

12-31-2010

## Science, Standards, and Power: New Food Safety Governance in California

Diana Stuart  
*Michigan State University*

Follow this and additional works at: <https://egrove.olemiss.edu/jrss>



Part of the [Rural Sociology Commons](#)

---

### Recommended Citation

Stuart, Diana. 2010. "Science, Standards, and Power: New Food Safety Governance in California." *Journal of Rural Social Sciences*, 25(3): Article 7. Available At: <https://egrove.olemiss.edu/jrss/vol25/iss3/7>

This Article is brought to you for free and open access by the Center for Population Studies at eGrove. It has been accepted for inclusion in *Journal of Rural Social Sciences* by an authorized editor of eGrove. For more information, please contact [egrove@olemiss.edu](mailto:egrove@olemiss.edu).

*Journal of Rural Social Sciences*, 25(3), 2010, pp. 111–140.  
Copyright © by the Southern Rural Sociological Association

## **SCIENCE, STANDARDS, AND POWER: NEW FOOD SAFETY GOVERNANCE IN CALIFORNIA\***

**DIANA STUART**

*MICHIGAN STATE UNIVERSITY*

### ABSTRACT

In 2006, an outbreak of *E. coli* O157:H7 associated with California spinach resulted in widespread illness across the United States. The magnitude of the outbreak and the resulting media attention demanded a change in the governance of leafy green produce. Drawing from more than 130 personal interviews, this paper critically examines how powerful players in the produce industry organized a strategic approach to governing leafy greens production in California. Networks are used to explore the evolution of new industry-led food safety standards and how they directly conflicted with and overpowered environmental agendas. This paper highlights serious concerns regarding participation and transparency in the creation of food safety standards, identifying patterns of winners and losers and suggesting ways in which we might foster more democratic approaches to food governance.

Although a new faculty member at Michigan State, I am very familiar with the work of Lawrence Busch and others from the Michigan State University (MSU) School of Agrifood Governance and Technoscience. Their work has provided substantial insight for agrifood scholars, helping us to understand and grapple with the increasing changes in food systems and food governance. My work remains heavily influenced by Busch and others' ideas about science (Busch 2000a, 2002, 2007), actor-network theory (Busch 2000b; Busch and Juska 1997; Gouveia and Juska 2002), and the role of private standards in food governance (Busch 2000a, 2003; Busch and Bain 2004; Hatanaka and Busch 2008; Juska et al. 2000; Konefal, Mascarenhas, and Hatanaka 2005). This work has guided and shaped my research in California exploring new food safety standards developed and put forth by the produce industry. The work of the MSU School has raised important concerns about current trends in food governance that are clearly illustrated in the present paper. This paper not only affirms these concerns but further exposes the

---

\*I would like to thank Margaret FitzSimmons for her support throughout this project. I would also like to acknowledge two anonymous reviewers and the editors for their work toward improving this paper. Funding for this research was made possible through an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. Additional funding was provided through a National Science Foundation Doctoral Dissertation Improvement Grant.

“backstage” (Konefal et al. 2005; Busch 2007) struggles involving science and power in the creation of new food standards. In this paper, I investigate the creation of new food safety standards in California and how industrial players have used new forms of governance to dismiss, ignore, and overpower other interests. Drawing from the work of Busch and others, I use actor-network theory as a theoretical framework to explore science, power, and democracy in food safety governance.

#### NEW TRENDS IN FOOD SAFETY GOVERNANCE

Considerable changes have occurred in agriculture and food systems over the past few decades. These changes include increasing industrialization and the rise of corporate agrifood companies with global operations and markets. Power has shifted away from processor and producer interests toward retailer and consumer interests, with corporate retailers emerging as central players in agrifood systems (Busch and Bain 2004; Flynn et al. 2003). Specifically, with the extensive consolidation in the agrifood retail sector in the 1990s (Wrigley 1999, 2002), retail oligopolies have emerged. The result is that large retailers such as Wal-Mart, Kroger, Safeway, and Publix hold considerable power over food processors and producers, now commonly exerted through industry-created food quality standards.

Today, agrifood systems are increasingly shaped by food quality issues, including food safety (Goodman 2003; Murdoch et al. 2000). Oligopolistic arrangements in food retailing have shifted competition away from price and toward quality and remain largely driven by private standards (Busch and Bain 2004; Flynn et al. 2003; Morgan et al. 2006). In response to health scares, food quality includes assurances that food is safe to consume. Simultaneously, recent trends demonstrate new approaches to food safety governance. While the U.S. government still plays a significant role in protecting consumers from tainted foods, this role has become increasingly overshadowed by individual corporations, industry groups, and third-party certifiers using their own food safety standards. Also, the ability for government to regulate food is becoming more constrained (Hatanaka et al. 2005; Hatanaka and Busch 2008).

Changes in food safety governance mirror larger trends that emerged from anti-Keynesian neoliberal movements and globalization. Since the 1980s there has been a strong movement for neoliberalization, or the shift toward governance “characterized by strong private property rights, free markets, and free trade” (Harvey 2005:2). This movement includes government deregulation and the overall “roll back” of government involvement in governance (Peck and Tickell 2002). Examples can be found throughout U.S. public policy as “new governance”

## SCIENCE, STANDARDS, AND POWER

113

emphasizes flexibility, market mechanisms, and public-private partnerships (Fiorino 2004; Salamon 2002). Often, neoliberal governance changes the role of government into that of a facilitator or market manager. Neoliberal strategies can involve deregulation, re-regulation of previous governance, and/or the development of new neoliberal approaches in response to emerging social problems. Globalization has also reshaped governance. For example, before the creation of the World Trade Organization in 1995, governments were largely in charge of inspecting food and ensuring food quality for consumers. With globalization, supply chains began to increasingly cross national borders creating the need for transnational standards. Transnational companies have taken a lead role in setting their own standards or creating new arrangements with international governing bodies (Hatanaka et al. 2005).

In the United States, the role of the government in food safety has been scaled back and attempts to increase food safety regulation have been stymied. While outbreaks of foodborne illness in the 1980s and 1990s resulted in heightened attention toward food safety and the development of Hazard Analysis and Critical Control Points (HAACP), the overall role of government in food safety governance has diminished. For example, food companies are increasingly in charge of self-monitoring while government responsibilities primarily entail paperwork, as they have limited personnel for site visits and enforcement (Nestle 2003; Schlosser 2001). Additionally, budget allocations consistently lack adequate funds for extensive monitoring. Nestle (2003) explained that the Food and Drug Administration (FDA) was initially created as a part of the U.S. Department of Agriculture (USDA); therefore its budget is determined by congressional agricultural committees that are less concerned with health issues than with protecting agribusiness.

Consequently, attempts to create stronger regulations or to add funds for monitoring and enforcement have been strongly opposed by large food producers and their congressional allies. As government accountability for food safety has diminished, market accountability has increased (Busch and Bain 2004). Private standards created by retailers, processors, and industry groups play a key role in food safety governance. Retailers use third party certifiers as a form of competitive advantage and as a way to avoid liability for incidents of foodborne illness (Hatanaka et al. 2005). However, we must recognize that when using these private standards, public welfare is not necessarily the primary goal. Sometimes, industry goals may align with public interests, but in other cases they may not (Konefal et al. 2005). Hatanaka and Busch (2008) remind us that although they play a very important role in food standards, third-party certifiers remain strategic actors who

make decisions “to maximize profits or promote specific objectives” (p. 87). Although efforts focus on maintaining consumer confidence, standards adopted by firms may or may not enhance food safety.

Promoting their own food safety standards, agrifood companies have continued to support efforts to keep government involvement to a minimum; however, this trend may be changing. Repeated outbreaks and food scares in recent years have heightened attention toward food safety issues and the lack of government oversight. For example, research by the Food Marketing Institute shows that consumer confidence recently reached a record 18-year low and that consumers do not trust industry to oversee food safety (McTaggart 2007). Consequently, companies are now seeking greater legitimacy. One response by some agrifood companies has been to rethink their relationships with the state. Not willing to surrender power, new arrangements to govern food safety have emerged where the state is recruited to enforce standards created by industry. This can be seen through the recent use of marketing agreements for produce in California, Arizona, and Florida. Such arrangements provide the perception of government oversight, while standards are determined by industry leaders—likely mirroring the private standards they are perceived to replace. Thus, through their use of private standards and new public-private “partnerships,” industry continues to direct food safety governance.

