

# Transforming Rural Light and Dark under Planetary Urbanization: Comparing Ordinary Countrysides in India and the UK

## 1 Introduction

The infrastructure of public lighting is changing rapidly with the spread of LED lighting, integrating with solar energy, improved battery storage, and smart city technologies. LED products contain the promise of providing more flexible and cheaper lighting than previous technologies (Adkins et al., 2010). Research shows that the initial wave of LED lighting technologies has been implemented unevenly, providing vital lighting to previously unlit areas, but contributing overlighting elsewhere (Kyba et al., 2017). Furthermore, many homes and communities are still lit using older technologies such as oils and sodium gas. The result is an unusual and uneven geography of technological development and diffusion.

In this paper, we explore how these changes are playing out in rural areas of Bihar in India and the North Pennines in the UK. We do so for four reasons. First, because changes in lighting practices draw attention to the role that the countryside is now playing in technological innovation and experimentation. Second, because the emergence of theories of planetary urbanization raise the question of the role of the countryside in a progressively urban world (Brenner & Schmidt, 2015; Ruddick, Peake, Tanyildiz, & Patrick, 2018). Specifically, it causes us to ask how cities and countryside come together (or not) to form global environmental and economic systems; in this paper, we argue that the countryside becomes an increasingly infrastructural space, but not necessarily an urban one. Third, because comparative urbanist research between global North and global South has been shown to be a useful tool in correcting some of the theoretical biases that North-based academia has tended to have, and we extend these insights from urban to rural locations (Robinson, 2016). Fourth, because the specific focus on lighting (and darkness) raises questions about the society-nature relations that are involved in evoking the 'planetary' as a scale of analysis.

We begin by reviewing the literature on planetary urbanization and comparative urbanism, showing what insights from rural studies might bring to this debate. We then explore how geographers and social scientists have begun to understand the role of light and dark in everyday life, in the context of spreading technological innovations. Our case studies then allow us to show how different rural locations are being transformed through changes in lighting technologies and practices, generating new planetary ways of living.

## 2 Literature Review

### 2.1 The rural in planetary urbanization

Robinson argues that the purpose of comparative urbanism is to create “a more global urban analysis” and stimulate theory cultures alert to the local, while also staying open to learning from other places and scholarly traditions (Robinson, 2016, p.188). We agree with this aim, but we see no reason for limiting it to cities. Comparative approaches do have a foothold in rural geography (e.g. Marsden, 1999), as well as in development studies (see below). Nonetheless, within geography, calls for comparative research have emerged alongside and in productive debate with theories of planetary urbanization, which have argued that the planet has become subsumed into a single, urban-dominated system. In other words, “with the unrelenting growth of large urban agglomerations in the wake of globalizing capitalism” non-urban spaces are continuously brought into, and co-opted into the urban (Arboleda, 2015, p.2). As part of such arguments, the sociospatial forms of ‘the city’ and ‘the countryside’ are taken as different manifestations of an “uneven thickening and stretching of an urban fabric” (Brenner & Schmidt, 2015, p.1.67), rather than as inherently different categories of space. The apparent gap between ‘comparative’ or ‘postcolonial’ urbanists and planetary urbanization has driven conceptual debates in urban studies and urban geography since the mid-2010s, though we agree with recent work which has argued that the differences raised in these debates are not between two, irreconcilable camps (Brenner, 2018; Loftus, 2018). Indeed the framework of planetary urbanization should encourage cross-national comparisons of both city and countryside life, insofar as it suggests that they are subject to similar processes of ‘extended urbanization’ (Castriota & Tonucci, 2018). What is important here is that planetary urbanization does not claim that the countryside disappears, or that it becomes homogenised, but that it is transformed by urban as opposed to rural logics (Keil, 2018).

Our research intervenes in two key ways. First, it follows calls for greater attention to be paid to the ‘planetary’, as opposed to ‘urbanization’ (Loftus, 2018). Several scholars have recently noted the absence of Spivak’s concept of ‘planetary’ (Derickson, 2018), an idea that she uses to stand for “difference, unknowability” (Jazeel, 2018, p.406), in contrast to the global. In other words for Spivak, the planet does not necessarily equate to the globe; following Catterall (2013, p.838), the planet might instead be a more ‘earthy’ idea, one which combines the big scale ‘globe’ with the small scale ‘ground’ (Loftus, 2018). The turn to lighting, as we outline in section 2.2., addresses this question of the planet, creating an engagement between what Shaw calls the biogeoastronomical cycle of light and dark (Shaw, 2018, p.50), and socio-technical lighting infrastructure. Second, planetary urbanization has been weaker in describing social lives than other approaches in urban studies. Ruddick et. al. (2018) argue that it is difficult “to locate either subjects or the process of subjectivation” (p.396) in much of the work; we would point to the foundational *Implosions/Explosions* edited collection as illustrative of this (Brenner, 2014). Ruddick and colleagues

call for “a social ontology of the urban” (p.388), which accounts for people’s everyday experiences and struggles, to enhance the theories of planetary urbanization. In our view, planetary urbanization does not inherently preclude analysis more directly embedded in the everyday, and some studies have shown the potential to create insights when this framework is applied to everyday social struggles (e.g. Wilson and Bayón, 2015; Arboleda and Banoub, 2018). Nevertheless, the breadth of research drawing on the everyday and on theories of planetary urbanization is relatively limited and, in combination with less attention being paid to the planetary, suggests space for more understanding as to how planetary subjects are produced through planetary urbanization.

