



Environmental and social risks, and the construction of “best-practice” in Australian agriculture

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Abstract. Amongst the environmental and social externalities generated by Australian agriculture are a number of risks both to the health and safety of communities living near sites of agricultural production, and to the end consumers of agricultural products. Responses to these potential risks – and to problems of environmental sustainability more generally – have included a number of programs to variously: define “best-practice” for particular industries; implement “Quality Assurance” procedures; and encourage the formation of self-help community “Landcare” groups. Taken together, these programs appear to deal comprehensively with both the social and environmental risks associated with agricultural production and products. However, these programs may also be interpreted as strategies that actually encourage the further intensification of agriculture, while attempting to reassure consumers that their food is safe and that farmers are doing “all they can” to protect the environment. Investigation of the Australian cotton and beef industries illustrates a number of strategies that have become evident between farmers, agri-science agencies, and the retail sector to manage these risks and define good farming practices in ways that satisfy their own perceived interests. Contrary to the image, therefore, of “green consumption” that is emerging as an integrated concern for “clean” (and thereby “healthy”) and sustainably produced foods, it appears that mainstream agricultural industries have bifurcated these concerns in ways that distract attention from production and processing methods, leaving conflict over on-farm production methods a characteristic only of those industries believed to have direct health impacts on nearby communities.

Key words: Australian agriculture, Best-practice, Environment, Knowledge construction, Landcare, Quality assurance, Risk

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Introduction

One of the more pervasive ideas to emerge in Australian society in recent years has been the notion of implementing “international best-practice.” As the Australian economy has been progressively “internationalized” via the abolition of tariffs, subsidies, and other forms of state intervention, the adoption of “best-practice” on an international scale has been seen as essential to the maintenance of competitiveness and an attractive environment for investment. The idea of “best-practice” has perhaps been most commonly taken up in the arena of so-called “workplace reform,” through which it has been linked to both increased enterprise efficiency, competitiveness and profitability,

and harmonious, trust-based workplace relations (Wright and Lund, 1996). It has thus been held to be both economically and socially responsible. In practice, however, the core concept of “benchmarking” – the establishment of minimum desirable performance indicators – has legitimated the linkage of best-practice with other efficiency-oriented euphemisms – such as managerial “downsizing” and labor “restructuring” – and with increased workforce monitoring and disciplining (Wright and Lund, 1996; see also Muetzelfeld, 1992). The positive connotations of the term “best-practice” have seen it become, nevertheless, widely used in a number of contexts, including agriculture.

There is much more at stake in contemporary agriculture, of course, than the issue of economic

competitiveness. "Best-practice" has thus been seen as necessary not only to ensure the competitiveness of agricultural industries, but to limit the extent to which negative impacts, or externalities, are generated that place at risk: the health and safety of communities living in close proximity to sites of agricultural production; the safety of end-consumers of agricultural produce; and the environmental sustainability of agricultural production. Initiatives addressing these risks have included the development and extension by some agricultural industries of educational best-practices programs to growers; the development of "Quality Assurance" schemes that monitor farming practices and reward compliance with industry-based standards with formal accreditation; and the promotion of community-based self-help groups that seek to coordinate local action to address environmental and sustainability issues. In a similar vein, competency standards have been developed for a range of agriculturally based professionals that also emphasize economic, environmental, and social responsibility.

