Seeds of Dispute:
Divergent Acceptance and Regulation of Genetically Modified Food between the European Union and the United States

Christian Breunig
University of Washington

Prepared for presentation at the European Union Studies Association Conference, Nashville, TN, March 27 – 29, 2003.

In 1982, scientists achieved for the first time the insertion of a single foreign gene into a plant. Ten years later, the U.S. Food and Drug Administration (FDA) approved the first genetically modified food (GMF) to be permitted for sale in the United States. Since the introduction of the Flavr Savr® tomato in 1992, numerous species of genetically modified (GM) crops, such as wheat, rice, corn, potato, grapes, oranges, cotton, and squash, have been launched into the market of the United States. In contrast to the rapid expansion of the application of biotechnology in the United States, the European Union (E.U.) has been more reluctant towards the development and marketing of GMF. Extensive debates at various levels of government and society have lead to cautious approval procedures, stalling introduction and product labeling of GMF in the European Union.

In the case of genetically modified food, these divergent regulatory policies present a reversal of the findings of many comparative studies of American and European[1] regulatory policies. These studies have assumed that regulation in the United States is highly politicized, litigious, costly, and formal, whereas European decision-making is consensual, informal, and closed to the public (Vogel 1986; Jasanoff 1990; Page 1992). Because the case of GMF is a reversal from previous findings, the understanding of the regulatory styles of both continents need to be reexamined.

This study will examine why the regulatory framework of GMF opposes previous patterns of environmental risk regulation and, more importantly, why different approaches towards regulation and acceptance of GMF have emerged in the United States and Europe. The argument of this paper is that, in the case of GMF, differences in acceptance of risk, rather than underlying policy traditions, determine regulatory policy-making. The model of "social amplification of risk"[2] facilitates the understanding of how a new regulatory policy is formed and why policy outcomes diverge in the cases of Europe and the United States. In particular, it will be shown that "focusing events" (food safety scares), the role of the media and other non-governmental organizations, governmental performance, and public opinion has led to a difference of acceptance and regulation of GMF in the United States and Europe. In short, the study attempts to show how the societal definition of acceptability of risk affects the development of environmental regulatory policy.

[1] Except otherwise noted, in this study, I will use the term 'Europe" and 'European" as an equivalent to European Union.

[2] This terminology was first employed by Kasperson et al. (1988).

Methodologically, this paper is a comparative two case study employing Mill's 'method of difference" (King et al. 1994). After describing the risk perception of GMF, the study conceptualizes how risk, and thus regulatory policy, is socially constructed. The social construction of environmental risk and the evolution of its regulation are explained by employing the model of social amplification of risk. This model integrates findings of policy processes (Kingdon 1984, Baumgartner and Jones 1993; Birkland 1997; Baumgartner and Jones 2002), decision making theory (Simon 1977; Simon 1985; Jones 1994; Jones 2001), and risk studies (Slovic 1987; Kasperson et al. 1988; Gowda and Owsley-Long 1998; Slovic 2000). Finally, structural differences between the United States and the European Union, put forward by the model of social amplification are analyzed.

THEORIES ABOUT REGULATION OF GENETICALLY MODIFIED FOOD

Genetically Modified Food and Risk Perception

The term genetic modification, or genetic engineering, is defined as the insertion of an alien gene into a plant to give it useful new traits, such as herbicide or pesticide resistance. In contrast to traditional methods of plant improvement, genetic engineering consists of an infinite number of ways to insert genes derived from one species into the DNA of an organism of an entirely different species. For example, genes of a fish that tolerate subfreezing temperatures can be inserted into strawberries, which then inherit the same capabilities. Since science is a gradual and evolutionary process, contesting views (see Table 1) about the benefits and perils of genetic modification have emerged within the community of natural science. The proponents of the innovation have argued that consumers, as well as producers, can greatly benefit from genetic modification for the following reasons: alleviation of world hunger, pesticide reduction, increasing yields, and improvements of food quality. The critics of the technology have raised a variety of socioeconomic, environmental, and ethical concerns, including antibiotic resistance, threats to the ecosystem, and the role of multinational corporations in food production.

Scientific and public debate concerning GMF produced identified several potential benefits and concerns of the technology. However, plausibility of risk does not explain policy responses. As technology evolves at an increasing pace and more lives are affected by its consequences, societies have to choose whether these technological innovations present an acceptable risk for present and future generations. The societal choices concerning the

acceptance and regulations of risks are seldom based on scientific evidence or economic considerations (Blumer 1971); rather, subjective judgments and societal decision-making structures determine preferences of acceptable risks. When assessing the risk of a technology, society focuses on qualitative considerations, such as catastrophic potential, voluntariness, dread, and familiarity (Slovic 2000). Given the conflicting assessment of the technology, the risks of GMF are perceived as unknown, new, unobservable, delayed in consequences, uncontrollable, and highly risky for future generations (Slovic 1987). As a result, technological choice, such as the utilization of GMF, is a political endeavor.

Genetically Modified Food and the Social Amplification of Risk

Since GMF is perceived as a risk, it is necessary to identify the determinants for acceptance and regulation of environmental risks. This section introduces the processes of the model of social amplification (see Figure 1). By integrating the literature on risk studies, policy processes, and decision making, the following "factors" in the acceptance and regulation of environmental risks are identified: focusing events, public opinion, mass media, interest groups, and the political realm's responses through institutions and actors. In this conceptualization, the term amplification describes two modes of action: intensification and attenuation. The process of social amplification of risk and the resulting acceptance and regulation of risk can be described as follows.

In all three strains of literatures, focusing events are recognized as a trigger and symbol for policy change (Kingdon 1984; Birkland 1997; Jones 2001). Generally, a focusing event is validated and gains importance when it is attached to a powerful symbol that can be widely diffused. A successfully attached symbol conveys a complex reality in a simple way people may already vaguely sense (Stone 1989; Rein and Schön 1991). Focusing events are given meaning by groups or actors utilizing an interpretive frame. These events can serve as a tool for groups and actors seeking policy change, because most focusing events can be portrayed as indicative for policy failure (Birkland 1997). However, interest groups and opinion leaders must be present, organized, and committed in order to attenuate or amplify the competing interpretations of the event.

Other "stations" of amplification/attenuation, such as public opinion and mass media, also pick up the signals and transmit their interpretations and organizational/policy demands.

Even though agenda setting and political communication literature (Downs 1972; Hilgartner and Bosk 1988; Rogers and Dearing 1988; Graber 2000) only attribute limited influence to public opinion in the policy-making process,[3] it is obvious that public perception and participation demand and lend legitimacy to societal choices about acceptable risks; public opinion is therefore considered a vital part of the process.[4] The mass media does not directly influence public perception concerning environmental risks; however, through extensive coverage, mass media makes a risk event salient to the public. As the intensity of mass media coverage grows, public concern about a risk issue increases accordingly. In the public mind, frequent reporting signifies potential danger (Slovic 2000, 242 and 323).

Eventually, these signals regarding the acceptability of environmental risks and policy change will be received in the political realm and may trigger behavioral and organizational responses through institutions and actors (Baumgartner and Jones 1993; Baumgartner and Jones 2002). In keeping with the metaphor, the institutions of the political realm provide an arena and the necessary tools to transform the "amplified signals" of individual "stations" into a coherent "program," i.e. public policy. Political institutions that need to be examined include regulating agencies, governmental bodies, and federal entities on both continents. In order to spell out the theory of the paper more rigorously, literature contributing to the theory of social amplification of risk is discussed individually. In order to establish the determinants of the social amplification theory, findings of policy processes and decision making (Kingdon 1984; Baumgartner and Jones 1993; Jones 2001; as well as Baumgartner and Jones 2002) are introduced and then linked[5] to literature regarding risk studies (Slovic 1987; Kasperson et al. 1988; Gowda and Owsley-Long 1998; and Slovic 2000).

Theories of Decision Making and Policy Processes

[3] Downs (1972) proposed that problems suddenly move to the center of political concern as a result of dramatic events and euphoria. Then, regardless of whether they are addressed, the issues of concern fade from public attention as the true costs and complexity of resolution become apparent. Subsequent studies shave shown that policy problems still may be resolved or even institutionalized even though public and media attention fade.

[4] Baumgartner and Jones (1993) show for the case of American policy-making that greater attention to a problem commonly leads to more negative assessments of the current policy.

[5] Interestingly, both decision making theory and risk studies have been first developed as individual level explanatory models and then expanded to macro-level theories. Both approaches integrate literature of the following disciplines: economics, psychology, biology, sociology, and political science.

Humans as well as organizations rely on information from often complex environments in order to make decisions (Simon 1977; Simon 1985; Jones 2001). Therefore, decision making involves two difficult tasks: identifying the important attributes of a problem and comparing these attributes with alternative solutions. This endeavor is challenging for humans and organizations because both possess a limited capacity to process information. In order to overcome cognitive limitations, humans and organizations pay attention only to selected parts of the environment.

As the case of GMF regulation in the EU forcefully illuminates, public attention to problems and governmental policy responses can be anything but incremental[6]. Rapid change in policy making is characterized by a positive feedback loop. Positive feedback is defined as a "self-reinforcing mechanism that accentuates rather than counterbalances a trend" (Baumgartner and Jones 2002, 20). Based on individual level decision making, Baumgartner and Jones (2002) identify two factors that are responsible for positive feedback loops in politics: cue taking and attention shifting. Clue taking, mimicking, or going with the winner are all labels of the process when humans observe the behavior of others and behave accordingly. Conversely, attention shifting is based on the notion that humans are "disproportionate information processors" due to the cognitive and emotional limitations (Jones 2001, 84-107). Because humans process information serially, when dealing with complex issues, people focus on one or very few dimensions only in making their choices. At times, people shift their attention to another dimension of an issue and subsequently change their behavior.

Individual behavior can be closely tied to social group behavior, and hence public policy making can be linked to the idea of attention shifting (Simon 1985, Jones 1994; Jones 2001). Although the issue of a public policy is often multi-dimensional, attention to the subject is usually uni-dimensional (Baumgartner and Jones 1993). Humans cannot simultaneously pay attention to multiple issues or dimensions of an issue, but issues or new dimensions may propel their way on the agenda as events occur or other humans take action (Downs 1972; Kingdon 1984; Birkland 1997).