We can also draw from the insights into global connections as developed in rural studies. Here, the globe has typically been imagined in terms of flows and networks, containing “contradictory processes of depopulation and ageing, processes of modernisation or reinvention of tradition and of marginalisation” (Hedberg & Do Carmo, 2012, p.2). In other words, rural spaces are subjected to transformation in an era of increased global flows, and such transformations may produce greater or lesser interconnectivity. This conceptualization of the ‘networked countryside’ means that we cannot equate infrastructure with urbanization, as commonly happens within urban studies. While infrastructure is, of course, a key part of urbanization, not all rural infrastructural developments are necessarily evidence of urban life. Woods’ (2007) description of the ‘global countryside’ contains various references to infrastructural elements, while infrastructure has been identified as a key element of developmental requirements in rural areas (Rodríguez-Pose & Hardy, 2015 p.20). While comparative urbanist approaches have been strong in looking at everyday infrastructural lives (see the collection edited by Graham & McFarlane, 2014), similar comparative research is less present in most of rural studies. As noted, development studies is stronger than geography in this respect, particularly in the Marxist tradition, where ‘the agrarian question’ of how capitalism transforms peasant lives has driven research which seeks to compare the trajectories of rural lives in different countries (Bernstein, 1994). Within this research, the focus is on “the processes that contribute to or constrain the emergence of agrarian capital and rural capital” out of non-capitalist peasant farming systems (Akram-Lodhi & Kay, 2009, p.20). Both this Marxist perspective, and insights from rural studies show that the countryside of the “global North and global South contend with the same challenges, albeit at different scales, intensity and immediacy” (McDonagh, 2013, p.715). Having shared challenges highlights the need to pay attention both to the uniqueness of distinct regional, national and international contexts of rural areas, and the ways in which they are transformed by becoming part of global systems (Hedberg & Do Carmo. 2012)

Playing with Robinson’s description of ‘ordinary cities’, we suggest exploring the comparisons between ‘ordinary countrysides’. By this term, we mean paying attention to rural spaces as

simultaneously being embedded increasingly in heterogeneous global flows and as having distinct features based on local geographical, cultural and historical specificities. Following this, our analysis draws from the “complexity and diversity” of specific rural settings (Robinson, 2006, p.2). To study ordinary countryside is to prioritize neither global connections nor local difference, but to see the ways in which the specific stories of rural places inform our understanding of a global, infrastructural countryside. Studies of the countryside in planetary urbanization have tended towards questions of resources, treating it as a sort of enhanced urban hinterland through which communication networks cross and onto which environmental degradation is done (see for example Meili, 2014), although work drawing from Monte-Mar’s concept of extended urbanization has started to correct this (Castriota & Tonucci, 2018). Nonetheless, there is a relative absence of attention to the everyday and the planetary within theories of planetary urbanization, particularly when contrasted to comparative urbanism. As we outline in the next section, the night, its illumination and lived encounters with this is an ideal topic to draw us to the relationship between subjects and the planet. Furthermore, our case study sites seem caught up in contradictory trends, whereby the villages of Bihar in India are having greater levels of artificial illumination introduced, while those of the North Pennines in the UK face a reduction in street lighting. Through our comparison, we want to take seriously the call for research in which theory learns meaningfully from diverse geographical locations, particularly through this act of bringing global North and South together (Robinson, 2016).

## 2.2 Light, Dark and Illumination

As Edensor (2017, p.12) argues, natural light and darkness are together actors both in the production of landscape, and our experience of it: “the most evident agent of vitality [in landscape] is light that pervades land and sky”. This agency is not just located in the role that lighting levels play in observation of landscape. Rather, light and dark operate in the same way that we might readily imagine water to produce landscape. Different lighting levels both shape how we encounter landscape, as well as many physical factors: plant growth, animal movement, water evaporation and snowmelt, and so forth. Crucially, this role in the landscape is held by light and dark together. Outside of extreme or contrived circumstances, pure darkness does not exist on earth: rather, we encounter varying levels of brightness and ‘gloom’ (Edensor, 2013). This is why we refer to light and dark as one of the planetary components of living; they connect everyday life to biological, evolutionary, astronomical and ecological forces. Despite this, studies of lighting have tended towards a focus on the relationship between artificial illumination on the one hand and the darkness of night on the other, but as well as Edensor’s (2017) exploration of natural lighting levels, research has begun to consider how we encounter the varied natural lighting of night skies (Jóhannesson & Lund, 2017).

The social science of light and dark in the last decade has moved quite comfortably between urban, suburban and rural settings, albeit in rural settings largely focusing on infrastructural or policy issues. This has generated many insights – four seem particularly relevant here. The first is the emergence of new technologies of artificial illumination, primarily driven by the use of LED lighting both in public lighting and in artistic lighting programmes. In both urban and rural contexts, these have been used to create art installations and light festivals (Edensor, 2017; Morris, 2011), as well as new forms of artificial public lighting. As this lighting is more flexible – it can be more cheaply and easily switched on and off, and its illumination levels can be changed – it has attractions for local authorities in diverse geographical contexts. One such context is combatting light pollution, the focus of the second major theme of research. In a discussion of darkness and mountains, Gwiazdzinski and Straw (2018) “find landscapes transformed by light” (p.2), while in the battle against light pollution, activists for darkness have turned to rural experiences as showing an ideal of minimal lighting (Daniel, 2011). The encroachment of light has led to attempts to protect rural darkness, most obviously through the work of the International Dark Skies Association, which accredits a variety of ‘Dark Skies Places’ (Hölker et al., 2010). These are places where artificial lighting has been controlled such that ambient light levels are below a given value of lumens. This valuing of darkness leads to our third theme, the exploration of meanings associated with light and dark. As this article will explore, light and dark have diverse meanings globally, differing both culturally and by social groups within cultures (Edensor, 2017). Darkness has often been associated with being ‘backwards’ or otherwise ‘less modern’ than brightly lit places (Badlwin, 2012; Maile-Petty, 2010). Such meanings have often developed quickly; Baker (2015) explores how Europeans of the late nineteenth century found India’s lack of artificial illumination to add to its exoticism, even though most European cities had only received significant artificial light in living memory.

