
From Incremental Dispossession to a Cumulative Land Grab: Understanding Territorial Transformation in India's North Karanpura Coalfield

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ABSTRACT

This article explores a great contradiction in rural land debates in India: on the one hand, explosive political contestation that is often able to halt proposed land acquisition; on the other, an unprecedented urban-industrial expansion that is appropriating rural land. The authors argue that land grabbing for mining proceeds in an incremental manner, yet its cumulative effect leads to territorial transformation. To investigate this incremental appropriation, a temporal study of the North Karanpura coal mining tract in eastern India was conducted, combining remote sensing, interviews and official land-use data. The results reveal a cumulative land grab of thousands of hectares from the late 1980s to the present day as open-cut coal mines swallow up vast swathes of agricultural fields and forests. The political economy mechanism behind this immense land grab, which to date has gone undetected, consists of three phases: the reservation of the land as a coalfield with multiple coal blocks; the division of the blocks into separate mines; and the flexible expansion of individual mines wherever reduced resistance to land acquisition is encountered. This research indicates that an aggregate analysis of land dynamics can more robustly place the dramatic rearrangements of the Indian countryside within the international land grabbing debate.

INTRODUCTION

Literature on widespread social protests over forced land acquisition in India has characterized the conflicts as ‘thousands of small wars against land acquisitions’ (Levien, 2011: 66). These protests occur across the country against the usurping of land by the state and/or industries for a range of reasons:

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urban expansion, industrial growth, infrastructure building, agricultural expansion, or for speculative purposes (Benjamin, 2017; Jenkins et al., 2014a; Levien, 2012, 2018; Sood, 2015). Given the controversial nature of such land acquisition, there is a growing literature on land conflicts (Baka, 2013; D'Costa and Chakraborty, 2017; Levien, 2013; Sud, 2014a), some of which uses the internationally popular term 'land grab' to explain the nature of appropriations (Basu, 2007; Ramachandriah and Srinivasan, 2011).

In general, however, the India-specific literature has refrained from relating the ongoing 'land wars' to wider transformations of landscapes and territories. Scholarly attention so far has primarily been on individual land struggles and their connections to wider regimes of dispossession (Bedi, 2013; Oskarsson and Nielsen, 2017). Each of these struggles has enriched our understanding of the social, economic and political transformations that the rural poor experience in a liberalizing and urbanizing nation. Yet, they neglect to explain the biophysical and social scale of the events unfolding across the country as they accumulate, as well as the political technologies worked out by the 'cunning state' (Randeria, 2003) to enable land transfers in a highly contested environment. The process has been described as 'dispossession by confusion', an uncertain process of dispossession shaped by material and discursive inequalities across India's institutional landscape (Oskarsson, 2013). A certain project may be portrayed as needing urgent action, presenting a compelling exigency — such as energy security for the nation — that then allows the state to selectively agglomerate land to resolve this wider national security crisis (Lahiri-Dutt, 2016a). If one could see the resulting picture from a macro scale, it would become apparent that these acquisitions represent 'a transfer of property and land use rights on a world scale' (Walker, 2008: 558), rightfully considered an unprecedented land grab in the country under the neoliberal economic regime.

The incremental nature of land transactions is such that available data do not capture the massive scale of land grabs in India. For example, the international database, the Land Matrix, contains only 13 transactions for India, with one being truly large at 40,800 ha (Land Matrix, 2017).¹ The acquisition of even 1,000 ha of land anywhere in India invariably leads to mass uprisings, protests, court cases, long-drawn-out bureaucratic processes and so on (Levien, 2011). Proposals for large projects usually encounter significant popular opposition causing long delays, at best, and, in some cases, complete cancellation (Oskarsson and Nielsen, 2014). Examples of cancelled large projects which attempted to acquire relatively small pieces of land, compared to international cases, include the Arcelor-Mittal steel plant in Jharkhand (Dungdung, 2015), the Niyamgiri bauxite mine in Odisha (Kumar, 2014) and the Nandigram Special Economic Zone (SEZ) in West

1. The largest entry in the Land Matrix database for India is the Nandan Cleantec biofuel investment; judging by the lack of discussion of this in recent news reports, it would appear that work has not yet commenced.

Bengal state (Chakravorty, 2013). India's largest foreign investment to date — by the South Korean steel company POSCO in Odisha covering 1,620 ha of land — languished for more than 10 years before being cancelled in 2016 (Krishnan and Naga, 2017; Pingle et al., 2010). Beyond the limited data available in the Land Matrix database, there are a few other large projects in India that could qualify as being of a global land grab size, including the Polavaram irrigation dam in Telangana state (46,060 ha) and the Adani Port and Special Economic Zone in Gujarat state (18,000 ha).²

The Indian state has pursued an economic policy to attract private, international and domestic investments (Jenkins et al., 2014a). As part of this liberalizing policy intent, the Indian government seeks international mining investments particularly for the extraction of metals (Oskarsson, 2017). Consequently, land purchases for industries have been afforded highest priority by successive national and state governments, leading to intense political economic debates (Jenkins et al., 2015) and some legal reforms (Sud, 2014b). More than the *size* of the acquisition, the *nature* of the land is of primary concern in India. A significant part of India's huge population relies on the local natural resource base of agricultural fields, grazing lands and forests (Ruparelia et al., 2011). Commenting on the contrast between land grab debates in India and China, Cernea (2016: xiii) argues that the 'arable' nature of land lies at the crux of the debate in India. Not only is India more densely populated than China, its land is more intensively used, especially for agriculture. The growing debate on land transfers in India, therefore, has primarily focused on population displacement (70 million people according to Fernandes' count cited in Cernea, 2016: xii). It remains unclear which sectors have contributed to what proportion of displacement within this colossal figure. Attention has shifted, in recent years, from land acquisition for reservoir construction to that for building urban-industrial SEZs (Banerjee-Guha, 2016; Jenkins et al., 2014a). In comparison, less attention has been paid to land grabs for extractive purposes, perhaps due to the scattered and diverse nature of mining operations. Rather, critiques of mining are animated by the need to preserve environments to benefit indigenous peoples (Padel and Das, 2010). Research on mining-related land transfers tend to criticize either the use of legal and para-legal instruments — sometimes outdated or of colonial vintage (Ahmad, 2014) — or non-state tactics to acquire land (Lahiri-Dutt et al., 2012), including tactics driven by corruption (Joseph, 2016).