Here, two important elements of studying policy change are submitted. First, focusing events can serve as a trigger for policy change (Birkland 1997) because many actors

[6] A large strain of literature, such as writing on agenda setting (Kingdon 1984, Anderson 1997), issue definition research (Rogers and Dearing 1988; Stone 1989; Rein and Schön 1991; Hall 1993; Rochefort and Cobb 1994), and policy entrepreneurs (Kingdon 1984) focuses on rapid policy change.

simultaneously pay attention to an issue with the expectation of policy change. As an issue or new dimension becomes more salient, an increasing number of political actors are willing to invest recourse. Second, an increase in salience is only seldom due to new information; rather, political actors attempt to "reframe" public debate (Kingdon 1984; Stone 1989; Hall 1993). Political communication research on agenda setting (Rogers and Dearing 1988) has stressed the importance of the media, public perceptions, and the importance of symbols in the policy-making process. As such, issues demanding governmental responses are social constructs created by the participants in the policy process. Rochefort and Cobb (1994, 4) recognize that "[c]ultural values, interest group advocacy, scientific information, and professional advice all help to shape the content of problem definition." These definitions are subsequently contested and may become redefined or even replaced. For Stone (1998), defining an issue as a problem is a strategic task resulting in conflict over definitions of policy images. Decision makers create "frames" to organize and interpret a complex reality. A "frame" provides "guideposts for knowing, analyzing, persuading, and acting. A frame is a perspective from which an amorphous, ill-defined situation can be made sense of and acted upon" (Rein and Schön 1991, 262). Public acceptance of a problem, portrayed through the mass media, then serves as a stipulation for successful policy change.[7]

This brief review of the policy making process, according to decision making theory (Baumgartner & Jones 1993, Jones 1994, Baumgartner and Jones 2002) reveals key determinants for examining GMF regulation. Individuals and institutions have limited capacity to process information. As a consequence, humans can pay attention to only a few issues or dimension of an issue at a time and therefore they will demand government responses to those issues that matter most to them.[8] But attention can shift rapidly as dramatic events (Birkland 1997), entrepreneurial political leadership (Kingdon 1984), media (Rogers and Dearing 1988, Graber 2000), interest groups or other factors convince individuals that an issue has become especially important. Then, as ideas become popular and diffuse, the public' s demands on government change – not so much because preferences have changed – but because its attention has shifted from some issues to others.

[7] This process is a reciprocal endeavor. For example, Habermas (1973) argued that public officials must link, and thereby legitimize, policies to public interest and widely shared public values.
[8] As Stone (1989) pointed out, old issues often reach the decision making stage through redefinition.

Social Amplification of Risk

Risk studies,[9] drawing from a wide range of social sciences, attempt to answer how society forms choices about the social acceptance of risky technologies. When researchers first asked how people perceive risks, they found that rather than quantitative and technical aspects, qualitative considerations, such as catastrophic potential, voluntariness, dread, and familiarity, are important in the public assessment of risk. Psychometric studies focused on the social perception of risks at an individual level ascertained that two factors, "dread" and "unknown" risk, determine the individual's acceptance of risks (Slovic 1987). Individual perception of GMF closely resembles the characteristics of other forms of biotechnological advancements. In general, biotechnology is perceived as unknown, new, unobservable, delayed in consequences, uncontrollable, involuntary, and highly risky for future generations (Slovic 1987, 36).

Although psychometric studies help to explain risk perception at an individual level, the primary question of this work is how societal and policy choices are made concerning environmental "hazards" in different geographic or temporal sphere s. And, how does a "society acting through political and social institutions ... define the meaning of a problem and the range of acceptable solutions" (Birkland 1997, 11) when the risks of the regulatory issues are obscure and the potential damage is not really observable? The theory of social amplification of risk proposes that

> risks are amplified or attenuated as hazard-related events interact with psychological, social, institutional, and cultural processes . . . Certain individuals and groups in society act as amplification or attenuation stations by collecting information about risks and then distributing that information in a manner consistent with their goal (Gowda and Owsley-Long 1998, 79).

This means that societal risk acceptance is shaped and modified by actors that educe social and institutional responses, i.e. public policy, in the public. Certainly, it is at the level of societal deliberation that concepts of risk studies and policy-making overlap. Cross-national risk studies stress that political factors decisively influence perception and acceptance of risks (Jasanoff 1990). This strain of literature emphasizes cross-national differences in social and political traditions (Jasanoff 1991) and "short-term" political influences by interest groups, regulating bureaucracies, and the public (Levidow 1999). Hence, risk studies confirm that the

[9] For a good introduction to the topic see Slovic (2000). Gowda and Owsley-Long (1998) provide a brief review of this multi-disciplinary social science.

perception and acceptance of risk is embedded within organizational context and often mediated through the mass media and interest groups. Hannigan agrees with the literature on policy processes and identifies the following factors as responsible for the social construction of an environmental problem: scientific authority for and validation of claims, existence of 'popularisers' who can bridge environmentalism and science, media attention in which the problem is 'framed' as novel and important, dramatication of the problem in symbolic and visual terms, economic incentives for taking positive action, [and] emergence of an institutional sponsor who can ensure both legitimacy and continuity (1995, 55). Thus, in order to understand the acceptance and regulation of environmental problems, such as genetically modified food, it is then necessary to incorporate findings of the decision making theories, in particular the notion of positive feedback, and risk studies.

In sum, the social amplification of risk "denotes the phenomenon by which information processes, institutional structures, social-group behavior and individual responses shape the social experience of risk" (Kasperson et. al 1988, 181). This social experience of risk, in turn, determines the demands for institutional responses, i.e. for environmental regulation. Theoretically, a risk-related event (actual or potential in nature)[10] is picked up by "stations," such as mass media, interest groups, or other social networks, which amplify or attenuate the risk. The potential differences between expert and public assessment of risk in conjunction with the different responses by various social interests may alter the scope and focus of the risk assessment. Eventually, the continuing diffusion and contesting interpretations by social and institutional actors, who also engage in amplification and attenuation of the risk, may lead to social or institutional responses, i.e. individuals' attitude change and public policies.[11] This conceptual structure of the social amplification of risk is depicted in Figure 1 in the appendix.

Alternative Perspectives on Environmental Regulation

Previous findings on environmental policy were rooted in two distinct perspectives on regulatory reform. Both of them attempted to explain why regulatory reform has taken place and how it has progressed. Simply stated, the first perspective, known as interest group pluralism,

[10] Risk events span real and constructed realities and consequences, which are shaped by interpretation, intervention, or technological development.

[11] This understanding of risk as an evolutionary and contested process in which individuals, groups and institutions organize and share their knowledge with other social systems through communication stresses only slightly more the "constructionist" nature of the concept than systems theory (cf. Luhmann 1986, Münch 1995).

asserts that interest groups are the motor of reform. The second perspective – neo-institutionalism – suggests that governments respond to certain pressures in distinctive ways, depending on their ideological and institutional legacies.

Interest Group Perspective

The first framework explaining regulatory stances is derived from David Truman's (1951) work on the governmental process. He contends that in a pluralist state, competing interests in and out of government will produce policies reflecting public convictions as a whole[12]. Based on the assumption that regulatory agencies can be "captured," Wilson (1989) claims that the regulatory outcome depends on how the governmental agencies are placed in the broader political environment. For Wilson, the distribution of benefits and costs (from concentrated to widely distributed) implied by policies will affect the organization and outcome of policies.

In examining the interest group perspective in regard to regulation of GMF, several empirical and theoretical shortcomings can be detected. Generally, the regulation of GMF has occurred under little public and political scrutiny in the United States. First, participating interest groups and their objectives changed over time as the issue developed.[13] Second, the changing nature of the actors and objectives led to an array of different policy preferences. At the outset, regulation seemed to be guided by technological aspects, but subsequently, the issue of labeling and food safety emerged. This process took place largely outside the political realm and introduced ever-new interest groups to the policy process.[14] In short, the interest group model is ineffective in explaining why regulation of GMF received attention from different interests with divergent objectives at particular times. The interest group approach does not describe how the regulation of GMF received public and political agenda status.

---

[12] For an overview, see Thomas (1993).

[13] For example, in the 1980s, business interests (cf. Eichenwald et al. 2001) began lobbying the American executive branch by keeping the issue away from public and interest group scrutiny thereby eliciting favorable regulation, just as Wilson's model (1989) suggests. However, in the beginning of the 1990s, business groups' strategy changed to aggressive lobbying to remove all regulatory impediments without any pressure or increased awareness from other interest groups. In the following years, a number of other groups have become aware of GMF.

[14] For example, real world indicators, such as scientific evidence, showed potential negative consequences of GMF. These indicators alarmed some environmental groups. The loss of important markets in Europe and Asia drew the attention of farmers to the issue. As the policy-making arena became more crowded, policy preferences were changed or reframed.

"Neo-Institutionalism" as a Comparative Perspective

The second perspective on regulatory reform – neo-insitutionalism – claims that national patterns of regulation depend on distinct national features of state institutions (Katzenstein 1978; Evans et al. 1985; Hall 1986; Immergut 1992; Weir 1992). Scholars of this school of thought assert that institutions not only provide the playing field of political struggles over redistributive or regulatory demands, but they also structure the political struggle by setting forth rules and procedures. In contrast to the interest group perspective, concepts of neo-institutionalism contend that institutions "structure political ac tions and outcomes, rather than simply mirroring social activity and rational competition among disaggregated units" (Aspinwall and Schneider 2000, 3). Given this understanding of institutions, neo-institutionalism is incapable of fully explaining the divergent GMF regulation between the EU and the US.

Although vast literatures of historical neo-institutionalism exist on both national and European level policy-making, the approach has failed to combine the effects of interdependence between national and European institutions. In the current political setting of the E.U., a reciprocal impact on and considerable interaction between national and supranational institutions flourishes. Moreover, inherent to policy-making in general and in the case of GMF in particular, domestic institutions are used in order to increase bargaining strength in the E.U.; yet, at the same time, the domestic institutions often present volatile policy preferences (e.g. France's or Britain's GMF stance). Finally, literature on the i ntegration of the E.U. has pointed out that supra-national entities, such as Directorates or the European Commission, actively create their own agendas (e.g. recognizing new issues, or proposing solutions). These aspects make clear that the development of overall European integration and environmental risk regulation has been comprised of some independent aspects induced by Member states or European regulatory agencies (e.g. the European Commission or the DG XI) but at the same time Member states perceived the creation of a European-wide regulation of GMF as part of the overall integration of Europe.