Despite the obvious desirability of "improving" Australian agriculture, a number of questions remain. What is best-practice for an industry? Who defines it? How is it measured? Essentially, what is the social basis for knowledge about the best way to undertake an activity? This paper does not address these questions from an epistemological or normative perspective that might seek to determine how best-practice *ought* to be defined. Rather, it seeks to address them from an explicitly sociological perspective that is concerned with the specific social processes that have shaped the development of "best-practice" in Australian agriculture. In doing so it will not offer a definition of "best-practice," but will treat the concept of "best-practice" as a *signifier*, or sign, to which a whole range of culturally produced meanings may be attached, or *signified*, by competing social groups (see Hall, 1993). Of fundamental importance here are the relationships between meaning and power. As social actors, we construe the meaning of activities by drawing on the stock of available discourses, or webs of meaning, that form the cultural milieu in which we live our lives (Long, 1992). Power, therefore, is as dependent on the ability of "actors to win the struggles that take place over the attribution of specific social meanings to particular events, actions and ideas" (Long, 1992: 24), as on more obvious forms of coercion. In this case, discourses around the idea of "best-practice" will be used to explore relationships between knowledge, science, society, and agriculture in the context of three case studies focused on the Australian Landcare Program and the beef and cotton industries. Following outlines of these three case studies, some observations will be made regarding their social and theoretical

implications in relation to the social and environmental risks generated by Australian agriculture.

Consumer safety and Landcare in Australian agriculture

In August, 1995, the Executive Director of the Australian Institute of Agricultural Science and Technology (AIAST) suggested to a conference of land conservation professionals that the certification of "competency standards" for primary producers would offer an opportunity to link best-practice in primary production to export accreditation (Field, 1995). The right to sell produce off-shore could be linked, therefore, to an ability to farm in such a way as to maximize product quality and minimize land degradation, as demonstrated by the attainment of competence in the conduct of a specified range of tasks followed strictly through the production cycle. AIAST accredited competency standards for agricultural production have not to date been developed, but the factors that led to their suggestion have remained prominent, and particular industries have responded to them with a variety of programs of similar intent. The linking of trade access to the environmental effects of the whole cycle of production and consumption in the final stages of the Uruguay round of the General Agreement on Tariffs and Trade has been of great concern to Australia, as costs incurred in complying with the environmental regulations of importing countries may reduce any comparative advantage enjoyed by Australian producers (Council for International Business Affairs, 1995). This is a sensitive issue, since even prior to the closure of the Uruguay round, exports of Australian Produce had been rejected on health grounds.

Moving to reassure consumers of product safety is quite a different thing, however, to reassuring either them or regulatory agencies that food or fiber production systems are environmentally sustainable. In this respect the cotton industry stands out as an industry that has devoted considerable resources to promoting its environmental and social credentials. For the most part, however, it seems only the relatively small organics (chemical free) industry that makes clear links between consumer safety and environmentally sustainable production. In this context the notion of "landcare" has emerged as a popular signifier of social and environmental responsibility to attach to farming practices and other social projects. Landcare was first initiated on a wide scale with the announcement of the National Landcare Program (NLP) in 1989. The NLP is primarily oriented towards the promotion and support of voluntary, self-help groups that aim to

address local land degradation or sustainability issues. These groups typically involve 30 or so members, and are based on water catchments or other communities of interest. These groups may apply to the NLP for funding to conduct trial or demonstration projects, and to other sources for support with planning, tree planting, and other activities. There are believed to be over 4,000 community Landcare groups in Australia involving around 30 percent of farm businesses (Mues et al., 1994). The term "landcare," however, has become a more generic term used to refer to everything from particular farming practices, to government extension activities, and to more nebulous ideas such as simply "caring for the land," or the "landcare movement."

Devoid of the radicalism of the environmental movement, the Landcare Program attracts considerable political support, publicity, and corporate sponsorship, with a private company, Landcare Australia Limited, licensing access to the Landcare logo to companies sponsoring Landcare activities. It has been argued that Landcare has thus provided companies with otherwise suspect resource extraction and manufacturing practices with cheap environmental credibility (Brown, 1994; Lockie, 1997b). Of more consequence, though, for farming practice is the symbolic association of Landcare with input-intensive farming systems.

