

EPISTEMIC BOOMERANG: EXPERT POLICY ADVICE AS LEVERAGE IN THE CAMPAIGN AGAINST TRANSGENIC MAIZE IN MEXICO*

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This article introduces the term “epistemic boomerang” to describe a distinctive pattern of activism in which activists, frustrated by exclusion from national politics, attempt to mobilize expert advice in support of social goals. Using expertise as leverage can be a desirable option for activists when political authorities favor technocratic decision making. Epistemic boomerang formation is possible when expert organizations encourage citizen participation in agenda setting and spaces are made for encounters between experts and activists. These processes are evident in the contentious politics of genetically engineered maize in Mexico. In this case, maize producers and community activists mobilized to confront an expert advisory group assembled by the tri-national Commission for Environmental Cooperation. As a result, the values and perspectives of many of the protesters were conveyed in the expert report and recommendations. This article examines the political outcomes of this epistemic boomerang and considers its implications for the study of social movements.

In 2002, a group of activists, scholars, and rural community leaders composed a petition demanding an assessment of the impacts of transgenic introgression into landraces of maize (corn) in Mexico. This seemingly obscure topic had become the core grievance of an emerging movement against genetically engineered (GE) crops. Critics railed against the “contamination” caused by the cross-pollination of GE corn with native varieties, while the biotechnology industry and its allies struggled to assure the public of the safety and benefits of their GE products. The petition was sent to the Commission for Environmental Cooperation (CEC), a tri-national body created as part of the environmental “side agreement” to the North American Free Trade Agreement (NAFTA). The CEC responded, and, after many months of research and deliberation, the scientific experts who were selected to investigate the topic held a public meeting in the heart of the state where contamination of native maize was first discovered. At the symposium, the ecologists, molecular biologists, social scientists, and other experts serving on the panel were stunned to encounter an impassioned, lively, and (to their eyes) chaotic public protest. This was not the first time that anti-GE activists had chosen a meeting of experts as a site of intervention, but unlike previous encounters, the meeting in Oaxaca reshaped the relationship between the movement and scientific expertise, blurring the boundaries that typically (if artificially) separated technical assessment from political contention. When the expert advisory group finally released its recommendations several months later, the influence of the protesters was unmistakable: the ostensibly scientific report addressed themes of democratic participation, cultural values, spirituality, and sustainable livelihoods.

This case offers important insights for the study of contemporary social movements. As a growing number of social movements are engaged with issues informed by, or even created by,

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new developments in science and technology, how are scientists drawn in as allies, and how does this change the arguments that scientists make? In this article, I suggest that the Mexican maize struggle illustrates a process that I will term an “epistemic boomerang,” through which local groups and non-governmental organizations (NGOs), frustrated by exclusion from policymaking debates, go outside their normal political channels to appeal to scientists, hoping to mobilize scientific research in support of their social goals. This strategy depends upon scientists’ willingness to respond to social movements and the receptivity of state officials to experts’ arguments, both of which are shaped by features of the institutional context.

Forming an epistemic boomerang can be a desirable option for activists when an issue has become “scientized” or when political authorities favor technocratic decision making. Activists are in a position to draw in scientific allies when the policies of expert organizations encourage citizen participation in agenda setting and when spaces are made for encounters between experts and activists (for example, when discussions are held in public places). In this case, the experts that maize activists confronted in public collectively shifted the character of their claims about maize. In their final report and recommendations, they made not only causal claims, as expected in an environmental assessment, but also adopted elements of the activists’ framing of the issues, referring to local cultural values and the need for participatory decision making. However, in political contexts where credibility is assumed to require distance from politics, experts who appear to be allied with activists are likely to be marginalized or discredited. The CEC report was met with overwhelming pushback from Mexico’s trading partners, who condemned the expert recommendations for reflecting something other than a narrowly technical assessment.

Thus, forming an epistemic boomerang is far from a surefire strategy for social movements. However, as expert advisory groups are increasingly a feature of national and international politics (including the Intergovernmental Panel on Climate Change, the many expert advisory panels of the World Health Organization, and similar bodies at the domestic and local levels), and as political leaders repeatedly insist upon “sound scientific” rationales for controversial decisions on a wide range of topics, it is likely that social movements will continue to seek scientific experts as potential allies against unresponsive governments. Understanding the complexities of the relationship between science and activism is therefore a necessary task for sociologists of social movements.

Data for the following analysis, which is part of a larger research project on the contentious politics of genetic engineering, was collected through interviews with activists, scientists, and public officials involved in the politics of GE crops in Mexico, as well as through participant observation, archival research, and analysis of published documents (such as scientific papers, newspaper articles, and activist websites). Field research in Mexico took place from September 2005 to April 2006. During that time, I interviewed over fifty participants in the conflict over GE maize, including professional activists working for transnational NGOs, representatives of Mexican environmental and sustainable development advocacy organizations, rural and indigenous activists involved in the grassroots “network in defense of maize,” expert contributors to the debate on GE maize (from Mexico and other parts of the world), and Mexican public officials. This interview data is supplemented with records of activist correspondence, archived at the offices of Grupo de Estudios Ambientales (Environmental Studies Group, or GEA), a small environmental NGO in Mexico City. Journalistic accounts and secondary sources were also used in reconstructing the history of confrontations between activists and professional experts on the matter of GE maize.

SCIENCE AND SOCIAL MOVEMENTS

In a variety of contemporary movements, from rainforest advocacy to conflicts over dam building to battles over genetically modified food, a particular group of elite actors—scientists—

are crucial partners to those seeking social change. Scientific actors and institutions contribute to defining emerging issues, provide information to activists, and take part in political conflicts at both the domestic and international levels. The relationship between science and social movements is perhaps most pronounced (and most widely analyzed) in studies of environmental movements, which have long relied on science to press the importance of their concerns (Schnaiberg 1980; Hays 1987; Dunlap and Mertig 1992). However, other examples indicate that (social) science and activism merge across a wide variety of historic and contemporary movements. Social scientists served as expert witnesses in landmark civil rights lawsuits in the United States (Jackson 2001), and today, antiracism campaigns use statistics on African-American incarceration analyzed by sociologists. In another example, the gay rights movement has, at times, grappled with the scientific possibility of a “gay gene” and had to deal with controversial research on brain differences between gay and straight people (Brookey 2002).

