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UNDERPERFORMING POLICY NETWORKS: THE BIOPESTICIDES NETWORK IN THE UKⁱ

Abstract

Loosely integrated and incomplete policy networks have been neglected in the literature. They are important to consider in terms of understanding network underperformance. The effective delivery and formulation of policy requires networks that are not incomplete or underperforming. The biopesticides policy network in the UK is considered and its components identified with an emphasis on the lack of integration of retailers and environmental groups. The nature of the network constrains the actions of its agents and frustrates the achievement of policy goals. A study of this relatively immature policy network also allows for a focus on network formation. The state, via an external central government department, has been a key factor in the development of the network. Therefore, it is important to incorporate such factors more systematically into understandings of network formation. Feedback efforts from policy have increased interactions between productionist actors but the sphere of consumption remains insufficiently articulated.

Keywords: policy networks; regulation; governance; implementation; pesticides; sustainability

Extensive research and analysis has taken place on policy communities and policy networks. There is a substantial British literature (e.g Richardson and Jordan, 1979, Rhodes, 1986, Marsh and Rhodes, 1992a, Marsh, 1998a). Some writers have moved onto other frameworks, for example advocacy coalitions (Sabatier and Jenkins Smith, 1993), or group capacity (Daugbjerg and Halpin, 2008). Whilst not discounting such approaches, our view is that policy network analysis remains of considerable utility in political science. A great deal of innovative writing and research is still taking place within the paradigm (For example, Botterill 2005, Parker 2007, Greenaway et al, 2007, Hindmoor 2009). It has been central to the literature on governance, which is often described as rule by and through networks (Bevir and Richards, 2009).

Research on policy networks and communities has tended to emphasize relatively stable policy communities, or at least relatively well integrated and functioning networks. As Hay observes, ‘network failure [is] almost wholly absent from the existing literature’ (1998, 49). There is a need to study loose and incomplete policy networks, if only to examine instances of underperformance where the potential of a network is not fulfilled. The literature distinguishes between tightly integrated policy communities which are closed to outside groups and have a limited membership, and issue networks which are loosely integrated, open to outsiders and have a broader membership. There is a risk of oversimplification; not all networks will fit these categorisations (a point acknowledged by writers such as Marsh and Rhodes, 1992b, 250, and Smith, 1993, 65). Moreover, what is meant by terms

such as ‘limited’ and ‘broader’ and where is the cut off point? In this article we introduce a category of ‘incomplete networks’ to indicate where not enough of the *relevant* actors are involved in a policy network, and outline how this differs from an issue network.

The biopesticides policy network in the UK is ideal for focusing on these issues. The network is relatively immature and weakly developed compared to others analysed in political science and often lacks political sophistication. The network has something of a ‘hub and spoke’ character with its core provided by a regulatory agency, the Chemical Regulation Directorate (CRD), which is constrained by its role in the initiatives it can take. CRD was formed on 1st April 2009, integrating the existing functions of the Pesticide Safety Directorate (PSD), the Chemical Schemes Assessment Unit of the Health and Safety Executive (HSE), and elements of human exposure and socio-economic assessment into a single regulatory unit. The case study is interesting, in part given the regulatory innovation that has occurred within the agency. It is an unusual step for a body which usually has to stick closely to what is laid down in statute to negotiate new policy spaces in which to operate which is essentially what has happened here (see Greaves, 2009).

The article is structured as follows. Firstly, we draw out the relevant points from the literature on policy networks, distinguishing between networks as interest intermediation and networks as governance. Secondly, we outline the potential participants in the biopesticides network, introducing our

themes of ‘incomplete networks’ and ‘network underperformance’. Thirdly, we outline the role of the Pesticides Forum as a compositional measure of the network. Fourthly, we outline the components of the network in more detail and from this draw our conclusions. The paper draws on fifty semi structured interviews with a range of actors in the network.

Different Network Approaches

The term ‘policy network’ is used in many different ways (see Rhodes, 2006).

Rhodes (2006, 426) offers the following definition:

Policy networks are sets of formal institutional and informal linkages between governmental and other actors structured around shared if endlessly negotiated beliefs and interests in public policy making and implementation. These actors are interdependent and policy emerges from the interactions between them

Rhodes accepts there could be many qualifications to this definition but it is a helpful starting point. We can, as Borzel (1998) and Bevir and Richards (2009) suggest, further distinguish between approaches that treat networks as interest intermediation and those which treat networks as governance. Both approaches are relevant to our discussion; indeed governance revises rather than replaces the model of policy networks and in many ways increases its importance (see Rhodes, 1997).

Policy Networks as Interest Intermediation

Policy network analysis focuses on the importance of organizational rather than personal relationships and often looks at whether there is continuity in the interactions of interest groups and government departments. These interactions constitute a process of interest intermediation (Bevir and Richards, 2009, 4). Recent work by Botterill (2005) and Hindmoor (2009) uses policy networks in this sense. The modern state has a crucial role in economic and social life. To intervene in these areas, government needs resources not available within the state apparatus (Kenis and Schneider, 1991, 41). Typically it will become dependent upon organized interests which have resources within specific policy areas (Daugbjerg, 1998, 21). Rhodes in his pre-governance work argued that it is ultimately government that calls the shots. ‘The relationship is asymmetric’, it is government which creates the network, creates access to the network and the rules of the game (Rhodes, 1988, 82). Networks are portrayed as sets of interdependent organizations which need to exchange resources in order to achieve their goals (Rhodes and Marsh, 1992, 10-11). This feeds into typologies and lists of the characteristics of policy networks and policy communities which suggest policy networks vary along a continuum according to the closeness of the relationships in them.

We can usefully consider Rhodes and Marsh typology (1992, 251), as adapted by Daugbjerg (1998, 44). Daugbjerg presents policy communities

and issue networks as two extreme network types on a continuum. His three dimensions are: membership, integration and institutionalism. Policy communities have a very limited number of members with a narrow range of interests represented. Issue networks, on the other hand, have a large number of members and a wide range of interests. Integration defines the form, quality and frequency of interaction within the network. 'Members of policy communities are highly integrated in governmental policy making whereas members of issue networks are only loosely integrated' (1998, 42).

Integration ranges from bargaining and negotiation in policy communities to consultations in issue networks. Interaction also varies in frequency. Contacts are frequent and relate to all matters in policy communities, in issue networks the pattern of interaction is unstable. Who needs who varies from issue to issue and from one question to another. An interest group will only be consulted if it has resources relevant to the specific question on the agenda; in other cases, it will be marginalized. Finally, the degree of institutionalism can be defined by the extent to which there is consensus on the principles to underpin policy choices and on the procedures with which to approach policy problems. In other words, such consensus will exist in policy communities but there will be conflict in issue networks.

