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Research programmes: adding value, filling gaps and building networks

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1 Introduction

Targeted research programmes represent one of the more directive means through which research funders seek to channel the course of scientific enquiry. As well as constituting an increasingly popular form of research 'steering' (Rip and van der Meulen 1996), programmes promise to 'add value' such that the resulting combination of projects is more than the sum of the parts. As the title of our paper suggests, there are different dimensions of 'added value': in some cases the aim is to fill recognised gaps, for example, by building distinctively interdisciplinary research agendas or responding to new policy requirements. In other cases the intention is to 'add value' by exploiting synergies between existing lines of enquiry. Alternatively, programmes may be driven by the ambition of fostering new research relationships and networks on the grounds that this is of value in its own right. In their role as principals, funding agencies that commission programmes seek to attract and involve multiple research agents, deliberately adding their separate efforts together in order to deliver more than could be achieved by supporting isolated projects or research activities. In other words,



the form of research funding – the programme - is in itself expected to influence the nature of the output.

This paper considers the operation of international research programmes from various perspectives and in the process tests, stretches and challenges understandings of the relation between society, research funding agencies and scientists/research providers as framed through principal-agent theory (van der Meulen 1998, Guston 1996, Braun 1993). One of the defining features of research programmes is that they concentrate attention and draw together otherwise separate fields, theories, issues and research providers. As such, they are instruments with which to deliberately engineer the collective production and reproduction of ideas, research relations and networks.

As we show, the day to day functioning of international research programmes depends upon the responses and reactions of a range of researchers and research teams, and the programme's positioning with respect to other national and international research initiatives. Many elements of this more complex picture can still be described and analysed in terms of the dyadic relation between principal and agent. However, the point and the purpose of this paper is to show how cross-cutting associations and programmes, understood as virtual research 'institutions', modify and structure the actions of both principals and agents.

In terms of principal-agent theory, programmes can be viewed as high-profile means of directing scientific enquiry. Alternatively, they may be seen as features of the background or context against which specific forms of principal-agent relations are played out. Third, and this is the line we develop, research programmes have the potential to change relationships between research funders (acting on behalf of state or societal interests), and across research groups. These dynamic aspects are crucial to the shaping of scientific agendas and practices but are not readily accounted for by more vertically integrated models of the type offered by principal-agent theory.

Research programmes come in all shapes and sizes, each having their own histories and purposes. In this paper we refer to three contrasting examples: a national research programme, an EU research programme, and a programme of networking and exchange funded by the European Science Foundation (the Tackling Environmental Resource Management or TERM programme). We pay special attention to the TERM programme, analysing it from the perspective of the programme's steering committee and from the point of view of those who participated and responded to the call for proposals. We use these cases to explore the positioning of programmes with respect to principal-agent theories of the relation between science and its sponsors, and to think further about the research landscapes in which programmes unfold and which they (sometimes inadvertently) restructure.

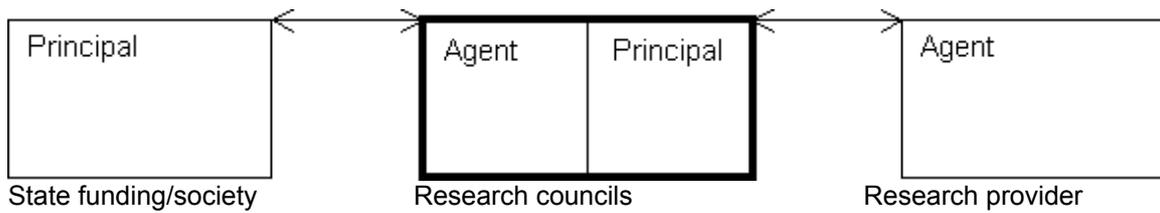
We begin by commenting on the characteristics of research programmes as instruments of co-ordination.

2 Research programmes as instruments of co-ordination

Principal-agent theory has been used to describe and analyse situations in which delegation has to occur and in which the delegator or principal has limited expertise and thus limited ability to judge or control what his or her agent does. In such situations, principals and agents may have competing goals. Principals are therefore obliged to trust their agents and/or invest in monitoring their performance. This is important. Because principals delegate to agents, agents are in a position to 'shirk' or defect. Many professional encounters are of this form (Abbott 1988). In the case of science policy, much interest has focused on the structuring of this relationship and the role of intermediaries - like research councils - in managing and mediating the relation between state funders and the scientific community.

In simple terms, bodies like research councils are positioned both as agents of state or societal interests (in which case their task is to deliver the goods, e.g. useful or relevant knowledge, research capacity, etc.), and as principals with respect to individual research providers and scientists (in which case their task is to get others to deliver these goods).

Figure 1. Principal-agent relations



This model is convincing and flexible and has provided a useful framework with which to compare and investigate different modes of delegation, contracting and control. van der Meulen (1998) has, for instance, developed this scheme in order to describe and characterise the (national) institutionalisation of science-policy relations and show how these evolve. Principal-agent theory is useful in characterising the relation between individual researchers and those who fund them. But can such a model be used to describe science-society relations when these are marked by a multiplicity of co-existing (but distinct) funding bodies whose actions together 'influence the framework for research performance and the networks which form part of the research environment' (Benner and Sandström 2000: 293)?

Research policy makers and funders tend to see programmes as means of focusing scientific endeavour and maximising the value of otherwise separate projects. They constitute one amongst a number of methods through which principals seek to ensure that agents in fact engage with the principals' problems and priorities not just on an one-to-one basis but as a shared endeavour. In terms of the principal-agent model, programmes have two characteristics. First, they are designed 'top down'. Although agenda setting may involve a complex process of consultation and interaction with the research community, programmes are typically developed and deployed by research councils in their role as principals. Second, to work at all, they require the involvement of a number of separate research-agents.

In graphic terms, a programme might be positioned thus:

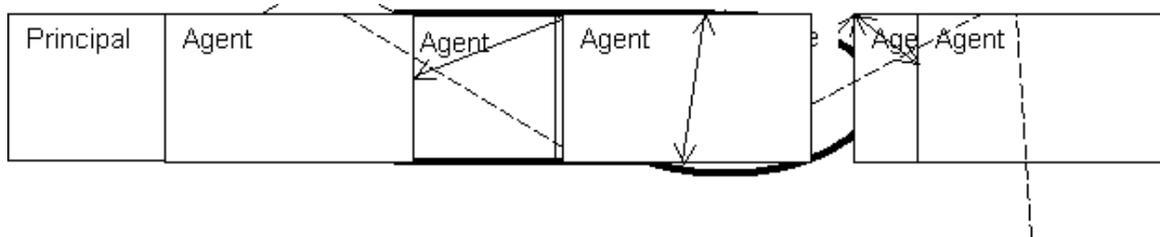


Figure 2: Research programmes and principal-agent relations

As this figure suggests, programmes occupy the position of yet another intermediary. Sure enough, programme directors and co-ordinators routinely contend with the dual roles of principal (with respect to the projects in 'their' programme) and agent (with respect to the research funding body). As Rip and van der Meulen explain, persons in such positions 'must be schizophrenic to be effective'....having 'an appearance of strictness in getting his own way, while actually creating incentive structures for aggregation to occur, hopefully in the direction he prefers' (Rip and van der Meulen 1998: 768). However, the more important point - indeed the defining feature compared to stand-alone project funding - is that of interaction, if not synergy between agents or agents' projects. Before looking more closely at how programmes operate in practice, we comment on the dimensions of value that programmes are expected to add.

