Maye, Damian M and Enticott, Gareth and Naylor, Rhiannon and Ilbery, Brian W and Kirwan, James R (2014). Animal disease and narratives of nature: Farmers' reactions to the neoliberal governance of bovine Tuberculosis. Journal of Rural Studies, 36 401-410.

Journal of Rural Studies

Animal Disease and Narratives of Nature: Farmers' Reactions to the Neoliberal Governance of Bovine Tuberculosis

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Abstract

This paper examines the relationship between neoliberal styles of animal disease governance and farmers' understandings of disease and nature. In the UK, new styles of animal disease governance has promised to shift the costs and responsibilities of disease management to farmers, creating opportunities for farmers to take responsibility for disease control themselves and opening up new markets for disease control interventions. Focusing on the management of bovine Tuberculosis (bTB) and drawing on interviews with 65 cattle farmers, the paper examines how farmer responses to these new styles of animal disease governance are shaped by their own knowledges and understandings of nature and disease. In particular, the paper examines how two key narratives of nature – the idea of 'natural balance' and 'clean and dirty badgers' – lead farmers to think about the control of bTB in wildlife (such as the choice between badger culling and/or vaccination) in very specific ways. However, whilst discourses of cost and responsibility appear to open up choice opportunities for farmers, that choice is constrained when viewed from the perspective of farmer subjectivities and narratives of nature. Discourses of neoliberalism as control rather than choice are therefore revealed, drawing attention to the complexities and plural strategies of neoliberal governance.

Keywords: Bovine TB; Badger Culling; Badger Vaccination; Nature; Neoliberalism; Partnership Governance; Balance of Nature; Equilibrium.

1. Introduction

According to Braun (2007, p.6), techniques to manage animal disease should not be seen as just a set of benign practices to 'make life safe', but as geopolitical regimes extending forms of sovereign power around the world. In Braun's view, the pursuit of biosecurity has become inexorably intertwined with neoliberal attempts of global economic integration. The significance of the relationship between neoliberalism and animal disease governance is noted in the agricultural biosecurity literature (see e.g., Enticott, 2013; Higgins and Dibden, 2011; Maye *et al.*, 2012; Waage and Mumford, 2008), particularly its prominence in international policy circles as a means to facilitate (through international laws, measures and standards) the free and safe movement of animals, agricultural products and practices around the world.

In this neoliberal regime, it is not just certain biological futures and versions of nature that come to be specified, but also the tools by which to manage animal disease. Beyond the global standardisation of diagnostic tools, a reliance on the market has begun to saturate governments' approaches to biosecurity around the world, just as it has in other areas of environmental governance (Castree, 2008a, 2008b). Common strategies under neoliberalism include the incorporation of market strategies into previously State-led functions and the emergence of partnerships that devolve responsibilities to private and/or civil society groups (Hodge and Adams, 2012; Peck and Tickell, 2002).

For some, these global neoliberal approaches to animal disease governance displace more nuanced 'local' explanations and practices of animal disease management (Braun, 2007; Hinchliffe, 2008). Yet, there is also recognition that 'neoliberalisation' (i.e., a set of processes that enact free market ideology) is far from monolithic and does not lead to uniform practices of neoliberal rule (Maye *et al.*, 2012, p.152); it is, in other words, a 'spatiotemporally variable *process*' (Castree 2008a, p. 137, original emphasis). Peck *et al.* (2010, p.96) characterise neoliberalisation as a vast number of "local trajectories, contingent forms and hybrid

assemblages" of capitalist logic. This renders the 'neoliberal project' more than just an expression of particular political-economic rationalities (Barnett, 2009) and views neoliberalisation as a mix of emergent activities, the outcome of complex partnerships, negotiations and social and political dynamics. For the governance of animal disease, this can mean that the intersection of neoliberalism with local practices may result in approaches with distinct local characteristics as they emerge 'out of complex articulations between actors in multiple locations' (Higgins and Larner, 2010, p.10) to make them workable across agricultural space.

In seeking to understand how approaches to animal disease are made, it therefore pays to be "attentive to *both* the local peculiarities *and* the general features of neoliberalism" (Peck and Tickell, 2002, p.388 emphasis in original). This paper examines neoliberalisation via an analysis of the relationship between local animal disease practices and the introduction of partnership forms of neoliberal governance for one particular animal disease – bovine Tuberculosis (hereafter bTB) – in England. Using the phrase 'cost and responsibility sharing', UK Governments have since the early 2000s sought to encourage new forms of animal disease governance involving a mix of public and private providers. For bTB, this has resulted in a landscape of choice in which farmers take responsibility for disease control themselves and markets for disease control interventions are developed. The paper analyses farmer reactions to these new styles of governance. Specifically, it examines how farmer responses to new styles of animal disease governance are shaped by their own knowledges and understandings of nature and disease.

Narratives and beliefs of nature and wildlife have been shown to be influential in the acceptance of management plans for a range of different environmental problems (Dandy *et al.*, 2012; Eden and Bear, 2011; Robbins, 2006). This paper seeks to extend these analyses to show how farmers' understandings of disease and nature correspond with the imaginations of nature and disease within different market-based approaches to the management of animal

disease. In doing so, it draws attention to the social domain in narratives of neoliberalism (Barnett, 2009) and problematises Atkins and Robinson's (2013, p. 1373) call to develop more spatially nuanced policy for bTB and badgers. Discourses of neoliberalism are revealed as versions of government control rather than true forms of 'choice'. It reveals the complexities and plurality of neoliberal governance, combining in this case state actors with farmers and other private organisations, but with the state required to maintain some responsibility. As Hodge and Adams (2012: 474) put it, "…in many instances approaches characterised as neoliberal may reasonably be interpreted as representing an increasing degree of intervention by the state. Neoliberalisation needs to be understood in the context of the evolution of state and private responsibility…". The rest of the paper is structured as follows. The next section reviews developments within UK bTB policy and links the transition towards market-based modes of neoliberal governing to Castree's (2008a) 'minimal state' model. The main empirical part of the paper examines farmer beliefs about nature and the role they play in determining farmers' preference for methods to control the spread of bTB from badgers to cattle. The paper concludes with some general remarks about the neoliberalisation of animal disease control and the evolution of partnership governance.

