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SPECIAL SECTION**GEOGRAPHIES OF LABOUR IN A CHANGING CLIMATE**

WILEY



'After me, all this is over': Exploring class-entangled geographical agency in a shifting climate among tobacco farmers in South India

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This paper builds on the concept of the “socio-ecological fix” to emphasise the contradictions inherent in seeking to produce nature through such fixes for insecure petty commodity producers who occupy the class place of both labour and capital. I explore how petty commodity producer households cultivating tobacco in western Tamil Nadu, South India, are reworking labour practices in managing erratic rainfall and groundwater depletion. Agriculture in Tamil Nadu is in decline, and dominated by small and marginal farming households that oscillate between agrarian production and waged work to make ends meet. These unstable petty commodity producer households have historically accumulated in western Tamil Nadu, through labour exploitation and the appropriation of groundwater, in order to transition to petty industry. However the long-term decline of the region's aquifers highlights the limits of such over-exploitation. The paper makes two contributions in exploring how petty commodity producer households are remaking space to move beyond agrarian accumulation. First, the paper highlights the biophysical limits of seeking to produce nature through socio-ecological fixes, therefore acknowledging the mercurial as well as produced aspects of nature as a form of space. Second, in adjusting to such biophysical limits on productive capacity, the paper highlights how petty commodity producer households enact forms of resilience and reworking in decreasing their reliance on waged workers and remaking agrarian landscapes to demand less labour, tending away from accumulation and towards salaried jobs. Overall, the paper looks to explore how petty commodity producers, which constitute a norm in Global South agrarian settings, offer new paths for thinking about forms of class-entangled geographical space-making in understanding trajectories of socio-ecological accumulation.

KEYWORDS

agrarian change, environment, India, labour

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1 | INTRODUCTION

This paper builds on Ekers and Prudham's concept (2015) of the "socio-ecological fix," to emphasise the limits inherent in seeking to produce nature through such fixes. I focus on petty agricultural producers in Tamil Nadu, who occupy a precarious position between commodity production and waged work, and are confronted by the biophysical limits of enacting a spatial fix in a context of rapid groundwater decline and precarious incomes.

The paper thus draws on insights from labour geography alongside work on the socio-ecological fix to complicate notions of labour as necessarily opposed to or removed from the logics of capital accumulation. Small farmers who historically increased fixed capital costs in well technology to appropriate groundwater and accumulated as a result are now stagnant petty producers, looking to labour arrangements that minimise cultivation costs, while simultaneously seeking to move towards salaried work for the next generation. The paper further explores caste dimensions of new labour arrangements, suggesting that the dominant "Konguvelala Gounder" (henceforth "Gounder") community are looking to move beyond their identity of agrarian toil (*ulaippu*) (Chari, 2004), and into professional jobs.

In addition, the agrarian household offers a crucial case from which to interrogate the dynamics of capricious nature. Tamil Nadu comprises 6% of India's population and only 3% of its water resources (ENVIS TN, 2020), and agriculture uses over 85% of the state's water (Central Ground Water Board, 2019). The "socio-ecological fix" (Ekers & Prudham, 2015) of well technology is thus shown to have limits in producing nature, as the paper highlights the constraints to capital's ability to "subsume nature within the value form" (Napoletano et al., 2019, p. 1813). The paper therefore highlights how natural processes of recharge present biophysical limits to the socio-ecological fix, and explores how in a region of uneven development, insecure petty commodity producer households combine the logics of labour and capital in reshaping natural environments to move away from accumulation.

2 | LABOUR GEOGRAPHY AND THE SOCIO-ECOLOGICAL FIX

Harvey's (1981) theory of the spatial fix highlighted how capital produces spatial configurations in order to overcome crises of accumulation, largely through investments in fixed capital. In advancing the notion of Harvey's "spatial fix" (1981), Ekers and Prudham argue for a distinctive approach to the "socio-ecological fix," asking how "it gives rise to or produces the socio-environmental conditions of our age" (2015, p. 2438). They draw our attention to how landscapes are produced, socio-natural relations transformed and labour restructured to offset "entangled social and environmental crises of capitalism" (Ekers & Prudham, 2015, p. 2438). The notion of a nature "produced" by capital emerges from the work of Smith (1984), who argued against the nature–society binary that is distinct in modernist thinking to highlight how nature is materially transformed and thus produced through social labour.