3 Programmes as means of adding value

A recent study of the value added by a programme funded by the UK's Economic and Social Research Council on the subject of 'Health Variations' (Raman, Shove and Southerton 2000) identified three possible dimensions of additionality. First, the quality and output of individual projects might be improved by virtue of their being part of a larger programme, for example through sharing knowledge and ideas, through interaction with other disciplinary perspectives,



and so on. Second, by concentrating resources and effort, the programme had the potential to shape research careers, develop capacity in some rather than other fields and draw researchers' energies and attentions towards topics of agreed societal importance. Third, the fact of funding a number of projects in a particular area promised to give that topic greater visibility and a higher profile within academic and non-academic communities alike.

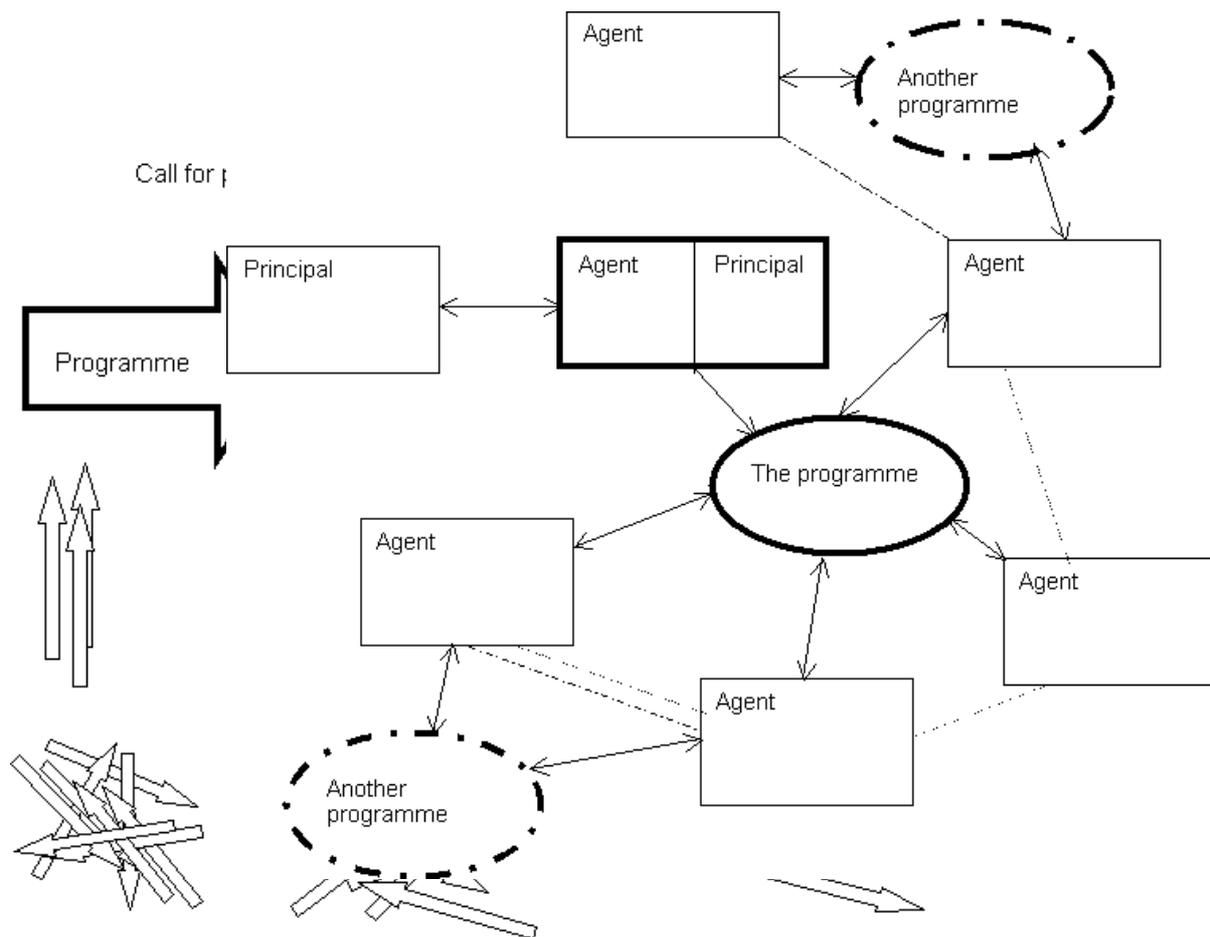
On all three counts, the ESRC's Health Variations Programme sought to change the context and conditions of research production. Though the points made above stress positive aspects like those of convergence and coherence, it is important to acknowledge the other side of the coin. In being drawn together, for example around the theme of Health Variations, academics were, at the same time, drawn away from lines of enquiry they might have otherwise pursued. In addition, some of the researchers who participated in this deliberately interdisciplinary programme experienced a weakening of previously critical disciplinary identities. New networks were made and old ties weakened. The process of 'making' a new field was in therefore one of intellectual fragmentation, division and disruption.

It is not necessary to go into further detail to appreciate the general point that the programme's ambitions included those of engineering new networks and of changing the landscape of research relations beyond the projects and beyond the researchers immediately involved. In this the research council and second-stage intermediary, the programme director, attempted to modify the actions of selected 'agents' (i.e. those who received project funding within the programme) as a means of influencing the wider research community. In so far as it was successful, the programme format allowed principals to influence a population of agents beyond those in receipt of funding. At first sight, and from the principal's perspective, programming seems to be a rather effective means of directing the course of science.

4 Programming in practice

To be effective and to attract quality applications, programme specifications have to deal in areas in which there is already some research expertise - at least in embryonic form. As a result, there are limits to the contexts in which programmes can be launched. A review of EU programme development (Redclift, Shove, van der Meulen and Raman 2000) showed the process of programme agenda setting to be one of constant iteration: the final publication of a call for proposals being just one moment in this process. This work also made it clear that programmes do not exist other than through the projects of which they are made. Rather than thinking of programmes as directive instruments of control, it made better sense to conceptualise them as 'aggregation machines', as illustrated in the following figure developed by Barend van der Meulen.

