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Using scenario-based influence mapping to examine farmers' biosecurity behaviour

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ABSTRACT

Understanding of farmers' influences relating to biosecurity is surprisingly weak, beyond general remarks that farmers tend to trust their private vet. Previous studies have explored influences in relation to single issue events. There is a need for better methodologies to fully appreciate how farmers' biosecurity practices are shaped. Using bovine Tuberculosis as a case study, this paper uses stakeholder mapping methods applied across different scenarios. The aim is to identify how farmers' responses to animal disease policy are shaped by their relationships with different actors. Interviews were conducted with 50 farmers in three areas in England. Farmers were presented with four scenarios to control bovine Tuberculosis: 1) a badger cull, 2) an oral badger vaccine, 3) a cattle vaccine and 4) a range of control measures. The results show that as things get more uncertain, government institutions become more influential. Government institutions and government vets are also important in situations where farmers do not consider themselves 'experts' i.e. vaccination as opposed to culling. The influence of other farmers was not universal; it differed between scenarios. These data show the value of scenario-based stakeholder mapping as a methodology that can enable biosecurity researchers to: more accurately and systematically determine stakeholder influence and understand how these influences change and evolve; understand the role of farmer biosecurity practices, the self-concept and 'good farming'; and identify broader logics of biosecurity that influence and potentially frustrate animal disease policy goals.

1. Introduction

It is increasingly accepted that understanding animal disease transmission requires not just epidemiological science, but social science approaches that allow the attitudes and practices of people to be taken into account. There is a now well-established social science biosecurity literature (for reviews see Bingham et al., 2008; Dobson et al., 2013; Reed and Curzon 2015; Hinchliffe et al., 2016) that includes analysis of international, national and sub-national biosecurity governance frameworks (e.g. Barker 2010; Maye et al., 2012; Higgins et al., 2016) and local analysis of biosecurity techniques among stakeholder groups/populations, including 'configurations of practices' on farms (e.g. Enticott 2008; Hinchliffe and Ward 2014; Naylor et al., 2017). Local and global disease events such as Foot and Mouth, bovine Tuberculosis (bTB) and Avian Influenza have promoted a concern and emphasis within biosecurity studies to understand the behaviour of farmers, vets and other stakeholders. In other policy areas, studies of farmer behaviour have typically relied upon behavioural frameworks such as the Theory of Reasoned Action (TORA) and the Theory of Planned Behaviour (TPB). These approaches have been widely used in agricultural and environmental contexts, suggesting that farmers' behaviour is shaped by subjective norms – the influence of others upon social norms of behaviour, usually pointing to farmers' reliance on "dialogue with other farmers for ideas and information, as well as professional advisers, agricultural newspapers and magazines" (Garforth 2015; p.31).

Biosecurity studies have drawn on farmer behaviour studies to identify the levels of interest and influence amongst different stakeholders as a means of optimising disease prevention communication. Consequently, theoretical approaches applied to examine stakeholder influence and its relationship with farmer biosecurity practices have tended to be dominated by behavioural and psychological frameworks (TORA/TPB) (Gunn et al., 2008). Whilst the theoretical frameworks used in these psychological studies can offer a way of understanding biosecurity behaviour, Burton (2004a) and Fielding et al. (2008) have suggested that caution is required in interpreting their results. They point to failures of inadequately specifying and measuring the full range of stakeholders and their relative importance in different contexts. In

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short, for different diseases, a different range of actors may be more or less influential than others. Without identifying the most appropriate stakeholders for each policy field, generic measures will dilute the influence of the most appropriate. Methods are required that can both identify and assess the level of influence of each actor. As Reed and Curzon (2015, p.15) note, "…attempts to systematically identify, categorise or analyse stakeholders in this field are relatively rare".

This paper argues that scenario-based influence mapping is a useful methodological approach that provides a systematic means for researchers to identify and tease out the different social influences on farmers' biosecurity practices and behaviours in specific governance contexts. Scenario-based influence mapping contributes to and builds on recent social science approaches that have been developed to address the limitations of behavioural frameworks and psychological approaches. This work gives greater emphasis to social, cultural and institutional influences, using theories of social capital (Fisher 2013), trust and risk (Enticott et al., 2014), lay and situated knowledges (Hinchliffe and Ward 2014; Maye et al., 2014) and institutional logics (Higgins et al., 2016). The aim here is to extend this work by identifying how farmers' responses to animal disease policy are shaped by their relationships with different actors. Other studies have explored these influences in relation to single issue events (e.g. studies of specific disease events, such as Foot and Mouth outbreaks). In this paper we use stakeholder mapping methods developed by Oreszczyn et al. (2010) across a range of different scenarios. The scenarios all relate to potential solutions to address (bTB) in England and reflect not just different technical solutions, but also different solutions to the governance of animal disease. This contributes to an understanding of how farmers are encountering and reacting to the changing governance of animal disease in the United Kingdom (Enticott et al., 2011; Maye et al., 2014). It also helps to account for social and cultural influences related to the self-concept and 'good farming' (Burton 2004a,b; Naylor et al., 2017) and connects the biosecurity literature more explicitly with theories of social learning and 'webs of influence' (Oreszczyn et al., 2010).