According to agrifood scholars, the increasing role of industry in food governance should make us wary for several reasons. First, transparency is a significant issue (Busch and Bain 2004). Standards are created behind closed doors or “backstage” (Busch 2007; Konefal et al. 2005), excluding others from understanding the process. Second, there is uneven participation in the creation of private standards. Far from democratic, new food standards created by retailers, third-party certifiers, processors, or industry groups often do not allow for public participation and often ignore the concerns of specific interest groups (Busch 2003). Third, uneven participation in creating standards reshapes relationships resulting in clear patterns of winners and losers once standards are implemented. Often standards favor large producers with compliance costs causing financial hardship for smaller operators (Hatanaka et al. 2005; Konefal et al. 2005). Lastly, neoliberal governance measures and the use of private standards may conflict with programs designed to support public goals, such as environmental protection (Mansfield 2007). These concerns center on the process of creating standards and the question of who participates. Unequal representation is likely to exacerbate social and environmental issues (Konefal et al. 2005), as certain voices dominate decision-

making. Given the above concerns, Busch (2000b) has called for more empirical studies to explore how different agrifood standards are created and maintained, what resistance emerges in response to new standards, and who benefits and loses following their implementation. This paper responds to this call and investigates an emerging form of food safety governance, the public-private “partnership.”

This paper explores recent trends in food safety governance in California (CA). In response to an outbreak of *E. coli* O157:H7 associated with bagged spinach, new alliances and networks were forged to create the CA Leafy Greens Product Handlers Marketing Agreement (LGMA). Proponents claimed that this public-private “partnership” was the most efficient approach and would result in the most effective food safety standards. New standards under the LGMA quickly took effect and now govern most produce production in CA. While many have accepted the new standards, contention remains over how these standards were created and over their ecological impacts. Most notably, these new food safety standards conflict with ongoing efforts to address environmental issues and have invoked resistance from environmental groups. These tensions and impacts associated with new food safety standards have been largely overlooked. This paper focuses on the forging of new networks, power struggles, and scientific narratives to uncover some serious concerns associated with this emerging form of food safety governance. To explore networks, power, and science, this paper combines approaches from both political economy and science studies.

#### THEORETICAL APPROACH

An increasing number of agrifood scholars have called for combining theoretical approaches from political economy and science studies. Political economy has explored commodity chains, industrialization, and globalization and has highlighted social and environmental problems associated with capitalist food production (e.g., Bonanno et al. 1994; Friedland et al. 1981; Goodman et al. 1987). However, many scholars have critiqued the political economy approach, identifying significant shortcomings. These shortcomings include a general oversimplification of explanations, overlooking of specific players and relationships, inattentiveness toward the role of nature, and divisions between local and global and production and consumption (Busch and Juska 1997; Goodman 1999, 2001; Lockie and Kitto 2000). Scholars have proposed combining political economy with actor-network theory (ANT), as described by Latour, Law, and Callon, as a means to address areas where political economy falls short (Busch and Juska 1997; Goodman 1999; Gouveia and Juska 2002; Murdoch 2000). This combined approach also serves to address

identified shortcomings of ANT, specifically its emphasis on symmetry that overlooks power inequalities (Castree 2002; Marsden 2000). A combined political economy and ANT approach guides the analysis in this paper as it focuses on networks, power asymmetries, and the hidden tensions and impacts associated with new food safety standards.

Adapted from science studies, ANT provides a useful framework to explore governance in agrifood systems. ANT can highlight networks of governance, looking beyond monolithic corporate actors to reveal the relationships that shape production standards (Busch and Juska 1997; Juska et al. 2000). Drawing from concepts in science studies, ANT can be applied to open “black boxes” associated with agrifood issues (Goodman 1999), including exposing the networks behind governance systems. These black boxes mask the processes and actions leading to specific relationships and outcomes. Latour (1999) describes “black boxing” as “a process that makes the joint production of actors and artifacts entirely opaque” (p. 183). Located within are taken-for-granted networks that often remain unexplored (Callon 1986). A key focus of science studies research has been opening black boxes to see the assemblages inside. With the increasing use of private standards we see the creation of new black boxes in food governance (Marsden 2000). By further exploring the networks that create and respond to these new standards, we may gain a deeper understanding of the overlooked struggles and impacts associated with new trends in food governance.

This paper draws from ANT and the concept of translation, the process by which networks are formed. Exploring the details of translation reveals the actors involved in network formation, as well as the specific processes of network creation, negotiation, and renegotiation. Agrifood scholars have suggested or utilized a translation approach as a method to better understand overlooked or hidden processes in food systems (Donaldson et al. 2002; Higgins 2006; Marsden et al. 1993). This approach includes an exploration of the four “moments” of translation as described by Callon (1986). First, *problematization* entails lead actors defining a problem and attempting to bring other selected actors into a network to serve their purpose. The second moment, *interessement*, refers to the process by which the lead actors attempt to convince other actors of their agenda and methods for achieving their goals. Next, *enrollment* results when, after negotiations, actors agree to take on specific roles to serve the lead actors agenda. *Mobilization* represents the final moment and occurs when the network is mobilized, using resources to push forward the given agenda. While these moments remain fluid in practice and are unlikely to emerge individually (Marsden et al. 1993), the ideas remain useful. Specifically,

focusing on translation can help us to better understand representation and participation in networks (Callon 1986; Marsden et al. 1993).

Another useful concept drawn from ANT is punctualization. As described by Law (1992), *punctualization* refers to the idea that a network is made up of smaller, often hidden parts. Law (1992) describes how large network assemblages can consist of smaller networks where relationships may be overlooked. Through the usurping of pre-existing networks, punctualization can be used strategically by actors to create new networks: “punctualized resources offer a way of drawing quickly on the social without having to deal with endless complexity” (Law 1992:385). Goodman (1999) applied punctualization to agrifood studies, emphasizing how networks can become subsumed into other networks. He explores how the attempted “hijacking” of organic standards can be seen as an attempt to retranslate the organic standards network “into the punctualized conventional agri-food networks of corporate agribusiness capitals and the state apparatus” (Goodman 1999:32). Punctualization is highly relevant to food governance as emerging neoliberal governance schemes create new relationships with the state and other networks, altering or subsuming their activities within their agendas.

Lastly, this paper draws from science studies to specifically examine the role of science in conflicts over new food safety standards. As illustrated by Busch (2002), regulatory science differs substantially from conventional science: it relies on the use of current scientific literature, it is not peer reviewed, data are often proprietary, scientists are often called to go outside their areas of expertise, and there is great emphasis on ending the rule making process rather than gathering additional information. Most importantly this type of science is often conducted by a select group of “experts” subject to social, economic, and political factors (Busch 2002). This paper illustrates how these elements serve to compromise the role of science in rule making. This paper also supports Busch’s (2002) views on the importance of values and the influence of political/economic issues in shaping scientific narratives about rule making. Here, these perspectives help to reveal that science is far from neutral. In addition, examples of circulating reference (Latour 1999) emerge as scientists from different fields examine agricultural practices. While stakeholders turn to science to resolve controversies, further studies may not resolve issues that remain heavily influenced by disciplinary perspectives, values, and external political/economic forces. As science is consistently enlisted to support conflicting positions in health and environmental issues, these insights from science studies take on greater significance.

Combining approaches and perspectives from political economy and science studies, this paper opens the black box of new food safety governance in CA and exposes hidden tensions regarding environmental concerns. The paper begins by adopting a translation approach to explore the creation of the LGMA and changes in private food safety standards in response to the 2006 spinach *E. coli* outbreak. The analysis then shifts to the creation of a new environmental network aimed at resisting and changing food safety standards in the LGMA and those used by individual companies. The paper also examines the important role of science in this conflict and the scientific narratives used to support contradictory positions between industry and environmental networks. Lastly, the paper uses theoretical perspectives from political economy and science studies to discuss the implications of this case study regarding power and food governance at large.

Methods used to inform this paper include content analysis of newspaper and magazine articles as well as extensive personal interviews. Newspaper and magazine articles (2006–2010) were used to explore how the outbreak and responses to the outbreak were framed by stakeholders and by the media. More than 130 personal interviews were conducted in CA between 2007 and 2010. Seventy row-crop growers were selected randomly for interviews in Monterey County, known as the “Salad Bowl of America.” Snowball sampling was used to interview more than 60 other stakeholders and key players including scientists and individuals from government agencies, environmental organizations, food processing companies, and food safety auditing firms. All interviews were semi-structured and recorded when possible. Interview data was transcribed and analyzed to identify key themes.