The diagram distinguishes between research funders and their agendas (i.e. the principal's agendas) and those of research providers (or agents). It assumes that these are not identical, hence the role of the programme as an instrument of co-ordination. However, and as the picture also shows, co-ordination is a complex, multi-stage process of alignment and mutual adjustment. As represented here, calls for proposals are responded to and interpreted in ways that mesh with researchers' existing interests and expertise. There is, of course, a formal selection process in which applications are evaluated according to their relevance to the programme (amongst other criteria). However, the programme, which only really comes to life when filled with projects, grows and unfolds in necessarily unpredictable ways. Not only do its constituent projects carry with them a history of prior research, they also spawn new ideas and generate further projects of their own, projects which may have a future as part of another funding regime or another funders' programme.



Programmes do not only aggregate projects. They also draw people together. This is relevant, for researchers' capacity to thrive, especially in international research environments, depends - in the longer run - on the extent to which they are networked with one another (a feature of increasing significance in the context of the EU's sixth framework programme). The Figure 3. Research programmes as 'aggregation machines'

study of EU social environmental research referred to above demonstrated that programmes can help generate and consolidate research relationships in ways that are unknown or irrelevant to the funder but important to the researchers involved. In this, programmes function as virtual social institutions - participation in which may be key to future exchange and interaction. In their analysis of two EU programmes, Redclift, Shove, van der Meulen and Raman (2000) identified 'serial operators', that is people or institutes who were successively effective in securing national and international funding and in using one source as leverage for another.

Serial operators were skilled in accumulating various forms of social, intellectual and financial capital by means of navigating between different principal-agent relations. From their perspective, the research landscape was populated by multiple possible sources of funding and multiple possible principals, as represented in this third version of the principal-agent/programme diagram. This figure shows how agents relate to a range of principals and how networks between agents condition and give shape to their strategies and responses.

Figure 4. Multiple principals, agents and programmes

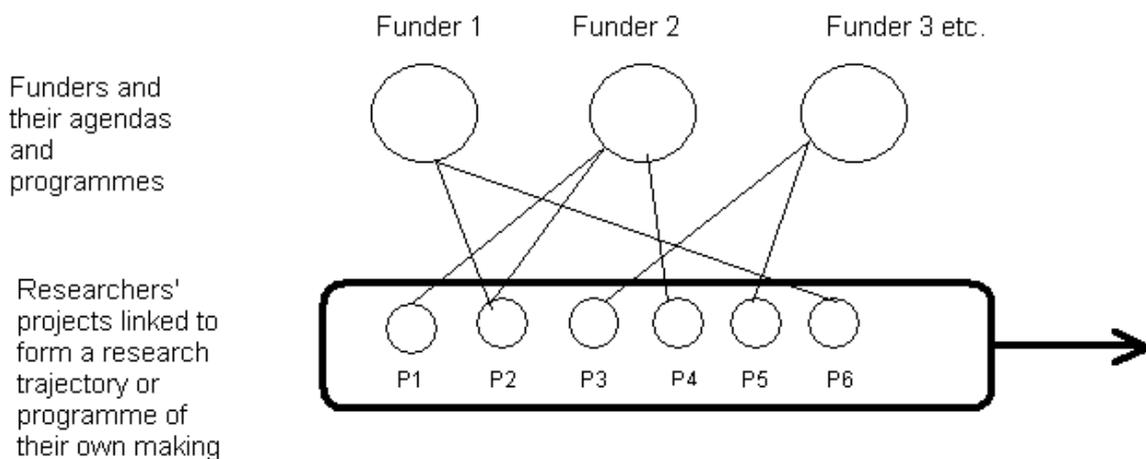
In describing how they navigated between different sources of funding, what they chose to bid for and how they positioned their work, researchers frequently presented themselves as programme makers in their own right. In simultaneously playing agent to quite different



principals, the challenge, as they saw it, was to build a coherent research portfolio through sequential participation in other peoples' programmes. They bid for money from here or from there for what was, in their eyes, either the same thing or a logical development of an internally consistent and coherent programme of work. This implies a hidden pattern of agenda setting and scientific development that proceeds effectively but beyond the view of any one funding agency.

Figure 5 gives an indication of how this works and how researchers patch funding together from different sources, participating in programmes but all the while constructing their own trajectories out of an assemblage of what seem (to individual funders) to be discrete projects within their programme portfolio.

Figure 5. Invisible agenda setting



This analysis suggests that research domains are criss-crossed by a variety of more or less formal 'programmes': some deliberately designed and developed as steering mechanisms, others equally deliberately assembled from a succession of apparently bounded studies. This is relevant in that researchers' willingness to respond to top down programming initiatives depends (to some extent) on the relation between that programme and their own 'subterranean' ambitions, their relative 'hunger' for means of support, their chances of getting funding from other sources, and so forth. Although these 'underground' agendas are of real importance for science policy and for the mechanics of delegation, monitoring and defection it is difficult to discern their existence by dissecting principal-agent relations. Whatever its other uses, principal-agent theory struggles to capture these longer term dynamics of agenda formation and network building and fails to detect the collective - but perhaps unintended - consequences of programme funding, including the possibility that programmes, as virtual institutions, have a form of agency in their own right.

How agents respond (and what principals expect of them) depends, in part, on interests, priorities and relationships that lie beyond the frame of principal-agent theory. In the context of research management, much depends upon the range of principals with whom agents interact. Detailed study of specific institutional settings misses this cross-cutting dynamic. Equally, by drawing in multiple agents and projects, programmes are frequently designed to have an effect (to add value) that goes beyond the dyadic principal-agent relation. In the following sections we review the European Science Foundation's (ESF) Tackling Environmental Resource Management programme (TERM) from different perspectives, using this as a means of illustrating and elaborating on the points made above. The ESF TERM programme is a revealing case to take in that it supports networking and exchange, not research itself. Although it aims to add value to research already funded from other (typically national) sources, the ESF has substantive ambitions of its own, using programme funding as means of directing resources and focusing attention on specific priorities and themes. In looking at how the TERM programme was shaped (by the steering committee and by those it



funded), and at the value it added, we draw on our own experiences: Aad Correlje as the ESF's TERM programme's scientific co-ordinator, and Elizabeth Shove as the academic co-ordinator of a series of successful proposals on the subject of 'consumption, everyday life and sustainability'.

5 The European Science Foundation's TERM programme

Acting upon a recommendation by the Standing Committee of the Social Sciences (SCSS) of the European Science Foundation to undertake new activities in the field of social science research on the environment, the ESF's Member Organisations launched TERM in October 1995. TERM made grants available to social scientists based at European universities and/or research institutes, for the organisation of summer schools, workshops and for exchanges addressing one or more of a limited list of themes.

The objectives of TERM were formulated as follows:

1. "to provide European "added value" to national programmes and projects sponsored by research councils and academies";
2. "to offer a facility that is regarded as valuable and worthwhile by researchers involved in the management and conduct of national programmes and projects";
3. "to provide opportunities for young scientists who are starting their scientific careers";
4. "to broaden the research basis for research on environmental issues in the social sciences";
5. "to stimulate interdisciplinary research on these issues";
6. "to publish results from activities organised within the programme".

