Openness to social science knowledges? The politics of disciplinary collaboration within the field of UK food security research

Abstract

This paper explores a form of knowledge politics played out within and between universities and research institutes as sites of certified disciplinary expertise in the agro-food domain. It investigates the 'openness' of this domain to the expertise of the agro-food social sciences particularly when challenge-led research programmes require collaboration across disciplines. A case study is provided by the multi-discipline field of food security research in the UK involving interviews with key stakeholders. The paper examines how this research field's disciplinary diversity is understood by key stakeholders. Interview data are analysed thematically in terms of the current and potential contribution of social science disciplines, the different ways in which stakeholders imagine social science research, and whether social scientists themselves recognise and align with these different imaginaries. The paper concludes by arguing that the field of food security research in the UK is only 'selectively open' to agro-food social science knowledges and that this is likely to have negative implications for addressing the challenges of food security. Further, if the promise of collaborative working between disciplines in agro-food research fields is to be made good then the emphasis of agro-food knowledge politics scholarship and the governance of knowledge making needs to change.

Key words: knowledge politics, social sciences, food security research, selective openness

Introduction

Knowledge politics, or struggles around the production, circulation and consumption of knowledge, has become an important theme within agro-food studies. Revealing where and how certified – (social) scientific - expertise frames agro-food governance by comparison with the non-certified knowledges of publics or stakeholders has been a major concern (e.g. Burgess et al. 2000; Food Ethics Council 2004; Morris 2006; Eden 2008; Riley 2008; Tovey 2008). Distinct, and less prominent as a research theme, has been institutional level analysis of how different forms of certified expertise, including those produced by the agro-food social sciences, inform and shape agro-food policymaking from the sub-national to the

international scales (Shortall 2013a, b; Reimer and Brett 2013; Homsy and Warner 2013). The relationship between the university, as an important site of knowledge production, and the political economy of research has also commanded some attention from agro-food studies scholars with questions raised, for example, about the constraints on academic freedom (Bryden and Mittenzwei 2013) and the fate of public goods research in agriculture under conditions of neoliberalism (Glenna et al. 2014). This article seeks to make an associated contribution to another, albeit relatively less developed facet of research into agro-food knowledge politics, as this is played out within and between universities and research institutes as sites of certified knowledge making. Rather than focusing on the relationship between policy and the social sciences our interest here is to interrogate the role of these disciplines in relation to other domains of certified expertise within fields of agro-food research where funding is increasingly premised upon collaborative research between the social and natural sciences[1].

In specifying this as a relevant challenge for agro-food studies we are responding to scholarship that has shown that the social sciences often occupy positions that are uncomfortable at best and marginal at worst in research fields in which natural science disciplines are also contributing and may act as leaders (e.g. Diedrich et al. 2011; Felt 2014; Petts et al. 2008; Castree et al. 2014; Balmer et al. 2015). The question that occupies us here is whether this is also the case within fields of agro-food research such as food security. The analysis is all the more pertinent given that joint working between distinct disciplinary domains has become embedded within national research policy (Lowe et al. 2013) and a considerable amount of attention has been given to identifying and promulgating the mechanics of good interdisciplinary research practice including within the context of agro-food matters (e.g. Lowe and Phillipson 2006; Phillipson and Lowe 2008). However, our concern is not to add directly to the extensive body of knowledge about 'how to do' collaborative research between different academic disciplines[2], work that often promotes interdisciplinarity (e.g. Lowe et al. 2008). Instead, our aim is to examine the nature and extent of 'openness' (following Stirling 2008; Wilson and Willis 2004) to the expertise of agro-food social science disciplines when research structures encourage if not require collaboration with other disciplinary domains, including in particular the natural and physical sciences. We do this in order to consider the implications of these disciplinary

engagements for addressing effectively the challenges of the research field of interest but also for the governance and scholarship of agro-food knowledge making.

To approach our task we draw on a case study of the field of food security research in the UK which has received increasing levels of investment in recent years. For example, in 2010 the UK's Department for Business, Innovation and Skills (DBIS) identified global food security as one of six Research Council UK (RCUK) priority research areas and in 2011 the UK launched a Global Food Security (GFS) research programme. This was established as a major five year initiative involving the UK research councils, which allocated approximately £449m to GFS (DBIS 2010), and a number of government departments[3]. Taken together with the fact that increasing numbers of research institutions across the country have launched food security research initiatives, these provide a justification for our paper's geographical focus on UK research. The food security research field as it is evolving in the UK is complex, being constituted by numerous institutional initiatives including but not limited to the GFS programme. It involves multiple disciplines from the natural, physical and social sciences and humanities and has significant policy interest[4]. Although the majority of the UK research councils (with the exception of the Arts and Humanities Research Council) have been engaged in the GFS programme, the lead council is the Biological and Biotechnological Sciences Research Council (BBSRC) and the programme's first 'champion' was an ecological scientist (Benton 2016). The programme has always promoted what it refers to as an 'interdisciplinary' approach to research[5] and has initiated some influential research agenda-setting exercises which engaged a wide range of certified and non-certified expertise (e.g. Ingram et al. 2013). Two recent funding calls (2015 and 2016) associated with the GFS programme on UK food system resilience required applicants to address the interests of each of the three main research councils sponsoring the call: the BBSRC, the Natural Environment Research Council (NERC) and Economic and Social Research Council. In short, social sciences had to be included in funding applications alongside the other areas of science: biological and environmental.

