

Theories of Change in Rural Policy Evaluation

Damian Maye *, Gareth Enticott  and Rhiannon Naylor

Abstract

Rural policy evaluation helps to understand the extent to which policies have met pre-defined objectives, achieve value for money and learn from implementation failures. However, there is increasing debate over the quality of policy evaluation and the extent to which its methods can fully contribute to an understanding of rural policy. Responding to these calls, this article employs a theory driven approach to policy evaluation to assess the social impacts of attempts to reduce animal disease on farms in England. Popular in other policy arenas, theory driven evaluation relies on developing a theory of change to examine the interactions between policy contexts and mechanisms and policy outcomes and determine what works for whom. Drawing on longitudinal qualitative and quantitative research, the article identifies two mechanisms of change to evaluate the Badger Vaccine Deployment Project (BVDP) in England to reduce incidence of bovine Tuberculosis (bTB) in cattle. The article shows how these mechanisms – ‘seeing is believing’ and ‘practice similarity’ – are triggered by different contextual factors leading to the failure to deliver expected policy outcomes. We also consider the advantages and limitations to theory based evaluation, and the contribution it can make to the evaluation of other rural development programmes.

Introduction

Evaluating the outcomes of rural policy initiatives, particularly those associated with Government funded schemes, is a key element of rural studies. Evaluation is important in order to understand the extent to which policies have met pre-defined objectives and achieve value for money. Evaluation may also focus on the implementation of policies to address implementation failures (Dax *et al.* 2014). On the face of it, rural policy evaluation may appear to be a ‘good thing’, providing a rational approach to the needs of rural development. Yet, there is increasing debate over the quality of policy evaluation and the extent to which its methods can fully contribute to an understanding of rural policy (High and Nemes 2007; Dwyer *et al.* 2008; Shucksmith 2010). For example, writing about the evaluation of the European Union’s (EU) LEADER programme, Dax and

Oedl-Wieser (2016) call for evaluation approaches to 'go well beyond' traditional approaches reliant on indicators, whilst others have called for a greater range of qualitative methodologies in rural policy evaluation (Mayne 2004; Vanclay 2015).

Such debates are long-standing in the policy evaluation literature (Blalock 1999; Fitzgibbon 2002; Martin 2005) in which researchers have instead attempted to transcend traditional dualistic quantitative and qualitative approaches by developing bottom-up evaluative methods. These approaches, generally referred to as 'theory driven evaluation' (Weiss *et al.* 1995; Weiss 1997a, 1997b) or 'theory of change' (Pawson and Tilley 1997), frequently involve bottom-up participatory design and rely on multiple methodologies. More specifically, they help to open up the 'black box' of policy making (Stame 2004) and move beyond asking whether a policy works to an understanding of how it works (Pawson 2002). Chen (1990) suggests that it is only through 'theory driven' evaluation that it is possible to understand why, for whom and in which contexts policy works.

Whilst theory driven approaches to evaluation are not common within evaluations of European rural development initiatives, they are frequently deployed within the evaluations of, and used to develop, rural policy in developing countries (Nayiga *et al.* 2014; Breuer *et al.* 2016; Apgar *et al.* 2017; Douthwaite *et al.* 2017; Thornton *et al.* 2017; Higgins *et al.* 2018; Maru *et al.* 2018; Richardson *et al.* 2018). Others have shown how theory driven approaches can help evaluations of urban renewal projects (Mehdipanah *et al.* 2015) in order to reveal the complexity that formal evaluations struggle to accommodate (Stame 2004). Building on these studies, this article explores the potential for theory of change approaches in the evaluation of the social impacts of rural policy interventions. To do so, the article draws on a five-year longitudinal evaluation of a biosecurity intervention on cattle farms in England. The longitudinal approach allows us to examine not just what impact this policy has, but by developing a theory change, evaluate how policy works, for whom and in what context. At the same time, the longitudinal methodology contributes to and extends existing rural and farm biosecurity research that to date have largely relied on cross-sectional data.

The article is structured as follows. Firstly, it considers how theory driven approaches can assist rural policy evaluation and can address current methodological debates facing rural policy evaluation. Secondly, we build a theory of change (ToC) to evaluate the social impacts of a farm biosecurity policy. After providing methodological details, we put the ToC into action to describe how and for whom the policy works. Finally, we consider broader questions relating to the theory of change, biosecurity policy and rural policy evaluation.

Rural policy evaluation and the theory of change

Whilst the role and evolution of rural development policies is an ever-present topic in European rural sociology, less attention has been paid to the methods and approaches used to evaluate these policies (but see: Dwyer *et al.* 2008; Dax *et al.* 2014; Vanclay 2015; Dax and Oedl-Wieser 2016). Despite this lacuna, some key arguments are discernible in the literature, including but not limited to expectations regarding efficacy and effectiveness, which support the need for more advanced theory-driven approaches to rural policy evaluation. There is not space here to review the rural

development literature in detail, but some important points emerge that inform the approach to animal health policy evaluation reviewed in the next section of the article.

The first argument is the relationship between the 'rural development' concept and what this means in terms of evaluation approaches. In essence, there is greater recognition for more complex evaluation approaches as the 'rural development' concept itself has evolved from something dedicated primarily to agriculture and food production, to analysis of the multi-functionality of agriculture and rural areas. This includes, for example, the shift from exogenous to endogenous rural development (van der Ploeg *et al.* 2000), the 'living countryside' concept (Commission of the European Communities (CEC) 2003), multifunctionality (Marsden and Sonnino 2008) and 'networked development', all of which conceptualise rural development as a multi-dimensional, integrated and multi-actor process. Recent debate about neo-productivism and rural development, linked to well-documented global food, energy and resource crises, arguably signals a return to sector-based compartmentalised thinking. However, the debate if anything reiterates the need to capture and better understand multi-level interconnections between in this case agri-food systems of provision and other forms of rural economy. Crucially, these approaches to rural development all demand policy evaluation frameworks that better capture interrelations between economic, social and environmental processes, including how best to develop and maintain them, as well as frameworks that develop a better appreciation of the integrated impact of associated policy actions (Dwyer *et al.* 2007).

A second key argument in the rural policy evaluation literature is growing recognition that frameworks to evaluate EU Rural Development Programmes (RDPs), including measures and support for LEADER, are if anything going the other way, defined as increasingly technical output indicator-driven exercises (Dwyer *et al.* 2008; Dax and Oedl-Wieser 2016). In the 2007–2013 programme, for example, a larger set of instruments and measures were made available but this diversity then required a more streamlined method to evaluate programme impacts under what is termed the 'Common Monitoring and Evaluation Framework'. This indicator approach is a linear, measure-based intervention evaluation logic, designed to enable comparison at a European level. However, the shift to quantitative indicators fails to capture regional context, local actors and the importance of social innovation processes as key elements of programme performance (Dax *et al.* 2014). This is ironic given the bottom-up intentions of RDP programmes and particularly LEADER. For the latter, processes of mainstreaming have demanded more technocratic processes to evidence impact. The above developments have initiated significant debate from rural development practitioners and evaluators who are concerned that the spirit of LEADER is being lost. Analysts are calling increasingly for greater use of qualitative methods and 'soft' indicators to capture processes that are not easily measureable but significant in terms of social innovation and socio-economic outcomes. This is not a new debate. Cloke *et al.*'s (1995) work on rural lifestyles in the 1990s, for example, called for greater priority to be given to qualitative evidence to better understand rural policy impacts.

