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► To cite this version:

Antoine Bernard de Raymond. “Aligning activities”: Coordination, boundary activities and agenda setting in interdisciplinary research. *Science and public policy*, 2018, 45 (5), pp.621-633. 10.1093/scipol/scx087 . hal-01685456v2

HAL Id: hal-01685456

<https://hal.science/hal-01685456v2>

Submitted on 26 May 2020

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“Aligning activities”: Coordination, boundary activities and agenda setting in interdisciplinary research

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Article publié dans: *Science and Public Policy*, 2018. Version pré-publication

1. Introduction

The British government is currently developing inter-agency programmes in relation to transversal issues (energy, ageing, environment, food security, etc.) so as to better coordinate all of the research funders: research councils, government departments and stakeholders (charities, firms, etc.). This article examines one of these programmes, *UK Global Food Security* (UK GFS), launched in 2009, which essentially brings together *public funders of food related research* (ministries and research councils). The objective is to understand the specific coordination activities involved in interdisciplinary and trans-disciplinary research.

Inter-agency programmes generally relate to the development of interdisciplinary or trans-disciplinary research, which differs from conventional academic research. This difference is conceptualised by the opposition between Mode 2 knowledge production and Mode 1 knowledge production (Etzkowitz & Leydesdorff 1997; Fuller 1999; Gibbons 1994). Mode 2 concerns research that cuts across all disciplines, academic worlds and R&D, involving knowledge producers and users, researchers and policy makers, etc. (O’Brien et al. 2013). In other words it is a form of research characterised by the heterogeneous nature of the practices, cultures, objectives and interests of institutions, organisations and individuals. Although this type of research aims to go beyond the shortcomings of academic research that is both overly specialised and overly theoretical, so as to deal with complex societal issues, Mode 2 knowledge production nevertheless poses specific problems of research coordination.

This transformation of the world of research goes hand in hand with changes to its governance, with the creation of specialised agencies, the externalisation of funding, project-based funding, etc. Whilst this aspect has been fully covered (macro approach, public policies), little work has been done at the micro or organisational level in respect of the management, coordination, work methods or activities specific to this type of research (Adler, 2009). The issue is to look at how to attract researchers, create dynamics and synergies, develop and perpetuate research collectives, etc. This article contributes to a sociological and processual approach to inter- and trans-disciplinary research. In so doing, it departs from an approach that consists in defining the optimal model with which to ensure that a programme’s aims are achieved, to instead observe the coextensive redefinition of organisations and their objectives. The article shows how the UK Global Food Security programme, starting from a narrow vision of food security as increasing food production, has gradually integrated a wider food system agenda. Yet rather than actually arbitrating between various food security frames, programme coordination has developed boundary activities (synthesis, horizon scanning,

prioritisation, etc.) that allow it to manage both the diversity of approaches and the plethora of knowledge and research questions. Finally, it shows that inter- and trans-disciplinary research organisation does not take place from an internal standpoint alone; it also involves external work on communication, influencing and agenda setting. It is therefore less a question of completing a pre-defined research programme than of legitimising a question or of keeping it on the public agenda, within a competitive arena of public issues.

2. Interdisciplinary research and coordination

2.1. Trans-organisational coordination

One of the main difficulties with boundary-spanning research (Adler et al. 2009) is that individuals and groups, belonging to different organisations and with different (or even contradictory) cultures, objectives and interests, have to be made to work together. Historically speaking, research organisation is based on a disciplinary model and this is a major obstacle to the development of interdisciplinary approaches. One of the challenges of transversal research programmes is therefore to coordinate the work and to implement all-encompassing holistic logics that make it possible to encourage dynamics, exchanges and collaboration between organisations which are formally and institutionally disconnected.

This coordination has been widely described at the macro level of public science policies. The works in question aim to identify the optimal model, the right governance structure with which to achieve the research policy objectives, examining different types of coordination and the different levels at which coordination operates (Braun 2008a). They show that the solutions for resolving tensions between contradictory logics and interests and for achieving greater overall coherency between research and innovation policies are not necessarily those that are the most intuitive. For example, ministries are not necessarily the most suitable level for ensuring the coordination or integration of research and innovation policies (Braun 2008a, 2008b; Koch 2008). Some of these works thus focus on the role of intermediary organisations and funding agencies as a tool for coordination (Barry et al. 2008; Lyall et al. 2013). British inter-agency programmes are located at this level, for example. This article focuses on the work of coordination done by these intermediary agencies. Rather than looking at these agencies from a *macro-policy arrangement* standpoint, it concentrates on the organisational dynamic and on the coordination and management implemented within *inter-agency programmes*.

This coordinating role played by funding agencies is analysed to some extent in certain studies on inter- or trans-disciplinary programmes, in particular through the prism of the principal-agent model (Jensen & Meckling 1976). These studies see research programmes as a problem of the delegation of tasks by the programme funder to the various researchers or institutions responsible for implementing the programme in question. Such delegation generates agency costs and generally encounters two obstacles – moral hazard and adverse selection (Borlaug 2016; Braun & Guston 2003; de Jong et al. 2016). Researchers therefore attempt to identify the governance structure that makes it possible to produce the incentives (funding, sanctions, rewards, etc.) that will overcome these issues. Whilst funding and incentive devices play an important role, on their own they are not enough to break down the

barriers between institutions and disciplines, and they can sometimes have unwanted consequences (Sá 2008). The literature on coordination between organisations teaches us instead that actors are sometimes reluctant to rely on highly formalised devices which might obstruct cooperation (Bakvis & Juillet 2004; Christensen 2012; Christensen & Læg Reid 2007). The principal-agent approach carries a vertical vision of the stakes of *interdisciplinary research*. Yet the challenge is not only for the principal to encourage agents to make a contribution, but also to ensure that the various agents work together. Furthermore, it may not be a question of one principal and several agents; there may be several principals. This is especially the case when a number of funding agencies come together to define and implement a programme. The horizontal coordination between principals then becomes an issue in itself (Klerkx & Leeuwis 2008; Shove 2003). Finally, programme objectives cannot be systematically predefined; they tend to be the product of a continuous process of co-production between principals and agents throughout the programme's duration (Shove 2003).