Yet, activist reports on mining highlight that a major land transfer is underway in India's mineral-rich tracts (Greenpeace India, 2012). As entire regions are transformed from small-scale farming and forest collection activities to coal mining, changing property dynamics imply a change in control of land and associated changes in labour patterns, as the local populations

2. The Polavaram dam appears to be under implementation but continues to be challenged in court after more than 15 years of slow construction, while the Adani Port and SEZ was divided into several industrial units to allow implementation.

either become employed in the lower ranks of the industry or are forced to relocate (drawing on the broad definition of a land deal offered by White et al., 2012). Coal mining based on open-cut technologies introduces radical social and environmental transformations to the coal-bearing areas of central and eastern India (Lahiri-Dutt, 2017). The sector is scheduled to grow to almost double its present capacity by 2020, in pursuit of the national goal to extract 1 billion tons of coal per year — up from the estimated 725 million tons extracted in 2016 (Ministry of Coal, 2017a).³ Most of the land needed to reach this target is not yet owned by the mining companies,⁴ leading to the question: how do coal companies obtain substantial pieces of land without resorting to large land transactions that are impossible to conclude, given the present politicized situation over land?

This article analyses the incremental acquisition of land, which we describe as resulting in a cumulative land grab. This kind of land grab sits at the heart of the political economy of India's land, and at the centre of its energy security. Incremental acquisition of land is disaggregated in nature because it occurs through relatively small-scale individual extractive projects. Only when all of these incremental acquisitions are placed together within a single coal mining tract, is the extent of land lost to mining revealed. We argue that the 'micro' land grabs collectively enable territorial transformations at an unprecedented scale.

The article is based on a temporal study carried out between 1988 and 2016 in North Karanpura, in the eastern Indian state of Jharkhand. We believe that the year 1988 gives a reliable picture of the pre-liberalization land-use scenario of the area. The late 1980s marked the beginning of what we refer to as cumulative land grabs, or small but frequent expansions of coal mines. Thus, 1988 offers a good baseline for comparison with 2016, the latest year for which remotely sensed data are available. We argue that instead of one large land grab, which would be recognized and understood internationally, a cumulative land grab of tens of thousands of hectares is taking place in the coal mining tracts of India. One implication of this is that future land research should include the analysis of aggregate land dynamics. Such analysis will better place Indian land grabs — or potential land grabs from mining and similar activities with incrementally growing land use in any other country — within broader international land debates.

The first section of this article situates the international debate on land grabs in the Indian political economy to understand how Indian land grabs might relate to international experiences. Following this, the methods used

3. The solar power sector appears to be growing strongly but at the moment it is not expected to dramatically alter the present coal land-use scenario.

4. Coal India Limited is a state-owned company which controls the majority of coal production in India. It has nine subsidiaries, of which eight are mining companies. There is also private coal mining by steel, power and cement companies for their own use — so-called captive mining.

in the analysis are articulated in greater detail. The next section then presents the reconfiguration of North Karanpura, outlining the three identified mechanisms of cumulative land grabs — from coalfield identification with coal block allocation, to coal mine planning, and finally incremental and separate coal mine expansions — to explain how incremental dispossession and dramatic land-use change recreated the territory as coal mining expanded in the area under liberalization. The conclusion attempts to better situate India within the global land grab debate and elucidates the implications of cumulative land grabs for our understanding of rural dispossession across India's liberalized landscapes.

ARE THERE LAND GRABS IN INDIA?

A contract signing over large agricultural areas to multinational investors can perhaps serve as the archetypal case of land grabbing in the extensive literature on large-scale land transactions. This meaning of land grabbing became a well-established phenomenon a decade ago, when several global crises (most notably the 2007–08 food price spike) converged to create a rush to control land, particularly in the global South (Borras and Franco, 2012). This understanding of land grabbing is, however, not readily applicable to the Indian context where land acquisitions are generally smaller in scale and centred on domestic factors. Could such smaller land transactions then qualify as land grabs? More recent land-grab discussions have taken a more nuanced position, looking beyond the mere size of transactions, the purpose of the investment, and the nationality of investors to incorporate other factors into the analysis (Aguilar-Støen, 2016; Cotula et al., 2009; Vicol, 2017; White et al., 2012; Wolford et al., 2013). Borras and Franco (2012) advocate a definition of land grabbing which focuses on characteristics in the processes that allow for transactions of land, labour and resources. This understanding of land grabbing is more relevant in contexts where land deals are relatively small and not always driven by foreign governments or corporations (Aguilar-Støen, 2016). This is particularly true in India, where political and institutional settings complicate large-scale land transactions, forcing land speculators to find alternative ways to access and control land (Vicol, 2017).⁵

