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Risk Governance of Agricultural Biotechnology in Europe

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Abstract

In the European conflicts over agbiotech, ‘risk governance’ can be analysed as a strategic response to legitimacy problems. When Europe-wide protest arose against agbiotech in the late 1990s, this sector became a focus of several contentious issues. ‘Sustainable agriculture’ was invoked in divergent ways by proponents and critics of agbiotech. Risks were linked with ‘globalisation’, which symbolised a neoliberal policy framework threatening democratic accountability. Official expert claims were readily challenged as policy-laden, contrary to claims for ‘science-based regulation’.

To address the legitimacy problems, some policy analysts diagnosed democratic deficits in regulatory procedures and stakeholder relations. Eventually policymakers defined a new problem: how to restore public and market confidence. Regulatory changes began to accommodate criticisms from mainstream consumer groups and environmental conservation agencies. By contrast, anti-agbiotech groups still sought to undermine public confidence in safety claims, while counterposing alternative futures for European agriculture.

Here governance can be understood as process management, which involves a tension between resolving a problem, on the one hand, and containing conflicts around the problem-definition, on the other. More participatory procedures and regulatory reforms have provided a basis for incorporating some broader problem-definitions, while marginalising others. Any governance remedy becomes an arena for further tension, given the inherent limits of risk regulation.

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1. INTRODUCTION

The term ‘governance’ has become commonplace in policy and academic analysis over the past decade or so; it bears multiple, ambiguous meanings. The term ‘risk governance’ has arisen more recently, in contexts of societal conflict, often arising from controversy about technological choices. Several questions can be posed about those concepts and their practical meanings, especially in the EU context:

- Why has the term ‘governance’ become so pervasive?
- How does it correspond to diagnoses of policy problems and strategic remedies?
- How does European ‘risk governance’ relate to risk regulation there?

Here those questions will be discussed through a case study of agricultural biotechnology, i.e. genetically modified (GM) crops. This focuses on the late 1990s and the subsequent transition period, as a new regulatory regime began by implementing the revised Deliberate Release Directive.

This paper has the following structure:

- how ‘governance’ has various meanings relevant to risk controversy and regulation;
- how agbiotech became a legitimacy problem for EU policy;
- how national debates framed the issues for agbiotech policy, e.g. as regards risk and sustainability;
- how EU regulatory procedures were changed in ways corresponding to ‘risk governance’ proposals.
- how this case study bears upon ‘risk governance’ in general.

2. GOVERNANCE AS THEORY AND POLICY ANALYSIS

‘Governance’ originates in a word which meant ‘steering’ in ancient Greek. More recently it has meant authority or legitimacy to rule. Now that such language has become pervasive in public and academic debate, ‘governance’ has meanings at three levels: concepts for diagnosing problems and thus informing practices; strategies for gaining governmental legitimacy; and theoretical perspectives for analysing those dynamics. Often the three levels overlap, especially when an analysis adopts a specific diagnosis or strategy. This section surveys meanings which have special relevance to regulatory conflict, and then among analysts and practitioners of ‘risk governance’ in the European context.

2.1 Governance: analytical perspectives from political science

Governance is often understood as co-operative means to deal with common problems and societal conflicts. According to an international body, governance is ‘a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken’ (CGG, 1995: 2). According to political scientist, governance involves social institutions ‘capable of resolving conflicts, facilitating cooperation, or, more generally, alleviating collective-action problems in a world of interdependent actors’ (Young, 1994: 15). Such concepts take for granted that society has a common interest in collective action.

In the context of international environmental issues, governance has been associated with ‘process management’, especially in reconsidering how to define policy problems. From an account of discussions at a UNDP conference:

The idea of process management also helps us to grasp the role that regimes can play in deepening or even transforming our understanding of the problems that led to their creation (Young, 1997: 286).

Process management addresses the inherent tension between managing, containing or resolving conflicts around the problem-definition. It goes beyond the literature which ‘has looked at institutional effectiveness primarily in terms of problem solving’ (ibid.). Although focusing mainly on inter-governmental conflicts, process management could also describe multiple actors beyond government.

Thus governance remedies are often promoted as means to involve stakeholders and civil society in general, towards addressing a common problem. Such participation depends upon the premise ‘that a problem is “common”, in the sense that stakeholder advantage cannot be obtained – nor, often, defined – independently from collective reasoning’. This premise stands in tension with any advantages which can be gained from strategic interaction outside such a framework. Moreover, politically effective roles depend upon organisations, not ‘civil society’ in general (Pellizoni, 2003).

Policy problems are formulated and defined as ‘common’ ones in ways which may not be obvious. ‘Governance’ helps practitioners and theorists alike ‘to unlearn embedded intellectual reflexes and break out of tacit patterns of thinking’ (Hajer and Wagenaar, 2003:

2). Such policy discussions

generate much more than straightforward debates on solutions for shared problems. Interactive policymaking is now a practice within which people generate new identities (Hajer and Wagenaar, 2003: 12).

Although ‘governance’ can simply describe efforts at broader inclusion or participation, the term has more specific meanings, as a response to governmental legitimacy problems. Often governments have invoked international legal and economic imperatives such as ‘free trade’, especially to over-ride national procedures and sovereignty. As a classic example, global trade rules have been designed to promote regulatory harmonization for trade liberalization. The consequent rules ‘effectively narrow the menu of regulatory choices open to governments’ (Newell, 2003: 64). More generally, constraints on government are reproduced through ‘a discourse of technical-rational knowledge’ – that is, by representing all problems as amenable to technical solutions (Ford, 2003: 124-125).