Empirically, the paper draws on 42 semi-structured interviews conducted between 2013 and 2015. Our approach has encompassed but not been limited to the GFS programme itself as some food security research initiatives have been established with funding from a range of

sources including, for example, from the European Union. We draw on these interviews to address the following questions: what is the current and potential contribution of agro-food social science disciplines to the field of food security research? In what ways do actors within the food security research field imagine social science research, do these imaginaries vary between different actors and do agro-food social scientists themselves recognise and align with them? In the sections that follow we provide further context, detail our methodological approach and present the empirical material according to the questions posed above. The paper concludes by elaborating on the implications of our central finding that there is only a 'selective openness' to social science knowledges in the field of UK food security research.

The politics of disciplinary collaboration and the role of the social sciences

The first point of context for our analysis is the debate around the 'opening up' (Stirling 2008; Wilsdon and Willis 2004; McLeod and Hobson-West 2016) of science and research. Although developed in relation to the democratizing of science vis-a-vis non-scientific publics and the contribution of 'non-certified expertise' (Collins and Evans 2002, 2007; Fisher 2009) to knowledge production, 'openness' is also relevant to understanding how different forms of certified expertise (i.e. sciences, social sciences, humanities disciplines) are envisaged as making a contribution to addressing a particular scientific or socio-technical matter or to a field of research involving multiple disciplines associated with a major funding programme (e.g. Balmer et al. 2015; Castree et al. 2014). As such we work with the concept of 'opening up' to examine how social sciences[6] are positioned and related to within our case study research field of food security. In doing so we highlight that this is a relatively undeveloped matter of concern within agro-food studies which justifies our inquiry.

A second key context to our analysis is a set of studies concerned with the politics of knowledge within debates about expertise and programmes of research that require collaborative working between different disciplines, both nationally and within the EU, and the engagements therein between social sciences and other disciplines. We organise this framing material according to three themes: deficit, enrolment and assertion. First, a social sciences *deficit* has been observed in the context of large scale programmes of research. For

example, Felt (2014) argues that in spite of an EU aspiration to embed both the social sciences and humanities (SSH) across all societal challenges of the EU's Horizon 2020 research programme[7] a deficit in these forms of certified expertise persists when compared with the sciences, engineering and medicine. Felt (op cit) also observes a similar SSH deficit within research programmes in the US. In discussing the European 'grand societal challenge' of environmental sustainability, Diedrich et al. (2011) likewise observe it is the environmental sciences rather than the social sciences which have been the major forms of expertise engaged in addressing environmental problems, a feature of environmental research also observed seven years earlier by Klein (2004). More recently, in the context of global environmental change research the role of the social scientist, with the exception of economists and social scientists working within a positivist framework, has been observed as remaining marginal if not invisible (Hulme 2010; Castree et al. 2014; Castree 2016). Lowe and Phillipson's (2006) analysis of the UK's research councils' Rural Economy and Land Use (RELU) programme similarly demonstrates that economics was the dominant social science discipline within this interdisciplinary initiative.

Alongside the problem of a social sciences deficit in challenge-led programmes of collaborative research, challenges of *enrolment* are also identified i.e. social sciences are imagined and consequently enrolled into research in particular, often narrow ways. For example, Castree et al. (2014: 763) argue that the field of global environmental change science, while calling for more research into "human dimensions" of change, is nevertheless characterised by "a stunted conception" of these dimensions. In other commentaries, social scientists, it is observed, can have their authority undermined by an imagining of their expertise as 'soft science' which is seen as arbitrary, replete with 'simple insights' and open to competition from 'common sense' views of the world (Petts et al. 2008). Meanwhile, particular framings of research problems, notably in physical or technical terms, have been identified as tending to narrowly characterise social sciences limiting their contribution to particular types of expertise (often with a quantitative orientation) and to particular roles within the research process. For example, in Deidrich et al's (2011: 937) analysis of environmental sustainability research in Europe, social sciences typically organise and facilitate "civil society involvement or simply … communicate solutions from technoscientific experts". Lowe and Phillipson (2006: 171) also observe that conventionally, social sciences

have had an 'end-of-pipe' role in technical programmes, in which they help to "overcome social constraints to advances in science and technology".