The programme was expected to last five or six years and after a first phase (1996/97) during which eight activities were funded it was decided to continue with a second phase (1998-2001). By the end of the first phase, news of the programme had reached scientists all over Europe. High quality applications for funding illustrated the 'demand' for the TERM approach and the research themes selected.

TERM's research themes, devised by the programme's steering committee in consultation with (parts of) the academic community included:

Theme A, Comparative dynamics of consumption and production processes, exploring the way in which consumption and lifestyles determine the environmental costs, and benefits of economic growth.

Theme B, Environmental management and policy instruments under uncertainty, addressing the provision of environmental quality, defined as a public goods with the problem of collective action. Central issues were the design of instruments; problems in implementation; lack of effectiveness of traditional regulatory approaches, and uncertainty with respect to basic scientific understanding of complex environmental issues and behavioural responses.

Theme C, Forms of international environmental co-operation and their development, addressed the trans-boundary character of many environmental problems, including the greenhouse effect and acidification. This raises special problems regarding international policy co-ordination and co-operation between different countries, the role of interest groups at the international level and private companies, and the interlinkage between domestic and international processes.

Theme D, Perception, communication and the social representation of environmental change, dealt with the way in which people perceive environmental problems and how their knowledge and attitudes influence their behaviour. Key research issues include: the communication of environmental problems, how to change behaviour, and relations between class stratification and perception, knowledge and behaviour.

As is shown in Table 1 below, projects were proposed under all of the TERM programme's themes. It was argued that "the four TERM themes were all encompassing – it was not possible to conceive of an environmental social science project which would not fall within the



remit of the programme. They did not therefore define programme priorities.” Indeed, “their main goal had been to provide a taxonomy of projects, to prompt and steer projects in a bottom-up programme and package the programme for presenting to the outside world, including research users”. Thus, the TERM Steering Committee, involving active scientists from a variety of disciplines and countries, was able to take the initiative in selecting innovative projects and relatively new approaches and combinations of disciplines and persons. In this respect it is important to acknowledge the parallel learning effect, within the Committee and in (parts of) the scientific community.

The Committee recognised – or was pointed to - promising and innovative projects and selected these on the basis of its normal quality criteria. The selected projects were executed usually during the following year and the scientific co-ordinator, who participated as an observer in most of the events, fed the immediate results back to the Committee’s next meeting.

In formulating the second round, earlier achievements were evaluated and taken into consideration when selecting new projects. This on the one hand induced variety in projects and approaches, while on the other it stimulated the gradual development of a number of foci built around serial users of TERM funding. Finally, the Steering Committee – via the scientific co-ordinator - often demanded slight adjustments to the set-up of the projects in the phase of further development.

At the same time, the research community learned about the way TERM was developing via several channels. Directly, the (comparatively) quick announcements and descriptions of projects selected and their immediate reporting back in the programme’s regular flyer, TERM Times, and the ESF website provided information to the research community about the approaches and themes already endorsed by the Steering Committee. Indirectly, the scientific co-ordinator and members of the Steering Committee advised interested researchers on promising ideas and projects. Also participants and organisers of first phase TERM-funded projects made use of their insights in (co-)developing new proposals. After an initial emphasis on the problems of specific themes and domains, like fisheries, transport, innovation and instrument design, the focus turned through this iterative process (involving both principals and agents) towards more general aspects, like uncertainty, multi-level governance, the role of perceptions, institutions, technology and patterns of socialisation in processes of individual and collective decision-making.

The requirement that projects have a multi-disciplinary character was emphasised by the Steering Committee and in the programme’s publicity. Single-discipline projects with a potentially suitable theme and approach were normally advised to bring scientists from other disciplines on-board. Yet, there was a large variance in the number of disciplines involved in the several projects. Typically, projects involved scientists from ‘neighbouring’ disciplines, mostly but not always within the social sciences. Given the need to respond to the programme’s agenda TERM stimulated the development of projects in which researchers from different disciplines and countries worked together for the first time, and co-operated around one or another of the pre-determined themes.

Table 1: Projects in TERM I & II, 1996 –2001

Name of Project	Theme	Year
Workshop and Exchanges: Consumption, Everyday Life and Sustainability	A	1997
First summer school on Consumption, Everyday Life and Sustainability	A	1999
Economic Modelling of Environmental Policy and Endogenous Technological Change	A	2000



Infrastructures of Consumption and the Environment	A	2000
Second summer school on Consumption, Everyday Life and Sustainability	A	2001
Summer school on the involvement of stakeholders to develop sustainable consumption in the urban environment	A	2001
Governance of Fisheries in Europe	A,B,C	1996
Social Psychology and Economics in Environmental Research	A,B,D	1999
Environmental Quality in European Space	A,C	1997
Negotiated Solutions to Environmental Problems	B	1997
The innovation of environmental policy	B	1997
Environmental Policy, Agriculture and Biotechnology	B	1999
Dealing with Uncertainty in Environmental management	B, D	2000
Public Uncertainty and Social Communication	B,D	1997
Civil Liability for environmental harm	1997	C
Environmental Discourses and Perceptions in Northern	C, D	2000

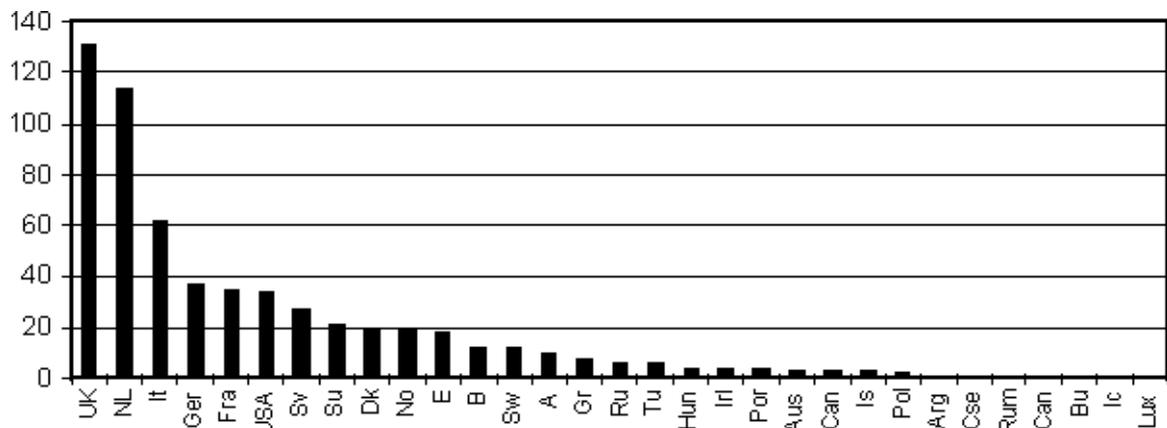


and Southern Europe		
The Europeanisation of Environmental Policy: European Union and Member State Perspectives	C,B	2001
Perception, Communication and the Social Representation of Environmental Risk	D	1996
Network for Research into the Construction of Environmental Risk	D	2000
Environmental socialisation within the European media	D	2000

The set-up of the 20 projects ranged from traditional single-day workshop events, to more elaborate series of meetings of a few days and a number of summer courses, lasting for about a week. The 'reach' of TERM was relatively large for such a small programme. Around 500 organizing and participating scientists from more than 20 disciplines were involved. These people included a mixture of junior and senior researchers from a wide range of countries. The resulting opportunities for networking were highly appreciated by most of the participants. Figure 10 shows the nationality of the researchers drawn into the TERM programme.