Often such rhetorical-technocratic imperatives have backfired, especially by provoking strong protest. As a result, global governance ‘can be seen as a product of two phenomena: the pursuit of neoliberal forms of globalization, and the resistance to such centralization of power’ (Paterson et al., 2003: 2). Environmental movements ‘are necessarily involved in some form of struggle with state and corporate actors’. Outcomes favourable to sustainable development ‘depend on the degree to which they are successful in devising strategies which resist the dominant logics of states, capital, big science, bureaucracy, etc’ (Paterson, 2000: 145).

In that way, the term governance can describe political roles beyond government. In contexts where state regulation retreats, ‘NGOs increasingly step in to regulate or “govern” the practices of TNCs’, as well as creating spaces where transnational corporations cannot dominate. Global governance means regulating those with power in the global economy and/or in states: resistance holds them to account, ‘making them legitimise their actions, democratising them, transforming their effects’ (ibid: 149). Thus the concept emphasises governance roles of movements which exploit regulatory gaps and potentially substitute for government. By contrast, other accounts emphasise participatory forms, such as means to incorporate dissent or conflicts within official procedures. In sum, this brief survey provides a basis to look at EU governance strategies for addressing legitimacy problems.

2.2 EU risk governance: diagnoses of legitimacy problems

In the EU, 'governance' became a mainstream policy term in the late 1990s. This language responded to a legitimacy crisis of risk regulation, especially following a series of public scandals over food and medical safety. These crises intersected with general debate about a 'democratic deficit' of the EU, e.g. criticisms that policymaking hid the role of national governments and favoured influence by industry. In response, the Commission's White Paper on European Governance set out principles of 'good governance', e.g. more openness and participation throughout all stages of the policy process (CEC, 2001a). The report formalised discussion on how to improve stakeholder relations for policymaking.

As a widespread criticism, politicians often used expert advice to avoid full responsibility for decisions. The White Paper discretely acknowledged this problem:

It is often unclear who is actually deciding – experts or those with political authority. At the same time, a better-informed public increasingly questions the content and independence of the expert advice that is given (CEC, 2001a: 19).

Consequently, 'Science and Governance' was given special prominence as a legitimacy problem for government. As these discussions recognized, official expertise often underwent challenge and so could not straightforwardly legitimize policy decisions. Experts and 'counter-experts' often contradict each another:

While being increasingly relied upon, however, expertise is also increasingly contested. ... 'Traditional' science is confronted with the ethical, environmental, health, economic and social implications of its technological applications. Scientific expertise must therefore interact and at times conflict with other types of expertise... (Liberatore, 2001: 6).

As a way forward, there were proposals to 'democratise expertise' – the title of the above report.

In a similar way, legitimacy problems have been attributed to governmental over-dependence upon science, or perhaps its discursive equation with official expertise. In a broad historical perspective, 'At stake here is the Enlightenment project, where objective science and representative democracy are combined to provide a new legitimation of the State', argue De Marchi and Ravetz (1999: 754). From the controversial cases of the BSE crisis and a GM Bt maize product in the 1990s, they diagnose difficulties of governing potential hazards. Even speculative hazards could undermine public trust in risk regulation. 'Here it is the uncertainties which dominate, and which require the reference to explicit values' (ibid: 755). As a governance solution already underway in some contexts, they advocate wider public participation, conceptualised as an 'extended peer review' of official expert judgements. However, NGO involvement requires a somewhat 'self-contradictory balance between their functions as critics and as stakeholders' (ibid: 756).

Long before the EU's legitimacy crisis in the late 1990s, the intense conflicts over nuclear power were theorised in terms of a 'risk society'. According to Ulrich Beck, antagonism in assessing 'secondary consequences' always presumes a consensus on how the technological development is carried out; yet the latter is losing its cultural consensus, for which science fails as a source of legitimation (Beck, 1992: 202-3). 'Scientific progress' becomes the greasy pole on which political responsibility slips from the democratic system into techno-scientific non-politics, which is not democratically legitimated (ibid: 186-87).

Indeed, a source of conflict lies in innovation policies which invoke market-technological imperatives. Since the early 1990s, the European Commission has favoured specific socio-technological trajectories as essential means to create wealth. In particular its 1993 White Paper on 'Growth, Competitiveness, Employment' characterised entire industries as 'dependent' upon Information and Communication Technologies (ICT) or genetic

modification techniques. Such language foreclosed options about alternative trajectories. More generally, 'technological progress' and 'sound science' were widely cited as an objective basis for policy, thus intensifying suspicion towards expert claims (Levidow and Marris, 2001).

An EU-wide debate on 'Science and Governance' emphasised risk issues, while also including critical perspectives on innovation:

The need to involve normative considerations in dealing with precautionary-oriented scientific issues is also an element that has a transforming capacity. Many of these issues call for various forms of participatory processes within which stakeholder involvement is important both for the formulation of concepts and questions as well as for the implementation... The broadening of what is really meant by a technology product, including the shift into providing services, changes the character of innovation characteristics (DG-JRC and Research, 2000: 3)

Thus governance can mean making R&D priorities accountable to societal needs of various kinds.