Although certain types of social science can and do contribute to the work of helping to overcome social barriers to the adoption of technical innovations, the danger is that all social sciences are imagined and enrolled in these terms, i.e. as 'strategic supporter' of scientific research, rather than enabling them to become an 'integral partner' in research (Felt 2014)[8]. In an analysis of agro-food science research, Riverra-Ferre (2012) identifies a 'conventional' framing of hunger that emphasises technical problems such as crop yields. This framing tends to lead to the selection of science-based and technological solutions to address the problems within a context where agriculture's role in society is constructed as a contributor to economic growth within a liberalised market system. This conventional framing, so Riverra-Ferre argues, necessarily limits the role of the social sciences with the exception of neo-classical economics. This 'limited role' implicitly references the long tradition of 'behavioural' social sciences that have analysed the adoption of agricultural innovations, both technical and policy (e.g. Burton 2004), a style of research well suited to the 'strategic supporter' role.

More positively, the *assertion* of a range of alternative or distinctive roles for social scientific expertise represents the third theme. In particular, it is suggested that social scientific knowledge can help to open up the framings of societal challenges, thereby widening both the problem definitions and solutions (Diedrich et al. 2011; Riverra-Ferre 2012; Lowe et al. 2013). Similarly, Balmer et al. (2015) identify a 'co-producer of knowledge' role for social scientists in programmes of scientific research as it is one that enables social scientists to contribute directly to collaborative knowledge production through their own forms of expertise (a point also made by Castree et al. 2014). However, they acknowledge that this role remains an aspiration for the most part. Returning to Riverra-Ferre's (2012) analysis of agro-food research, an 'alternative' agro-food science framing of hunger constructs the problem in political and social terms requiring a diverse range of solutions including but not limited to those based on scientific knowledge. Likewise, agriculture's role in society is cast in a different, much broader and more complex way, as providing healthy and culturally important food through a democratic food system which recognises a role for small scale

and sustainable farming. Although currently a minority framing of food system challenges within agro-food science research, this alternative perspective, Riverra-Ferre suggests, offers more opportunities for critical social sciences expertise including: raising the profile of and promoting the alternative framing of hunger both amongst scientists and other actors beyond science who are aligned with the conventional framing; developing critiques of the industrial agro-food system; working with scientists that are sympathetic to the alternative framing; and working with civil society actors who emphasise a human rights-based narrative for agriculture. These tasks and the other roles for social sciences outlined above including, importantly, its tradition of critique (Holmwood 2010), are clearly very different to the 'strategic supporter' role that is all too often evoked within multi-discipline programmes of research. Whether this is the case in the field of food security research will be examined in the empirical sections that follow description of the methods employed.

Methods

In order to explore openness to the expertise of social science disciplines within the field of UK food security research data were produced through the following stages of investigation. The first of these involved 14 semi-structured interviews conducted in 2013 with national level actors associated with the GFS programme, including representatives of research councils, scientists involved in the production of the Government Office for Science's 2011 'Foresight' report on the Future of Food and Farming, food retailers and NGOs. Subsequent stages focused on research institutions engaged in food security research.

An internet search was undertaken initially in May-June 2012 and repeated in the same period two years later, and employed key search terms including 'food security research university' and 'research institute food security'. At the time of our research, five research institutes[9] and 11 UK universities[10] (out of a total 142 higher education institutions in the UK) hosted dedicated food security web pages reflecting a significant institutional commitment to food provisioning research framed in this way. A further 12 universities made mention of food security within their websites although the degree of prominence given to food security varied considerably. In addition to the five research institutes with dedicated food security web pages a further 10 institutes[11] were identified through the search as having variable interest in food security.

In order to gain initial insight into which academic disciplines are contributing to food security research within UK universities and provide some context for interviews we first examined a selection of those institutions that had a clearly defined programme of food security research on their websites[12]. This scoping work provided a preliminary indication of contributing disciplines that were organised into broad categories of sciences, social sciences and humanities[13]. This information was subsequently developed in depth through 14 semi-structured interviews with research programme leaders and other relevant senior academics/scientists, the majority of which (11) were from the natural sciences. These interviewees were based in eight universities and five research institutes that were selected for our purposes according to the public prominence of their food security research programme, as well as to ensure representation across institutions in all of the devolved administrations of the UK. Additional factors shaping the selection of research institutes were the desire to include a government research institute, BBSRC core funded institutes, an institute that, following Riverra-Ferre (2012), adopts an explicitly alternative perspective on agro-food provisioning and, especially as a Scottish university was not in the university list, a Scottish case. It is acknowledged that the approach adopted has focused on research institutions that claimed publicly at the time of the study to be doing research in the food security domain, rather than on individual scholars (from a range of disciplines) who are known for researching food security and who could be identified through the published literature. Nevertheless, we are confident that the majority of contributors to the research field that is self-consciously interested in 'food security', and promotes its research in the terms of this framing, were encompassed by our search efforts. Moreover, since our concern is in cross-collaborative working between different disciplines, and specifically the place of the social sciences within this process, our approach is justified as it enabled the identification of institutional level initiatives that were trying to mobilise researchers from multiple disciplines to work together.