2. Governing Bovine Tuberculosis in the UK

This section begins with an overview of bTB governance. It shows how the management of bTB is shifting from state to partnership styles of governance, where the Government is still involved in governing bTB but seeks to devolve some responsibilities to the private sector, and considers the relationship of these styles of governance with beliefs and understandings of disease and nature.

BTB is a major biological, economic and political issue in Great Britain. It is regarded by the Department for Environment, Food and Rural Affairs (Defra) as one of the most difficult animal health issues facing England in particular[1]. In the 1980s, the disease was isolated to several hot-spots in the south-west of England. By 2010, 10.8% of herds in England had a recorded bTB incident, and as high as 22.7% in the West and South-West, leading to the slaughter of 25,000 cattle (Defra, 2011a). Each bTB incident is estimated to cost £30,000. About £10,000 of this cost falls to farmers; the emotional trauma following the loss of cattle to bTB can also be considerable (Defra, 2010; Farm Crisis Network, 2009). The Government spends £100million a year on testing and compensation, which is managed by the Animal Health and Veterinary Laboratories Agency (AHVLA) and delivered by private veterinary surgeons. The management of the disease is controversial because wildlife – specifically badgers – is implicated in the spread of bTB. That badgers are protected and culturally iconic (Cassidy, 2012) has meant that decisions to cull badgers to control bTB in cattle have proved contentious. BTB has become a 'political disease' (Grant, 2009), with arguments between politicians, farmers, scientists and conservationists over the best way to manage the disease (see also: Atkins and Robinson, 2013; Enticott, 2001, 2008a; Maye et al, 2013).

Historically, debates over the management of bTB have assumed that Government would be responsible and accountable. In fact, arguments over the control of badgers have overshadowed significant changes to the governance of animal disease in general and a movement towards neoliberal styles of governing animal disease. Enticott et al's (2012) review of veterinary expertise suggests that the UK Governments have sought to fundamentally redistribute the costs and responsibilities of animal health. This agenda was

[1] In the UK, policy responsibilities for bTB are devolved to Wales, Scotland and Northern Ireland. This paper focuses on the governance of bTB in England.

prompted by the spiralling costs of dealing with disease outbreaks, such as the 2001 Foot and Mouth Disease outbreak, whilst the European Union (EC, 2007) has pressed for a rebalancing of responsibilities for the management and prevention of livestock disease towards private producers. The UK's 2004 Animal Health and Welfare Strategy (Defra, 2004) reflects these changes, laying primary responsibility for disease control firmly on livestock keepers. The strategy signals a major shift away from government taking the lead, except where it had legal responsibilities for disease control, food assurance and animal welfare. The outbreak of Bluetongue virus in 2008 provided a first example of these new arrangements. Rather than direct Government intervention, a solution was developed by brokering a strategic collaboration between the veterinary profession and farming groups to encourage vaccination of cattle. In the old regime, compensation to farmers would also have been offered, but none was offered in this case. Indeed, for other diseases, UK Governments have sought to reduce compensation to farmers for livestock slaughtered as a result of disease outbreaks to shift the burden of biosecurity responsibility to farmers rather than reward poor practice (NAO, 2003).

The state has also fundamentally altered its approach to disease control through strategies of privatisation and/or 'agencification'. 'Agencification' is the process by which the implementation of policy is hived off into separate units to provide the freedom to manage their activities and thereby improve the efficiency and quality of service delivery using the tools more commonly associated with the private sector. Examples include the creation of the Animal Health Agency in 2007. Formed from the old State Veterinary Service (SVS), it has responsibility for implementing government policies aimed at preventing or managing outbreaks of serious animal diseases, protecting the welfare of farmed animals and safeguarding public health from animal borne disease. As Enticott et al (2012) argue, this has had significant effects: it has removed animal disease expertise from central government, making it more difficult for them to give advice effectively and easier for their advice to be ignored (see also Wilkinson, 2011).

These trends are not UK-specific; just as other neoliberal policies have diffused around the globe (Peck and Theodore, 2010; Prince, 2010), so too has a global mobility of animal disease policy solutions redefined its governance in the UK. Discourses of 'cost and responsibility sharing' therefore borrow heavily from their implementation in countries like Australia and New Zealand. In these countries, the desire to preserve agricultural exports amid adverse economic conditions led to new institutional arrangements in which the State's role in managing disease was transformed as costs and responsibilities were devolved to farmers and new quasi-governmental organisations (Lehane, 1996; More, 2007). For example, borne out of New Zealand's financial crisis in the 1980s, the 1993 Biosecurity Act established National Pest Management Agencies (NPMAs) to resolve outbreaks of animal disease. NPMAs such as the Animal Health Board were formed by farming organisations in partnership with local and national governments. Disease control operations were financed by farmers who, as a result, had a direct say in disease control policy (Enticott, 2013).

Discourses of cost and responsibility sharing have proved increasingly popular with UK Governments as they have sought to deal with bTB (Enticott and Franklin, 2009). Launching its first strategic framework for the control of bTB in 2005 (Defra, 2005), 'partnership' was touted as the essential ingredient. Whilst these discourses of partnership existed at different institutional scales (Enticott and Franklin, 2009), farmers were identified as key actors who needed to 'individually and collectively, take responsibility for managing risks to their herds from bTB'. Control of bTB, Defra argued, was not a responsibility of taxpayers, but by 'cattle farmers…individually and collectively, [taking] responsibility for managing risks to their herds from bTB…and bearing a progressively greater share of the costs of bovine tuberculosis controls' (ibid., p. 41).