Analysis of texts, such as the corporate sponsored magazine *The Challenge*¹ – which is sent to community Landcare groups and other interested organizations and individuals – reveals a number of consistent themes. These range from the portrayal of land degradation as "disease-like," to the representation of chemical use as vital to successful tree establishment, and the practicality of local group action supported by state agencies and the corporate sector. This means that neither the manufacturers nor the users of farm inputs are constructed as contributors to the production of environmental degradation. Instead, agri-chemical products are defined as part of the solution to an "insidious disease" for which, presumably, no one is deemed directly responsible. Other research involving farmers in the broadacre cropping industries demonstrated that contrary to this suggestion, many felt a high degree of anxiety regarding the long-term sustainability of input-intensive farming systems (Lockie et al., 1995). Nevertheless, they also believed they had little choice but to continue intensifying their operations if they were to maintain economic viability. The representation of agri-chemicals as essential to environmental protection in texts such as *The Challenge* serves to reassure farmers that they are not themselves poor environmental stewards but that they are, at least, doing all they can.

Instead of a fundamental reassessment of the high-

input trajectory along which Australian agriculture has been developing (Knopke and Harris, 1991), the positive meanings associated with "Landcare" have been used by state and agribusiness agencies to promote the adoption of a limited range of technological and managerial innovations identified as "best-bet practices" (Lockie, 1997a). The adoption of a vaguely defined package of practices including conservation farming (or minimum tillage), perennial pasture establishment, tree planting, property planning, and re-fencing has become such an orthodoxy that these are often understood as "landcare practices" (Campbell, 1990). Indeed, their adoption was used as the basis of official Landcare group evaluations in all States except New South Wales (NSW) conducted between 1991 and 1994 (Curtis and De Lacy, 1997). Using the extent to which these activities had been undertaken as an index of group effectiveness, all consideration of the effectiveness or relevance of each activity to particular agroecological and social contexts was ignored (Lockie, 1993).

"Landcare" has not been used to signify the idea that food or fiber is produced sustainably to sell Australian produce, but the idea that farmers are, nevertheless, doing everything they can about land degradation. As a model for state action the NLP has attracted considerable international interest (Wensley, 1994), while market research indicates that "landcare" is a popular and recognizable "label" amongst Australian consumers (Scarsbrick, 1997). Perversely, any reassurance that the Landcare Program may provide to both domestic and international consumers that Australian farmers are doing their best to adopt environmental best-practice is only ever directly attached to the products of companies sponsoring Landcare Australia Limited – many of which have a vested interest in selling farm-inputs – not the agricultural produce of Landcare group members. Nevertheless, pressure on farmers to adopt some form of "best-practice" clearly remains. The rest of this paper deals with attempts to adopt some form of "best-practice" in the beef and cotton industries, each of which has attracted attention for the generation of very different types of environmental risk.

Quality Assurance and food safety in the Australian beef industry

While Australian agriculture in general has been a focus of concern regarding product quality and environmental sustainability, the beef industry in particular has attracted attention for the risks posed to the end-consumer of beef products. In 1987, for example, organochlorine residues found in beef exported to the

United States led to the quarantining of some 1,500 properties (Barr and Cary, 1992). Since then, a number of further food safety “scares” in Australia and overseas have both threatened the ongoing viability of the Australian industry, and opened up opportunities to capitalize on the perceived risks associated with the consumption of beef produced elsewhere. In 1987, the safety of Australian beef products was questioned due to “unsafe” levels of chemical residues, while since then the focus has shifted more towards bacterial contamination such as *E. coli*, listeria, and salmonella. Consistent with the regularity and changing focus of these public “scares,” Australia’s largest meat retailer – the Woolworths supermarket chain – claims food safety, not price, to be the prime concern for consumers of meat products (*The Land*, 21 August, 1997), while the Australian Supermarket Institute claims that bacterial contamination has displaced chemical residues as consumers’ leading “food phobia” (*Queensland Country Life*, 17 October, 1996).