The socio-ecological fix starts an important theoretical discussion in drawing out the distinct dynamics of "nature" *vis-à-vis* space, but it offers little space for the agency of workers in (re)making space as agents in capitalist accumulation. In this regard, Herod's assertion of workers as "geographical agents" (2003, p. 112) in the making of spatial capitalist dynamics has enlivened a field of labour geography thinking. This body of work explores how workers' agency and/or resistance – often understood in a wider sense to encompass both organised and everyday instances (Katz, 2004) – (re) shapes trajectories of capital accumulation. Agency always has a "geographical dimension" (Coe, 2013, p. 273), and is embedded in and constrained by wider structures of political economy (Coe & Jordhus-Lier, 2011). Attention to space-making as a socio-ecological phenomenon in labour geography remains limited. Mitchell's work (2007) is notable in this regard, exploring how labour struggles across different scales produce particular landscapes – where industrial crop production and cemeteries littered with undocumented labouring bodies in California materially embody a labour regime reliant on a pool of disempowered surplus, migrant labour.

Mitchell also looks both to how the particular requirements of the landscape – of "making the desert bloom" (2007, p. 573) – shape particular labour requirements, and how processes of class struggle in turn reshape the landscape. This double movement of landscape and labour speaks to another tension in work on the socio-ecological fix. Ekers argues that both "Harvey and Marx are keenly aware that agricultural and resource landscapes are never really "natural" in the sense of being strictly nonhuman in origin, but rather are better seen as produced forms of nature that embody and circulate labor, capital, and knowledge" (2015, p. 2540). Yet eco-socialist critique has argued for a greater recognition of how natural forces are both subsumed by capital and remain independent of it. Napoletano et al. highlight that "capital's ability to really subsume nature within the value form is far more limited by the natural form than the technological optimism of the bourgeoisie would sometimes suggest" (2019, p. 1814).

Furthermore, the expansion of capital “is inherently confronted by ecological contradictions due to biophysical processes (e.g., resource constraints) and factors that shape and constitute the use values found in nature” (Napoletano et al., 2019, p. 1814). These biophysical contradictions are inherent to industrial agriculture, understood as production based on the commodification of inputs and outputs (Weis, 2010), and highlight the centrality of understanding natural dynamics as both produced by and distinct from the social (Malm, 2017).

In building on the notion of the socio-ecological fix, this paper takes inspiration from labour geography thinking and the work of eco-socialists in exploring how petty producers, combining waged labour and petty enterprise, and representing a dominant livelihood across much of the Global South (Davis, 2006), are reshaping labour arrangements in response to a water crisis. In Indian agriculture, the vagaries of climate, food prices, state support for agriculture, and non-farm opportunities drive many households to undertake waged work alongside agricultural commodity production to reproduce themselves (Bernstein, 2006; Lerche, 2013). In Tamil Nadu, 92.5% of farmers cultivate holdings of 2 hectares or less (Government of India, 2019). Such small farming households rely on a combination of activities to reproduce themselves: waged work (42% of household income), cultivation and livestock (43%) that involves own-work on their farms and in some cases hired-in labour, and finally non-farm businesses (15%) (NSSO, 2013).

Petty commodity producer households therefore largely work to reproduce themselves but retain some insulation from the market due to their limited control over means of production. Furthermore, petty commodity production, “when it is founded on access to means of production ... typically contains an aspiration to accumulation” (Bernstein, 2006, p. 457), while remaining largely stagnant. Petty commodity producer households thus complicate our notion of what the socio-ecological fix may look like, combining logics of labour and capital. This paper interrogates the geographical agency of tobacco petty commodity producer households in western Tamil Nadu, exploring compounding logics of constrained spatial fix and resistance through a focus on socio-ecological dynamics.