Research on land grabs is inherently messy (Edelman, 2013), with the evidence of claims-making immediately becoming deeply embedded in politics (Scoones et al., 2013). For India, Lahiri-Dutt (2017: 85) argues that coal is more than just a material; it is the 'key to the country's sovereignty as a nation-state; is equivalent to modernity; and is crucial for an energy secure future'. Consequently the mining of coal has been afforded great

5. As Aguilar-Støen (2016) points out, a high demand for land in settings with dense population can also create severe consequences for smaller land transactions.

importance in national policy circles ever since independence. Inadequate supplies of coal, along with a host of other long-running failures, mean that the provision of electricity has suffered from ‘systemic inadequacy in quantity and quality’ (Chatterjee, 2012: 91) with widespread blackouts, high industrial tariffs, state electricity boards close to bankruptcy, and 400 million people still living off-grid in 2019 (Kale, 2014). While these problems have long existed, economic growth in recent decades has increased the gap between supply and demand, so that the poor overall provision is starkly out of synch with the country’s growing ambitions as an emerging global power (ibid.).⁶ Against the background of an overall expansion of mining for all kinds of minerals in India, coal mining has grown tremendously. From 226 million tons (Lyday, 1994) in 1990, prior to liberalization, India increased its production (sometimes through, and sometimes despite, major scams) to an expected 725 million tons in 2016–17 (Ministry of Coal, 2017a).⁷ Coal India Limited extracted 657 million tons of this amount with the remainder privately mined (ibid.). Most of the coal is used for, and its mining is justified by, thermal power generation; indeed, as energy generation in the country jumped dramatically in accordance with the five-year plan of 2012–17, coal extraction was not able to keep up (Dubash et al., 2018).

Much of India’s coal is concentrated in certain regions and, within these regions, along river beds. One such region is Jharkhand state, carved out of Bihar in the year 2000 to assert indigenous rights. Although India, and particularly eastern India, has a long history of coal mining, coal extraction in Jharkhand exemplifies neoliberal India’s ability to acquire large tracts of land that should not, in principle, be alienated from its people. According to Kalpavriksh and Greenpeace India (2012: 4) ‘[t]he entire North Karanpura coal field covers an area of approximately 118,668 ha, of which 41,457 ha is forest land’. The analysis in that report covers a total area of 2,336,657 ha across 13 coalfields, indicating the significant extent of coal mining land use in India (Kalpavriksh and Greenpeace India, 2012). The North Karanpura coalfield is part of the Chota Nagpur *adivasi* region.⁸ The region has witnessed strenuous protests over many centuries against various outsiders, resulting in strong indigenous land protection on paper but, in practice, support for outsider resource extraction through mining and forest plantations

6. As with so many other aspects of India, dramatic variations exist across the country: in some states, nearly all residents are connected to the grid, while more than half of all households in Jharkhand remain without electricity.

7. Corruption and scams have often played a role in enabling coal expansion to continue; at times, however, they have also led to mining operations being cancelled, especially in the light of the judgment on national corruption (Supreme Court of India, 2014); more on this below.

8. *Adivasis*, meaning the original inhabitants, are perceived as people who inhabited the Indian sub-continent preceding the arrival of other groups. *Adivasis* are identified in the Indian Constitution by the name Scheduled Tribes and are considered in need of special protection, although they are not recognized as indigenous. They are also referred to as ‘tribals’.

(George, 2009; Ghosh, 2016; Herbert and Lahiri-Dutt, 2004). Crucially, the land acquired for mining under the Coal Bearing Areas (Acquisition and Development) Act of 1957 remains with the mining companies whether the mine goes ahead or not,⁹ and also after it has been mined out, rather than being restored and returned to the original owners, or even ear-marked for other future activities.¹⁰

Coal India Limited, the state-owned company with a near-monopoly over coal production in India, owns substantial land areas through various subsidiaries operating in different geographical regions. It is most likely the second largest landowner in India (after the Indian Railways) and probably owns as much as 200,000 ha, although its official records detail coalfields of 'only' 56,000 ha (Ministry of Coal, 2017a: 29).¹¹ It is unclear how Coal India came to own this enormous amount of land; some of it is a legacy of the past, transferred to the company when privately owned collieries were brought under state ownership during 1971–73. However, unlike today's open-cut mines, most older mines operated underground and had a small footprint on land.¹² The tremendous growth in coal production in India since economic liberalization in the early 1990s implies that significant amounts of land must have been acquired during this period. It is therefore apt for Greenpeace to state that 'India is experiencing a massive land grab under the guise of providing energy security' (Greenpeace India, 2012: 3).

An official view of the total amount of land involved in mining remains elusive in the extensive set of governance procedures and documents on coal mining expansion. These rather produce, as Hull succinctly notes with regard to the city planning of Islamabad, '[o]rder and disorder on every scale . . . through the cease-less circulation of millions of maps, forms, letters, and reports' (Hull, 2012: 4). The multitude of reports, maps and documents produced by the coal mining bureaucracy, even when brought together from across India's dispersed institutional structure which operates at local, state and national levels, fails to produce a complete picture of historical territorial transformations. In India, this inherent disorder is further enhanced by frequent changes to official plans, poor administrative processes,

9. See www.legislative.gov.in/sites/default/files/A1957-20.pdf.

10. As most coal mining takes place on forest land, compensatory forests are legally mandated to be planted elsewhere. This 'green grabbing' — or confiscation of land for environmental purposes (Fairhead et al., 2012) — doubles the land requirement of coal mines but remains untracked and under-researched to date, as the new forests are dealt with directly by state forest departments and therefore not included in environmental planning documents.