According to the Commonwealth Department of Primary Industries and Energy, the protection offered to consumers by government enforced inspection regulations in abattoirs is no longer sufficient to guard against bacterial contamination (*Queensland Country Life*, 15 February, 1996). The response of the beef industry to food safety risks has begun to focus, therefore, on more far-reaching systems of Quality Assurance based on the Hazard Analysis Checkpoint Control Program – which requires all potential food hazards to be identified and addressed in the production, processing, and handling of a product – thus enabling the promotion of Australian beef as safe. The largest Quality Assurance program launched to date has been the “Cattlecare” program, which offers independent monitoring and accreditation of farmers, saleyards, processing plants, transporters, and live exporters, in an attempt to develop “integrated Quality Assurance systems throughout all sectors of the meat and livestock industry” (*Queensland Country Life*, 8 May, 1997: 7).

Unlike “best-practice” programs, Quality Assurance programs like Cattlecare do not necessarily address all practices involved in the production of a commodity, focusing only on those thought to impact on the quality of the product sold to the end-consumer. Nevertheless, many farmers have expressed concern about external auditing of their activities, and subsequently have supported the development of a rival Quality Assurance program, the Queensland based “Q-Care” (*Queensland Country Life*, 18 April, 1996). Q-Care incorporates only the residue management elements of Cattlecare, and in place of external auditing requires comprehensive record keeping to back up vendor declarations at the time of sale. In this

case, responsibility for the monitoring of on-farm practices remains very firmly on the farm. Farmers would only, therefore, declare that they have done everything within their power, given current knowledge, to ensure the safety of their produce.

As rival groups within the beef industry debate the best way to go about Quality Assurance, large produce processors and retailers, such as McDonalds and Woolworths, are initiating their own Quality Assurance programs, aimed towards delivering “a secure standard to consumers . . . and to ensure supply chains (and consumers) are protected from food-borne health concerns” (Cole, 1997: 23). Retailers, such as Woolworths, claim to be extremely responsive to consumer needs, and are using a combination of point of sale records and market research to inform increasingly specific and strict product specifications from their suppliers (Story, 1996). The simple message from these retailers is that farmers not prepared to guarantee the level of Quality Assurance required should take their business elsewhere. Similarly, if industry-wide Quality Assurance programs are not in place, these retailers will initiate their own. There is little doubt, therefore, that a great deal of the impetus behind changes in the beef industry lies in the increasing role of the retail sector in the sourcing, processing, and branding of foods. This is a sector that trades little on the environmental sustainability of food production, associating itself more with signifiers of health, freshness, and convenience. It remains to be seen how much trust consumers will be prepared to place in “Quality Assured” produce since, as the British experience with *bovine spongiform encephalopathy* (BSE) – or “mad cow disease” – shows, consumers have not necessarily been reassured in the past by the claims of state science agencies that there is no “scientific proof” that a foodstuff represents a danger to them.²

Best-practice and the environment in the Australian cotton industry

Over the space of only two decades, the Australian cotton industry has grown from a relatively minor base, to become the nation’s fastest growing agricultural industry – now worth around one billion dollars per annum – and fifth largest export commodity (Vanclay and Lawrence, 1995). It also, however, stands out among agricultural industries as a focal point of community concern and conflict. Although raising few concerns about the safety to consumers of cotton products, considerable controversy has erupted over chemical spray drift and its dangers to human and environmental health, and over the impacts of extensive irrigation on the integrity of inland river systems

and the needs of other water users. In the summer of 1991–1992, for example, the Murray-Darling River system³ experienced widespread blooms of highly toxic blue-green algae that threatened both town and livestock water supplies through much of the system. Although a hotly contested accusation, many community members blamed the irrigation practices of cotton growers who pumped directly from rivers to fill on-farm storages during periods of low rainfall, thus reducing stream-flows, and hence the ability of the river system to flush itself clean of nutrients and algae (McHugh, 1996; Vanclay and Lawrence, 1995). Conflict over water resources continues in several cotton growing areas as the industry and government move to ensure water supplies through the development of dams, weirs, and other irrigation infrastructure; often with questions over the needs of other users (including environmental flows) and the direct impacts of construction and inundation unsatisfactorily resolved in the minds of many outside the irrigation and water industries.