Fourth, lighting has been seen as central to the roll-out of ‘modernity’ to the countryside, and the associated developmental agenda. Despite evidence that many people give more importance to other forms of electrification (Kumar, 2018), lighting is a key marker of development. In the last decade, many western for-profit and not-for-profit actors have ‘experimented’ with various forms of lighting provisions based around solar powered LED lamps (Adkins et al., 2010), as well as more innovative projects such as ‘Litre of Light’ (Numminen & Lund, 2017). These have sought to provide lighting without connecting homes to national grids, avoiding conflict with other demands of electrification. In turn, this innovation has informed technological development on a wider scale. This troubles established understandings of the geographies of technological development, in which technologies are developed in the global North and then exported to the South. These insights from the literature on artificial lighting and darkness show that this topic can respond to the planetary

urbanization literature. Changing rural darkness and the meanings associated with dark and light help us explore the ways in which everyday lives might be lived in relation to the planet, while experimentation with new LED technologies allows us to talk about infrastructural transformations which are at once urban, rural, local and global.

### 3 Methods

This paper brings findings from two different research projects carried out between 2012 and 2018. Our Indian case study is based on ethnographic research in five villages in Bihar, a largely rural state in north-east India. During 2012-13, [insert name after peer review] spent three to six weeks in each of the five villages for a nine-month-long ethnographic study involving 60 family interviews and home tours (34 higher caste and 26 lower caste), 10 group discussions and 24 elite interviews. The research explored two low carbon energy case studies and two baseline energy systems. The first case study, present in two research villages, Bijuriya and Sahariya, is *Lighting a Billion Lives (LaBL)*,<sup>1</sup> in which a solar lantern charging station with 50 or 60 lanterns is set up in an entrepreneur's house. The villagers pay daily or monthly rentals for the lanterns. The second case study, present in one village (Hardiya) and defunct in a second (Bijuriya), is *Husk Power System (HPS)*.<sup>2</sup> HPS is a private company that finances, operates and maintains micro-grid powered by biomass gasifiers. For a set rental, customers are allotted fixed electricity wattages. The baseline cases are Rangpur, a village with electricity supply from India's central grid and, Berangpur, a second village that neither has electricity from the case study projects nor the central grid. An entrepreneur in Berangpur runs a diesel generator micro-grid for domestic light. People in all five villages use kerosene oil.

The data from the UK case study is from the valleys of Teesdale and Weardale, located in the North Pennines, a moorland area of England. Data from Teesdale and Weardale draws predominantly from existing secondary sources. First, we analysed five policy documents related to street-lighting and sustainable planning from the local authority Durham County Council (DCC), published between 2010 and 2016.<sup>3</sup> Second, we used keyword searches to find articles in local newspapers (the *Northern Echo* and the *Teesdale Mercury*) published about street lighting between 2016 and 2018, these dates chosen to reflect policy change in 2016. We found eight articles, and in addition to the published text, we collated online comments from each article. Third, using keyword searches, we consulted tourist leaflets and websites for the area, capturing the versions available in September 2018.

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<sup>1</sup> Lighting A Billion Lives; <http://labl.teriin.org/about.php>; retrieved 22-11-18

<sup>2</sup> Husk Power System; <http://www.huskpowersystems.com/about-us/>; retrieved 22-11-18

<sup>3</sup> These consisted of: two iterations of the *Street Lighting Policy* (2010 and 2016); *The Sustainable Community Strategy for County Durham 2014-2030* (2014); an update on the *Street Light Energy Reduction Project* (2015); and the *Neighbourhood Services Service Plan 2016-2019* (2016)

Fourth, we drew from [insert name after peer review]'s participant observation notes from two visits to an art installation in Teesdale in 2016.

There are clear methodological differences in the UK case study, primarily drawing from secondary data, and the Indian case study, primarily drawing from primary data. In part, this reflects the nature of our collaboration, drawing together two independent projects which aimed to answer the same question: how do people make sense of the arrival and departure of modern lighting technologies in the context of their cultural understandings of light and dark? The paper is an outcome of a longstanding intellectual collaboration between the authors maintained through regular conversations and co-organisation of conferences.<sup>4</sup> These collaborations led to an exploration of convergences and divergences in the two projects. Subsequently, we carried out a second analysis of our respective data to develop themes presented in the paper. The differences in data also reflect the differences in lighting governance, as described in section 4.2. Specifically, in India, while public lighting is nominally the responsibility of central and provincial governments, in practice it is provided by a range of actors including NGOs, local authorities, corporations and private individuals. To understand lighting therefore requires conversations with a wide range of actants. By contrast, in the UK, public lighting is more formally subject to local authority control, which in turn is legally bound to a set of obligations set out in the British and, at the time of writing, EU Lighting Standards. Lighting practices can therefore be understood more directly through a focus on the policy documents of the relevant local authority, in this case, DCC. By contrast, such local authority documents do not exist in Bihar. Nonetheless, we note the limitations of this study in using datasets of differing types (predominantly ethnographic v predominantly secondary), and we have attempted to analyse the data accordingly. Analysis of both followed a grounded theory approach (Cragg & Cook, 2007). NVivo was used to code the field notes, photographs, interviews, documents and website data. Multiple rounds of in-software and on-paper coding led to the generation of relevant quotes used in the paper. Name of people have been anonymised, with pseudonyms used rather than interview numbers to avoid dehumanising the participants.