So rather than simply addressing the issue of delegation and the resulting agency costs, this article examines the question of commitment, of enrolling heterogeneous organisations in a research programme, from a horizontal coordination standpoint, at intermediary agency level (Corley et al. 2006; Klerkx & Leeuwis 2008; Lyall et al. 2013). But what exactly does the term “coordination” refer to? Here the framework developed by Hessels may prove useful (Hessels 2013). Hessels defines coordination as *the establishment or strengthening of a relationship among the activities in a system, with the aim to enhance their common effectiveness* (p. 322). The advantage of this broad definition is that it allows us to understand coordination beyond issues of funding and formal partnership, and to integrate all relationships between distinct entities within a system. It allows us to envisage a whole range of tools and activities upon which coordination is based. Similarly, it allows us to take a broader look at the functions that coordination fulfils: the type of performance targeted is not predetermined, the sole criterion being to aim for an effect – that of improving the way in which a system works. So as far as coordination is concerned, the challenge is no longer simply one of optimising the allocation of resources or of coming up with the right incentives, it is also that of establishing or improving relations such as acquaintance between research teams and the identification of similarities between different research projects, making it possible to develop coherent research programmes, complementarity between teams and efficient task division; or else competition between research teams in order to encourage better performance, collaboration and resource-sharing between teams; or, yet again, physical proximity between teams, making it possible to improve mutual learning and make the most of spillovers¹. As Klerkx and Leeuwis point out, whilst the principal-agent theory sees coordination from a strictly economic standpoint, such as the monitoring of proper fund allocation, the work of coordination needs to be viewed in a more substantive knowledge production and diversified manner (Klerkx & Leeuwis 2008). Hessels' approach teaches us that processes of coordination can relate to diverse objectives and can serve to establish or improve different relationships by using a wide range of tools. In other words, coordination does not relate solely to incentives for individual performance through methods for creating competition and systems of sanction/reward; it also relates to questions of cooperation, trust, resource sharing, knowledge production, etc.

¹ Some researchers prefer to replace the word “coordination” with the term “co-production” to take account of its extended functions (Guston 2001). I use the word “coordination” in a sense which is akin to the concept of “co-production”.

2.2. Coordination and wicked problems

The framework suggested by Hessels makes it possible to study coordination via different activities and interventions, and in very different research contexts. As he points out in the conclusion to his article, “*a comparison between coordination approaches in different scientific fields is desired*”. Referring to Whitley (2000), he adds that these forms of coordination are likely to vary, depending on the interdependency between a system’s different activities and on task uncertainty. On this point it is necessary to characterise the UK GFS programme more accurately than as an interdisciplinary research programme.

Various scholars qualify food security as a *wicked problem* (Breeman et al. 2015). A wicked problem is a problem defined as being complex, multidimensional, transversal, uncertain and controversial, in such a way that it is the object of different or even contradictory definitions and approaches that are impossible to resolve in any definitive fashion, that crystallise political conflicts and that cannot be easily dealt with by a monothematic and specialised agency (Candel 2016; Newman & Head 2015; Rittel & Webber 1973). The problem for research then becomes that of articulating heterogeneous issues and knowledge and of setting up interdisciplinary communities and scientific dynamics. This articulation may oscillate between one frame’s domination over all others, and the preservation of knowledge that is strictly compartmentalised and only formally interlinked (Chien 2013; Daccache 2011). Furthermore, one aspect of wicked problems is that of the proliferation of knowledge and of fronts of research. In addition to the management of heterogeneity, one of the challenges of transversality is therefore the overabundance of knowledge and scientific questions. From this point of view, coordination supposes the ability to simplify, select, organise, compare, prioritise, etc. Finally, *wicked problems* are not only marked by a high degree of uncertainty and contestation from an internal standpoint, but also by external uncertainty in terms of public attention, of being put on the agenda and of competition from other *wicked problems* (Howlett 2009; Jochim & May 2010). One of the challenges of trans-disciplinary programmes is not only that of coordinating a large number of actors, from an internal standpoint, but also of gaining recognition that a problem is important and of maintaining collective vigilance over said problem. In competition with other global issues such as climate change or the environment, food security generally finds itself in just such a situation.

Due to its multidimensional nature, food security may be viewed as a wicked problem. The 1996 World Food Summit defined the latter as follows: Food security “*exists, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*”. This definition implies that food security is based on 4 pillars: production, accessibility, regularity and utilisation. It breaks away from the historical approach to food security, based on maximising production, measured in calories. Whilst officially there is agreement on the need for a multidimensional approach, in practice it remains very complicated to articulate so many different approaches, such as research on agricultural yields, research on market organisation and purchasing power, or on nutrition and micro nutrient intake, or research on issues of culture, inequality, gender, governance and social protection.

In short, a wicked problem such as food security creates specific problems of coordination with the following characteristics: high task uncertainty, a low level of technical

interdependency, potential conflicts and asymmetries of power between different approaches to the same problem, the abundance and heterogeneity of both the results and the issues of the research in question, along with – sometimes – the issue’s lack of legitimacy compared to other problems. These questions are summarised in Table 1.

Table 1

Wicked problems and coordination

Coordination challenge	Problem to be solved
Task uncertainty	Identifying relevant research issues
Conflicts and asymmetries between various approaches	Articulating and/ or arbitrating between various approaches
Scope of the subject to be studied	Aligning research activities between participants/ Uncoupling, fragmentation
Token participation	Avoiding “branding” and business as usual
Funding	Enhancing the level and the efficiency of funding

With these characteristics in mind, we can make the hypothesis that the coordination processes implemented as part of such an interdisciplinary research programme will valorise relationships of acquaintance and similarity between activities, and will attach less importance (at least at the start of the programme) to relationships of competition and complementarity. Similarly, one might suppose that it will be more complicated to set up relationships of collaboration and resource-sharing, and that this will cause participants to prefer informal mechanisms of coordination to formal and restrictive mechanisms that are defined *ex ante*. In other words, one might suppose that similar *relationships* will be backed by different *interventions*, depending on the characteristics of the system to be coordinated.

In his article, having developed an analytical framework with which to understand coordination above and beyond funding activities, Hessels notes that the majority of coordination processes that he had observed within the programme he was studying related to the allocation of funding. In this article I show that whilst the issue of funding remains important, in the case of an uncertain, transversal and conflictual research task the intermediary agency in charge of its coordination has far more diversified functions; these relate less to the management and allocation of resources than to the development of activities that make it possible to generate a certain trust between participants, and to deal with the plurality of approaches and the abundance and heterogeneity of both the available results and the research issues to be managed. This allows us to understand the task of coordination undertaken by an intermediary organisation above and beyond the mechanisms or partnerships created upstream of the research activities, so as to apprehend the activities located at the heart of the knowledge activities themselves.

2.3. Coordination tools

These coordination processes can thus be differentiated not only in terms of the relationships or type of performance they target, but also in terms of the interventions (or tools) upon which they are based.

This first of all raises the question of the division between the formal and the informal. The literature on policy coordination shows us that the issues at stake with horizontal coordination tend to encourage the adoption of flexible forms of cooperation based on networks, give and take, benevolence, etc. (Christensen 2012). Yet with networks and informal give and take there is a risk of anomie and of weak interaction (Rhoten 2004). One important result, above and beyond networks, is that it is often people themselves – and particularly those responsible for running the programme – who play a role in its dynamic (Adler et al. 2009). In other words, in itself a trans-organisational network is nothing if it is not managed by a specific person. This raises the question of the recognition of skills other than those that are strictly academic (König et al. 2013). On the other hand, the absence of any formal device might be a problem with regard to the perpetuation of interdisciplinary programmes, and this raises the issues of career management by research institutions and of publication media, etc. (Lyall & Fletcher 2013; Rhoten & Pfirman 2007). Furthermore, the literature shows (and not only in the case of interdisciplinarity) that coordination (and even integration) are *processes*, that the solutions to be adopted are by their very nature evolutionary (Lyall et al. 2013), that the evolutions are neither necessarily linear nor globally coherent, and that they are often fragile (Barry 2007; Candel 2016; Metcalfe 1994). One of the keys to success for a transversal research programme is therefore its capacity to skilfully articulate formal (funding, infrastructures, etc.) and informal devices.