The linking of science and social movements is part of a broader scientization of social problems and politics over the past several decades (Drori, Meyer, Ramirez, and Schofer 2003; Drori and Meyer 2006). In the 1960s and 1970s, European and American political theorists began to note a shift toward a technocratic model of governance in which politics is replaced by a scientifically rationalized administration (Price 1965; Habermas 1970; Benveniste 1973). As Sheila Jasanoff (1990) suggests, technical experts have become the “fifth branch” of the United States government, providing advice and policy guidance while maintaining the appearance of political neutrality. A variety of scholars have observed that the tendency for political conflicts in the United States to become scientized puts ordinary citizens at a disadvantage (Sarewitz 2004; Morello-Frosch 2006). In a wide range of recent debates, from tobacco to genetically modified foods, industry groups have used a concept of “sound science” to silence dissent and maintain the upper hand in political deliberations. Much of the scholarship documenting the scientization of politics focuses on the U.S. and Europe; however, there is growing evidence that the trend has also reached other parts of the world (Drori et al. 2003; Kinchy, Kleinman, and Autry 2008; Kleinman, Kinchy, and Autry 2009). For example, Sabrina McCormick (2006: 327) has shown that Brazilian dam-building policy, shaped by “European or American-educated technocrats,” is also scientized, as “decisions about regulating dam building are based on environmental impact assessments generated by hired scientific consultants.”

Given the widespread scientization of politics, it is not surprising that social movements often adopt scientized repertoires of contention, such as using counterexperts, publicizing suppressed studies, and carrying out their own participatory research. Sociologists of science and others in the interdisciplinary field of science and technology studies (STS) have been observing these trends for some time. Much of the STS work on social movements has focused on science and technology as the arenas of contention, asking how activism changes scientific knowledge and practice (for a review, see Hess, Breyman, Campbell, and Martin 2008). Research has shown that social movements can bring about new ideas and methods in scientific research (Epstein 1996) or technological development (Hess 2007). Numerous studies indicate that mobilized citizens can become scientific experts and knowledge producers themselves on matters of significance to them, such as illness or local environmental contamination (Brown 1992; McCormick, Brown, and Zavestoski 2003; Corburn 2005; Hess 2009). Activists—particularly in the health arena—can have a significant impact on the causal claims that scientists make. For example, Stella Capek (2000) has shown how a grassroots self-help group helped transform how medical professionals understand the causes of endometriosis. Another area of investigation indicates that scientists sometimes behave like activists, working to change the priorities and practices of their fields and sometimes venturing into the contentious politics of public policy (Moore 1996, 2008; Kinchy and Kleinman 2003; Frickel 2004a, b; Kinchy 2006). When it comes to ordinary citizens using science as a resource in struggles against the state, however, the general conclusion seems to

be that science is an “unreliable ally” (Yearley 1992). Among other shortcomings, activists repeatedly discover that science is unable to provide clear-cut solutions to value-laden social conflicts.

Despite the proliferation of compelling case studies of social movements that use, critique, and produce science and technology, science and experts are still peripheral concerns in the major theoretical work on collective action. However, there are several opportunities for giving science a more central place in the major theories of social movements. A significant attempt to theorize the relationship between scientific experts and social movements can be found in Eyerman and Jamison’s (1991) theory of cognitive praxis. They suggest that social movements are shapers of consciousness and public spaces in which knowledge is produced. According to Eyerman and Jamison, new ways of understanding the world develop first among “movement intellectuals,” who may be dissenting scientists or “organic intellectuals” in the Gramscian sense. These ideas are then taken up and developed by a wider public, providing a source of collective identity across long distances of physical space and producing broad cultural change. For example, according to Jamison (2006), ideas from the scientific study of systems ecology and the “small is beautiful” economics of Ernst F. Schumacher were translated into public discourse and shaped the subsequent development of the environmental movement. Sylvia Noble Tesh (2000) observes that, prior to the environmental movement, it was uncommon for ordinary people to perceive that chemical waste might be causing disease. But today, these connections are so taken for granted that ordinary citizens are often the first people to discover the links between chemicals in their communities and an elevated rate of disease.

The theory of cognitive praxis captures one important way that science and social movements together transform culture, but it does not address the questions about political opportunities, organizations, resources, framing, and transnational networks that motivate much contemporary research on contentious politics. There are several potential ways to bring science into existing theoretical frameworks that do address those questions. For example, the framing literature suggests that collective action frames must have empirical “credibility” (Snow and Benford 1988; Benford and Snow 2000), which, presumably, could imply *scientific* credibility in certain cases. The literature on the construction of scientific credibility (see Gieryn 1999) may therefore be useful for conceptualizing how movements construct credible collective action frames. Additionally, incorporating insights from the sociology of science could also strengthen the conceptualization of elites in the social movements literature. Analysts of social movements have long discussed the effects of elite allies on movement mobilization (Jenkins and Perrow 1977; McCarthy and Zald 1977; McAdam 1982). For example, it is widely recognized that divisions among elites generate political opportunities for mobilization. If “expert advisors” are conceptualized as a variety of political elites, it is plausible that schisms among scientific advisors may create political opportunities. In a study of AIDS treatment activism, Steven Epstein found that “preexisting lines of cleavage within the biomedical establishment” generated opportunities for activists to influence the direction of medical research, by “throw[ing] their weight on one side or the other” (Epstein 1996: 336). However, the topic of how schisms among experts might generate opportunities in the area of state policy and practice remains unexamined.

Theories of transnational activism offer yet another opportunity to conceptualize the relationship between science and social movements. Work in this vein tends to draw a clear line between advocacy and policy-relevant expertise. Margaret E. Keck and Kathryn Sikkink (1998: 30), for example, distinguish between transnational advocacy networks and epistemic communities, explaining that the former are motivated by shared values, while the latter are motivated primarily by shared causal beliefs (see also Khagram, Riker, and Sikkink 2002: 14). Advocacy networks involve activists and organizations “working internationally on an issue, who are bound together by shared values, a common discourse, and dense exchanges of information and services” (Keck and Sikkink 1998: 2). By contrast, an epistemic community

is a “network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area” (Haas 1992). As understood by Peter Haas (1992), epistemic communities are not necessarily scientific communities; they are typically made up of broad coalitions of actors, including scientists, public officials, and, in some instances, NGOs. However, what defines an epistemic community is the existence of shared causal beliefs, derived from a specific area of common expertise. Members of an epistemic community may disagree on the details of how to respond to the problem they agree upon; however, as Claire Gough and Simon Shackley put it, “Scientific knowledge is the ‘glue’ that helps to keep policy actors committed and can be used as a trump card against opponents to the epistemic coalition” (2001: 332). The “glue” for an advocacy network, on the other hand, is shared values.