#### 4. Comparing Rural Lightscapes in India and UK

##### 4.1 Darkness, Illumination and Discourses of Safety

Artificial light is a signal for human presence; in Bihar light is therefore connected to development and human habitation in a landscape. This rings true regardless of the lighting technologies involved. The arrival, establishment and continuous presence of artificial lighting make the human claim of

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<sup>4</sup> Some specific details to be added after peer review

development more prominent by connecting to notions of modernity, as light gives more than just material illumination:

Light does not mean only light. It translates into a lot of other developments. It actually...translates into many other facets such as education, empowerment in general, health, networking. When you see the impact of light in those villages, where were they yesterday, where are they today? So, you feel, yes something has happened.

(Gurpreet Bedi, Manager, *LaBL*)

Mr Bedi connects the arrival of light to the arrival of development, modernity and 'enlightenment'. Efforts to bring modern energy to people around the world, primarily in the form of lighting from solar lamps and micro-grids, focus on this rhetoric of development (Kumar, 2018). Such an understanding has a long history cross-culturally (Edensor, 2017), and so it is perhaps unsurprising to find it in Bihar. In County Durham, however, this meaning is largely lost. Writers have regularly found that lighting, once established, becomes a background technology, naturalized as always present, except in periods of breakdown (Baldwin, 2012; Nye, 2010); this contrasts to the often higher visibility of infrastructure in the global South (Gupta, 2018). In such contexts, the presence of artificial lighting is not seen as a marker of modernity; rather, it gains a quasi-ontological status, a marker of how things are. An online commenter on a 2013 *Northern Echo* article on streetlight removal in Weardale<sup>5</sup> says:

Street lights were never threatened with being switched off years ago when council tax was a fraction of what it is now. Why is it that although council tax has more than trebled, we still have the councils saying we don't have enough money for basics?

Note the reference to lighting as a 'basic'. This idea of 'basic' is deeply embedded in the development discourse surrounding lighting in the global South too. Scholars and practitioners of energy access focus on 'basic needs' that can be derived from energy like lighting, entertainment and cooking (Kumar et al., 2019). More recently, The World Bank put such 'basic needs' in a hierarchy framework to guide and assess the progress of energy access work, placing lighting at the most important tier-1 level of 'basic need'.

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<sup>5</sup> 'Turn the lights off and watch crime increase, councillor warns'. 20<sup>th</sup> Nov 2013. *The Northern Echo*. [http://www.thenorthernecho.co.uk/news/local/southdurham/bishopauckland/10822713.Turn\\_the\\_lights\\_off\\_and\\_watch\\_crime\\_increase\\_councillor\\_warns](http://www.thenorthernecho.co.uk/news/local/southdurham/bishopauckland/10822713.Turn_the_lights_off_and_watch_crime_increase_councillor_warns). Accessed 22-11-18

The modernized and developed countryside is thus understood as infrastructural, and the absence or presence of infrastructure as the absence or presence of development. By contrast, the apparent presence of a 'basic' service in Durham is simply 'how things are' or how they 'should be'. A rollback of artificial lighting in County Durham is not framed in terms of 'un-development', but instead as governmental bias or incompetence. In contrast to this, Petrova (2018, p.9) demonstrates that "under-consumption of light is one of the most pronounced expressions of energy poverty" in Europe. While our two locations see similar lighting technologies introduced, residents in both experience and interpret these in very distinct ways, according to local techno-political histories of lighting. This reflects the insights within the economic-focused work of Marxist development studies, which has shown the contrasting ways that different rural areas have been transformed under capitalism (Akram-Lodhi & Kay, 2009).

While the two places depart in their contemporary framing of lighting, in both Bihar and County Durham, changes in illumination are framed in terms of discourses of safety. In Bihar, light and lit spaces give people comfort. During fieldwork in Bihar, an elderly higher caste farmer in Sahariya remarked, "the presence of light gives good feeling". This 'good feeling' comes from mental and physical safety, from both worldly and 'non-worldly' or spiritual threats. A middle age higher caste farmer in Sahariya, when asked why he could not sit and talk in the dark, responded: "Would we feel good in darkness? We are not ghosts that we would sit in the dark! Would you like to sit in the dark, like a ghost?" Indian villages sit in the middle of agriculture fields and tree plantations. It is common for poisonous reptiles and small carnivores, like foxes, to inhabit these fields. Invariably, these animals venture into habitations and injure human beings and cattle. In many parts of India, where villages are close to forests, human-animal conflicts are common. In 2012, in a Rangpur household, the host merrily and casually told stories of huge snakes and scorpions that used to, and still sometimes, crawl the house. A few days later, [insert name after peer review] notes:

"When I made my way to a nearby dalit<sup>6</sup> neighbourhood, I could see cows tied on both sides of the dark village road. Some women also sat near the road. It was dark, and they could sit out, where it was cooler than inside the home, without being seen by the village men. Suddenly my guide said casually, "Look, a snake", as if it was an everyday matter. A man sitting nearby said, "I have a stick", hit the snake, killed it, and threw it aside. We had torches and saw the snake, but many people sit and walk in the dark, without any artificial lighting. They are often bitten and some die too. In

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<sup>6</sup> A lower caste

another neighbourhood of the same village, dalit women told me that sometimes foxes bite their children or cattle as they sit outside, in the dark.” (Research diary)

Such encounters illustrate that while fears of darkness incorporate several layers of social-cultural construction, they also incorporate material dangers.-

These dangers, both socially constructed and materially encountered, are gendered. In Bihar and in ‘top-down’ global discourses of energy access, women are imagined to be especially needing help. Scholars and practitioners argue that the provision of public lighting elevates women’s safety, and helps their mobility, and by extension empowerment (Clancy et al., 2011). However, dictated by socio-cultural norms, many women in Bihar remain limited to inside spaces of homes. In such cases, public lighting gives a ‘feeling’ of safety but does not do much to facilitate mobility and empowerment. Women need to maintain *purda*, a sort curtain or separation from ‘other’ men. Darkness can help female mobility under *purda*, granting freedom to move around, at least to visit a neighbour’s home without being seen, or to sit outside where it is cooler than inside homes during summer. Furthermore, a lack of toilets in many homes in rural India means that women (and men) defecate in the open. Women, in particular, do so either very early in the morning or late in the evening, under the curtain of darkness. Artificial lighting breaks this curtain. In a recent Bollywood film, *Toilet: Ek Prem Katha (Toilet: A Love Story)* that explored the theme of open defecation, the female lead character, while finding it highly inconvenient and embarrassing when faced with open defecation after marriage, came to a breaking point when the headlights from a tractor fell on her and broke the curtain of darkness. While the men of the household did not care much, the female lead character revolted and demanded a toilet at home. [Insert name after peer review] encountered similar gendered discourse of light and *purda* in Bijuriya.