11. The subsidiary Central Coalfields Limited lists its land ownership as 49,500 ha, casting significant doubt on the overall land use figures of Coal India Limited (CCL, 2016a).

12. While specific land data are lacking, it seems that at the time of nationalization about 25 per cent of coal came from open-cut mines. In comparison, about 80 per cent of India's coal today comes from open-cut mines with an inherently large land requirement (Ministry of Power, 2012).

a need to constantly realign to specific conditions at each proposed site, and fluctuating pressure group demands (Oskarsson, 2015). Official plans that clearly delineate overall land use and population displacement data simply do not exist in India. While crucially important in their own right, site-specific conditions detailed in much of the existing 'land wars' literature in India therefore run the risk of obscuring the bigger picture, and particularly links to global land-grab processes.

The acquisition and allocation of land for industrial purposes has long relied on the state as key actor (Raianu, 2017), and yet it becomes clear that a formalized, national approach to land acquisition for coal mining has never existed, and indeed cannot exist given the dispersed governance structure of the country, and the many controversies engendered by the acquisition of even relatively small parcels of land. To understand cumulative land grabs, we therefore need to develop an understanding of governance across federal India in which highly localized, competitive, populist politics with strong rent-seeking drivers can, at times, find a sense of direction around shared national goals. As Jenkins (1999) shows in his account of economic reform in the 1990s, Indian politics can find ways to move, not perhaps in the form of coordinated action, but at least advancing towards widely shared policy goals — in this case, increased coal mining to augment electricity provision. The 'reform by stealth' (*ibid.*) process of economic policy reforms opened the door to changes which had previously been blocked by dominant interest groups. In a similar vein, cumulative land grabs, while drawing on decades-old plans, rely on a broad coalition of interests which have converged in support of increased coal extraction, and by implication increased land use by coal mines. Coal energy has found support among some of the most powerful political lobbies of the country, including agricultural groups for whom electricity means irrigation by electrical pumps, private sector companies in need of energy for manufacturing, and the growing middle classes aspiring to urban lifestyles (Kale, 2014).

Within this complex system of pressure groups, political careers have not only been built on managing interests, but also by profiting from organizing and 'unlocking' land held up by protests and agitation. In the liberalization era, subregional governments are key to overall development initiatives and particularly crucial for land transfers (Price and Ruud, 2010; Sud, 2014a). The states are the ultimate owners of land according to the constitution, and it is at the state level that the main claims for social welfare, including compensation from forced displacement, are made (Jenkins, 1999). State governments, via their primary actor the Chief Minister, take on multiple responsibilities in land processes to act as 'direct purchaser, property dealer, law interpreter, policymaker, and so forth' (Jenkins et al., 2014b: 17). Such processes become highly uneven depending on the personal qualities of decision makers, wider state government capacity to carry out plans, relationships to the national government, and a range of other

concerns. Randeria's (2003) 'cunning state' strategically claims an inability to adequately settle the demands that citizens make on it, and yet shows significant capacity in core policy concerns. The Indian state thus continues to exhibit 'weak-strong' (Rudolph and Rudolph, 1989) characteristics, both retreating and expanding across policy arenas with the main intent to support private sector development (Chandra, 2015). Whether governments across federal India, and particularly key top-level brokers, can continue to ensure that highly controversial development projects become reality is looking increasingly uncertain. Jenkins (2011: 62) argues that '[t]he credibility of the Indian state as a broker of compromises on a large scale is so damaged by its repeated failures . . . that compensation-based schemes find few takers and become unviable as deadlock-breaking solutions'. Controversial coal extraction has high-level planning support, but needs to operate 'by stealth' to avoid open confrontation, relying on trial and error in case-by-case approaches. Plans developed over many decades to expand coal extraction across India's central-eastern mining region thus play out at the level of individual mines through highly uncertain processes as specific land parcels are acquired and contested via protest activities on the ground, in courts and a wide variety of other forums.

Methodologically it should be simple to detect the grabbing of land by coal mines through widely and freely available satellite images. The task is straightforward, as anyone with an internet connection can browse Google Earth images to see the 'black holes' at the heart of India's energy security. Yet, the multitude of official documents do not touch on these images, instead preferring to replicate and disseminate obscure and outdated maps and materials to create a *maya* (illusion) of separate coal mines throughout planning, design and implementation/expansion. Even where several mines exist adjacent to each other, thereby creating an agglomeration of projects, a holistic understanding of mining land use has not emerged so far. However, the task also involves studying the use of the land over time to detect changes. It is only over time, and seen through the lens of the political economy within which coal is situated, that one can fully understand India's incremental land deals for coal as part of a cumulative land grab.

Methods

This article studies the radical transformation of land use through the rapid expansion of coal mining using open-cut extraction processes. It relies on Geographic Information Systems (GIS) methodology applied to satellite images that became available from the late 1980s. Concurrently, the authors carried out fieldwork to check the accuracy of data. Primarily, however, the article explores the political economic mechanisms and processes that allow large-scale dispossession, since satellite images can only tell us about

what changes have occurred in the landscape, not why these changes have happened or how they affect the local population and the environment. The region in focus is North Karanpura which offers the possibility to record transitions in land use to coal mining.¹³