This is important given a third argument, which is to recognise the role of context, or in the case of RDPs, regional specificity. Studies show, for example, that Member States and regional administrations interpret a common vision for rural development, as defined within the second pillar of the Common Agricultural Policy (CAP), in different

ways (for example: Lowe *et al.* 2002). Different contextual factors are in play. For instance, it may be due to existing policy trajectories and the influence of the agenda of different actors and stakeholders who are involved in drafting and implementing rural development policy (Dwyer and Maye 2010). Regional variability in spending and priorities can also be a reflection of ideological and organisational differences, as well as historical legacies or path-dependency in policymaking (Dwyer *et al.* 2007). These contextual differences influence the development and operation of rural development policies and it also affects their performance and outcomes. This explains why there is increasing need to place greater emphasis on policy design and implementation processes. Policy design in this context refers to the content, evolution and structure of public policy (Schneider and Ingram 1999), taking account of the wider context within which it operates in order to understand why, how and where policies have developed, and the instruments and operational modalities chosen for implementing them. For rural development programmes under the CAP this translates as examining the design of national programmes and their underlying aims and drivers (Dwyer and Maye 2010).

ToC approaches to evaluation have the potential to fill these evaluation gaps. By no means new, ToC approaches to evaluation have experienced a surge of interest since the mid-1990s. Their origins, however, lie in theory based evaluation whose fundamental tenet is ‘that the beliefs and assumptions underlying an intervention can be expressed in terms of a phased sequence of causes and effects (i.e., a program[me] theory)’ (Weiss 1997b, p. 501). By focusing on programme theory, the aim is to open up the ‘black box’ of policy making (Stame 2004) to understand not just whether a policy achieves its intended goals but also the reasons why (Pawson 2002). Chen (1990), Weiss (1999) and Pawson and Tilley (1997) all suggest that it is only through ‘theory driven’ evaluation that it is possible to understand why, for whom and in which contexts policy works.

The use of the word theory is at times confusing and misleading (Blamey and Mackenzie 2004). As Weiss (1997b) points out, programme theory should not be abstract but targeted at the causal chain within policies. These causal theories may be influenced by more abstract theory, but they are specific to the parts of the policy to be evaluated. In this sense, theories represent ‘hypotheses which people consciously or unconsciously build their program[me] plans and actions’ (Weiss 1997b, 503). However, whilst policies may have several underlying theories, they are rarely explicit. Instead, theory based evaluation can adopt different ways of identifying them. For example: Chen and Rossi (1989) suggest that policies have no coherent theory and evaluators should endeavour to establish it; Weiss (1999) suggests that policies are a muddle of theories and that identifying the ones to evaluate should be achieved through consensus; finally, Pawson and Tilley (1997) suggest that theories are enacted by policy participants, and that selecting the ones to analyse comes through a process of ‘adjudication’.

It is through the identification of theories that ToC approaches may also address critiques of formal evaluation procedures of rural development programmes. Theories can be retrospective (developed after a policy has been implemented) or predictive (developed as part of policy development and design). Participatory approaches to theory development can therefore embed stakeholders within both the evaluation and the project design from an early stage (Richardson *et al.* 2018) such that projects

transform social relations between project partners as much as they deliver project outcomes (Apgar *et al.* 2017).

Whilst there exist different ToC approaches to evaluation, there nevertheless remain key similarities. Firstly, context is considered key to uncovering the circumstances in which policies work (Blamey and Mackenzie 2004). Thus, in Pawson and Tilley's (1997) ToC-based realist evaluation, *contexts* refers to the place and people specific factors in which policies are deployed. For example, in rural policy, different socio-economic and environmental factors may influence the extent to which a policy succeeds. Local cultures, implementation approaches and styles of regulation can also provide the context in which any given policy operates.

Secondly, *contexts* link to *mechanisms*, defined as 'what it is about programmes and interventions that bring about any effects' (Pawson and Tilley 2004, p. 6). *Mechanisms* are common to theory driven approaches to evaluation (Dalkin *et al.* 2015) and refer to the kinds of responses generated by the implementation of new policy programmes (Weiss 1997b). In Pawson and Tilley's realist evaluation, mechanisms represent the 'resources' offered to people that enable them to make the policy work – in intended or unintended ways. Programme mechanisms represent the 'process of how subjects interpret and act upon the [policy]' (Pawson and Tilley 1997, p. 6). For example, evaluating the impact of closed circuit television (CCTV) to reduce crime in car parks, Pawson and Tilley (1997) identify eight potential mechanisms, including: the 'nosy parker' mechanism (in which CCTV leads to enhanced natural surveillance to deter car crime) and the 'memory jogging' mechanism (in which CCTV prompts car owners to take greater care with locks and valuables). Programmes may work in multiple ways – intended or otherwise – so theory driven evaluation must carefully assess the extent to which different mechanisms exist.

Finally, *outcomes* refer to the impacts of policy. For rural social policies, outcomes are frequently obvious, although other hidden, tangential and unintended outcomes should be expected. Evaluating any rural policy is therefore a matter of identifying the different *context-mechanism-outcome* relationships to establish in which contexts mechanisms lead to desirable outcomes.

Like all policy evaluation approaches, ToC approaches are not without their problems. Most significant of all is that they are only as good as the theories they rely upon. Where the programme theory of a policy is obscure, or there are political sensitivities around the policy, it may be difficult to elicit theories in the usual way by examining documents or talking to key actors. Similarly, developing a ToC may appear to play into the hands of the critique of rational policy making in which goals and programme activities adapt during the life of a policy. In this view, ToC frameworks lock-in evaluators and are too inflexible to accommodate change. Weiss (1997b) disputes this, however, arguing that whilst conceding complexity is added by considering new lines of enquiry and possibilities of change, the ToC approach is readily adapted.

Developing a theory of change for farm biosecurity policies

Attempts to understand the geographical spread of animal disease management have largely focussed on the epidemiological outcomes of disease control. The key outcome is: has disease incidence declined? Where disease eradication programmes

have been successful, *post-hoc* explanations of success focus on technical excellence, standardised practices, and stakeholder involvement (Tweddle and Livingstone 1994; Lehané 1996; Livingstone *et al.* 2015). Rarely have their social outcomes been evaluated. Research has examined the relationship between, for example, farmers' intentions to implement animal disease controls and their attitudes and perceptions (Gunn *et al.* 2008; Heffernan *et al.* 2008a, 2008b). However, predominantly, studies are cross-sectional (Enticott *et al.* 2014) and there are few longitudinal studies that examine how disease control initiatives result in changes in acceptance, and the reasons for them, towards specific control measures.

In the United Kingdom (UK), biosecurity interventions to prevent the spread of animal disease may be funded by national governments, and/or by European funding through rural development funds. For the purposes of this article, our focus is on the management of bovine Tuberculosis (bTB) which is recognised as the most challenging animal disease problem in the UK (Godfray *et al.* 2018). Since 2012, the management of the disease has been partly funded by the EU. A key challenge has been limiting the spread of bTB from wildlife – badgers – to cattle. Badger culling policies have proved controversial, and their efficacy questioned (Independent Scientific Group (ISG) 2007). As such, the vaccination of badgers came to be seen as an alternative solution when a vaccine became available in 2010. Anticipating this announcement, the Department for Environment, Food and Rural Affairs (Defra) announced a programme of badger vaccination in 2009, known as the Badger Vaccine Deployment Project (BVDP) (Defra 2009). The BVDP was not framed as a scientific trial to assess disease incidence but was rather described as an attempt to understand 'how best to practically deploy vaccines, including how best to work with all stakeholders to deliver a vaccination programme and an understanding of training needs, *we aim to build confidence in the principle and practicalities of vaccination*' (Defra 2009: emphasis added).