Many government officials and advisors have diagnosed the problem as 'public distrust'. This in turn was attributed to various deficiencies – of public rationality, of public knowledge, of risk communication, of government procedures, or of all those deficiencies. The need to gain or restore trust served as a general argument to make institutions more trustworthy, through measures which official experts did not always regard as scientifically grounded. Beyond simply educating the public, proposed remedies included greater public transparency, consultation and even participation, sometimes in the name of 'governance' (Levidow and Marris, 2001).

Building upon those insights, the Trustnet project brought together individuals from industry and government to create more participatory solutions. According to its diagnosis of past practice, the prevalent Top-Down approaches had reinforced adversarial processes, often focusing on risk acceptability. When there is no broadly accepted social justification of a hazardous technology, e.g. for its general benefits, public concerns focus upon unacceptable risk. Moreover, official emphasis on 'science' has led critics to promote their own experts for advocacy science: 'Stakeholder relations degenerate into public conflicts and endless scientific controversies'. Therefore 'New patterns of risk governance are needed to provide legitimacy and promote trust', argued its report (Trustnet Secretariat, 2000).

Towards such an approach, risk governance would involve stakeholders in defining issues. The Trustnet project carried out the task 'to re-interpret collectively the specific stakes and concerns expressed by each category of participant in order to build common goals tolerable for the participants as a whole'. Stakeholder involvement makes explicit conflicting goals, scientific uncertainties and expert judgements involved in decisions. In the Mutual Trust paradigm, participants attempt to reach a common understanding of such issues. Such efforts could answer the question, 'Why should society take a controlled risk?' Stakeholders are involved in 'authenticating or rebuilding the common values which nurture social trust and social cohesion' (Dubreuil et al., 2002: 91-92).

Such an approach goes beyond the limits of earlier deficit models but neglects deeper sources of conflict. For example, governments claim to represent the general interest, even when acting as a stakeholder, e.g. by promoting a specific technology. And power imbalances lead NGOs to use whatever means possible, including direct action and counter-experts. Nevertheless, as a more modest expectation for the Mutual Trust paradigm, 'It may then be possible to identify where the real disagreements lie' (Elliott, 2001: 269).

From another perspective on risk governance, prevalent practices limit the scope for understanding and handling conflicts. Often expert knowledge addresses the wrong question,

thus missing relevant aspects of an issue. European Commission policy has accepted wider participation at the risk-management phase, i.e. in interpreting evidence, but not yet at the knowledge-creation phase. Although wider participation could be helpful, ‘the main purpose of a public debate is not to eliminate the conflict, but possibly to clarify what [the] conflict is really about’ (de Marchi, 2003: 172).

That critique has echoes in writings on EU conflicts over agbiotech. Regulatory procedures excluded the full range of public concerns about agri-food technologies, e.g. societal needs and alternative innovations. As policy analysts noted,

Risk assessment per se does not therefore deal with public concerns. One result has been increased distrust in the motives of institutional actors and other stakeholders perceived to be interested in promoting the technology. If public confidence is to be regained, it is important to explicitly incorporate public concerns into the risk analysis process, perhaps through developing new and influential methods of public engagement and consultation. Once public concerns (and the values on which they are based) are understood, they can be more effectively introduced into risk assessment and risk management practices (Frewer et al., 2004: 11).

This proposal challenged regulatory procedures to incorporate wider public concerns.

Policy analysts have diagnosed various ‘deficits’ for explaining risk controversy and regulatory conflicts. On the next page, Table 1 juxtaposes these deficit models or diagnoses. Mid-1990s diagnoses implied the need for public education to communicate ‘real risk’ and thus to validate expert safety advice. More recent diagnoses implied the need for governance remedies, potentially changing risk regulation and stakeholder relations (e.g. Trustnet, 2000; Dubreuil, 2002). The latter diagnoses have supplemented the former, rather than replace them in policy debate; a mixture may inform institutional changes. Following the more recent diagnoses, the lower-most rows describe government dilemmas and governance roles as remedies.

In sum, ‘governance’ has meanings grounded in various deficit models. Through more recent broader approaches, official procedures can open up their policy assumptions, make decisions more publicly accountable and perhaps change the official account of the general interest. In addition to the questions posed earlier, we can ask:

How does governance select and represent some problems as ‘collective’ ones?

How does governance legitimise a claim to represent the general interest?

How do governance roles operate in explicit and implicit ways?

Let us examine such questions through our case study.

Table 1: Regulatory-Legitimacy Problems: diagnoses and governance roles

problem	public capacities or views	expert-regulatory practices	systemic legitimacy
mid-1990s diagnoses	deficits in... rationality or capacity for rational discussion	deficits in... expert communication of real risk, based on sound science	deficits in... risk acceptance (e.g. due to demands for absolute safety)
more recent diagnoses	scientific knowledge trust in science and (official) expertise trust in regulation and government	expert independence and objectivity plural, diverse expertise transparency about uncertainty and expert judgements	social justification of a hazardous technology framework to encompass or reconcile specific stakes and interests social cohesion grounded in common values and problems
dilemma for government	by simply seeking or expecting public trust, government intensifies sources of distrust	by invoking ‘sound science’, govt encourages adversarial disputes among experts, even attacks on their integrity	by presuming societal need for a technology, government intensifies arguments over risk acceptability
governance: explicit role	make the regulatory process more open and trustworthy	make decisions more accountable for their basis in science, uncertainty & policy (non-scientific aspects)	develop participation to accommodate conflicting goals/stakes and to build common values