The concept of disease responsibility has manifested in different guises. One way has been through Defra's attempts to develop markets for wildlife control interventions to control bTB. In 2008, the Labour Government concluded that, based on the current scientific advice,

badger culling was not an appropriate option and instead recommended that badgers should be vaccinated. Six areas of England were identified in which badgers would be vaccinated. Unlike previous wildlife control interventions, these areas would not act as a scientific trial to test the effectiveness of vaccination, and nor would badgers be vaccinated by the Government. Instead, the main aim was to "kickstart an industry in badger vaccination and build the capacity of trained expertise in the country" (Wilson quoted in EFRACOM., 2013, p.Ev. 4). The strategy relied on creating a market amongst pest control companies to compete for vaccination contracts that the Government would pay for. Moreover, the project aimed to train "lay vaccinators" – farmers and members of the public with an interest in badger conservation – to provide animal health services to the farming industry.

An alternative strategy has been to pass the choice of wildlife control to farmers themselves. Following the election of the new Conservative-led coalition Government in 2010, attempts to eradicate bTB through new policies further emphasised the role of farmer responsibility. The new government argued that, to resolve bTB, it needed to give "farmers more control and choice…empowering the industry to take greater responsibility for tackling TB; sharing and reducing the cost of TB and ensuring farmers have the right incentives" (Defra, 2011b, p.17). Landowners and farmers were encouraged to establish private wildlife control companies to limit bTB infections from cattle. Rather than vaccinate badgers, however, the companies would cull them. Farmer groups would have to apply for a culling licence from Defra and fulfil various criteria, but they would fund and manage the culling operations themselves once the licence was awarded. The first two licences were awarded in 2012 and culling began in 2013. If the first two pilot schemes were deemed a success, up to ten additional licences were scheduled to be awarded annually from 2014. The subsequent independent evaluation of the pilot culls has put back this national roll out, with new licences unlikely to be issued before 2015. Nevertheless, farmers are being given a choice in the management of bTB. Referring to the culling options, Jim Paice, the (now former) agriculture minister in charge of the policy at

the time of the survey was clear about this, stating that "if [farmers] don't want to do it, they don't have to: it's entirely up to them" (Paice quoted in BBC, 2011).

Responding to Neoliberal Animal Disease Policy: The Role of Cultural Understandings of Disease

Whilst it is possible to conceptualise these changes to the governance of animal health as a neoliberal 'hollowing out of the state', this interpretation is problematised by the variable character of neoliberalism as it is implemented in different places. Moreover, neoliberalism is not knowingly implemented by central government and delivered downwards to a local level where proposed policy options are consented or rejected. The process of governmentality is more fluid and emergent than this: through implementation and interaction with local cultures and environments, neoliberalism undergoes frequent translations and emerges out of complex negotiations. Work on "specific *modalities*" of nature's neoliberalisation (Castree, 2008b, p.157 emphasis in original) provides useful insight into this translational process. Castree (2008a) argues that neoliberalisation provides different 'environmental fixes' to enable private organisations, the state and other stakeholders a means to maintain economic growth. Neoliberal governance therefore takes different forms, including situations (as is the case with bTB) where the state must take *some* responsibility for relations between the private sector, the state and nature even though it may lack the resources and capacity to deal with the problems in these relationships (Hodge and Adams, 2012, p.473). As well as 'hollowing out' the state, Castree (2008a) identifies a second means to deal with this problem: a 'minimal state' model. This characterisation fits with the partnership model emerging to govern bTB.

Hodge and Adam's (2012) also suggest that neoliberalism and neoliberalisation now embrace an increasingly divergent range of approaches. They suggest that analysis of government must assess the operation of market instruments at a more detailed and contingent level. This work re-asserts the essential role of the State in the neoliberal project and confirms the idea

that neoliberalism can "only exist in the form of messy hybrids" (Peck, 2010, p.7). Hodge and Adams (2012: p. 481) regard neoliberalism as a form of "institutional blending", which "reflects the complexity of the processes of transfer and decomposition of property, the emergence of organisations with a mix of public and private characteristics and the development of partnerships".

If neoliberal solutions are translated differently, this may be attributed to local cultures, beliefs and narratives surrounding the nature of disease, or other social and economic factors. In other words, people's narratives and beliefs about the nature of disease can influence the way certain neoliberal policy trajectories are constructed in favour of others. That is to say, beliefs about the ways in which disease can be transmitted and spread influence the acceptance or rejection of particular neoliberal futures and provide a guide to more acceptable versions. Farmer views about nature and disease form an important part of the emergent activities that make up bTB governance. This is already evident as forms of neoliberal animal governance attempt to be implemented around the globe. Firstly, the interaction of local agricultural priorities and international disease control regulations leads to a variegated landscape of disease control policy. Rather than standardised approaches to managing disease, these relationships lead to new hybrid forms of governance that vary from place to place. For example, despite the presence of standardised international trading laws, Dibden *et al.* (2011) argue that biosecurity regulations are not implemented in the same way in all places. Despite attempts to harmonise trade rules and view biosecurity as an international territory, perceptions of the risks to national biosecurity identities can still lead to a divergence in biosecurity practices and a protection of national agricultural territory (see also Higgins and Larner, 2010). Secondly, attempts to develop new relationships between disease experts, such as vets and farmers, have tended to fall flat, due to farmers' socio-economic priorities and attitudes to disease control. For example, Defra's Animal Health and Welfare Strategy has sought to redefine the role of vets as entrepreneurs who can successfully navigate rural development funding streams and demonstrate their market value to farmers

(Enticott et al, 2012). However, farmers seem unwilling to act as demanding customers, preferring to rely on their vet in emergencies only, are slow to recognise how their vet can add value to their farming business (Lowe, 2009), and are driven more by immediate value-for-money concerns (Defra, 2007).