Public debate over the dangers of spray drift has been concentrated in the towns of Emerald, in Central Queensland, and Gunnedah, on the Liverpool Plains of New South Wales. Between 1980 and 1985, a cluster of seven cases of childhood leukaemia were diagnosed in Emerald; a rate eight times that which would be normally expected – a four in one million chance (Short, 1994). The following year the Queensland Department of Health monitored airborne pesticide levels for three months before concluding that the levels were not considered to pose a threat and that the leukaemia cluster had indeed occurred by chance. In response to continuing community fear, another study was undertaken during the 1990–1991 growing season, which again found that background exposure to aerially applied pesticides was very low and not considered a risk (Queensland Health, 1991). Both these reports have attracted detailed "scientific" criticism from both community members and environmentalists (McHugh, 1996; Short, 1994), but have contributed to an easing of overt conflict, and a belief amongst outsiders that Emerald has dealt with its "perceived" pesticide problem. While ongoing debate over pesticide monitoring suggests that such a conclusion may be premature, it is certainly true that Gunnedah has recently attracted more attention, as local residents threaten to take legal action against cotton farmers over spray drift, leading to government intervention to tighten spraying guidelines.

In broad terms, the cotton industry has responded in four ways to community concerns. The first has been to promote and welcome environmental monitoring of the industry, rather than to simply react to and dispute the claims of critics as they arise. It seems though

that such studies are not entirely accepted outside the industry, irrespective of the degree to which they de-legitimize the "non-scientific" views of concerned community members. Also, as Short (1994) demonstrates, the "science" on which these studies are based is often contestable. The second response has been a concerted advertising campaign to associate cotton with a range of attractive signifiers – in particular naturalness, health, clean land and water, environmental care, comfort, sophistication, and glamour – while having little to say about the production or quality of either cotton or cotton products. When consumers consider cotton, they are thus encouraged to think of it as the antithesis of industrialized and artificial synthetic fibers, not as the user of one third of the world's agricultural chemicals. The third response has been to enthusiastically embrace technological solutions to pest-control – in particular, genetically engineered plant varieties that incorporate the naturally occurring *Bacillus thuringiensis* protein, more commonly known as the Bt gene – which promise to maintain or improve productivity while reducing expenditure on chemical inputs. That little public concern has been expressed in Australia over risks associated with biotechnologically engineered cotton varieties would seem consistent with the finding by Norton and Lawrence (1996) that consumers are most concerned about genetic engineering in the context of products that they actually ingest.

The fourth response the cotton industry has made to community concerns about its environmental sustainability has been the development of best-practice programs designed to ensure that farmers make the best possible use of available technologies in order to optimize productivity and sustainability. This response is consistent with the self-identities of cotton growers, who regard themselves as members of a particularly progressive and technologically sophisticated industry with a heavy investment in research and development. Cotton growers' knowledge is constructed and operationalized in farming practice through close interactions with agri-science agencies, clearly challenging any temptation to romanticize "indigenous" or "local" knowledge as somehow intrinsically more environmentally or socially sustainable than "scientific" knowledge.⁴ An interesting feature of this response, however, has been the contradictory approaches taken by two competing best-practices programs. The first of these programs, based in the Emerald district, was designed to facilitate the formation of "best-practice teams" involving representatives from around eight cotton farms (Clarke et al., 1997). Once formed, these groups were to be taken through a process similar to the best-practice programs of other industries. This involved determining for themselves

a benchmark of current best-practices for their area; identifying specific problems and constraints that they wanted to overcome; and, with the help of facilitators, “analyze information and organize action to find solutions to specific problems (specialist support, trials, research or field days)” (*Cotton “Best-Practices” information brochure*, undated). By giving farmers the resources to evaluate their own practices and set their own priorities for knowledge creation, it was thought that more ground would be made in the development and adoption of improvements in irrigation and pest control practice.