3. NATIONAL DEBATES OVER AGBIOTECH

In European national debates over GM crops, ‘risk’ discourses have been central, though often linked with ‘sustainable agriculture’. Agbiotech has intersected with a wider European debate over how to remedy problems which result from intensive agricultural methods. ‘Sustainable agriculture’ has been framed by distinct cultural values, linking the quality of food products, rural space and livelihoods. Although chemical-intensive methods still prevail there, the European countryside has been increasingly regarded as an environmental issue, variously understood – e.g. as an aesthetic landscape, a wildlife habitat, local heritage, a stewardship role for farmers and their economic independence.

Protest linked GM food with environmental risks of cultivating GM crops. Anti-agbiotech activists throughout Europe catalysed a wide-ranging risk debate about the intensive methods prevalent in the agro-food chain. Environmental NGOs emphasized unpredictable risks as grounds for a moratorium on commercial use of GM crops (e.g. FoEE, 1996-98). Environmental issues were taken up also by consumer NGOs. Protest took the form of demonstrations, pressure on supermarkets and attacks on field trials.

‘Risk’ was soon linked with ‘globalisation’. Regulatory procedures delayed approval of further GM products, e.g. maize shipments awaiting export from North America. Some government officials criticized such delays as a threat to free trade and ‘globalization’; they warned that the USA could bring a case against the EU under WTO rules. In response, protestors reversed the argument: globalization threatened national sovereignty and democracy, e.g. by allowing multinational companies to dictate government policy.

This section surveys national features of the Europe-wide debate and protest, illustrating links between various concepts of risk and sustainability.

- Germany

In the early 1990s Germany's policy framed biotechnology as a *Hoffnungsträger* — i.e. an essential tool for R&D investment, innovation, a stable job market and international competitiveness. Protesters emphasized that GM crops threaten 'nature' — popularly associated with forests in Germany, though linked little to agriculture. Such polarization continued through the 1990s (Dreyer and Gill, 2000).

In 2000 the BSE crisis in Germany provided a new opportunity for critics of the *Agrarfabriken* or factory farming, a phrase pejoratively linking animal diseases with intensive agriculture. The government shifted agricultural policy to a new Federal Ministry for Consumer Protection, Food and Agriculture. It also initiated the *Agrarwende*, (literally) turning agricultural policy towards consumer interests, informed choices and sustainable methods. Led by a Green Party politician, the new Ministry promoted organic agriculture as a model for more sustainable forms of farming, and aimed to increase its share to 20% within ten years. New technologies had to prove their contribution towards the goal of sustainable agricultural change (Boschert and Gill, 2004). The Ministry also funded research to develop and promote less-intensive agricultural methods (Öko-Institut, 2002).

- Denmark

In the case of Denmark, its environmental legislation has affirmed the general aim of 'sustainable development'. Since the 1980s Denmark has had a policy to reduce agrochemical usage, especially so that ground water could be used safely as drinking water. Citing that policy aim, NGOs demanded risk assessments which evaluate the long-term implications of GM crops for herbicide usage and residues, especially in groundwater. In the mid-1990s they successfully pressed the Danish Parliament to raise such questions about herbicide-tolerant crops. In response, the Environment Ministry adopted broad risk-assessment criteria along those lines (Toft, 1996). The Danish approach valued groundwater as a common resource, implicitly linked with more extensive methods using fewer pesticides.

Later the herbicide issue became more complex, as risk research investigated effects on farmland biodiversity as well as groundwater. The results identified a dilemma for farm-management practices. Early-season spraying meant killing all weeds and thus harming biodiversity, but it also meant less herbicide usage and thus less impact on groundwater; by contrast, late spraying meant more weeds and thus benefited biodiversity but also meant more herbicide usage and thus more impact on groundwater. Meanwhile the agbiotech debate became more and more polarized – between NGOs and many farmers denouncing GM crops as unsustainable, versus industrial and agricultural decision makers advocating these products as useful tools for sustainable agriculture (Toft, 2004).

- Austria

In Austria GM crops symbolized a threat to organic agriculture and thus to a key public good. Even before GM crops became a high-profile issue there in the mid-1990s, the Austrian government was promoting organic farming – as ecologically sound, as 'quality' products, and as an economically feasible market-niche alternative for an endangered national agriculture. This 'competitiveness' scenario contradicted the pro-biotechnology imperative to increase agricultural productivity. Some government officials regarded agricultural biotechnology as a threat to the environment and an obstacle to sustainability. Austrian regulators unfavourably compared potential environmental effects of GM crops to methods

which use no agrochemicals, among others grounds to oppose commercial approval (Torgerson and Seifert, 2000).

Given that a GM-free Austria had become nearly a national consensus, the government sought stronger means to justify this policy, especially at EU level. Austria banned every GM crop which had obtained EU approval. Civil servants drew links between the Precautionary Principle and sustainable development; for example, the former was framed as simplifying the concept of sustainability. In their risk-benefit analysis, risks were always uncertain, while benefit was understood as promoting the political aim of a society oriented towards sustainability. The Austrian law on biotechnology had a 'social sustainability' clause, which prohibits 'inappropriate disadvantages' for societal groups through biotechnology. Civil servants anticipated using this clause to justify strict rules for segregating GM crops from non-GM crops, thus potentially deterring the former (Torgerson and Bogner, 2004).