It is also likely that farmers' reactions to new styles of governing animal disease will be influenced by their own understandings of what disease is and their understandings of disease aetiology (Enticott, 2008b). The significance of cultural practices and beliefs about nature has long been recognised in science and technology studies (Wynne, 1992). In agriculture, cultural beliefs can inform styles of knowledge production or ideas of what constitutes appropriate behaviour – such as good farming (Burton, 2004; Silvasti, 2003). Studies of agricultural biosecurity draw attention to local health beliefs as enablers or disablers for policy uptake. Heffernan et al's (2008a) work on the uptake of vaccination for FMD in Bolivia, for example, shows how uptake and resistance to the vaccine reflected local health beliefs. Uptake they argued was not due to scientific or economic arguments, but because of a discourse which was 'reinvented' to fit in with local beliefs that FMD was caused by heat. Enticott's (2008b) work on bTB in the UK also notes how farmers have developed their own understandings of the disease through individual experience and collective exchanges of accounts of bTB breakdowns, which have formed 'candidate' farms, farmers, cattle and badgers that are likely to suffer from the disease. These classifications are always vulnerable and luck plays a strong role in disease beliefs.

This research is consistent with other work on the way narratives and philosophies of nature influence the acceptability of different environmental management practices. In relation to deer management, Dandy *et al.* (2012) examine the acceptability of control methods such as culling, fencing, the use of 'scarers' to affect deer behaviour and changes to human behaviour. Acceptability of these methods is related to different histories, experiences and understandings of nature. They argue that attitudes towards control methods are related to

underlying beliefs about nature in general. These natural beliefs or narratives of nature relate to ideas of naturalness and over-abundance. Nature is understood to have natural predators and their own natural spaces, but encroachment into these spaces can lead to unnatural populations. Similarly, Buller (2008) shows how different philosophies of nature – distinct sets of moral and ethical reasonings, or beliefs about fairness and nature – are tied up in the acceptance of rural wildlife management, such as the re-introduction of wild species. Frequently, these philosophical beliefs of nature invoke ideas of 'natural balance' or 'equilibrium' to justify particular forms of nature management. Eden and Bear (2011) also show how certain narratives of nature – or what they call 'lay ecologies' – influence how anglers support different interventions designed to facilitate fish health. Beliefs in 'natural equilibrium' or 'a balance to nature' led some anglers to argue that there was no need to control predating birds like Cormorants, or fish like Pike, because nature always returns to its own level. However, these narratives of nature are also spatial: nature can find its own level, but some animals and birds can find themselves out of place and threatening these self-regulating systems. What is clear from this work, however, is that these different views rationalise different forms of management, ranging from non-intervention to attempts to restore natural equilibrium or to directly restore natural habitats.

When it comes to the governance of bTB, it should be no surprise therefore to see neoliberal solutions imported from other countries playing out in different ways. Firstly, in a policy environment where farmers are being given more 'choice' over the management of bTB, different understandings of nature and disease are likely to affect the acceptability of different interventions. Secondly, it should also be expected that idealised neoliberal solutions will depart from their idealised pathways as they interact with these natural understandings. The paper turns now to examine how farmers' views of nature and disease affect the acceptability and preference of the two solutions to bTB (badger vaccination and culling) currently available to them and how this may influence partnership modes of bTB governance.

3. Methodology

In exploring the extent to which beliefs about nature affect the roll out of neoliberal solutions to bTB, we draw on 65 interviews with cattle farmers in three study areas in the West and South West regions of England. The interviews are part of a larger social science study examining farmers' confidence in bTB control methods (badger vaccination and culling) and the role of government in managing bTB. The three study areas are in Stroud (Gloucestershire), Congleton (Cheshire) and Great Torrington (Devon) (Figure 1). In one of the areas (Stroud in Gloucestershire), badger vaccination has been used as part of Defra's Badger Vaccination Deployment Project (BVDP). The study locations are all areas where bTB is high, although bTB disease prevalence is lower in Congleton compared to Stroud and Great Torrington.

---Insert Figure 1 here ---

The interviews were completed in October and November 2011 and were mostly qualitative in nature. They were carried out around the time that the Coalition Government had announced its latest bTB policy, including plans to issue licences for groups of farmers to control wildlife. The interviews were intended to illuminate farmer responses to the proposal and to reveal contextual issues and important micro-social processes and to enliven the messiness of 'real world policy processes' (Henwood *et al.*, 2010). A 'biographical narrative approach' (Rist, 1994) was developed in order to obtain a detailed understanding of the local, cultural and social contexts that influence farmer belief systems and attitudes towards bTB and badger control. This approach recognises the importance of embedding risk research within wider social and political contexts; such factors, it argues, influence how risk is constructed and understood by individuals. In this case, the approach encouraged farmers to talk about their experiences and attitudes to badger control options in an open, reflective manner. The schedule was designed with two key requirements in mind. Firstly, in line with

the approach of Henwood *et al.* (2010), the interview was designed to encourage farmers to outline, in their terms, their farm's bTB and farming histories, including past and current experiences of the disease, impacts the disease has had and was having on them and their farm enterprise, and their understanding and knowledge of badger vaccination and badger ecology. Secondly, the interviews aimed to capture farmers' views of bTB policy and badger control options.

Farmers selected for interview were identified from the results of an earlier telephone survey of 341 farmers and selected based on their levels of trust in government, confidence in badger vaccination, and herd size/type (see Maye et al, 2013). The interview transcripts were imported into NVivo9 and coded for analysis. Of the 65 interview participants, 37 had beef herds, 26 dairy and two had both dairy and beef cattle (see Table 1). These characteristics are broadly representative of the total populations in each area. Dairy herds are generally larger than beef (133 compared to 110) and the largest herd was a farm which kept 1300 cattle (milking 600 cows). Farm sizes varied significantly between the three study areas. Similar to herd size, farms in Great Torrington are larger than the overall sample average and smallest in Congleton. Respondents also had a range of different experiences with bTB. Some farmers had not experienced any bTB breakdowns, whereas others had regular and sometimes major breakdowns. For example, one dairy farmer in Great Torrington has been under bTB restriction for the last twelve years and has lost 200 cattle. Overall, the pattern of bTB on the sample of 65 farms surveyed reflects the prevalence of bTB in the study areas, especially in Stroud and Great Torrington, with the majority [56 of the 65] having experienced at least one bTB breakdown. Most farms surveyed [44 out of 65] had had a bTB outbreak in the previous five years and 16 had had a breakdown in 2011. In the Congleton study area, the pattern of bTB in the sample is different. Six of the 22 farms had never had bTB and few had experienced a major breakdown. Farmers in the north of this area had a relatively low incidence of bTB, whereas bTB prevalence in the south was much higher.