A brief examination on whether neo-institutionalism is well-suited for examining the American case is also necessary. As outlined earlier, neither Congress nor other federal units have shown great interest in regulating GMF. The three regulating agencies – USDA, FDA, and EPA – have so far received little political or public scrutiny of their initial regulatory framework. Hence, rationalist neo-institutionalist approaches are not particularly helpful. Because GMF is

an emerging regulatory topic, historically-derived explanations also seem to be ill-suited. Curiously, already existing regulatory institutions were employed for this novel regulatory issue. Considering that the three regulatory agencies are located in different policy subsystems, surprisingly few mêlées between the agencies have occurred and thus, regulatory responsibilities so far have not been reorganized. In short, both rationalist and historical neo-institutionalism is insufficient for explaining the regulation of GMF in the United States. While the policy issue is too novel for historical analysis, the problem with rationalist explanations lies in the uncontested nature of the policy area.

Summary and Conclusion

Neither the interest group nor the neo-institutional perspectives can fully explain the turnaround in environmental policy-making for the case of GM foods in Europe and the United States. The interest group perspective is not particularly helpful because the composition of actors, who often shifted their attention and preferences, changed over time. Institutional explanations for the difference in the regulation and acceptance of GM foods may be capable of partly describing the divergent outcomes in regulation; however, they fail in depicting how the difference of regulation has been socially constructed in such a short period of time. While exclusive theories of institutions or interest groups are insufficient, institutions and interest groups need to be considered as vital parts of any theoretical consideration. The reasoning is that "[i]nstitutions, conceived as those formal and informal mechanisms that produce regular patterns of social behavior, act as both independent and intervening variables" (Aspinwall and Schneider 2000, 5). Institutions create both constraints and opportunities for political actors. However, contextual environments and actors also amplify or diminish the power of institutions.

Both approaches are incomplete because they fail to explain how and why a new policy issue (regulation of GMF), in which the alignment of interest and the structure of institutions is not established, has or has not received agenda status. Therefore, a dynamic model – rather than a static model, such as neo-institutionalism and pluralism – needs to be developed in order to capture the evolution, attention to, and acceptance of GMF regulation. A dynamic framework then must be generated that acknowledges the novelty of the regulatory topic and its distinct environment in the larger societal context and that also incorporates an awareness of European institution-building and policy-making in order to delineate the differences and commonalities in

GMF regulation on both sides of the Atlantic. A model that is inclusive, and not exclusive, has to incorporate a host of participants and their resources, as well as the dynamic processes of decision making.

The model of the social amplification of risk provides an inclusive and dynamic account for the cross-Atlantic differences in GMF regulation. The model of social amplifications contends that focusing events provide and are framed as signals for social stations of amplification or attenuation. These individual stations, which include interest groups, public opinion, the mass media, and governmental agencies, then assemble and transmit, often competing interpretations (policy images) of societal demands for policy change. Eventually, these social signals of the acceptance of environmental risks will be received in the political realm and may generate behavioral and organizational responses, i.e. public policy-making, through institutions and actors. In contrast to neo-institutional or interest group approaches, social amplification does not assume that the configuration of interest groups and institutions has been established; instead a dynamic view of policy making is proposed.

DIVERGENCE IN ACCEPTANCE AND REGULATION OF GMF BETWEEN THE UNITED STATES AND THE EUROPEAN UNION

This section explains the differences in the regulation of GMF between the United States and the European Union[15] employing the model of social amplification of risk. In the following section, all sources of regulatory divergence put forward by the model of social amplification of risk are examined separately. These sources include the following: the role of focusing events, public perceptions of the issue including citizens' trust in government, news media, influences of nongovernmental organizations (NGOs) and business interests, and governmental structures as well as actions. Finally, in order to illuminate the dynamic and procedural aspect of the model, the interaction of these individual factors is described.

[15] For a comparison between the U.S. and the E.U. regarding the role of scientific communities on the introduction of GM corn, see Levidow (1999).

Focusing Events

According to the model, the amplification process starts with a focusing event. A focusing event can either signify physical (e.g. disaster) or potential (e.g. scientific reports) failures of a risky technology. These events not only have the ability to propel an issue on the public, media, and political agenda, but they also allow societal groups to attach their symbols and interpretations. Hence, two features of a focusing event deserve consideration: the actual impact of the event measured by quantitative real world indicators (such as the number of deaths or magnitude of liability compensation) and symbolic potential measured by qualitative aspects (such as dread or controllability).

In the second half of the 1990s, several major food scares deteriorated the European public confidence in the national and E.U. regulatory agencies. The first and probably the central food safety failure was the case of BSE (bovine spongiform encephalopathy). In 1996, the British government under John Major announced that the Creuzfeld-Jakob disease, a fatal human disease, can be linked to BSE, a cattle disease spread through animal feed. Consequently, the E.U. Commission issued a ban on British beef and many cattle herds in Britain were destroyed. Nevertheless, consumer confidence and public trust in the E.U. regulatory agencies had been severely undermined and, just as GMF was introduced to the market, consumer awareness of food safety rose. In the following years, a political wrangling about the reintroduction of British beef ensued, which was stifled by recent revelations about additional BSE cases in other European countries. As the topic resurfaced in the public, the E.U. discussed the possibility of banning certain animal feeds (*Financial Times* 2000).

Other major food-related scares that occurred in Europe in recent years also caught European-wide attention, such as scandals related to adulteration of food in France and Spain, and the feeding of carcinogenic dioxins to poultry in Belgium, which the Belgian government tried to cover up. Most recently, the highly infectious foot-and-mouth disease has been spreading from Britain to continental Europe and as a consequence thousands of animals have been tested and slaughtered. Because of these food-related incidents, the European public became aware of the potential dangers of industrial framing and the ineffective E.U. regulatory oversight. For example, in Britain, where consumers were already displeased and distrustful of

official statements regarding food safety, a scientific study[16], despite its widely contested findings, stirred up additional public concerns and negative press coverage.

Although failures of regulatory oversight have happened repeatedly in the United States (e.g. local Ebola contamination of beef, the detection of GM maize in taco shells, or other food callbacks), none of them received considerable media or public attention. Two potential focusing events – approval of recombinant bovine somatotropin (bST) [17] and the call back of taco shells – in the United States are examined in the this section. In the early 1990s, the approval of recombinant bST[18] by the FDA provided a potentially powerful image for attaching cultural and social themes.[19] American farmer and public interest groups[20] used bST as a vehicle to advance the topic of GM on a broad, national agenda and pressed for more stringent regulation by framing the social and economic impacts of the new technology negatively. The proponents of bST comprising federal officials, researchers, and members of biotechnological industry and business achieved favorable regulation by framing bST use as social and economic progress, discrediting opponents as extremists, disconcerting public concerns through advertising, and emphasizing the efficacy of the existing regulatory framework (Hannigan 1995, 170-176; Plein 1997). In early 1994, the FDA ultimately approved bST for commercial use. Despite brief periods of national coverage, the mass media had also shown an only subdued interest in the issue.

In 2000, the discovery of taco shells containing GM corn not approved for human consumption brought attention to GMF and their regulation (Barboza 2000). The corn, known as StarLink, contains a bacterial protein that kills insect pests. The EPA did not approve this strain of corn because of a lack of scientific information concerning the allergenic potential of the protein called Cry9C. Besides recalling millions of taco shells and other products, the EPA urged the developer of the corn (Aventis) to cancel its marketing license. The incident received

[16] Dr. Pusztai at the Rowett Institute for Agriculture in Aberdeen conducted the study and found that GM potatoes had negative impacts on the immune system of rats (*Economist* 1999a).
[17] bST is a biotechnologically derived growth promoter injected in lactating diary cows. The European Community placed a moratorium on the commercial use of bST and several European countries banned it at a national level.
[18] bST is a growth hormone injected in cows.
[19] As Hannigan (1995, 176) put it: 'the purity of nature as embodied in milk."
[20] One of the early opponents of genetic modification was Jeremy Rifkin and his lobby group the Foundation of Economic Trends (FET). In the case of bST, Rifkin initiated a campaign by petitioning the FDA to prepare an environmental impact statement on the commercial production of bST. Rifkin, one of the first and most ardent critics of GM in the U.S., not only wrote extensively about the negative impacts of GM but also launched numerous lawsuits against a variety of governmental entities.

attention by national TV and print media, in which anti-biotech groups as well as GM supporters called for additional regulatory supervision. But, neither side was able to produce substantive public attention or support from political actors, such as lawmakers. In December 2000, a class action lawsuit was filed arguing that Aventis had harmed American farmers through negligence. However, this focusing event mainly concerned farmers and food producers and their need to separate GM from non-GM crops.[21] As a consequence, the ensuing discussion centered on the need to find tests for detecting GM ingredients and not on the potential merits and drawbacks of GM.

Focusing Events and GMF Regulation

Potential focusing events occurred on both sides of the Atlantic in the 1990s. Yet, only the European food scares, most prominently BSE, and the shipment of GM corn acquired far-reaching attention by all "stations" of amplification, such as interest groups, media, public, and political actors. To answer which potential focusing events are observed, framed, and promoted in both cases, we have to examine their quantitative and qualitative potential. In Europe, BSE and other food scares proved to be a powerful catalyst for the public's distrust in existing environmental risk regulation, "industrial" farming practices, and biotechnology industries because both the "real" and "constructed" consequences had great signal power. Thousands of animals were slaughtered and human lives were perceived as endangered. The public apprehension was also fostered because the spread of the BSE-disease proved to be difficult to contain by government, industry, or science. The European food scares were perceived as unobservable, uncontrollable, and involuntary. From early on GMF was integrated in the discussion and a similar negative image was attached to the technology.

None of these features materialized in the American case. Both potential focusing events, bST and the contamination of taco shells, were recognized as observable, controllable, and individual.[22] In the U.S., the real world indicators were considerably weaker in terms of their potential than in Europe. In the case of the taco shells and bST, the only perceived negative impacts were the burden on supermarkets and on farmers who bore additional costs. Hence, the harms of these potential incidents were perceived as indirect (e.g. loss of revenues) and not direct

[21] Having experienced problems with exports to European and Japanese markets, the incident illuminated the problems of contamination and segregation of GM and non-GM crops to American farmers at a domestic level.
[22] Similarly, the irritation of food can be described as easy to control and indirect (e.g. loss of revenues).

(e.g. food poisoning, or damage). In none of the American potential focusing events did the lives and livelihood of humans become imperiled.

Public Opinion

Public Opinion

Public opinion is widely regarded as one of the most significant factors in the development and implementation of effective environmental policies. A supportive public provides a valuable resource for policymakers. As the case of nuclear energy proved, public attitudes are one of the major factors for the development and application of technology. Several features of public opinion need to be scrutinized in order to ascertain disparities between the European Union and the United States in regards to acceptance of GMF. In the following paragraphs, public awareness of the issue, attitude dissimilarities, source credibility, and underlying social and cultural views are employed in the comparison between the U.S. and E.U.