- UK

In the UK anti-agbiotech critics drew an analogy between GM crops, industrialized agriculture and the market pressures which led to the BSE crisis. Critics warned that broad-spectrum herbicides could increase harm to wildlife habitats in or near agricultural fields. On these grounds, the government's own nature conservation advisors had demanded a delay in commercial use. Later the Consumers Association attacked the agro-food industry for its 'unshakeable belief in whizz-bang techniques to conjure up the impossible – food that is safe and nutritious but also cheap enough to beat the global competition' (McKechnie, 1999).

UK farmers became divided or ambivalent over agbiotech. The National Farmers Union initially supported GM crops as an important tool for economic competitiveness, but later it became more cautious. Early dissent came from a split-off called the Small & Family Farm Association. In opposing GM crops, some critics counterposed less intensive methods – as a more sustainable option, as a future alternative scenario, and as an appropriate baseline for judging the environmental effects of GM crops. According to a report of the UK Environment Agency, agri-biotech products became controversial because they are designed for an 'increasingly intensive monoculture'. Therefore GM crops should be evaluated in a wider debate about sustainable agriculture, 'not just relative to today's substantially less-than-sustainable norm' (Everard and Ray, 1999).

Indeed, the environmental issues were framed by different accounts of sustainable agriculture: could GM herbicide-tolerant crops encourage more intensive and harmful practices? In response to that controversy, the UK funded large-scale experiments for testing the overall effects of herbicide usage on farmland biodiversity. These 'farm-scale evaluations' were designed to simulate the practices of commercial farmers, to compare GM herbicide-tolerant crops with conventional practices, and so to gain more evidence for regulatory decisions. Accommodating nature-conservancy agencies, the experimental design included non-GM fields using relatively less-intensive farming methods, as a more stringent baseline for evaluating the effects of spraying GM crops. According to the test results, sprays on GM oilseed rape and sugarbeet were relatively more harmful than their conventional counterparts, while GM maize had the opposite results, though only because conventional sprays were so harmful (Oreszczyn, 2004). This led to more debate over intensive agricultural practices in general, beyond GM crops.

- France

In the late 1990s the French debate expanded from 'risk' to sustainability issues, framing agriculture as a common good linking producers with consumers. Some industrial-type

farmers initially sought access to GM crops, as a means to enhance their economic competitiveness. By contrast, the Confederation Paysanne attacked such products as a threat to their skills and livelihoods. According to French peasants' leaders, GM crops pose risks to their economic independence, to high-quality French products, to consumer choice and even to democracy. This frame resonated with the trend towards producing French food as *produits de terroir*, a label which denotes its origin from specific localities and peasant cultivators.

Against the commoditized inputs of multinational companies, they counterposed their own *paysan savoir-faire*, as a basis for a different societal future (Heller, 2002). When peasant activists were prosecuted for sabotaging stores of GM grain, they used the trial to gain public support for their attack on industrialized agriculture. As an alternative future, they argued, 'Today, more and more farmers lay claim to a farmer's agriculture, which is more autonomous, economic, and which integrates problems associated with the environment, employment, and regional planning' (Bové, 1998).

By 2002 the French controversy shifted to small-scale field trials, which came under verbal and sometimes physical attack. Public-sector researchers defended these as necessary for the future of sustainable development, while critics counterposed non-GM alternatives as ways towards sustainable agriculture (Marris et al., 2003, 2004). After the French government established an independent body for food safety, AFSSA, it became a platform for raising broad questions about the benefits and environmental sustainability of agri-biotechnology.

- Italy

As in France, Italian anti-agbiotech opponents sought to protect the agro-food chain as an environment for craft methods and local specialty products, known as *prodotti tipici*. The Italian Parliament had already allocated subsidies to promote such products and foresaw these being displaced by GM crops. According to a Parliamentary report, the government must 'prevent Italian agriculture from becoming dependent on multinational companies due to the introduction of genetically manipulated seeds'. Moreover, when local administrations apply EU legislation on sustainable agriculture, they should link these criteria with a requirement to use only non-GM materials. Parliament was adopting arguments from Coltivatori Diretti, a million-strong union of mainly small-scale farmers who opposed GM crops (Terragni and Recchia, 1999).

When the Left-Green 'Olive Tree Coalition' was replaced by the Berlusconi government, policy generally shifted along more neoliberal lines than before, yet Italian officials still framed agbiotech products as a threat to sustainable agriculture. Environmental NGOs, farmers and food retailers built a network seeking to exclude GM materials from Italian agriculture. When a company requested authorisation to import GM rapeseed in 2003, Italy objected that any escaped seed could contaminate related plants and thus undermine centres of diversity for *Brassica* crops; this scientific argument served as a proxy for an implicit policy to exclude GM products, as a threat to the wholesome image of Italian products. In 2005 the government declared that no GM crops would be permitted unless regional authorities had devised adequate measures to prevent GM material spreading to non-GM crops; this effectively banned such products.