Daugbjerg adds that a policy network often has a core and a periphery, again reflecting a point made by Marsh and Rhodes (1992b, 255). The core consists of actors continuously involved in the policy process, whilst members of the periphery are consulted only on specific issues in which they have particular resources. *Within a policy network* there is a distinction between

members with resources and influences and those without. In essence the literature implies 'either that members of a policy network have unequal resources or that some interests are outside the network but, on occasion, are consulted or that the boundaries of any network are permeable' (Marsh and Rhodes, 1992b, 256). This raises the issue of 'incomplete networks'. (Pross 1986, 99), for example, refers to the 'attentive publics' of policy networks, a phrase which draws attention to the range of possible actors but does not treat them as members of the network.

Hindmoor (2009, 80) asks why governments form policy communities with some groups but not with others? He suggests that government will work most closely with those groups which have valuable resources; a point made in a different way by Daugbjerg (1998, 22) who argues that 'perhaps the most important reason why some actors are excluded from a network is that they lack [such] resources'. No organization willingly includes others (Daaugbjerg, 1998, 22). As Rhodes puts it (1981, 122), 'organisations are....primarily concerned to avoid each other'. In a policy community there is a sense in which some groups are 'consciously excluded' (Bevir and Richards, 2009, 4). Heclo (1978), in a landmark study, played down the restricted nature of access to policy making and was the first to conceptualize the idea of relatively open 'issue networks' with a wider array of participants as having replaced closed circles of control. As Daugbjerg puts it (1998, 50), 'access to an issue network is relatively open' but he adds that there are some restrictions such as actors must have 'legitimate' interests in the issues addressed.

Marsh (1998b) interprets Dowding as arguing that network structures *per se* have no influence on policy outcomes. Rather, networks reflect patterns of interaction and resource exchange between agents and it is these which determine outcomes: ‘the explanation lies in the characteristics of the actors’ (Dowding, 1995, 142). Dowding, however, denies giving primacy to agents not structures, arguing that network analysis can produce genuine structural explanations (Dowding, 2001, 100-1). The importance of structures is particularly clear when considering very loose and incomplete networks. Unless there is a regularized framework for interaction which includes agreement on the rules of the game and broad objectives, it is difficult to see how effective bargaining that resolves conflicts and produces solutions can occur. We advocate, in a sense, a dialectical approach as put forward by Marsh (1998c) and Marsh and Smith (2000). This suggests that networks are structures which can constrain or facilitate action but do not determine actions because actors interpret and negotiate contracts. Not only do networks affect policy outcomes, but policy outcomes feed-back and affect networks.

Policy Networks as Governance

A theme in modern public administration is the shift from government to governance. There has been a shift from government by the unitary state towards governance by and through a range of networks of various kinds (eg: Rhodes, 1997; Bevir and Rhodes, 2003). As Greenaway et al put it (2007, 717-18), ‘network approaches have provided useful insights into the issue of

policy implementation. They stress the importance of exchange of resources, the non-hierarchical interaction of actors and institutions, and interdependence in a world of bargaining and complexity'. There are many different definitions of governance (see Rhodes, 1997, 46-52). Rhodes has defined it in terms of 'self-organizing, inter-organizational networks' (Rhodes, 2000, 346), and points to four key characteristics. The first of these is 'Interdependence between organizations. Governance is broader than government, covering non-state actors.' The changed boundaries of the state mean that the boundaries between public, private and voluntary sectors become shifting and opaque. Second, there are 'Continuing interactions between network members, caused by the need to exchange resources and negotiate shared purposes.' In other words, governance requires the existence of policy networks that operate effectively. Third, there are 'Game-like interactions, rooted in trust and regulated by rules of the game negotiated and agreed by network participants.' Fourth, there is 'A significant degree of autonomy from the state. Networks are not accountable to the state: they are self-organizing.' The state does not occupy a sovereign position, but it can indirectly and imperfectly steer networks (Rhodes, 2000, 346). The Rhodes formulation makes clear that policy networks facilitate negotiation and the development of shared understandings among participants. We can infer that in order to function properly, policy networks must be constitutive of all relevant policy-makers

The traditional policy network literature was based on central departments or parts of them. Rhodes, therefore, revises the policy network

concept to reflect the shift to governance (Rhodes, 2000, 348). Firstly, the membership of networks has become broader, incorporating both the private and voluntary sectors. Secondly, the government has swapped direct for indirect controls. For example, it removed operational management from central departments and vested it in separate agencies (see Rhodes, 1997, ch 5-7). Fragmentation not only created new networks but increased the membership of existing ones. Central departments are no longer necessarily the fulcrum, or focal organization, of a network. Rhodes uses the term ‘network’ to describe the ‘various interdependent actors involved in delivering services’ (1997, 51). As British government creates agencies and uses special-purpose bodies to deliver services, networks become increasingly prominent among British governing structures (1997, 51). As networks multiply, so do doubts about the centre’s capacity to steer (Rhodes, 1997, 54). Rhodes emphasis on ‘policy delivery’ may indicate another shift from the traditional literature. That being said, he notes that the importance of (traditional) policy networks varied with the stage of the policy process (Rhodes, 1997, 12). Marsh and Rhodes, for example, stressed its relevance for analysing policy implementation (see 1992b, 185-6); as does Smith (1993) who argues that tighter policy communities increase the capabilities of the state to make and implement policy

Parker (2007), in a particularly helpful article, suggests that in order for networks to be regarded as a form of governance they must play a role in steering, setting directions and influencing behaviour. The characteristics necessary for these objectives to be achieved are density, breadth and

association with values such as trust, mutuality and identity. A dense network is one in which all group members are connected to each other. Density ensures that there are no gaps in the network that might result in a critical break in information sharing, communication and negotiation. Networks also require breadth in the sense that they incorporate the range of actors and institutions whose activities impact on governance outcomes. As Parker puts it (2007, p. 119), ‘without density and breadth, networks would be unable to influence behaviour and set directions for the range of actors involved in a particular policy problem and would therefore be unable to satisfy governance outcomes’. This can be seen as updating some of the traditional thinking of policy networks in terms of membership and integration. Finally, trust, mutuality and common identity are critical if networks are to perform a coordinating function in steering and shaping behaviour (see Keast et al, 2005, 364).