A: Some people told me that after sunset it is time for *purda*, concerning women. What does this mean?

M1: It means they can defecate in the open. Those who do not have a toilet.

[...]

A: So if there is a good facility of electricity, and there is light everywhere, will these people not face problems?

M1: No! No! They will just have to go a bit further.

M2: Meaning, not on the road. They will have to go a bit further in the fields.

M1: But they should have facilities at home.

(Group discussion, Elderly men, mixed caste, Bijuriya)

Although this group of elderly men did not recognise lighting as problematic for women who are forced to defecate in the open, their reasoning - that women can just go a bit further away from the roads and the village – is illustrative. Being forced to defecate in the open already puts women in a vulnerable position. There are frequent cases of sexual assaults on women going in the fields to relieve themselves (Jadhav, Weitzman & Smith-Greenway 2016; see also McFarlane, Desai & Graham, 2014). Public lighting, without the addition of sanitation facilities, forces women to go further away from the habitations and, in this context, put them in positions that are more vulnerable. M1 draws from the discursive connection between lighting and development to presume that lighting comes alongside sanitation. As the men explain later in the same discussion:

If we have better electricity, our [living] standards will raise. And the government makes toilets for everyone either through public toilets or through subsidies.

The power of the discursive connection – electricity will be accompanied by other developmental goals such as improved sanitation – is illustrated here. In [insert name after peer review]'s research, however, the reality was that this connection did not always occur. As such, where lighting was introduced but sanitation not improved, women potentially became more vulnerable by having to defecate further away from habitation. The point, here, is twofold. First, that lighting is believed to be inherently tied to other forms of development, though in practice this is not always true. Second, that the relationship between lighting and safety is complex. While lighting is often presumed to increase safety, and to increase women's safety in particular, in this instance some women may find lighting reducing their safety.

Perhaps surprisingly, public discourse in Teesdale and Weardale made little mention of gender. Instead, comments largely centred on issues of traffic accidents and roadside safety. The removal of lights at Daddry Shield, Weardale, was successfully contested on the grounds that it would put

“children, dog walkers and elderly people at risk” (*Northern Echo*, October 2016).<sup>7</sup> Similarly, the proposal to remove lighting was challenged at North Bitchburn in Weardale on the grounds that “children walk along that road to go to school” (*Northern Echo*, May 2018).<sup>8</sup> Interestingly, of the newspaper articles consulted, only one contained testimony from an individual claiming that they themselves would be at risk, with a resident of Etherley on the border of Teesdale and Weardale saying, “I walk that stretch (of road) to the Blacksmiths [pub]. You have got a very narrow path with a grass verge between that and the road” (*Teesdale Mercury*, November 2017).<sup>9</sup> The majority of testimonies about street lighting concerned the (imagined) safety of others. In these public comments, age was the main determiner of vulnerability, with mainly children, but also frequently the elderly cited as needing protection. The imagined danger was from vehicle accidents or mobility-related hazards (trips, falls etc.), rather than from burglary or attack. This contrasts both with Bihar, but also with urban areas in the UK, where fear of attack broadly and for women specifically are generally more prevalent (Pain, 1997; Wesely & Gaarder, 2004). Such findings may be explained by the lower levels of fear of crime that have existed in rural UK, even though rural fear of crime is increasing (Pain, 2000). The only account that mentions crime levels to a significant extent is from a councillor, who made campaigning against lighting removals a political platform in Weardale. The previously cited 2013 article quoted him as saying “turn the lights off and watch crime increase” (*Northern Echo*, November 2013). However, this statement came amid a wider discourse focused almost entirely on road traffic safety.

In contrast to concerns about snakes and other animals in Bihar, the residents of County Durham have to deal with little more than a few rogue sheep. In terms of the ‘natural landscape’, local tourist literature reframes the relative absence of artificial light in Teesdale and Weardale as an attraction. The *Stargazing in the North Pennines* leaflet, produced by the *Visit County Durham* tourist board, promises that:

“Few people have seen a truly dark sky, but here in the North Pennines, where there are few people and low levels of light pollution, we’ve got the darkest skies in England... [and] we are taking steps to keep our skies dark

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<sup>7</sup> Westgate and Daddry Shield street light removal plans withdrawn. 3<sup>rd</sup> Oct 2016. *The Northern Echo* [https://www.thenorthernecho.co.uk/news/14779299.Westgate\\_and\\_Daddry\\_Shield\\_street\\_light\\_removal\\_plans\\_withdrawn/](https://www.thenorthernecho.co.uk/news/14779299.Westgate_and_Daddry_Shield_street_light_removal_plans_withdrawn/) Accessed 22-11-18

<sup>8</sup> North Bitchburn residents launch petition against street light removal 9<sup>th</sup> May 2018 *The Northern Echo* <https://www.thenorthernecho.co.uk/news/16212049.north-bitchburn-residents-launch-petition-against-street-light-removal/> Accessed 22-11-18

<sup>9</sup> Switch street lights back on before someone gets hurt. 2<sup>nd</sup> Nov 2017. *Teesdale Mercury* <http://teesdalemercury.blogspot.com/2017/11/switch-street-lights-back-on-before.html> Accessed 22-11-18

by encouraging communities and developers to implement measures that will reduce light pollution.”