In the mid 1990s, the general public knew and understood little about biotechnology, particularly about GM agricultural products on both continents (Lemkow 1993; Hoban and Kendall 1997). In the following years, due to media exposure and public protest, the public awareness about the issue increased sharply in Europe. In 1995, between 30 and 50 percent of Europeans believed that bioengineering posed "serious risk" to food supply, whereas in the U.S. only one-fifth of the consumers voiced such a concern (Hoban and Kendall 1997). Overall, Americans expressed positive attributes about the effect of science and technology, specifically the use of biotechnology, but were largely unaware of the use of biotechnology in agriculture and food production (Hoban and Kendall 1997).

Reports funded by the European Union have revealed a diversity of attitudes towards genetic engineering among different demographic groups as well as between countries in Europe (European Commission 2000). The findings of the most recent report can be summarized as follows: positive attitudes towards GM decreased by approximately 5% in the last 5 years; over 70 % of the respondents heard about GMF; over 70% of the respondents stated the desire to learn more about GM; of all applications of biotechnology, food production is regarded as the one carrying the greatest risks; less than 50% felt that their governments regulate biotechnology well enough; respondents had greatest confidence in consumer, medical, and environmental organizations on this topic; public trust in all sources of biotech information declined by at least

10%; most respondents voiced ethical and moral concerns about the implementation of genetic engineering; between 40 and 60 % of the respondents regarded GM of food as a serious risk (compared to ca. 14 % in the U.S.). Significant differences exist between levels of understanding, awareness, and trust in different member states (cf. Frewer 1998). A survey (Menrad 1999) of experts from industry, research institutions farmers' organizations, consumer and user organizations, environmental groups, and administrations of several European countries confirmed the more skeptical assessment of GMF technology in Central and Northern Europe as compared to the Mediterranean. Still, the drop in support in Southern European countries was enormous (European Commission 2000).

The most recent polls indicate that the public is "deeply suspicious" (*Economist* 2000a, 69) in countries where GM foods have been in the public debate. For example, between 75 – 80% of consumers in France and Germany most likely would not buy GM food. Britain was the least hostile European country polled; still, more than 66% of its citizens reject GM food, whereas 57% of U.S. citizens would be less likely to buy GMF products. The poll stressed that the main difference lies in the public awareness of the issue. In contrast to a third of Americans, only 10% of Europeans have not heard or read about the issue –in Germany, less than 5%. The most often cited underlying reasons for opposition was the perception that GM food is nutritionally inferior and that its ethical and environmental impacts are uncertain. In Europe, studies of individuals' risk perceptions of transgenic applications also found significant environmental, ethical, and social concerns (Lemkow 1993; Frewer 1998). Moreover, many Europeans perceive the distribution of risks and benefits favors industrial profits more than consumer preferences and suspect an untenable manipulation of consumers through the gradual introduction of GM food by U.S. companies (Frewer 1998, 11; *Economist* 2000a, 69). In Europe, Lemkow (1993, 35) identified "growing evidence of deepening public concern about the lack of control of economic activities which have implications for the maintenance of environmental equilibrium and public health". As the European case makes evident, when the public identifies potential benefits as tilted towards the industry, public acceptance will be low.

An additional concern of the public on both continents is source credibility. Industry and government often lack public credibility in Europe, whereas other sources, such as consumer groups and environmental organizations, are highly trusted (Lemkow 1993; Gaskell et al. 1999). Public mistrust in the regulators and industry stems from the belief that the real risks are being

hidden. A fruitful response to public mistrust may be available in the form of labeling because labeling food products that are GM allows the consumer to make a more informed choice.[23] Therefore, the feeling of being excluded from the decision-making process would be reduced. A European-wide study found that 86% of the consumers supported GM food labeling and more than 50% trusted consumer associations to report the truth about food supply. Vogel (1997, 59) even proposed that the E.U.'s 'labeling of genetically engineered foods was a response to pressures from European consumers. The eco-labeling initiatives reflect the intensity of public support in much of Europe for improving environmental quality." In the U.S., consumer surveys concerning labeling found more mixed views. This finding may be due to the more lackadaisical attitudes about food in the United States. In spite of a general mistrust in government, Americans showed great confidence in the FDA, the food and drug regulatory body, to ensure the food safety, including GM food (*Economist* 1999b). Undoubtedly, all of these surveys show that Europeans have been less willing than the American public to accept genetic modification of plants and foods and that 'the relative lack of U.S. consumer anxiety over GM foods has allowed the United States a more flexible regulatory policy" (Pollack and Shaffer 2000, 47).

Many studies of public opinion also touch on the cultural roots of the differences between the United States and the European Union. Both the U.S. and most countries in the E.U. are highly industrialized and prosperous societies. Yet, in contrast to European states, the U.S. is a vast and relatively decentralized nation, where industrial farming is geographically and psychologically removed from American consumers and biotechnology is perceived as just another technological innovation (Lynch and Vogel 2000, 12). American farms are often equated with industrial production and are starkly separated from concerns about conservation and environmental protection. In Europe, where little land exists that remains untouched by anthropological forces, farmland and food are perceived as an important cultural and aesthetic resources of individual regions (Levidow 1999, 15). In Europe, food is as much a matter of identity as of economy.

In sum, in the assessment of the differences in public opinion on GMF between America and Europe, several indicators were examined. The comparison revealed that 'for a variety of cultural and political reasons, citizens ... on both sides of the Atlantic do not share identical

[23] However, the simplistic notion that consumers in the supermarket ultimately decide the acceptance and regulation of GMF (cf. Frewer 1998) could not be supported here.

goals and priorities" (Vogel 1997, 60). Overall, the public understanding of the technology and its implications is relatively low in both cases, but as public awareness grew in the E.U., differences between both continents as well as among E.U. Member states surfaced. In Member states, where GMF has been on the public agenda for nearly a decade, public opinion has stabilized at a level characterized by skepticism. This is particularly true for Northern European countries and 'big E.U. countries," such as Germa ny and France, where the public is more conscious of GMF and attitudinal differences are more pronounced. However, in recent years, the reception of GMF turned increasingly negative in all European countries, whereas the American public has retained its more positive attitude. European consumers expressed social, ethical, and environmental trepidations towards GMF, which, due to the high levels of public unawareness about the issue, have not been considered in the United States. Several sources contribute to the negative European public opinion. First, the European public identified the industry as the main benefactors of the technology and also has distrusted most sources of information, particularly government and industry. These two trends are not pronounced in the United States. Finally, underlying cultural and social values concerning farming and the environment also contributed to the negative assessment of GMF by the European public.

Trust in Government and Regulators

Due to the mishandling of the BSE crisis by national and E.U.-level regulatory authorities in the late 1990s, public trust in government regulation and scientific expertise has markedly diminished. The impact of this administrative failure raised European public awareness of the process of the production of food and heightened the rejection of new technologies in agriculture and food industry. Surveys repeatedly show that the public trust in governmental regulatory agencies dropped by more then 10 % in many European countries (European Commission 2000). In contrast to the United States, where national regulatory bodies could build on already well-established regulatory structures, the E.U. institutions struggled to provide an adequate and comprehensive regulatory framework in all member states. Indeed, the political institutions of the E.U. magnified the distrust and suspicion of European consumers. Europe's regulatory bodies vastly contributed to a negative reception of GMF because in the case of GMF – and in contrast to previous environmental regulation in the E.U. – the regulatory policy-making process has been atypically open, deliberative, and slow. This assessment is significantly portrayed in

the following statistic: 'while 90% of Americans believe the USDA's statement on biotechnology, only 12 % of Europeans trust their national regulators" (Lynch and Vogel 2000, 12). In spite of a general mistrust in government, Americans showed great confidence in the FDA, the food and drug regulatory body, to ensure the food safety, including GM food (*Economist* 1999b).

Luhmann (1979) asserted that in an increasingly complex world, trust would serve as a substitute for knowledge. One of the major differences between the United States and Europe in the regulation of GM foods is the level of public trust in experts and regulatory institutions. Beyer argued that 'trust in institutions arises not simply as a result of openness in government responses to local interest groups, or priorities emphasized in the press ... but also from doing a difficult job well" (Breyer quoted in Pollack 1995, 189). In this regard, European regulatory agencies handled the problem poorly. The failure of European and national regulatory agencies in the case of BSE corroborated the generally pessimistic mood over the political controllability of social change in Europe.[24] Certainly, the credibility of the risk regulators will be an important feature in the public assessment of risk concerning the application of GM in foods in the future. The continuous struggle of the European regulatory agencies to regain trust by creating ever-new means of testing and implementation portrays the inherent difficulty of rebuilding trust once it is lost. In the United States, where a general mistrust in government is prevalent, the current confidence in the regulatory bodies of GMF may ultimately prove to be superficial. So far, the American public seems to tolerate rather then accept GMF. Because tolerance is based on trust in the regulatory arrangement and not on adequate knowledge (O'Riordan 1995, 5), the incident of a focusing event, should it occur, may ultimately eradicate not only the chances of future application of GM but also the slowly established trust in the U.S. regulatory agencies.

News Media

The media is the primary source of information about biotechnology and GM food in particular because only a very limited number of clearly labeled products of GM are available to consumers. The theory of social amplification of risk postulates that the news media is critical for the agenda setting and for the formation of a public opinion about risk. Research shows that

[24] Particularly in cases where scientific uncertainty is inherent to the problem, the public increasingly distrusts technical expertise.

framing and quantity (more coverage, more negative perception) of press coverage are the two most influential factors in the public perception of risk (Graber 2000; and several chapters in Slovic 2000).

Gaskell et al. (1999) analyzed American and European press coverage of GM food between 1984 and 1996. They concluded that the amount of press coverage as well as negative public perception increased sharply in Europe in the 1990s (Gaskell et al. 1999). The amount of press coverage did not differ between both continents until 1991; since then, the European national newspapers' coverage increased precipitously in the European Union. In 1996, twice as many articles were printed in European as in America. From 1997 onward, the European press consistently covered topics related to biotechnology and GM food. In the wake of the spread of the BSE disease, the hesitancy surrounding the introduction of GM corn, the cloning of the sheep Dolly in the United Kingdom, and the increasing amount of GM crop shipments from the United States received headline coverage in major European newspapers, which then led to a more general discussion about the promises and perils of biotechnology and GMF (de Cheveigné 2000). De Cheveigné also points out that in Northern countries, such as Sweden, Denmark, and Germany, where the debate and press coverage started earlier, public opinion about GMF has remained skeptical. One of the consequences of increased media coverage in the E.U. is that the knowledge about GM food is significantly higher in the European Union than the United States. However, the rise of GM food coverage in the 1990s does not necessarily translate into an European public confident about the adequacy of its information. Indeed, surveys show that the public repeatedly expresses requests for additional and more comprehensive coverage of the topic.