Figure 6: Number and nationality of participating researchers.

Generally, the researchers involved valued the TERM approach because it allowed for the



organisation of relatively small-scale seminars, conferences and summer schools, with a relatively light co-ordination structure and a simple procedure for applying. The resulting events were especially effective in exploring and developing new scientific approaches from previously scattered insights and ideas emerging from national research programmes and



other sources. Another important aspect was that the programme offered an arena for PhD students to present and discuss their work in an international circle of junior and senior researchers. Indeed, the requirement for involving more and less experienced researchers was strongly enforced by the Steering Committee.

Over a 5-year period, 20 projects were executed. In November 2001, the TERM programme closed with a conference at which the organisers and a number of project participants presented an overview of what they took the programme's achievements to be. In addition, the programme was reviewed by third parties – relevant researchers not involved with the programme and representatives of the potential 'users' of social science research on environmental issues. In the light of the stated objectives, it was concluded that the TERM approach had been effective, by and large.

6 Projects in the programme: ambitions, forms and effects

Having considered the results of the programme in terms of the kinds of projects funded and the sorts of proposals attracted, we now turn our attention to the researchers. Who looked to the ESF TERM programme for funding, why, and for what types of project (remembering that projects here mean networking, exchanges, workshops and summer schools)?

Research groups that submitted proposals were evidently 'using' the programme for different purposes (Latour and Woolgar 1979, Shove 2001). A number of well-structured proposals were formed around a small kernel of three or four already co-operating researchers who wanted to promote a clear-cut concept to interested colleagues and the 'user' community and to thereby expand the circle of people working with their ideas. Other more exploratory projects emerged from 'brain-waves' of scientists who had only recently gathered together around a specific theme. Projects engendered in this way sought to explore the potential for studying a theme, or group of themes, from several disciplinary angles. The third category of proposals included projects built around the straightforward plan of combining and publishing papers from invited researchers, sometimes from a single discipline, sometimes not.

As the programme developed, an apparently clear relationship could be observed between the achievements of multi-disciplinary projects and the chosen format, including the intensity and duration of interaction between the scientists involved. In essence, the more complex and multi-disciplinary a project's ambition, the more care and attention had to be paid to the process of scientific and intellectual exchange and to the detailed design of the event itself.

Complex projects combining several disciplines around more or less exploratory research objectives were more productive and effective when the format of the workshop, summer school or exchange provided a structured combination of formal and informal exchanges of concepts, ideas and approaches (type 2 in the figure below). Where people from very different disciplinary backgrounds and countries came together to debate a specific theme, the classic format of formally presenting and discussing pre-prepared papers (with a view to their publication in a special issue of a journal or as a book) was unproductive (type 1). Such a format inevitably narrowed the terms of debate before any real interaction took place. It was, however, appropriate and productive when disciplinary positions were already well known and when the aim was to refine existing and essentially familiar concepts (type 3). In contexts like this, the introduction of novel or less formal project formats had the effect of destabilising what were assumed to be established paradigms, leading to a different 'positioning' of the project and its participants (type 4).

Figure 11 illustrates these possibilities, also indicating the potential transition from conventional to unconventional forms of interaction as debates stabilise and become 'established' in their own right and as established paradigms are challenged and disrupted in new ways.

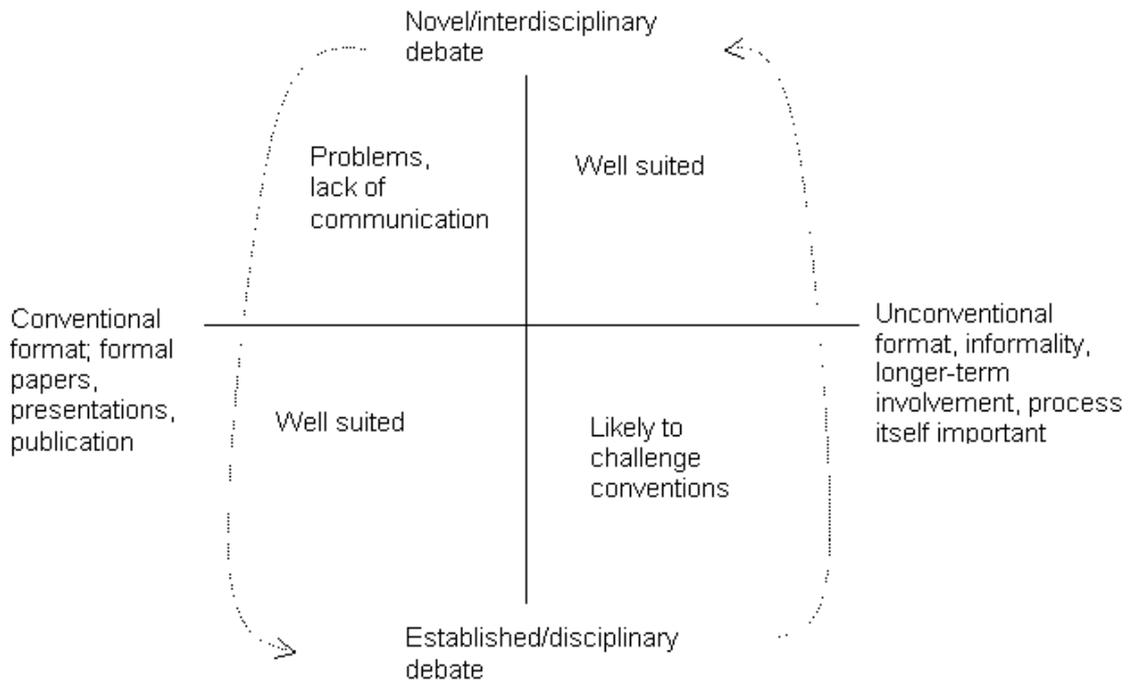


Figure 11 Types of debate (established/novel) and forms of interaction (conventional/unconventional)

The practical point is that greater care needs to be given to the design of an event when involving people from different disciplines and traditions. The more subtle observation is that the design of projects within the programme made a difference to the extent to which the

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programme met its own goals. In this respect, goals five “to stimulate interdisciplinary research on these issues”; and six “to publish results from activities organised within the programme” were in tension. That the fact that the TERM programme included conventional and unconventional projects (reflecting the varied ambitions of those who applied for funding), meant that - as a whole - the programme energised new debate and provided a chance to consolidate already (or increasingly) familiar ideas.