The Biopesticides Policy Network

Biopesticides are made up of a broad group of agents. They are defined here as mass produced, biologically based agents used for the control of plant pests. This definition includes not only the active ingredient of a biopesticide but also the way it is used. The management of plant pests is heavily reliant on synthetic chemical pesticides. Problems of natural resistance and the withdrawal of products for regulatory and commercial reasons mean that there are fewer chemical pesticides available on the market. This is a particular problem for speciality crops in the horticulture sector that are grown on

relatively small acreages, e.g., courgettes, cauliflowers and are, therefore, not attractive in terms of the commercial development of new products. Many of these so-called minor crops are dependent on one, relatively old product which may not work with all soil types. Biopesticides have an important role to play in crop protection but usually in combination with other methods such as chemical pesticides as part of Integrated Pest Management (IPM). They tend to be less toxic than chemical pesticides, have little or no residue and are often very specific.

It is helpful at this point to summarize the main network players.

Essentially one can identify the following potential participants:

- 1: The regulatory agency (which forms the hub of the policy network).
- 2: Growers (and their representative organizations)
- 3: The biocontrol manufacturers (and their representative organization).
- 4: Consultants (who can be important intermediaries).
- 5: Environmental non-governmental organizations.
- 6: Retailers.
- 7: Consumer organizations

The relevant national government department (Department for Environment, Food and Rural Affairs - Defra) is excluded from this list as under governance arrangements, its role should be one of 'steering' This task may not be performed perfectly, but it is expected to be softer, less intrusive

and less hierarchical than under traditional systems of government. CRD is the agency responsible for regulating microbial agents and naturally occurring substances used as plant protection products in the UK. Defra, to which CRD reports, has a fairly ‘hands off’ relationship with the agency; they may prefer to keep themselves distant so that if anything goes wrong CRD will take the flak (Greaves, 2009). The minister responsible for pesticides policy, Phil Woolas, commented at an open meeting of the Advisory Committee on Pesticides (ACP) that, ‘It’s an area of public service if it gets in the news, it tends to be negative. As an elected politician one wants to keep it out of the news. It is not an easy area of government policy’ (12th November, 2007). CRD’s policy advisory work is funded by a grant from Defra, whilst its approvals and registration work is undertaken on a cost recovery basis, through charges to the firms seeking registration and a levy on approval holders. Each year CRD’s objectives are agreed with government ministers, but in common with many government agencies they are given a considerable degree of autonomy.

A focus on the organizational relationships between the potential participants may suggest similarities with an ‘issue network’, as outlined by Daugbjerg (1998). There is a lack of integration, in terms of the form, quality and frequency of interaction (although some positive changes are occurring in this respect). When it takes place it consists of consultation and is on an ad hoc and issue by issue basis. Whilst there is a degree of consensus on goals and procedures, they are not shared with important actors’ such as retailers and environmental groups. Daugbjerg concentrates on ‘horizontal’

interactions between ‘interests’ and the government department: we may also wish to consider vertical interactions between players in the network, which are also often weak. He also focuses on integration into the policy making process: in the age of governance we also need to focus on policy implementation. Finally, we can define ‘interests’ broadly to include not only pressure groups but actors such as supermarkets and individuals such as consultants.

An Incomplete and Underperforming Network?

The network lacks what Parker (2007) would describe as density and breadth (and, therefore, values such as trust, mutuality and identity). The interactions with retailers and environmental groups are so limited they are best described as lying outside the network. Whilst it can be difficult to demarcate the boundary of a network, we believe this offers greater clarity than the core periphery distinction in the literature. This links to the notion of ‘incomplete networks’, in a sense building on Pross’s analysis (1986). This raises the methodological question of who determines whether the network is incoherent or incomplete. We have extensive materials based on interviews, observation and documentary analysis about the operations of the network. However, the researcher cannot determine as a ‘deus ex machina’ who should be in the network and how it should operate. This can only be done by the participants in the network itself as a self-constituting entity. Respondents did not, of course, use the language of network analysis, but they did comment extensively on the absence of effective relationships between actors that

facilitated policy formulation and implementation. In particular, regulators drew attention to the difficulties that arose from the lack of systematic contact with retailers while biopesticide manufacturers regretted their lack of engagement with environmental groups.

More ‘joined up’ relationships between these actors would facilitate the search for policy solutions and their implementation. The debate is not simply about the *number* of actors involved, but whether the *right* actors are involved. This distinguishes an incomplete from an issue network where there are many participants (and membership is fluid) because the barriers of entry are very low. In so far as the network has been strengthened, it has been in terms of seeking to incorporate biopesticide manufacturers and to strengthen links with farmers and growers. In other words, the focus has been on the politics of production. However, contemporary politics is typified by a greater emphasis on the politics of consumption. Consumption choices contribute to definitions of personal identity:

The growth of affluence has led to a stress on personal development and society is re-orientated towards the values of individuality and self-expression. With the decline in the defining power of old economic and political forms – associated with workplace, class and nation – self-identity has shifted to spheres where individuals have discretion and control (Lowe et al, 2008, 228).

These choices are structured by retailers who see themselves as proxy spokespersons for consumers. The lack of connection of retailers with the policy network means that it is lopsided and confined to one sphere of politics. To what extent, therefore, does the incomplete nature of a policy network lead to network failure or underperformance? As stated at the outset, network failure is underplayed in the existing literature. Hay, however, provides a helpful analysis, stating that the immediate problem of identifying network failure can be captured in the question, ‘failure for whom?’ (Hay, 1998, 49). In other words, failure for one organization, interest or actor may constitute or represent success for, and the success of, another. Indeed, the (perceived) network success for one organization is not unrelated to its ability to seize and hegemonize the ‘common’ strategic agenda of the network, in turn subverting the collective interest for the particular interest (1998, 49/50). Hay takes the analysis a stage further by separating out analytically (i) *network failure*: where the collective strategic agenda is subverted in pursuit of a singular agenda; and (ii) *network crisis*: a situation in which perceptions of network failure threaten the very continuity of the network (1998, 50). We add a further category of *underperforming networks* to account for instances where although the potential of the network is not fulfilled there is not total network failure.

It is helpful to define network failure (or underperformance) more clearly. A failing network may be unable to promote its collective interest. This may not be because of subversion in pursuit of a singular agenda; it may be because the network is incomplete so that if relevant stakeholders are not

consulted policy risks being deficient. The main focus in this paper, however, is on network failure in terms of policy implementation and delivery. We assess policy implementation and delivery in terms of whether the government's goal of the wider use of biopesticides has been achieved. A fully functioning network would facilitate the new objectives set by the European Union (EU) legislation passed in 2009, principally the revision of 91/414 and the sustainable uses directorate. This places an emphasis on IPM and the uses of alternatives to synthetic pesticides. Member states have to demonstrate that they are making progress in that direction and that would be more readily achievable with a fully functioning and comprehensive policy network.