The framing of the topic is the second variable that needs to be examined in the evaluation of the media. Until 1990, "progress," "economic prospect," and "health" dominated the news coverage on both continents. Between 1991 and 1996, these themes remained important. But while the new frames "public accountability" and "nature/nurture" emerged in the U.S., European newspaper coverage dealt increasingly with "ethics" (Gaskell et al. 1999). Moreover, no evidence was found that the number of "risk" stories increased in Europe more rapidly than in the U.S. in the 1990s (Gaskell et al. 1999) and comprehensive coverage of ecological aspects were rare (Sentker 1996, 253). In an analysis of the German press coverage of GM, Sentker modified these findings by arguing that reports on economic pages portrayed a

more positive perspective of GM (economic prospects, technological advancement) than reports placed in the political section of newspaper, which mainly focused on ethics, international situations, and national regulation. As the public assessed GM more skeptically, the German media coverage on the topic became increasingly politicized (Sentker 1996, 251 - 253). In this process, news regarding genetic engineering moved from the "science" section to the "political" section of the news. This relocation produced a debate in which opponents of the technology complained about uncritical reporting, scientists described newspaper coverage as incomplete, and advocates of GM alleged that the press exaggerated and dramatized the risks.

In the last three years, numerous articles on the perils and benefits of GM food as well as on the E.U.-U.S. trade dispute about GMF exports appeared in major American journals and newspapers, including *The New Yorker*, *The Atlantic Monthly*, *Consumer Reports*, *New York Times*, *Wall Street Journal*, *Time*, *The Nation* and *Newsweek*. For example, *The New Yorker* discussed the rise and fall of Monsanto's CEO, Robert B. Shapiro, regarding the commercialization of GMF (Specter 2000). In the American coverage, stories about the nexus between American agriculture, international trade, and European resistance to GMF have outnumbered discussions about the environmental concerns and particularly American policy-making.

In Europe, the tone of the press coverage has remained critical and has been expanded by the numerous reports and articles on the European–wide "food scares." New frames that articulate the negative perceptions of GMF have appeared in many European countries. For example, the British press repeatedly labeled GMF as "Frankenstein Foods;" the French newspaper *Libération* ran a headline about the U.S. imports of soybeans with the title "Alert au soja fou" (Mad soy bean warning); and the German *Der Spiegel* called the food industry's futile campaign against European apprehension about GMF as "Monsantos [*sic!*] Vietnam."

News Media and GMF Regulation

In the United States and the European Union, the press has generally fulfilled its role as "the fourth branch of government" by performing its public service role and facilitating the political discourse. On both sides of the Atlantic, news media coverage of GM did not differ substantially until the mid-1990s. Since then, the more extensive press coverage of GMF and the creation of increasingly negative frames in some media outlets has been accompanied by

increasingly apprehensive public perception of the technology in Europe. In America, the press coverage has remained the same in the last few years. The frames employed by the U.S. media outlets mainly focus on economic and trade issues. In short, European press coverage concerning GMF distinguishes itself from American by the greater amount of coverage and the increasingly negative framing.

Interest Groups

Support or opposition of interest groups is a crucial element in the policy-making process, because NGOs (nongovernmental organizations) provide policy ideas and alternatives to the political process, influence public awareness, and supply the political realm with resources such as expertise. Generally, there are two types of interest groups concerned about GMF regulation: one supports the use of GMF (business and agricultural interests) and one opposes it (environmental and consumer groups). In this section, differences in alignment of interest groups, their structural resources, and their strategies are examined.

European Public Interests

Previous comparative studies of social movements and NGOs suggest that due to the open and participatory process of policy-making in the U.S., American NGOs are better situated in the political system to influence governmental policies (Vogel 1986, Münch 2001). However, in the case of GM food, European NGOs seemed to hold structural advantages over their American counterparts. European NGOs' success in raising public awareness of the issue and framing the issue can be attributed to two main sources (Lynch and Vogel 2000, 9 – 11): structural resources and priority setting.

First, because E.U.'s Green Parties and NGOs are socially and politically better situated than their American counterparts, more institutional opportunities for action have been available. Due to revisions of the Treaty of Rome, the power of the European Parliament was broadened. In the European Parliament, the role and influence of environmental NGOs is particularly strong because Green Parties hold a considerable amount of seats and access (e.g. to hearings) is fairly open. Moreover, due to electoral successes of Green Parties in member states, the influential Council of Ministers also moved towards the interests of European NGOs. Hence, consumers,

"green" activists, as well as politi cians are able to apply pressures[25] for stricter regulation on the European Commission and the Council of Ministers (Lynch and Vogel 2000, 10). As new policy issues are tackled by European institutions in the process of European integration, European lobby groups who often share the same interests and expertise with E.U. bodies become integrated in E.U.-level policy networks. The cumulative effects of these described changes have resulted in more open access for European NGOs in the decision-making process in the case of GMF.

The second source – strategies and priorities – of European NGOs' strength stems from their capability to exploit political opportunities in order to frame the issue of GMF, rally public support, and raise consumer awareness. From the very beginning of the debate, most European NGOs, including environmental, consumer, and farmer groups, have represented a unified front against GM foods. European NGOs, most prominently the European Bureau of Consumers' Union (BEUC), and several scientific groups have stressed and publicly debated the harms associated with undermining clinical use of antibiotics and threats to 'hon-target" insects; in the United States, such debates never occurred between regulator and environmental groups because studies conducted by industry groups were simply accepted by both. In contrast to NGOs in the United States, some environmental groups, such as the European branches of Greenpeace, have retained their capacities to stage highly visible and widely published campaigns with the goal to apply public pressure for more rigorous regulation of GMF (Spiegel 1999). Additional methods of the diverse groups of GMF opponents in Europe have included uprooting of GM crop fields in decontamination suits, securing support of high profile celebrities (e.g. Prince Charles and Paul McCartney), and targeting particular brands and companies with boycotts and leaflet campaigns (Came 1999).

American Public Interests

Typically, the incremental and slow American policy-making process is a product of the multitude of venues and actors needed to reach agreement among diverse interests. In the 1970s, for environmental groups, the open and easily accessible political arrangement in the United States bequeathed U.S. NGOs a great deal of influence in many arenas, including Congress,

[25] For example, some Member states (e.g. Germany and Britain) held hearings concerning the regulation of biotechnology, which provided NGOs with an occasion for participation and media coverage.

executive branch, judicial system, and sub-national levels. However, American environmental NGOs have been dwarfed in terms of their institutional resources (e.g. access, hearing, and administrative support) by the Reagan administration in the 1980s and the Republican-led House of Representatives in the 1990s (Bosso 2000). Moreover, environmental groups mainly have relied on organizational and informal ties to the regulating agencies since Congress and sub-national institutions have exhibited scant interest in regulating GMF. Because GMF are regulated by three federal entities – FDA, USDA, and EPA – environmental and consumer groups had to divide their resources. These structural features contributed to the volatile alignment, weak mobilization, and vague objectives of U.S. environmental groups in the context of GMF regulation.

The assessment of the strategies and priorities of public interest groups opposing GMF in the U.S. is difficult because U.S. NGOs' objectives and resources are more dispersed than those of their European counterparts. A key point for the assessment of interest group influence is that consumer and environmental NGOs in the United States are less concerned than their European counterparts about GM. Although a number of NGOs opposing GMF have existed since the initial stages of regulation, GMF regulation was not a relevant issue for major environmental and consumer groups until the mid 1990s. A variety of environmental groups still feel indifferent about or even support genetic engineering. During the 1990s, some environmental groups even regarded GM crops as an efficient means to reduce the damages of large-scale agriculture or to alleviate world hunger and famine (Hannigan 1995, 164).

Several years after the fact, American interest groups realized that federal agencies did not raise questions concerning social and ethical consequences of GM foods in the U.S (Thompson 1997, 55). Various consumer and farmer organizations[26] at local and national level have attempted to fill the void left by the sidelined environmental NGOs in the United States. However, this diverse group of interests often has disparate goals[27] in their opposition to GMF. Therefore, they have been unable to present a united and publicly recognized front against GM foods. Moreover, a number of American interest groups, such as Ralph Nader's Public Citizen or the Sierra Club also oppose GMF for safety or environmental reasons; however, the issue has

[26] Critics of GM crops and foods in the United States include Jeremy Rifkin and his Foundation of Economic Trends, the Council for Responsible Genetics, the National Family Farm Coalition, Consumers Union, and the Union of Concerned Scientists.

[27] For example, Rifkin, who opposes genetic engineering generally and focuses his activities on litigation, has paired up with Consumers Union, which is mainly concerned about the issues of labeling and public education.

low priority status on the agendas of these established and recognized groups. So far, none of the American NGOs has been capable of finding and exploiting political opportunities and powerful rallying symbols, such as food scares or the release of scientific findings. Instead, American public interest groups increasingly have relied on nearly inconspicuous lawsuits[28] and petitioning[29] against the regulating agencies.

Business Interests on both Continents

The role of business interests and their reaction to regulation in the U.S. and the E.U. is surprisingly similar. Since American-based biotechnology firms– partly due to initial governmental support – rapidly advanced technologically and economically, U.S. suppliers[30] of seeds, raw materials, and foods for the European market started lobbying[31] and advertising for favorable regulation and consumer acceptance in Europe in the mid 1990s. However, these advertising campaigns, particularly Monsanto's in Great Britain, backfired, because the U.S. industry was perceived as forcing GM foods on European consumers.[32] By 1999, this negative perception of the "multinational food giants" spilled back to the United States. As a consequence of public pressure and for marketing reasons, several multinational companies began segregating GM and non-GM crops, voluntarily labeling their products, or even declaring that they would no longer use GM ingredients for their products. Major food manufacturing and processing companies in the U.S., like Nestle, Archer Daniel Midland, Gerber Products Co., H.J. Heinz Co., Frito Lay, and McCain Foods (Specter 2000), followed this lead of many European manufactures and retailers, such as Danone, Iceland, or Sainsbury (Came 1999, 45). To counteract increasing public concerns, American "life sciences" and food companies founded the Biotechnology Industry Organization and also launched new advertisement and lobby

[28] E.g. *Alliance for Biointegrity v. Shalala* concerning the FDA over labeling and safety requirements, or the EPA over the approval of GM crops by U.S. Greenpeace and other groups.
[29] E.g. the group Mother for Natural Law collected circa half a million signatures requesting labeling of GMF products by the FDA.
[30] GM crops were mainly developed by multinational corporations that operate in a wide range of related areas, such as agricultural chemical, seeds, and pharmaceuticals. Recently, the industry labeled as "life sciences" underwent significant changes due to acquisitions and mergers. In Europe, Norvatis is the result of a merger of two Swiss companies and AgrEvo is a German-Belgium company. In the United States, Monsanto expanded its reach by acquiring several seed companies and is now seen as the leading global GMF proponent (cf. Specter 2000).
[31] For example, the Senior Advisory Group on Biotechnology (SAGB), funded mainly by multinational corporations, was set up as a lobby group in Brussels.
[32] Robert Shapiro, CEO of Monsanto, candidly remarked, "If I'm a bully then I'm not a very successful bully" at a London conference (Came 1999, 44).

campaigns, such as the Alliance for Better Foods. In 2000, another $50 million campaign for promoting GMF was launched, which includes lobbying efforts, advertisements, and Internet resources[33] and will last three years (Bettelheim, 2000, 938).