We carried out remote sensing analysis using Level-1 data products (satellite images systematically pre-processed by the US Geological Survey) from the Landsat 5, 7 and 8 satellites. Images for the years 1988, 2001 and 2016 were used, corresponding to the earliest and most recent years for which images were available for the whole study area; 1988 was also identified as a suitable start year since the gradual expansions of individual coal mines in North Karanpura appear to have started in the late 1980s, according to our extensive review of official documents and publicly available reports. The resolution of 30 metres was considered sufficient to carry out a land-use change analysis for the purposes of this article. Four distinct land-cover classes were used for the analysis: forest, agriculture/open land, water and mining. These classes are easily detectable using the band combination RGB-432 (see a similar application by Prakash and Gupta, 1998). To visualize land-cover changes due to coal mining it was not relevant to distinguish between agriculture and open land and therefore these were merged into one land-cover class. The images were first aligned to their correct geographic positions using both ground control points and visual interpretation. An unsupervised classification was performed in ArcGIS 10.2.2 to automatically form spectral classes by a clustering algorithm. Fifty spectral classes were used for this study, which were manually categorized into one of the above-mentioned land-cover classes, using higher-resolution satellite images and photographs from the ground for reference, drawing on land-use analysis carried out by Lillesand et al. (2004). Due to poor dust management practices, the coal spreads as black soot outside mine boundaries and a decision was made to include these areas in the mining land-use class. For the sake of simplicity, vegetation and water bodies present within active mines are also classified as mining. After classifying all satellite images, we calculated the area of each land-cover class including land-cover changes between 1988 and 2016.

The recorded land uses were compared with official data from the website of the Ministry of Environment, Forests and Climate Change (MoEFCC),¹⁴ and in annual reports of Coal India Limited and its subsidiary in the North Karanpura coalfield, Central Coalfields Limited (CCL). The final method used was interviews in the North Karanpura coalfield and at state level over extended visits of six months in total, between 2013 and 2015.

13. The analysis did not attempt to trace new forms of land use once mining ended.

14. Environmental approval documents are publicly available on <http://environmentclearance.nic.in>.

THREE ITERATIVE STEPS IN THE EXPANSION OF THE COALFIELD

At North Karanpura coalfield, the state deploys three steps to keep the cumulative land grab under the radar of activists and researchers. First, large-scale plans for coal extraction, following intensive geological exploration, reserve the land primarily as a coalfield consisting of multiple coal blocks. This helps delegitimize other existing land uses and alternative ones that might be proposed. This mechanism falls under the joint jurisdiction of the national government's Geological Survey of India (GSI) and Coal India's research wing, the Central Mine Planning and Design Institute (CMPDI). Second, individual coal mines are allocated and planned — by Coal India's subsidiary in the region, or sometimes by a private mining company, in collaboration with CMPDI — and various approvals are sought from state and national authorities. This is when land is acquired to turn coal-bearing blocks into mines; each project (block) is planned without acknowledging the overall coal development. Third, once operational, and wherever local resistance and other factors allow, individual coal mines expand through additional land acquisition. This growth takes place over time, in separate phases and without cumulative data or aggregate planning, although in many cases coal mines are immediately next to one another. Each of the mechanisms is discussed in turn in the following sections.

Coalfield Identification and Coal Block Allocation

The North Karanpura coalfield was first outlined as long ago as 1869–70 by British geologists (Geological Survey of India, 1871). This investigatory work specified an area of 122,000 ha, a remarkably similar size to what recent reports convey — 123,000 ha in Advance Environmental Planning Group (1987) and 122,000 ha in CMPDI (2013).¹⁵ Initial prospecting involved some drilling in the Karanpura valley but only limited geological explorations appear to have been carried out over this large area. Additional geological investigations followed in the 1920s but little actual mining occurred beyond a few private, underground mines. Once India became independent, a major effort was made to increase coal production. Consequently, GSI investigations and re-surveys of the North Karanpura coalfield were conducted from 1953 onwards (Ghosh, 1955). The general procedure is that once coal has been identified in a certain area, CMPDI is tasked with the responsibility for detailed geological investigations (CAG, 2012). Intensive explorations were carried out in North Karanpura from 1974 by the CM-

15. Later maps follow the same outline as far as can be ascertained, since they do not use detailed geo-referencing. Detailed coalfield borders, including the outline of coal blocks, remain uncertain, but have been estimated in this study based on recent coal-mining maps and active mining seen on satellite images.

PDI (Advance Environmental Planning Group, 1987). Throughout the many explorations and re-surveys from the 19th century to the present day, the outline of the North Karanpura coalfield appears to have remained largely intact, including the way the separate blocks were delineated in the 1960s. This indicates that social movement protests against displacement from the 1980s onwards, and the introduction of environmental screening via national environmental approvals in 1991, have had no apparent influence on overall coalfield planning.

The North Karanpura coalfield has been divided into a number of coal blocks for what appears to be administrative reasons. The purpose and use of the term ‘coal block’ remains unclear, as it is neither a mining technology nor a geological sciences term. In India, the Coal Blocks Allocation Rules of 2017 do not offer a definition of a coal block other than ‘an area containing coal which has been identified in accordance with . . . rule 3’ (Ministry of Coal, 2017b: 12). Rule 3 simply states, however, that the government should identify the coal blocks ‘as per the standard technical parameters’ without mentioning what technical criteria are to be used. In this sense a coal block is very similar to a coalfield, an area containing coal that is technically and economically feasible to extract. It appears clear that blocks were not part of the original coalfield planning, as the first North Karanpura coalfield maps from 1871 and 1925 (Geological Survey of India, 1871, 1925) do not contain coal blocks. Blocks are similarly absent in the first reports of independent India (Ghosh, 1955). Perhaps there was no need to divide the coalfield into blocks in the initial stages when the entire area was leased to a single company, the private Karanpura Development Company (Geological Survey of India, 1925). Blocks appear to have been added at a later stage, possibly in the early 1960s, to divide the large coalfield into areas amenable to individual coal mines. From the 1960s onward coal blocks have been planned with no mention of the overall coalfield, thus hiding the wider land-use picture.