The Pesticides Forum

We can use membership of the Pesticides Forum as a compositional measure for the pesticides policy network in its wider sense, because of its role which requires a broad membership but one that also sets boundaries. Its responsibilities include overseeing the work of the Action Groups referred to below. The Forum was established in 1996 and its objectives were updated towards the end of 2007 to better reflect their role in aiming to develop an agreement amongst their stakeholders and supporting the UK Pesticides Strategy. Its overall aims are:

- 'To continue to oversee work under the UK Pesticides Strategy, monitor the effects of policies, laws and other initiatives that affect or

are affected by the use of pesticides, and offer advice to Ministers and stakeholders as appropriate’.

- ‘To provide a forum for exchanging views, and wherever possible allowing our stakeholders (the people who have an interest in our work) to come to a general agreement’

(http://www.pesticides.gov.uk/pesticides_forum.asp?id=1318,

accessed 13 July 2008).

Following expansion in 1998 from its original 16 members, membership of the Forum is now drawn from 23 organizations. These cover the farming and agrochemical industries, environmental and conservation groups, education and training, consumer interests, trade unions and organic farming. Ten Government departments and departmental bodies can attend as observers. The International Biocontrol Manufacturers Association (IBMA) is not a member, suggesting that biopesticides manufacturing is not seen as a high priority. The Fresh Produce Consortium is represented and its membership ‘covers all areas of the industry spectrum including wholesale, food service, importer, packer, retail and floral’

(http://www.freshproduce.org.uk/who_we_are.php, accessed 17th Sept 2008) .

Retailers, therefore, receive some form of representation (many of the large supermarkets are members of the Consortium). However, in this sector individual firms are important in their own right; in that sense retailers are not properly integrated into the network.

The Forum is not a body that any interested party can join.

Appointments are formally made by Defra Ministers but acting on advice from CRD. This is consistent with Defra delegating as much decision making as possible: the Forum is based at York, within the same offices as CRD. Membership is on the basis of invitation, but was intended to reach out to a wider range of stakeholders to ‘trusted consumer and green groups ... beyond a formerly narrow circle of expert insiders and agribusiness consultees.’ (Hood et al, 2003, 160). At a stakeholder meeting held by Defra, one participant commented that the Pesticides Forum ‘was a bit of a closed shop ... It would help represent interests better [if there was] a wider range of groups. Some people are allowed on it and some are not.’ Another participant from the forestry sector stated that they had asked if they could be represented and were told that the group was full. Any attempt to formally reproduce a policy network always creates difficulties of inclusion or exclusion. CRD’s response on this occasion was that they were wary of the group becoming unwieldy or unbalanced and that non-governmental organizations struggled to resource the input.

There has been little discussion of biopesticides within the Forum but the topic was discussed at a meeting in the autumn of 2008 leading to a view that the availability action plan should give greater attention to ‘alternatives’ to conventional pesticides such as biopesticides. This was primarily a response to new EU legislation that places greater emphasis on alternatives to synthetic pesticides. Nevertheless, it is the best descriptor of the network we have and relevant for finding out whom is in the network in its wider sense.

This brings up the question of the relationship between the wider and narrower networks. The system of chemical pesticides regulation in the UK has developed since the 1940s with pesticide residues in food being monitored since the 1950s. Hence, the actors involved, such as the National Farmers' Union (NFU), have long experience of interaction with the regulators.

Biopesticides and their regulation is a more recent development, reflected in the immaturity of the network. The networks overlap and some of the actors are the same so an actor's involvement in the wider network might give it access to biopesticide discussions. This access is particularly evident in the case of the farmers and growers' organizations, whereas IBMA is a recently formed organization with no long-term experience of interaction with government bodies.

A Sectoral or Sub-Sectoral Network?

This links to the debate on the relative importance of policy networks at sector and sub-sector level. There are difficulties in defining a 'sector' but for our purpose we refer to 'pesticides' as a sector and 'biopesticides' as a sub-sector.ⁱⁱ Jordan et al (1994) argue that agricultural policy making in Britain is characterized by sub-sectoral policy communities. Cavanagh et al (1995, 627), meanwhile, write that only empirical analysis can establish whether sectoral or sub-sectoral policy networks are the most important in a policy sector. They add, however, that research should 'pay more attention to structure, in particular to the principles, procedures and norms guiding the policy process within sub-sectoral policy communities. These are often set by sectoral policy

communities (Cavanagh et al, 1995, 627-8). The sector/sub-sectoral debate involves major methodological disagreements which are difficult to resolve (see Daugbjerg, 1998, 25-26). Essentially, we share the view of Marsh and Rhodes that ‘the policy network concept can be used at *both* the sectoral and the sub-sectoral level’ (Marsh and Rhodes, 1992b, 254). To some extent governance moves the debate on: networks will be focusing more on policy delivery and the devolution of responsibilities to government agencies could result in more networks operating at a more specialized level (see, for example, Jordan and Maloney, 1997). In a sense networks can be seen as existing at every level (Marsh and Rhodes, 1992b, 254).

Sustainability, Co-operation and Networks

The biopesticides policy network is challenged to promote more sustainable alternatives to chemical pesticides. As the national pesticides strategy, *Pesticides and the Environment: a Strategy for the Sustainable Use of Plant Protection Products* (2006, 13) puts it, ‘The Government believes that the availability of plant protection products is largely a matter for the market and for the crop protection and farming industries.’ Hence an ability to work together effectively in a policy network becomes a key factor determining whether environmentally sustainable policies can be delivered. There are many definitions of sustainability, but the Brundtland Commission (1987) defined it as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (<http://www.sustainabilitydictionary.com>, accessed 30/01/08). Although

environmental sustainability must have a special emphasis in relation to pesticides, other aspects of sustainability should be taken into account, including economic sustainability. A key obstacle to promoting sustainability is the regulatory process. As Waage puts it, 'biopesticide development is locked into an inflexible and unimaginative chemical pesticide model. In this position, all of the shortcomings of biopesticides relative to chemicals emerge and none of the benefits' (Waage, 1997, 14).

Pesticides are toxic substances and there needs to be a thorough evaluation of their impact. The aim is not to remove or reduce regulation, but to reconfigure it so that the benefits of more environmentally friendly products can be realized. This requires a learning process for the regulators and a willingness to engage with a range of stakeholders. Here policy network analysis becomes particularly important. Effective change requires the co-operation of a wider range of actors. Co-operation is needed to ensure that regulation does not discourage innovation in sustainable products by imposing onerous requirements that have little relevance to the objectives of regulation (e.g. ensuring that a product is safe). This can be achieved by effective information exchange that identifies the problems and develops mutually acceptable solutions to them.