Secondly, the issue of coordination between formally separated entities is not solely resolved by setting up ad hoc formal or informal organisations; it is also resolved through the development of specific activities and tools. Here we might refer to the intuitions put forward by Star in relation to *boundary objects* (Star 2010). These are objects (material or abstract) which offer both an infrastructure (standards, forms of classification, etc.) shared by different social worlds, and a certain interpretative flexibility, allowing heterogeneous individuals or organisations to cooperate without consensus. These objects might be maps, directories, files, algorithms, etc. Given that this article is about research agencies, we will not look specifically at boundary objects in research practices, but rather at *boundary activities* that allow heterogeneous actors, who do not necessarily share the same objectives or interests, to nevertheless coordinate and work together. For example, such activities might relate to different participative devices (workshops, meetings, interviews) that allow points of view and practices to be exchanged between researchers from different disciplines or between researchers and stakeholders (O'Brien et al. 2013). More particularly, we will look at activities which, whilst they allow an *encompassing approach* to be developed, also make it possible to select, synthesize, sort and prioritize, whilst preventing an interdisciplinary programme from attempting to achieve everything, thus ending up as an empty shell.

3. Methods and data

The data used in this analysis are taken from a study of the UK GFS programme. The study itself was part of a collective research programme on food security and contemporary transformations of the framing of this issue. This programme examines changes in the governance of food security from the point of view of public policy tools, themes relating to food security and the levels at which these policies are conducted. The aim is to understand

how, through global policies, the relationships between farming and food are transformed on a worldwide scale.

The study on the UK GFS programme is based both on interviews with the members of the programme (coordination group, advisory board), observation of events organised within the programme and documents from the programme (documents on programme orientation, calls for contributions, reports, journal published by the programme, individual publications, website, posts on the programme blog, social network accounts).

Between March 2013 and November 2015 I conducted 15 interviews with most of the members of the coordination group, including management and secretarial staff, and with certain members of the programme's advisory board². The interviewees were thus members of the research councils, ministries and charities taking part in the programme. All of the interviews were *semi-structured* and included questions on the educational and professional backgrounds of the interviewees, their work within the programme, the subjects of the debates between members of the coordination group, their points of view concerning the programme's orientations in relation to food security, and the events and research specifically related to the programme and in which their organisations had participated. All of the interviews were the object of note-taking at the time of the interview and of post-interview field notes. All of the interviews were recorded and transcribed. One interview took place over the phone; all of the others were face-to-face at each interviewee's place of work.

Analysis of the interviews (both actual content and systematic comparison) was supplemented by the gathering and analysis of public documents. The latter related to: conferences organised as part of the programme, with transcripts of the speeches and debates communicated by the organisers; guidance and organisational documents, along with the programme's communication documents and calls for scientific contributions; the *Insights* journal, published by the programme; scientific reports and individual or collective publications by the interviewees in academic journals or in the press, on the subject of food security; and finally the programme's website, blog posts on the site, and Twitter accounts linked to the programme. The gathering and analysis of these documents allowed me to examine the programme from organisational, scientific, communication and public policy orientation standpoints. The monitoring of social network accounts proved extremely useful, allowing me, for example, to accurately follow the activities (meetings, workshops, conferences, calls for contributions) developed as part of the programme, and the coordination work carried out by the coordination group.

4. Inter-agency programmes and the making of the UK GFS programme

4.1. Inter-agency programmes in the UK

Since the mid-1990's, British research has been organised into research councils specialised by subject and/or discipline. There are currently 7 research councils in existence, each of which manages its own public research funding and researchers' careers. The sector's

² To consult the current composition of the coordination group, see:

<http://www.foodsecurity.ac.uk/programme/governance/programme-coordination-group.html>

organisation into a set of specialised and fragmented sub-systems has led to classic problems of coherency that the research councils are trying to resolve through the development of *cross council research*, organised around “*big challenges*”. Typical of post-NPM management (Christensen 2012; Christensen & Lægheid 2007), these inter-agency coordination structures are also designed to manage the State’s financial crisis and to enable more to be done with less (McNamara 2012). These transversal programmes are designed to last between 10 and 20 years. They might involve not only research councils, but also ministries or even “devolved” administrations. There are currently 6 *cross-council research programmes*: Digital economy, Energy, Global Food Security, Global uncertainties: security for all in a changing world, Living with environmental change, and Lifelong health and well-being. Each of these transversal programmes has its own scope and its own means of coordination. There are, by definition, several research councils within each programme, each with a council *leader* or council *core members* (see Table 2). Some have centralised and hierarchical structures, others have forms of coordination that are more horizontal and informal. Some aim to coordinate and catalyse research council activities from a cognitive standpoint, whilst others have programmes for investing in *facilities*. The majority of these programmes appeared around 2007-2008. UK GFS came into being a little later, around 2009-2010.

Table 2

Cross-council research programmes in the UK

Name	Creation	Leader(s)	Investment	N° of member organisations
Digital economy	2007	EPSRC	+150£M	
Energy	2003	EPSRC	863£M	5 RC’s
Global Food Security	2009	BBSRC		14
Global uncertainties	2008	AHRC, EPSRC, ESRC		6 RC’s
LWEC	2007	NERC		22
Lifelong health	2008-2015	MRC	51£M	14

4.2. The UK Global Food Security programme

Following the worldwide food crisis in 2007-2008, marked by “hunger riots” in over forty countries, “food security” once again became an important collective concern and a priority on the international agenda. The creation of the UK GFS programme was led by the Government Chief Scientific Adviser (Sir John Beddington) who in 2009 gave a public warning of an even greater food crisis that would likely occur around 2030. He described this future crisis as being the result of a “perfect storm”, i.e. of the convergence of negative factors such as an increase in the world’s population, diet changes, climate change and the depletion of fossil fuels and hydraulic resources³. According to Beddington, this *perfect storm* would lead to serious disruptions in the food system and to major political disturbances. In order to avoid this catastrophic scenario, Beddington encouraged countries to make every possible effort to double worldwide agricultural production by 2030. This alert, sounded by the

³ <http://www.theguardian.com/science/2009/mar/18/perfect-storm-john-beddington-energy-food-climate>

Government Chief Scientific Adviser in the United Kingdom, was the trigger for new thinking about food security and for action to improve the food system. This work took place within a neo-Malthusian frame designed to increase production through new technologies, in order to meet the dual demographic and environmental challenge (Tomlinson 2013). In other words, it was a question of producing more with the same amount of land. At that time, several reports by British research institutions pointed to the concept of “sustainable intensification” as the only solution to the food security challenge (Foresight 2011; Royal Society 2009).