Following the initiation of this project, however, a manual for best-practice in the cotton industry was related by the Cotton Research and Development Corporation (CRDC). This manual did not describe the processes of benchmarking and comparative analysis that underpin the notion of “best-practice” as used in managerial discourse (Wright and Lund, 1996), but a set of production practices identified by scientists from a range of research organizations as most suitable for the cotton industry. Growers in Emerald were thus confronted with two very different strategies to define “best-practice,” one that purported to help them identify their own problems, opportunities, and strategies to develop best-practice, and another that told them what best-practice was and how to implement it according to the core research agencies involved in the cotton industry. Not surprisingly, in addition to the creation of confusion, many growers thought the CRDC document largely irrelevant to their own situation, reflecting an ingrained bias towards the priorities and conditions of the larger cotton-growing areas. At the same time, scientists involved in its production were extremely critical of, and unresponsive to, the issues and ideas for research identified by growers (Clarke et al., 1997).

In some respects, the conflict that has been evident between proponents of these two approaches to “best-practice” seems odd, illustrating perhaps more than anything competition for legitimacy between those involved in the production of agricultural knowledges. Nevertheless, in doing this it also illustrates very clearly some of the problems associated with trying to identify the “best” way to go about farming in any particular industry and the particular agroecological and social environments in which it is pursued (see also Clark and Murdoch, 1997). If agreement over the best way to practice farming cannot be found in an industry characterized by high levels of external criticism and scrutiny regarding environmental risks; strong industry organizations; the concentration of production in clearly defined irrigation areas; and close relationships between growers and agri-science agencies, how much more difficult must this be in

Australia’s generally more extensive and diffuse agricultural industries?

Knowledges, the environment, and power in agriculture

Contemporary sociologists take for granted the notion that knowledge is socially constructed, and that even the privileged knowledge claims of science are theory-laden (Feyerabend, 1988) and embedded within social projects. As Foucault (1977) argues, the will to knowledge is the will to power – a point well illustrated by the analysis provided by, among others, Chambers (1983) of clashes between indigenous and scientific knowledges in the context of Third World agricultural development. It is also well illustrated by the clash between growers and agri-science agencies in the definition of best-practice for the Australian cotton industry. Such critiques of the inherent superiority of “scientific” knowledge have been extended into more extensive analyses of late twentieth century social organization. According to Lyotard (1990), the knowledge claims and rational basis of scientific bureaucracy have lost their social legitimacy as a foundation for truth and meaning. Beck (1992, 1996), however, argues that in the face of massive risks generated by industrial development – risks such as nuclear accidents, pollution, and contaminated food supplies – it is not so much science and rationality that are confronted by a crisis of faith, but the institutions that purport to apply them in the management of risk. It is important to note here that these risks are themselves socially constructed, both in the sense that they are caused by human activities, and in the sense that our understandings of them are as contested, theory-laden, and embedded within social projects as any other knowledge. It is no surprise then that potential consumers of British beef believed the reassurances of the British government and beef industry that there was no scientific basis for concern over BST to reflect the commercial interests of this industry (Penman, 1996).

Confronted with mounting concerns over environmental sustainability and the safety of consumers and rural communities, Australia’s agricultural industries have been actively involved in attempts to define and manage these risks. Discourses around “best-practice,” “landcare,” and Quality Assurance illustrate the particular competition that has emerged in relation to knowledge regarding the most appropriate way to farm. However, competition to define legitimate knowledge is not necessarily reflective of either a simple desire to control others, nor of solely technical debates over the objective validity of competing truth claims (see also Habermas, 1984). Rather, such conflict may reflect

very different assumptions regarding the characteristics of healthy landscapes and the most desirable social practices to undertake within them (Greider and Garkovich, 1994). In relation to agriculture, a great deal comes to rely then on competing conceptions of what it means to be a “good farmer” (see also Lockie, 1997b; McEachern, 1992; Tovey, 1994). This has at least two consequences. Firstly, practices or ideas that are not congruent with particular agents’ pre-existing constructions of good farming practice are likely to be met with resistance. Secondly, constructions of good farming practice are not developed through purely localized processes exclusive to farmers, but through a range of social relationships that may be widely separated in space and time. Developments in farming practice, therefore, occur through a variety of contexts including the economic or material relations of production; the symbolic aspects of these relationships; and a range of broader public discourses such as environmentalism and economic rationalism.