The national pesticides strategy (2006) is designed to reduce the environmental impact of plant protection products in the UK. This strategy encourages 'voluntary approaches to deliver results wherever possible.' (2006, 8). The government's view was that 'a broad package of voluntary

and statutory measures is likely to deliver benefits beyond those achievable through regulation alone.’ (2006, 9) The strategy outlines high level Action Plans to take forward further measures to promote sustainable use. The responsibility for taking forward these Action Plans rests with a series of implementation groups comprising key stakeholders. In some cases this has led to network formation where actors were not connected before. In the case of the Amenity Forum which brings together non-agricultural users of pesticides its chair stated that there was ‘no tradition of co-operation and discussion of core issues until its formation’ (ACP meeting, 12 Nov 2007). The important one in terms of biopesticides is the Availability Action Plan Group (re-named in 2008 to include the word ‘Alternatives’). This includes stakeholders such as the NFU , the Crop Protection Association, and the IBMA. The group works, for example, on initiatives designed particularly to help maintain sufficient pesticide availability for the production of minor crops in the UK where, as we have seen, biopesticides have a role to play.

A better relationship amongst network actors could also encourage producers to use the regulatory framework rather than seeking to evade it by producing so-called ‘grey products’ that then undermine confidence in biopesticides because they lack efficacy. Some products, for example, appear in forms that lie outside the scope of the pesticide regulations, e.g. as plant strengtheners, leaf enhancers etc. It has been estimated that thirty products are sold as bio-stimulants in the UK with the impression being given that they have pest control benefits (Availability Action Plan Group Meeting, York, 28 Nov 2007).

Network Components

CRD: the Hub of the Network

Encouraging the wider use of biopesticides has been a policy objective for the Labour Government, yet progress towards this goal initially proved painfully slow. It therefore became necessary for the institutions of the core executive to intervene in the policy making process. The then Business Regulation Team (BRT) of the Regulatory Impact Unit of the Cabinet Office discovered in 2002 that, ‘although Defra has been funding the research and development of “alternatives” to synthetic pesticides, none had been able to obtain the authorisation required for such products to be placed for sale in the UK as plant protection products’. It was observed that PSD’s testing requirements ‘were evidently designed to cope with standard, mass produced synthetic chemical pesticides which, by their nature, tend to deliver very high efficacy rates, and not with this group of safer alternatives’. As far as the Regulatory Impact Unit was concerned, this ‘appeared to us to be an interesting example of regulation-inspired market failure’ (Business Regulation Team, 2003, 19).

In the coded language of the English civil service, ‘the BRT approached PSD seeking to help to establish a workable solution to this problem.’ In other words, they used their authority to lean on PSD. It was reported that PSD ‘was keen to discuss ways in which the pursuit of this new

aim could be promoted.’ (Business Regulation Team, 2003, 19). That they leaned on PSD was confirmed both by a senior figure within the agency and by an industrial executive seconded to BRT to work on biopesticides. CRD’s Director of Approvals commented that ‘there was a political driver but it wasn’t Defra or growers, it was the Cabinet Office’ (Biopesticides Workshop, 31st October 2007).ⁱⁱⁱ Furthermore, ‘it was someone on secondment to the Cabinet Office, not a career civil servant’ (Biopesticides Workshop, 31st October 2007).

This led in June 2003 to the introduction of a pilot scheme to encourage the development and introduction of alternative control measures. As the Director of Approvals put it, ‘we did need some pressure to introduce the scheme’, we were given ‘a kick in the teeth’ (REBECA Conference, Sept 20/21 2007).^{iv} The scheme included lower registration fees and pre-submission meetings to encourage and assist applications. A permanent Biopesticides Scheme was introduced in June 2006 and this continued with pre-submission meetings and reduced fees. It also introduced a biopesticides champion to provide initial contact for product innovators and manufacturers and help them through the approval process. It also led to the appointment of specialist ‘bio-contacts’ to provide guidance on specific scientific and regulatory issues. Only four actives were approved between 1985 and 2003. Since the introduction of the pilot scheme, six further actives have been approved for use in the UK. Seven others are at various stages of evaluation and a number of others are under discussion (Dale, 2008). PSD were told by the biopesticide industry that if they reformed the ‘floodgates would open’.

This has not happened but outcomes have been favourable compared to the preceding period. As John Dale from CRD puts it (Dale, 2008), ‘still not as many as we had hoped for, but an encouraging start’

Intervention from the Cabinet Office was a factor in the formation of the policy network. This can be described as exogenous pressure: CRD after all is an agency of Defra, not the Cabinet Office. Indeed, in accordance with governance arrangements the regulatory agency operates at some distance from Defra (see Greaves 2009). There was little interaction, not least between IBMA and PSD, before the Cabinet Office intervention. There was little to resemble a policy network as commonly understood by the term. The agency had no particular provision for biopesticides, IBMA had only just been formed, and the UK Minor Uses Network (of which growers and farmers are members) did not meet until the end of April 2003. There were other forms of exogenous pressure. Dale refers to negative press and grower concerns over a lack of alternative control measures. The agency responded to the various pressures by increased communication with the IBMA, growers and others (Dale, 2008). A conference on biopesticides held in November 2003 by the Horticultural Research International (HRI) Association provided a further focus for discontent over the handling of biopesticides, which had been given momentum by a report published in that year by ACP on alternatives to chemical pesticides

Despite its distance from Defra the agency is constrained in what it can do, both in terms of the existing pesticides legislation (both EU and UK)

and its mandated aims and objectives. This could be a factor in preventing further network development. The agency's framework document (1996) sets out its formal status and accountability. It states that 'the aim of PSD is to protect the health of human beings, creatures and plants, safeguard the environment and secure safe, efficient and humane methods of pest control, by controlling the sale, supply, storage, advertisement and use of pesticides' (<http://www.pesticides.gov.uk/corporate.asp?id=232>, accessed 9/10/07). One of its aims, as part of the strategy for sustainable food and farming, is to reduce the negative impacts of pesticides on the environment. The objectives of the organization appear consistent with promoting the wider use of biopesticides, but only with further ministerial approval and guidance. It may also not be appropriate for a regulatory agency to promote a particular technology. At a practical level the approvals side of CRD is set up with a staff of scientists to undertake the task of registration to ensure the safe use of pesticides and it is not equipped to take on an advocacy role. The role of the (part-time) Biopesticides Champion is to assist biologicals through the registration process and not to be an advocate in any stronger sense. Furthermore, as the Director of Approvals put it, 'my challenge is to promote the scheme, not to promote biopesticides, there is a difference' (Biopesticides workshop, 21st October 2007).