The final stage of data collection involved four case studies of research institution food security initiatives, undertaken to provide a more detailed insight into how these initiatives were designed, funded and operationalised and their approach to collaborative working between disciplines. The case studies also afforded an important opportunity to engage

with researchers who were members of a food security research initiative but not in strategic or senior positions. Two single institution (case studies A and B) and two multi-institution initiatives (involving both universities and research institutes; case studies C and D) were included. The case studies were selected to reflect these contrasting organisational arrangements, different 'core expertise' and programme emphases, e.g. on a particular dimension of food security or a broader approach to the topic. The case study work involved interviews with researchers affiliated with each of the food security research programmes from a range of academic disciplines although the majority were from the natural sciences. In total 42 interviews were conducted across the different stages of research which concluded in 2015. All interviews covered a range of topics, one of which addressed the involvement of different academic disciplines within food security research. It is primarily this topic area which yielded the data that were analysed thematically and are discussed in the following section of the paper.

The social sciences and the field of food security research: empirical findings

According to the initial web-based scoping of contributing academic disciplines to food security research within UK universities (see Table 1): science disciplines predominate over the social sciences and humanities with the latter featuring in very few institutions; within the sciences plant, food and animal sciences appear to be more dominant; within the social sciences economics is always a contributing discipline. Interviews conducted subsequent to this web-based review confirmed the dominance of science disciplines within programmes of food security research.

TABLE 1 HERE

Characterisations of the contribution of the social sciences to the food security research field

Interviewees were encouraged to indicate the ways in which they understand, or imagine, the social sciences' contribution to the field of food security research, both in terms of the types of research the social sciences undertake and the roles performed by social sciences. The most prominent themes are discussed in the following sub-sections.

i. Social sciences are an integral part of the field of food security research

Almost without exception interviewees were very positive about the actual and potential contribution of social sciences as no particular discipline was regarded as "more important than anything else, they are all necessary" (Research Council - science). This position was asserted even when there was limited or no institutional 'in house' social sciences expertise, as was the case in most of the research institutes dominated by expertise in biology. Sometimes interviewees argued that the food security research agenda presents significant opportunities for social sciences, as this quote highlights:

> "I think the social sciences is marbled through all of it really .... it [global food security] is incredibly complex and for social science to begin to unpick all of that I think there is a real opportunity there in particular" (Research Council representative – natural science).

In endorsing a role for social sciences it was not always clear if this was as a 'standalone' contribution or as part of multi-discipline food security projects. However, it was often the case that respondents discussed social sciences' contribution in relation to the latter form of research and sometimes imagined this contribution in very particular ways (see below). Many respondents characterised food security as a complex or "multifactorial" (natural scientist, Case Study A) challenge that necessitated a collaborative, multidiscipline approach to its investigation. In making a positive case for social sciences interviewees rarely asserted the value of one social science discipline over another. This contrasts with the greater prominence of economics within the preliminary web analysis of university food security programmes. However, as the subsequent themes reveal, interviewees did appear to place more value on, or at least be inclined to recognise, particular types of social scientific enquiry.

ii. Social sciences are interested in people, their cognitions and associated behaviours

Although respondents asserted that social sciences are integral to the food security research field they sometimes struggled to articulate a clear understanding of what the social sciences might contribute. One illustration of this was the tendency to refer to social sciences as being a group of disciplines that deal with 'people' rather than with specific subjectivities, individual or collective, around which social scientists themselves would

typically frame their research. An example of this is from an interview with a natural scientist involved at a strategic level in a university food security programme: "...some of the geographers [in the university] are more interested in people's opinions, you know, sort of social science aspects". This quote, and the two below, also signal a prominent theme within the data which is the characterisation of social sciences, by interviewees who are not social scientists, as being primarily concerned with the cognitive processes and actions of individuals, e.g. opinions (as in the quote above), attitudes and perceptions, and also behaviour(s) and behavioural change. None of the interviewed social scientists aligned themselves with a behavioural perspective (even though this is evident in the wider agro-food studies literature):

> "so if you are thinking about… *changing people's behaviour* in a sustainable way, which we need to do otherwise we are going to be in deep doodah by the middle of the century, then we have to think about influencing both UK public perceptions and global public perceptions and so a lot of the issues for me are around thinking about the role of social science" (Research council representative - natural science).

> "we are trying to look at the motivations, what actually motivates people to conduct fraudulent activity [in the food system] and how consumers perceive that" (University food security research programme leader - natural scientist).

There was little or no acknowledgement that social sciences are also interested in institutional or social structures, the dynamics of socio-technical practices (Shove 2010), the (re)framing of research challenges, or the tradition of critique.