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4. Responding to Responsibility: The Role of Narratives of Nature

Cost Sharing and Responsibility – Farmers' Responses

In principle, the majority of farmers interviewed were not against the idea of taking more responsibility for the management of bTB. This included both farm-specific activities, such as improving biosecurity, as well as becoming involved in managing badger policies. Farmer involvement in badger culling policies was justified on three grounds. Firstly, farmers were involved 'at the sharp end' which gave them rights to control policy. Secondly, interviewees spoke of the 'practical wisdom' possessed by farmers which needed to be incorporated into policy making processes so that policies 'don't get in the way of farming practice'. Thirdly, farmers suggested that there was a greater industry good to be had from farmers working together to eradicate the disease. As one farmer suggested: "You would go along with it, wouldn't you, for the sakes of all the other farmers" (C502). However, as recognised by Heffernan et al (2008b), this sense of farmers trusting each other to work for the common good is overly idealistic. Indeed, attitudes towards farmers' responsibilities in bTB policy varied according to farmers' own experiences of bTB. Farmers who have not had significant problems with bTB held less favourable attitudes to contributing financially to bTB controls. Those who had the disease, especially those who have lost the greatest number of cattle to it, were much happier to shoulder some, if not all, of the cost.

Farmers' acceptance of discourses of responsibility were frequently reluctant and not unconditional. This was largely because of farmers' perceptions of the fairness of the policy. It was common for farmers to suggest that ideas of responsibility had been pushed onto the agricultural industry because of the failings of the government. In this context, the idea of

farmers paying for wildlife controls provoked either anger at incompetent politicians or resigned acceptance that the government were no longer in the position to afford to do it themselves. Discourses of responsibility were not simply about shifting the costs of bTB, but also the blame. Farmers therefore perceived the government to be handing over their 'dirty work' and redirecting public outrage over any badger culling policies towards farmers. There was also concern that any cost and responsibility sharing should be balanced with a 'commitment from both sides if it is to work' (C576). Farmers' distrust of Government led many to worry over the extent to which they would have any choice over measures that they could end up paying for. Farmers believed it was only fair that they contributed to measures that had a guarantee of success. Farmers spoke about the lack of proof regarding the efficacy of badger vaccination, coupled with concerns regarding its practicality and high cost. Yet, the prospect of Government deciding to vaccinate badgers and passing those costs on to farmers appeared real. As one farmer complained, "If the ministry decides that wildlife wants to be vaccinated, then why should I pay to have badgers vaccinated?" (C518).

In relation to badger cull proposals, farmers were also keen to see that costs were distributed fairly between all farmers. However, farmers that supported the idea of paying for a badger cull were also concerned that they had little freedom to organise it in the best possible manner. One farmer who was responsible for creating a badger cull company complained that the rules laid down by the Government 'were not the ideal way of doing it, but it is what we have been given…we perhaps don't like it, don't agree with it…but this is the only offer on the table' (C1571). This realism was by no means shared by all farmers. Others called for other methods to be used or for badgers to be removed from the protected species list to allow farmers 'to sort the problem out in the areas where it was' (C1581). Underlying these rejections of cost and responsibility sharing were a distinct set of understandings of nature and disease. These are explored in the next section.

Farmers' Understandings of Disease and Nature

As with previous work on the acceptance of wildlife control strategies, a number of specific beliefs, narratives and philosophies of nature emerged during the interviews which were deployed when farmers were considering the new styles of bTB management proposed by the Government. Two narratives of nature are prominent – a 'balance of nature' narrative and a ''clean' and 'dirty' badgers' narrative. These cultural understandings of nature explain why farmers have preference for certain wildlife control methods over others, but they are not always compatible and in turn reveal the challenges to be negotiated in new styles of partnership governance for bTB.

Farmers in all areas believed the risk from bTB was "high" or "very high". Many felt the risk was "always there" (C502) or "in the back of your mind all the time...you hold your breath a bit" (C536). Even farmers who did not record bTB problems recognised the risk bTB posed to their business, usually with reference to the fact that most neighbours around them have had or have bTB. Those that did not have the disease described themselves as "very lucky" (GT1055) or as "like lightening striking…It might get you, it might not" (C536). Farmers explained theirs and others' breakdowns in relation to transmission from badgers. There was a general consensus that badgers played an important role in transmitting disease. Farmers recognized that other wildlife (such as deer) might play a role. Risk of transmission from cattle was also accepted, but this was thought to be much reduced because of strict cattle testing controls imposed by Defra. Others pointed to 'closed herds' (which do not buy in stock) as examples of the importance of badgers to cattle transmission. Farmers therefore accepted that badgers needed to be controlled as part of any attempt to control bTB. The following quote reflects this view.

> "Whether it is in the wildlife around this area, I don't know. I think they play a part in it, definitely. It's the old argument: if you're going to control it in the cows, then it has to be controlled in the wild as well" (C548).

Attitudes to culling badgers did not simply rest on their role in transmitting bTB. Rather, farmers pointed out that the problem lay with the badger population rather than individual badgers. Here, farmers drew on familiar discourses of nature that emphasise the role of balance and equilibrium and the dangers of human interference with nature's balance. The belief amongst farmers was that there were too many badgers and that the population was 'out of control'. For example:

> "I love to see them, like probably 95% of farmers do, 99%, I mean most people do, I mean I love to see them, but what I don't like is when there is far too many of them and they are getting riddled with disease" (GT1117).