The TERM programme's light management structure, with an active scientific co-ordinator and a steering and learning Steering Committee, provided an agile, flexible and effective mode of programme management. The low threshold of effort involved in submitting proposals was also crucial. Both features allowed proposers and applicants the 'room' to pursue their own ambitions and devise projects of diverse formats that contributed, in different ways, to some of the programme's goals. On these counts, the ESF TERM programme was distinctive at least in the field of international/European research funding. At the same time, the 'light weight' approach had less favourable consequences when it came to achieving other goals. As was observed, there was perhaps insufficient learning from one project to another and no real mechanism for doing so. Within the programme there was a tendency to “forget” the outcome of research previously conducted. Second, if user engagement was to be a high priority, those funded through the programme would have needed much more “top-down” guidance and encouragement to synthesise and package results and insights for such audiences. On the other hand, if 'users' want access not to research, as such, but to a research community with the capacity to interpret new ideas emerging from research, this style of light, flexible and interactive programming proved well suited to the production of novel and interesting perspectives.



Regarding TERM's legacy, quite a few publications are emerging, directly and indirectly, from the several projects and from co-operation flowing from those projects. Several proposals for (inter-)national research programmes, (partly) originate from relationships and ideas developed under TERM. This legacy reflects the programme's multi-disciplinary, international and broadly domain-oriented character and is consistent with the description of agent-led research trajectories outlined above. However, and as the next section shows in greater detail, the TERM programme has been influential in shaping seemingly 'private' careers in terms of the formulation of networks and the development of attractive or 'magnetic' research topics.

7 Adding value in practice: themes and networks within the TERM programme

The European Science Foundation's Tackling Environmental Resource Management Programme supported networking and exchanges between researchers from different countries, most of whom were involved with research already funded from other, typically national, sources. The history of a series of workshops and summer schools on 'consumption, everyday life and sustainability' (funded within the TERM programme) is, in effect, a tale of how subterranean processes of science practice unfold within what was intended to be a clearly defined, topic focussed, programme.

The first phase consisted of two linked workshops. People were invited to these events on the basis of prior contact with one or another of the five-person steering group. The next major event was a summer school organised by much the same steering group. Some of the workshop participants were involved again as speakers and presenters and new contributors were invited. Summer school participants were selected from an open call for applicants. A more focused workshop on infrastructures was proposed, funded and organised by some of the PhD students involved in the workshops and first summer school. This event consolidated emerging research relationships and again drew more people into the process. By the time of the second summer school, people who had started off as relatively isolated students found themselves as speakers and as key players in a highly elaborate network of contacts and connections.

The following sequence of three figures gives an indication of how connections developed between participants over time. The boxes represent people and the lines between them represent prior contact, that is, they show who knew who before the event in question. As the sequence demonstrates, people who start off as PhD students with few links (e.g. BvV) turn into critical 'nodes' in their own right, collaborating with other members of the same network, submitting proposals and developing research applications in order to take forward private research trajectories and ideas formulated through involvement in these workshops, exchanges and summer schools.

Figure 12. First workshop, 1996

Thick margin = steering group member, bold initials = PhD student.