American farmers also started to worry about planting GM crops because crop exports, particularly soybeans, to the European Union dropped by nearly 50% between 1998 and 2000 (Economist 2000, 31). This decrease in exports resulted in an estimated loss of $305 million for corn and more than $1.5 billion of soybeans between 1996 and 1999. This development was largely due to E.U. labeling requirements and the American resistance to segregate GM from non- GM crops. This loss in revenues for farmer reverberated back to the multinational seed and food companies. Due to the U.S. firms' recognition of European consumer opinion and their fear of a potential backlash on both sides of the Atlantic, business interests, including farmer associations and multinational corporations, engaged in a more deliberative approach towards GMF in the commercial and political spheres.

Interest Groups and GMF Regulation

After having examined the alignment, structural resources, priorities, and objectives of interest groups concerned about the regulation of GMF, several differences between the American and the European interest groups constellation can be inferred. First, in contrast to the usually more accommodating structural resources for American interests, European public NGOs have held advantages in the case of GMF regulation. European public interest benefited both from the increased power of Green Parties and from the structural changes within the European Union. Their American counterparts suffered from the conservative drainage of structural resources by executive and legislative branches in the 1980s and 1990s, as well as from the regulatory division of the issue. Second, European public interest groups opposed GMF from early on in a unified front equipped with highly visible campaigns; conversely, American NGOs picked up the issue relatively late as a fragmented coalition of diverse interests employing elusive strategies. Third, business and industry on both continents reacted similarly. But, in contrast to the United States, the European public perceived the extensive and expensive lobbying efforts of mainly American business interests as forcing GM foods on European consumers. Fearing that American consumers would echo this perception, biotechnology

[33] E.g., Biotech lobbies established the website www.whybiotech.com.

increased their U.S. lobbying efforts in the last three years. On both continents, the alignment of interests and their goals has taken more than a decade, and a clear division between opposing and supporting interests is still not established, particularly in the American case.

Regulatory Response

In this section, the regulatory responses and initiatives to and from focusing events, public opinion, mass media, and interest groups on both sides of the Atlantic are discussed. In particular, the process of policy-making will be delineated in order to identify the roles of individual actors and institutions in the policy process and output.

Policy Responses and Initiatives by Institutions and Actors

Since the early 1980s, the U.S. Congress has shown a marked reluctance and lackadaisical attitude regarding the regulation of GMF.[34] As a consequence, the FDA, USDA, and EPA adopted *The Coordinated Framework for the Regulation of Biotechnology* ,published under the auspice of the Office of Science and Technology (OSTP) in 1984. This framework proposed that GM foods would be regulated according to their characteristics (in contrast to the process of production); therefore, existing federal statues – most notably the Federal Food, Drug and Cosmetic Act of 1938, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947, and the Toxic Substance Control Act (TSCA) of 1976 – would be sufficient for regulation. Thereby, the EPA regulates substances[35] released in the environment by GM crops ('safe for environment'), while the USDA is responsible for ensuring the environmental safety of GM crops ('safe to grow'). The FDA regulates GMF in the market ('safe to eat'). By using guidelines established in 1992, the FDA has exempted most organisms from safety tests because these products are presumed to be "generally recognized as safe" or "substantially equivalent" to their natural counterparts. Hence, the FDA has taken the role of a consultant rather than regulator in the review and approval of GMF.

Since 1997, awareness of GMF and their regulation increased in the United States. The American regulatory agencies have faced some challenges domestically. For example, the EPA was sued over the approval of genetically modified crops and the environmental group Mothers

[34] Lynch and Vogel (2000) extensively discuss the development of GMF polices on both sides of the Atlantic until the year 2000.
[35] E.g. herbicides or pesticides.

for Natural Law collected half a million signatures on a petition calling for mandatory labeling of GMF. In response, the FDA held a series of public hearings to review its policy on GMF and on GMF labeling issues. In 2000, the National Academy of Science released a report on GM foods that approved the underlying principle of regulating GMF in the U.S. However, the Academy also sided with more than 50 consumer, farmer, and environmental groups, which petitioned the FDA earlier in the year, in a call for tightening the regulatory oversight of GM crops (Bettelheim 2000, 938). In May 2000, the Clinton administration announced that, in the coming month, the FDA would gradually strengthen its regulatory oversight of GMF regulation by requiring biotech companies to submit research results that affirm the food's safety. Previously, this process has been voluntary. The new notification and other requirements are aimed at providing greater consumer confidence according to the Clinton administration (Weiss 2000). In January 2001, the FDA announced rules that would strengthen the oversight of GM foods. The agency issued, but did not implement, guidelines on voluntary food labeling. The administration proposed that the FDA would make a safety review before market introduction of GMF became mandatory (Pollack 2001). Nevertheless, the voluntary and lenient approach towards the regulation of GM foods basically remained unchanged.

Particularly, Congress has demonstrated little interest in the regulation of GMF. As a response to the growing public awareness on the issue, Rep. Dennis Kucinich (D – OH) and Sen. Barbara Boxer (D – CA) introduced the Genetically Engineered Food Right-to-Know Act (HR 3377, S 2080) that would require labeling of foods containing GM organisms in Congress in late 1999. Additionally, Kucinich and Jack Metcalf (R – WA) introduced the Genetically Engineered Food Safety Act (HR 3883), which would overhaul the existing regulations relying solely on summaries of company safety assessments. The bill mandates that the FDA would have to conduct a safety assessment similar to the current food additive process, which is then followed by a 30-day comment period for the public. The bills have been supported by a bipartisan group of circa 20 members of Congress. However, hearing or passage on any of the bills during the current session is highly unlikely (Bettelheim 2000, 939).

In summary, American political institutions and actors have shown little interest in the regulation of GMF. Instead, they opted for the application of existing federal regulatory statues. All three federal agencies involved in regulating GMF still hold the belief that GMF do not pose any special risks concerning their production. The sporadic pressures and worries of public

interest groups and irregular media exposure of GMF related problems have not led to any substantial changes in the way GM foods are regulated in the United States in recent years. So far, policy entrepreneurs who are persistently devoted to the topic and are capable of supplying policy solution have not emerged. Not even legislation drafted under the label of Right-To-Know, which was prevalent in many other policy fields in recent years, could draw any considerable amount of attention and support by national lawmakers.

In Europe, national and supra-national regulatory agencies have been much more hesitant than the United States in accepting GMF (Levidow 1999; Lynch and Vogel 2000). Adopted in 1990 and 1997 respectively, the two major E.U. directives regulating GM foods are the Directive 90/220/EEC, which regulates the deliberate release into the environment and marketing of GM organisms, and the Novel Foods Regulation, which requires labeling of foods containing GM organisms. The regulation is based on the "precautionary principle," which requires businesses to provide extensive evidence for demonstrating food safety. In order to release and market a GM product, companies must acquire a license in one or more countries, as well as at an E.U. level. Under the Directive 90/220/EEC, the approval of a GM product at E.U. level has to go through several stages, which are dominated by decisions from the European Commission rather than the Council of Ministers or scientific entities. The European Commission must approve a GM product with a qualified majority. In addition, each member state has the right to object to marketing of a GMF within their borders. Article 16 of the Directive 90/220/EEC allows a Member state to restrict or ban an approved GMF if there is a justifiable reason that a particular GM product poses risk to human health or the environment. This clause allowed several countries, including Denmark, France, Austria, and Italy, to ban or severely restrict the introduction of particular GMF in their respective nations. Britain also halted commercial planting for at least three years. These national bans or restrictions were often the result of domestically-conducted scientific research, growing public pressures through demonstrations and petitions, increased lobbying efforts by nationally organized farmer and environmental interests, and continuous inquiries and demands for regulation of Green Parties in national legislatures (Hausknost 1998). Detailed examples of national restrictions and their implications for the E.U. will be discussed in the following section dealing with the federal structure.

The continuing controversies within the E.U. and among its Member states over the approval of particular GMF and increasing imports of GM crops from the United States led to

the initiation of the Novel Food Regulation in 1997 (Lynch and Vogel 2000). Again, the slow and deliberative nature of policy-making became apparent. First, the European Commission and the Council of Ministers provisionally compromised on labeling only novel GMF but not mixtures of GM and non-GM foods. The Novel Food Regulation also excluded labeling on GMF that have previously been approved. This decision was challenged within the supra-national institutions, as well as among Member states. Disagreements also existed about the wording of the labeling and thresholds that would require labeling. After several rejections by the Council of Ministers, interventions by Member states, and revisions by the European Commission, the E.U. labeling rules of GMF established a one percent threshold for the permissible level of GM ingredients in foods in 2000. However, the directive is still not fully implemented due to the lack of technological and procedural problems.

After the Novel Food Regulation was enacted in 1997, the debate concerning the release and marketing of GM organisms remained highly contested (Brand 2000). In 1999, the European Commission suspended all authorization procedures and then the European Council announced a moratorium on GM crops. In April 2000, the second reading of the revised version of Directive 90/220 on the release and marketing of GM organisms was adopted. Therein, the European Parliament rejected tougher requirements for growing and marketing GM foods in the European Union. The Christian Democrats blocked the several proposals cornering GMF including "environmental liability rules", which would have held producers of GMF responsible for damaging the environmental and public health. However, this issue is currently returning to the E.U. governments for another round of debate and new liability clauses will be drafted in late 2001 according to E.U. Environmental Commissioner Wallstrom.