Here farmers express ambiguous and contradictory feelings towards badgers. On the one hand, farmers expressed appreciation and affection for badgers, suggesting that it was a delight to see them. Respondents used past memories of (rare) badger sightings. As one farmer put it, "When I were a child and I saw a badger, I thought it was fantastic... But now it doesn't mean anything, there are just so many about" (C518).

The over-population of badgers had not only spoilt the rare glimpses of secretive badgers – their very natural characteristics – but it was also responsible for spreading disease to cattle as well. This temporal aspect to the 'right' population level for badgers is linked to the ways the balance of nature was maintained previously. For example, farmers referred to the way farmers and gamekeepers used to keep badger populations in balance in the past. The past was a period when country knowledge and craft was applied in order that "everything was kept in a balance" (C502). Similarly, farmers applied the same over-population arguments to

other pests (e.g. foxes): that when there are too many of them, nature needs to be rebalanced through forms of population control.

A key element of farmers' over-population argument was that the badger population had been thrown out of kilter by the Badger Protection Act. Badgers were first protected by the 1973 Badger Act which was strengthened and amended by the 1993 Badger Protection Act. Badgers are also protected by the European Commission's Habitat Directive and are a species listed in the Bern Convention for protection. For many farmers, the unbalancing of the badger population can be traced back to the moment badgers were first protected:

> "There are too many badgers for their own good, I would think. I come from an era when the local gamekeeper would keep badgers under control, like any vermin, because of the damage they do… It's funny how TB increased when the badger was protected" (GT1035).

For badgers, the situation was made worse by the fact that they have no natural predators that could naturally control their population. Indeed, it was suggested that the protection of badgers was in danger of throwing all of nature out of balance: as the badger population grew, so they were predating on other animals such as hedgehogs and ground nesting birds to such a level that those aspects of nature were in danger. In short, then, farmers across all areas highlighted a concern for a kind of moral order of nature. Badgers were like all other aspects of nature in that there was an appropriate level for them. Beyond, or beneath, that level, nature required assistance to rebalance it against other pressures or social activities. Farmers believed that preventing badgers being persecuted was correct, but attempts to rebalance the population had simply gone too far, and badgers' population level was now a key factor in the spread of the disease, as this farmer argued:

> "…if you've got lots and lots of them, it's like anything, there are too many badgers in certain places and when you have too many badgers you get sickness. It's the same with probably too many cows in one place - if one or two are sick it will spread (GT1096)".

The balance of nature discourse suggests a universal problem, one in which all badgers are seen as a problem in all areas. However, badgers were also understood by farmers in a more nuanced and spatial manner. In this second narrative of nature, farmers distinguished between 'clean' and 'dirty' badgers. Farmers in all three case study areas described badgers in these terms – i.e. some badgers are dirty because they are infected with bTB, whilst others are clean and healthy. For instance, a number of farmers who had not been affected by bTB or were not currently under restriction, considered their badgers to be an asset, protecting them from infection. As one beef farmer in Stroud explained: "I don't mind having badgers on the farm if they're all right. If they're healthy you should leave them alone" (S307). Another Stroud farmer commented: "We do have quite a lot of badgers on the farm, but they are obviously clear, so we don't interfere with them and keep them where they are and that always seems to work" (S284).

This narrative of 'clean' and 'dirty' also applied to areas of farmland as a whole. In other words, farmers developed a highly spatialised understanding of disease risk. The variability of bTB risks could exist at quite a broad geographical scale. For example, in the Congleton study area, interviewees identified particularly 'bad' areas that were prone to bTB (e.g. Manifold Valley and the top of the Biddulph Tor in the North Staffordshire section of the Congleton study area), and other areas that were seen as 'safe' or 'good'. Farmers in the three study areas also identified bTB risks at the farm scale, highlighting parts of their farm, specific fields or surrounding areas that were prone to bTB, usually particular fields or parcels of land. Similarly, farmers understood that certain landscape features such as woodlands next to fields or disused railways could act as a "transmitting highway for the bTB disease"

(C1581). For example, in this quote a farmer recalls what happened when he used a field known to be 'bad' for bTB:

> "We were tight for land at the time so we had to put some stock in again. We put some younger beef animals in there again. We just needed to put them in there for two weeks. We took them away after the two weeks and we tested again (60 days later) and another 18 out of the 20 went (massive great lumps again) (GT1080)".

This spatialisation of TB risk at a farm/field scale is not always straightforward. In the example above, the farmer went on to explain how he used the field for old barren cattle in the expectation that they would get bTB. The compensation he would receive would be higher than their sale value. At the next bTB test, however, all the cows passed. The clean and dirty narrative therefore both partly supports and challenges the idea of a natural equilibrium. On the one hand, it suggests a variable rather than a universal understanding of nature. The spread of bTB in and from badgers cannot simply be understood in population terms: nature is too varied and changing for that to work. On the other hand, the language of clean and dirty allows farmers to spatialise the spread of the disease. Unexpected infections in areas known to be 'clean' can be attributed to 'dirty' badgers that are out of place in the countryside and can reinforce the belief that the badger population is out of control.

Narratives of Nature and Farmer Preference for Wildlife Control

Despite their apparent opposition, farmers frequently deployed both of these narratives of nature and disease at the same time: they see a general problem with an uncontrolled expansion of the badger population and the associated effects on disease levels and the absence of other wildlife. However, farmers are also wary of over-generalising at the expense of losing the protection of the 'clean' badger. Jointly however, these narratives play a significant role in determining farmers' preference for methods to control the spread of bTB

from badgers to cattle. But at the same time, they go some way to questioning the extent to which farmers are able to determine the shape of new bTB policies designed to give them choice.