CRD has devoted considerable resources to stakeholder engagement but it was evident from the research that network development initiatives could only take place at a relatively high level within the agency. As one consultant put it in interview, 'In PSD you need to go up to policy director

level to bring about change.’ Within CRD, network formation is clearly a key role for the small Strategy and Stakeholder Engagement Group, but the Policy Group also has an important role. While there are differences of culture within CRD, the Director of Approvals Group has been very actively involved in network formation and development activities. He thought that CRD had an interesting agenda for a regulatory agency as it could work with stakeholders on initiatives. The challenge had been that ‘We particularly felt that we were not meeting the right stakeholders and they were not hearing us. You had to sit back and ask why they are not listening to us.’ (interview, 8 December 2005). One of the reasons was that the policy network was incomplete.

Farmers and Growers

A key challenge for farmers and growers is the withdrawal of plant protection products as a result of the EU regulatory review process. Following the implementation of European Directive 91/414 EEC there has been a significant decline in the number of active ingredients permitted for use in crop protection products. This is likely to be accelerated by a revision of 91/414/EEC which was awaiting Council approval in 2009. Moreover, because of the expense of research and registration, manufacturers are unlikely to develop new chemical products on a large scale. This means that the production of some crops might become impossible in the UK if there is nothing that can be used to deal with infestation. It is, therefore, not surprising that NFU is particularly active within CRD’s Minor Uses Network

which addresses minor use problems and has considered the contribution of biological products to filling gaps in availability.

More generally, NFU seems to be relatively well disposed towards the agency and recommended in the context of discussions about the implementation of the EU's REACH regulations that PSD should form the core of a new chemicals agency that would enable it to draw on its experience.

^v Through their organizations, farmers and growers are relatively well integrated into the policy network, at least in its wider sense. The trade association, the Fresh Produce Consortium, organizes key intermediaries (packers and wholesalers) between growers and supermarkets as well as involving importers and retailers. However, farmers and growers are 'policy takers' rather than 'policy makers'. They have to operate within the constraints of a stringent regulatory framework and they also have to cope with the market power of the supermarkets which impose additional restrictions on their use of pesticides. The link between the grower and the biopesticide producer is limited, with implications for product development and supporting the development of data for national product registration. The grower on the ground is largely separate from the regulatory process. There is a concern that involving them could compromise safety, but this highlights the lack of trust between all parties and the absence of effective policy and information exchange networks.

The Biopesticides Industry and the IBMA

IBMA is the worldwide association of biocontrol industries. Created in 1995, it represents the views of biological control producers, mainly small companies with limited resources. There are only two firms in the UK industry that are sections of larger multinational groupings. IBMA has only part-time staff and consultants working for it, although some work has been undertaken on its behalf by independent wealthy individuals. Based in Paris, it at one time had the reputation of being a very French centric association. IBMA UK is a local organization of the international body and was formed in May 2003.

PSD had to build up its relationship with IBMA in order to find a route into the industry. In Hay's terms (1998, 47), this represented a further stage in network formation with the network hegemon recruiting a further strategic partner to reinvigorate the network in the context of the development of the Biopesticides Scheme. As a senior CRD official put it, '[We] had to build up confidence, [we are] now much closer to IBMA, [we] had to break into them, [we went] out there telling them there is a plan, but they were reluctant to come and meet us.' Another official summed up, 'it's a new relationship with the IBMA. They've offered us visits round plants – formulation technology, unfamiliar techniques, opportunities to see it in a field'. One practical indication of this new relationship is the joint working group of IBMA and CRD on efficacy issues, although IBMA is customarily represented in these meetings by consultants. One of these meetings was observed as part of the

research. It lasted for around two-and-a-half hours and a range of policy and technical issues were discussed in an open and constructive fashion.

Despite undergoing organizational development, IBMA has been hampered by a lack of resources and the fact its technical knowledge is not always matched by a comparable level of political sophistication. As one consultant put it, ‘there is not good communication between the relevant parties’. An official within CRD added, ‘it is quite a disparate group with problems of communication. Consultants report back to the group, making it more manageable’. IBMA has often had difficulty in acting in a proactive fashion and portraying itself as an authoritative spokesperson for the industry that can make effective decisions about its stance on issues sufficiently quickly. It has also not organized all potential registrants of biopesticides which is a challenge for CRD in their outreach efforts directed at the industry. Furthermore, previous experience with the regulatory system has, to some extent, undermined the confidence of product developers. Even when they do make contact they may be reluctant to provide relevant information, making it difficult for CRD to assist them. For those firms that do make contact, our observations have shown how pre-submission meetings are a vital part of the process

IBMA is a member of the Availability Action Plan Group, and CRD and other members of the network have been invited to IBMA meetings (such as one held in September 2005 where a senior figure within the organization stressed how helpful he had found the agency). The REBECA programme,

funded by the European Commission, has also brought together relevant actors (e.g. IBMA and others) who might not otherwise have had contact, such as at a congress in Brussels in September 2007. The question is whether these contacts can be maintained, but it has been argued that the annual conference of the IBMA in Lucerne is emerging as a ‘one stop shop’ for the policy network.

Consultants

Given the relative fragmentation of the policy network, it might seem that specialist consultants would be able to play an intermediary role in bringing actors together and using their technical expertise to devise policy solutions. It should be noted that many of these consultants are effectively one person businesses specialising in biopesticides and advising applicants on the approval process. Other consultants provide growers with ‘hands on’ technical advice on the use of biopesticides, but they are less integrated in the policy process. To some extent, consultants do act as intermediaries. For example, they are prominent in IBMA and often form the IBMA delegations that interact with CRD, e.g., in the joint efficacy working group. However, they are constrained by the fact that their function is primarily a commercial one. There is also some ambivalence about them within the hub of the network, CRD. One perception is that ‘We do consultants job for them’ in the sense that consultants ring up and ask questions when they incorporate into advice that they sell to their clients. There is concern that in certain instances they could convey the impression to some clients that access to the

regulatory system is more difficult than is in fact the case and this can produce some suspicion of their role. On the other hand, there is also a realisation that ‘Some consultants can direct flak away from us.’ To some extent, they are buffers for CRD, but they had no evident links with retailers and cannot compensate for deficiencies in the network as a whole.