In all three case studies discussed in this paper notions of “landcare,” “best-practice,” and “Quality Assurance” were consistently deployed by agri-science agencies as signifiers to promote the further intensification of farming practices – practices heavily dependent on the knowledge produced by those agencies. However, the continued application of industrialized sciences – such as biotechnology – to these problems is seen by many critics to intensify the environmental and social risks they purport to address (e.g., Levidow and Carr, 1997). Importantly, discourses of “best-practice” do not deny the importance of these risks, but simply suggest that given current knowledge and production conditions, some practices are demonstrably more desirable than others. Thus, the promotion of “best-bet practices” can be seen to acknowledge the side-effects and indeterminable consequences of industrialized agriculture – in the face of criticism from environmentalists, consumer groups, and alternative agriculture movements – while attempting to discredit the knowledges on which oppositional groups base their own proposals. Knowledge generated to support particular social projects may thereby reassert its claim to “objectivity” and value neutrality.

This has some resonance with Beck’s (1992) argument that the complexity of interdependencies between the actors involved – and equally complex webs of cause and effect – involved in the production of social and environmental risks in agriculture allows all those involved to acknowledge their existence while denying individual responsibility. Everybody is at least partially responsible, Beck argues, and so no individuals or agencies may ultimately be held accountable or forced to change their practices. Beck does, however, overstate this point. Both the complicity that Beck

alleges amongst actors involved in agriculture, and the alternative proposition he critiques – that the activities of farmers are controlled by agribusiness agencies – must be problematised. As Wynne (1996) argues, dependency and alienation may create an illusion of trust that masks the ambivalence farmers feel towards the claims of expert institutions, but both resistance and alternative knowledges remain possible (see also Kloppenborg, 1991). Beck’s argument ignores important social relationships and projects implicated in the construction of agricultural knowledges, including: the dominance of high input farming research within the priorities of agri-science institutions; the risks to farmers inherent in deviating too far from accepted approaches to farming in particular industries and locales; and the substantial resources that are devoted – utilizing signifiers such as “Landcare” – to convincing farmers that chemically intensive farming is environmentally, economically, and socially responsible (Lockie, 1997a).

Rather than conceptualizing those actors involved in generating risks related to agriculture as either equally complicitous, or controlled by a single elite group of actors, it is more constructive to examine the more subtle ways in which actors seek to influence each other. Power to influence another agent does not necessarily depend on the ability to *control* them, but may be based on attempts to influence either the environment in which they make decisions (Miller and Rose, 1990) or the ways in which they are likely to understand and respond to that environment (Burchell, 1993). As argued in the introduction to this paper, the ability to associate specific meanings with specific social practices (Long, 1992) is a potentially profound source of influence. These case studies illustrate that the association of “landcare” – together with its connotations of social, environmental, and economic responsibility – with particular “best-bet” farming practices by state agri-science agencies and agribusinesses has been largely successful. This contrasts markedly with the overt conflict evident in the Emerald cotton growing area over how to define “best-practice,” but less so with the pressure placed by meat retailers on beef producers to adopt some form of Quality Assurance program despite resistance to the idea of external auditing of farm management practices.