#### NEW FOOD SAFETY GOVERNANCE IN CALIFORNIA

The fall of 2006 represented a very unpleasant time for the California produce industry. An outbreak of *E. coli* O157:H7 associated with Dole bagged spinach resulted in more than 200 cases of illness and at least three deaths, including a two-year-old child (CDC 2007). A recall of all bagged spinach and a loss of consumer confidence cost growers and shippers more than \$100 million (Skrycki 2007). Those implicated in the outbreak also faced multibillion dollar lawsuits. Long after the recall ended, consumers remained concerned and even outraged about food safety. The produce industry in CA, as well as public health and agricultural agencies, faced heightened pressure to address food safety concerns. Official investigations regarding the specific sources and vectors of contamination remain inconclusive, but implicate nearby cattle and feral pigs living close to cattle (CDHS/FDA 2007).

## SCIENCE, STANDARDS, AND POWER

119

Despite uncertainties regarding the cause of the outbreak, the crises called for an immediate evaluation of the current food safety system.

The outbreak successfully highlighted clear inadequacies with federal food safety oversight. While the USDA is responsible for the safety of meat, dairy, and egg products, it falls under the FDA to oversee the remaining plant-based food items making up approximately 80 percent of the food system (Martin 2009). In contrast to the USDA, the FDA has little enforcement ability and lacks the equivalent work force. Furthermore, any authority the FDA holds has diminished in recent years as budget cuts between 2003 and 2006 dropped the number of produce-related tests from 9,748 to 2,455 (Nagin 2007). The number of inspectors at the FDA has also dropped, with the FDA's 1,300 inspectors paling in comparison to the USDA's 7,800 (Martin 2009). Most FDA inspectors do not visit farms, but focus on more than 12,000 processing plants and facilities (Shin 2006). Following the 2006 spinach *E. coli* outbreak, attention focused on the failures of the federal food safety system, with critics suggesting an overhaul to create one unified regulatory agency with increased monitoring and enforcement capabilities (Nestle 2006; Pollan 2006; Schlosser 2006). A subsequent outbreak related to produce served at Taco John's restaurants further mobilized consumer groups and policymakers to address food safety.

In spite of increased attention and concern, attempts by government to strengthen food safety regulation have so far been thwarted or stalled. Six months after the spinach *E. coli* outbreak, the FDA released new voluntary guidelines for fresh produce, but has lacked the authority or scientific evidence necessary to create mandatory production standards (Wood 2007). An absence of knowledge regarding the causes of recent outbreaks remains a primary concern for government officials despite pressure to create specific and measurable standards. To date, federal legislation aimed at strengthening and overhauling food safety has yet to pass both houses of Congress; however, the 2010 Food Safety Modernization Act retains more momentum than previous attempts. At the state level, the produce industry and its supporters successfully halted new food safety legislation in CA. In the wake of the 2006 spinach *E. coli* outbreak, CA State Senator Dean Florez proposed a trio of new food safety bills. These bills were strongly opposed by the produce industry and labeled as "draconian." The bills were held up in committee by industry sympathizers and functionally killed when Governor Schwarzenegger publicly opposed the bills in favor of industry's proposed approach to food safety governance (Cone 2007).

As crop grower associations, processors, and distributors faced intensive pressure from retailers, the spinach crises led to a quick proposal from industry to self-regulate leafy greens. With consumer confidence at record lows (McTaggart 2007), food safety governance for leafy greens in CA became a top priority for the food industry at large. On October 26<sup>th</sup>, 2006, a consortium of 18 retailers and distributors including Safeway, Costco, Sysco, Wegmans, Kroger, and Albertsons sent a letter to the Produce Marketing Association, United Fresh Produce, and the Western Growers Association demanding that the produce industry in CA create new standards for food safety within six weeks (Shin 2006). Western Growers, an agricultural trade organization that represents most of the growers, packers, and shippers in CA and Arizona, emerged as a leader in this effort. Individuals at Western Growers brought forth the idea of a leafy greens marketing agreement for food safety. Other industry groups and farming associations were rallied in support, most favoring this approach as a means to give producers and processors more influence in food safety standards. Having gathered the support of other dominant industry groups and the California Farm Bureau, representatives from Western Growers approached the California Department of Food and Agriculture (CDFA) to propose a marketing agreement.

Marketing agreements were created in CA under the California Marketing Act of 1937 and nationally under the Agricultural Marketing Agreement Act of 1937. These acts were passed as a means of addressing overburdened markets during the 1930s. The purpose of a marketing agreement is to stabilize the market for specific commodities by regulating the amount produced; the size, grade, and quality of the product; or the characteristics of product packaging. Marketing agreements are voluntary, but once participants sign the agreement they must follow the specific standards outlined. In contrast, there are also marketing orders, created under the same state and federal legislation that require mandatory participation for all producers or handlers of a particular commodity. Marketing agreements and orders exist for products such as milk, fruits, vegetables, and nuts and are designed to standardize commodity production. Marketing agreements and orders have focused on product quality and commodity characteristics for marketing purposes and have never before been used solely to govern food safety.

As emphasized in personal interviews with stakeholders, using a marketing agreement for food safety represented a strategic approach by leaders in the produce industry. A marketing agreement is designed by industry and industry leaders create the rules that govern the agreement. Arguments in favor of a marketing agreement approach focused on the speed at which new standards could

## SCIENCE, STANDARDS, AND POWER

121

be created and implemented and the flexibility of standards compared with legislation. More quietly, proponents also suggested that the produce industry could more capably create effective food safety standards than legislators or government agencies who may be influenced by other (non business-friendly) interests. While consumer groups railed against industry self-regulation, calling it “the fox guarding the hen house,” supporters argued that a marketing agreement approach would include government participation. However, here government participation is limited to distanced and hands-off administration and hired services for monitoring and enforcement of the rules that industry determines. Simultaneously, ideas of a “partnership with government” or “government oversight” provided useful rhetoric to sooth consumers and skeptics of self-regulation. Therefore, a marketing agreement approach represented a tactful way to increase consumer confidence while avoiding “draconian” government regulations.

After discussions with representatives from Western Growers and other leaders in the produce industry, the CDFR organized public hearings to assess support for a leafy greens marketing agreement among stakeholders in the CA agricultural sector. Those that opposed the marketing agreement approach largely included small farmers who feared the power that the agreement would give to large shippers and processors. Signatories of the agreement would be product “handlers,” or any person or company “who handles, processes, ships, or distributes leafy greens products for market” (LGMA 2010). When a processor or shipper signs the agreement, all of the crop growers who sell product to the company must comply with the rules or find another way to access the market. Therefore sometimes, those who create and agree to the rules are not the same people who will be required to implement them. Other vocal opponents of the marketing agreement included representatives from environmental organizations and natural resource agencies who realized how specific food safety standards in the LGMA would likely have detrimental impacts on water quality and wildlife in CA. While these concerns were made public, most of the attention was focused on the need to address food safety quickly to rescue and protect the multibillion dollar CA produce market.

Much of the opposition to the LGMA stemmed from issues regarding participation in the rule making. The purpose of the LGMA was to create uniform food safety standards for CA leafy green produce. Specific and measurable rules needed to be created to dictate what constitutes acceptable and unacceptable practices for food safety. Rules focused on a variety of areas including irrigation water, buffers around fields, farm worker hygiene, and the presence of livestock and

wildlife. While a lack of scientific evidence previously hindered government agencies in creating specific rules, the CA produce industry now faced intensive pressure to move forward. According to key informants, the standards for the LGMA were created by a selected group of “experts” in the produce industry. The group was selected and led by an individual from Western Growers and an individual from United Fresh Produce. The group spent “many many days” creating specific benchmarks and measurable rules. Most participants held scientific degrees and worked for the produce industry as food safety managers or researchers. The group included representatives from large companies like Fresh Express and Dole, third party auditing companies, and produce associations. Representatives from small or organic farms and environmental agencies and organizations were not included in this process.