Within the context of an institutional case study [B] involving multiple universities and research institutes, one of the natural scientists involved referred to the social scientists based in a partner university as "fantastic consumer social scientists". Bearing in mind the reputation of this particular group of social scientists it is unlikely that they would align themselves with this narrow conceptualisation. Although some interviewees (typically the representatives of research councils and individual social scientists) did imagine a broader role for social sciences as covering a range of empirical issues, sites and scales, more often

than not this still encompassed, if not emphasised, the narrower conceptualisation of social sciences. For example, the same interviewee who we quoted above as arguing that social sciences is 'marbled through' all areas of the food security field then went on to say:

> "...food choice and societal and economic drivers for *food choice* is an enormous and complex area …. it is not just a case of producing more food, something like 30-40% of the food that we produce is just … thrown away and a lot of that are societal drivers and you know *the choices that people* make and *understanding why they make those choices* when they are walking up and down the supermarket aisles..." (emphasis added).

Meanwhile, even though another research council representative identified a diverse set of contributions from social sciences, including analysis of food system governance, they returned to choice processes and the actions of individuals:

> "So it is a broad role and … cuts across the whole food chain really or the food system so I think there is a lot around sort of *understanding consumers* and organisations *and their behaviours* and …. *how are people going to respond to* …[nutrition recommendations] and how realistic is that …, understanding…*how sustainability agendas link to consumer behaviour*..." (emphasis added).

Almost exclusively it was university-based interviewees who were themselves social scientists that imagined a broader role for social sciences which cut across numerous empirical contexts, scales and processes. For example, one university social scientist described how her concerns focused upon "the influence or the importance of the political dimension in shaping the food system". Similarly, another social scientist interviewed as part of Case Study B discussed the diversity within the social sciences colleagues in his university that contribute to its food security initiative: "you have got people who are dealing with supply chains … with political economy questions about erm social justice, power, you have got people dealing with it from a development perspective…". In both of these examples it was investigation of social structures and institutional arrangements rather than cognition and behaviour that was highlighted as social sciences' distinctive

385 contribution to food security research. Although this finding is not entirely surprising it
386 nevertheless demonstrates that social sciences continue to be understood by those in other
387 disciplines in particular, narrow ways. A corollary is that social scientists may need to work
388 on communicating more effectively the value and range of social science to natural
389 scientists.
390
391 *iii. Social sciences assist and serve science*
392 For some, but by no means all, respondents, the imagining of social sciences as primarily
393 concerned with the cognitive processes and behaviours of individuals was couched in terms
394 of securing the implementation of scientific advances or removing obstacles to what are
395 seen as scientifically sound approaches. Such a 'handmaiden' (Pickersgill et al. 2013) or
396 'strategic supporter' role for social sciences is an oft-quoted theme within scholarship on
397 the politics of interdisciplinarity or knowledge more broadly (e.g. Calvert and Martin 2009;
398 Macnaughton et al. 2005). The following quote illustrates this characterisation of social
399 sciences:
400
401 "what is the point of coming up with these fantastic solutions if they are not actually
402 applied … solutions that mean you can reduce your inputs of fertilisers and
403 pesticides to your fields if it is not going to be taken up? And so to have social and
404 economic researchers at the heart of the design of some of that research to me
405 seems to be absolutely essential and we don't have the right balance at the
406 moment" (Representative of research institute – natural scientist).
407
408 A representative of an NGO with an interest in the GFS programme suggested a different
409 type of 'service' role for social sciences to "act as a bridge between some of the harder
410 sciences if I can call them that and … policy making". Exactly what this 'bridge building'
411 might entail was not elucidated but another interviewee, a social scientist working within
412 Case Study A, made a similar point, observing that his science colleagues viewed social
413 sciences as making their 'hard' science 'relevant' to policy makers.
414
415 Overcoming these perspectives on social sciences was seen to be a challenge because these
416 disciplines are understood differently by physical and social scientists. This was

unequivocally expressed by a social sciences member of an institutional food security programme:

> "although [name of programme leader, Case Study B] and other physical scientists were very, you know nonpartisan and open scholars *they just didn't really get what was being done in the social sciences*".

Suspicion, distrust and widely different philosophical and methodological approaches were other explanations given by interviewees for the challenges involved in moving social sciences beyond their strategic supporter role. Also identified was the limited amount of substantive co-working in the food security research field:

> "there are some very good strong social scientists but we're not maybe working with them … on these areas as much as we should be so maybe we're kind of at a stage where yes there is room for improvement in that area" (University research programme leader – natural scientist).

> "I have to say that it is an endless frustration of mine … that we're not as well integrated as social scientists with the natural scientists. I think there are lots of challenges in doing that, that we still haven't really worked out how to solve them" (University research programme leader – social scientist).

iv. Social sciences engages the public

A further role identified for social sciences, albeit one that was not highlighted as much as we had anticipated, was in terms of science and public engagement (e.g. Balmer et al. 2015). One research institute food security programme leader (and natural scientist) who was struggling to think of any social sciences involvement in their grouping nonetheless made an association between social sciences and public engagement:

> "Erm not terribly much [social sciences involvement] I would say I mean we do a fair amount of public engagement, quite a lot of public engagement but in terms of formal projects I cannot think of…".