Adopting a ToC approach to the evaluation of the BVDP, we sought to identify the contexts, mechanisms and outcomes that were integral to the workings of the project. As such, we interviewed policy makers, conducted documentary analyses, and drew on existing social research and theoretical perspectives of scientific controversies to identify context, mechanisms and outcomes (CMO) linkages to evaluate.

In terms of *context*, traditional biosecurity analyses focus on farm management styles and disease incidence. For example, in areas of high disease prevalence farmers' assessment of the disease risk and their subsequent behaviour may differ compared to those in lower areas of risk. Similarly, farm business models that are more vulnerable to the effects of bTB may have different views of vaccination. Whilst these contexts are important, the BVDP introduces another contextual layer, that of institutional support or action in relation to wildlife infection. Alongside this we may also think of other forms of contextual social support, such as that offered by farmers' vets.

Building on these biosecurity contexts, identifying the BVDP's *mechanisms* was harder to establish at the outset of the research. In farmers' meetings prior to the launch of the BVDP, the idea that vaccination was free and 'something for nothing' was used to encourage acceptance by Defra officials. Alternatively, press releases and publicity welcomed the involvement of farmers in the BVDP, suggesting they could 'learn lessons' (Defra 2009). By encouraging them to participate for the full 5 years,

farmers would also be able to 'maximise their chances of seeing benefits, as it will take time for badger vaccination to have a knock-on effect on the risk of disease to their cattle' (Defra 2009, p. 5). This addressed earlier criticisms of the government's approach to studying badger culling as being too distant, with farmers held at arm's length resulting in distrust of scientific knowledge (Enticott 2008). We refer to this mechanism as 'seeing is believing' in which exposure to the vaccination practices and its potential is linked to acceptability. A second mechanism emerged during the research process itself, which we refer to as practice similarity. Drawing on ideas of behavioural spillover (Thøgersen 1999), practice similarity suggests that where new interventions (i.e. vaccination of badgers) are similar to existing practices (such as vaccination of cattle), this similarity acts as a mechanism – or what Dietz *et al.* (2009) call a 'wedge' – for acceptance, and potentially, additional biosecurity activities. Practice similarity may also work through an alignment of similar identities: vaccination implicitly proposes a specific form of biosecurity 'good farming' (Burton 2004). This has two implications. On the one hand, farmers may support vaccination because it reflects their own cultural identity of a good farmer (Naylor *et al.* 2018; Shortall *et al.* 2018). On the other hand, vaccination may encourage others to adopt these biosecurity identities out of concern of being culturally different and 'letting the side down'.

Finally, in terms of the *outcomes* of the BVDP, Defra clearly framed these as social outcomes rather than outcomes relating to disease prevalence. Specifically, outcomes were identified as 'confidence' in vaccines (Defra 2009). Framing the outcome as 'confidence' referred to the technical ability to deliver vaccination, but it also highlighted wider concerns about the loss of trust in disease control policy and biosecurity highlighted in previous social research of bTB. In this case, farmers had lost trust in the government's ability to deliver effective bTB control amongst farmers (Enticott 2008). The ability of farmers to be involved and learn lessons about the BVDP also suggested an attempt to address levels of trust in the scientific process from which farmers had felt distanced (Poortinga *et al.* 2004; Heffernan *et al.* 2008a; Fisher 2013).

Thus, the CMO configuration that the evaluation set out to evaluate was:

- C – Disease environment: prevalence, institutional action, social support, farm environment
- +
- M – Seeing is believing
- M – Practice similarity
- +
- O – Confidence (in vaccines/biosecurity/Government)

Methodology

In order to analyse these CMO relationships, research was conducted in three 100km² areas, one area where badger vaccination had been deployed (the BVDP) and two comparison areas with no vaccination between 2010 and 2014. The BVDP was based in an area of Gloucestershire, covering 100km² and containing 197 cattle herds. The area was historically a high-risk area for bTB: 50 per cent of farms in the area had suffered a bTB incident in the previous three years. Two similar-sized non-vaccination areas were chosen to assess the impact of the BVDP upon levels of confidence. To account for variations in context, areas were chosen according to disease

prevalence, historical duration of endemic bTB, numbers of dairy and beef farmers, and historical/contemporary badger culling operations. The first comparison area – Great Torrington (in Devon) – had historically high bTB prevalence. The second area – Congleton (in Cheshire) – had historically had lower but increasing bTB prevalence.

A repeat telephone survey was used to determine levels of vaccine confidence during the study period. Two telephone surveys were completed: the first in 2010 (as the BVDP was beginning) and the second in 2014 (prior to the completion of the BVDP in March 2015). Farmers were identified using a stratified random sample of cattle farms that was drawn using the Animal and Plant Health Agency's bTB database. The sample was weighted in relation to farm type, surveying more dairy farms than proportionally necessary to enable comparisons between farm types (see Table 1 for details). The survey was designed using a standard set of attitudinal statements relating to confidence and trust and adapted to fit the BVDP context (Metlay 1999; Poortinga and Pidgeon 2003). Farmers were asked about their farm's bTB status and management practices, their confidence in vaccination and their levels of trust in the Government's bTB policy. They were asked to rate attitudinal statements relating to vaccination, confidence and trust along a scale of 1 (strongly disagree) to 5 (strongly agree). The response rate for the baseline survey was 80 per cent, and represented 229 respondents or 23 per cent of the total population of the three case study areas. The repeat telephone survey achieved 151 responses, a response rate of 65 per cent, representing 16.4 per cent of the cattle farmer population in the study areas. Responses to the telephone survey were analysed in SPSS. For this article, analysis has focused on longitudinal changes in response and variation between areas and disease contexts.

Between the two surveys, three annual rounds of face-to-face interviews were carried out with a sub-sample of farmers selected from the baseline survey. Farmers were selected based on willingness to participate in further research, farm characteristics and bTB incidence, and their levels of vaccine confidence derived from survey responses. In total, 50 farmers were interviewed every year (for further details see Table 2). Interviews were based around: each farmer's experience of bTB and their perceptions of why they had bTB and its causes; the evolving bTB policy context; and farmers' perceptions of the governance of bTB. Interviews were fully transcribed and analysed annually in Nvivo to identify key themes in the data relating to farmers' perceptions of badger vaccination, and the underlying behavioural mechanisms for them.

Theories into action

In this section we link the contexts, mechanisms and outcomes of the BVDP. Firstly, we show how the two mechanisms are linked to contexts. Secondly, we show how these mechanisms relate to outcomes.