Implementation of the UK GFS programme also related to changes in research on food and farming issues. In one of its reports, the Royal Society expressed regrets concerning the decline of agricultural research in British universities (Royal Society 2009 pp. 61–62) and called for massive investment in a “Grand Challenge food research programme on food security”⁴.

The UK GFS programme would appear to be a joint-product of these various initiatives, at the intersection of different public concerns: a need to redefine British food strategy, a determination to improve coordination between ministries and/or public agencies so as to gain a clearer understanding of transversal issues, and lastly the increasingly serious issue of “global food security” as the master frame for food matters.

From the very outset, the purpose of the UK GFS programme was to bring together all food research funders. The number of the programme’s member organisations has grown over time, currently standing at 19, divided as follows between Research Councils and Government Departments (table 3):

Table 3

UK GFS member organisations

Research Councils	Government Departments	Charity
BBSRC EPSRC ESRC MRC NERC Science and Technology Facilities Council	Department for Food, Environment & Rural Affairs (Defra), Innovate UK BIS Department for International Development (DFID) Department for International Trade Food Standards Agency Foreign and Commonwealth Office Government Office for Science Met Office Public Health Office Scottish Government Welsh Government	Wellcome Trust

⁴ <https://royalsociety.org/news/2009/grand-challenge/>

Each of these organisations has a representative within the coordination group⁵, which also includes UK GFS staff members. This personnel has also evolved over time and now includes a Head of the GFS programme and a policy officer. For a long time it included a Champion (cf. infra) who played a central role in programme coordination, but he left his post in the autumn of 2016.

Regarding funding (cf. infra), the programme has no recurrent funding and no common pot. Funding is thus decided on a case-by-case basis and is based solely on the voluntary participation of programme members. So whilst the financial structure can evolve, an interviewee estimated the BBSRC's share of the funding at approximately 50%.

As it stands, the UK GFS programme faces several coordination challenges. Firstly, there is an organisational issue. Its objective is to bring together all funders of agricultural and food research. The programme must currently find ways of allowing 19 different organisations to work together (6 RCs, 12 Government Departments, 1 Charity), all of them having specific objectives and methods of funding. Furthermore, the programme was initiated by an organisation leader, BBSRC, which continues to play a central role in the programme with regard to both funding and the theoretical stakes. Like other inter-agency research programmes, this programme contains asymmetries that need to be managed. Secondly, the programme involves a proper scientific coordination issue. It brings together different disciplines and has to ensure that the programme is truly interdisciplinary. This is even more complex in as much as food security is the object of competing approaches that must be articulated. In this case, impetus for the programme came from BBSRC, whose vision of food security is focused on agricultural production and improved yields, whereas other disciplines concentrate on questions of consumption, nutrition and food systems, or on inequalities and social justice. Finally, programme coordination faces a political challenge. On the one hand food security is the object of competing approaches, yet the programme must attempt to deliver a clear message, especially to policy makers; on the other hand food security has to compete with other global issues and one of the challenges of coordination is therefore to raise food security's profile.

5. Results

I observed 4 different coordination processes employed by the UK GFS coordination team (see Table 4). Whilst both the actor managing the coordination and the system targeted are common to all of these processes, they differ in terms of their objectives, the type of tools they use, and the relationship(s) between elements of the system they aim to improve. We can also differentiate between these processes in terms of whether they are introduced upstream, during or downstream of the research activities (and therefore outside the programme). It is important to note that whilst it is possible to analytically distinguish between these processes, in reality they are often entwined. I have organised the presentation of the results in accordance with the latter criterion.

⁵ See here for the current composition of the coordination group (accessed 10th April 2017): <http://www.foodsecurity.ac.uk/programme/governance/programme-coordination-group.html>

Table 4

Coordination processes within UK GFS

Name	Activities	Tools	Relationship	Performance
Community Building	Establishing and enhancing networks	Organising meetings, funding networks, identifying and funding leaders	Acquaintance, Similarity	Working together, growing the research community, enhancing effective participation
Resource management	Facilitating participation of funders in research programmes	Funding research programmes	Competition, transversality	Increasing resources available for research, improving coherency of research programmes
Systemism	Aligning activities	Workshops, meetings, synthesis, prioritisation,	Similarity, Collaboration, complementarity	Improving overall programme coherency
Profile raising	Popularising results, lobby, influence	Reports, meetings,	Acquaintance, legitimacy	Ensuring programme visibility, influencing public policies

5.1. Formal and informal structure of the programme

Two coordination processes relate to programme structure: community building, managing resources.

Community building

Issues of mistrust, conflict (or even reciprocal ignorance) between approaches to food security mean that it was vital, from the very outset of the programme, that its coordination establish a community around food security. The purpose of actions taken to establish and improve this community is to provide an environment for friendly exchange, to facilitate discussion between members and to encourage collaboration. Above all, they aim to develop networks for the participants and to provide leadership within these networks.

The tension between the existence of a leading institution (BBSRC) promoting a specific food security framing (as an *agricultural* issue to be resolved by using technology to increase production) and the will to set up a truly transversal inter-agency programme, is at the heart of the solutions experimented to coordinate the programme. In addition to the risk of one frame

being predominant, the programme members also look to avoid total uncoupling between the different approaches (Lander 2016), and any weakening of the collective scientific dynamic behind formal branding practices. Rather than focusing on the implementation of both a research programme through formal partnership, and of specific funding tools, these solutions concentrate on informal network logics, on the construction and running of multiple research communities and on those in charge of the programme having sufficiently strong skills to manage these networks and communities. In particular, these solutions are designed to break down mistrust between participants and avoid the programme becoming an empty shell marked by purely token participation.

The UK GFS programme was not launched in one go, but gradually, between 2009 and 2010. It had a formal coordination structure (coordination group) from the outset, with one representative from each participating institution (ministry, research agency, charity/NGO). The number of participating institutions has been growing steadily since 2010, up to 19 institutions today.