Research by sociologists of science repeatedly demonstrates that the boundaries between science and politics (or values) are not given; they are social accomplishments (Gieryn 1999; Lamont and Molnar 2002). Thus, distinctions between advocacy networks and epistemic communities are better understood as variable rather than given by definition. Nevertheless, there are good methodological reasons to distinguish between them as ideal types. Sanjeev Khagram and his colleagues note that a restrictive definition of a transnational advocacy network, consisting only of NGOs and social movements, “helps focus on the conscious linkages made to other actors as factors conditioning the emergence and/or effectiveness of transnational collective action rather than as part of the network by definition” (Khagram, Riker, and Sikkink 2002: 9). This suggestion is relevant not only to transnational networks, but also domestic struggles. How then, might we study the “conscious linkages” between activists and expert communities?

EPISTEMIC BOOMERANG

One potential form that linkages between activists and experts can take is an arrangement that I refer to as an *epistemic boomerang*. Building on Keck and Sikkink’s (1998) boomerang model of transnational advocacy, I suggest that expert advisory groups and other sources of scientific advice to government exert a kind of influence that may serve as leverage for local social movements. In Keck and Sikkink’s boomerang model, when states are unresponsive to the demands of their citizens, activists may seek the support of international allies in a process referred to as externalization (Tarrow 2005). Externalization can take the form of information politics, in which activist networks diffuse to international allies information about abuse or injustice taking place locally, or institutional politics, in which local actors take their grievances to supranational institutions, such as the European Court of Justice (Tarrow 2005). Transnational networks of activists and NGOs play an important role in the externalization of contentious politics, often aiding domestic social movements when the efforts of local organizations to pressure their government are rebuffed. The boomerang metaphor, further elaborated in a variety of recent studies (Tarrow 2005; Seidman 2007), is meant to capture the sense in which local citizens voice their concerns to the international community, which are then echoed back as external pressure on their recalcitrant governments. Pressure comes from governments and publics that are sympathetic to local groups, or from international agencies that have the authority to make decisions or recommendations about domestic issues. This boomerang pattern can be an effective way to produce political change when governments are deaf to the grievances of their own citizens.

There is a significant difference between the expert advisors in the epistemic boomerang model and the sympathetic international actors that are found in Keck and Sikkink’s work. In cultural contexts where scientists are seen as “biased” if they express political opinions, scientific experts are far less likely to explicitly state their political affinity with activist groups. Thus, in the epistemic boomerang model, the key feature is interaction among

activists and expert advisors, resulting in scientific advice that furthers the aims of a local struggle. Local groups use their relationships with NGOs to gain access to scientific researchers and advisors, in the hopes that the experts will influence state policy by providing advice and making other expressions of scientific concern about the issue at stake. It is not expected that the experts in this model will always openly and explicitly voice support for locals. The epistemic boomerang is also different from the model of transnational advocacy in that it is not necessarily transnational. However, because of the transnational nature of many scientific communities and the supporting role of international organizations, it is likely that an epistemic boomerang will cross national borders.

The formation of an epistemic boomerang depends upon scientists' willingness to respond to and interact with social movements. Some organizational and discursive factors may encourage scientists to be responsive to activist concerns. First, activists must frame their concerns in ways that resonate with questions that interest scientists, whether in academia, research organizations, or in the expert branches of government. Sylvia Noble Tesh (2000) describes a case in which residents of Alsea, Oregon in the mid-1970s organized against the spraying of the herbicide 2,4,5-T by the Forest Service, believing it to cause health problems. One resident, a schoolteacher, collected community-level data that seemed to indicate a correlation between the spraying of the herbicide and the incidence of miscarriage. Friends of the Earth, an environmental advocacy NGO, publicized the teacher's study and pressured the U.S. Environmental Protection Agency (EPA) to conduct a full scientific inquiry. Because the EPA was already attuned to the issue and had recently asked manufacturers to produce research showing that the herbicide was safe, the schoolteacher's amateur epidemiological study "landed in a fertile field" (Tesh 2000: 15). The EPA created a study team to more fully examine the link with miscarriage. Ultimately, citing the research carried out by its study team, the EPA suspended the use of the herbicide. In this case, the presentation of the community's concerns in the form of an epidemiological study (as opposed to, say, a critique of the chemical industry) successfully bridged the local group's concerns and the perspectives of toxicologists at the EPA. This case also indicates the important role of NGOs in connecting local groups with experts.

The organizational setting for interactions between activists and experts is another significant factor in the formation of an epistemic boomerang. In particular, the site for interaction must be public and accessible, either through the organization of physical space (such as public hearings) or through policies encouraging citizen input and participation. For example, UN meetings have increasingly opened to NGOs. Perhaps most important for the formation of an epistemic boomerang is the existence of a public service mandate for the scientific organization or discipline in question. There are a number of cases in which academic researchers from schools of public health have allied with grassroots antitoxics groups in local communities (Brown 1990; Corburn 2005: 55-57). In each case, not only service to the public but also collaboration with local communities was treated as an important part of innovative public health research.

Beyond identifying the conditions in which an epistemic boomerang might form, this study is concerned with how intersections between advocacy networks and epistemic communities change the character of the claims that scientific experts make. Scientists are typically held to professional standards that require at least the appearance of political neutrality. When faced with a contentious political issue, scientists tend to limit their contributions to factual information and relatively uncontroversial technical advice. Scientific experts who openly venture into the realm of politics, moving from advice to advocacy, from causal claims to principled claims, risk their credibility as objective observers. However, the epistemic boomerang creates the potential for two-way sharing of knowledge and ideas between experts and the local activists who are seeking social change. In such a context, experts do not simply give advice to activists or to political authorities; they also listen to local groups seeking political change. Could this lead experts involved in an epistemic boom-

erang to make *principled* claims on behalf of a social movement? In what circumstances do scientists break with convention and take principled stands in support of local activists? Answers to this question are difficult to find in the existing literature on science and social movements. A number of relevant factors emerge in the case I examine in the remainder of this article.