The North Karanpura coalfield, estimated to contain 9 per cent of India’s known coal reserves, was planned as a public sector mining area in the 1970s and 1980s after coal mining had become nationalized. By the mid-1980s, the region had turned into an open-cut mining area as new, large-scale mining projects were started. The land use in 1987 was estimated at 50 per cent forest, 16 per cent fallow land, 10 per cent cultivable waste land and 24 per cent other land. It was well known that the population was from marginalized groups; a study of 51 villages reported 23 per cent Scheduled Caste and 26 per cent adivasi residents (Advance Environmental Planning Group, 1987). This was not seen as a problem but rather a reason to continue mining plans, as:

[available knowledge] clearly brings out the generally beneficial effects of whatever industrial activity . . . has been started in the area, as evidenced by better income levels, [and] better literacy rates . . . in the villages around the industrial locations as compared to villages in the hinterland. Since considerable mining activities are to be taken up in other areas in the region, the economy of villages in nearby areas is also expected to undergo similar upbeat transformation. (ibid.: 70)

Jharkhand's history of coal mining stretches back over a century when peasants and landowners turned to coal for windfall gains (Rothermund and Wadhwa, 1978) and in the process transformed the land into a continuous urban-industrial tract (Herbert and Lahiri-Dutt, 2004). This early mining growth primarily occurred towards the east, in and around Dhanbad but extending into Raniganj (in West Bengal). It is only in recent decades that coal mining has expanded westwards, 'opening up' new frontiers into the forested territories of North Karanpura, inhabited largely by the adivasis who often used land that was not necessarily recorded in their names. This expansion also coincided with a neoliberal emphasis on efficiency and productivity, which led to the replacement of the handful of old-style underground mines¹⁶ with large-scale, mechanized, open-cut coal mines. The World Bank facilitated the process, and mining technologies imported from Australia were supposed to ensure truly modern coal mining (Herbert and Lahiri-Dutt, 2004). A host of environmental mitigation and reclamation activities were also supposed to be followed by the mines (Advance Environmental Planning Group, 1987) but these have been criticized by a number of reports (Greenpeace India, 2012; SARINI and JMAC, 2010).¹⁷ Eventually the World Bank withdrew from the project (Herbert and Lahiri-Dutt, 2004).

The report by the Advance Environmental Planning Group outlines in detail how the transformation of land use of North Karanpura was envisaged in the early 1980s, with mining expected to use over 20,956 ha in 1994–95, including for housing and transport. The initial plan divided the coal-bearing area into 26 mining blocks roughly corresponding to separate mines (Advance Environmental Planning Group, 1987). Each block can, however, contain several mines (Sinclair Environment, n.d.) although the opposite is also possible — that is, one mine can spread across several blocks (CMPDI, 2012). The shift from underground to open-cut mining, with a consequent vastly enlarged land requirement, was justified simply as being based on 'geo-technical considerations' (Advance Environmental Planning Group, 1987: 47) without specifying what these were. Until 1993, there were no specific criteria for coal block allocation. Most allocations were on the recommendation of the state government where each project was proposed (CAG, 2012). Initially, coal blocks in North Karanpura were

16. Production at North Karanpura remained modest until nationalization of all coal mines between 1971 and 1973. In the mid-1980s it had increased to 6 million tons per year with five operating mines of which three were open-cut (Advance Environmental Planning Group, 1987).

17. Coal India monitors the reclamation of closed mine land via satellite images and claims to have a very high reclamation success rate of 77 per cent across 155 examined mines (Ministry of Coal, 2017a; see also CMPDI, 2014). The criteria defining land reclamation are not known, and North Karanpura field visits, supplemented by high resolution images, fail to confirm meaningful reclamation, let alone a return of land to other uses once mines are closed. Independent research on land reclamation is much needed to complement existing knowledge.

allocated to CCL. Later, private companies received mining leases, particularly in remote parts of the coalfield with known law and order problems. These mines never opened and recently became part of the national coal allocation corruption scandal that saw authorization for more than 200 mines cancelled by the Supreme Court in 2014 (see Bhandari and Lamba, 2013; CAG, 2012; Supreme Court of India, 2014). The corruption scandal does not appear to have changed land-use planning, however, and plans for extraction in the coal blocks continue as before, in spite of a revised allocation procedure via auction.

Coal Blocks Become Separate Mines

Once the land has been identified as a coalfield and outlined in separate blocks, each block is planned as one or several mines. Not only do the coal blocks lack a clear definition, they are often conflated with coal *mines* in planning processes. One example of this comes from the approval document for the North Karanpura coalfield Keredari A mine, which is phrased as ‘Coal Mine Block approval’ (MoEFCC, 2010). Another example is The Coal Mines (Special Provisions) Act, 2015, which lists 204 ‘Coal/Mine Blocks’ that are to be auctioned to the highest bidder, as if the two terms are the same.

Coal development in North Karanpura was entirely in the hands of the private sector until 1958, when the government-run Bachra underground mine was opened. At present there are 59 outlined mines in the North Karanpura coalfield, of which 17 are operational. CCL owns 67 mines in total, across its different coalfields in central-eastern India, of which 42 are open-cut; it owns all 17 operational mines in North Karanpura (CCL, 2016a). Not all mines operate in the same way; rather, the continued expansion of coal mining has created mines with strikingly variable extraction and transport technologies, even within the North Karanpura coalfield. Open-cut extraction with mechanized mining, such as the World Bank-sponsored Piparwar mine, exists side-by-side with mines using manually loaded trucks travelling on rough forest roads, as well as underground mines operating with rudimentary equipment and limited infrastructural support. Within the different ‘resource worlds’ (Lahiri-Dutt, 2016a) in which coal operates in India, private firms are once again becoming increasingly prominent, while official ownership remains public via CCL. A lack of transparency in terms of who is responsible for certain activities creates serious challenges for accountability in day-to-day operations, including in the varying reports on land use and compensation, even between mines within the same coalfield (CAG, 2012).