5. EU REGULATORY PROCEDURES AS CONFLICT MEDIATION

Following that survey of national debates, this section briefly sketches how EU regulatory reforms mediated the conflicts arising within and among member states. Regulatory procedures eventually incorporated towards more stringent criteria, potentially favouring more public goods and comparisons to less-intensive cultivation methods.

5.1 Regulatory reforms

For regulating GMOs, EC legislation sought to link environmental protection with market integration, i.e. overcoming internal trade barriers. In that vein, the Deliberate Release Directive aimed to 'establish harmonized procedures and criteria' for assessing GMO releases, so that any product approval would apply throughout the European Community. Member states had a duty to ensure that GMOs did not cause 'adverse effects to human health or the environment' (EEC, 1990: 15). However, the practical definition of 'adverse effects' later proved to be contentious and thus difficult for achieving 'harmonized criteria'.

At European and national levels, governments promoted biotechnology on several grounds. According to officials, such technological development would attract R&D investment, enhance the efficiency of European agriculture, and reduce the environmental impacts of agriculture. Economic arguments came specially from the UK and German governments. Many politicians warned against the potential loss of economic and environmental benefits, sometimes linked with agendas for trade liberalization of European agriculture.

Within that neoliberal policy framework in the mid-1990s, many national regulators accepted safety claims by companies, while acknowledging that GM crops could cause some undesirable effects. If weeds acquired tolerance to herbicides, or if insects acquired resistance to GM toxins, then such inadvertent effects were regarded as acceptable or irrelevant to the legislation on GMOs. According to safety claims by the UK and France, other pest-control methods would still be available, so current options were regarded as interchangeable and therefore dispensable, regardless of whether they might be deemed environmentally preferable. These 'genetic treadmill' scenarios were conveniently classified as 'agricultural problems', rather than as environmental harm, and thus irrelevant to risk regulation.

By defining harm in narrow ways, safety claims could treat the European agri-environment as a homogenous resource for intensive monoculture. GM crops were judged to cause no more harm than the most agrochemical-intensive cultivation methods. And no government authority had responsibility for evaluating the effects of changed herbicide practices, e.g. a switch from selective to broad-spectrum herbicides. On that basis, EU-wide approval was granted to a GM herbicide-tolerant oilseed rape and insect-protected maize in 1996-97, despite dissent from several EU member states.

After public protest erupted in the UK and France in 1997-98, the earlier safety assumptions were challenged, and objections gained strength. Diverse national dissent converged into EU-wide policy changes. In 1998 the EU Environment Council decided that henceforth risk assessments must include any 'indirect effects' of changes in agricultural management, e.g. herbicide-usage patterns.

In mid-1999 several Environment Ministers demanded legislative changes, including precaution as the basis for risk assessment, before they would consider additional GM products for approval. The EU-wide decision procedure was effectively suspended through a *de facto* moratorium. The prospect of a genetic treadmill, formerly marginalised as an 'agricultural problem', was now treated as a risk to be managed and prevented. Governments adopted measures to control or test the genetic treadmill scenarios, e.g. from herbicide-tolerance and insect-tolerance genes, and to test herbicide-tolerant crops for potential harm caused by broad-spectrum herbicides (Levidow and Carr, 2000).

Formalising those changes, new EU rules broadened the regulatory framework to protect various public goods, while enhancing public accountability for expert judgements. Eventually the Deliberate Release Directive was revised to include more stringent measures which some member states had already been applying. It provided for time-limited

registrations, required market-stage monitoring, and clarified that the risk assessment must consider the effects of any changes in agricultural management methods (EC, 2001). In 2003 the Directive was further amended so that member states could protect non-GM crops from the spread of GM material. However, many governments or regional authorities adopted segregation measures which would block GM crops altogether, contrary to Commission policy.

Within that broader regulatory framework, conflicts have continued between Ministries within EU member states, among their governments, and with the Commission. During 2003-04 few member states supported Commission proposals to approve GM products (FoEE, 2005). These conflicts can be analysed as a dynamic tension between relatively narrow versus broader accounts of precaution, featuring disagreements over criteria for evidence and non-agbiotech comparators in risk assessment (Levidow et al., 2005).

5.2 EU-level participatory exercises

Industry had difficulty in responding to the new context of public protest and regulatory delays (Levidow et al., 2002). Agbiotech companies had initially played a central role in EU policy agendas, e.g. by promoting a neoliberal 'competitiveness' framework; their safety claims accepted the normal hazards of intensive monoculture. As protest and commercial blockages arose in the late 1990s, however, industry became more dependent upon government for new procedures which could legitimise approval decisions.

EU-level regulatory and consultation procedures were opened up for involvement by more stakeholders, e.g. representatives of Europe-wide NGOs as well as industry. Such meetings discussed the following issues: priorities for risk research; criteria for evidence in risk assessment; guidelines for market-stage monitoring; means to extend information access at national level; and measures for co-existence between GM and non-GM crops. Some meetings promoted deliberative procedures, rather than simply an adversarial contest between prior views.

NGOs were invited to take part in scientific discussions of risk research and assessment. As high-profile examples, DG-Research organized Round Tables on biosafety issues of Bt maize and herbicide-tolerant crops in 2001 and 2002, respectively. Participants included Europe-wide NGOs, e.g. Greenpeace, Friends of the Earth Europe (FoEE) and the Bureau Européen des Unions de Consommateurs (BEUC).