The main distinction regarding the regulation of GMF is manifested in the regulatory response on both continents. Literature on policymaking stresses the need for an institutional sponsor or policy entrepreneurs who can ensure the legitimacy and continuity of a policy problem. In the United States, where political institutions and actors did not perceive GMF as different from regular foods, the regulatory agencies have relied on existing federal statutes. As a result, American regulation can be characterized as consensual and informal. In the U.S., Congress has shown little interest in the topic so far. Therefore, the executive branch and its agencies have established and maintained a framework for regulation that has yet to be seriously challenged. The findings of the European case point in the opposite direction. A slow and

deliberative process has produced a number of comprehensive new GMF laws in an open, highly politicized and formal process. At an E.U. level, the policy arena has been particularly crowded and regulation evolved slowly. The extensive phase of reconciliation of a wide range of views has occurred on two levels. The first level is characterized by the supra-national arrangement of the European Union, wherein the European Commission played the major role in the approval and release of GMF. Decisions of the European Commission have been challenged by other European institutions and stakeholders, such as the Council of Ministers or supra-national scientific and interest groups. The second level includes Member states and their changing policy positions concerning GMF regulation, which are subject to domestic demands and incentives for policy-making.[36] In contrast to the marginal attention towards GMF by the U.S. states, several countries, such as Britain, have continuously struggled to find appropriate policy responses demanded by national entities. The divergent policy stances among the Member countries have contributed to a slowly evolving and heavily contested European policy framework for the regulation of GMF.

CONCLUSION

The significantly divergent approaches of the European Union and the United States in regard to genetically modified food are expressed through a number of statistics. Whereas, after four years of commercial introduction in the U.S., over 50 percent of the acreage of soybeans, over 40 percent of cotton, and over 30 percent of corn (in 1999) were genetically modified, in the European Union less than twenty licenses of for GM plants were issued (*Economist* 2000b: 30). In the United States, approximately 60 percent of all processed food and many other products containing GMF are available in stores without any labeling; in the E.U., considerably fewer GM products can be found on the market and these products have to conform to strict labeling rules. Hence, the question arises as to what factors are crucial for this decisive difference in environmental risk regulation.

In this paper, the individual 'stations "of amplification and their role in the formation of the acceptance and regulation of genetically modified foods were separately examined. The

[36] For example, as a response to the uproar of several Member states, the E.U. considered introducing labeling requirements for GMF. Previously, restrictive legislation was evoked in Spain and has been instigated in Italy. The United Kingdom re-interpreted E.U. regulation in order to require mandatory monitoring of the effects of GM products after marketing approval and to extend risk assessments by scientific bodies.

model of social amplification of risk postulates that the acceptance and regulation of environmental risks is a dynamics process.[37] Therefore, a brief review of the American and the European cases is in order, so that this dynamic component of the process becomes transparent. Although focusing events often initiated the process due to the direct harm inflicted by an incident, the model stresses the reciprocal and interactive relationship between each "station" of amplification.

After the outbreak of BSE, the poor handling of the crisis by national and supra-national regulators, and the increased marketing efforts of GMF by American companies, all stations of amplification in Europe have become increasingly aware and involved in the questions regarding GMF. These focusing events signaled the European "stations of amplification" the direct and indirect harms of food related "accidents." For the increasingly aware public, these incidents have been perceived as novel, involuntary, uncontrollable, and potentially catastrophic in regard to their environmental, social and ethical impacts. As a consequence of the regulatory failures of the BSE outbreak, the public distrusted national regulatory agencies. The mass media picked up focusing events and social action, such as demonstrations, and fostered negative images of GMF (e.g. by labeling products as "Frankenstein foods"). The political and administrative bodies at the E.U. level also endowed Green Parties, NGOs, and other formal associations with additional institutional opportunities for political action and allowed public interest groups to convey their interpretations of focusing events, like the BSE outbreak, to a broader and already worried public. The call for E.U. level regulation produced an amplification of various national and supra-national sources, e.g. British public apprehension, French farmers' and public interest group protests, Austrian scientific doubts about GMF, and German public knowledge about potential consequences, and thereby created a European demand for "cautious", deliberative GMF regulation. As a result, the European Union has enacted new and comprehensive laws regarding the regulation of GMF.

Conversely, in the United States, the "stations of amplification" have not picked up potential focusing events due to the lack of a clearly visible ("real") and symbolically meaningful and exploitable ("constructed") events. The few potential focusing events, such as the taco shell recall, were perceived as controllable, individual and observable. In America, where consumers

[37] These findings, based on the perspective of political science research, may also enhance research of risk studies, where the influence of political institutions, actors and processes is often neglected (Slovic 2000).

trust their regulatory agencies, the public so far has been unaware of and unknowledgeable about the issue, and has maintained a positive attitude towards the application of the technology. At the same time, media coverage of GMF has so far been focused on economic and trade aspects and the amount of coverage of the issue fluctuated in recent years. Most American public interest groups have paid little attention to the consequences and regulation of GMF. The structurally and strategically fragmented public interest groups have been struggling to reduce the complexity of the topic and to frame their concerns regarding GMF. Finally, the political realm at national and sub-nation level has shown little interest on the regulation of GMF overall. Consequently, GMF has been regulated by employing existing regulatory statues.

By integrating theoretical findings of risk studies, policy processes, and decision making, a dynamic and fluid model for studying the acceptance and regulation of environmental risks was introduced. Theoretically, the process of social amplification/attenuation can be depicted as follows. Generally, focusing events with direct or indirect harms signal policy failure. After political symbols are attached to these events, various "stations of amplification," including interest groups, media, public opinion, governmental entities and policy entrepreneurs, subsequently pick up the signal and transmit their interpretation and organizational demands. Substantiated by institutions, actors within the political realm eventually transform the amplified or attenuated "signals" into a coherent "program," i.e. public policy. The described processes are dynamic, reciprocal, and interdependent; there is no particular order of how a risk issue becomes salient, is framed, communicated to others, and then responded to at individual and organizational level.

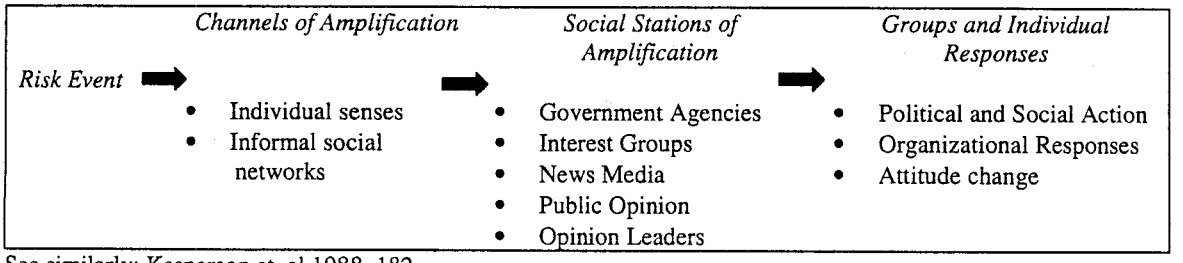
APPENDIX

Table 1. Concerns and Benefits of Genetically Modified Food.

Perceived or potential concerns:	Perceived or potential benefits
Socioeconomic:	
Commercial exploitation	Reduction of world hunger
Role of multinationals	Higher Productivity/higher yields
Patenting rights	Improvement in crop and product quality
Effects on developing countries	Potential to grow crops in less optimal conditions in the developing countries
Agriculture and profitability	
Already existing food surplus in Europe	
Environmental:	
Threat to ecosystem (competition, predation, parasitism)	Less chemicals in agriculture
Habitat destruction	Less land use/ habitat destruction
Pollution	Production of non-renewable resources by genetic processes
Threats to biodiversity	
DNA-transfer	
Health:	
Resistance transfer (through 'marker gene')	Improvement of specific nutritional goals
Introduction of allergens or toxins to food supply	Decrease of accidental gene products from cross breeding
Long-term effects (e.g. creation of new bacteria and viruses)	
Ethical:	
Human/animal rights	Support developing countries
Links to biological warfare	Property of new crops and products secured
Who decides?	
Effects on the evolutionary process	
Secrecy/commercial confidentiality	
Man playing God (religious and ethical opposition)	
Equality and the developing countries (used as 'test site')	
Ownership of life and intellectual property	
Trust in science:	
Human error	
Commercial Science	
Predictability/reliability	
Dose-response relationship	

Adopted from: Teuber (1996) and Thompson (1997).

Figure 1. A Conceptual Framework of Social Amplification of Risk.



See similarly: Kasperson et. al 1988, 182.

BIBLIOGRAPHY

Aspinwall, Mark D., and Gerald Schneider. 2000. 'Same Menu, Separate Tables: The Institutionalists Turn in Political Science and the Study of European Integration." *European Journal of Political Research* 38: 1-38.

Barboza, David. 2000. 'Gene -Altered Corn Changes Dynamics of Grain Industry." *New York Times*, December 11.

Baumgartner, Frank R., and Bryan D. Jones. 1993. *Agendas and Instability in American Politics*. Chicago: University of Illinois Press.

_____, eds.. 2002. *Policy Dynamics*. Chicago: University of Chicago Press.

Bereano, Phil, and Florian Klaus. 1999. 'The Politics of Genetically Engineered Foods: The United States versus Europe." *Seattle Times*, November 8, B13.

Bettelheim, Adriel. 2000. 'Reluctant Congress Drafted into Bioengineering Battle." *CQ Weekly*, April 22, 938-44.

Birkland, Thomas A. 1997. *After Disaster: Agenda Setting, Public Policy, and Focusing Events*. Washington D.C.: Georgetown University Press.

Blech, Jörg, and Rafaela von Bredow. 1999. 'Monsantos Vietnam." *Spiegel* 49, 51-61.

Blumer, Herbert. 1971. 'Social Problems as Collective Behavior." *Social Problems* 18, 298-306.

Brand, Constant. 2000. 'EU Assembly Rejects Tougher Rules on Genetically Modified Food." *Associated Press*, April 13.

Brasher, Philip. 2000. 'FDA Ann ouncing Biotech Food Rules." *Associated Press*, May 4.

Brickman, Ronald, Sheila Jasanoff, and Thomas Ilgen. 1985. *Controlling Chemicals: The Politics of Regulation in Europe and the United States*. Ithaca: Cornell University Press.

Bosso, Christopher J. 2000. 'Environmental Groups and the New Political Landscape." In Vig, Norman J., and Michael E. Kraft, eds. *Environmental Policy: NewDirections for the Twenty-First Century*. 4th ed. Washington, DC: CQ Press, 55-76.

Came, Barry. 1999. 'The Food Fight." *Macleans's* 112 (42), 44-45.

de Cheveigné, Suzanne. 2000. *The Press, GMOs, and Biotechnology*. Centre National de la Recherche Scientifique [www.cnrs.org/cw/en/pres/compress/ogm/ ogmeurope.htm] June 08.