Despite concerns voiced at public hearings, the LGMA was approved and initiated in the spring of 2007. Sign-ups were successful with handlers responsible for more than 90 percent of the volume of leafy greens in CA enrolled in the first several months. This was not surprising considering that Dole and Fresh Express together control more than 80 percent of the leafy greens market. An advisory board governs the LGMA along with several committees all containing members (signatories). These board and committee members are nominated and voted upon by other members and then approved by the CA Secretary of Agriculture, currently A.G. Kawamura (a past president of Western Growers). Members on the board and committees rotate with alternating two-year terms, but consistently include representatives from high profile produce companies. The board largely approved the standards proposed by the industry experts, adopting what is now called the LGMA Food Safety Practices. To enforce these standards the LGMA hires auditors from the CDFR to conduct inspections—an average of five per year with one unannounced. All members pay a fee covering the costs of inspections. Products from LGMA members are labeled with the LGMA service mark so that consumers can choose LGMA-approved produce. Currently, approximately 99 percent of the volume of leafy greens in CA is governed by the LGMA.

Besides the LGMA, responses to the 2006 spinach *E. coli* outbreak included individual produce companies “enhancing” their pre-existing food safety standards. With earlier outbreaks and scares in the 1990s, many large retailers, shippers, processors, and growers already used their own food safety standards. These standards are typically created by in-house food safety experts or contracted third-party auditing companies. The details of these standards remain largely unknown, as they are considered proprietary information. After the spinach *E. coli* outbreak,

## SCIENCE, STANDARDS, AND POWER

123

most companies increased the rigor of their standards, seeming to use food safety as a form of competition. For example, an October 2006 *USA Today* article described Fresh Express' new food safety program and their claim to "the most stringent" standards in the industry (Schmit 2006). Personal interviews revealed that, compared to the LGMA, these standards require additional testing and larger buffers around fields, along with maintaining a lower tolerance for the presence of wildlife (Stuart 2009a). Since most growers sell their produce to large processors, distributors, or retailers, they are subject to these more stringent standards. In these cases, the LGMA represents a benchmark from which companies require additional standards to demonstrate their commitment to food safety. Where rule making for the LGMA illustrated an exclusive process, the creation of private standards remains even less transparent and participation is likely even further limited.

## ENVIRONMENTAL ORGANIZATIONS RESPOND TO FOOD SAFETY STANDARDS

As new standards for food safety emerged, it became clear to environmental groups that food safety practices called for by the LGMA and individual processing or retail companies conflicted with ongoing efforts to enhance and protect environmental quality. Their concern primarily focused on the Central Coast region of CA, where most of the leafy greens are produced. This region contains the Salinas Valley known as the "Salad Bowl of America." Due to the intensive nature of Central Coast agriculture, the region faces substantial environmental degradation from the deposition of agricultural pollutants. The watersheds of the region empty into the Monterey Bay National Marine Sanctuary, the largest marine protected area in the US. The waterways emptying into the sanctuary repeatedly fail to meet water quality standards with significantly elevated levels of nutrients, pesticides, and sediment (Caffrey 2001; Hunt et al. 1999). In addition, the region contains numerous threatened and endangered species including the California Sea Otter.

For the past several decades, a variety of government agencies and environmental organizations have worked to reduce water pollution and impacts on wildlife associated with agriculture in the Central Coast. This includes the USDA Natural Resource Conservation Service (NRCS) and regional Resource Conservation Districts (RCDs) who work with crop growers to reduce run off and pollution and to enhance wildlife habitat. They promote the installation of specific environmental practices that use vegetation around fields and in waterways to absorb and filter out pollutants (Los Huertos 1999). These environmental practices

may also create habitat and support wildlife. Conservation programs through the NRCS use federal money to provide technical assistance and economic incentives for the adoption of environmental practices. NRCS staff in the Central Coast region have worked for decades to establish positive relationships with growers. By 2006, most growers in the region had adopted at least one environmental practice (Beretti and Stuart 2008).

Besides the NRCS, other agencies have worked to address environmental issues associated with agriculture. Amendments to the Clean Water Act have provided resources for states to address non-point source pollution. In CA, a non-point source program is administered by the State Water Resources Control Board and nine Regional Water Quality Control Boards (RWQCB). Because agriculture is the leading source of non-point source pollution in the state, most of the program resources focus on agricultural pollution. In 2004, the Central Coast RWQCB adopted the "Agricultural Waiver Program," which includes mandatory grower education and encourages the use of the same environmental practices supported by the NRCS. The program also requires participation in water quality monitoring, which may be used in the future to identify sources of pollution and implement enforcement measures (Dowd et al. 2008).

Over the past few decades, organizations in the Central Coast have demonstrated considerable effort and cooperation in an attempt to address environmental problems associated with agriculture. Due to threats to the marine sanctuary, the Agriculture Water Quality Alliance formed to encourage agri-environmental stewardship. The organization is a partnership between the marine sanctuary, six county Farm Bureaus, the NRCS, six RCDs, and the University of California Cooperative Extension. The Central Coast RWQCB had also been very successful in enrolling growers in the "Agricultural Waiver Program." Non-governmental organizations including the Wild Farm Alliance and Community Alliance with Family Farmers (CAFF) have supported efforts to plant native vegetation around fields for water quality and wildlife habitat. Members from these organizations frequently work together on environmental projects. Because of these efforts, the Central Coast became a model for other areas addressing agri-environmental issues. However, progress in addressing regional environmental degradation is facing increasing opposition, stemming from new industry-created standards for food safety.

Environmental programs are now threatened by specific practices called for in the LGMA and other food safety standards. These standards state that wildlife species represent possible sources or vectors of pathogens. The LGMA lists specific

## SCIENCE, STANDARDS, AND POWER

125

“animals of significant risk,” including deer (LGMA 2010). According to growers, other private standards used by large companies are more stringent and portray many wildlife species as threats to food safety. This has resulted in the use of poison bait, traps, fencing, and the widespread removal of vegetation that could serve as wildlife habitat. This includes the vegetation used in environmental practices aimed at reducing run off and water pollution. Participation in NRCS programs significantly declined between 2004 and 2007, likely due to new food safety standards discouraging vegetation and wildlife (Stuart 2009b). Growers who planned to participate in native plantings through programs funded by CAFF have changed their plans while others removed previously installed vegetation. The RWQCB’s non-point source program is facing increasing resistance from growers who feel they must prioritize food safety over environmental concerns. While the Wild Farm Alliance has worked for years to promote wildlife on farmland, most of the growers now admit to adopting practices to deter and eliminate wildlife including unlawful removal of vegetation and the use of poisons (Stuart 2009a). While the cumulative effects remain difficult to determine, it is likely that these actions will result in significant harm to wildlife and an increase in the deposition of agricultural pollutants into the Monterey Bay (Beretti and Stuart 2008; Stuart 2008).

As programs led by government agencies and environmental organizations became increasingly impacted by food safety standards, individuals came together to organize a response. Largely under the direction of passionate individuals from Wild Farm Alliance, the Nature Conservancy, and CAFF, a new coalition emerged to address the environmental impacts of new food safety standards. The Farm Food Safety and Conservation Network was created in 2008 and includes members from Wild Farm Alliance, the Nature Conservancy, CA Department of Fish and Game, the NRCS, the Monterey County RCD, the National Marine Fisheries Service, the U.S. Environmental Protection Agency (EPA), the Monterey Bay National Marine Sanctuary, CAFF, and the Central Coast RWQCB. The purpose of the network is to coordinate an effort to minimize or avoid impacts to water quality, wildlife, and habitat from food safety measures. Representatives from organizations whose programs became threatened by food safety standards or individuals with relevant expertise were contacted and enrolled in the network. The organization of the network was determined through several meetings and conference calls. The network consists of a core steering committee as well as several subcommittees with members focused on specific priorities and/or approaches to address conflicts with food safety standards.

The activities of the Farm Food Safety Conservation Network focus on education, training, outreach, and communication. Members of this network have met with representatives from the LGMA and private companies to voice their concerns. After receiving repeated letters from the RWQCB and the EPA, the LGMA board responded by altering some language regarding wildlife in their rules. However, most network members remain far from satisfied with the changes. Acknowledging that industry may continue to ignore their concerns, the network has turned to consumer education. In the fall of 2008, Wild Farm Alliance spearheaded a teach-in for media entitled "Food Safety Gone Astray: The Misguided War on Wildlife." Articles on the environmental impacts of food safety standards have been published in the San Francisco Chronicle, the Wall Street Journal, and several magazines. However, most consumers remain largely ignorant of the issue. Even if consumers were aware they may choose to trust the industry, reasoning that enhanced consumer protection justifies the environmental degradation. Although the efforts of the network continue, most members have limited time and resources to devote to this issue and at times their efforts seem hopeless. Many stakeholders hope that new scientific studies will help to resolve this conflict.