Artificial lighting is described in terms of light pollution, and reductions in lighting levels are framed in terms of this pollution. These skies are supposedly things of wonder and awe: one tourist website offers visitors the chance to “be one of the few people in England to experience the majesty of the Milky Way and see a whole new side to the night sky” (*Explore Teesdale*).<sup>10</sup> The dark landscape of the North Pennines is thus described in relation to the lights of the night sky and the celestial bodies that can be seen within it. In other words, what is valued in this dark landscape is not solely darkness, but its interplay with light. In this context, we encounter natural levels of light and dark as a resource, as something to be fostered, rather than as a danger, a threat, or a lack of modernity.

#### 4.2 The Role of the State

Despite significant differences in the trajectory of lighting practices and lighting governance responsibilities, both cases studies offer a similar imagination of the role of the state. In Teesdale and Weardale, the vast majority of public lighting is the responsibility of the local authority, DCC.. While some other local authorities outsource this provision via ‘public-private partnerships’, DCC does not, meaning that lighting is operated directly by the local state. In Bihar, lighting governance is more complex. Depending on how integrated the village is into the state’s electricity network the provision could be through: the national electricity grid; the state’s scheme of solar streetlights deployed through the village council; privately operated micro-grids; and lighting projects deployed through NGOs. Therefore, a range of state and non-state actors falling on a spectrum of formalisation are involved.

There is thus a much fuller lighting plan in County Durham than in Bihar. The ‘*Street Light Energy Reduction Project*’ (SLERP) forms part of DCC’s ‘*Neighbourhood Services’ Service Plan 2016-19*’. The role of street lighting in the most recent policy is to “reduce road traffic accidents; reduce the severity of road traffic accidents; reduce the fear of crime; and promote the night-time economy,” though these aims come with “financial”, “environmental” and “amenity” costs (DCC, 2016, p.4). By contrast, the original 2010 version of the lighting policy makes no reference to the costs of lighting (DCC, 2010). Indeed in 2010, the policy states that “public lighting is a part of a sustainable transport policy” (p.3), making lighting a goal in and of itself. In other words, there is a move from in 2010 seeing lighting as a key part of transport policy, and by 2016 seeing it as a tool for specific and aims, which has both costs and benefits.

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<sup>10</sup> Dark Skies. *Explore Teesdale*. <http://www.exploreteesdale.uk/dark-skies> Accessed 22-11-18

The rationale behind these shifts are found in the expanded discussion of the policy, which in 2010 has no mention of lighting removals but in 2016 contains a clear mechanism to justify removal. In the 2010, Durham's rural areas are listed as a single category where roads are "generally not lit, except residential and Industrial Estates" (DCC, 2010, p.5), but by the 2016 version, there is a shift to follow nationally defined Environmental Zones. This places much of Teesdale and Weardale into 'E1', where "the general presumption is that street lighting should not be provided"; other rural areas are in category 'E2', non-protected rural areas, where lighting will be provided on roads in residential areas of villages but not between villages or on footpaths (DCC, 2016, p.5). The 2016 policy includes a statement that street lighting removal is authorised in E1 and E2 where these criteria are not met, so long as a risk assessment is completed and passed. A caveat is that parish councils – the most local level of governance in England – are allowed to take on the funding for any lighting that is to be disposed. This shows a movement from a policy without a mechanism for removing street lights to one designed to facilitate their removal.

By contrast, in Bihar, policies seek to increase and implement more lighting. While governance may be complex, centralized development plans have meant that the Indian state has had the moral, if not practical, the responsibility of infrastructure development and the provision of basic services. Therefore, light and dark in effect also become indicators of state's presence and absence, whereby people see the presence of lighting as effective state governance and its absence as the state failing in its obligations. For example, in Rangpur, a national grid connected village, [insert name after peer review] arrived at a poorer higher caste household where some children studied under a light bulb. A kerosene lantern hung in the doorway. He asked why they had lit a kerosene lantern if the household had electricity from the national grid. They explained that the electricity supply was highly erratic. Just then, there was a power cut. They laughed and said, "Now you see why we kept the lantern on. Now take pictures". Similarly, in Berangpur, a village not connected to the national grid, upon request of the villagers who thought that [insert name after peer review] was a state official or development worker, he spent two evenings going from home to home and clicking pictures to record the absence of electric light, and (by implication) the state.

When the state arrives, it does not arrive unmediated. A number of local, formal and informal brokers mediate the relationship between the state and the people (Chatterjee, 2004). These brokers mediate lighting too, especially when it comes to socio-economically weaker groups. In Sahariya, the 30-40 household strong dalit colony had no solar streetlights (SSL). Dalits complained that this was due to politics. Later members of the higher caste from the same village explained that the head of the *panchayat*, the lowest level of local governance in India, was a man from a neighbouring village who allotted very few SSLs to Sahariya. Indeed the village had very few SSLs

compared to other research villages, largely concentrated in the higher caste neighbourhoods. The Indian state has been working aggressively in the last decade to bring electricity and lights to everyone. Although the state invests in the installation of solar streetlights in the villages, it often leaves the responsibility of their upkeep on the villagers and local political interests. The upkeep does not always happen equally, and SSLs are not always maintained; theft of wires, poles and batteries from SSLs is also common.