At the beginning, even though there was a formal partnership, with a coordination group (initially called a *development board*), very little was done. There were two problems: the participants did not trust one another (or did not know one another), and no-one was really in charge. Indeed, as it was the BBSRC which had initiated the programme, participants feared a predefinition of food security as increased global production. Concerning the period during which he took up his post, when the programme had already been launched, the programme's Champion thus stated:

When I came to post, that was a good degree of lack of trust between the different departments. Because they were slightly worried... Somebody from DEFRA told me: "we are worried, from the DEFRA's perspective, that this will be a bunch of academics [trying] to drive changing GM policy". So there were lots of worries about research councils and academics saying to government: "you have to change your behaviour". And that was really quite difficult to start off with. **Champion**

This reticence was not only expressed by the ministries in relation to the research councils, but was sometimes mentioned by other research councils:

The most important thing from my view is to have a food security research programme that is balanced across the sciences and the policy agendas and one that is not dominated by any one discipline. That's a difficult thing to do because it's normally the case that a research programme starts from a person having some ideas and writing them down on a piece of paper and that immediately, I assist in the development of the thinking because it starts from that persons view point. Now because most people who are engaged in the food security debate in some way come from agricultural sciences, the conversation about food security almost always starts with a conversation about food production. **Research**⁶

Faced with these difficulties, rather than relying on formal partnership rules (decision-making, funding, research programme etc.), the stance taken within the programme/coordination group initially (approximately the first 18 months) consisted in functioning in an informal network mode, by organising very regular meetings in order to break down the distrust, to allow all potential participants to be able to see in what way the programme would be useful to them, and to use a very broad definition of food security so

⁶ In order to respect the anonymity of interviewees, and given the small number of member organisations in the programme coordination group, I qualify interviewees only according to their status of representative of a research council or organisation ("Research"), a Ministry or agency ("Ministry"), or a Charity ("Charity").

that no-one felt left out. Similarly, the programme did not introduce any formal decision-making mechanisms (voting procedures, etc.) or specific funding mechanisms. The UK GFS programme thus came into being gradually, initially as an informal space for debate and discussion, in order to establish acquaintance and similarity relationships. Then later on, particularly after the recruitment of a spokesperson (Champion), the programme became a more formal entity, with a coordination group, a revolving presidency and a strategic board. It also established a strategic plan for the period 2011-2016, divided into four themes, thus allowing each member organisation to clearly situate itself. The programme has nevertheless so far preserved two major characteristics: the absence of specific funding mechanisms and the absence of collective decision-making mechanisms which would make it possible to constrain participants or enable the Champion to take a stance on behalf of the group as a whole. In this way, the programme essentially comes across as a space for the “coordination of activities” (Ministry). The programme participants regularly compare UK GFS with another inter-agency programme, Living With Environmental Change (LWEC). The latter - older and larger (in terms of the number of participants and the resources engaged) – is based on far more formalised and rigid coordination tools and, notably uses common funding mechanisms. However, on the basis of LWEC feedback, the UK GFS partnership chose to use informal devices and to avoid any restrictive mechanisms.

This approach to the construction of “communities” using proactive strategies to build and maintain interpersonal networks, spaces for exchange, etc. remains one of the structural characteristics of this programme. When new topics appear, the programme might sometimes encourage the creation of inter-organisational and interdisciplinary networks, sometimes using calls for proposals⁷. An active networking-building approach is sometimes put in place, with related ecologies (workshop, blog, meetings, etc.), in order to encourage exchanges and build relationships, initially informally, so as to later on be able to introduce more formal methods of cooperation.

Another characteristic of this process of community building is that these networks are generally run by a leader. In other words, they are not simply horizontal, autonomous structures; they also have characteristics of centrality and hierarchy. They are created with the idea that they will only be viable if they are run and coordinated by a person dedicated to the task. The result is that the viability of this type of coordination depends to a very large extent on the prerogatives and skills of one specific person.

These different characteristics (participants’ defiance, relatively loose structure, no precise work programme set out beforehand) mean that the *Champion’s* role is crucial. Indeed, at the time of recruiting, it was clear to the BBSRC that the programme’s success depended on who was chosen. The choice finally fell on Timothy Benton, Professor of Population Ecology at the University of Leeds. The programme “Champion” emphasises the fact that his job is just as much one of internal coordination as that of spokesperson and external communication. He sees it first and foremost as a job to build links between participants and of internal communication, so as to develop synergies and concrete research operations:

⁷ See for example, <http://www.bbsrc.ac.uk/funding/opportunities/2015/sustainable-intensification-community-network/>

I have largely been left to do my own thing with the aim of if I am making the program successful, then everybody's happy, and if I'm not making the program successful, then the program will fall apart... I see my job as having 3 components: One is the horizon scanning to identify gaps, and then putting in place the funding mechanisms to stimulate the research and to fill those gaps. Part 2 is effectively increasing communication across government, and from academia to government (presenting academic output to policy makers). And then the 3rd component is building networks, between academics, and between academics and industry – and of course in this space, industry is very fragmented, because the space that we're working in is: nutrition, consumer behaviour, environment, agri-industry, food-processing industry, international development, rural life units. **Champion**

At its very minimum, the UK GFS programme might be seen as a simple tool for coordinating between different public bodies, allowing them to more effectively articulate their *existing* research activities: to know what is already being done in relation to a specific issue, or to set up joint research on a shared subject, etc. From this point of view, the food security programme essentially comes across as a tool with which to coordinate bodies involved in agricultural and food research, without the reference to food security per se modifying the research undertaken⁸.

Resource management

It is commonly accepted that one of the advantages of coordinating a transversal research programme is to be able to provide common centralised management of resources. This is supposed to make management more efficient, in particular because it increases each party's bargaining power (Hessels 2013). Or alternatively, in imposing a centralised allocation of resources, it allows research programmes to be harmonised. In UK GFS' case, whilst there is a shared objective to ensure effective resource management, it is generally decentralisation, voluntary participation and negotiated sharing that prevail. These solutions echo the problems of asymmetry and trust mentioned earlier in relation to community building. The choice of voluntary participation and contribution creates specific problems, but it does not mean that the structure of the programme has no specific added value in terms of improving resource management.

The programme's members chose not to adopt any formal arrangement mechanisms and to allow each organisation to take part in a given project on a voluntary basis, particularly given the wide range of issues relating to food security. This means that many activities, projects and initiatives which are developed as part of the programme do not involve all participants, but only those who wish to be involved. The projects developed within the programme are thus often of a multilateral or bilateral nature, rather than engaging all UK GFS members as a whole. So in order to be developed, an activity does not need a commitment from all organisations, just a collective agreement that it is pertinent to the programme's objectives.

Whilst this flexibility regarding participant engagement is often put forward as one of the programme's qualities, some people point out the weakness of the partnership, in particular the lack or absence of specific additional funds to finance research:

⁸ Incidentally, this characteristic is in itself precious to programme participants, because said programme is being developed in a context of drastic reductions in public budgets, combined with reductions in ministry personnel. Inter-agency programmes can be seen as budget rationalisation tools in a context of reducing public expenditure. This aspect is frequently mentioned by the interviewees.