Contexts – mechanisms – outcomes (1) – 'seeing is believing'

As the vaccination trial progressed, successive annual interviews with farmers provided some evidence that policy makers' expectation that the 'seeing is believing' mechanisms could trigger confidence in badger vaccination. For those farmers

Table 1: *Sample for baseline and repeat cattle farmer telephone surveys*

Area	Dairy		Beef		Other		Total	
	2010	2014	2010	2014	2010	2014	2010	2014
North West of Stroud	81	66	157	180	56	4	294	250
	34.6%	36.4%	24.8%	15.6%	21.4%	75.0%	26.9%	22.0%
South East of Congleton	149	140	220	273	48	7	417	420
	23.5%	17.9%	15.0%	7.7%	14.6%	14.3%	18.0%	11.2%
Great Torrington	66	68	185	177	24	4	275	249
	27.3%	19.1%	27.6%	20.3%	25.0%	0%	27.3%	19.7%
Total	296	274	562	630	128	15	986	919
	81	62	123	85	25	4	23.2%	16.4%

Note: The 'other' category includes mixed herds.

Table 2: *Sample of repeat farmer interviews for the badger vaccination study (Rounds 1-3, 2011–2013)*

Year	Stroud	Congleton	Great Torrington	Total
2011	20	22	23	65
2012	18	18	20	56
2013	17	16	17	50

directly involved with the BVDP, the opportunity to watch badgers being vaccinated provided a new perspective on vaccination. Witnessing vaccination first-hand and being part of the scientific process behind the project addressed the failings they had levelled at previous scientific attempts to deal with bTB. For example, the following quote demonstrates how the authenticity and reliability of badger vaccination was derived from farmers’ proximal witness to badger vaccination:

‘Seeing it first-hand has made a difference. I didn’t really understand it before to be honest... I didn’t know how they were going to get them all. It was nice to see it done...It has given me more confidence in the job’ (S307).

As predicted, context – in this case geographical proximity – was a key element in triggering the ‘seeing is believing’ mechanism. In order to publicise badger vaccination more widely, Defra produced videos of the process of badger vaccination that were made available on Government websites and featured in popular farming TV programmes. However, in areas where vaccination was not taking place, farmers were unable to dissociate their lack of trust in Government with badger vaccination. On showing these films to farmers as part of the longitudinal interview process, farmers were sceptical, struggling to accept that the badger was ‘wild’ and not selected specifically to make vaccination look easy. Similarly, the film reinforced questions they had on the practicality, efficacy and cost of administering a vaccination programme. These farmers demanded evidence that vaccination ‘worked’, for example:

‘If I knew it worked, I would agree with it. But until somebody tells me it works, or shows me, then I won’t agree’ (C498).

The experiences of farmers in the BVDP suggested that demands for evidence were also a call for a different kind of evidence in which they were actively implicated in the production of knowledge, rather than being cast as bit part players on the margins. However, a changing political context contributed to a growing invisibility of vaccination thereby disrupting the ‘seeing is believing’ mechanism. Farmers had become accustomed to scientific trials to assess bTB interventions. However, whilst the BVDP had the appearance of a scientific project, its aims were wholly different: to test the practicalities of vaccination rather than assess its effect upon disease incidence. Defra had been careful to frame the BVDP as a ‘project’ rather than a ‘trial’, a nuance lost on most farmers. At the same time, politicians quickly took a view on the trial: the Minister with responsibility for bTB stating as soon the BVDP had begun that:

'Vaccination does not guarantee that all badgers are fully protected from infection and it would take some time to develop immunity within a local population. Vaccination is still likely to reduce disease risk and have greater disease control benefits than taking no action to tackle [bTB] in badgers... In addition, when used in combination with culling, vaccination could help to mitigate the perturbation effects of culling' (HC 2010)

A year later, the secretary of state claimed that she had '*seen* [the practicalities] with *my own eyes*' (HC 2011: emphasis added). If the 'seeing is believing' mechanism had worked for the minister, it ironically meant that resources would not be used to evaluate the effect of vaccination on disease incidence, frustrating the ability of the mechanism to work with farmers. Moreover, the meaning of the BVDP became malleable to suit political purposes. Set up as a trial, its contribution to BVDP became realigned to other policy objectives such as complementing a badger cull. In interviews, however, the political role that the BVDP came to occupy and its failure to provide the kinds of evidence expected by farmers resulted in frustration, as well as lower levels of trust and confidence in Government seen in the survey.

The changing political context also had implications for the seeing is believing mechanism. The BVDP was launched in 2009 by a Labour Government in which farmers had come to have little confidence in matters of bTB. Following the election of the Conservative-Liberal Democrat coalition in 2010, farmers had more favourable views, suggesting they were 'prepared to give this lot a go' particularly, after an announcement that badger culling would be introduced. However, the postponement of this policy had a knock on effect to farmers' confidence in badger vaccination. The failure to implement this policy sustained the view that the Government could not be trusted to deliver effective bTB policy. This failure also increased farmers' concerns about whether sufficient badgers could be vaccinated. As one farmer from the Great Torrington area, who has been under bTB restriction for four years, put it:

'[T]he fact that they have realised suddenly that there is more badgers out there than they originally thought, just highlights the scale of the problem' (GT1063).

The relationship between mechanism and outcome was also situated within cultural and environmental contexts. Indeed, as the quantitative analysis shows, overall the effect of the 'seeing is believing' mechanism in developing vaccine confidence appears to be limited (see Table 3). Levels of trust and confidence amongst farmers in the BVDP did not change as a result of being exposed to badger vaccination. In general farmers in the BVDP had no different views to those farmers with no experience of vaccinating in 2010 or 2014, nor were changes over time significantly different between these two groups (see Table 4). Indeed, whilst the explicit purpose of the BVDP was to demonstrate the practicality of badger vaccination, farmers in the BVDP scored the practicality of vaccination the same as in 2010. Moreover, even within the BVDP area, farmer attitudes towards badger vaccination were generally negative or ambivalent at best. In fact, confidence in vaccination became more negative in the BVDP area than non-vaccinating areas. Overall, levels of trust in Government were similar for both groups. However, by 2014, overall levels of trust amongst BVDP farmers had remained at a similar level compared with 2010, whilst trust fell in the non-vaccinating areas. BVDP farmers rated the Government as more competent, credible and with

Table 3: *Farmers' confidence in badger vaccination*

Concept	Question	All Areas		Non-Vacc				BVDP			
		2010	2014	Difference	Sig.	2010	2014	Difference	Sig.	2010	2014
Vaccine Acceptability	Badger vaccination is an acceptable way of dealing with bTB	2.89	2.53	-0.36	0.000	2.80	2.45	0.37	0.153	2.45	2.67
	Vaccinating badgers is better than culling badgers to control bTB	2.37	2.15	-0.22	0.016	2.33	2.05	0.28	0.497	2.05	2.35
	Paying for badger vaccination should be the Government's responsibility	4.25	4.27	0.02	0.797	4.21	4.25	0.10	0.391	4.25	4.29
General Affective Evaluation	I think vaccinating badgers is a good thing to do	3.13	2.88	-0.25	0.017	2.91	2.69	0.62	0.001	2.69	3.24
	Badger vaccination will help me feel more confident about avoiding bTB restrictions	2.90	2.53	-0.37	0.000	2.82	2.49	0.22	0.268	2.49	2.60
	I am confident that badger vaccination will help prevent the spread of bTB	2.68	2.35	-0.33	0.002	2.56	2.35	0.33	0.067	2.35	2.35
Risks and Benefits	Badger vaccination will decrease levels of bTB in badgers	3.35	3.34	-0.01	0.944	3.31	3.24	0.11	0.261	3.24	3.51
	Vaccinating badgers is practical	2.37	2.23	-0.14	0.183	2.21	1.96	0.46	0.008	1.96	2.69
	Badger vaccination will reduce the chances of my herd going under bTB restrictions	3.16	2.88	-0.28	0.008	3.05	3.00	0.30	0.063	3.00	2.69
											0.118