Environmental Non-Governmental Organizations (NGO's)

Environmental NGO's tend to have a wider remit than pesticides, the exception being Pesticide Action Network (PAN). There is a lack of engagement by such groups in the biopesticides debate, reflecting indifference rather than hostility. For its part IBMA has been slow to reach out to environmental groups as potential allies, which is perhaps surprising given that their members are producing more sustainable products than conventional pesticides. Environmental groups have often been relatively isolated. The debate about a more sustainable agriculture is framed more around discourses about organic farming. For example, the alternative to the extensive use of synthetic pesticides is often presented in terms of organics, or even genetically modified (GM) crops which remain politically controversial. Although they have generally been critical of pesticides and called for greater restrictions on their use, environmental groups have not been particularly supportive of biological alternatives. This may be in part because of a suspicion that they are ‘still pesticides’

According to their website, PAN ‘promotes healthy food, agriculture and an environment which will provide food and meet public health needs without dependence on toxic chemicals, and without harm to food producers and agricultural workers’ (<http://www.pan-uk.org/About/index.htm>, accessed 11/02/08). A senior official within the organization accepted that food production without toxic pesticides would be more sustainable. However, they added that whilst ‘biopesticides are a possibility ... the reaction of the establishment to biopesticides is that it is a niche market ... Just because they’re biopesticides doesn’t mean they’re safe’. NGO’s such as Friends of the Earth and Greenpeace have not significantly engaged in the debate on biological alternatives, perhaps because they have largely left this area of policy to PAN. In terms of the PSD’s pilot scheme, Friends of the Earth were reported to be ‘not in favour of “fast-tracking” for bio-pesticides as they can still have an impact.’ (ADAS Consulting, 2003, 36). This is unfortunate given the good environmental characteristics of many biopesticide products and the contribution they could make to sustainability. It is important, however, to recognize involvement where it does exist, for example, PAN’s membership of the Water, Diversity and Amateur Action Plan Groups. This, however, is interaction with the pesticides network in its wider sense.

Retailers and Supermarkets

Retailers often push for levels of pesticide reduction more rigorous than those required by regulators, which in themselves are very stringent. This is consistent with a body of work by Marsden and others that depicts retailers as

private interest governments that play a key role in food quality and safety issues. (Marsden et al 2000). ‘The concept of choice editing – the idea that policymakers and businesses, especially retailers, can “edit out” the least sustainable products from appearing on shelves – is now well embedded in the debate around sustainable consumption and production.’ (Food Ethics Council, 2008, 35). One consequence is that in relation to pesticides supermarkets impose sustainability requirements on farmers and growers, who in turn require alternative crop protection tools.

The research suggests a lack of connection, however, between large supermarkets and the rest of the policy network, in both its narrow and wider sense. This relative lack of contact represents a significant disjuncture in the network because the retailers are the point of contact with the final consumer and can influence their buying behaviour. Because consumers are perceived to be concerned about pesticide residues, large supermarkets have developed what is in effect their own supplementary private system of regulation. Admittedly, it is not strictly a system of regulation in the sense that it does not involve the potential imposition of penalties in law, but the use of contractual relationships to affect the decisions of growers of fresh produce has a similar effect. Although regulators had to be guarded about what they said, it was evident that there was some unease about supermarkets banning pesticides that had been judged to be safe by the approvals process. From the perspective of CRD, this supplementary regulatory system creates some difficulties as it implies that the state system is approving products that are not safe for use. It is not surprising, therefore, that some reservations were expressed by CRD

staff about the role of the retailers. Expressing a personal view, one staff member commented, '[It] makes it difficult for us [retailers] giving the response that lots of pesticides are not safe....Retailers have [their] cake and eat it, they expect impossibly high standards from farmers who are forced into the situation of using them'. For their part, some retailers expressed criticisms of CRD. A senior manager in a major retailer commented, '[There is] No sign of movement by PSD, [they] say we always do it that way, you've got to do it that way....[In] all my dealings with PSD, what really frightens me is that they have no real life experience on the farm or of what the market is saying'.

CRD sources stated that links with retailers were relatively tenuous and this was confirmed by our interviews with large supermarket chains. This is despite CRD '[trying to] have some engagement'. '[We have] a dialogue with supermarkets but [it is] limited'. As one retailer put it, 'apart from meetings I go to I have no other connection. [You] could say it's both ways [the lack of contact]'. There is thus a lack of effective engagement between the hub of the network, CRD, and a key set of commercial actors that are pursuing their own pesticide policies. CRD as an organization bases its activities on the rigorous scientific appraisal of pesticide products. In contrast, the retailer system is driven by a desire to gain a competitive edge over other supermarkets by demonstrating that the products on their shelves are greener and safer. Therefore, the drivers for CRD and the retailers are different. CRD have to use scientific expertise to implement a regulatory system created by statute whereas the central goal for the supermarkets is profit maximisation. As one retailer put it, the key question for them was 'What effect does it have

on us commercially in terms of costs and yields? [It's] always driven back to costs. The market place we've got is very competitive so you can't afford to be out of line commercially.'

Retailers do not usually actively promote biopesticides to their growers as a sustainable alternative to synthetic pesticides, arguing that they cannot promote particular commercial products. Marks and Spencer and Sainsbury's are two exceptions; the latter held a conference in 2008 to discuss advances in the use of biopesticides with their suppliers. Retailers see themselves, moreover, as proxies for the consumer and consumer organizations are not particularly involved in discussion on biological alternatives. Again, consumers are generally information takers and not policy makers. One challenge is that they tend to have a clear if rather ill-informed image of organic produce, but relatively little understanding of the potential contribution of biocontrol agents to a more environmentally sustainable agriculture. One retailer commented, 'We don't meet [with environmental groups] enough, we want to get a bit further down the road'. As stated above, however, environmental groups are not particularly engaging in the biopesticides debate.

Conclusions

We have argued that the biopesticides policy network is both incomplete and loosely integrated. This results in an underperforming network, although not one that is completely dysfunctional. As one may expect, a very loose and

incomplete network has little impact on observable policy outcomes. It is clear from our research that the network has had limited influence on the formulation of policy. To the extent that policy has developed on biopesticides, it has been in large part due to (exogenous) pressure from the Cabinet Office; the authority resources of the state have been used to produce an outcome (Greaves, 2009). Even more importantly, however, the network has not facilitated policy delivery.