For this interviewee social sciences *is* public engagement rather than having interests or agendas of their own, although the reference to 'formal projects' suggests that other contributions from social sciences, beyond their role in engaging publics in science, might be welcomed. Another university programme leader, again from the natural sciences, highlighted the involvement of the Arts in their food research grouping, in relation both to public engagement but also other scientists within her university:

> "(O)ne of our collaborators is in Theatre Studies so we have actually used the Arts as one way of trying to engage you know both our colleagues and the wider public in the sort of issues that we're thinking about".

However, it was not universally the case that public engagement was understood as the exclusive domain of social sciences. For example, Case Study A had stakeholder engagement as an integral aspect of the institutional operation of the food security programme and across the interviewees none mentioned social scientists as the key colleagues with responsibility for this process.

v. Social sciences recast and reframe research questions and programmes

Although not a prominent theme there was some evidence, particularly from the case studies, that an awareness exists of the tendency for social sciences to be cast in a 'strategic supporter' role and that steps are being taken to avoid this by engaging social sciences earlier on in the research process, to help recast science questions or practices:

> "we have a couple of social scientists and a couple of economists but the balance is by no means … right ..., we need more of that dimension and you know *absolutely these skills involved at the outset of projects. Part of the design of the projects as well as the execution.* If we want … to actually come up with solutions that are really going to work" (Research institute programme leader, natural scientist, emphasis added).

480 "we're breaking away from the notion that the natural scientists produce the widget
481 and then they go to the social scientists to say how can we get people to use our
482 widget, if I can put it crudely like that, to really developing a dialogue or initiating a
483 dialogue early on with the social sciences to discuss food preferences, accessibility of
484 practices…" (Programme leader, natural scientist, Case Study B].
485
486 While these activities can be interpreted as a positive development, the second quote
487 reinforces the already observed tendency for social sciences to be understood as providing
488 expertise mostly in food choices. Nevertheless, the key point here is that the initiative is
489 trying to engage social sciences earlier in the research process, and was endorsed by
490 another Case Study B natural scientist who characterised his experience of working with
491 social scientists as a "road to Damascus experience" and "very enriching", elaborating that it
492 had:
493 "really opened my eyes to the fact that you need to plan research, looking at it as
494 much from the way that humans will perceive it and will deal with … *You know even*
495 *phrasing the question*, which … as biological scientists we tend to be a little bit
496 narrow focused so I think it is absolutely core" (emphasis added).
497
498 Another suggested that a means by which the social sciences could overcome some of the
499 problems identified was by reframing the research programme to which they contribute. In
500 this way, social sciences could set their own research agendas without being hidebound by
501 the interests of the natural and physical sciences:
502
503 "… we tend not to be too categorical about food so our studies are integrated
504 between food and place and between food and society, food and economy and using
505 food as a lens really *so we haven't gone down a sort of food security route* if you see
506 what I mean, or try to define it in that sort of way" (Case Study C, social scientist,
507 emphasis added).
508
509 For this group of researchers a conscious effort has been made not to align themselves with
510 the concept of food security (in spite of being part of a multi-institution initiative that has
511 the term in its title) and this has enabled the social scientists therein to pursue a broader

programme of 'food' research. There is at least one further prominent food research grouping in the UK that deliberately chooses not to frame its research in terms of (global) food security. Attempts to engage this group in our empirical research were unsuccessful.

Discussion and conclusions

Based on the perspectives of contributing scholars and wider stakeholders this paper has explored empirically the nature and extent of openness to the expertise of social science disciplines within agro-food research fields in which collaboration is encouraged and sometimes required with other disciplinary domains. The field of food security research in the UK has provided a case study. By doing so the paper has sought to contribute to debates about agro-food knowledge politics which often take as a given the role and value of the social sciences, for example when addressing the relationship between evidence and policy. In this final section we draw conclusions from our analysis and reflect on the wider implications of our findings.

The paper has demonstrated that social science disciplines are certainly involved in food security research in the UK, a contribution that is also evinced in the publication of a number of food security themed issues of social sciences journals, including the International Journal for the Sociology of Agriculture and Food (2012), the Journal of Rural Studies (2013), and Dialogues in Human Geography (2014). However, it is important to note that much of the scholarship in these themed issues does not arise from interdisciplinary research projects, e.g. of the type required by the GFS programme, and includes contributions from scholars based in countries other than the UK. The majority of respondents argued that social sciences knowledge, broadly conceived, has a valuable role to play in addressing the 'multifactorial' challenge of food security. This leads us to conclude that the field of UK food security research is *open in principle* to the social sciences but *in practice* the evidence suggests that social sciences currently occupy a relatively marginal position by comparison with natural science disciplines. Interviewees identified that opportunities for greater social sciences involvement have not yet been evidenced while also acknowledging the various challenges involved, both methodological and epistemological, in making this happen in practice. This supports the observations made

about other multi-discipline research fields including those associated with global environmental challenges (e.g. Hulme 2010; Castree et al. 2014).