3 | RESEARCH METHODS

Analysis in this paper is taken from field research conducted over six months from 2014 to 2015 in villages clustered around market towns located across five districts in Tamil Nadu: Coimbatore, Tiruppur, Erode, Salem, and Dindigul; collectively “Kongunadu.” Data collection comprised 68 interviews with farmers who varied in terms of class from petty commodity producer to capitalist farmer, with many undertaking second livelihoods in agriculture and/or in industry. Tobacco farmers tended to be larger than the state average (see Table 1).

Twenty respondents were petty commodity producers, namely those with land < 2 hectares who reported one or more household members undertaking waged work as a primary source of household income in the past five years. Out of 68 interviews, 66 were with male household heads, with the two women interviewed when their husbands were not home. Wider gender dynamics were elucidated to a limited extent through time spent with respondents outside interviews and extensive field notes, though gender was not a major focus of the research. Respondents were primarily Gounder, and Vanniyar in the northern reaches of the region – agrarian caste communities that dominate Kongunadu agriculture, with a minority of other caste groups (see Figure 1).

Interviews and observations of agricultural production and waged work were conducted in Tamil, in which the author is fluent, and translated and transcribed by the author. Sampling was undertaken using snowballing methods, so data are not representative but rather offer insight into dynamics that cannot be gleaned through large-scale data analysis.

4 | HISTORICAL WATER DEPLETION AND THE SOCIO-ECOLOGICAL FIX

Agriculture in Tamil Nadu is in decline, both as a share of state GDP and as a proportion of agricultural household income (Department of Economics & Statistics, 2015). The drivers for the broader process of agrarian change in the region are well documented. There is a long-term trend of agrarian to industrial migration due to the onset of small-scale industrialisation

TABLE 1 Kongunadu and case sample landholding distribution

	Marginal (1>)	Small (1 to <2)	Semi-medium (2 to <4)	Medium (4 to <10)	Large (10<)
Tamil Nadu (2015/16)	78.41%	14.1%	5.7%	1.61%	0.18%
My sample	0%	7.8%	14.1%	37.5%	32.8%

Source: Author’s fieldwork, 2014/15, and Government of India (2019)

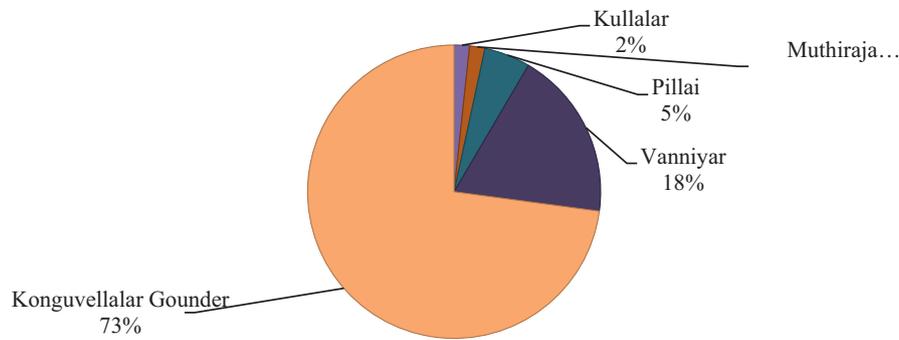


FIGURE 1 Caste composition of my sample.

from the early 20th century in the towns of Coimbatore and Tiruppur, although regional accounts highlight the spatially uneven nature of transition (Chari, 2004).

One key driver for agricultural decline is irrigation access – Kongunadu’s water table today is in rapid decline. The historical pattern of socio-ecological fixes in enabling groundwater extraction reveals both the production of water for agriculture and the limits of such productive capabilities. Access to water for farmers in Kongunadu has long been a complex affair. The region is located at the foothills of the Western Ghats and is characterised by erratic rainfall and low-lying groundwater (Baker, 1984). The nearby mountains mean Kongunadu sits in a “rain shadow area” (Srinivasan et al., 2014, p. 7) and its water table lies below a bed of gneissic rock in uneven aquifers. High temperatures have rendered tank storage unfeasible. Consequently, farmers in the region have deployed capital-intensive well technology going back to the medieval era (Baker, 1984).