THE CAMPAIGN AGAINST GE MAIZE IN MEXICO

Like many other countries around the world, Mexico has become a site of contentious conflict over the introduction and regulation of GE crops (sometimes referred to as transgenic, genetically modified, or GM, crops). Although concerns about biotechnology are numerous, one of the central issues today is the topic of “transgene flow”—the uncontrolled movement of GE material through the environment. Pollen travels via wind and insects, allowing GE seeds to scatter and become easily mixed with conventional seeds. In 2001, scientists from the University of California, Berkeley, discovered GE maize growing in isolated rural areas of Mexico, despite the fact that the crops had not been approved for cultivation in that country (Quist and Chapela 2001). Evidently, Mexican peasant farmers had no knowledge that some of the maize they had planted was genetically engineered; they had simply cultivated some of the grain that is imported from the United States in vast quantities every year (Nadal 2000, 2003; Henriques and Patel 2004). Because Mexico is a center of genetic diversity for maize and its wild relatives, scientific and popular discussion about this discovery immediately turned to environmental safety issues, such as the potential effects on teosinte, a wild relative of maize.

However, urban and rural activists pointed to the broader implications, tracing the root cause of the problem to Mexico’s neoliberal agricultural policies, which have resulted in increasing food dependency on the United States (Henriques and Patel 2003). Furthermore, indigenous rights activists argued that the genetic “contamination” of native varieties of maize constituted an attack on traditional cultures and indigenous communities’ autonomy (Vera Herrera 2004). This quotation from an indigenous activist gives a sense of how some rural Mexican activists frame the problem of GE maize and unwanted transgene flow:

For us maize is sacred, it is present with us [*presente*], and we care for it through all that we do, listening to the wisdom of the elders, respecting our customs and culture. We don’t want and we won’t allow any transgenics, and we will unite with all the communities that have been contaminated and that resist. Maize [is part of] our autonomy and we are not going to allow any government or corporation to contaminate it. (Red “En Defensa del Maíz” 2005, my translation)

Framed in this way, maize is both sacred and a means of economic and cultural survival. Another activist put it this way:

There is a broad attack against maize. The matter of transgenic contamination is only one of the forms in which maize is being threatened.... [Because of poverty] *campesinos* [peasants] are working in the United States and so less maize is being produced.... So all of these things are together and we see them as an aggression against indigenous people. (Interview with respondent 3, 2006, my translation)

In other words, transgene flow is both a symptom and symbol of Mexico’s changing corn economy. Contamination is understood as a part of an entire complex of industrial agriculture, free trade, and oppression of indigenous people.

Two transnational NGOs, Greenpeace and the Action Group on Erosion, Technology and Concentration (ETC Group), took on an important role in organizing events, publishing

materials, and linking multiple community groups and organizations together in a growing network “in defense of maize.” Alliances between advocacy NGOs and rural communities have been facilitated through intermediary organizations—“development-oriented civic entities that provide services for, and channel resources to, local base organizations comprising disadvantaged rural or urban households and individuals” (Carruthers 1996). A transnational anti-GE advocacy network additionally supports the Mexican struggle against GE maize. For example, in 2003, over 300 organizations signed an open letter, calling on the Mexican government and the international community to take immediate action to stop the introduction of GE maize to Mexico through grain shipments from the US. Signatories included groups as diverse as the Confederation of Indigenous Nations of Ecuador, the National Family Farm Coalition of the US, the Ecological Society of the Philippines, and the Gene-Ethics Network of Germany (ETC Group 2003).

Mexican officials have been unresponsive to the demands of anti-GE protestors, despite formal assurances that protecting maize biodiversity is a priority. Under strong pressure from the biotechnology industry, a new “biosafety law” was passed in 2005, which establishes a system for eventually authorizing the cultivation of GE maize (Massieu Trigo and San Vicente Tello 2006). One of the ways that the Mexican government has justified its unresponsiveness to public concerns about GE maize is to define the issue as narrowly technical. In general, the policy process related to GE maize has been focused on evaluations of risk to biological diversity (a “biosafety” threat). Cultural and economic issues, while raised persistently by activists and often mentioned in interviews by sympathetic government officials, are not included among established regulatory criteria. Thus, policies toward biotechnology marginalize social, economic, and ethical concerns, leaving farmers and activists with few official venues in which to express their wide-ranging critiques of the technology and its impacts.

FORMING AN EPISTEMIC BOOMERANG

Facing continued recalcitrance on the part of government regulatory agencies, Mexican anti-GE activists, supported by international allies, decided to externalize the conflict using the institutional mechanisms generated by the North American Agreement on Environmental Cooperation (NAAEC), the environmental “side agreement” to NAFTA. Under the NAAEC, a tri-national body, the Commission for Environmental Cooperation (CEC), works to “address regional environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law.”¹ In 2002, petitioners asked the CEC to study the issue of GE maize in Mexico and generate a set of recommendations. Under persistent pressure, the CEC eventually responded favorably to the petition and created an interdisciplinary advisory group made up of scientists and other experts with a wide range of views on the risks and benefits of GE crops.² The central task of the advisory group was “to examine, from different perspectives, issues related to gene flow from transgenic varieties of maize to Mexican land races and their wild relatives, and the conservation of biodiversity in this centre of origin,” with the aim of producing policy recommendations.³

The relationship between the CEC advisory group, advocacy NGOs, and local community groups constitutes what I refer to as an epistemic boomerang. The experts participating in the advisory group were drawn in as leverage for the campaign against GE maize. Although they should not be characterized as overt “allies” of the anti-GE movement (indeed, some members of the advisory group were more clearly friends of the biotechnology industry), the expert advisors were situated in a position to exert some degree of influence on the Mexican government, and maize activists hoped that influence would aid their struggle. Maize activists’ experiences with the CEC therefore provide insights into the organizational structures and processes that facilitate the formation of an epistemic boomerang and lead experts to

take positions on the issues that matter to social movements.

Like most environmental agencies, the CEC's approach to carrying out environmental assessments is fairly scientized, relying on experts to assess the issues. However, as an inter-governmental organization, the CEC is unusual in that it provides various formal opportunities for public participation. As one observer has described the CEC, the commission endeavors to "assure an independent, neutral or scientific judgment, at the same time, taking into account the possible number of legitimate political interests" (Antal 2006). A citizen submission procedure permits citizens of the three NAFTA countries to file environmental complaints to the CEC. NAAEC also instituted a committee called the Joint Public Advisory Committee (JPAC), made up of citizens primarily drawn from NGOs in the three member countries. The fifteen JPAC members produce consensus statements on matters relevant to CEC activities, thus providing an additional source of civil society input (Wirth 2003). Furthermore, the CEC typically holds a public symposium as part of the process of preparing a report and recommendations. In the case of the Mexican maize controversy, the CEC held the symposium in Oaxaca, which provided an unprecedented occasion for local critics of GE maize to bring their concerns to an international audience.