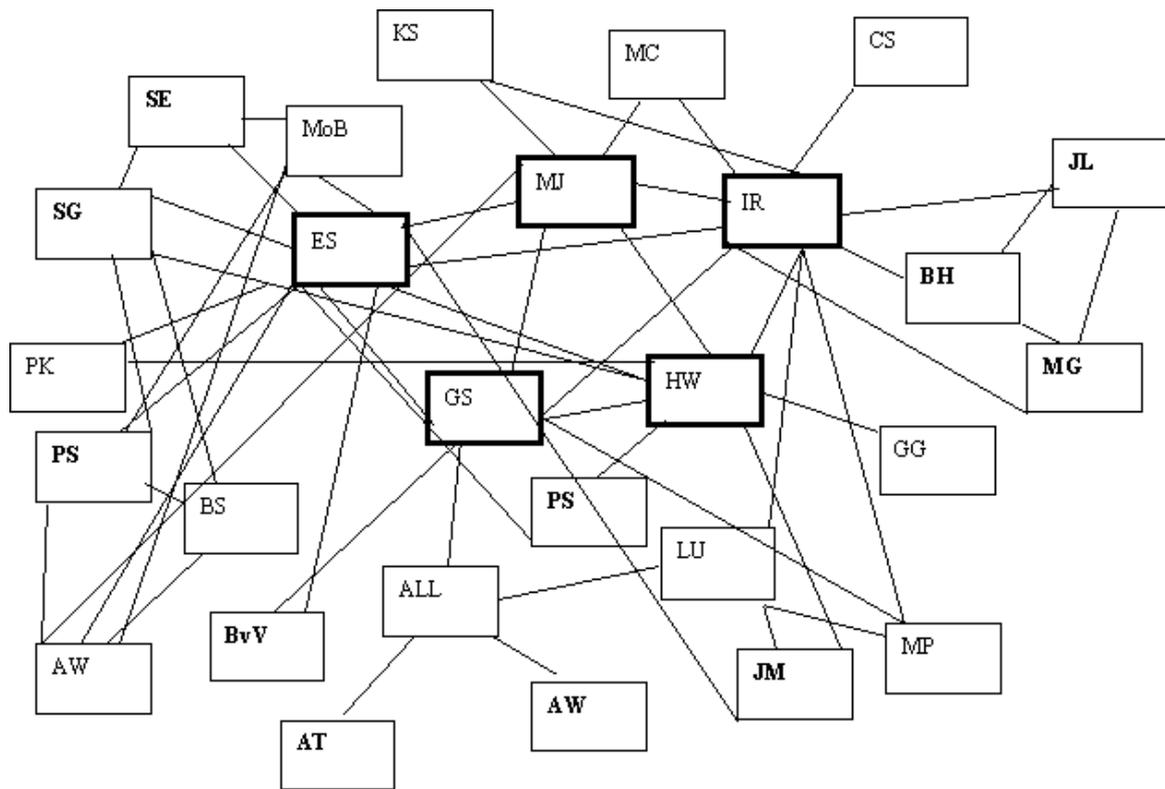


Figure 13. First Summer School 1999

* = speaker, bold initials = PhD student, dark margin = involved before

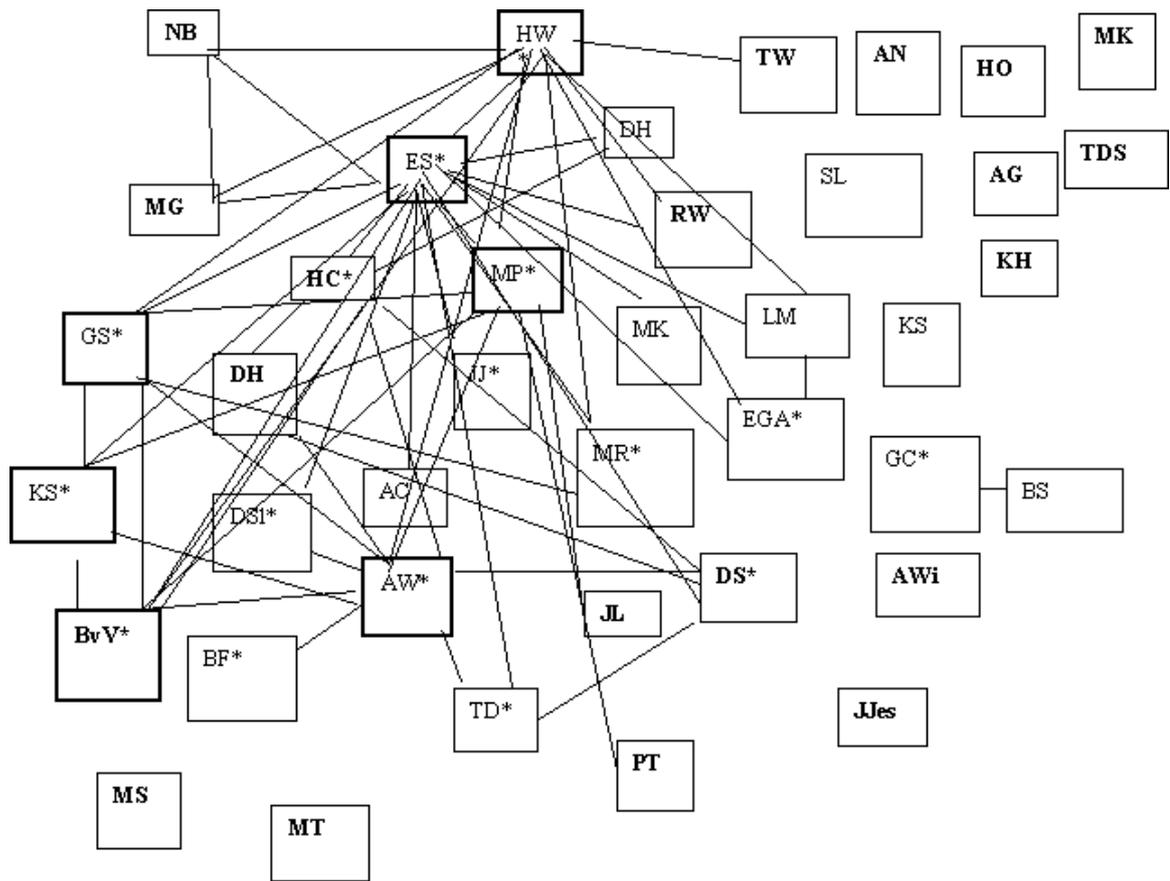
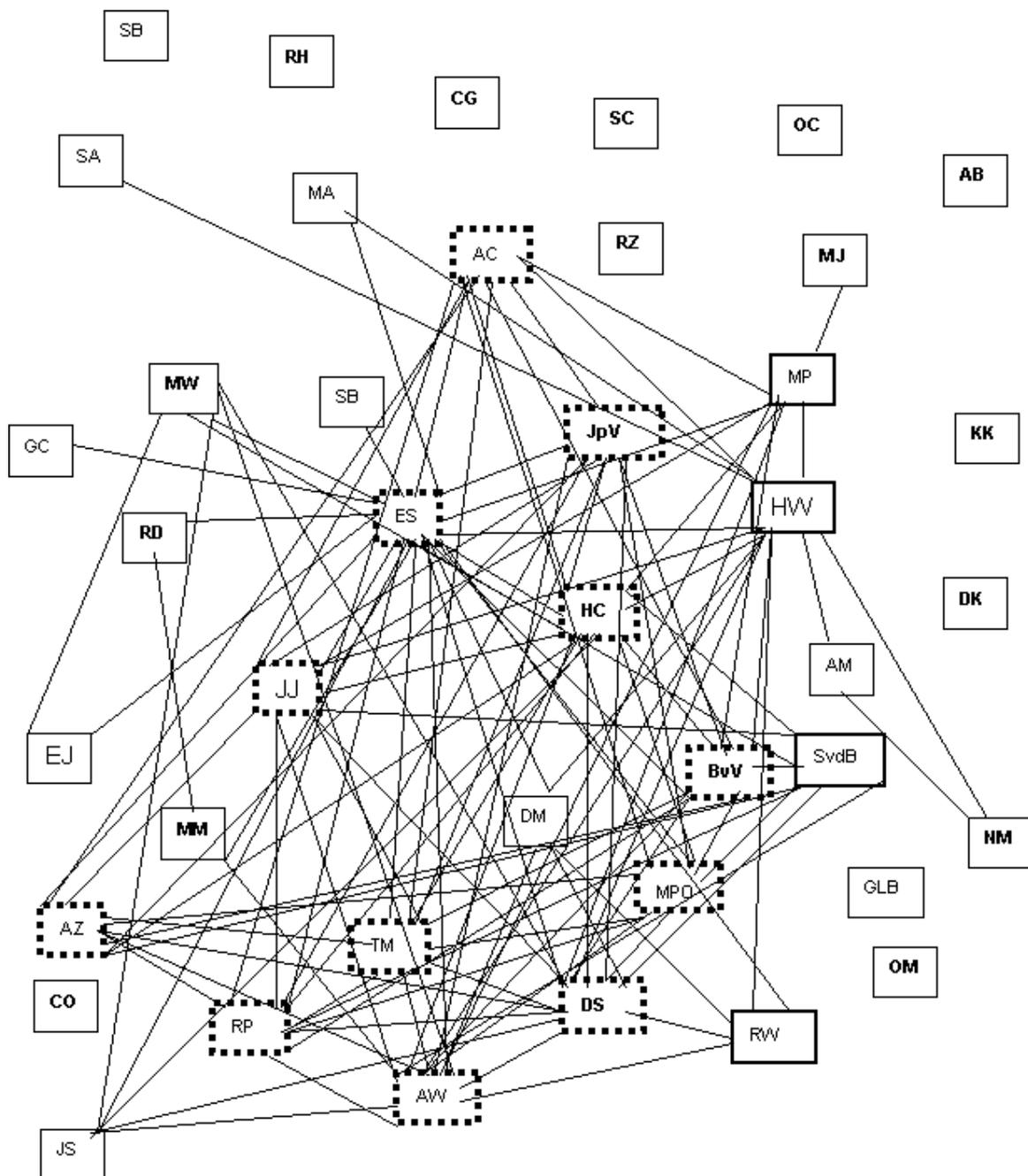