The introduction of Cambodia cotton into the region in the early 20th century led to the acceleration of commercial agriculture and industrial capitalism in Coimbatore and Tiruppur (Chari, 2004). The generation of agrarian surplus among petty commodity producer farmers in this period, combined with the burgeoning of small-scale industry, allowed such farmers to transition from worker to owner with relative ease (Mahadevan & Vijayabaskar, 2014).

Agrarian commercialisation relied on gender, class, and caste-based labour control strategies (Chari, 2004), and on plundering groundwater. Colonial state subsidies for electricity resulted in the rising use of water pumps, which replaced the kavalai system of cattle-drawn water, and enabled increased rates of groundwater extraction without the need for labour control (Cederlöf, 1997). In addition, the colonial and post-colonial state increased investments in agro-technology, including groundwater technology (Baker, 1984). Electrified wells rose from 4,300 wells prior to Independence to 600,000 by 1971/2 (Lindberg, 2013), and post-colonial state attempts to reduce subsidies for pumpsets were thwarted by a farmers’ movement led by surplus-generating farmers in Kongunadu from 1970 onwards.

State-subsidised groundwater extraction technology remains a key aspect of farmers’ socio-ecological fix in the Kongunadu region. Despite the general retrenchment of state support following agricultural liberalisation in the 1990s, subsidies for agricultural electricity remain in place (Harriss-White & Janakarajan, 1997). Yet the efficacy of this fix is undermined by the rift between rates of groundwater exploitation and natural processes of groundwater recharge. Groundwater decline was reported as early as the 1920s (Baker, 1984), and a recent study highlighted that between 2002 and 2012 groundwater depletion outpaced recharge by 8% (Chinnasamy & Agoramoorthy, 2015), with increasingly erratic rainfall further threatening recharge of both surface and groundwater (Srinivasan et al., 2014). The production of groundwater is therefore limited by the biophysical constraints of recharge, and the financial limits associated with continually deepening bore wells, leading certain rural classes to look beyond agrarian production.

5 | MOVING BEYOND TOBACCO: A CONSTRAINED SOCIO-ECOLOGICAL FIX

After me, all this is over.

(Mr Dhandapani, tobacco-growing petty commodity producer)

Tobacco farming (in keeping with agricultural production more broadly) in Tamil Nadu is in decline, with cultivation gradually falling from above 10,000 tonnes in 2001/02 to under 6,000 tonnes in 2013/14 (Department of Economics & Statistics, 2003; Government of Tamil Nadu, 2013).

Tobacco's history in Kongunadu mirrors the broader dynamics of agrarian change. It came to the region in the 17th century, and grew steadily during the 18th century, cultivated for chewing tobacco and cheroots. It rose in acreage from around 30,000 acres in 1880–1950, to a peak of 47,000 in 1977–78, aided by agrarian commercialisation and state support for tobacco High-Yielding Varieties (HYVS) (Baglia, 1966; CTRI, Vedasandur, 2014). The crop continued to suit the intensive, small-scale, commercially oriented farming that dominated in Kongunadu, and its short duration lent itself to small farming households where one or more members were increasingly commuting to an industrial unit in Coimbatore and Tiruppur's growing industry (Mahadevan & Vijayabaskar, 2014).

Yet today, as Mr Dhandapani suggests, both successful and struggling tobacco farmers are looking to leave agriculture and move to more secure forms of reproduction. Sixty-seven out of 68 respondents, ranging from petty commodity producers to large capitalist farmers, aspired for the next generation to leave farming behind and named water procurement as among the main drivers of this. Exploring the dynamics of this within petty commodity producer households revealed the entangled agency of waged work and agricultural cultivation driving change, with two key dynamics at play: a shift from hired wage work to family labour, and a move towards professional work for the next generation.