Table 4: *Farmers' trust in badger vaccination and bTB policy*

	All Areas		Non-Vacc		BVDP		Non-Vacc		BVDP	
	2010	2014	Difference	Sig.	2010	2014	Difference	Sig.	2010	2014
Competence	2.54	2.26	-0.28	0.017	2.78	2.11	-0.67	0.000	2.16	2.44
Credibility	2.89	2.66	-0.23	0.019	2.77	3.11	0.34	0.015	2.47	2.98
Integrity	2.73	2.95	0.22	0.044	1.79	2.04	0.25	0.093	1.92	2.37

Table 4: (Continued)

	All Areas	Non-Vacc				BVDP				Non-Vacc				BVDP			
		2010	2014	Difference	Sig.	2010	2014	Difference	Sig.	2010	2014	Difference	Sig.	2010	2014	Difference	Sig.
Reliability	The Government takes its commitments to reducing bTB seriously	3.16	3.24	0.08	0.459	3.28	2.95	-0.33	0.470	3.26	3.20	-0.060	0.762				
	We can rely on the Government to ensure that badger vaccination is carried out properly	2.83	2.87	0.04	0.699	2.64	3.19	0.55	0.000	2.60	3.35	0.750	0.000				
Openness	The Government is open and honest about badger vaccination	2.95	2.96	0.01	0.909	2.94	2.96	0.02	0.868	3.02	2.85	-0.170	0.241				
	The Government is interested in what farmers think about badger vaccination	3.22	3.05	-0.17	0.126	3.24	3.19	-0.05	0.749	2.02	3.09	1.070	0.566				
Fairness	The Government cares about reducing bTB	3.67	2.74	-0.930	0.000	3.76	3.52	-0.24	0.169	2.76	2.70	-0.060	0.666				
	The Government considers all arguments for and against badger vaccination	3.40	3.25	-0.15	0.101	3.39	3.42	0.03	0.832	3.25	3.25	0.000	0.747				
	Decisions made by the Government about bTB are fair and just	2.75	2.66	-0.09	0.394	2.87	2.53	-0.34	0.024	2.63	2.71	0.080	0.729				

more integrity. By contrast, for those in non-vaccinating areas, responses to survey items relating to trust declined.

The failure of context to trigger the 'seeing is believing' mechanism was also attributable to failings in what Weiss (1997b) refers to as 'implementation theory' – the resources and activities required to trigger the 'seeing is believing' mechanism. For farmers taking part in the BVDP, the way information was communicated was particularly important. However, farmers' contact with the team delivering vaccination varied markedly. Some farmers knew the number of badgers that had been vaccinated but others raised concerns about the level of communication they had received from scientists running the project. Some farmers claimed they had 'no idea' when the last or next time badgers would be vaccinated on their farm. The importance of communication was emphasised by one farmer who proactively sought feedback:

'I always try and get them to tell me what they've caught or whatever but they say the cubs aren't around at this time because of the weather last year but um they're not, I don't know really they say they're catching what is there, I'm not convinced they're catching them all' (S367).

Whilst the aim of the BVDP was to create a new context in which scientists and farmers came together, these relations were highly contingent, dependent on farmers' enthusiasm to learn, chance encounters with vaccinators and local environmental conditions that determined whether vaccination actually took place or not.

Contexts – mechanisms – outcomes (2) – practice similarity

The mechanism of practice similarity relies on a supportive socio-cultural context. Interview and survey data, however, revealed that this context was rarely present and instead existing forms of good farming, social networks and farmers' own understandings of disease means that similarities did not lead to outcomes. The failure to trigger practice similarity can therefore be seen in relation to these contexts.

The first element of practice similarity was farmers' comparison between their whole herd approach to vaccination (or disease testing) and the suggestion that not all badgers would need to be vaccinated because of the herd immunity concept (Defra 2009). Based on their experiences of vaccinating all cattle at risk of disease, farmers argued that badger vaccination would work only if 100 per cent of badgers were vaccinated. Farmers thought this was impractical at the scale at which the vaccine needed to be administered. While the majority were willing to accept that a single badger could be vaccinated, very few felt that it would be possible to scale-up the process that was connected to their beliefs in the over-population of badgers:

'I just can't see how they are going to know that everything is vaccinated. I don't think it's realistic to be done on the scale that it would need to be done on. I mean, bloody hell, there are thousands of them, everywhere' (C521).

Secondly, in interviews farmers consistently drew on their own experiences of vaccination and/or bTB testing to contest the likelihood of badger vaccination working. Farmers argued that vaccinating badgers – just like cattle – that were already infected was pointless. Rather, just like their treatment of cattle, badgers they argued would

need to be tested to see which ones were infected (and culled) whilst the remainder were vaccinated. For example:

‘Unless you’re actually going to cull the infected and vaccinate the clean ones I really can’t see there being a lot of benefit of it’ (S300).

Farmers felt that vaccinating badgers in areas where bTB is endemic would not be effective. Instead, farmers suggested that badgers should be vaccinated in areas that are currently uninfected, particularly in areas surrounding bTB hotspots. At the same time, farmers held the view that there were simply too many badgers, that nature had been allowed to ‘get out of control’ by legal protections. As noted elsewhere (Enticott 2008; Maye *et al.* 2014), these beliefs appear to be deeply ingrained amongst farmers, forming strong social norms about what should be done about bTB. For example:

‘If you know you’ve got a clean sett, fine, vaccinate them and then they’re covered, but you need them tested first to know what we’re dealing with really. What’s the point of vaccinating a badger that’s got TB anyway? If the cull has worked, and the badgers left are clean, fine, vaccinate them’ (GT1100).

Thirdly, this failure to generate vaccine confidence was also connected to farmers own knowledge practices in which they articulated their own ‘field-level epidemiology’ to make sense of disease. These theories about the way bTB was transmitted were derived from their own experiences and those of other local farmers, which were collected and disseminated through their own social networks (Fisher 2013). In the BVDP, the evidence vacuum gave these knowledge practices added significance. For example, during interviews, farmers sought to make sense of the localised spread of bTB in order to make sense of the effectiveness of vaccination:

‘Even though there’s the [badger] vaccination going on we’ve still succumbed to it [bTB]... Even though there was vaccination going on we were still going down with it and all our stock were in areas where they were being vaccinated so it may not be the answer’ (S334).

Fourthly, practice similarity failed to generate confidence because of a less than supportive social environment. Farmers did not view biosecurity as a defining characteristic of a ‘good farmer’, such that social norms of vaccinating did not trigger the practice similarity mechanism. Similarly, farmers frequently identified their local vet as their most trusted advisor and source of information on vaccination and bTB (see Maye *et al.* 2017). Local vets were therefore important in contributing to firing mechanisms, yet in the BVDP they were influential in shaping farmers’ attitudes against vaccination. For example:

‘I’ve stopped it because I no longer agree with it. The more I found out about it the less I agreed with it so I stopped it. The vaccine they’re using is no good. It’s not suitable vaccine to even be testing. I’ve got 3 friends that are retired vets and they all agree that it’s a total waste of time and money so I stopped it’ (S389).