Conclusion

While the respective foci of the beef and cotton industries on Quality Assurance and best-practice – along with the more widespread concentration on Landcare – represent very different outcomes in the struggle to manage the risks generated by contemporary agricul-

tural practices, all three outcomes illustrate important developments in the ways in which externalities produced by agriculture are dealt with. Possibly the most important point to note here is the separation that is made through these approaches between those risks that are generated concerning the natural environment and those that concern human health. While oppositional discourses (such as the “alternative agriculture” movement) have not been entirely silenced, it is apparent that the idea that farmers are doing “all they can” and adopting the “best practices” available has widespread appeal amongst Australian consumers. Frequent health scares, by contrast, have focused public attention on the ways in which food is transported, processed, and retailed, and have influenced the development of Quality Assurance programs in order to regulate these and minimize consumer risk. The separation of Landcare and best-practice programs, on the one hand, and Quality Assurance, on the other, ensures that issues of product safety, and the environmental effects of production, also remain largely separated, leaving overt conflict over on-farm production methods a characteristic only of those industries in which production methods are believed to have direct health impacts on nearby communities. This bifurcation between the twin discourses of environmental sustainability and food safety also has major implications for our understanding of so-called “green consumerism,” which is predicted by writers such as Lawrence (1996) and Buttel (1994) to place increasing pressure on agricultural industries to develop more sustainable production regimes.

While this outcome would appear to be very much in the broad interests of agricultural industries, Beck’s (1992) notion of complicity between all actors involved in the production of technological risks in agriculture remains problematic. “Best-practice” has emerged as yet another signifier that agri-science institutions attempt to attach to particular production methods in order to convince farmers that these practices are superior to others, including those that alleviate concerns over environmental and health risks. The cotton industry demonstrates how unprepared such agri-science institutions are to cede some responsibility to farmers in the development of best-practice – as it is more generally understood – even though cotton stands out as an industry both in which public debates over the production of risks are particularly predominant, and in which the farmers involved are highly supportive of the high input trajectory that generates these concerns. One can only speculate as to how these institutions would respond to growers should they suggest a fundamental alternative.

The beef industry, conversely, illustrates the increasing importance of the retail sector in the whole

network of supply, processing, and distribution, and the focus of this particular sector on risks associated with food safety. The ability of retailers to claim representation of the interests of end-consumers, along with their increasing size and vertical integration, offer important symbolic and material resources on which they can draw in disputes over how food is produced. The development of increasingly precise product specifications is perhaps not surprising, but moves by retailers to force the adoption of Quality Assurance programs – which have clear implications for the acceptability or otherwise of particular farm management practices – represents a more substantial attempt to regulate the activities of farmers. Beef farmers have resisted this to the extent that there is widespread support amongst them for programs based on self-monitoring rather than external auditing. However, the question must be asked as to whether this will make a substantial difference to farm management practice, since the environment within which farmers make decisions will be heavily influenced by the availability and requirements of particular retail outlets, and the ways in which they make decisions will be influenced by knowledge regarding risk minimization generated by the traditionally dominant agri-science agencies. Whether or not, in other words, farmers accede to external auditing and accreditation, may make little difference in the end to the ways in which good farming practice is defined and operationalized, increasingly in line with the strategic interests of retailers.

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Notes

1. *The Challenge* magazine was sponsored by a major petrochemical company. The host of smaller newsletter circulated among Landcare groups included *Property Management Planning*, directly published by an agricultural manufacturing firm.
2. The 1995 BSE crisis saw the loss of 30,000 jobs from the meat industry and an estimated cost of 2.4 billion pounds (approximately US\$4 billion), despite assurances from the Minister of Agriculture that there would be no loss of consumer confidence (Penman, 1996).

3. The Murray-Darling is Australia's largest water catchment, and the fourth largest in the world. Its 11,000 kilometres (6,875 miles) of waterways drain approximately one million square kilometres of predominantly agricultural lands (Lawrence and Vanclay, 1992).
4. Indeed, any argument that cotton growing has developed as one of the world's most chemical and capital intensive agricultural industries – offering often substantial profits to growers – somehow against growers' wishes would be weak.

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