The CEC typically includes socioeconomic impacts in its assessments of environmental issues, and in the case of GE maize, the commission determined from the very beginning of the investigation that its terms of reference would be extremely broad. The advisory group set out to consider social values and cultural identity alongside ecological, agronomic, and health issues. The inclusion of social and cultural impacts as areas of assessment drew criticism from United States authorities. The U.S. Environmental Protection Agency (EPA) formally expressed its objections to the CEC's unconventional approach to assessing the impacts of GE maize. The EPA suggested that the commission should *not* consider the effects of GE maize on indigenous peoples and asked for the deletion of phrases such as "issues of justice and fairness in the distribution of risks and benefits among affected parties" (Redlin 2003). The CEC rejected the EPA's suggestions, keeping social, cultural, and economic impacts within the terms of reference for the report. An anthropologist and a sociologist were also hired to prepare a background paper on the "Social and Cultural Effects Associated with Transgenic Maize Production."

Despite the CEC's clear commitment to social impact assessment and issues of justice, the paper on social and cultural effects gave no sign of being aligned with maize activists. The lengthy, detailed report maintained a tone of neutrality and distance from the political conflict, downplaying the negative impacts of changes that might occur because of introducing transgenic maize, and simply suggesting more research and public input:

Maize agriculture and Mexican society and culture are dynamic and will experience change whether transgenic maize is introduced or not, and Mexican farmers have shown that they are capable of managing their maize populations to limit or encourage change from new varieties. Whether transgenic maize will accelerate change or provoke unique or undesirable consequences in the country's maize is impossible to predict, but the possibility of this warrants further research. (Brush and Chauvet 2004: 47)

More generally, the background paper conveyed the diversity and complexity of maize production systems in Mexico and the impossibility of making a blanket assessment of the social impacts of transgenic maize (Brush and Chauvet 2004). At certain places in the report, the authors drew conclusions that contradicted the claims of anti-GE activists on some key issues, such as intellectual property and farmers' control over the seed supply. Thus, application of social science perspectives to the issue of GE maize did not necessarily mean providing support for the maize activists' social critique of the technology. However, as I discuss in a later section, the CEC's commitment to examining impacts *on* indigenous peoples and other maize producers, as well as their desire to solicit public input, appears to have disposed the CEC to later consider the opinions *of* those people—not just on the topic of the

“effects” of GE maize, but on the large scale causes of the problem, including free trade agreements, neoliberal agricultural policies, and a widely perceived “attack” on small-scale maize producers.

The CEC scheduled a symposium to be held in Oaxaca in March 2004, in which the initial findings would be presented to the public and the advisory group members would be able to privately formulate their policy recommendations. The CEC’s institutionalized openness to civil society participation provided activists with a sense that it was their right to weigh in on the issue and change the direction of the CEC’s plans, if necessary. The belief that the forum was intended to be open was conveyed most clearly to me in 2007, when I shared the findings of this study with one of the primary organizers of the protest events surrounding the CEC process. She expressed surprise when I referred to the CEC symposium as a “scientific meeting.” Her perception (which differed greatly from that of the scientists involved, as discussed below) was that since her organization and other activists had taken the lead in bringing about the CEC assessment process, the symposium was rightfully a space for protest and citizen testimony.

By the end of 2003, Greenpeace and a number of Oaxacan organizations were already planning to turn the CEC meeting into a major opportunity for the movement to take a stand against GE maize. A national activist forum “in defense of maize” was held in Mexico City in December 2003, and there, environmentalists called on participants to converge on Oaxaca during the CEC symposium in March for a major demonstration. The day before the CEC symposium, the protesters held an alternative forum called “Defend our maize, protect life.” Activists told me that the gathering in Oaxaca represented an important turning point, when the opposition to GE maize, begun as a campaign by environmentalists, took shape as a grassroots movement driven by indigenous communities and small-scale maize producers, whose objections to GE maize were rooted in a broader critique of industrial agriculture, neoliberalism, and the loss of cultural traditions.

Over 380 people attended the symposium—280 of them Mexicans—far more than the CEC had anticipated (Secretariat of the Commission for Environmental Cooperation 2004). NGOs and rural groups used the public scientific meeting as an opportunity to demonstrate their opposition to GE maize through testimony, protest signs, theatrical interventions, and the placement of colorful mosaics of maize on the floor, all of which disrupted the planned sequence of events for the symposium. Demonstrators crowded into the conference room and then proceeded to take control of the microphone, presenting hours of testimony. While, as one advisory group member put it, some of the testimony was from “crazed Americans who probably chewed too much peyote” (interview with respondent 58, 2007), there were also many statements from peasants and indigenous people, some dressed in traditional clothing, who spoke about their own experiences, traditions, and beliefs about maize to the expert panel. To assert the relevance and credibility of their perspective, farmers and other activists presented themselves to the experts as the voice of the group most directly and profoundly affected by GE maize, the “people of maize.”

Although maize activists believed the forum was rightfully a space for protest, the experts who participated on the CEC panel that I interviewed held a different view. Expecting reasoned discussion of the background papers that had been prepared, they were dismayed to find seemingly chaotic protests and testimony given at length by the farmers and activists who attended the forum. As one ecologist described to me, “they [took] over the meeting and made long speeches, and we listened, and they gave us tortillas and lit candles and did all kinds of things [laughing slightly], and so it turned into more of a protest than a dialogue, and I would have really liked to have more dialogue” (interview with respondent 5, 2005). Another scientist recalled the experience as “torture” (interview with respondent 8, 2005). Still another participant in the CEC group, who had pro-biotechnology ties, described his experience this way:

[It was] a really politically charged atmosphere, with banners—one I will never forget said “Death to [secretary of agriculture] Victor Villalobos, the king of transgenic crops.”... Dr. Sarukhan [the chair of the committee] said to me, “why aren’t you saying anything,” [and it was because] I’m not a fool. . . . I wasn’t going to put myself at risk, it was a really aggressive environment and of course completely dominated by the opposition groups. (Interview with respondent 41, 2005, my translation)

As these reactions to the activists suggest, none of the CEC scientists I interviewed was prepared for or knew how to respond to the mass mobilization that occurred in Oaxaca during their meeting. Even some of the most left-leaning of the experts felt uncomfortable with the deviation from the planned presentations and were astonished by the statements the protesters made. One scientist, a self-described “liberal academic,” said that in comparison to the protesters, he felt like he was “an imperialist scientist,” a fascist “in jackboots” (author interview with respondent 58, 2007). The mass turnout of protesters, particularly the unexpected testimony of indigenous men and women, challenged the advisory group’s expectations for what the symposium was supposed to accomplish. As a result, the advisory group began to take seriously the perspectives of the farmer-activists. Remarkably, as a result of this confrontation, some came to the realization that the meeting could and should serve a different purpose. One American scientist explained this realization to me. She recalled:

