that people attempt to build their livelihoods with.

Krishna's use of event histories as a means to understand processes driving people into and out of poverty is a useful methodological tool. However, it is inadequate to understand the relational embeddedness of individuals or households, which make them respond differently to similar shocks. He emphasises the lack of information as a major constraint to the design of better institutions but does not engage with households' interactions with ecology and technology under conditions of incomplete information, which might be crucial in shaping pathways into and out of poverty. To cite an example, Krishna (2008, 56) points out how growing salinity of drinking water in a village in Andhra Pradesh produced poverty, following diseases among both the villagers and their cattle. Even as he recognises the importance of such context-specific events, Krishna does not engage with the history of (agrarian) socio-ecological-technical processes that exacerbate salinity or the reasons as to why people could not recognise the dangers of such salinity and act upon it.

Other longitudinal studies, similarly, present a complex picture that shows the trend of falling poverty since the 1960s with rising inequality and shifting caste dynamics. For example, Himanshu, Lanjouw, and Stern (2018) trace long-term change in a single north Indian village over seven decades. They show that casual off-farm employment has been key for raising living standards in the last 30 years, particularly among disadvantaged groups. At the same time, however, off-farm employment is correlated with lower intergenerational mobility (cf. S. Kumar 2016). Himanshu, Lanjouw, and Stern (2018) also show how access to non-farm employment is strongly influenced by access to caste and family-based networks, whereas certain events such as serious illness, death of the head of a

household, alcoholism, and addiction to gambling are triggers for downward mobility. However, similar to Krishna's work, these longitudinal studies do not adequately account for the relational webs (of power), in which poor people are embedded. They do not examine how the relational webs are constituted by changing local ecologies or with technologies that people have been prodded to adopt in their livelihood practices. It is important to recognise that changing ecologies and technologies are not simply neutral or passive 'objects' that people can control and deploy for their benefit. Instead, changing ecologies and technologies shape people's agency, their capacity to act (e.g. heavy rainfall or depleted groundwater resources), over time, to help constitute pathways into and out of poverty.

New relational approaches to poverty

A field of new relational studies to poverty is developing since the early 2000s. These studies critique standardised managerial approaches to poverty reduction. Relying on quantitative indicators, managerial approaches may involve targeted social protection within a neoliberal framing of decentralised participation, aiming to 'incite activeness in the otherwise docile poor' (Chakrabarti and Dhar 2013, 1036). Managerial approaches may also design interventions using asset- and capability-based causal explanations of poverty, which marginalise wider relations in which people are embedded and people's own understandings of a good life. Such approaches to poverty governance (and development expertise) thus circumscribe political agenda by defining poor people primarily in terms of 'deficiencies' and predetermining their needs. In contrast, the new relational studies focus on the ongoing production of subjectivities through hegemonic development practices and the ways in which they are contested (Elwood, Lawson, and Sheppard 2017). These studies foreground poor people's political agency in the form of narratives and organised movements. Political agency is not only that of protests against mechanisms of impoverishment, but also offers alternate conceptions of well-being that diverge from dominant poverty alleviation interventions. Yet, the role played by people's engagement with technological and ecological processes in the formation of political agency remains under-appreciated.

Bringing feminist and postcolonial theory in conversation with Marxist and other structural analyses, Coleman et al. (2018) develop a framework for relational understandings of poverty. This framework outlines what they call thinkable and unthinkable forms of politics. The terrain of thinkable politics is defined by dominant poverty alleviation schemes and development projects, which are premised on distinguishing 'deserving' subjects from 'undeserving' ones using indicator-based measures of poverty (cf. Breman 2016). In practice, however, inclusion in such projects can be discriminatory, governed by structural inequalities based on relations of gender, caste and class. And persisting poverty can be normalised and made invisible through systematising bureaucratic practices amidst a range of failed development interventions (Gupta 2012). Thus it is recognised that inequalities reproduced through development schemes and projects inhibit the possibilities of a more radical transformative politics (e.g., Sampat 2018). Yet, resistance against mainstream development projects can also generate emancipatory possibilities.