... it's difficult to know but I don't think there's much new money for [the programme]. It's to an extent a re-grounding exercise so it's the work that NERC and BBSRC, ESRC and EPSRC have all been doing. [...] They've got a website and all the rest of it but in terms of new money, it's harder to see how that's changing things. **Research**

There's a lot of people there doing interesting research but they're all responding to their own...I mean us here, our priorities are established by our ministers [...]. We're accountable to our Ministers for the use of money that we're given through our departmental results framework and that takes up a lot of our time. We don't sit here wondering how to fill the long days and contemplating how better we can coordinate with food standards agency or with the economic and social research council; we have lots of stuff to do and we respond directly to that. **Ministry**

As certain participants have pointed out, it is difficult to know whether research projects that are launched under the UK GFS banner are in fact launched thanks to the programme itself, or whether they would have come into being in any case. In response, the GFS coordinators state that the programme helps interdisciplinary projects to emerge, that the fact that they bear the programme's label gives them legitimacy with funding agencies, and that this makes it possible to bring together a larger number of partner organisations than if the agencies had proceeded solely on the basis of bilateral relations. In short, the programme acts as a place of facilitation rather than as a space for the direct funding of calls for projects:

It should be noted that the GFS programme does not have its own research budget, rather it facilitates greater coordination and collaboration of existing spend across partners.⁹

Similarly, concerning a programme of research on soils, launched under the auspices of UK GFS, a member of the coordination group declared:

You could argue that the two were doing something already on soils so it kind of helped spark that and got them working together but the real added value is actually bringing in other partners and that's another thing GFS does. We're able to advertise things more widely within this forum so we managed to get DEFRA and the Scottish Government involved and they also funded research in this programme, that's 4 of our partners, cross-government, cross-research council; so that's one of our big successes I would say. **Secretary**

For the time being – though with this perhaps being a possibility at some future point in time – the programme partnership has made little use of formal decision-making or incentivising mechanisms, particularly where budgets are concerned. This leaves room for criticism of the purely formal nature of UK GFS' coordination work: that participants are first and foremost carrying out branding operations, in order to run the research programmes that they would have developed in any case. But the fact that there is no specific funding mechanism does not mean that one gives up on improving or catalysing funding: rather than being in a logic of concentrating negotiating power, one is in a logic of facilitation, of bringing together and of legitimisation.

The two processes I observed (community building and resource management) aim to coordinate in a context of mistrust and fragmented research. Their objective is to develop relationships of acquaintance, of similarity and ultimately of collaboration. In terms of intervention or tools, they correspond first and foremost to informal negotiated solutions, to soft skills. In both cases the risk is the same, that of purely formal participation and of continuing business as usual. This is why the question of leadership and of the management of these informal devices is so crucial.

⁹ UK GFS, *Key findings from the mid-term review of the Global Food Security programme*, p. 4.

5.2. Coordination within knowledge activities

The fragmentation of the research space and the potential conflicts between participants caused the programme coordinators to introduce measures that would allow them to build trust and attract heterogeneous actors, in order to encourage them to make effective contributions to the programme (Klerkx & Leeuwis 2008; Shove 2003). Yet programme coordination is not limited to the ex-ante creation of favourable conditions for broad and effective participation in an interdisciplinary programme; it is also involved within knowledge activities. An important process of coordination takes place here, that of managing not the number and heterogeneity of the researchers and research organisations, but the number and heterogeneity of results and research issues. I call this process *systemism*. It is a question of ensuring the coherency of all research activities relating to a very broad subject. This might mean an effort to gather scattered knowledge, and therefore totalisation. Or else it might mean an effort of selection: when a subject is as vast as “food security”, participants must accept that they cannot do everything. It is therefore a question of coming to an agreement on what will or will not be done. Finally, as a coordination process, systemism is a work of articulation: coordination consists in ensuring that the various research projects enjoy a certain level of coherency and that their composition effects are not contradictory. In the case of UK GFS, systemism as a process of coordination relates to different tools. We can see the latter as boundary activities or boundary objects which, by virtue of their infrastructure an interpretative flexibility, allow heterogeneous actors to cooperate without reaching any consensus. These tools (popularisation review, workshops, prioritisation procedures, etc.) allow for operations of synthesis, sorting, prioritisation, selection and bridging. To use Hessels’ terminology (2013), the purpose of these tools is to reinforce the relationships of complementarity and collaboration between activities within UK GFS.

The first and most obvious feature of this way of organizing knowledge is a *synthesis* activity. Whilst it might seem to be a somewhat formal, didactic exercise, this activity of gathering, centralizing and formatting existing knowledge for both the scientific community and policy makers is crucial to the UK GFS programme. We tend to think that, fundamentally speaking, scientific research is to do with the unknown, with being open-minded towards unexplored issues. Whilst this is true in itself, it would nevertheless seem that one important challenge for an interdisciplinary research project is also to organise the scope and abundance of existing knowledge, so as to make it significant and usable.

Probably, a significant part of the value of the programme is about ensuring better coordination of what is already going on. There are some new activities, and we’re keen to develop new activities, but a lot of what is needed is already happening or about to happen. [...] So, another aspect of the program is starting to synthesize that body of knowledge which is coming from different areas. And producing information or fact sheets or sign posting people to where they can find information that will make them better informed. Acting as a policy maker, that’s something that is really important. We can’t keep an eye on everything that’s going on over there. **Ministry/ Ministry agent**

From this point of view, UK GFS develops a boundary activity by playing the role of a “centre of calculation” (Latour 1996) which, in gathering and organising information, data and pre-existing but scattered ideas, gives them new/better meaning and power to act. This

work of synthesis includes the publication of a journal, *Insight*, on the programme's website¹⁰, and the publication of reports on specific issues¹¹. It is worth noting that prior to the launch, this activity was not necessarily considered to be central to getting the programme up and running. The participants initially focused on questions of new research and methods of funding, but faced with the difficulties of obtaining funding, the work of synthesising existing results became increasingly important.

So I think our role has developed into a more leadership and synthesis role. We spend a lot more of our time now synthesising knowledge that's already out there, so not relying on any funding but saying, right, we know a lot about these issues; generally these are the cross-disciplines. Again it's about bringing these disciplines together, can we synthesise something that brings all that together and informs policy or practice. So a lot of our work is directed towards that nowadays. **Secretary**

This synthesising work goes hand in hand with other activities that consist in identifying and dealing with new research issues. Here, coordination is essentially a question of prioritisation. Whilst there are many new research issues, it is just as much a case of determining what one will do, as what one will not do. Whilst new research questions can emerge from discussions during meetings between members of the coordination group, they also result from dedicated workshops that bring together a broader community of experts (O'Brien et al. 2013) and which are from the outset considered to be formal exercises in the prioritisation of research issues. In other words, the identification of new areas of research is also and simultaneously considered to be an effort to define priorities. With a view to defining a list of priority research questions, two workshops of this type have taken place as part of UK GFS, one for agriculture (Pretty et al. 2010), the other for the UK food system as a whole (Ingram et al. 2013). In fact, one might presume that the work of prioritisation relates to a more general characteristic of these issues, defined as transversal or wicked issues: as they have no limits or predefined content, and as they bring together stakeholders with very different interests, there is always the risk of biting off more than one can chew. By wishing to maximise actor participation and inclusion, one risks creating programmes that offer no concrete mode of action for research. One member of the coordination group commented as follows:

Priorities are as much about saying what you're not going to do as it is about saying what you are going to do. The biggest thing that strategy documents almost never do is say 'we're not going to do this, this or this' so the danger of a strategy is that it becomes a catch-all, it says everything. It doesn't really provide the basis for saying 'well these are the three things that we think we should be doing together'. I think that is a big problem with the current strategy, actually. I don't think it's a bad document, it's logically constructed, it's well written but there's a lot in there. If you were to sit down and say 'this strategy is really going to tell me what I should be doing next year' it doesn't really; it's just a long list of stuff. It seems to me that right from the very start, the Global Food Security programme has had the problem of almost having too much there. The thematic papers were meant to then drill down into those much narrower priorities but that's not really gone very fast; it's a slow business. **Ministry**

The immensity of the subject, its transversal nature and the heterogeneity of the actors concerned therefore mean that prioritisation becomes a vital element of the research process, most importantly making it possible to select research issues that will actually be funded.