I think it was Doreen Stabinsky [of Greenpeace] who said something like, “you know, this is probably making all of you scientists really uncomfortable, but this is democracy.” Or something like that, she basically said, you know, this is part of life, you have to hear this, and you know, that’s how I felt, I felt like *okay, we’ll just change the meeting over and have it serve a different function and we’ll just listen.* (Respondent 5, my emphasis)

In sum, by externalizing the conflict over transgenic maize to the CEC, Mexican maize producers were brought into face-to-face contact with experts who were poised to advise policymakers, and thus claimed a place in the scientific and policy debate about transgene flow. The experts involved in writing the CEC report on GE maize did not become part of the transnational *advocacy* network as a result of this interaction, but neither did they remain aloof from the diverse concerns articulated by rural people and local NGOs. Indeed, the advisory group not only listened to the claims of activists, but also changed the character of its own claims, as I discuss below.

CHANGING THE CHARACTER OF SCIENTISTS’ CLAIMS

When an epistemic boomerang pattern is formed, scientific experts may begin to make principled claims on behalf of a social movement. At the symposium, the problem of GE maize was significantly reframed for the CEC experts. What was initially treated as solely an issue of cause and effect (that is, an attempt to reach consensus on the effects of introducing GE maize to local ecosystems and agricultural systems) became a matter of values and principles. Francis Fox Piven and Richard Cloward (1978) have argued that the power to disrupt, through mass defiance, is one of the most important tools of social movements. And indeed, the disruption described above seems to have been a significant factor in swaying the advisory group to adopt many of the challengers’ positions on cultural diversity and preservation.

One scientist, the man who said he was made to feel like an imperialist scientist, said quite explicitly that at the symposium he “got it”—he realized that the matter of GE maize was “not a science issue, but a social issue” (respondent 58). In his understanding, the opposition to GE maize was based on the feeling of not having a choice in the matter, of having it imposed on rural Mexico without consultation. Although he maintained that the protests did not affect his scientific assessment of the biological aspects of GE maize in

Mexico, he was a strong advocate of including the “social issues” in the official findings. Another participant told me privately that he was moved by the testimony and actions of the indigenous people who came to the CEC symposium. He thought that it had touched some other members of the advisory group as well. These comments indicate the extent to which protesters disrupted the expectations of the participants in the CEC symposium, and led at least some of the experts to shift their framing of the issue to align more closely with activists’ perspectives.

The indigenous activists’ claims struck a chord with the Joint Public Advisory Committee (JPAC) of the CEC, made up of civil society representatives. After the meeting in Oaxaca, the JPAC released a letter to the ministers of agriculture of the three NAFTA countries, stating, “What we learned from our participation [in the Oaxaca symposium] is that the conservation of biodiversity cannot be separated from the protection of cultural diversity. A better understanding and respect for the human and social context is called for in this debate” (Joint Public Advisory Committee 2004). The committee went on to observe that “the emphasis on ‘scientific method’ and ‘science based’ conclusions can work to exclude indigenous peoples.” The letter also described the difficulties that the authors of the background chapters for the CEC had in “respond[ing] to the many indigenous presenters who attempted to discuss and articulate their relationship with maize as sacred, the center of life, their brother and part of their dignity and identity.” The JPAC concluded that the CEC lacked a balance in the composition of the advisory group, and that as a result, they may promote a position that is “directly contrary to the views of the indigenous peoples in the area.” The letter was welcomed and praised by Maria Colin, the legal advisor to Greenpeace Mexico, who was quoted in a press release as saying, “If the CEC is only guided by scientific studies, without taking into account the opinion of the citizens, a historical opportunity will be lost and this may be seen to affect its credibility” (Greenpeace México, Grupo de Estudios Ambientales, and UNORCA 2004, my translation).

After the symposium, the expert advisory group developed a report and set of recommendations, published in 2004 (Secretariat of the Commission for Environmental Cooperation 2004). Probably the most controversial of the recommendations was that the Mexican government should “minimiz[e] the import of living transgenic maize grain from countries that grow transgenic maize commercially” (Secretariat of the Commission for Environmental Cooperation 2004: 27). In other words, the present system of grain imports from the U.S.—the main source of GE maize in Mexico—must be altered. From the perspective of the local activists, the recommendation was a victory, bolstering their opposition to GE maize imports. However, according to one of the authors I interviewed (who admitted to finding the protests compelling), this recommendation was not influenced by the activists, but rather stemmed from longstanding scientific concerns that maize modified to produce pharmaceutical or other inedible materials might accidentally enter the Mexican seed supply.

As the previous comment suggests, the authors of the report made an effort to distinguish between their scientific assessment and the political or value-laden concerns associated with GE maize. In a section on the process of developing the report, the advisory group acknowledges the “important social and cultural issues . . . at play,” but clarifies that they attempted to “keep those considerations distinct from the scientific evidence about health or environmental impacts” (Secretariat of the Commission for Environmental Cooperation 2004: 11). Indeed, the report is organized in such a way that “sociocultural matters” are separated from “gene flow,” “biodiversity,” and “health.” Nevertheless, the perspectives of local activists feature prominently in various places throughout the report. For example, the opening paragraph in the key findings section refers to the “recent cultural memory and political history among the indigenous peoples of perceived inequity and injustice at the hands of Mexicans of Spanish origin, Americans, and powerful elites” (Secretariat of the Commission for Environmental Cooperation 2004: 14). And in the recommendations related to biodiversity, the advisory group urges that attention be paid to the “role and needs of campesinos, which

have largely been neglected” (Secretariat of the Commission for Environmental Cooperation 2004: 28). That set of recommendations goes on to suggest that future decisions regarding agricultural technology be made with the participation of maize producers and rural communities: “Farmers of all sorts should be involved in the development of new agricultural practices from the start of the process” (Secretariat of the Commission for Environmental Cooperation 2004: 28). This proposal not only explicitly challenges the pattern of biotechnology research and development that has proceeded in Mexico thus far, but also appears to blur the boundary between the expert community and ordinary citizens, as farmers are included as relevant contributors to knowledge production.