Such possibilities point to 'unthinkable politics' that can rework understandings of poverty and a meaningful life (Da Costa and Nagar 2018). This goes beyond resistance against dominant framings of poverty (e.g. through indicators) and conceptions of 'development' as modernisation (Borges 2018). It foregrounds alternative imaginaries of development (and well-being) emerging from lived experiences of deprivation. A main implication for poverty studies is that knowledge production cannot be limited to documenting poverty as defined by dominant conceptualisations and 'thinkable politics', which equate poverty only 'to the lack of something that is abundant elsewhere' (Borges 2018, 185). By focusing on 'unthinkable politics', poverty studies can develop alternate conceptualisations of well-being based on people's own lived experiences, knowledges and movements, rather than just

theorising about them (see for example, Singh 2015). Such conceptualisations, however, remain rare in the literature.

While the overall thrust of the new relational approaches is on different mechanisms constituting pathways into poverty, some scholars highlight how many social security entitlements are actually policy responses to civil society mobilisations (Khera and Nayak 2011; Drèze and Khera 2017). Emphasising the latter political agency, scholars argue that for the rural poor, development interventions become sites for challenging not only the dominant meanings of poverty and well-being (as discussed above), but also the oppressive social relations such as those based on caste and gender (Jakimow 2015; Roy 2014). For example, examining MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), Roy (2014) suggests that rural workers engage with the scheme to actively challenge caste and class norms in the village, enabled by the declining influence of landowning castes facing an agrarian crisis (that is associated with widespread indebtedness among farmers). Whether such challenges can foster the emergence of alternative imaginaries of development based on 'unthinkable politics', which can fundamentally transform political and policy discourses towards the realisation of comprehensive social justice, remains an open question. Also, how agrarian livelihoods are a part of these imaginaries remains to be seen.

Overall, the new relational approaches to poverty can be distinguished from the earlier Marxist and structuralist literatures on agrarian relations and poverty, in five ways. First, they avoid the teleological assumptions implicit in early Marxist understandings that sought to evaluate actual processes against a normative model of the 'agrarian transition' from pre-capitalist or semi-feudal production relations towards capitalist relations that enhance surplus generation.

Second, the new relational approaches are more explicit in recognising multiple gradients of power, which cannot be subsumed by class relations. Gender and caste are considered central to understanding rural power relations, rather than as mere corollaries to class relations or as sources of fragmentation that can undermine class-based collective mobilisation. Political agency through caste-based mobilisation, for example, can translate into politics of redistribution through claim-making on the state (cf. Witsoe 2011).

Third, the new relational approaches place greater emphasis on institutional factors leading to the social exclusion of specific groups such as the unemployed, women workers, the old and disabled. Combining Marxist and Weberian frameworks, they focus on the mechanisms of exclusion that perpetuate inequalities. Mosse (2010), for example, points to the ability of a social group to hoard resources or opportunities, while preventing others from accessing it. This 'opportunity hoarding' is particularly visible when labour markets are shaped by caste or gender, barring the marginalised from accessing certain opportunities.

Fourth, the new relational understandings direct greater attention to the power of social groups to set agendas (Mosse 2010), which shapes how poverty is framed and how it can be addressed. For example, by assuming that poverty persists because poor people fail to seize opportunities opened up by markets, 'neoliberal common sense' fails to recognise that people may be pushed into poverty by neoliberal reforms themselves (Gupta 2012).

Fifth, as Roy (2016) argues, relational conceptualisations of poverty might bring into purview the circulations of commodities and discourses between the Global South and North. These circulations point to interconnected geographies that produce poverty in the South to sustain privilege and wealth accumulation in the North. Such a perspective on 'global' circulation is obscured in much poverty governance literature focusing on local and national scales in India.

Despite offering multiple useful insights, the new relational turn in poverty studies remains limited in its exploration of complex webs of heterogeneous ecological and technical engagements of people, which interact with their social relations. Therefore we review selected studies of agrarian transformation in India to appreciate how socio-technical and -ecological relations can help elucidate poverty politics.