Such events have highlighted differences among critics of lax regulation. Environmental NGOs emphasized unpredictable and unknown risks to justify a ban on GM products, especially for cultivation uses (e.g. Ritsema, 2002). By contrast, consumer groups emphasized the need for a better relationship with the risk-assessment process, e.g. through greater transparency about uncertainty and expert judgements. They accepted the safety of GM foods already authorised by the EU. This acceptance resulted partly from prior dialogue with expert advisory committees, e.g. in the UK and the Netherlands, where risk-assessment criteria had become more stringent and transparent. Consumer groups have emphasised knowledge gaps which could be improved by more systematic research or better lab techniques.

In stakeholder dialogues with more open agendas, conflicts have arisen over criteria and priorities for innovation research. At one event, for example, participants disagreed about whether GM crops are compatible with Integrated Crop Management. Moreover, NGOs advocated research funding for less harmful or less intensive crop-protection methods (e.g. SBC, 2001, 2002). From their standpoint, such research has two aims: more stringent

comparators for risk assessment of GM crops, and alternatives to intensive cultivation methods.

After much stakeholder consultation, the European Commission prepared a major policy document, 'Towards a Strategic Vision of Biotechnology and Life Sciences'. This document emphasised 'governance, i.e. attention to the way public authorities prepare, decide, implement and explain policies and actions'. Among the many action lines for governance, 'Science-based regulatory oversight should enhance public confidence' (CEC, 2002: 6, 15). By default, a great political burden falls upon regulatory science as an arbiter of societal choices, while leaving ambiguous (or even denying) the policy basis of that knowledge and its relevance.

When the EU's new regulatory procedures started to consider marketing applications for GM products in 2003, these came under widespread criticism, though from different standpoints. Consumer groups accepted the safety of GM foods already approved in the 1990s and did not challenge safety claims for new ones, though they raised doubts about the rigour of data requirements. By contrast, environmental NGOs emphasised uncertain, irreversible risks. In making detailed criticisms of GM product files, they pursued several aims: to arouse public suspicion, to justify regulatory blockages, and to demonstrate that their opposition has a scientific basis (Levidow et al., 2005).

5.3 Alternatives stimulated

Alternatives to industrial methods have been called agriculture extensification, which has origins in concepts of 'harmonious control', later 'integrated control', and eventually 'Integrated Pest Management'. IPM manages the cultivation system to control pests, e.g. through crop rotation, fertiliser application, soil preparation, time of sowing, etc. Along with a shift towards biological crop-protection agents, this also meant changes in agronomic practices and farm structure. All these changes draw upon and stimulate research into 'agro-ecology', especially in Europe (e.g. Greens/EFA 2001).

Public protest against both pesticides and agbiotech has given further stimulus to alternative agricultures. Food retail chains require and help farmers to adopt cultivation methods which avoid pest problems and so reduce the need for agrochemicals. They promote IPM, which enhances knowledge of how best to use various methods and inputs (EUREP 1999).

Through some IPM methods, farmers can gain independence from purchased inputs from suppliers. Such efforts diverge from intensive agricultural models. Retail chains fund research on soil-management methods which strengthen plant resistance to pests and disease. Organic food lines are expanded by supermarket chains; organic breeding institutes develop pest-tolerant seeds which may be more durable in the face of novel pests (Levidow and Bijman 2002).

The agro-food industry has undergone pressure to change not only the characteristics of products, but also the concept of innovation (cf. DG-JRC, 2000). Beyond product-based solutions, different cultivation processes are developed. By 2001 some governments were giving more financial support for research on such alternatives. Consequently, future scenarios for European agriculture are not limited to conventional versus GM inputs. Both options are challenged and superseded by a debate over what kind of agriculture to develop. As environmentally less harmful methods become available for crop-protection, these alternatives serve as more stringent comparators than the chemical-intensive methods which underlay early safety claims for GM crops.

Such alternatives eventually gained support from a broad policy network. Originally environmental NGOs counterposed organic agriculture as the sustainable alternative to GM crops, though later they extended support to more alternatives. They made links with the Coordination Paysanne Européenne, which encouraged physical attacks on GM field trials and research labs; they counterposed a multi-functional, high-skill, ‘quality’ agriculture. Eventually regional authorities led a formal campaign promoting ‘GM-free zones’ as a symbol of less-intensive, green and ‘quality’ agri-production (AER, 2005).

6. CONCLUSIONS: RISK GOVERNANCE OF AGBIOTECH

Agricultural biotechnology provides a case study of risk governance as strategies for legitimising risk regulation and a contentious innovation. The case illuminates longer-term policy conflicts and changes which are still underway.

6.1 Legitimacy problems and governance strategies

In the 1990s EU policy promoted agbiotech by invoking objective imperatives such as economic competitiveness, technological dependence and eco-efficiency benefits. Within this neoliberal framework, ‘science-based’ regulatory criteria accepted the normal hazards of intensive monoculture, e.g. a genetic treadmill and harm to farmland biodiversity. This technocratic harmonisation model conceptually homogenised the agri-environment, thus complementing EU policy aims of trade liberalisation and the internal market. ‘Technological progress’ and ‘sound science’ were widely cited as an objective basis for policy; this raised the stakes for expert safety claims, which readily underwent challenge as policy-laden views (Levidow and Marris, 2001).