Lighting in County Durham also comes in the context of changes in local state governance. As Green et al. (2015) found, views on street lighting provision often go beyond straightforward concerns about mobility, crime or issues related to lighting. In their research, participants expressed concerns over “uncertainty and anxiety about the implications of reduced street lighting not just for their own individual wellbeing, but also for their neighbourhoods as healthy places to live” (p.175). In other words, the loss of street lighting engendered a sense of more than just infrastructure being taken from communities. Such cuts can be seen in the wider context of cuts to rural services and a lack of a sense of democratic accountability. The previously cited article on the removal of streetlights in North Bitchburn, states that this removal was “the final straw” (*Northern Echo*, May 2018) for residents. Stories such as this can be found throughout local news in the region since the start of the SLERP, with further examples of fear over abandonment expressed in Rookhope, Weardale<sup>11</sup> and Daddry Shield. These feelings need to be contextualized in the wider sense of rural abandonment that has spread in England, particularly since austerity politics started cuts to services in the late 2000s. While DCC has attempted to mitigate against some of these cuts – for example, it has avoided some of the cuts to bus services that other local authorities have implemented – still both Weardale and Teesdale have lower levels of public services now than in 2008. In Weardale, schooling for 16-18 year olds has been withdrawn resulting in longer journeys, and in both Teesdale and Weardale, the local authority has sought to close several primary schools (ages 4-11), although local political action has been able to avoid this. In late 2017, the only pharmacy services in upper Teesdale and Weardale were withdrawn, extending journey times for residents. In such a context, a failure to keep the lights on can be understood as symbolic of the wider rollback of the state. These links between austerity and lighting have also been established elsewhere in Europe (Petrova, 2017).

Superficially, the situations in Bihar and the North Pennines are very different: in one, we see attempts at increased levels of artificial light provision, while in the other we see plans to reduce it. Despite the different trajectories, the processes at play are similar and are indicative of the marginal

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<sup>11</sup> Fears over village road left in dark at Rookhope *The Northern Echo*  
<https://www.thenorthernecho.co.uk/news/16220683.fears-over-village-road-left-in-dark-at-rookhope/>  
Accessed 22-11-18

status of rural areas in the contemporary world and the ‘thinning’ of state in rural areas. In both settings, the hold on infrastructures is tenuous. If the “global countryside” (Woods, 2007) is indeed an infrastructural one, then perhaps one distinction between urban and rural experiences is the relative fragility of that infrastructure. While acknowledging that urban infrastructure can also be prone to collapse, crisis and austerity, in both Bihar and the North Pennines there seems a more precarious grasp on its existence and endurance compared to urban areas in the same countries. In Bihar, the state continues to struggle to roll out, and thereafter, endure services such as sanitation and lighting, while in the North Pennines there is a continuous fight for enduring availability of health, transport and education services. In both cases, the precarity of infrastructure is a distinctly rural quality.

#### 4.3 Transformative nature of light and dark

Landscapes are transformed by the action of light and dark together. We have already read that villagers in Bihar generally feel that dark landscapes are more dangerous than lit ones. As we suggested in section 4.1, this extends beyond material questions of safety, to the construction of an association between light and good, and darkness and bad: “the presence of light creates [good] culture” (Male, Elderly, higher caste, farmer, Sahariya), as one participant put it. Despite this discourse, a long established paradox of darkness (see Edensor, 2017 for longer discussions on this) in many cultures is that it both creates perceived dangers, and provides a refuge or space of sanctuary for activities which lack social approval. For example, Indian society prohibits pre-marital love, but as noted previously the *purda* boundary between men and women may be crossed in darkness. Bollywood films have extensively used the idea of light and darkness in this context. In the iconic 1951 film *Awara*, the actor Nargis croons to the moon to look away, so she has a moment of love with Raj Kapoor. In Bihar, dark spaces are used for activities deemed anti-social or uncultured, such as drinking alcohol or smoking marihuana. An example was to be found in Mr Mandal’s small teashop on the outskirts of Bijuriya village. Many village men gather here in the evenings for tea and chitchat, but many also avoid his shop. At Mr Mandal’s shop, one can get *ganja* (marihuana). He uses two solar lamps inside and one battery powered light in front of the shop. There is no light on the side of the shop. Here people sit to smoke *ganja* in the safety of darkness. Those who sit in front of the shop, under the light bulb, only drink tea. It is a common perception in the village that people who visit Mr Mandal’s shop smoke *ganja* and the smokers are also well known. Even with this being common knowledge, people lack comfort in doing these activities in full view due to the associated social stigma. Darkness thus provides a home to stigmatized behaviours, both offering freedom for those who partake in them and reinforcing others’ belief that darkness is morally wrong and corrupting.

Cultural transformations of landscape by lighting take place in County Durham too. In the past decade, the UK (and Europe more widely) has seen a proliferation of art and festivals drawing from the transformative effect of artificial light on landscapes (Edensor, 2017). This has emerged as LED lighting technologies have made large-scale installations much more achievable. Several arts and leisure events have used the dark skies of Teesdale and Weardale to provide new ways of imagining and engaging with landscape; an annual 'Star-Gazing' festival takes place in the valleys in October. Exemplary of the work done as part of these was the 'Waterfall' visual arts installation by artist Steve Messem at Bowlees, Teesdale, in October 2016. Video footage of the High Force waterfall in Teesdale was projected onto traditional whitewashed stone barns. Operating either side of dusk, the effect was to produce moving and pulsating images, with the bright white barns standing out as beacons on the dark landscape. Visitors navigated between barns following low-level LED lanterns that crossed tracks and fields. These lanterns highlight the blinding effects of bright lights: when visiting, [insert name after peer review] found that while the lanterns lit the area immediately in front of him, this was at the cost of being able to see beyond the next light, which at times made navigation difficult as muddy puddles or approaching people just outside the field of light were obscured.