Relating with ecology and technology

As reviewed above, poverty studies have paid limited attention to ecological and technological change playing active roles in shaping people's sense of well-being and their agency to build pathways out of poverty. Even when ecology and technology are brought into the picture, they are represented in one of two following ways: (a) they are treated as resources that poor people struggle to access, for generating *impact* on poverty measured through income or other indicators; (b) they appear as ahistorical *events* in poor people's lives and livelihood processes, but how they shape people's capacity to act remains unclear (Krishna 2010). As a result of this focus on impacts and events, accounts of interactions between social, technological and ecological changes are left largely out of the picture. This oversight of hybridising socio-ecological-technical changes, and the ongoing formation of agency and power within them, is also reflected in policy frameworks on poverty alleviation in India. The latter have largely remained disconnected from debates on (ecologically) sustainable development. This critically undermines possibilities of addressing the UN's (2015) Sustainable Development Goals (SDGs) in the country.

Rural people's pathways in and out of poverty are constituted not only by unequal social relations of class, caste and gender, but also by the ways in which agency is afforded/constrained by everyday engagement with ecological and technological developments (Arora and Glover 2017). Even though the latter developments are shaped by social relations of class, caste and gender (Shah 2003; Bijker 2007), they cannot be subsumed by the workings of social relations. The making of technological artefacts and (knowledge-based) ecological transformations (e.g. of groundwater extraction, depletion and salination), is always only *partially* determined by the social relations that shape them (Latour 1988; Haraway 1991).

This social shaping is partial because: (a) human collectives developing technologies and transforming ecologies, cannot fully control and mould material reality in accordance with their expectations of maintaining or transforming extant social relations (Joerges 1999); (b) the knowledges driving technological and ecological developments are always incomplete and uncertain (Wynne 1992; Callon, Lascoumes, and Barthe 2009), which means that the full range of their social and ecological effects cannot be predicted. These effects are also often obscured by *power*, particularly around those actors who expect to benefit from the widespread use of their technologies and knowledges (Arora 2019). Many potentially harmful ecological and social effects of technologies and knowledges are therefore suppressed or simply unanticipated. In order to do justice to such effects, it is critical that technologies and ecologies are approached as material 'mediators' (Latour 2005). Mediators do not just serve as predictable instruments of social reproduction (or of desired transformation). Instead, (social) inputs into the design and development of mediators are 'never a good predictor of their output' (Latour 2005, 39).

Arguably, it is as mediators that technologies and ecologies have come to play a critical role in the agrarian crisis of the last two decades in India. Unanticipated and suppressed ecological effects such as soil depletion, excessive groundwater extraction and the use of expensive farm-inputs have forced farmers into indebtedness and landlessness (see e.g. Vasavi 2012; Arora 2012). These changes have been shaped by the use of technologies such as bore-wells, water-guzzling crops and chemical fertilisers promoted by India's formal agricultural research system and agro-industrial firms since the Green Revolution (GR). These ecological and technical changes in turn shape social relations of class, caste and gender, for example by reinforcing power in the form of dispossession of land and exploitation of labour (Levien 2012; Vijayabaskar and Menon 2018; Thakur 2019). It is therefore imperative that relational understandings of rural poverty account for farmers' and farmworkers' diverse practical encounters with entangled ecologies and technologies, situated in and around farms.

Some ecological concerns associated with GR technologies were identified already in the 1970s (Farmer 1977), but they were either dismissed or marginalised by institutional proponents of the GR. Similarly, the effects of GR technologies on socioeconomic inequality were mapped by some

early studies (e.g. Chinnappa 1977). However, the mainstream discourse on the GR privileged positive accounts of GR technologies' effects on productivity and poverty. Unwilling to foresee negative socio-ecological effects of GR technologies, mainstream accounts crafted and celebrated heroes of the Indian GR, most emblematically in 'the father of the Indian GR', M.S. Swaminathan. Challenging claims of positive impacts of the GR, Bardhan (1985) highlighted that agricultural growth (as promoted during the GR) can also generate poverty. For example, the use of agricultural machinery displaced labour, and growing reliance on purchased inputs pushed small and marginal farmers into debt. Extraction of groundwater using bore-wells and electric pumps lowered water tables and reduced availability of communal water, which disproportionately immiserated poorer farmers (Janakarajan 2004).