To begin with, of the two forms of wildlife intervention – badger vaccination and culling – the narrative of over-population is strongly consistent with preferences for badger culling and a clear reason why farmers reject badger vaccination. From a farmer's perspective, badger numbers need to be reduced to help control bTB and, crucially, to also rebalance nature. Restoring this natural equilibrium explains why many favoured a badger cull. This was clear in farmers' assessments of what to do about badger over-population. For example, farmers in Great Torrington argued that culling was the only way to rebalance nature:

> "It's nice to see a bit of wildlife but not too much. It's like everything, it's gotta be controlled hasn't it. Don't let things get out of hand like" (GT1023).

In this view, the problem is not so much bTB, but the population itself: reducing the number of badgers in the countryside is what is needed. By restoring nature to its natural level, the problem of bTB will also be dealt with. Other farmers argued that this could be achieved by simply lifting the 1993 Badger Protection Act: by lifting these protections, farmers could rebalance local badger populations as a way of ensuring bTB would not affect their cattle.

The preference for culling was also based on a different form of balance – a kind of balance of fairness - which also reflected over-population arguments. Farmers felt that the 1993 Badger Protection Act gave badgers special treatment and protection when it came to dealing with bTB. In particular, it was argued that there was unequal treatment between badgers and cows, with cows regularly slaughtered and badgers protected and not dealt with. As one dairy farmer from Great Torrington put it:

> "…you have a reservoir of wildlife building up with it; none are being tested or controlled. There is no point in one sector hammering us if you don't balance it out from where the disease comes from. Does the cow give it to the badger or does the badger give it to the cow? We are trying to eliminate it from the cows" (GT1049).

In this argument, the balance of nature is extended to farm animals as well as wild animals. Both should be allowed to survive alongside each other, but there has to be fairness in how this balance is managed. Culling one animal whilst leaving the population of the other unchecked is not seen as a fair or an appropriate way to manage the disease. Nevertheless, there is a one-sidedness to this balance: few farmers said that disease was a result of there being too many cows and that the cattle population needs to be reduced or stocking densities lowered. Similarly, whilst farmers recognise facets of modern agriculture – such as growing maize – as a reason why the badger population has been able to grow, there was less unanimity that these practices should stop to restore the balance of nature.

The over-population narrative leads to a rejection of badger vaccination in other ways, too. Simply, farmers believe that the population of badgers is such that it is just impractical to vaccinate each one. The majority of farmers surveyed argued that a 100% vaccination of the badger population would need to be achieved, which many felt would be impossible, as emphasised by the following quote:

> "It's a wonderful idea, but how on earth is anybody in the world ever going to inject every badger, especially at the rate they breed. It's not going to happen is it, let's be quite honest, it ain't gonna happen" (GT1080).

For this and other farmers, the sheer number of badgers meant that it would be impossible to conduct a rational and organised vaccination programme. Just as with vaccination of cattle, farmers believed that badgers would need to be tagged, coded and paperwork completed, and

that all badgers would need to be vaccinated to achieve herd immunity. Again, there is an element of balance and fairness here: farmers viewed badger vaccination in the same way as they would for their cattle, involving an ordered and recorded process. That this was not the case for badgers simply reinforced the view that there was 'one rule for one and one for another' (C1581) and that ultimately, if diseased cattle are slaughtered, so should diseased badgers be.

However, this does not mean that badger culling was universally accepted by farmers. In fact, the tension between the two narratives of nature presented by farmers meant that many had trouble accepting the culling proposals offered to them by Defra. In particular, the distinction between clean and dirty badgers meant that some farmers were resistant to a cull on the basis that clean badgers acted as a natural defence. For example:

> "I've had a clear TB test and I believe from the clear TB test that the badgers on my farm or next door to my farm are clean and I want to protect them because they'll keep the dirty ones away […] My badgers are protecting me and I will protect them, and I will, and I will, sincerely, I will protect them" (GT1046).

Instead, farmers called for a targeted badger cull that focused on the identification of dirty setts, badgers and areas. In one area, a number of farmers mentioned a local farmer who was well-known for his knowledge of badger behaviour and his skills at identifying 'clean' and 'dirty' setts. He advised one interviewee to protect his 'clean' badger sett "like gold dust" (GT1081). Farmers seemed to place more trust in this 'local expert' and his forms of lay ecology and epidemiology than formal bTB science, and believed that any cull would need to proceed along these lines. Not all farmers in the sample favoured a targeted cull. A minority argued the disease was now so endemic in certain 'hot spot' areas that a population approach to culling was what was required and were skeptical therefore about only culling 70% in an area. Nevertheless, there was almost universal criticism of the proposed culling method (free

shooting) of dealing with wild badgers. This view is summarized by one dairy farmer who argued that: “I don’t think shooting will work because if you shoot one the rest will disappear. You need to gas them. It’s okay to do an area. It might work, but it won’t if you shoot them because you won’t get them all” (GT1110). The majority of farmers thus favoured gassing as a more practical way to deal with the disease. As another farmer, in favour of a targeted cull, commented,

> “The most efficient way of dealing with a badger cull would be to do what they did years ago and gas the sett rather than free running shooting as I think that will lead to problems… If they can identify that they are diseased animals in those setts, they gas them and take the lot out” (S282).

Narratives of nature therefore lead farmers to think about the control of bTB in wildlife in very specific ways. Beliefs in over-population and the loss of natural balance lead farmers to favour badger culling over vaccination as a way of restoring natural order. But, on the specifics of culling, farmers’ understandings of how disease is distributed unevenly lead many to favour a targeted cull. This preserves the natural defence of ‘clean’ badgers and preserves culling only infected badgers or cattle. Farmers were therefore critical of the choices available to them in the current wildlife control proposals. They welcomed the possibility to control badger numbers but felt that they have little room for manoeuvre regarding the specifics of the proposals. Rather than pursuing such a targeted cull, the licence agreements require at least 70% of badgers to be randomly culled using a method (free shooting) that many have significant practical concerns about. In opposition to their beliefs about nature, farmers are required to make a choice. For many farmers, the support of the cull is therefore made reluctantly. As indicated above, even those farmers involved in attempting to set up culling syndicates acknowledged that they had compromised their beliefs because, in their view, something had to be done about badgers. In the same way that critics of neoliberalism point out its varied form, so this solution reflects the continued power of the

State to impose solutions through the private sector, rather than the private sector possessing a free will to choose solutions that it prefers.