#### A MATTER OF SCIENCE?

Most respondents interviewed claimed that conflicts between food safety standards and environmental programs are based on a lack of scientific information. Uncertainty regarding the role of wildlife in the spread of pathogens remains the crux of the issue. Debates center on a lack of studies in CA exploring whether wildlife carry pathogens like *E. coli* O157:H7. Food safety experts explain that they aim to be as cautious as possible, treating wildlife as a serious risk unless new evidence suggests otherwise. Environmental groups counter that wildlife do not represent a serious risk and that removing vegetation could increase the run off of pollutants as well as the spread of pathogens. Science takes on a key role in this conflict. How science was used to create the LGMA Food Safety Practices remains a significant black box in this debate. Limited evidence suggests that opposing parties used available scientific studies selectively to support specific agendas. Exploring the views of food safety experts and environmental scientists also revealed inherent differences in disciplinary perspectives. While many stakeholders view science as a solution to this conflict, the present discussion shows that new scientific research remains unlikely to provide a resolution.

## SCIENCE, STANDARDS, AND POWER

127

Interviews provided insider perspectives on the creation of new food safety standards. These standards are touted as created by experts and “based on the best science.” Further investigation reveals that a more accurate description entails “experts” making the best of limited information. Regarding the LGMA Food Safety Practices, industry experts created quantitative rules without scientific evidence. While a lack of scientific data remained a primary barrier for government agencies, industry leaders faced a six-week period for developing new standards. According to participants in the rule making process, some measures were based on previous guidelines but others were “pretty arbitrary” or “pulled out of the air.” One participant claimed that finding the “right” numbers was impossible because the scientific data did not exist. In these cases decisions were based on “expert opinion” and shaped by concerns over consumer confidence, liability, and practical aspects of implementation. The LGMA claims that rules will be modified to reflect new scientific evidence. Given the uncertainty involved, one participant stated that he truly hopes the LGMA is a living document. While less is known about rule making within specific companies, insiders suggested that individuals without scientific backgrounds heavily influence standards. Regarding these private standards, one food safety scientist claimed that “up to 70 percent of the measures are irrelevant to food safety.” Many growers shared opinions that requirements seem based on perception and not science. One grower stated: “I know we have to get consumer confidence back . . . but a lot of this is smoke and mirrors” (Nagin 2007).

Regarding wildlife specifically, different parties used available scientific studies to support contrasting positions. Those who created the LGMA Food Safety Practices designated specific “animals of significant risk” that include deer. Growers report that individual processing and retail companies suggest or demand that they deter and eliminate other wildlife including amphibians, birds, and small mammals. While the science used to support these measures in private standards remains unknown, the use of science to create wildlife rules for the LGMA is only slightly more transparent. Regarding wildlife as a food safety risk, only one study was cited in the LGMA. This study showed that 12 percent of seagulls found near a sewage outfall in England tested positive for *Salmonella* (Fenlon 1981). When questioned regarding why no other studies were cited, a participant in the LGMA rule making process responded that other studies were used but not cited. Agricultural and environmental groups responded to wildlife rules with a detailed literature review, citing more than 60 sources and showing that, on average, 1 percent of wildlife tested in the United States and Europe carry foodborne pathogens (RCDMC 2006). However, this information was also produced with a specific agenda. Inside the

environmental network, arguments centered on the exclusion of specific studies from their own reports. For example, certain individuals wanted to exclude several studies that suggested amphibians can carry pathogenic *E. coli*, albeit in a laboratory setting. On both sides of the conflict the selection of scientific studies may be influenced by participants' priorities and values.

Acknowledging the important role of science in this conflict, a group of agricultural and environmental organizations sponsored a conference entitled "Promoting Coordinated Management of Water Quality Protection and Food Safety Initiatives in California Vegetable Production" held in April of 2007. The conference aimed to create a dialogue between food safety and environmental scientists and to identify gaps in information, research priorities, and current barriers to "coordinated management." Over three days scientists and stakeholders met and conducted site visits on farms. During these visits food safety and environmental scientists shared contrasting views of landscape features - such as an on-farm water body. For example, on one site visit food safety scientists called the water body a "pond," whereas environmental scientists called it a "sediment basin." To the food safety scientists, a pond represented possible wildlife habitat and should be drained and filled. In contrast, to an environmental scientist, a sediment basin represented a means to reuse and conserve farm water, capture sediment and pollutants in run off, and support threatened wildlife. Regarding such differences, one organizer stated: "It's like the elephant. One group is looking at the trunk and the other is looking at the tail, only seeing pieces of the whole from different perspectives." While the conference did succeed in identifying possible research directions, little progress was made toward addressing differences between distinctive disciplinary perspectives that continue to drive conflicting practices.

Stakeholders who have been deeply immersed in this issue for several years are beginning to realize that more scientific studies may not resolve the conflict. While new research is underway, many remain skeptical. Industry groups and individual companies, such as Fresh Express, have funded much of this research. Research often focuses on quick fixes and "kill steps" to destroy bacteria rather than ways to support both food safety and environmental quality. Many studies focus on laboratory research and have been criticized for their lack of practical application. However, the few scientists conducting field studies describe the difficulties involved: "we can only see bits of what exists at certain times, we can't put all the pieces together." The California Department of Fish and Game and university researchers have been sampling wildlife for the past several years in CA and have found four positive samples of *E. coli* O157:H7 out of 866 collected and no positive

## SCIENCE, STANDARDS, AND POWER

129

samples from 311 deer (CDFG 2009). LGMA board members say that current sampling numbers are not sufficient to justify removing deer from their list of “animals of significant risk.” The testing and statistics produced may mean very little given that industry determines what constitutes a “significant risk.” This remains a value judgment. Those who highly value wildlife would find higher rates of prevalence acceptable, whereas those liable for outbreaks feel that any risk is too great. While some continue to describe this as a conflict based on scientific uncertainty, further scientific findings may serve to reveal how the issue is less about science and more about values, power, and profits.

## GROWING CONCERNS OVER NEW FOOD SAFETY GOVERNANCE

To date, conflicts between environmental programs and food safety standards persist in CA. Much of this conflict stems from the refusal of industry to include other interests in the rule making process. Participation was limited to industry scientists, experts, and food safety managers representing industry interests. In their attempts to influence standards, environmental organizations have been largely ignored. Meanwhile, changes in on-farm practices are likely to cause significant environmental degradation in CA (Beretti and Stuart 2008; Stuart 2009a, 2009b). Although not the focus of this paper, the LGMA and private food safety standards have also resulted in social impacts. Interviews indicate that small farming operations are experiencing increasing financial hardship due to new food safety demands. Consumer groups also remain unsatisfied with an industry-led approach, especially after additional food scares associated with leafy greens from CA. Given the possible range of ecological and social impacts, food safety governance for leafy greens remains a contentious issue in CA. Concerns and tensions among stakeholders have not subsided and have even escalated in response to efforts to expand LGMA policies to the national level.

After success with the CA LGMA, Western Growers pushed forward a proposal for the National Leafy Greens Marketing Agreement (NLGMA). Expanding upon the support it garnered promoting the CA LGMA, Western Growers has rallied nationwide industry support with new partners in Georgia, Arizona, and Texas (NLGMA 2010). However, public hearings concerning the NLGMA brought forth representatives from environmental organizations opposing the approach. In addition, Georgetown University’s Produce Safety Project recently released a report written by scientists for The Nature Conservancy evaluating the ecological impacts of on-farm food safety measures in CA (PSP 2010). This report aims to expose the possible range of impacts if similar standards are adopted nationwide.

If approved, the Agricultural Marketing Service at the USDA would administer the NLGMA. The USDA received more than 3,500 comments regarding the proposed NLGMA, representing record numbers compared with the average 2-3 comments for typical commodity rules and up to 100 comments for more controversial issues (Skrzycki 2007). The USDA is currently evaluating the proposal, a process that could take several more months. Adoption of the NLGMA is not assured, however, given the number of comments on the proposal and strong opposition from a diverse set of interest groups.