The result of this context – mechanism relationship can be seen in the outcomes. Farmers’ general affective valuation – i.e. how they *felt* about badger vaccination, or the affect heuristic (Finucane *et al.* 2000) – was largely ambivalent, becoming more

negative by 2014 (see Tables 3,4). Values for these questions however declined by 2014 and differences with 2010 were all statistically significant. Farmers' perceptions of the risks and benefits of badger vaccination reflected the pattern of initial ambivalence followed by more negative attitudes shown in their responses to questions on their affective evaluation of vaccination. Specifically, farmers were statistically significantly more likely to disagree that vaccination would reduce their herd's chances of getting bTB in 2014.

Discussion and conclusion

Operationalising a ToC approach provides lessons not just to understand the social impacts of animal disease policy, but also addresses the challenges of rural policy evaluation raised within the literature. This section discusses the broader relevance of the approach we have adopted to evaluate the BVDP. Firstly, we assess what these findings say about animal disease policy in general; secondly, we discuss, the relevance and limitations of the ToC approach to policy development; and thirdly, we link the approach to the wider critique of rural policy evaluation.

The desired social outcome of the BVDP was increased farmer confidence. Vaccine confidence levels were low to start with (in 2010; see also Enticott *et al.* 2014) but declined further by the end of the vaccination project. Farmers in the BVDP area were the most negative in 2014, but these impacts were felt in all research areas: lower levels of trust in government and with trust falling most sharply in the two non-BVDP areas. This research extends existing cross-sectional analyses of bTB and animal disease policies by revealing longitudinal changes in farmers' attitudes and behaviours in areas receiving different disease management interventions. Moreover, adopting a ToC framework helps to explain why and for whom these changes have occurred by identifying the relationships between contexts, mechanisms and outcomes. The analysis focused on two CMO relationships. Firstly, 'seeing is believing' triggered social impacts through the context of geographical proximity and farmer participation in the project. Secondly, 'practice similarity' was triggered by farmers' contextual familiarity with vaccines and their cultural relevance.

From a disease policy perspective, identifying and understanding how causal mechanisms generate social impacts can help refine policy approaches to animal disease and other agricultural policy. Identifying mechanisms like 'seeing is believing' can help define the key goals for everyone involved in delivering policy. As Weiss (1997a) points out, policy theories are frequently implicit, yet the failure to explicitly articulate policy theory can cause problems when policy is formulated and delivered by a range of different actors and organisations. In this case, a wider appreciation of the 'seeing is believing' mechanism may have allowed for more inclusive farmer participation within the vaccination project. The idea that the BVDP was designed to test the practical application of the technology was missed by participants or viewed as a side issue, even though this was the stated aim. Some farmers in non-BVDP areas were not even aware of the BVDP, let alone its purpose. Others were aware of the project but were unwilling to engage with it, which reflected their general lack of confidence in the technology. Elsewhere theory of change approaches are used as part of participatory approaches to policy development and implementation (Apgar *et al.* 2017). A more

collaborative approach to disease control in which farmers were actively engaged in planning vaccination may have avoided these problems. Indeed, calls for more participatory approaches to policy evaluation have been made elsewhere in relation to evaluation of rural development schemes (see, for example, High and Nemes 2007).

The failure to meaningfully and consistently trigger either mechanism also hints at the challenges facing policy theory when policy formulation, delivery and implementation are spread across a range of organisations. This is particularly relevant given the way farm animal disease policy is currently being reorganised within the cost and responsibility sharing agenda for animal health (Godfray *et al.* 2018). Whilst working in partnership is a key feature of the shared responsibility rhetoric, the extent to which this translates into focused policies with shared theories of change across all organisations is yet to be tested. A key criticism of ToC is their apparent inability to respond to contextual changes during an evaluation (Weiss 1997b). The development of the cost-sharing agenda during the evaluation project, along with other political and policy changes, had the potential to affect the ability of the approach to detect and understand changes. In our case, however, the longitudinal approach allowed for new events to be incorporated into our data collection and their relationship to the two mechanisms identified fully analysed. Indeed, attempts to 'educate' farmers about the role of vaccination through the production and dissemination of films and leaflets during the project allowed us to analyse the contexts of geographical proximity in relation to the 'seeing is believing' mechanism.

The identification of CMO relationships is also integral to the ability of ToC approaches to identify 'what works for whom in what circumstances' (Pawson and Tilley 1997). In this respect, our analysis was unable to fully distinguish between those who benefitted from the vaccination policy (in terms of greater confidence) and those that didn't. This is partly because the failure to generate these social impacts was felt relatively uniformly across all farmers in each of the different disease and policy contexts studied. The qualitative research did highlight some examples of how disease contexts or farm characteristics influenced the mechanisms, such as farmers who stopped vaccination because of a new bTB incident. More broadly, however, there was little sign that the geographical context of policy was influential. Proximate interventions appeared to make little difference to farmers' views towards vaccination compared to those that were delivered from a distance. If anything, farmers' attitudes in the vaccination area became more negative as the trial progressed compared to those outside it.

It may be the case that other contextual factors not fully accounted for within the analysis – such as farmers' age, or their ethical and environmental values – may have influenced the way outcomes were distributed. This highlights the significant methodological resources that are required to fully operate a ToC approach, and the degree to which all contexts can be accounted for. Nevertheless, these findings also confirm a much broader body of theory within studies of farming behaviour relating to the role of context: that without significant disruptions to embedded cultural, environmental and economic practices, changes to farmers' behaviour are likely to be small-scale, incremental and short-lived (Sutherland *et al.* 2012).

It may also be the case that there are other undiscovered mechanisms at play which influence the social impacts of the BVDP: theory driven evaluation is only as

good as the theories tested. Whilst this is possible, the mechanisms studied here are grounded in both an analysis of the policy itself, and the wider literature. As Henke (2008) shows, the visibility of experiments is a powerful influence shaping how farmers behave and innovate. Similarly, as Wynne (1992) forcefully shows, the visibility and involvement of farmers in scientific experiments plays a significant role in the rejection of Government policies. Perhaps more interesting is the extent to which 'seeing is believing' has wider relevance for other rural development programmes. Pawson and Tilley (1997) suggest that the aim of theory driven evaluation should not be excessive theory development, but to test existing theories wherever possible. For both mechanisms studied in this analysis, we therefore recommend analysing them in different contexts and for different kinds of policy to examine their broader utility in both analysing and developing rural policy.

The ToC approach utilised in this article also raises broader implications for rural policy evaluation, particularly EU rural policy evaluation. A focus on the CMO relationships provides a useful way for evaluators to track and monitor the resources offered to make a programme work, particularly the context mechanisms that create desirable outcomes. As noted by previous commentators (Dwyer *et al.* 2008; Dax *et al.* 2014; Vanclay 2015), national programme reviews tend to favour quantitative indicator-based evaluation strategies, which are aligned to a Common Monitoring and Evaluation Framework. These approaches appear to offer reliable data, but on their own they are not sufficient for complex programmes.

In the case of LEADER, for example, these bottom-up rural development groups are best placed to foster social innovation. A number of studies from the 2007–13 programming period now show quite clearly that evaluation approaches failed to capture their impact (Dax and Oedl-Wieser 2016). One key delimiting factor was the design of the programme itself, which limited the ability of Local Action Groups (LAGs) to support socially innovative projects. The current programme (2014–2020) appears to be equally challenging for LEADER groups, with an emphasis on measures and focus areas. Potentially, ToC approaches to policy evaluation would be helpful in this context to capture these issues. For example, it could monitor policy design influences, the resources available to LAGs, context and delivery mechanisms and unanticipated factors linked to outcomes. At a programme-level, this requires a shift in what constitutes creditable and legitimate knowledge, recognising much more the power of robust qualitative measures, including the value of story-based approaches and narrative evaluation (Vanclay 2015), alongside quantitative techniques.