Figure 14, Second Summer School 2001

Dotted margin = involved in another research proposal

Bold initials = PhD student

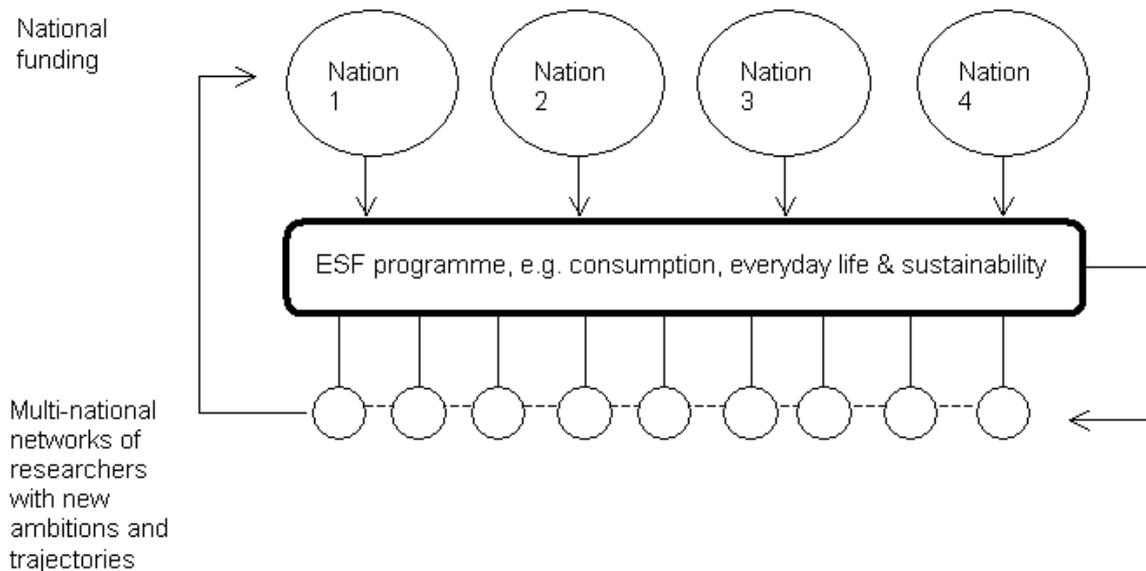


There is nothing especially surprising about this sequence: careers and networks often develop over time. The point, however, is that the ESF programme created a distinctive international and interdisciplinary space in which a specific set of relationships developed and in which a stream of new research issues began to unfold.

As this diagram suggests, researchers involved in the summer schools have since gone out of their way to look for national and other sources of research funding, tapping into other funders' programmes and agendas with the aim of continuing lines of enquiry engendered through (but as it happens, not directly related to) the ESF programme.



Figure 15. Formulating collective (subterranean) research trajectories



ESF programme, e.g. consumption, everyday life & sustainability

This is an instructive example for it shows that a programme can be many things at once. From the ESF's point of view, the workshops and summer schools delivered the goods: they addressed issues of consumption and production and did so in a manner that bore at least some resemblance to the goals outlined in the initial call for proposals. Nonetheless, the ESF also appears to be the innocent victim of collective hi-jacking: participants brought to and took from these workshops and events pretty much what they wanted (i.e. in keeping with 'their own' personal programmes). However, the collective nature of the process was itself creative: new ideas and networks were developed in the process, but in unexpected ways and with outcomes unrelated to programmes' stated goals. These emerging themes are now taking root not in the visible domain of science policy but in the shadowy regions in which researchers' own ambitions and aspirations grow. Having established themselves in this manner, novel and challenging themes are likely to see the light of day and filter up into 'established' funding regimes (perhaps packaged as something else or disguised to fit the stated priorities of national science policy).

8 Principals, agents and international programmes

We chose to concentrate on research programmes on the grounds that targeted programming represents a distinctively deliberate mechanism of science policy and research management. On the face of it, programmes help research councils/funders direct the actions and energies of their agents whilst also demonstrating focus and coherence to their principals. Selective discussion of three different programmes and projects suggests, first, that this mechanism is likely to generate more than is bargained for and, second, that principal-agent theory is not well equipped to appreciate collective effects of the kind that programmes engender.

Better appreciation of how research programmes operate, and of how programme designers' ambitions are mediated by the strategies and responses of research applicants reminds us that research programming is, like it or not, a process of co-production. More than that, researchers' responses are likely to be informed by the personal aim of stringing together sequences of separately funded projects so as to construct what they count as a worthwhile programme of work. Analysis of formal research programmes in terms of principal-agent theory is unlikely to detect these 'horizontal' manoeuvrings, or to pick up the unanticipated and longer-term consequences of research programme funding for relations between researchers and research groups.



It is tempting, and in terms of principal-agent theory, consistent to view research programmes as inter-mediating links in a 'supply chain' of delegation. However, the examples explored above point to another possibility, namely that of viewing research programmes as virtual but nonetheless effective 'actors' in their own right. Seen in this way they really are more than the sum of the parts, not because they add value to a pre-determined agenda, but because they (have the potential to) function as uncontrollable monsters roaming wild outside the neat compound of principal-agent relations. These more anarchic possibilities derive from the fact that programmes draw people together in new combinations and configurations; that allegiances can form to the programme itself (and/or to other participants in it), and that programmes stand outside more formally organised disciplinary and institutional structures – once they are established and manned.

To conclude, this somewhat sketchy discussion of research programming highlights a number of challenges for principal-agent theory in characterising the relationship between science and society. Three points are worth highlighting. First, principal-agent theory has an understandable tendency to extract science policy relationships from the contexts and situations in which they have meaning. In reflecting on how researchers respond to programmes it has proved important to take account of actors and factors beyond the immediate relationship between scientists and those who fund their work on behalf of society. What happens is influenced by the actions (or inactions) of other funding sources within the research landscape. Exclusive focus on the mode of delegation between one principal and one agent fosters the illusion that that one principal is influential in their own right, not in context.

Second, and as is more conventionally recognised, scientists' own ambitions influence what happens in practice. However, this analysis suggests that scientists' goals are not simply those of 'capturing' the agenda and attendant resources for their own collective purposes. In other words, this is not a clear-cut story of defection or of shirking. The more subtle pattern observed here is one in which researchers work with others' agendas in order to develop their own. This includes members of programme steering committees and project co-ordinators, particularly when these are selected from the stock of actively working scientists. Again exclusive focus on the projects supported within one formal programme, or by one funding body will inevitably miss these horizontal linkages.

Third, research programming appears to be a potentially risky means of directing science. It is unwise to generalise too far. Programmes come in all shapes and sizes, some also being much more rigorously policed than others. But however instrumental the intentions, programmes (have the potential to) create protected spaces within the research landscape – spaces that are, by definition, located outside 'normal' institutional or disciplinary frames of reference. Paradoxically, the very conditions that are expected to add value (from the principal's perspective) are also those in which synergistic relationships can form and novel ideas take root – but not necessarily in the way that funders and sponsors expect.

The more that principals rely on programming as a means of directing and ordering scientific agendas, the more complex the ecology of national and international research systems promises to become. And the more complex it becomes, the harder it will be to trace the pathways of scientific enquiry that researchers are privately carving through the undergrowth of different funding systems. This is significant for these pathways and homegrown trajectories make a real difference to how agents respond to principals' efforts to steer and organise their activities, and to principals' collective sense of research capacity and of emerging and important research agendas for the future.

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