The rest of the paper is structured as follows. First, the importance of appropriate stakeholder mapping exercises in agricultural and disease control research is reviewed. Second, the case context of the study – bTB and its changing governance – is introduced. Third, methods and scenarios are explained, including the design of influence maps, before presenting results. Finally, we discuss the benefits of the stakeholder mapping approach developed in the paper as a means to understand webs of influence (Oreszczyn et al., 2010). This includes reflections on how conversations with farmers related to the influence maps could be used to deepen analysis of biosecurity logics that can help explain resistance to biosecurity policies (Higgins et al., 2016).

2. Biosecurity stakeholders, webs of influence and significant others

There has been increasing interest in animal disease in the social sciences (Fish et al., 2011; Dobson et al., 2013; Hinchliffe et al., 2016). Partly, this has been driven by the global and spectacular nature of diseases such as Foot and Mouth and Avian Influenza. The spread of animal disease, though, can also be seen as a symptom of climate change, contributing to the challenge of food security (Godfray et al., 2010; Maye and Kirwan 2013) captured within the 'one-health' agenda (AVMA 2008). Whilst these concerns have prompted technological efforts to reduce the impact of animal disease (such as the development of new vaccines), they have also been accompanied by attempts to change farmers' behaviour and develop forms of social resilience in agricultural communities. In doing so, Governments have sought to identify and analyse the key drivers for animal disease behaviour amongst farmers, vets and other agricultural professionals, in order to identify the best possible means to communicate with and influence their behaviour.

This kind of research is not unfamiliar to land-use and agricultural scholars. Numerous studies exist, for example, that seek to understand farmers' behaviour in relation to their participation in environmental schemes (Morris and Potter 1995), the delivery of ecosystems services (Wynne-Jones 2013), conservation practices (Beedell and Rehman 2000; Pannell et al., 2006), farmers' responses to climate change (Fleming and Vanclay 2010; Hyland et al., 2016), soil management (Ingram 2008), and the adoption of new agricultural technologies (Garforth et al., 2006; Higgins 2007). Many of these studies rest on the assumption that identifying how farmers behave, and the influence of their social networks, can help ensure that new policies and practices can be more effectively communicated to them, thereby ensuring greater policy efficiency. Such a belief is also attractive to policymakers in the field of animal disease, such that recent studies of farmers' animal health practices are justified on these grounds. For example, Garforth (2015, p.30) argues that this kind of research "can help in the design of appropriate, targeted communication, and of effective policies and regulatory frameworks". In relation to biosecurity, Alarcon et al. (2014, p.224) argue that "effective communication of relevant disease-related knowledge is essential to facilitate farmers' decisions on disease control and, thereby to help them minimize the impact of diseases". Similarly, Hernández-Jover et al. (2012, p.262) suggest that "understanding stakeholders' interest and influence on the issue can assist in the development of risk management and communication strategies identifying those most likely to be in a position to influence the actions of the target group".

Where studies are based on a risk communication rationale, they have frequently relied on psychological models of human behaviour such as TORA or TPB (Ajzen 1991; Fishbein and Ajzen 2010). These models provide an explanation of how attitudes link to behavioural intentions through the incorporation of subjective norms – the extent to which an individual believes significant others believe that they should engage in a behaviour. Perceived behavioural control is also included in the TPB to account for the extent to which people believe they can do something about the challenges (such as disease outbreaks) they face.

Although these approaches have been widely used in agricultural studies (Carr and Tait 1990), Burton (2004a) argues that many are flawed through incorrect application. Firstly, he suggests that many studies fail to take into account the influence of significant others on decision making by conflating subjective norms with attitudes, such that resulting explanations are divorced from the social context in which farmers' make decisions. For example, Benjamin et al. (2010) examine farmers' attitudes to cattle disease but make no mention of subjective norms. Alternatively, studies often measure the influence of people within farmers' 'information environments' to account for subjective norms. However, Terry et al. (1999) argue that these can only be considered subjective norms when they are behaviour specific and follow the 'principle of compatibility' – i.e. they are specific to the situation being researched. As noted by Fielding et al. (2008) and Terry and Hogg (1996), aggregating impressions of people who are more or less important runs the risk of diluting the significance of those people who are relevant to that behaviour. Burton (2004a) also points to the importance of differentiating between social norms and subjective norms, or the difference between those behaviours approved of by others, and the perceived evaluations of those behaviours.

One reason for the failure to generate data "capable of producing a broad enough picture of farmer motivation" (Burton 2004a) is the time and funding such research demands. As Gilmour et al. (2011) show, accounting for all the potential sources of subjective norm can be a lengthy process, when done properly, leading to a lengthy questionnaire (Burton 2004a). As a result, biosecurity researchers may simply reduce the various sources of influence to a 'core-set' to make research more practical (see for example, Toma et al., 2013). Alternatively, the TPB may simply be used as a qualitative interview guide rather than as a tool for quantitative assessment. For example, Alarcon et al. (2014) use the TPB framework to investigate pig producers biosecurity