The failure of rural policy evaluation to capture process-related and intangible impacts also extends beyond LEADER. Agri-environmental measures are another well-established element of RDPs, but often it is difficult in formal evaluations to measure the impact that their involvement has on farmer behaviour and identity, particularly over a sustained period. From a territorial perspective, RDP support measures and focus areas (e.g., farm succession and generational renewal) also have impacts and outcomes linked to contextual factors that defy measurement via output indicators. EU schemes have 'complex realities', as noted in relation to schemes that use environmental management to support community development (Prager *et al.* 2015).

At the same time, the ToC approach can help address the lack of active participation of actors in the evaluation process, particularly to establish appropriate goals and success criteria. The alignment of theory driven approaches with participatory approaches to rural policy development and evaluation (Apgar *et al.* 2017) allows these approaches to complement the bottom-up approaches to rural development such as the EU's LEADER scheme, addressing the current mismatch in bottom-up development and top-down evaluation approaches (High and Nemes 2007). This is important given the proposal in the next RDP that member states will have flexibility to determine their national programmes (for both pillars) but they must closely monitor performance outcomes (European Commission 2018; Hogan 2018). As the EU's rural development programme continues to evolve and become more flexible across its two pillars, theory driven approaches to evaluation can play a valuable role in meeting the needs of rural policy makers.

Funding information

This research was funded by Defra (project codes SE3121 and SE3135).

Conflict of interest statement

There is no conflict of interest to declare.

Acknowledgements

We would like to thank the farmers that participated in the research. We would also like to thank the editor, Bettina Bock, and two anonymous reviewers, for their helpful comments on a previous draft of the article.

*Corresponding author.

References

- Apgar, J.M., W. Allen, J. Albert *et al.* (2017) Getting beneath the surface in program planning, monitoring and evaluation: learning from use of participatory action research and theory of change in the CGIAR Research Program on Aquatic Agricultural Systems. *Action Research* 15 pp. 15–34
- Blalock, A.B. (1999) Evaluation research and performance management movement. *Evaluation* 5 pp. 117–149
- Blamey, A. and M. Mackenzie (2004) Theories of change and realistic evaluation. peas in a pod or apples and oranges? *Evaluation* 13 pp. 439–455
- Breuer, E., M.J. De Silva, R. Shidaye *et al.* (2016) Planning and evaluating mental health services in low- and middle-income countries using theory of change. *British Journal of Psychiatry* 208 pp. s55–s62
- Burton, R.J.F. (2004) Seeing through the 'good farmers' eyes: towards developing an understanding of the social symbolic value of 'productivist' behaviour. *Sociologia Ruralis* 44 pp. 195–215
- Chen, H. (1990) *Theory-driven evaluation* (London: Sage)

- Chen, H. and P. Rossi (1989) Issues in the theory-driven perspective. *Evaluation and Program Planning* 12 pp. 299–306
- Cloke, P., M. Goodwin, P. Millbourne *et al.* (1995) Deprivation, poverty and marginalization in rural lifestyles in England and Wales. *Journal of Rural Studies* 11 pp. 351–365
- Commission of the European Communities (CEC) (2003) Conclusions of second European conference on rural development in Salzburg: “planting seeds for rural futures - building a policy that can deliver our ambitions” (Brussels: CEC)
- Dalkin, S.M., J. Greenhalgh, D. Jones, B. Cunningham and M. Lhussier (2015) What's in a mechanism? Development of a key concept in realist evaluation. *Implementation Science* 10 pp. 1–7.
- Dax, T. and T. Oedl-Wieser (2016) Rural innovation activities as a means for changing development perspectives – An assessment of more than two decades of promoting LEADER initiatives across the European Union. *Studies in Agricultural Economics* 118 pp. 234971
- Dax, T., T. Oedl-Wieser and W. Strahl-Naderer (2014) Altering the evaluation design for rural policies. *European Structural and Investment Funds Journal* 2 pp. 141–152
- Defra. (2009) Bovine TB: the badger vaccine deployment project (London: Defra)
- Dietz, T., G.T. Gardner, J. Gilligan *et al.* (2009) Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences* 106 pp. 18452
- Douthwaite, B., J. Mayne, C. McDougall *et al.* (2017) Evaluating complex interventions: a theory-driven realist-informed approach. *Evaluation* 23 pp. 294–311
- Dwyer, J. and D. Maye (2010) Comparing CAP rural development programmes: insights from policy design, delivery and context. *Irish Rural Policy News* 1 pp. 3–7
- Dwyer, J., N. Ward, P. Lowe *et al.* (2007) European rural development under the common agricultural policy's 'second pillar': institutional conservatism and innovation. *Regional Studies* 41 pp. 1–15
- Dwyer, J., D. Bradley and B. Hill (2008) Towards an enhanced evaluation of European rural development policy reflections on United Kingdom experience *Économie rurale* 307 pp. 53–79
- Enticott, G. (2008) The ecological paradox: social and natural consequences of the geographies of animal health promotion. *Transactions of the Institute of British Geographers* 33 pp. 433–446
- Enticott, G., D. Maye, R. Fisher *et al.* (2014) Badger vaccination: dimensions of trust and confidence in the governance of animal disease. *Environment and Planning A* 46 pp. 2881–2897
- European Commission (2018) Future of the common agricultural policy (Brussels: European Commission)
- Finucane, M.L., A. Alhakami, P. Slovic and S.M. Johnson (2000) The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making* 13 pp. 1–17.
- Fisher, R. (2013) 'A gentleman's handshake': the role of social capital and trust in transforming information into usable knowledge. *Journal of Rural Studies* 31 pp. 13–22
- Fitzgibbon, C.T. (2002) Evaluation in an age of indicators. *Evaluation* 9 pp. 140–148
- Godfray, C., C.A. Donnelly, G. Hewinson *et al.* (2018) Bovine TB strategy review (London: Defra)
- Gunn, G.J., C. Heffernan, M. Hall *et al.* (2008) Measuring and comparing constraints to improved biosecurity amongst GB farmers, veterinarians and the auxiliary industries. *Preventive Veterinary Medicine* 84 pp. 310–323
- HC. (2010) Bovine Tuberculosis, Vol. 515, Col. 45WS, September 15th
- HC. (2011) Bovine TB, vol. 531, Col. 816, 19th July, 2011
- Heffernan, C., L. Nielsen, K. Thomson *et al.* (2008a) An exploration of the drivers to bio-security collective action among a sample of UK cattle and sheep farmers. *Preventive Veterinary Medicine* 87 pp. 358–372
- Heffernan, C., K. Thomson and L. Nielsen (2008b) Livestock vaccine adoption among poor farmers in Bolivia: remembering innovation diffusion theory. *Vaccine* 26 pp. 2433–2442
- Henke, C.R. (2008) Cultivating science, harvesting power. Science and industrial agriculture in California (London: MIT Press)