To adapt Hay's question: underperformance for whom? Firstly, although some progress has been made, CRD still encounters difficulty in reaching out to biopesticides manufacturers and hence achieving the objective of registering more biopesticides to promote sustainability. IBMA is under-resourced, lacks political sophistication, and does not organize all potential registrants of biopesticides. Moreover, the confidence of product developers has been undermined by previous experience of the regulatory system. Secondly, environmental groups have not been fully engaged in the debate, although in part this reflects a structuring of the discourse in terms of a polarisation between conventional and organic forms of farming. Environmental groups could do a great deal to promote biopesticides but they focus on being negative about synthetics rather than offering a positive alternative. It is disappointing how IBMA have not reached out to such groups. Although they attempted to have a dialogue with the Soil Association (an environmental charity promoting sustainable, organic farming and championing human health), this was largely unsuccessful. Biopesticides that

display good environmental characteristics, therefore, are not being fully exploited.

Thirdly, the sphere of consumption is insufficiently articulated in the network. CRD have commented on the lack of systematic contact with retailers, claiming that they try and have a dialogue. However, there is some concern on their part about the role of retailers as ‘supplementary’ regulators. The failure to integrate retailers reflects a broader tension between systems of state authority and market power when they exist alongside each other. Moreover, it leads to a creation of a supplementary private system of regulation in an attempt to meet consumer concerns about pesticides which might frustrate the achievement of preventive health objectives such as the ‘five a day’ target. The consumer may be reluctant to eat such fruit and vegetables due to a fear of pesticide residues. However, this supplementary system of regulation does little to promote biopesticides as a safer alternative. Moreover, retailers have a considerable influence on growers and they could potentially do a great deal to encourage them to use biological alternatives. If retailers were to promote biopesticides, it would produce a real impetus to produce more products. One could also visualize a retailer-environmental group alliance to promote biologicals (in the same sense as Bluesky, an American retailer of environmentally friendly building materials and products for homes. <http://blueskywindandsolar.com>).

As it is, retailers are undermining confidence in the state regulatory system. An important reason why the network underperforms is the inability

to enrol market actors' such as consumers and supermarkets. One point about policy community insulation is that it is effective for the insiders when they can control formulation and implementation. In this case supermarkets would help promote the successful delivery of policy but they are not part of the relevant policy network. Therefore, a private/market governing regime operates separately from a policy-bargaining regime and this is a broader challenge for governing in market-liberal systems. Supermarket 'schemes' and 'codes' may have profound implications on how consumers act with knock on effects for public goods such as environmental quality and biodiversity etc.^{vi} However, these are necessarily driven by commercial considerations and are less likely to achieve public purposes than systems of state regulation. There is the added question as to whether retailers are adequate proxies for consumers, even given the information about consumer preferences that they collect as part of their commercial operations. Moreover, if consumers held favourable views on biopesticides, retailers may have responded more positively^{vii} Therefore, public opinion (or the lack of it) is a factor in the network being incomplete (this incidentally puts a new twist on Jordan and Maloney's [1997, 558] view that 'low public profile [visibility] of decisions' and 'low political attention level' favours the formation of closed policy communities).

The nature of the biopesticides network constrains the actions of its agents. As suggested by Marsh's dialectical model, there are also feedback effects from policy. In particular, government attempts to encourage biopesticides have led to some improvement in integration within the network,

in turn leading to improved outcomes in terms of rates of registration. There is a sense in which central government intervention, or exogenous pressure, helped to create the network, or at least galvanized it, around the regulatory agency. Marsh and Rhodes (1992b, 257) point to the importance of exogenous forces in driving through ‘network change’ and network formation. Broadly speaking central government intervention is a form of what they call ‘institutional pressure’ (1992b, 257). Our study shows how even under governance arrangements where agencies have a large degree of autonomy, networks can be promoted by (external) central government departments.

Our analysis highlights that not all networks work as effectively as they could. Moreover, we introduced the notion of ‘incomplete networks’ (which we distinguished from issue networks) and showed how they can result in network underperformance. This can be a particular problem when retailers are excluded from policy making and implementation. It is important to remind the more enthusiastic governance theorists that network governance does not always work as intended. This supports Parker’s (2007) argument that networks need density and breadth, as opposed to writers such as Smith (1993) that policy communities increase the capabilities of the state to make and implement policy. As stated at the outset, not all networks fit the policy community/policy network typologies as suggested by the literature. Our study has identified a loosely integrated network but with a relatively small number of actors and not always easily accessible to external stakeholders. In short, it is relatively easy to enter the network, but it is not completely open. The question is not simply who wants to come in but to what extent

they are invited by existing members of the network, a situation applying to both retailers and environmental groups. Indeed, membership of the Pesticides Forum is by invitation only (that being said, if the network is to function at all there has to be some boundary management).

CRD have been keen to engage in dialogue but there is some concern on their part, particularly about the role of retailers. We need also consider whether outsiders would choose (or are able) to join such a network, even if *invited* to do so. The ‘organic’ discourse of environmental groups, and the ‘profit driven supplementary regulator’ agenda of supermarkets limits their ability (or wish) to reach out to the regulatory agency and other actors associated with biopesticides. In short, a loose network can remain incomplete, with ‘discourses’ and ‘agendas’ in control as much as a wish for resources by a state department or agency. To put in another way, the desire for (and feasibility of) dialogue must work both ways. These vertical links are often underplayed in the literature, with its focus on government reaching out to external stakeholders. To conclude, our analysis of loose and incomplete networks, network underperformance and network failure brings some new thinking to the policy network paradigm. In the words of Daugbjerg (1998, 191): ‘Policy Network analysis is a fruitful approach. Although its emphasis has been on description, this should not lead one to conclude that it has no potential for providing explanation’

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NOTES

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ⁱⁱ A Google search (27/03/09) brings up references to a pesticides sector. See, for example, <http://www.pan-uk.org/Images/oldstyle/books/pestsapp.htm>, accessed 27/03/09).

ⁱⁱⁱ This was held at Warwick HRI – more information at <http://www2.warwick.ac.uk/fac/soc/pais/biopesticides/events>

^{iv} REBECA stands for the ‘Regulation of Environmental Biological Control Agents’.

^v REACH stands for the ‘**R**egistration, **E**valuation, **A**uthorisation and **R**estriction of **C**hemical Substances’

^{vi} EG: the various assurance schemes such as Nature’s Choice from Tesco. The standard was developed to ensure that produce comes from growers who use good agricultural practices, operate in an environmentally responsible way and with proper regard for the health and well being of their staff. It was first introduced in 1991 to control chemical usage and develop environmentally sustainable production standards for Tesco’s growers (see <http://www.tescofarming.com/tnc.asp>).

^{vii} The public may be concerned about pesticide residues but they are not well informed about biological alternatives (and may be put off by the term biopesticides). Further research would be useful on public opinion perhaps through the use of focus groups and citizen’s juries.