Downs, Anthony. 1972. 'Up and Down with Ecology – the 'Issue-Attention Cycle'." *The Public Interest* 28, 38-50.

Economist. 1999a. 'Seeds of Discontent."February 20, 75 -77.

_____. 1999b. 'Sticky Labels."May 1, 75 -76.

_____. 2000a. 'Blech."January 15, 69.

_____.2000b. 'To plant or not to plant."Janu ary 15, 30-31.

Edelman, Murray. 1964. *The Symbolic Uses of Politics*. Urbana: University of Illinois Press.

Eichenwald, Kurt, Gina Kolata, and Melody Petersen. 2001. 'Biotechnology Food: From Lab to a Debacle." *New York Times*, January 25, B1.

Eisenberg, Avigail I. 1995. *Reconstructing Political Pluralism*. Albany: State University of New York.

European Commission. 2000. *Eurobarometer 52.1.The Europeans and Biotechnology*. Brussels.

Evans, Peter, Dietrich Reuschemeyer, and Theda Skocpol, eds. 1985. *Bringing the State Back In*. New York: Cambridge University Press.

Financial Times. 2000. 'BSE in Europe: Timeline."December 4.

Frewer, Lynn J. 1998. "Public Perception of Genetically Modified Foods". *Pesticide Outlook.* 9 (5): 11-16.

Frewer, Lynn, Chaya Howard ., D. Hedderley, and Richard Shepherd. 1996. "What Determines Trust in Information about Food-related Risks? Underlying Psychological Constructs." *Risk Analysis* 16 (4): 473-86.

Gaskell, George, Martin W. Bauer, John Durant, and Nicholas C. Allum. 1999. "Wo rlds Apart? The Reception of Genetically Modified Foods in Europe and the U.S." *Science* 285: 384-87.

Giannini Spohn, Suzanne. 1996. "The Making of Environmental Policy Decisions" In Rudolph, Frederick B., and Larry V. McIntire, eds. *Biotechnology: Science, Engineering, and Ethical Challenges for the 21st Century.* Washington, D.C.: Joseph Henry Press, 246-60.

Gowda, M. V. Rajeev, and Paula Owsley-Long. 1998. "Of Nuclear Energy and Acceptable Risk: The Relevance of Social Science to Societal Technology Choices." In Neuby, Barbara, ed. *Relevance of Social Sciences in the Next Millennium.* Vol. 35, 71-84.

Graber, Doris, ed. 2000. *Media Power in Politics.* 4th ed.. Washington, D.C.: CQ Press.

Habermas, Jürgen. 1973. *Legitimationsprobleme im Spätkapitalismus.* Frankfurt am Main: Suhrkamp.

Hall, Peter. 1986. *Governing the Economy.* New York: Oxford University Press.

_____. 1993. "Policy Paradigm, Social Learning, and the State" *Comparative Politics* 25 (3):275-96.

Hall, Peter, and Rosemary C. R. Taylor. 1996. "Political Science and the Three New Institutionalism." *Political Studies* 44:936-57.

Hannigan, John A. 1995. *Environmental Sociology: A Social Constructionist Perspective.* New York: Routledge.

Hausknost Daniel. 1998. *In Europe Consumers Think Twice: A Look at the Uproar over Genetically Engineered Food.* Vienna: Institute for Agriculture and Trade Policy.

Hilgartner, Stephen, and Charles L. Bosk. 1988. "The Rise and Fall of Social Problems: A Publi c Arenas Model." *American Journal of Sociology* 94 (1): 53-78.

Hoban, Thomas, and P. Kendall. 1997. "Consumer Acceptance of Biotechnology: An International Perspective." *Nature/Biotechnology* 15: 232-33.

Immergut, Ellen. 1992. *Health Politics: Interests and Institutions in Western Europe.* New York: Cambridge University Press.

Jasanoff, Sheila. 1990. "American Exceptionalism and the Political Acknowledgment of Risk." *Daedalus* 119 (4): 61-82.

_____. 1991. "Cross -National Differences in Policy Implementation." *Evaluation Review* 15 (1): 103-19.

Jones, Bryan D. 1994. *Reconceiving Decision Making in Democratic Politics.* Chicago: University of Chicago Press.

_____. 2001. *Politics and the Architecture of Choice: Bounded Rationality and Governance.* Chicago: University of Choice Press.

Kasperson, Roger E., Ortwin Renn, Paul Slovic, Halina S. Brown, Jacques Emel, Robert Goble, Jeanna X. Kasperson, and Samuel Ratick. 1988. "The Social Amplification of Risk: A Conceptual Framework." *Risk Analysis* 8 (2): 177-87.

Katzenstein, Peter, ed. 1978. *Between Power and Plenty.* Madison: University of Wisconsin Press.

King, Gary, Robert O. Keohane, and Sidney Verba. 1994. *Designing Social Inquiry: Scientific*

Inference in Qualitative Research. Princeton, Princeton University Press.
Kingdon, John W. 1984. *Agendas, Alternatives, and Public Policies*. Boston: Little, Brown.
Lemkow, Louis. 1993. *Public Attitudes to Genetic Engineering: Some European Perspective*. Luxembourg: Office of Official Publications of the European Communities.
Levidow, Les. 1999. 'Regulating Bt Maize in the United States and Europe: A Scientific - Cultural Comparison." *Environment* 41 (10): 10-20.
Luhmann, Nicklas. 1979. *Trust and Power*. Chichester: Wiley.
_____. 1989. 'Politische Steuerung. Ein Diskussionsbeitrag" *Politische Vierteljahreszeitschrift* 30: 4-9.
Lynch, Diahanna, and David Vogel. 2000. "Apples and Oranges: Comparing the Regulation of Genetically Modified Food in Europe and the United States." Paper presented at the 2000 Annual Meeting of the American Political Science Association.
Menrad, Klaus. 1999. 'Future Impacts of Biotechnology on Agriculture and Food Processing." *Outlook on Agriculture* 28 (3): 155-61.
Münch, Richard with Christian Lahusen, Markus Kurth, Cornelia Borgards, Carsten Stark, and Claudia β.2001 *Democracy at Work: A Comparative Sociology of Environmental Regulation in the United Kingdom, France, Germany, and the United* States. Westport: Praeger.
National Conference of State Legislatures. 2000. *Agricultural Biotechnology Regulation 2000.* May 1. [www.ncsl.org/programs/ESNR/biotecleg.htm].
Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Internal Dynamics of Interest Groups*. Cambridge: Harvard University Press.
O'Riordan, Timothy. 1995. 'Introduction: Risk Management in its Social and Political Context." In O'Riordan, Timothy, ed. *Perceiving Environmental Risks*. London: Academic Press, 1-10.
Page Edward C. 1992. *Political Authority and Bureaucratic Power: A Comparative Analysis*. 2nd ed, New York: Harvester Wheatsheaf.
Plein, L. Christopher. 1997. 'Strategies of Agenda Denial: Issue Definition and the case of bST" In Cobb, Roger W. and Marc Howard Ross, eds. *Cultural Strategies of Agenda Denial: Avoidance, Attack, and Redefinition*. Lawrence: University Press of Kansas, 89 - 111.
Pollack, Andrew. 2001. 'FDA Plans New Scrutiny in Areas of Biotechnology." *New York Times*, January 18, A1.
Pollack, Mark A., and Gregory C. Shaffer. 2000. 'Biotechnology: The Next Transatlantic Trade War?." *The Washington Quarterly* 23 (4):41-54.
Pollak, Robert A. 1995. 'Regulating Risk." *Journal of Economic Literature* 33 (1): 179-91.
Rein, Martin, and Donald Schön. 1991. 'Frame -reflective Policy Discourse" In Peter Wagner, Carol Weiss, Björn Wittrock, and Hellmut Wollmann, eds. *Social Sciences and Modern States. National Experiences and Theoretical Crossroads*, Cambridge: Cambridge University Press, 123-99.
Rochefort, David, and Roger W. Cobb, eds. 1994. *The Politics of Problem Definition*. Lawrence: Kansas University Press.
Rogers, Everett M., and James W. Dearing. 1988. "Agenda -setting research: Where Has It Been? Where Is It Going?" in Anderson, James A., ed.. *Communication Yearbook* 11. Newbury Park: Sage, 555-94.
Schattschneider, E. E.. 1960. *The Semi-Sovereign People*. New York: Holt, Rinehart and Winston.

Sentker, A. 1996. 'Genetic Engineering and the Press – Public Opinion versus Published Opinion." In Tomiuk, J., K. Wöhrmann, and A. Sentker, eds.. *Transgenic Organisms: Biological and Social Implications*. Basel: Birkhäuser Verlag, 241-54.

Simon, Herbert. A. 1985. 'Human Nature in Politics: The Dialogue of Psychology with Political Science." *American Political Science Review* 79 (2): 293-304.

_____. 1997. *Administrative Behavior*. 4th ed. New Work: Free Press.

Slovic, Paul. 1987. 'Perception of Risk" *Science* 236: 280-85.

_____, ed. 2000. *The Perception of Risk*. London: Earthscan.

Specter, Michael. 2000. 'The Pharmageddon Riddle." *The New Yorker* April 10, 58-71.

Stone, Deborah A. 1989. 'Casual Stories and the Formation of Policy Agendas." *Political Science Quarterly*, 104 (20): 281-300.

Teuber, M. 1996. 'Genetically Modified Food and its Safety Assessment." In Tomiuk, J., K. Wöhrmann, and A. Sentker, eds. *Transgenic Organisms: Biological and Social Implications*. Basel: Birkhäuser Verlag, 181-95.

Thomas, Clive S., ed. 1993. *First World Interest Groups: A Comparative Perspective*. Westport: Greenwood Press.

Thompson, Paul. 1997. *Food Biotechnology in Ethical Perspective*. New York: Chapman & Hall.

Truman, David. 1951. *The Governmental Process*. New York: Knopf.

Vogel, David. 1986. *National Styles of Regulation: Environmental Policy in Great Britain and the United States*. Ithaca: Cornell University Press.

_____. 1997. *Barriers or Benefits? Regulation in Transatlantic Trade*. Washington, DC: Brookings Institution Press.

Vogel, Steven. 1996. *Freer Markets, More Rules*. Ithaca: Cornell University Press.

Weir, Margaret. 1992. *Politics and Jobs*. Princeton: Princeton University Press.

Weiss, Rick. 2000. 'U.S. to Add Oversight on Biotech Food." *Washington Post*, May 3, A01.

Wilson, James Q. 1989. *Bureaucracy: What Government Agencies Do and Why They Do It*. New York: Basic Books.