Another key finding is that social sciences are narrowly understood or imagined by many interviewees as the study of behaviour and its cognitive precursors. This is a not a knowledge imaginary with which all agro-food social scientists identify including those interviewed as part of our study who instead approached food provisioning challenges from very different perspectives, including challenging the problem framing of food security. Further, it is an imaginary that, although not always explicitly articulated, embodies a normative behavioural change agenda that is typically directed at consumers and farmers. The former are envisaged as potentially contributing to food security through 'better' choices when buying and eating food, while farmers are imagined as needing to behave differently by adopting scientific innovations in production that will in turn contribute to food security. Although this imaginary has legitimacy within particular ontological and epistemological boundaries, it ignores the diversity of agro-food social sciences and reflects instead a limited understanding of social sciences as behavioural science. It also provides further evidence that social sciences continue to be enrolled, all too often, as 'strategic supporter' in multi-discipline research efforts because social scientists, through their investigations of decision-making and associated behaviour, are regarded as helping to 'smooth the passage' of scientific or technical developments into use on the ground.

This limited conceptualisation of social sciences leads us to our second conclusion that the field of food security research is only partially or selectively open to social science disciplines. By doing so we acknowledge the argument of Holmberg and Ideland (2010) made in the context of their investigation into the opening up of animal science research to the influence and expertise of those 'beyond' science. In our analysis selective openness refers to the openness to particular – mostly behavioural - forms of social sciences that are likely to be useful in serving the needs of certain types of natural science, and may also be of immediate relevance to policy makers. However, behavioural social science has been extensively criticised for ignoring or diverting attention from systemic questions and solutions to food system – and other - challenges that many social scientists are concerned

to address and which necessitate very different framings and approaches to research, a point to which we return below (e.g. Rieser 1973; Shove 2010).

The observed selective openness to social sciences within the food security research field is likely to have negative implications for addressing the challenges of food security as approached through multi-discipline research endeavour. This results when the 'human dimensions' of a global challenge such as food security are insufficiently addressed through an overall lack of social sciences, and / or are approached in limited ways, such as when the social sciences research that is undertaken is narrowly behavioural and serves scientific agendas in a 'strategic supporter' role. Such patterns of social sciences involvement are inadequate for the production of the relevant and actionable knowledge required to address that challenge alongside the scientific and technical research that otherwise dominates processes of knowledge making (Castree et al. 2014). This is because much like environmental unsustainability (Shove 2010), patterns of food (in)security emerge from an irreducible co-evolution of infrastructures of provision and consumption. Human choices (or, indeed, lack of choices) are an outcome of this interaction, and cannot therefore be transformed by technology or behavioural interventions alone.

A response to this dilemma requires a rethinking of the 'governance' of agro-food knowledge making. Debates about research governance typically focus on management processes within research institutions including in particular of ethics procedures (e.g. Dyer and Demeritt 2009). This is too narrow a conception of governance as it fails to encompass and address the structures of power in agro-food knowledge production and their underlying values and assumptions, a feature also identified in parallel debates over participatory rural governance (Tsouvalis and Waterton 2012). Of particular concern here is the need to ask fundamental questions about how multi-discipline research is constituted by research funders, and in particular, the effects of narrowly circumscribed imaginaries of the purpose of collaboration on openness to the full range of social sciences. . It has been argued that interdisciplinary research which is often oriented to discovery, application and use (Holmwood 2010) suits, if not demands, behavioural approaches rather than forms of social research that address "large themes and explanatory factors such as those associated with political economy and political institutions" (King 2011: 88-9).

In short, interdisciplinarity as currently constituted can have the effect of 'crowding out' more critical social sciences and consequently research takes on a more depoliticised character. Some scholars read this unduly pessimistically, arguing that this situation seems likely to continue given the prevailing neoliberalization of UK higher education and the research landscape more broadly (Holmwood 2015). An alternative perspective is to consider whether and how collaborative research more generally (its institutional, programme and project governance) can actually embed critical social science perspectives (e.g. Balmer et al. 2015). One suggestion in this respect is for research funders and other research institutions to seek, at least in some cases, to effect 'coordination' across distinct disciplinary domains that contribute to a research field – such as food security – rather than always requiring direct collaboration between the social and natural sciences[14]. This approach would specify a role for both social and natural science contributions and would therefore help to ensure that there is sufficient social sciences involvement within a research field, i.e. avoiding a social sciences deficit. Rather than mandating interdisciplinarity in all research funded to address grand challenges, this would mean actively supporting diverse disciplinary approaches forms including potentially mono-disciplinary forms of critical social scientific analysis. In other words, such diversity would address the problem of 'selective' openness.