First, 15 out of 20 petty commodity producer households indicated that they are reducing their reliance on waged workers and increasing family labour on farms, in response to questions on changing patterns of family/waged labour use on garden plots of ten acres or so, or 'thottams'. Tobacco is a labour-intensive crop, and particularly so if farmers want to reach higher rates of profits by curing it themselves and storing it, to afford them with higher post-harvest rates when selling to traders. Crucially, unlike Ramamurthy's (2010) account in Andhra Pradesh, where the increase in household male labour on undertaking the "feminised" work of hybridising cotton seeds on their own farms is seen as a means of enabling aspirational betterment for future generations, the rise in family work among tobacco-cultivating petty commodity producers is conversely seen as necessity. As Mr Sukumar, a Gounder petty commodity producer put it, "Is there any other choice?!"

Petty commodity producers complain of the rising price and scarcity of waged workers. As Mrs Loganathan, a Gounder 2-acre tobacco petty commodity producer, states, "There are no labourers [these days], they all go to drive trucks or tractors – or they go for salaried jobs in Tiruppur or whatever." Historically, waged labour in the region is largely provided by landless workers from Dalit and "Most Backward Class" communities, whereas petty commodity producers are mainly Gounder and Vanniyar (Govt. of Tamil Nadu, 2006; Heyer, 2016). Despite sustained marginalisation, the increasing availability of off-farm work enables such waged workers to wield increased bargaining power over farmers seeking to hire them. This has resulted in regional agricultural wage rates experiencing a real terms increase of 126% for women and 195% for men from 1981/82 to 2012/13 (calculated from Government of Tamil Nadu, 1985; 2013). Furthermore, Tamil Nadu state government's relatively robust record in implementing welfare programmes has seen the state take on some of the reproduction costs of poorer households, affording them increased bargaining power for work (Heyer, 2012).

Increased family labour has resulted in different arrangements. In one village, neighbouring family members reported using in-kind labour arrangements among themselves to undertake key labour-intensive tasks such as harvest and curing tobacco. Mr Murugan, a Vanniyar farmer with 2.5 acres of land, exemplifies this. Having worked on his neighbouring relatives' thottams in exchange for their labour on his own, the four neighbouring farm households also co-invested in three bore wells, with all four thottams sharing the output of whichever well has water at a given time. Mr Murugan says they cannot manage for peak periods, such as harvest and curing, and hire waged workers, but only for half days to save costs. Largely, they work on each other's thottams to try and make ends meet.

In other instances, farmers reported that work on thottams was undertaken in addition to existing waged work, therefore lengthening the working day and number of working days each week for family members. Mr Kandasamy indicated that work on his own thottam took over much of his spare time, stating "We do as much as we can ourselves, but if we can't manage certain things we call labourers in." Others indicated that children and grandparents contributed increasingly to thottam work for intensive, regular tasks such as watering and weeding to avoid hiring-in labour. Furthermore, out of the 19 petty commodity producer households with married couples, in 17 both husband and wife worked extensively on their thottam, indicating that the shift to family labour is likely to have impacts on women's broader labour burden (Kapadia, 1995).

These labour arrangements speak to what Davis (2006; cf. Bernstein, 2006, p. 457) terms the "relentless micro-capitalism" of petty production, where the aspiration towards continued autonomy and accumulation leads to increased labour, which is in turn subsumed by wider circuits of capital. This formal subsumption of labour by capital thus reveals the resilience of such households, whereby their push to maintain some level of control over the agricultural environment through increased labour represents a "restorative and strengthening" act (Katz, 2004, p. 242) in the face of broader forces of socio-ecological change, albeit along differentiated lines of gender and likely caste.