Even within theoretically diverse critical accounts of the GR, which highlight ecological consequences (e.g. Shiva 1988; Pingali 2012), everyday interactions of technologies with people doing farm-work, such as landless workers and smallholders, are largely left out of the picture. Similarly marginalised are people's ways of relating with (degrading) ecologies (R. Kumar 2016; Sharma 2019; for a review of GR scholarship, see Patel 2013). Going beyond pro- and anti-GR accounts of impacts, some qualitative studies provide a nuanced understanding of how the GR's technological package was not uniformly imposed but rather enacted through complex negotiations between farmers, local ecosystem dynamics and cultural food preferences, within specific regional geographies (e.g. Frankel 2015; Farmer 1977). Gupta's (1998) ethnography in Western Uttar Pradesh, is exceptional in being attentive to embodied labour practices. Detailing how farmers interpreted and modified the GR technological packages based on their material conditions and social constraints in practice, he examines the GR's implications for broader political dynamics and postcolonial state-formation.

Beyond the GR, studies on agrarian transformations have drawn attention to how social and ecological relations constitute each other. They explore interactions between seasonality, crop diversification, new technologies, and ecological degradation, which re-shape labour practices and can reconfigure social hierarchies (Pandian 1987; Kapadia 1993; Mitra and Rao 2019). For example, Breman (1989) shows how crop diversification may alter relations of power between landless workers and farmer-employers. A shift from labour-intensive paddy to sugarcane and mango cultivation which require less labour, dampens the ability of workers to negotiate with landlords. Similarly, Karanth (1987) demonstrates how the introduction of new technologies such as sericulture can modify Jajmani relations to some extent. And, Arora (2012) shows how an ostensibly participatory intervention, promoting the adoption of new agroecological techniques, can fail to transform caste- and land-based relations of power in a south Indian village.

Literature on globally conditioned and locally situated agrarian transformations also engages with farmers' and workers' practices to understand how they challenge and reconfigure technologies (such as genetically modified seeds) in conjunction with socio-political hierarchies (Shah 2005; Stone 2010; Flachs 2016; Birkenholtz 2008; Arora et al. 2013; R. Kumar 2016). Although these studies do not directly focus on poverty, they carry insights useful for advancing policy and academic discourses on poverty. For example, Singh (2003) outlines how irrigation technologies such as tanks can help reproduce hierarchical orders of caste (and class), by providing preferential access to water for irrigation to larger upper caste farmers. Such reproduction of social orders, however, can be accompanied with the use of technologies and knowledges to subvert caste hierarchies. Shah (2003) documents how tail-end farmers used hydrological arguments about seepage (into farms at the head and the middle of a canal), to make the case for irrigation canals bringing water first to tail-end farmers.

Birkenholtz (2008) studies how power relations between the state and farmers (as local users/managers of groundwater resources) are mediated by 'environmental knowledges'. While the state promotes (regulatory) interventions based on the knowledge of its groundwater engineers, farmers rely on a range of alternate knowledges including those of traditional water diviners and private firms drilling tube-wells. This highlights the politics of plural knowledges and diverse development

pathways (cf. Arora et al. 2019), of which only the dominant ones are generally promoted by the state and modernising experts in firms and research institutions.

The foregoing highlights the rethinking of poverty by mapping changes in social relations interacting with dynamic rural ecologies and technologies as material mediators. This mapping of hybrid socio-material relations must go beyond the impact of ecological and technological changes on smallholders' and farm-workers' incomes (or other indicators of poverty). It focuses on how poor people's relations around caste, gender, class and the state, are mediated by ecologies and technologies. Focusing on such mediation helps reveal how social relations are reworked in and through (agricultural) practices. Such practice-based politicisation of pathways in and out of poverty, may be crucial for enlarging space for *multiple context-sensitive pathways* of sustainable development (cf. Leach, Scoones, and Stirling 2010; Arora et al. 2019). Complementing social welfare policies, promotion of diverse SD pathways may be necessary for addressing persistent social, ecological and technological vulnerabilities confronting small farmers and landless workers.