The combined effect of the light artwork, and of the poor implementation of lighting for visitor navigation, illustrates how darkness and its rupture by artificial lighting can radically transform the rural landscape (Edensor, 2017; Morris, 2011). Celebrations with light are very different in rural Bihar. Diwali, the Hindu light festival when people decorate their homes with oil lamps and strings of electric lights, relates to religion, ancient culture and traditions as opposed to the modern dazzling impacts of Durham's light installations. Hindus believe that Lakshmi, the goddess of prosperity, visits and blesses lit homes on Diwali night. As opposed to this, misfortune visits dark homes, and so people desire and produce as much light as possible on this day (Kumar, 2015). Diwali celebrations thus have a more traditional characteristic in comparison to the spread of light-based rural arts installations (see also Morris, 2011), and while there are local traditional light festivals and practices in the rural UK (for example the New Year's Eve barrel-burning tradition in Allendale, just north of Weardale), these are not characteristic of rural UK in the way that Diwali celebrations are of much rural India.

In both contexts, illumination is used to positively transform landscapes to promote a sense of 'good culture': in Bihar, this is associated with moral imperatives for behaviour, while in Teesdale and Weardale, 'good culture' incorporates darkness too, as reimagined through festivals and art projects. In the UK, this is very much a 'top-down' embracing of darkness and lighting, and this reflects the dominant trend in the production of light art, festivals and Dark Skies parks by governmental bodies

(but see Edensor, 2018). In India, the connection between light and good culture is much more commonly shared and 'bottom-up' in origin. Again, the problems faced and opinions held seem significantly rural in nature. County Durham's art installation was a rural one, similar to that studied by Morris (2011) and contrasting with urban-based light festivals (Edensor, 2017). In Bihar, the transformed lit landscape was considered culturally appropriate and prosperous, contrasting with the dangers and cultural malaise imagined in the darkness of the countryside.

## 5 Discussion

The act of comparing rural Bihar with rural County Durham reveals both distinct local histories, and similar planetary relations. Of course, they cannot stand for a world of difference; darkness has distinct localized meanings beyond the two examples here (see Amid, 2018 who argues that darkness does not have the same association with ill-morals in Iranian culture; or Bille and Sørensen, 2007, on the different roles of light in hospitality in Danish and Bedouin homes). Nonetheless, in both our case studies and the published literature, the earth's darkness has an agency to transform the familiar landscape of the day. This is a landscape that contains both dangers and opportunities. Perceived dangers in the dark landscape are both human and non-human – from car accidents and (sexual) assault through to animals and uneven paths. While the specific dangers may be more rural or more urban, the perception of the dark as more dangerous is independent of these spatial forms. Opportunities of darkness include the freedom of social surveillance, which may allow people to partake in socially stigmatized activities, or the production of new cultural forms through either mundane or spectacular light art and culture. Furthermore, this rendering of subjects according to the planet is socially varied – as noted there are gendered and caste based differences, which was particularly visible in our data from Bihar. The nature of our data from Weardale and Teesdale offers less information on this, but in the description of presumed disadvantages that less mobile people might have in darkness, we see similar understandings of a socially differentiated darkness. Across the two sites, as countryside locations, there are commonalities in the experience of a darker and more extensive night than city locations. In Teesdale and Weardale, where lighting is expected as an inherent part of good governance, we see perhaps a more urbanized countryside than Bihar, where lighting is still read as a sign of arriving modernity. This leads us to a simple suggestion: as places become more urban, they become less planetary, where planetary is understood in terms of connections to the planet rather than as 'global'.

Insofar as planetary urbanization is a synonym for the global spread of capitalism and modernity – for example, as in Wilson and Bayón (2015): "we begin by setting out our understanding of planetary urbanization in terms of the real subsumption of space to capital" (p.3) – then we can endorse much

of the argument being made. However, we also struggle to equate this growing influence of capital with the notion of a 'countryside' manifestation of an underlying "urban fabric" (Brenner & Schmidt, 2015, p.167), noting that planetary urbanists have also continued to explore and unpack what this notion might mean in diverse ways (see for example Castriota & Tonucci, 2018). What does seem clear is that the ordinary countryside is now an infrastructural one. In that way, the rural has become connected to the urban through increasingly complex infrastructural networks, without, we would argue, necessarily being dominated by the urban. In particular, for rural residents access to infrastructure is precarious, in some ways more so even than for residents in informal urban communities, whose lives are profoundly dominated by infrastructures that they may tap in to or live in and around (Silver, 2014). In Teesdale and Weardale, the precarity of infrastructure is exposed by austerity politics, which reveal taken-for-granted technologies as subject to both economic and political will. In Bihar, the ongoing use of a variety of lighting technologies illustrates a better recognition of this precarity, despite clear beliefs that this precarity will one day disappear. Importantly in both sites, the ways in which new infrastructures are both implemented and understood seems distinctly rural. Such an analysis pushes us closer to the concept of the 'ordinary countryside', which is precariously infrastructural within a global capitalist system (Robinson, 2006), rather than a rural formation of an underlying urban logic.

To summarize, in this paper we look to agree with most of the insights of planetary urbanization. Our two case study locations show some very similar transformations as new lighting technologies are introduced, supporting the idea of both being part of a global system of capital, as agrarian studies within development studies have also argued. However, attention to the details of planetary being, via comparison of everyday interactions with nocturnal landscapes and the discourses surrounding these, reveals the usefulness of the distinction between the urban and the rural. Rural studies offers conceptualizations of countryside subject to techno-capitalist governance (Woods, 2007), and we find that planetary urbanization does seem to make an unnecessary elision between infrastructure and urban life. To that end, we argue that more work could be done to connect research in urban studies to research in rural studies, particularly as the turn to the 'planetary' suggests that these spaces must be understood in tandem, even if we retain an analytical distinction between them.

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