Yet simultaneously, petty commodity producers also expressed a second dynamic: an increased propensity for salaried, professional work for the next generation, and a concurrent decrease in cultivation to allow for this. All 19 of the petty commodity producers who had children reported that they wanted their offspring to complete school and undertake a college degree, whereas none of the 20 petty commodity producers themselves had completed school. Affirmative action policies providing reserved seats for “backward classes” (among which Vanniyar and Gounder communities were counted) in state colleges (Jaffrelot, 2006) meant that many aspired for their children to access government jobs, which were also subject to caste reservations, or jobs in the state’s burgeoning Information Technology (IT) sector. Only one petty commodity producer had a son working in IT already; for others the path remained an aspiration. Yet petty commodity producer farmers indicated an aspiration towards an urban life for future generations, which in turn meant shifting to fewer and more profitable cash crops such as tobacco, or crops requiring less upkeep such as coconut, in order to free-up time. This was linked to the sense that thottam work took up increasing amounts of time, given the aforementioned shift to family labour. Therefore these seemingly contradictory shifts speak to how petty commodity producers are remaking their landscapes to minimise their own labour requirements; a constrained instance of a socio-ecological fix.

In explaining this, the vagaries of water access were continually contrasted with the stability of a job, speaking to the limits of enacting a socio-ecological fix in the context of financial precarity. Of 20 petty commodity producers, only two had full access to working bore wells in the past year, the remaining 18 either made do with joint access to a single well, or undertook rain-fed agriculture because of inadequate funds. By 2014, 85.5% of agricultural irrigation across Kongunadu was through wells, 14% through canals, and the rest from other sources (Government of Tamil Nadu, 2014).

Farmers cited decreased rainfall as a driver of change, which as indicated in Figure 2 (see Government of Tamil Nadu, 2015) shows a long-term increase over the period in question, while being highly erratic. As Mehta (2011) has highlighted through her research in Gujarat, the construction of narratives around water scarcity tends to over-privilege “climate change.” In Tamil Nadu, regional studies highlight that the impacts of climate change are felt largely through increased extremes in rainfall, rather than decline (Bal et al., 2016). Persisting scarcity is largely driven by decades of untrammelled and state-supported groundwater exploitation (Janakarajan, 2004). Furthermore, while 9/20 respondents were indebted, only four used institutional credit, which is primarily used for irrigation investments (Guérin et al., 2012). The insecurity of well deepening made credit for this purpose unattractive. In this sense, petty commodity producers are moving beyond a spatial fix and are instead “reworking” their “oppressive and unequal circumstances” (Katz, 2004, p. 242) through the forging of new income streams that reduce the insecurity caused by the biophysical contradictions of industrialised agriculture.

This shift has further resonance in terms caste identity. Chari (2004) has highlighted the centrality of toil or “*ulaippu*” to the Gounder community’s self-representation of its ascent from agrarian to industrial surplus in the 20th century. This renovated identity speaks to their hands-on approach to both farming and industrial entrepreneurship, but also conceals the social and environmental exploitation that drove their ascent. Yet today, farm life is associated with hard work, drudgery, toil, and dirt, while burgeoning opportunities in professional work are portrayed as easy and clean. Caste identities are often