Beyond opposition from environmental organizations, a NLGMA is opposed by organizations representing small farmers. The CA LGMA illustrated that small farmers are more financially affected by requirements than large farmers. For example, smaller growers are required to have the same buffer widths around fields although they must take a greater percentage of their land out of production. In addition, growers have been required to conduct expensive water tests and complete increasing amounts of paperwork. Most small growers lack the resources and staff to easily meet these demands and must rely on extra hours from family members or sell operations to larger growers. CAFF remains a strong opponent to the NLGMA, citing negative impacts to small farmers, farmers with diverse operations, and immigrant and minority growers. In acknowledgment of how standards in the meat and dairy sectors led to increased market consolidation, some produce growers feel that the LGMA was designed to force them out of business, allowing large operations to increase their acreage. Thus, CAFF is “opposed to this proposed approach to food safety where an industry board dominated by large processors and shippers could dictate farming practices to all farmers” and claims that the rules “could devastate traditional leafy green farmers nationwide” (CAFF 2010).

Consumer groups have also emerged as strong opponents to a marketing agreement approach to food safety. The Consumers Union, the Consumer Federation of America, and other consumer groups have released public comments condemning the approach as a strategic and shady push for self-regulation. The Consumers Union issued a public comment entitled: “Handling Regulations for Leafy Greens under the Agricultural Marketing Agreement Act of 1937.” In this document, they detailed problems with the CA LGMA and condemned a NLGMA:

In an attempt to shore up consumer confidence and to avoid being regulated from outside, the California leafy green industry—heavily influenced by Dole and other major players—developed its own best practices guidelines and trace-back systems, behind closed doors and without public comment.

## SCIENCE, STANDARDS, AND POWER

131

The industry appointed itself as the safety oversight board, including some of the very companies, such as Dole, which have been accused of marketing contaminated leafy greens. The resulting California Leafy Green Marketing Agreement, which is voluntary, was presented as the panacea for the safety of leafy greens (Odabashian 2007: 56678).

The report later stated that “industry self-regulation seldom protects consumers” and that “marketing orders are not the solution, but rather will deflect USDA and FDA from creating proper and meaningful measures to assure leafy green safety” (Odabashian 2007). Consumer groups continue to heavily doubt the effectiveness of industry-created standards. This doubt may be further justified after revealing that many industry-created standards are not backed by scientific evidence and instead focus more on perception and economic aspects of implementation.

These concerns highlight the range of possible ecological and social impacts of a marketing agreement approach to food safety and provide additional evidence to support issues regarding transparency and participation previously raised by food governance scholars (Busch 2003; Hatanaka et al. 2005; Konefal et al. 2005). While a marketing agreement approach is slightly more transparent than the creation of standards by individual companies, rule making remains behind closed doors. Participation is limited to industry leaders and focuses on industry interests. While the best interests of consumers may or may not be represented in industry-created food safety standards, it is far less likely that the interests of small farmers and environmental groups are considered. Given the lack of scientific data to support new food safety standards, the arbitrary nature of rule making is likely to be more easily influenced by non-food safety related factors favoring industry interests. Specific rules that cause environmental and social impacts are therefore imposed without scientific justification.

This paper demonstrates that the public-private “partnership” through the LGMA is not a partnership but a useful notion to mask an asymmetrical power relationship. In accord with neoliberal trends, industry is making the rules and paying government for monitoring and enforcement. Consumer groups fear government inspectors will “owe their loyalty” to the industry rather than to consumers (Martin 2009). Evidence already suggests that enforcement directed by industry is far from consistent. Growers report that auditors from processing companies will break their own rules, accepting produce that would otherwise be rejected in cases where the market price is high. In contrast, growers claim that companies use food safety as an excuse to reject crops when the market price is low

(Stuart 2009a). While some view a marketing agreement as a more democratic approach compared with private standards, similar issues with transparency and participation in both rule making and enforcement suggests that the differences remain superficial. A marketing agreement led by industry insiders is unlikely to result in the best outcomes for small farmers, the environment, and consumers. This case study reinforces suggestions that such systems of food governance “will further exacerbate inequalities in health, social welfare, and ecological conditions” (Konefal et al. 2005:300). While ensuring more diverse participation alone may not address power inequalities, at the least participation increases the visibility of other interests and allows a platform for voicing concerns.

Given the issues highlighted in this paper, the current trend toward neoliberal food safety governance should raise some concern. The LGMA illustrates how neoliberal governance can be exclusive, undemocratic, and potentially socially and ecologically damaging. Exposing these issues, many critics support government-led approaches. However, some of these same issues arise with government. Most notably, powerful corporations maintain a heavy influence over current legislative and administrative systems. As illustrated by Juska et al. (2000), government approaches to rule making can be plagued by coercion from corporate interests and may result in negative impacts to marginalized groups. Government responses to food safety concerns are heavily shaped by corporate interests, putting forth approaches that support large agrifood companies and overlook issues of scale and impacts on small producers (DeLind and Howard 2008). In addition, it remains very unlikely that new legislation will do anything to curtail the use of private standards and marketing agreements for food safety. While this paper raises serious concerns over neoliberal approaches to food safety governance, we must also remain critical of the alternative. In contrast to neoliberal approaches, government systems contain channels designed to foster democratic processes. However, these channels have become weak – limiting the diversity of participation, representation, and interests considered in policymaking. In all cases these factors determine whether the governing process is truly democratic and ultimately shape the equitability of social and environmental outcomes.

## CONCLUSION

Following the work of Busch and others from the MSU School of Agrifood Governance and Technoscience, this paper uses insights and approaches from science studies to empirically explore food governance, attempting to open the black box of new food safety governance in CA. This investigation reveals not a

## SCIENCE, STANDARDS, AND POWER

133

straightforward process of rule making, but a process that included strategic participation and exclusion resulting in clear winners and losers. While there are always winners and losers, recurring patterns of industrial power should raise some alarms. Here, leaders in the produce industry created a new network that successfully pushed forward the LGMA, excluding and ignoring the concerns of small farmers, environmental organizations, and natural resource agencies. While the industry-led approach remains highly favorable to industry, the excluded groups become the clear losers. However, these losers are not powerless actors. This case illustrates that the creation of one network can directly result in the creation of another. A new environmental network emerged and enlisted participants to resist industry-created food safety standards. This network continues to push back; however, its influence pales in comparison to corporate actors. For both networks, leaders with the most at stake rallied together representatives from other impacted groups to create and push forward a plan of action. Opening the black box of food safety governance in CA reveals new insights about power, network interactions, and the possible impacts of industry-led governance approaches.

This case study also provides insights regarding the role of science in food governance. The process of rule making for the LGMA clearly highlights how actors use scientific narratives and the notion of expert authority to push forward specific agendas. Here, scientific evidence was differentially used or ignored during the creation of food safety standards. Such behavior suggests even further bias associated with the creation of private food safety standards, created in an even more clandestine manner. The standards are largely based upon “expert opinions” from industry insiders – seeming to be more heavily based on economic and liability issues than scientific evidence. These conclusions echo findings from Juska et al. (2000) that illustrate the complicated and highly political process of creating new meat standards. Opening the black box of that process revealed how experts were called to go beyond their areas of expertise and how “political, ideological, ethical, and legal considerations played a much more important role than the scientific data” (Juska et al. 2000:259). While individual companies, agricultural associations, and even government agencies claim that their rules are based upon “the best science,” this may be misleading given that often little evidence exists, existing studies may be ignored, and experts outside their areas of expertise are making judgments that continue to be heavily influenced by other interests (Busch 2002).

This case study reveals how the introduction of a new food governance network can both encapsulate and overpower other networks. Drawing from the concept of

punctualization (Law 1992), a marketing agreement approach to food safety governance takes existing networks from a governmental agency (e.g., the CDFA) and incorporates them into a new governance scheme. This incorporation serves to reduce initial organizational efforts. Including government in a “partnership” may also offer some legitimacy to skeptics, but this legitimacy remains an illusion as government inspectors work for industry. Furthermore, this neoliberal approach to food safety has overpowered government networks as well as environmental programs. While taxpayer dollars support efforts by the NRCS and the RWQCB to protect the environment, their programs have now been significantly affected by new food safety standards. In other words, the new food safety network has “subsumed its outsides” (Mansfield 2007). Food safety standards preclude growers from participating in environmental efforts and even encourage them to break environmental laws (Stuart 2009a). Due to budgetary problems, environmental and natural resource agencies lack the ability to fully implement and enforce these laws. In short, by controlling access to markets, the produce industry has substantially more influence than government agencies over farm practices. This case illustrates how food industry leaders represent the most powerful force in CA agriculture, easily overtaking other governance networks.