5. Conclusions

This paper shows how understandings of nature inform farmer preferences in respect of disease control options for bTB and assesses the extent to which the State has withdrawn and handed choice and control to farmers in new modes of neoliberal governance. Analyses of neoliberalism increasingly view it as an emergent outcome of negotiations and socio-political dynamics. Recent initiatives in bTB governance appear to signify a shift towards more market-based approaches to animal disease control. There is intent by the State to enable and encourage farmers to share costs and to take more responsibility for disease management. However, the composition of these new styles of governance reveals that state protection and control remains persistent and necessary (i.e. a minimal state model – Castree, 2008a).

Farmer preferences to market options for wildlife interventions are also influenced by cultural understandings of disease and nature. This further complicates the management of bTB and reinforces the hybridity and messiness of neoliberalisation in this context. The majority of farmers interviewed for this study described badger populations as ‘out of control’ and ‘out of balance’. This imbalance was responsible for the spread of bTB and had been caused by the 1993 Protection of Badgers Act. Balance was important in other ways too: farmers argued for a sort of natural justice in which badgers should be treated in the same way as cattle in disease management. The importance of balance and natural equilibrium are noted in other studies of wildlife management, but many farmers also described nature as variable and dynamic which both supports and challenges the relationship between natural balance and disease. In classifying badgers, fields and landscapes as ‘clean’ and ‘dirty’, farmers imagined a more variegated nature, with healthy animals and places to be found mingling with infected animals

despite the warnings of over-population. However, the spread of disease into these clean spaces and animals further reinforced farmers' narratives of over-population and balance. These 'lay ecologies' of nature (Eden and Bear, 2011) are critical in terms of how farmers rationalise and respond to different neoliberal management options to control bTB. Farmers are in favour of badger culling because it will rebalance nature, whilst beliefs in the over-population of badgers also rule out badger vaccination because of the large numbers of badgers that would need to be vaccinated and the associated cost and practical difficulties.

However, the narratives of nature and disease presented by farmers do not always fit easily with the neoliberal solutions proposed by governments and challenge the extent to which farmers feel in control of disease management. Whilst farmers are given a choice of intervention methods, that choice is constrained by Government. Farmers expressed concerns about the licencing conditions for badger culling, suggesting that they are overly complicated and unlikely to work. Moreover, there exists no option for farmers to pursue the kind of targeted cull of 'dirty' badgers some would prefer. This highlights how one potential consequence of neoliberal reforms is that local beliefs about nature are 'displaced' (Braun, 2007). As the paper shows, farmers base this targeted solution on craft knowledge and the country experience of those people that they trust. That there is no scientific evidence for a targeted approach is not a barrier for farmers, but the reliance on scientific evidence in the solutions created by Defra reveals the extent to which traditional forms of expertise and styles of state-led government continue to hold sway in the governance of animal disease. If bTB control was fully handed over to farmers, it is more likely that they would form a different set of solutions than is currently available to them. Farmers' choice and control of disease is therefore limited: whilst they have some ability to choose between vaccination and culling, it is a restricted choice that has little resonance with farmers' cultural understandings of disease.

Farmers current perceptions of choice and their response to policy options are arguably more suggestive of command modes of classic bureaucracy rather than collaborative, partnership

modes of neoliberal regulation and governance. Animal disease control signifies a form of environmental management that requires some level of state intervention and responsibility (Castree, 2008a). Partnership modes of neoliberal governance for bTB are still in their infancy, but this lack of choice has two broader implications. Firstly, we might question the extent to which farmers will want to engage with devolved animal disease solutions in meaningful ways. The lack of direct engagement with farmers' cultural understandings of disease may generate resistance to these plans. Alternatively, ambivalence to these controls may fail to engage farmers in broader discussions around disease control. As the experiences of other countries show, the eradication of disease requires the active engagement of farmers in a number of different aspects of disease control and not simply financial commitment to wildlife control (Enticott, 2013).

Secondly, whilst the 'roll out' of neoliberalism in animal health governance and bTB is still at a relatively early stage, these findings suggest that neoliberalism's reach into the governance of animal control is limited. Far from offering farmers choice and control of animal disease, the experiences of bTB so far have continued to place the State in direct control of how animal diseases are managed. At best, attempts to devolve power and responsibility to farmers reflect what Hodge and Adams (2012) call mutable forms of 'institutional blending' in which the involvement of the private sector is more than matched by continued significant degrees of State intervention. Nevertheless, there remain questions as to which farmers will engage with even these limited forms of devolved governance.

In conclusion, the evidence presented in this paper reveals discourses of neoliberalism as control rather than choice when viewed from the perspective of farmer subjectivities and reveals the continued power of the State to impose solutions through the private sector, rather than the private sector possessing a free will to choose solutions that it prefers. Neoliberalisation operates in and forms part of the evolution of state and private responsibility. A spatially nuanced policy that reflects the heterogeneities of bTB (Atkins and

Robinson, 2013), including farmer understandings and local beliefs about nature, is desirable but may be difficult to achieve in practice through neoliberal styles of governing.

Acknowledgements

The research on which this paper draws was funded by Defra (Department for Environment, Food and Rural Affairs), as part of a larger project examining farmer confidence in methods to control bTB in wildlife. We are grateful to Clive Potter and two anonymous reviewers for their constructive comments on an earlier version of this paper. The usual disclaimers apply.

Figure 1: Study area locations

Table 1: Farm characteristics

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