Articulating issues. From global supply/demand balance to a food system approach

¹⁰ For example, *Insights* issued reports on the importance of soil for agriculture and on *severe weather and UK food resilience*.

¹¹ Of such reports, we might mention: food waste, sustainable nutrition, insects as animal feed.

Finally, as a coordination process, systemism relates not only to management of the abundance of research results and issues, but also to the alignment of different food security perspectives. The programme is both a topic (*food and farming*) and an issue (Global Food Security): it is not simply a question of getting people from different discipline with shared objectives to work together, but also of aligning an issue. It is a case of encouraging people to share objectives. Whilst implementation of the programme was the object of considerable preparatory work designed to define a problem and the concepts which would govern the way the programme operates, in reality the participants do not necessarily consider this preliminary work to be definitive. The programme's overall coherency and the potential redefinition of its objectives remains a coordination challenge throughout its implementation. On the one hand, if one maintains too restrictive an approach to the problem, this might discourage any real participation in the programme and encourage opportunistic strategies; on the other hand, if one leaves too much room for multiple approaches, this might lead to a lack of programme consistency and coherency, limiting its visibility and its capacity to achieve meaningful results.

Whilst these matters can only be resolved in a singular fashion, we might identify the solution chosen in the UK GFS case with the term “keying” used in frame analysis (Benford 1993; Mooney & Hunt 2009; Snow et al. 1986; Snow & Benford 1988). Keying consists in partially integrating certain aspects of an alternative framing of the problem, whilst at the same time preserving the properties of a primary frame. In this case, UK GFS' problem is that it started off with a productivist agricultural frame for food security, based on increasing yields in order to maintain balances between global supply and demand. Within UKGFS, in place of a “Global food security” strategy, some people are trying to promote a food system approach. Such an approach does not consist in balancing global supply and demand, but in understanding the interdependencies between food and farming from an empirical standpoint:

The title of the UK programme is Global Food Security programme so its purpose is to use the best UK science and understanding to help the global situation. However, there are a very large number of players out there and [they are] principally about food production. Many of the international programmes that exist are principally about food production, so one of the benefits I think the Global Food Security programme could share is a more holistic approach to food security. **Research**

In order to qualify and systemically grasp these interdependencies, some participants use the “food system” concept, inspired by Sobal et al. (1998). As certain authors point out, to link works on *food systems* with those on food security (by making food security a function or product of *food systems*) is to explicitly aim to go beyond a perspective that makes a simple and direct connection between agricultural production and food security. The food system approach aims to emphasise just as much the need to consider interdependencies between all stages of the food chain (above and beyond production), as the need for interdisciplinary cooperation (especially between natural sciences and the social sciences) in order to understand these interactions. For example, this approach inspired the workshop on *priority research questions for the UK food system*. It would appear that this type of criticism has had an effect on the programme's dynamics; it has been creating more and more research on issues of consumption, food transition, nutrition, obesity and food waste. An article co-written by the programme Champion and recently published on the UK GFS website clearly

illustrates this evolution, declaring that efforts to reduce agricultural emissions of greenhouse gases must be made in the areas of transforming diets and farming production techniques¹².

So within the programme there is divergence between two visions of food security – one embodied by the BBSRC and by those who initiated the programme, based on agricultural production and on its increase through the use of new technologies, and the other, embodied by agronomists, social science researchers and nutritionists, which focuses more on the other pillars of food security¹³ and which sees the latter as an emerging consequence of the dynamic of agri-food systems. This tension is a major issue when it comes to understanding the scope of the programme and its possible shifts¹⁴. This tension should not however be viewed as a choice between two mutually exclusive strategies; one should instead consider the programme taking food system approaches into account as “keying” (to use Mooney and Hunt’s (2009) expression), an activity which consists in modifying a dominant framing in order to allow it to integrate certain properties of a counter-framing. For whilst the programme is gradually integrating questions of consumption, nutrition and diets, it is doing so whilst at the same time maintaining one major characteristic: a technological approach to issues. As such, it continues to ignore the problems of governance, law, justice and social classes that have been at the heart of numerous approaches which have recently challenged agricultural framing of food security (Duncan 2015; McKeon 2015).

We can view keying as a boundary activity that allows one to articulate heterogeneous approaches to food security without having to force any consensus between them and without needing to abandon the characteristics of the primary framework supported by BBSRC. This activity makes it possible to develop relationships of similarity and collaboration between the actors sponsoring the different approaches to food security.

5.3. Raising awareness

The work of programme coordination is not only internal, but also relates to the outside world. It is a question of maintaining the programme’s public visibility, of ensuring the dissemination of results and of influencing public policy agendas. The programme links with third-party organisations and institutions, both in the UK and elsewhere, and with the general public, and as a cross-government experiment it is also making considerable efforts to spread awareness of its problem. This relates to the entire semantic field of “influence”, “awareness raising”, “raising the profile of the issue”, etc. This effort must not be seen as added value, but as one of the basic functions of the programme. It does not only relate to aspects of scientific research, but also to food and farming regulation and even to communication to the general public. What one must remember here is that as a *cross-cutting issue*, food security is itself in competition/complementarity with other issues of the same type, to reorganise the objectives and instruments of different sectors of public policy, to capture their resources, etc. (Howlett 2009; Jochim & May 2010). And from this standpoint, food security – historically embedded in the field of development aid and driven by dominated institutions (Fouilleux 2009) – is in a

¹² <http://www.foodsecurity.ac.uk/blog/2016/04/where-was-food-in-the-cop21-paris-agreement/>

¹³ This said, it is worth noting that the UK GFS programme does not in any way examine issues of social transfer, food aid, etc.

¹⁴ Note that an assessment of this type should take into account the way in which UK GFS integrates the UK’s overall food strategy, and more particularly how the programme intersects with the *Agri-Tech Strategy*.

somewhat unfavourable position compared to global issues such as the environment or climate change, which are far more firmly ensconced in the landscape of the governance of sustainable development, at both national and international levels¹⁵. I refer to this coordination process as *profile/awareness-raising*. It pursues the objectives of increasing research funding and visibility, and impacting public policies.

These outside coordination activities vary a great deal. They relate just as much to communication with the general public as to the development of networks and strategic partnerships with other research organisations, to agenda setting and influencing public policies.