Examining food governance using network-based approaches may help us to identify new configurations and possibilities. As the MSU School of Agrifood Governance and Technoscience has illustrated, many current examples of food governance remain far from democratic and result in similar patterns of corporate winners and marginalized losers. As stated by Gouveia and Juska (2002:372) “increased corporate power to mold and re-mold production and consumption relations and regulatory initiatives is an undeniable fact in contemporary capitalism.” To increase democracy in food governance, changes must be made. Echoing the sentiments of Busch (2003), we must increase the range of people whose concerns and priorities shape governance. In other words, we must create new governance networks. While ANT helps us to identify powerful actors and their allies, we can also apply ANT to focus on other actors and alternative ways that networks may develop (Gad and Jensen 2010). That is, ANT can be used to explore how we might retranslate networks to provide alternative outcomes, and how networks “might be dismantled . . . and power reconfigured” (Goodman 2001:195). Thus, as research in food governance continues, we should focus not only on the dominant networks, powerful actors, and impacts of current arrangements, but should also direct our attention toward efforts to reconfigure dominant networks and create more democratic alternatives.

## AUTHOR BIOGRAPHY

**Diana Stuart** is an assistant professor at Michigan State University with a joint appointment through the Department of Sociology and the Kellogg Biological Station. Her research focuses on the adoption of agricultural practices, food systems, science and technology, and environmental issues. (dstuart@msu.edu)

## REFERENCES

- Beretti, Melanie and Diana Stuart. 2008. "Food Safety and Environmental Quality Impose Conflicting Demands on Central Coast Growers." *California Agriculture* 62(2):68–73.
- Bonanno, Alessandro, Lawrence Busch, William Friedland, Lourdes Gouveia, and Enzo Mingione, eds. 1994. *From Columbus to Conagra: The Globalisation of Agriculture and Food*. Lawrence, KS: The University of Kansas Press.
- Busch, Lawrence. 2000a. *The Eclipse of Morality. Science, State, and Market*. New York: Aldine De Gruyter.
- \_\_\_\_\_. 2000b. "The Moral Economy of Grades and Standards." *Journal of Rural Studies* 16:273–83.
- \_\_\_\_\_. 2002. "The Homiletics of Risk." *Agricultural and Environmental Ethics* 15:17–29.
- \_\_\_\_\_. 2003. "Virgil, Vigilance, and Voice: Agrifood Ethics in an Age of Globalization." *Journal of Agricultural & Environmental Ethics* 16(5):459–77.
- \_\_\_\_\_. 2007. "Performing the Economy, Performing Science: from Neoclassical to Supply Chain Models in the Agrifood Sector." *Economy and Society* 36(3):437–66.
- Busch, Lawrence and Carmen Bain. 2004. "New! Improved? The Transformation of the Global Agrifood System." *Rural Sociology* 69(3):321–46.
- Busch, Lawrence and Arunus Juska. 1997. "Beyond Political Economy: Actor Networks and the Globalization of Agriculture." *Review of International Political Economy* 4(4):688–708.
- Caffrey, Jane. 2001. "Biogeochemical Cycling" Pp. 215–36 in *Changes in a California Estuary: A Profile of Elkhorn Slough*, edited by J. Caffrey, M. Browne, and T. W. B. Typler. Moss Landing, CA: Elkhorn Slough Foundation.
- Callon, Michel. 1986. "Some Elements in a Sociology of Translation: Domestication of the Scallops and Fishermen of St. Brieuc Bay." Pp. 19–34 in *Power, Action, Belief*, edited by J. Law. London: Routledge.
- Castree, Noel. 2002. "False Antitheses? Marxism, Nature and Actor-networks." *Antipode* 34(1): 111–46.

- Center for Disease Control (CDC). 2007. *Multistate Outbreak of E. coli O157 infections, November-December 2006*. Retrieved June 15, 2007 (<http://www.cdc.gov/ecoli/2006/december/121406.htm>).
- California Department of Health Services and US Food and Drug Administration (CDHS/FDA). 2007. *Investigation of an Escherichia coli O157:H7 Outbreak Associated with Dole Pre-Packaged Spinach*. Retrieved February 12, 2010 (<http://www.dhs.ca.gov/fdb/HTML/Food/EnvInvRpt.htm>).
- Community Alliance with Family Farmers Food Safety (CAFF). 2010. Retrieved March 21, 2010 (<http://www.caff.org/policy/foodsafetylg.shtml>).
- California Department of Fish and Game (CDFG). 2009. California Department of Fish and Game News Updates. Retrieved March 11, 2010 (<http://www.dfg.ca.gov/news/news09/2009040702.asp>).
- Cone, Marla. 2007. "Gov.'s Stance an Obstacle for Spinach Safety Bills." *Los Angeles Times*. March 1, 2007. Retrieved January 11, 2011 (<http://articles.latimes.com/2007/mar/01/local/me-spinach1>)
- DeLind, Laura B. and Philip H. Howard. 2008. "Safe at Any Scale? Food Scares, Food Regulation, and Scaled Alternatives." *Agriculture and Human Values* 25(3):301-17.
- Donaldson, Andrew, Philip Lowe, and Neil Ward. 2002. "Virus-Crisis-Institutional Change: the Foot and Mouth Actor Network and the Governance of Rural Affairs in the UK." *Sociologia Ruralis* 42(3):201-14.
- Dowd, Brian, Daniel Press, and Marc Los Huertos. 2008. "Agricultural Nonpoint Source Water Pollution Policy: the Case of California's Central Coast." *Agriculture, Ecosystems and Environment* 128:151-61.
- Fenlon, David R. 1981. "Seagulls (*Larus* Spp) as Vectors of Salmonellae - an Investigation into the Range of Serotypes and Numbers of Salmonellae in Gull Feces." *Journal of Hygiene* 86(2):195-202.
- Fiorino, Daniel J. 2004. "Flexibility" Pp. 393-425 in *Environmental Governance Reconsidered*, edited by R. F. Durant, D. J. Fiorini, and R. O'Leary. Cambridge, MA: MIT Press.
- Flynn, Andrew, Terry Marsden, and Everard Smith. 2003. "Food Regulation and Retailing in a New Institutional Context." *The Political Quarterly* 74(1):38-46.
- Friedland, William, Amy E. Barton, and Robert J. Thomas. 1981. *Manufacturing GreenGold: Capital Labor, and Technology in the Lettuce Industry*. Cambridge, MA: Cambridge University Press.
- Gad, Christopher and Casper B. Jensen. 2010. "On the Consequences of Post-ANT." *Science, Technology, & Human Values* 35(1):55-80.

- Goodman, David. 1999. "Agro-food Studies in the 'Age of Ecology': Nature, Corporeality, and Bio-politics." *Sociologia Ruralis* 39(1):17–37.
- \_\_\_\_\_. 2001. "Ontology Matters: the Relational Materiality of Nature and Agro-food Studies." *Sociologia Ruralis* 41(2):182–200.
- \_\_\_\_\_. 2003. "The Quality 'Turn' and Alternative Food Practices: Reflections and Agenda." *Journal of Rural Studies* 19(1):1–7.
- Goodman, David, Bernardo Sorji, and John Wilkinson. 1987. *From Farming to Biotechnology: a Theory of Agro-industrial Development*. Oxford: Basil Blackwell.
- Gouveia, Lourdes and Arunas Juska. 2002. "Taming Nature, Taming Workers: Constructing the Separation Between Meat Consumption and Meat Production in the U.S." *Sociologia Ruralis* 42(4):370–90.
- Harvey, David. 2005. *A Brief History of Neoliberalism*. Oxford: Oxford University Press.
- Hatanaka, Maki, Carmen Bain and Lawrence Busch. 2005. "Third-party Certification in the Global Agrifood System." *Food Policy* 30(3):354–69.
- Hatanaka, Maki and Lawrence Busch. 2008. "Third-party Certification in the Global Agrifood System: An Objective or Socially Mediated Governance mechanism?" *Sociologia Ruralis* 48(1):73–91.
- Higgins, Vaughan. 2006. "Re-figuring the Problem of Farmer Agency in Agri-food Studies: a Translation Approach." *Agriculture and Human Values* 23:51–62.
- Hunt, John W., Brian S. Anderson, Bryn M. Phillips, Ron S. Tjeerdema, H. Max Puckett and Victor deVlaming. 1999. "Patterns of Aquatic Toxicity in an Agriculturally Dominated Coastal Watershed in California." *Agriculture Ecosystems & Environment* 75(1–2):75–91.
- Juska, Arunas, Lourdes Gouveia, Jackie Gabriel, and Susan Koneck. 2000. "Negotiating Bacteriological Meat Contamination Standards in the US: The Case of E-coli O157: H7." *Sociologia Ruralis* 40(2):249–71.
- Konefal, Jason, Michael Mascarenhas, and Maki Hatanaka. 2005. "Governance in the Global Agro-food System: Backlighting the Role of Transnational Supermarket Chains." *Agriculture and Human Values* 22:291–302.
- Leafy Greens Marketing Agreement (LGMA). 2010. California Leafy Greens Marketing Agreement. Retrieved March 3, 2010 ([www.caleafygreens.ca.gov/about/](http://www.caleafygreens.ca.gov/about/)).
- Latour, Bruno. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge, MA: Harvard University Press.
- Law, John. 1992. "Notes on the Theory of Actor-network: Ordering, Strategy, and Heterogeneity." *Systems Practice* 5(4):379–93.