The report’s sections dedicated to sociocultural matters respectfully convey the perspectives of the local activists who attended the symposium. Here, the authors appear to challenge the notion, offered earlier in the report, that scientific and cultural matters can be separated. They state: “Maize has significant cultural, symbolic, and spiritual values for most Mexicans. . . . The risk assessment of transgenic maize in Mexico is inextricably linked to these values” (Secretariat of the Commission for Environmental Cooperation 2004: 23). The section goes on to describe some of the views expressed in writing and in presentations during the process of developing the report. For example, “Many campesinos and community organizers . . . perceive GM [GE] maize as a direct threat to political autonomy, cultural identity, personal safety and biodiversity” (Secretariat of the Commission for Environmental Cooperation 2004: 23). The authors treat these perceptions as distinct from technical assessments, but equally relevant to constructing policy. They explicitly draw a parallel between the “low level of information about the fundamentals of plant genetics . . . in rural communities” and the “low level of information about rural social and cultural concerns within scientific and policy communities.” They say both “frustrate the generation of scientifically sound and socially acceptable policies” (Secretariat of the Commission for Environmental Cooperation 2004: 24).

Far from simply making causal claims about the impact of transgenic maize on biodiversity, this group of experts conveyed a set of values that were shared, at least in part, by maize activists. But why? Other studies, such as Wendy Espeland’s (1998) analysis of a water conflict involving the Yavapai Indians in the American Southwest, show the difficulty of reconciling technocratic modes of analysis with the perspectives of indigenous peoples. The evidence is only suggestive, but it is possible to draw some tentative conclusions. First, the typical routines for drawing boundaries between science and values were disrupted. This was facilitated by features of the organization, such as openness to public participation and an absence of formalized rules proscribing scientists’ political activities. Given such an organizational context, the disruption caused by social protest persuaded experts to adopt an alternative framing of the problem at hand and incorporate principled claims into their assessment. Second, it is likely that the scientists were able to adopt the activists’ frames because the stakes were fairly low. Unlike the case that Espeland studied, the CEC experts’ recommendations were nonbinding, which may explain why consensus was achieved despite the presence of participants who were highly unsympathetic toward the anti-GE movement. Indeed, I was told by at least one informant that the “pro-GE” members of the advisory group made little effort to involve themselves in the process—which probably would not have occurred if they expected the report to have significant consequences.

OUTCOMES OF THE EPISTEMIC BOOMERANG

If interaction between local groups and professional experts leads to a change in how experts frame the issue—from narrowly technical to broadly social or values-based—what are the political outcomes? Are the implications uniformly positive, or are epistemic communities perceived as straying too far into advocacy when they begin to echo elements of the activist critique? In this case, the CEC process resulted in a number of outcomes for the struggle to

defend non-GE maize. First, it demonstrated that maize producers are willing to confront authority and to demand that their perspectives be taken seriously. Second, the report itself has become a resource for continued activism. It is often cited in calls for changes to state policy on GE crops and is used by anti-GE activists to demonstrate that their concerns are credible. Third, the process facilitated scientist-activist alliances and the sharing of important information—including a copy of the report, leaked to Greenpeace prior to its official release.

However, Mexican maize activists did not achieve the main objective of externalizing their grievances to the CEC. Despite the CEC advisory group's recommendations, the Mexican government has not taken any actions to halt the importation of GE maize from the US. To the contrary, Mexican regulatory agencies are quickly moving toward approving the commercial cultivation of GE maize. Although it is difficult to single out the most important reason for the Mexican government's lack of attention to the CEC report, certainly the non-binding nature of the recommendations was crucial, and the state politics of international trade were decisive. But the report was also cast by opponents as lacking scientific authority and being slanted in favor of local activists—making it more easily dismissed.

The U.S. and Canadian environmental ministries complained that the CEC's recommendations did not follow from the scientific information presented in the report. For example, the comments from the U.S. suggested that the scientific findings provided no justification for treating GE maize differently from other modern crop varieties. The U.S. took issue with a perceived slant in favor of the protesters, saying "many of their recommendations attempt to respond solely to social-cultural perceptions of one specific group of stakeholders, while ignoring the needs of others" (U.S. Environmental Protection Agency 2004). The Canadian response was also critical of the apparent influence of local activists. For example, the cover letter from the representative from Environment Canada observed that the recommendations were informed by "comments received throughout the process and based on the personal judgment of members of the Advisory Group"—a thinly disguised accusation of bias (Environment Canada 2004). Furthermore, Canada opposed the inclusion of social considerations in the report, saying, "risk assessment should be based solely on science. If a risk is identified, socioeconomic factors may be considered when implementing an appropriate risk management strategy." Finally, while the official Mexican response did not attack the scientific basis of the report, it took issue with parts of the report that appeared to make "value judgments," particularly the line, quoted earlier, about "inequity and injustice at the hands of Mexicans of Spanish origin, Americans, and powerful elites" (CIBIOGEM 2004).

Thus, despite the success of the advocacy network in bringing attention to the socioeconomic and cultural implications of transgenic maize, the political outcome was not in the activists' favor. The Mexican government has experienced no compelling pressure to implement the commission's recommendations. This suggests a need to systematically consider the circumstances under which epistemic boomerangs may be more likely to produce tangible political changes. Even where activists do gain expert allies, this will fail to affect government policy if states cast the resulting scientific advice as lacking credibility. This is likely in contexts where credibility is assumed to require distance from activist politics. States and industries resisting the pressures of epistemic communities benefit from perpetuating the notion that scientific advice must not be "tainted" by social concerns that are of central interests to activists. Thus, presently, activists dealing with the complex problems resulting from developments in science and technology must walk a tightrope. On one side, they depend on scientists, both to produce the answers they need and to lend credibility to their concerns. On the other side, when scientists appear to share the values and political ideas of activists, their work may be more easily discredited by opponents. Therefore, while activists may successfully intervene in the scientific enterprise, ironically, such intervention may be detrimental to their political struggle if it leads the scientists involved to take a principled stand.

Does this mean that activists wishing to back up their positions with scientific evidence ought to discourage scientists from making principled claims on their behalf? Such a route

might have the short-term benefit of protecting the perceived credibility of the scientific data. However, in the long run, such distinctions perpetuate a hierarchy of science over values that ultimately excludes ordinary citizens from the politics of technical decision making. This situation suggests that the long-term success of anti-biotechnology activism may ultimately depend not on giving states more and better scientific advice but on deeply challenging the role of science in state decision making.