Communication with the general public is an integral part of the programme's work, both during major events such as the Universal Exhibition in Milan in 2015 and more frequently during seminars, "scientific cafés", etc. where the Champion comes to present the challenges facing food security and the programme¹⁶. Furthermore, the UK GFS programme commits to the public by organising panels for lay audiences on programme-related subjects (sustainable intensification, food system, urban agriculture, etc.). For example, over a one-year period as from 2015 the ScienceWise agency organised a Food Futures Panel for UK GFS. The main purpose of such workshops is to examine public reaction to some of the programme's concepts and orientations, such as those relating to trade-offs between different objectives¹⁷ located at the heart of the Global Food Security approach.

The programme also pursues networking, partnership and scientific alliance strategies. For example, UK GFS helped set up the "TempAg" network (which brings together several international agronomics institutes). It has also carried out synthesis work on the resilience of food systems to extreme weather events. It has helped to share its research agenda within JPI FACCE which has the objective, at European level, of coordinating national and European research on matters of food security and climate change. For example, the programme leader was on the expert committee that reported on the contribution that European research has made to food security, the report being presented to the Universal Exhibition in Milan in 2015. This is one of the programme's basic objectives: to share the "Global Food Security" approach whilst at the same time gaining recognition for British expertise in this field, with the particular objective of obtaining international (European) funding in a context where national public funding is being squeezed.

Finally, although UK GFS is a scientific programme, it pursues the objective of influencing public policy. The various reports that it publishes thus contain recommendations to policy makers. Whilst it is obviously hard to assess the impact of such practices, we can nevertheless confirm that these recommendations are common. Similarly, the programme leader sometimes represents the programme within governmental or inter-governmental bodies (the UK government, the European Commission, the G20) in order to bring scientifically informed recommendations to the attention of public decision makers. Also, one of the programme's objectives is to make food and farming a global issue *in its own right*

¹⁵ This observation serves to nuance to certain publications which are highly critical of UK GFS (Tomlinson, Lang) and which see it as the new prevailing discourse on food in the United Kingdom. If we examine this discourse above and beyond debates within a given country and aside from issues proper to food and farming, the dominant nature of the "Global Food Security" approach needs to be put into perspective.

¹⁶ One example: <https://www.youtube.com/watch?v=fyH9RwWM6aE>

¹⁷ See: <http://www.foodsecurity.ac.uk/assets/pdfs/ff-food-systems.pdf>, chapter 8.

and/or make it a factor to consider *within* global issues. Through the prism of global food security, it is a question of having these objects recognized as important both in themselves and for the resolution of other global issues, climate change in particular. In an article published in April 2016, the programme's Champion asks: "where was food in the Paris COP 21 agreement?"¹⁸ He contends that although food and farming are responsible for approximately 30% of greenhouse gases, they were almost never discussed at COP 21; he recommends putting food and farming at the heart of programmes to reduce greenhouse gases, on the one hand by increasing agricultural yields so as to limit the extension of farmland throughout the world, and on the other by preferring a food transition towards diets that are less rich in animal proteins. This is a case of awareness-raising, of working long and hard to influence decision makers, not just to make food security a concern in itself, but also to place it at the heart of policies linked to other global issues such as climate change.

It is impossible to fully grasp the rationale of the *Global Food Security* approach if one only looks at it from the standpoint of the internal debates on the food security issue (transversality, integration of the 4 pillars of food security, etc.), without taking account of the fact that its rationale is constructed within a competitive arena of public policies relating to global issues, a space in which food and farming issues hold little sway and are not a priority. The purpose of reasserting the food security objective over the last decade is precisely to re-legitimise farming issues within this space.

6. Conclusion

In this article I have based my approach on that of Hessel, who takes a broad view of coordination, thus making it possible to grasp coordination activities above and beyond issues of efficient resource allocation. I have thus examined the role that intermediate agencies play in the coordination of inter- or transdisciplinary research. I have shown that they play a vital part in managing constraints relating to complex transversal issues (*wicked problems*). Wicked problems are not subject to any *a priori* agreement; on the contrary, they are characterised by disagreement and conflict. The purpose of coordinating a wicked problem is thus not so much to define a research task *ex ante*, in order to monitor its proper implementation, as to create the conditions for overcoming the lack of trust between partners, to create synergies between them and to establish partnerships between separate institutions.

Secondly, coordination takes place over the course of the research activities themselves and is not limited to creating, *ex ante*, the right conditions for research. In the case of a transversal and complex problem, coordination means dealing with the issue of the abundance and heterogeneity of both the existing knowledge and of the questions to be resolved. Here it is not a case of finding the right incentives, but of developing the tools and activities that will make it possible to create a holistic approach to activities developed as part of the research programme [allowing researchers to categorise, sort, synthesise and prioritise, and thus select and eliminate]. These tools and activities, which I have qualified as "systemism", are not merely formal operations, they also substantively impact the way in which an issue is framed.

¹⁸ <http://www.foodsecurity.ac.uk/blog/2016/04/where-was-food-in-the-cop21-paris-agreement/> Note that Tim Benton replied to a comment on this blog post as follows: "Many thanks. Very much appreciate the positive comment. I am currently in Brussels where we have been talking about this issue; **raising it – and making it an issue** – is the first step to getting positive recognition of the need for change." (12 April 2016)

Indeed, one aspect of interdisciplinary research is often the coexistence of different framings of a given problem. Coordination thus aims to achieve a certain level of coherency for the programme as a whole, from both thematic and problematic standpoints, whilst at the same time avoiding two pitfalls – one framing’s domination of the others and the uncoupling of different research projects. In this case – that of the UK GFS programme – this means the (partial) integration of a food-system approach into a primary frame based on an increase in agricultural production.

This throws light on the frustrating, fragile yet innovative nature of interdisciplinarity. Whilst it is rarely realistic to share and implement an integrated agenda, it is nevertheless possible to develop boundary activities that not only allow one to predefine content, but also to agree upon how to deal with overload, abundance and variety, and to select, eliminate, sort, prioritise and synthesise. From this point of view, the UK GFS programme is neither a new dominant paradigm that indiscriminately imposes itself on all and sundry, nor an empty shell (due to it not having its own funding), but instead a tool with which to reorganise a whole range of elements.

The fragile and dynamic nature of the work involved in coordinating a *wicked problem* is reinforced by the fact that coordination is not just an internal task, but is also an external one, of the dissemination, communication and profile-raising of an issue. In the case of the UK GFS programme, this communication and profile-raising issue was immediately seen to be an essential aspect of coordination work, as can be seen from the choice of the word “Champion” as the programme leader’s title. Interdisciplinary research issues both compete and interact with one another. Ensuring the visibility and saliency of a research issue is therefore part of coordination work, in as much as the latter conditions the viability of a research programme, along with its attractiveness, the securing of funding, etc.

Finally, coordination relates not only to enhancing the efficiency of the relations between separate entities, but also – from both internal and external standpoints – to the very meaning of what constitutes the research issue. It is not only about implementing a research question, it is also about making the issue.

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