When Europe-wide protest arose against agbiotech in the late 1990s, opponents linked its risks with ‘globalisation’ – which symbolised threats to democracy, national sovereignty, peasant livelihoods and agricultural environments. In the name of sustainable development, they counterposed future scenarios which would favour common goods, more extensive cultivation methods and producer-consumer links. Protest took the form of political demonstrations, consumer pressure on supermarkets and attacks on field trials. European retailers decided to exclude GM grain from their own-brand products. By the late 1990s a legitimacy crisis led to an impasse in regulatory procedures at EU and national levels.

That crisis stimulated policy debate over the sources of conflict. Early diagnoses identified deficits in public rationality, risk communication and risk acceptance. Later diagnoses emphasised systemic deficits in regulatory procedures and stakeholder relations, needing a remedy in ‘risk governance’, generally meaning greater openness of various kinds. These various diagnoses have informed policy changes (see again Table 1).

Eventually policymakers defined a common problem – how to restore public and market confidence. The new problem-definition helped to bypass narrow arguments about whether specific regulatory measures were justified by prior scientific evidence of risk. Institutional reforms accommodated some NGO framings of scientific uncertainty which warranted more rigorous evidence, control measures or labelling requirements.

The EU began to incorporate changes already demanded or underway in some member states. Legislation was redrafted to broaden risk-assessment criteria, to manage uncertain risks through market-stage monitoring, to mandate public consultation procedures on risk assessment, and (later) to require traceability through the agro-food-feed chain. More diverse kinds of expertise were included in advisory bodies, especially in some member states.

Risk regulatory procedures elaborated their own distinctive account of sustainable agriculture, beyond the earlier neoliberal frameworks. Risk-assessment criteria were broadened to encompass potential harm to agri-environmental resources and common goods (e.g. biopesticidal efficacy and farmland diversity), which earlier EU decisions had regarded as dispensable or irrelevant. Food safety advisors were requesting more stringent evidence of safety, partly in response to consumer groups which proposed such changes as necessary means to gain public trust.

Such changes began to accommodate mainstream consumer groups and environmental conservation agencies. Relative to the 1990s regulatory criteria, more rigorous scrutiny could make safety approval more difficult but also more credible. While often making similar criticisms of lax criteria, environmentalist and small-scale farmer organisations sought to undermine public confidence in agbiotech, e.g. by emphasising ‘uncontrollable’ risks and counterposing alternative agricultural futures.

Those regulatory-procedural changes correspond to more recent, broader proposals for ‘risk governance’. Its explicit roles, as sketched in Table 1, also involve implicit ones. In attempting to make regulatory decisions more worthy of public trust, advisory and consultation procedures implicitly construct the public through organisational representatives who participate. In making decisions more publicly accountable, regulatory procedures generate more stringent criteria for safety assessment – while implicitly separating biophysical risks from ‘political’ issues, e.g. globalisation, sustainability and alternative agricultures. In attempting to build common goals which can accommodate conflicting values, new procedures implicitly define a collective problem, especially how to gain public and market confidence. Such language can incorporate some critics into a common effort to achieve the aim, perhaps even a joint responsibility, while leaving aside more fundamental sources of conflict over agricultural-societal futures.

6.2 Tensions of governance as process management

This case study provides a basis to elaborate theoretical issues of governance, as surveyed at the beginning. Activists linked biotechnological risk with neoliberal globalization, thus creating a legitimacy crisis for regulatory decisions (cf. Newell, 2003; Paterson, 2000). Protest activity stimulated significant changes – in regulatory frameworks, labelling criteria and market rules –but civil society could not substitute for those measures (notwithstanding Paterson, 2000). As protest attempted to hold companies publicly accountable for their GM products, and to hold governments accountable for their decisions, such efforts remained dependent upon policy changes as an arena for public influence.

These governance processes defined and addressed a new policy problem *as if* it were a collective one: how to gain public and market confidence. In theoretical terms, this exemplifies a ‘collective-action problem’ among ‘interdependent actors’ (Young, 1994). Its *collective* or common status was a task to be achieved. Through broader stakeholder involvement, process management can address the inherent tension between resolving a problem, on the one hand, and containing conflicts around the problem-definition, on the other (cf. Young, 1997). These conflicts arise from divergent policy agendas within governance.

In the EU agbiotech case, a problem-*redefinition* helped to structure and manage stakeholder interdependence, especially in relation to consumer NGOs and environmental conservation agencies. This relation potentially legitimised a specific policy agenda, i.e. ‘science-based regulation’, by stretching earlier accounts of science. In mediating the wider societal conflict, governance meant incorporating broader problem-definitions, while marginalising others.

Such a framework potentially creates a policy arena where stakeholder advantage cannot be gained independently of collective reasoning (cf. Pellizoni, 2003).

In this case, however, some key stakeholders continued independent action antagonistic to agbiotech and EU policy. NGO involvement required a somewhat ‘self-contradictory balance between their functions as critics and as stakeholders’ (De Marchi and Ravetz, 1999). This ‘balance’ had different meanings for NGOs seeking to undermine or enhance public confidence.

In all those ways, any governance remedy becomes an arena for further tension, especially given the inherent limits of risk regulation. More open procedures highlight what the controversy is about, e.g. divergent accounts of sustainability and of societal futures (cf. de Marchi, 2003). Risk regulation will continue to bear the burden of such conflicts unless R&D policies are opened up for debate and change.

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