CONCLUSION

In this article, I have argued that sociologists of social movements should be attentive to the particular ways that activists interact with scientific experts and use the claims of scientists as leverage in difficult struggles. In particular, I have shown that such interactions may occur in an “epistemic boomerang” pattern. Inspired by Keck and Sikkink’s work on transnational advocacy networks, the epistemic boomerang concept represents a relationship between local activists, NGOs that support them, an indifferent or oppressive national state, and a group of scientists or other experts that are recognized by the state as having some degree of authority. An epistemic boomerang can be said to occur when the experts direct claims toward the national state in support of the local activists. NGOs are typically the mediators or facilitators of interactions between locals and scientific experts. I identified particular conditions that facilitate the formation of an epistemic boomerang. First of all, activists must frame their concerns in ways that resonate with questions that interest scientists or align with the mandates of organizations that coordinate expert advice. Second, an expert body must be public and accessible, either through the organization of physical space (such as at public hearings) or through organizational policies encouraging citizen input and participation. In particular, an epistemic boomerang is more likely to emerge if the scientific organization or network in question has a public service mandate, such as a stated commitment to aiding disadvantaged communities. Future research may identify additional organizational features and political arrangements that also facilitate epistemic boomerangs.

There is, of course, a bit of irony in the fact that an activist network opposed to one of the major recent developments in science and technology would choose to use scientific expertise as a resource in their struggle. It is this apparent contradiction that Ulrich Beck (1992) writes of when he describes the “risk society”: we increasingly rely upon science and technology to assess the risks of science and technology. However, Mexican maize activism appears to break out of that circular process. The most striking feature of this case is that maize activists actively challenged the dominant framing of GE maize as a “risk management” problem, instead showing it to be a far-reaching social, cultural, and economic dilemma that experts only partially comprehend. And indeed, their success in transforming the CEC experts’ mode of assessment of the issue may ultimately be one of the most significant outcomes of this struggle. I have argued that scientific experts in an epistemic boomerang may make both causal and principled claims, and that scholarship on this topic should pay close attention to whether and how different actors in the epistemic boomerang make distinctions between the two. I found that interactions with locals can lead experts to make principled claims—in this case, in support of traditional maize cultivation and the right of locals to have a say in the development of new technology.

On one hand, the experts’ principled support of the activists’ positions can be seen as a victory for the struggle; on the other hand, the inclusion of such “unscientific” statements in the CEC report provided an easy justification for government authorities and trade partners to reject the experts’ conclusions. In a context where the political authority of science rests heavily on the appearance of political neutrality, the principled support of scientific experts may be more of a liability than a benefit to activists. That said, the perpetuation of artificially rigid boundaries between causal and principled claims can also be a detriment to activists

when authorities use such distinctions to elevate scientific knowledge above laypeople's viewpoints and to justify technocratic modes of decision making.

In building a theory on a single case study, there is of course the problem of generalizability. Is the case of maize activists and the CEC unique? It is certainly not uncommon for activist groups to call on counterexperts or to use scientific studies as sources of leverage. However, the epistemic boomerang involves pressure from an organized group of scientific experts on a national state that is inattentive to local activists. How likely is this to occur in other circumstances? The organizational design of the CEC certainly makes it distinctive. There are few, if any, other international organizations that are so explicitly dedicated both to providing expert recommendations and facilitating civil society input on contentious matters. However, there are plenty of organizational opportunities for epistemic boomerangs to take shape. NGOs are already frequent participants in many UN-organized technical meetings, including, for example, the Subsidiary Body for Scientific and Technological Advice of the UN Framework Convention on Climate Change (Miller 2001). The "participatory" processes of other international organizations also hold the potential for mobilization that generates an epistemic boomerang. For example, the World Bank holds public consultations on projects such as new hydroelectric dams. Although the so-called "participation" that occurs in these hearings has been criticized (Goldman 2004; see also Cooke and Kothari 2001), encounters of this sort are likely settings for the kind of mobilization observed in the Mexican maize case. Clearly, more research is needed on activist-expert interactions in these and other settings.

Even if epistemic boomerangs like the one in the Mexican maize case do not prove to be frequent occurrences, the present analysis offers several useful insights for the study of social movements more generally. As the discussion early in this paper indicated, science is an important part of many contemporary social movements. Scholars of social movements have certainly acknowledged the important roles that science plays; however, efforts to explicitly include science and scientists in theories of collective action, such as the "cognitive praxis" model (Eyerman and Jamison 1991) have not been widely applied. Above, I outlined a number of possibilities for modifying existing theories to address the unique issues associated with science and expertise in politics. First, studies of framing processes can consider how ideas come to be viewed as *scientifically* credible and whether this matters for effective collective action framing. Second, in many contexts it is useful to conceive of scientists as a type of elite actor with unique characteristics. Third, the study of transnational advocacy networks could be strengthened through continued analysis of the contact points with epistemic communities and other sources of scientific knowledge.

In addition to identifying these possibilities for bringing scientific actors and knowledge into social movements frameworks, the analysis presented in this paper contributes to a growing body of research on nonstate targets, such as corporations, culture, and other institutions (Armstrong and Bernstein 2008). In this case, maize activists demanded action by the Mexican government to control the biotechnology industry and the maize trade. Activists directed their protest not at the government (or at the biotechnology industry, for that matter) but at scientists who were in the position to advise government. However, recognizing that social movements choose targets other than the state should not imply that national states are of diminished importance. In this case, the actions of the U.S. and Canadian governments, and the ultimate refusal of the Mexican government to act on the CEC's recommendations, were the most salient forces determining the outcome of GE maize in Mexico.

Finally, it is also worth considering how the efforts at public sociology could be informed and strengthened by attention to activist-expert interactions in a wide variety of cases. Beyond the more obvious reflections about the challenges of serving simultaneously as an expert and an advocate, the present case serves as a reminder that sociologists' efforts to provide advice to policymakers and support to social movements may play out in unexpected ways. Indeed, one striking lesson from the CEC case is that scientific processes (formal assessments, symposia) may prove useful to social movements, but not necessarily as intended by the experts themselves.

NOTES

¹ Quotation found on CEC website. Retrieved July 22, 2009 (http://www.cec.org/who_we_are/index.cfm?varlan=English).

² Eighteen experts wrote ten background chapters addressing a wide range of potential impacts of transgene flow in Mexican maize. Sixteen additional experts served on the CEC advisory group, which comprised a diversity of expertise, including molecular biology, biotechnology, ecology, population biology, agronomy, health and nutrition, economics, philosophy, law, and political science. Most of the members of the advisory group held posts in academic or nonprofit institutions, and at least three represented the biotechnology industry.

³ Quotation found on CEC website. Retrieved August 24, 2009 (<http://64.34.71.149/Page.asp?PageID=924&SiteNodeID=347>).

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