As forest and agricultural lands become coal mines, conflicts over land with local communities are conspicuous by their absence in the official reports of Coal India. Land, however, remains a concern for the company as evident from the number of delayed projects (34) listed in its annual report, with about half being delayed due to issues related to land acquisition

Table 1. Official Landholdings of Central Coalfields Ltd in 2016

Reason for acquisition	Size (ha)
Railways	9,332
Nationalization*	15,384
Acquired under CBAA**	49,519
Direct purchase	2,129
State mineral concession***	2,770
Total	79,134

Notes:

Land acquired under:

*Coking Coal Mines Nationalization Act, 1972, and Non-Coking Coal Mines Nationalization Act, 1973.

**Coal Bearing Areas (Acquisition & Development) Act, 1957.

***Mineral Concession Rule & Other State Acts.

Source: CCL (2016a).

(Coal India Limited, 2016). Private mines have fared even worse, unable to commence mining despite governmental approval (Supreme Court of India, 2014). Nationally, such delays in land acquisition have been blamed on a lack of knowledge among coalface communities. The Ministry of Power is of the opinion that 'Coal Companies should work closely with the communities affected such that the enduring value of coal mining is well appreciated by the local communities' (Ministry of Power, 2012: 127). Getting 'physical possession' of the land that has been approved and acquired from a distance is thus presented as a daunting task by Coal India. According to a report published by the CCL subsidiary that operates in North Karanpura, forested lands are a key problem because 'encroachments [are] not easy to get rid off [sic]' (CCL, 2016b: 127). Consequently, the report laments that 'the rehabilitation of project affected persons has become a big bottle neck in the development of new projects' (ibid.). Table 1 summarizes the 2016 landholdings of CCL.

Our analysis of the North Karanpura coalfield shows that the original size of the coalfield — 122,000 ha — is different from the size which can be measured by GIS analysis of the 59 coal blocks, which amounts to only 48,200 ha. The approved size of mines according to the MoEFCC is 3,800 ha. Whether the remaining 44,400 ha of the coalfield is intended to be mined is not known. Our analysis further indicates major differences between the coal block map and actual mining. As coal blocks moved from overview planning based on imprecise coalfield maps to detailed mine planning, the land use has changed considerably. Once approved, for example, the Piparwar mine grew from 533 ha to 1,164 ha, more than twice the size indicated on the North Karanpura block map (Advance Environmental Planning Group, 1987), for reasons that are unclear but are most likely related to more coal having been found as detailed geological investigations proceeded.¹⁸ The expansion of

18. Available planning maps uniformly lack geo-referencing details, making their accuracy highly uncertain. The changed size (and shape) of the Piparwar mine appears to be beyond any possible margin of error but this remains challenging to estimate in detail.

mining blocks outside the area designated as the North Karanpura coalfield — without an explicit discussion among regulatory authorities about the implications for existing land uses and people dependent on this land — indicates an inability to plan for long-term land use among authorities.

Incremental Expansion

CCL has frequently proposed coal mine expansions since open-cut mining commenced in North Karanpura in the 1980s; in recent years, the intensity of activities has increased, both in terms of expanded mining area and augmented rate of extraction within existing lease boundaries. Understanding the expansion of the North Karanpura coalfield has been made easier since the early 2000s by the Ministry of Environment, Forests and Climate Change which presents data about individual mines on its website for environmental approval purposes. While three mines continue to operate based on approvals received before national environmental legislation came into play in 1991, MoEFCC documents make it clear that up to March 2017, 14 different North Karanpura mines had been approved by the ministry for establishment or expansion via 31 separate applications. The MoEFCC approval documents and meeting notes show that mines located immediately adjacent to each other are considered to constitute individual projects; they are therefore discussed in isolation and not as part of a wider coalfield. Approval documents do not provide clear reasons for changes or expansions, instead focusing on the presence of environmental norms that could prevent them from going ahead as proposed. The underlying motivation is to implement Coal India's vision 'to provide energy security to the country' (Coal India Limited, 2017). The highly contested nature of the North Karanpura coal expansion is laid bare in an expansive set of civil society reports and academic journal articles from the early 1990s to the present day, and across a range of concerns including displacement (Areeparampil, 1996; Bharat Jan Andolan and Nav Bharat Jagriti Kendra, 1993; Herbert and Lahiri-Dutt, 2004; Lahiri-Dutt et al., 2012), biodiversity (Greenpeace India, 2012; Imam, 2017), cultural heritage (Bhaskar, 2017; Imam, 2004), human rights (SARINI and JMAC, 2010) and violent conflict (Oskarsson, 2017). It is only in the light of this comprehensive body of literature that we can understand the explosive nature of contestation, and in turn the frequently delayed, step-by-step expansion of individual coal mines.