Concluding remarks

Reviewing a wide range of relational approaches to rural poverty, we have highlighted the different ways in which they conceptualise social relations of class, gender and caste, while also paying attention to institutional interventions. Unlike technocratic emphases on the measurement of poverty and identification of 'the poor', relational approaches seek to explain the historical-political processes that involve the reproduction and contestation of social inequalities (see Table 1 for a summary). Specifically, new relational approaches focus on lived experiences to draw attention to poor people's own articulations of deprivation and of well-being. They also highlight collective action and struggles against dispossession. Rather than reducing people to economic individual subjects defined by deprivation, new relational approaches highlight *agency* through enactments and conceptualisations of diverse ways of living a 'good life', amidst contexts of manufactured scarcity and dispossession (Singh 2015). In such understandings of relational agency, greater attention is required for people's diverse engagements with ecological and technological developments.

We suggest that by reviewing processes of agrarian transformation (also examined in early Marxist approaches and in studies on the green revolution), we can move towards grasping how social, ecological and technical relations together constitute agency. Such a socio-technical-ecological approach might be crucial for understanding how pathways in and out of poverty are constructed. Socio-technical and -ecological relations matter beyond agrarian transformations. They cut across

Table 1. An overview of different relational approaches to rural poverty in India.

Approach	Key concept(s)	Agency of poor people	Policy implication(s)
Early Marxist	<ul style="list-style-type: none"> • Class; • Means of production; 	<ul style="list-style-type: none"> • Collective, yet largely unaccounted; 	<ul style="list-style-type: none"> • Land reforms.
Structural (including caste and gender)	<ul style="list-style-type: none"> • Hierarchy; • Mobilisation; • State; 	<ul style="list-style-type: none"> • Collective; • Political; 	<ul style="list-style-type: none"> • Land rights; • Social welfare; • Institutional reform.
Network	<ul style="list-style-type: none"> • Social capital; • Chain of events; 	<ul style="list-style-type: none"> • Individual (also methodologically); • Situational; 	<ul style="list-style-type: none"> • Self-help groups (also for micro-credit); • Decentralisation and participation.
New relational	<ul style="list-style-type: none"> • Opportunity hoarding and social exclusion; • Intersecting relations of caste, class and gender • Adverse incorporation • Neoliberal governance • 'Unthinkable politics'; 	<ul style="list-style-type: none"> • Collective and situated; 	<ul style="list-style-type: none"> • Social justice through redistribution of resources, political demands for dignity and accountability; • Challenging expert-led discourses on poverty by recognising alternate conceptions of well-being.
Hybrid relational	<ul style="list-style-type: none"> • Ecology and technology as material mediators; • Power relations; 	<ul style="list-style-type: none"> • Relational: situated and mediated; 	<ul style="list-style-type: none"> • Aligning poverty alleviation with sustainable development; • Promotion of plural development pathways.

agricultural and non-agricultural sectors. For example, in the era of neoliberal governance since the 1990s, they can help us better understand how infrastructural developments have afforded people's mobilisations around welfare entitlements and social security. Similarly, people's participation in the non-farm economy is clearly contingent on industrial-technological and ecological developments. Overall, in understanding poverty pathways, conceptual and methodological attention to socio-technical and -ecological relational dynamics can connect the agrarian sphere to non-farm sectors. Such attention can also help us productively rethink poverty alleviation through the lens of sustainable development.

Going beyond impact assessments of ecological and technological change on poor people's livelihoods, mapping people's relations with ecological and technical developments in practice reveals adverse effects that might have been suppressed or unanticipated earlier. Such an appreciation is critical for resisting the entrenchment of a dominant development pathway as the only possible way forward (Stirling 2009). In agriculture, such a dominant pathway is structured around toxic technologies that industrialise agriculture at the expense of biodiversity and smallholders' livelihoods. To move beyond such dominant pathways, and to realise sustainability, it is critical to struggle for plural development pathways in each field of activity. These plural pathways can be based on alternate conceptions of well-being (as mapped by the new relational approaches to poverty) and people's diverse knowledges. Critical in this struggle is the levelling of cognitive hierarchies that situate people's diverse knowledges and techniques as inferior to the knowledge and technology of modernising experts who design poverty alleviation policy agendas. Clearly, the tackling of such hierarchies is no easy task. Multiple tactics might be necessary, including research approaches that foreground poor people's own conceptions of well-being and intersecting socio-technical-ecological relations that constitute their agency.

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