- Lockie, Stewart and Simon Kitto. 2000. "Beyond the Farm Gate: Production-Consumption Networks and Agri-food Research." *Sociologia Ruralis* 40(1):3–19.
- Los Huertos, Marc. 1999. "Nitrogen Dynamics in Vegetative Buffer strips Receiving Nitrogen Runoff in Elkhorn Slough Watershed." PhD dissertation, Department of Environmental Studies, University of California Santa Cruz, Santa Cruz, CA.
- Mansfield, Becky. 2007. "Articulation Between Neoliberal and State-oriented Environmental Regulation: Fisheries Privatization and Endangered Species Protection." *Environment and Planning A*. 39:1926–42.
- Marsden, Terry. 2000. "Food Matters and the Matter of Food: Towards a New Food Governance?" *Sociologia Ruralis* 40(1):20–9.
- Marsden, Terry, Jonathan Murdoch, Philip Lowe, Richard Munton, and Andrew Flynn. 1993. *Constructing the Countryside*. London: University College London Press.
- Martin, Andrew. 2009. "Filling Safety Gap, Growers Pay for Inspections." *The New York Times*. April 17, 2009. Retrieved January 13, 2011. (<http://www.nytimes.com/2009/04/17/business/17leafy.html>)
- McTaggart, Jenny. 2007. "Food Safety: Safety Dance." *Progressive Grocer*. October 2007. Retrieved January 13, 2011. (<http://business.highbeam.com/4122/article-1G1-170296861/cover-story-food-safety-safety-dance>)
- Morgan, Kevin, Terry Marsden, and Jonathan Murdoch. 2006. *Worlds of Food: Place, Power, and Provenance in the Food Chain*. Oxford: Oxford University Press.
- Murdoch, Jonathan. 2000. "Networks—A New Paradigm of Rural Development?" *Journal of Rural Studies* 16:407–19.
- Murdoch, Jonathan, Terry Marsden, and Jo Banks. 2000. "Quality, Nature, and Embeddedness: Some Theoretical Considerations in the Context of the Food Sector." *Economic Geography* 76(2):107–25.
- Nagin, Carl. 2007. "How Safe is your Salad?" *San Francisco Chronicle Magazine*. December 16, 2007. Retrieved on January 13, 2011. ([http://articles.sfgate.com/2007-12-16/living/17272757\\_1\\_natural-selection-foods-coli-outbreak-0157-h7](http://articles.sfgate.com/2007-12-16/living/17272757_1_natural-selection-foods-coli-outbreak-0157-h7)).
- Nestle, Marion. 2003. *Safe food: bacteria, biotechnology, and bioterrorism*. Berkeley, CA: University of California Press.
- \_\_\_\_\_. 2006. "The Spinach Fallout: Restoring Trust in California Produce." *The San Jose Mercury News*. October 22, 2006. Retrieved October 12, 2007. ([www.foodpolitics.com/pdf/spinachfal.pdf](http://www.foodpolitics.com/pdf/spinachfal.pdf))

- National Leafy Greens Marketing Agreement (NLGMA). 2010. National Leafy Greens Marketing Agreement. Retrieved February 23, 2010 (<http://www.nlgma.org/>).
- Odabashian, Elisa. 2007. *Regarding Handling Regulations for Leafy Greens under the Agricultural Marketing Agreement Act of 1937*. Docket No. AMS-FV-07-0090; FV07-962-1 AN (Page 56678 of Federal Register/Vol. 72, No. 192). Retrieved March 20, 2010 ([http://www.consumersunion.org/pub/core\\_food\\_safety/005238.html](http://www.consumersunion.org/pub/core_food_safety/005238.html)).
- Peck, Jamie, and Adam Tickell. 2002. "Neoliberalizing Space." *Antipode* 34(3):380–404.
- Pollan, Michael. 2006. "The Vegetable-industrial Complex." *The New York Times*. October 15, 2006. Retrieved January 13, 2011. ([http://www.nytimes.com/2006/10/15/magazine/15wwln\\_lede.html](http://www.nytimes.com/2006/10/15/magazine/15wwln_lede.html))
- Produce Safety Project (PSP). 2010. *Managing for Food Safety and Ecological Health on California's Central Coast*. Georgetown University Produce Safety Project. February 2010. Retrieved March 2, 2010 (<http://www.producesafetyproject.org/reports?id=0007>).
- Resource Conservation District of Monterey County (RCDMC). 2006. *Reconciling Food Safety and Environmental Protection: A Literature Review*. October 2006. Retrieved February 4, 2010 (<http://www.rcdmonterey.org/Downloads/PDFs.html>).
- Salamon, Lester M. 2002. "The New Governance and the Tools of Public Action: an Introduction" Pp. 1–47 in *The Tools of Government*, edited by L. M. Salamon. Oxford: Oxford University Press.
- Schlosser, Eric. 2001. *Fast Food Nation: the Dark Side of the All American Meal*. New York: Houghton Mifflin.
- \_\_\_\_\_. 2006. "Has Politics Contaminated the Food Supply?" *The New York Times*. December 11, 2006. Retrieved January 13, 2011 (<http://www.nytimes.com/2006/12/11/opinion/11schlosser.html>).
- Schmit, Julie. 2006. "Fresh Express Leads the Pack' in Produce Safety." *USA Today*. October 23, 2006. Retrieved January 13, 2011 ([http://www.usatoday.com/money/industries/food/2006-10-22-fresh-express-usat\\_x.htm](http://www.usatoday.com/money/industries/food/2006-10-22-fresh-express-usat_x.htm)).
- Shin, Annys. 2006. "Outbreaks Reveal Food Safety Net's Holes: Produce Growers Balk at Call for Regulation." *The Washington Post*. December 11, 2006. Retrieved August 22, 2009. (<http://www.washingtonpost.com/wp-dyn/content/article/2006/12/10/AR2006121000903.html>).

- Skrzycki, Cindy. 2007. "In a Pickle Over Self-Regulation for Produce Growers." *The Washington Post*. December 11, 2007. Retrieved March 3, 2008. (<http://www.washingtonpost.com/wp-dyn/content/article/2007/12/10/AR2007121001635.html>).
- Stuart, Diana. 2008. "The Illusion of Control: Industrialized Agriculture, Nature, and Food Safety." *Agriculture and Human Values* 25(2):177–81.
- \_\_\_\_\_. 2009a. "Constrained Choice and Ethical Dilemmas in Land Management: Environmental Quality and Food Safety in California Agriculture." *Agricultural and Environmental Ethics* 22:53–71.
- \_\_\_\_\_. 2009b. "Coastal Ecosystems and Agricultural Land Use: New Challenges on California's Central Coast." *Coastal Management* 38:42–64.
- Wood, Daniel B. 2007. "A Move to Make Fresh US Produce Safer- a Series of Food-illness Outbreaks has Pushed the FDA to Issue New Voluntary Guidelines." *The Christian Science Monitor*. March 16, 2007. Pp. 3.
- Wrigley, Neil. 1999. "Market Rules and Spatial Outcomes: Insights from the Corporate Restructuring of US Food Retailing." *Geographical Analysis* 31(3):288–309.
- \_\_\_\_\_. 2002. "Transforming the Corporate Landscape of US Food Retailing: Market Power, Financial Re-engineering and Regulation." *Tijdschrift Voor Economische En Sociale Geografie* 93(1):62–82.