An additional suggestion for change in research governance concerns the setting and framing of research agendas. The evidence presented in this paper reveals that in some research institutions social scientists are being enrolled earlier in the research process to help frame food security research questions differently and in doing so have the potential to become 'integral partners' rather than 'strategic supporters' in research. While this provides grounds for optimism as it goes some way to overcoming the selective openness problem, some individuals and groups of social scientists rejected entirely food security as a research objective. One explanation for this is that the interests and theoretical agendas of these social scientists are in tension with the food security framing of food system challenges. Alternative frames in social sciences have been proposed, such as food sovereignty which places more emphasis on social rather than technological solutions to food system challenges (Riverra Ferre 2012; Hopma and Woods 2014; Trauger 2015). Likewise, the

'placelessness' of a technically driven and globally oriented food security agenda has been challenged (Sonnino et al. 2016) and food security issues such as food waste rethought in food system or structural terms rather than emphasising behavioural change amongst consumers (Evans 2014). Leaving research funding programmes more 'open' from the outset might go some way to resolving the problem of framing, and in the UK the research councils' 'responsive mode' funding effectively provides this option[15]. However, when funding is organised through large, multi-discipline research programmes that are often framed in specific ways, as in the GFS initiative (while offering researchers some opportunity to influence this framing before funding calls are announced), this shapes, in turn, how research institutions direct and support research 'in house'. Without meaningful openness to substantial social science input into the framing of new research programmes, it may be hard to put into practice, at least in the case of agro-food research, optimistic proposals for 'reciprocal reflexivity' on the part of both social and natural scientists (Calvert and Martin 2009) and 'experimental collaboration' (Balmer et al. 2015).

Our final point concerns future scholarship of agro-food knowledge making. Given the arguments presented in this final section a greater degree of attention in this scholarship needs to be given to addressing the governance and power structures of agro-food knowledge production including, in particular, when those structures 'naturalise' interdisciplinary approaches to such research (Pestre 2003, Holmwood 2010).

End notes

1. As such, our interest is in research fields that are 'multi-discipline' i.e. constituted by multiple academic disciplines. We acknowledge that joint or collaborative working between disciplines can take different forms that have been differentiated as 'multidisciplinary', 'interdisciplinary' and 'transdisciplinary' (e.g. Tress et al. 2006). The term 'multi-discipline' does not assume any one of these forms, which may be specific to the particular research initiative under investigation. Nonetheless, and central to our interest here, the term 'multi-discipline' signals that joint working is either encouraged or required within a research field. Furthermore, the term 'interdisciplinary' is widely used within these contexts, although is often not defined, and has become the subject of its own field of social science research.
2. We acknowledge that collaborative research can also, in the context of 'transdisciplinarity', involve non-scientific publics or non-certified expertise. However, our exclusive focus here is the relationship between certified experts from different academic disciplines.

3. Although the GFS programme has always referred to itself as a programme (e.g. on its website and publications) it has operated differently to the conventional research council funding model. As a strategic research partnership it seeks to coordinate research amongst its partner organisations and to stimulate them to fund research programmes which invite researchers to bid for funding.

4. The publication in 2011 of the Government Office for Science's Foresight report on the Future of Food and Farming, crystallised food security as a key driver of national agri-food policy.

5. For example, the GFS programme website [accessed 6.2.2018] states "Interdisciplinary and whole system approaches to research on UK and global food systems are cornerstones of the GFS programme…. GFS facilitates new interdisciplinary research to address food system challenges".

6. The labelling of our object of interest is a debate in itself i.e. how to describe or categorise research that addresses social matters. Some scholars resist the label 'social science', perhaps because the moniker might imply links with positivism, preferring instead 'social research' or even 'social theory'. Whichever generic label is applied there is a danger of lumping together diverse disciplines, epistemologies and methodologies. We try to avoid this trap by referring to social sciences in the plural.

7. The notion of 'societal challenge' or 'grand societal challenge' is the way in which the EU is currently framing the key issues that need to be addressed by the research funded under its current research programme entitled 'Horizon 2020'.

8. Balmer et al. (2015) discuss a range of additional roles performed by social scientists within the Ethical, Legal, Social Implications (ELSI) strand of large scientific research programmes such as the human genome project and synthetic biology.

9. Food and Environment Research Agency (FERA); James Hutton Institute; John Innes Centre; Organic Research Centre; Rothamsted Research.

10. Bristol; Cambridge; Coventry; Cranfield; Edinburgh; Lancaster; Leeds; Liverpool; Nottingham; Reading; Warwick.

11. Countryside and Community Research Institute; Garden Organic (Henry Doubleday Research Association); Genome Analysis Centre; Institute for Animal Health; Institute for Public Policy Research (IPPR); Institute of Development Studies (IDS); Institute of Food Research; Moredun Institute; Roslin Institute; Scottish Agricultural College.

12. Six of the university websites were selected for the analysis presented here since these were the most fully developed and provided the necessary level of information required which was not available on all of the institutional websites.

13. Given that the AHRC did not contribute to the GFS programme, and we did not explore in detail the role of the humanities in the food security research field, we do not consider further these disciplines in our analysis. However, their importance is acknowledged and should be the subject of future investigation (see also Castree et al. 2014).

14. In making this distinction between 'coordination' and 'collaboration' we acknowledge research into joint working in agriculture (e.g. Prager 2015).

15. Although even here research councils assess responsive mode applications against a reasonably limited set of 'strategic priorities'.

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