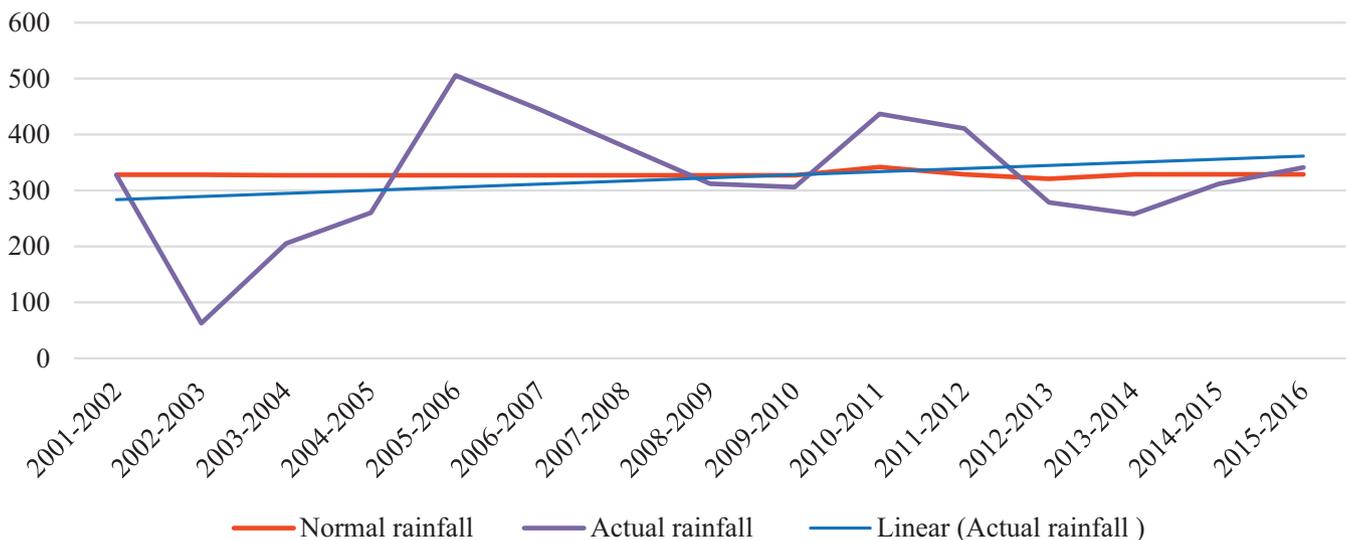


FIGURE 2 Rainfall in Coimbatore district 2001–2016. Sourced from Government of Tamil Nadu (2015).

linked to particular professions and thus class ascension is also a process of caste renovation (Srinivas, 1969). As Mr Sivakumar, a Gounder 5-acre tobacco farmer told me, an upper-caste woman, “you come here having studied and looking neat and so on, yet here we are with cow dung on us and the smell of cow’s milk”; the juxtaposition highlighting my privilege through tropes of dirt and cleanliness, long-maintained by Brahminical Hinduism in asserting the spatial segregation and abuse of lower-caste and Dalit communities (Srinivas, 1969).

Petty commodity producer households are therefore reworking their relations of oppression, through reorganising cultivation and urbanising to salaried work, and this is propelled in part through the breaking-down of historical processes of groundwater extraction. Younger members look to move beyond the agrarian toil characterising their historical caste identities and into new professions that are insulated from the vagaries of groundwater dynamics.

6 | CONCLUSION

Petty commodity producers in Kongunadu highlight both the unstable and shifting class relations in the countryside, and speak to how this places limits on producing nature for accumulation. Historical patterns of groundwater extraction – the socio-ecological fix deployed by surplus-generating small farmers in the region and aided by state support – have outpaced natural cycles of groundwater recharge, such that persisting groundwater decline combined with an increase in erratic rainfall patterns renders agricultural production highly insecure. The ensuing reshaping of petty commodity producer households speaks to a contradiction in terms of class dynamics, where older farmers look to retain some level of cultivation through decreasing the reliance on waged work, while limiting long-term plans for agriculture in order to ensure that subsequent generations move to professional jobs and away from aspirations towards accumulation.

Petty commodity producers represent a rising norm across India (Harriss-White, 2014), and in agriculture across the Global South (Bernstein, 2006). Their insecurity as agrarian capital reveals how for some there are limits to the socio-ecological fix, or rather a reticence to continue trying to accumulate, as the vagaries of water access render continued fixed capital investments too risky in comparison with steady forms of labour. Crucially, their autonomy and increased flexibility as geographical agents, in maintaining production through increased familial labour, while simultaneously aspiring to rework their relations within the labour market, foregrounds their spatial agency as both labour and capital, highlighting the need for further exploration of how space-making may be imbued with contradictory class logics. Finally, while it is beyond the remit of this paper, further work would do well to explore the gendered dynamics of shifting family labour in petty commodity producer households, and how this further complicates our notion of agency within this constituency.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, Dr Nithya Natarajan, on reasonable request.

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