- Higgins, D., T. Balint, H. Liversage *et al.* (2018) Investigating the impacts of increased rural land tenure security: a systematic review of the evidence. *Journal of Rural Studies* 61 pp. 34–62
- High, C. and G. Nemes (2007) Social learning in LEADER: exogenous, endogenous and hybrid evaluation in rural development. *Sociologia Ruralis* 47 pp. 103–119
- Hogan, P. (2018) Speech of commissioner Phil Hogan on simplification and subsidiarity (Brussels: European Commission)
- Independent Scientific Group (ISG) (2007) Bovine tuberculosis: the scientific evidence (London: Defra)
- Lehane, R. (1996) Beating the odds in a big country. The eradication of bovine brucellosis and tuberculosis in Australia (Collingwood, Australia: CSIRO)
- Livingstone, P.G., N. Hancox, G. Nugent *et al.* (2015) Development of the New Zealand strategy for local eradication of tuberculosis from wildlife and livestock. *New Zealand Veterinary Journal* 63 pp. 98–107
- Lowe, P., H. Buller and N. Ward (2002) Setting the agenda? British and French approaches to the second pillar of the common agricultural policy. *Journal of Rural Studies* 18 pp. 1–17
- Marsden, T. and R. Sonnino (2008) Rural development and the regional state: denying multi-functional agriculture in the UK. *Journal of Rural Studies* 24 pp. 422–431
- Martin, S. (2005) Evaluation, inspection and the improvement agenda contrasting fortunes in an era of evidence-based policy-making. *Evaluation* 11 pp. 496–504
- Maru, Y.T., A. Sparrow, J.R.A. Butler *et al.* (2018) Towards appropriate mainstreaming of “theory of change” approaches into agricultural research for development: challenges and opportunities. *Agricultural Systems* 165 pp. 344–353
- Maye, D., G. Enticott and R. Naylor (2017) Using scenario-based influence mapping to examine farmers’ biosecurity behaviour. *Land Use Policy* 66 pp. 265–277.
- Maye, D., G. Enticott, R. Naylor *et al.* (2014) Animal disease and narratives of nature: farmers’ reactions to the neoliberal governance of bovine Tuberculosis. *Journal of Rural Studies* 36 pp. 401–410
- Mayne, J. (2004) Reporting on outcomes: setting performance expectations and telling performance stories. *Canadian Journal of Program Evaluation* 19 pp. 31–60
- Mehdipanah, R., A. Manzano, C. Borrell *et al.* (2015) Exploring complex causal pathways between urban renewal, health and health inequality using a theory-driven realist approach. *Social Science & Medicine* 124 pp. 266–274
- Metlay, D. (1999) Institutional trust and confidence: a journey into a conceptual quagmire. *Social Trust and the Management of Risk* pp. 100–116
- Nayiga, S., D. DiLiberto, L. Taaka *et al.* (2014) Strengthening patient-centred communication in rural Ugandan health centres: a theory-driven evaluation within a cluster randomized trial. *Evaluation* 20 pp. 471–491
- Naylor, R., A. Hamilton-Webb, R. Little *et al.* (2018) The ‘good farmer’: farmer identities and the control of exotic livestock disease in England. *Sociologia Ruralis* 58 pp. 3–19
- Pawson, R. (2002) Evidence-based policy: in search of a method. *Evaluation* 8 pp. 157–181
- Pawson, R. and N. Tilley (1997) Realistic evaluation (London: Sage)
- Pawson, R. and N. Tilley (2004) Realist Evaluation (London: Cabinet Office).
- van der Ploeg, J.D., H. Renting, G. Brunori, K. Knickel, J. Mannion, T. Marsden, K. de Roest, E. Sevilla-Guzman and F. Ventura (2000) Rural development: From practices and policies towards theory. *Sociologia Ruralis* 40 pp. 391–408.
- Poortinga, W. and N.F. Pidgeon (2003) Exploring the dimensionality of trust in risk regulation. *Risk Analysis* 23 pp. 961–972
- Poortinga, W., K. Bickerstaff, I. Langford *et al.* (2004) The British 2001 foot and mouth crisis: a comparative study of public risk perceptions, trust and beliefs about government policy in two communities. *Journal of Risk Research* 7 pp. 73–90

- Prager, K., B. Nienaber, B. Neumann *et al.* (2015) How should rural policy be evaluated if it aims to foster community involvement in environmental management? *Journal of Rural Studies* 37 pp. 120–131
- Richardson, E.Z.L., M. Phillips, A. Colom *et al.* (2018) Honoring lived experience: life histories as a realist evaluation Method. *American Journal of Evaluation*. <https://doi.org/10.1177/1098214018796319>
- Schneider, A.L. and H. Ingram (1999) Policy design for democracy (Kansas: University of Kansas Press)
- Shortall, O., L.-A. Sutherland, A. Ruston *et al.* (2018) True cowmen and commercial farmers: exploring vets' and dairy farmers' contrasting views of 'good farming' in relation to biosecurity. *Sociologia Ruralis* 58 pp. 583–603
- Shucksmith, M. (2010) Disintegrated rural development? Neo-endogenous rural development, planning and place-shaping in diffused power contexts. *Sociologia Ruralis* 50 pp. 1–14
- Stame, N. (2004) Theory-based evaluation and types of complexity. *Evaluation* 10 pp. 58–76
- Sutherland, L.-A., R.J.F. Burton, J. Ingram *et al.* (2012) Triggering change: towards a conceptualisation of major change processes in farm decision-making. *Journal of Environmental Management* 104 pp. 142–151
- Thøgersen, J. (1999) Spillover processes in the development of a sustainable consumption pattern. *Journal of Economic Psychology* 20 pp. 53–81
- Thornton, P.K., T. Schuetz, W. Förch *et al.* (2017) Responding to global change: a theory of change approach to making agricultural research for development outcome-based. *Agricultural Systems* 152 pp. 145–153
- Tweddle, N.E. and P. Livingstone (1994) Bovine tuberculosis control and eradication programs in Australia and New Zealand. *Veterinary Microbiology* 40 pp. 23–39
- Vanclay, F. (2015) The potential application of qualitative evaluation methods in European regional development: reflections on the use of performance story reporting in Australian natural resource management. *Regional Studies* 49 pp. 1326–1339
- Weiss, C. (1997a) Theory-based evaluation: past, present, and future. New directions for evaluation (San Francisco, CA: Jossey-Bass)
- Weiss, C.H. (1997b) How can theory-based evaluation make greater headway? *Evaluation Review* 21 pp. 501–524
- Weiss, C.H. (1999) The interface between evaluation and public policy. *Evaluation* 5 pp. 468–486
- Weiss, C., J.P. Connell, A.C. Kubisch *et al.* (1995) Nothing as practical as good theory: exploring theory-based evaluation for comprehensive community initiatives for children and families, in: Connell, J.P., A.C. Kubisch, L.B. Schorr, C.H. Weiss (Eds.), *New approaches to evaluating community initiatives: Concepts, methods, and contexts*. (Washington DC: Aspen Institute), pp. 65–92.
- Wynne, B. (1992) Misunderstood misunderstanding: social identities and public uptake of science. *Public Understanding of Science* 1 pp. 281–304

Damian Maye*

Professor of Agri-Food Studies, Countryside and Community Research Institute
University of Gloucestershire
Swindon Road
Cheltenham
Gloucestershire GL50 4AZ
UK
e-mail: dmaye@glos.ac.uk

Gareth Enticott

Reader in Human Geography
Cardiff School of Planning and Geography
Cardiff University
Cardiff
UK

Rhiannon Naylor

Senior Lecturer in Rural Land Use and Management
Royal Agricultural University
Cirencester
UK