Field visits and satellite images make it clear that six approved mines are yet to commence operations. Mines approved as far back as the early 1990s, such as the Rohini mine (MoEFCC, 1995), have yet to open. Other mines have faced years of delay, like the 4.5 million tons per year Amrapali mine on 1,426 ha, originally approved in 2006 but only implemented from 2015 (MoEFCC, 2006, 2015). One recent example of the flexibility of the coal mine expansion comes from the 833 ha Purnadih mine, originally approved

Table 2. Land-use Change Estimated by GIS Analysis

Land cover (ha)	1988	2001	2016
Forest	21,370	22,420	17,480
Open land / agriculture	33,150	30,980	34,800
Water bodies	266	544	322
Mining	1,190	2,020	3,360

in 2007 and again in 2009, and finally opened from two different ends around 2013. During interviews at the North Karanpura coalfield in 2014, respondents clearly stated that mining had been delayed due to land protests, leading to a commencement of mining from a different end of the mining lease area. When one of the authors visited the Purnadih mine in 2014, trucks were busy removing overburden rocks. The new second pithead of the mine appeared to be only a few months old and operations had yet to reach the underlying coal seam. This does not appear to have been the original plan but indicates that for individual mines there is significant operational malleability to local conditions, even after all government approvals have been granted.

Analysis of publicly available satellite images for three years — 1988, 2001 and 2016 — shows that, since the late 1980s, a number of open-cut coal mining operations have begun in the North Karanpura coalfield. Supporting information photo S1 (in the online version of this article) presents a time series analysis of land data to show that the amount of land used for coal mining and related processing and transport infrastructure increased from 1,190 ha in 1988 to 3,360 ha in 2016. As noted earlier, these agricultural and forest lands are theoretically and legally inalienable, and are meant for India's Scheduled Tribes. It is not known if the present mines will consume all the land within their coal blocks before being exhausted. The actively mined areas occupy coal blocks of 14,700 ha in total. The GIS analysis also makes it clear that the most noticeable rate of increase occurred after 2001. This marks the period of heightened 'land wars' across India but it is apparent that India's energy crisis ensured that land continued to be diverted to coal mines through incremental processes of dispossession. The absolute figures from the GIS analysis of land-use change are presented in Table 2.

DISCUSSION AND CONCLUSION: UNDERSTANDING CUMULATIVE LAND GRAB MECHANISMS

This article has outlined a process referred to as a cumulative land grab to explain how it has been possible to divert large land areas for coal mining at a time of heightened land contestation in India. The North Karanpura area and its coal have been shown to be part of long-running layers of historical and contemporary outsider resource extraction and land use on

an immense scale. By combining different forms of evidence, this article has presented an explanation for how these large land areas can be acquired in a context of extensive social protest and democratic support for rights including access to courts. A story of deep conflict over land emerges, with major sums being spent on compensation both to displaced people and for new forest plantations. And yet enormous disruptions continue to affect the social life of thousands as the coal pits advance and the area, its rivers, remaining forests and fields, literally turn black as a result of widespread environmental degradation. Local protests continue, but have few meaningful results, beyond monetary compensation for some who have lost land to the mines. The expansion via a cumulative land grab goes on. As an indigenous person displaced from the Piparwar mine of North Karanpura put it: 'like children grow up with age, the colliery was small, but little by little it has become big' (Lahiri-Dutt, 2016b).

Due to the lack of attention to cumulative acquisition — the approach presented in this article — land transfers in India have been underestimated in the extensive literature on 'land wars'. Consequently, the scale of the transition which the country has been undergoing since economic reform is also underestimated. Investigating cumulative land grabs may thus allow us to start linking the 70 million displaced in India with equivalent areas of land. The cumulative land grab process described here has deep roots, as the North Karanpura coalfield was identified and outlined by non-*adivasi* geologists as far back as the late 1800s. The coalfield was later cemented as a resource enclave for outsiders when mines in this *adivasi* area were given names of ancient Hindu kings like Ashoka and Magad from the state of Bihar, of which Jharkhand state was a part at the time. Even the period of intensified land use for coal mining, from the late 1980s to the present, represents a relatively prolonged period in the context of the study of land grabbing, but one which we argue is essential to understand the development of contested territorial transformations. The cumulative process studied over time at North Karanpura does not conform to the common understanding in the literature of a land grab, which is seen as a sudden process. Cumulative accumulation of land not only slips under the radar of international coverage of land grabbing, it also forces us to expand our understanding of what the concept of land grabbing means. By linking cumulative land grabs to the wider political economy of energy security we have attempted to show both the connections between land-use changes in North Karanpura and key national policy goals, and the flexibility and insularity afforded to individual mines which have been able to expand wherever resistance has been lowered.

The benefit of using different methods that can robustly examine these changes at different scales and across time periods is enormous. Collectively, they provide detailed evidence of why and how events unfold, and how they remain invisible from public scrutiny. Methodologically this article offers a new way of approaching land grabs in mining areas, using aggregate site-level dynamics where the full force of the effect of land-use change is

experienced over time. This approach requires looking for, and using, new kinds of data on land. For India, these data are publicly accessible, in English, for those who might be interested in tracking the changes. Beyond analysis of the data, the key is to understand the planning and policy-making processes that enable the dispersed Indian state to present an appearance of smaller land acquisitions without ever providing an overall picture of how this amounts to land grabs of contiguous tracts of land measuring tens of thousands of hectares across India's more than 50 large coalfields. The results discussed here also have wider implications for the mining of other minerals and metals in other parts of India, including, for example, land and corruption controversies over iron ore mining in the states of Karnataka, Goa and Odisha. It could also have implications for the cumulative expansion of the urban-industrial frontier surrounding India's mega cities. Future research may thus show how large swathes of land are grabbed and converted in cumulative land grab processes, turning agricultural fields and forests into mine pits and waste piles, but also into infrastructure, industries and built-up areas.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Photo S1. Time Series Analysis of Land-use Data, Jharkhand (1988, 2001, 2016)