

**Interdisciplinarity and integration as reflections of community:
An ethnographic view of integration in the Sustainable Grazing Systems Program**
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Introduction

The performance of research is a social process. Nowhere does this become more prominent than in interdisciplinary, multi-organisational research collaborations. Such collaborations may have durations that see long-term relationships establish, and common forms of language, practice and cultural capital emerge. In short, some scientific collaborations may claim to have formed a sense of ‘community’ among members with common aspirations, expectations, structures and norms of behaviour.

This paper deals with integration as a diffuse artifact of relationships between researchers, managers, users of research knowledge and those within the wider contextualizing society. It takes the form of ethnographic narrative description based around the Sustainable Grazing Systems Program, conducted between 1996 to 2002. Nowhere does the paper attempt to identify some Holy Grail-like notion of an elusive key driver of integration. Indeed, to do so would likely miss the all-important forest in search for a single tree.

Contextualization of the Sustainable Grazing Systems Program (SGS)

The operating context

Grazing industries have long been a mainstay of Australian agriculture and rural life. They have provided a source of wealth for the country, as well as a source of inspiration, folklore and, in some senses, cultural identity. Stories of Australian graziers, their fortunes and misfortunes, have been told in the works of Henry Lawson and Banjo Patterson, the memoirs of Sir Henry Kidman and Sarah Henderson, and the artworks of Russell Drysdale, Frank McCubbin and Arthur Streeton. Today, grazing activities cover 63 per cent of our continent, meaning that most Australians are within modest distance of some form of physical or social contact with grazing land and graziers (NLWRA 2002, 2001).

The case study in this paper concerns the performance of science within the most important meat producing zone of southern Australia – the High Rainfall Zone (HRZ - Map1). Here, there are estimated to be around 25,000 meat producers located in 11 regions extending from northern New South Wales through to the north-east of Victoria, western Victoria and across to south-west Western Australia. Grazing enterprises within the HRZ are relatively diverse. 37 percent of beef producers have less than 100 head of cattle, operate around 30 percent of the area of holdings and manage around 12 percent of the total herd. Five per cent of producers have more than 500 head of cattle, operate 30 percent of the area of holdings and manage 42 percent of the cattle (PDP Australia 1996).

Despite the wealth that grazing has traditionally brought to Australia, the industry has been in decline in terms of its contribution to national Gross Domestic Product, number of graziers and grazier incomes. At the commencement of this case study, around one third of meat producers in the HRZ earned less than \$22,500 per annum (ABARE 1996), and between 1991 and 1995, grazier numbers declined by 18 per cent (ABARE 1996). A survey of graziers in the HRZ undertaken in 1994 (Lees & Reeve 1994) confirmed a despairing personal outlook among graziers. In particular, graziers indicated a lack in confidence about the persistence of sown pastures, one of the most crucial components of their production system and an important one from a natural resource management perspective. The survey also pointed towards grazier criticism of existing research programs addressing their concerns. Despite this, it showed a strong desire by graziers to receive clear, science based information about grazing management on a regional basis.

Like most other agricultural industries in Australia, the grazing industries have a statutory-based system of funding their research and marketing requirements. At the time this study began in 1995, the meat industry had two organisations coordinating these functions respectively; the Meat Research Corporation (MRC) and the Australian Meat & Livestock Corporation (AMLC). Both these organisations were funded largely through industry levies charged to individual graziers as a percentage of their sales. In the case of the MRC, the Commonwealth Government provided a matching contribution, dollar-for-dollar, on the basis of a number of public policy principles, including market failure and the inability of individual graziers to adequately support research activity or privately capture the benefits of such activity (Price 1993). These bodies gave a single, public face to what might otherwise have been viewed as an immense, and disparate, range of individuals engaged in grazing activities. Within these bodies was encompassed the body politic of graziers. Their budgets, priorities and programs reflected the negotiations of industry leaders on behalf of industry constituents. Indeed, the 1999 amalgamation of the MRC and AMLC into a single body, Meat and Livestock Australia (MLA), represented the outcome of a political process whereby graziers, through their peak producer bodies, wanted to maximise industry control over the statutory arrangements governing their national research and marketing functions (Ben Russell, MLA, pers. comm. 8 March 2002).

Within the science sector servicing grazing management research, MLA wields enormous influence by virtue of its sheer, economic significance. Over 85% of grazing management research is either directly funded by MLA or by partners directly involved in MLA research activities (MLA 2000). Its influence, however, is more than economic. The close association it has with its levy payers ensures that it is an advantageous body to deal with when attempting to reach significant numbers of otherwise unreachable graziers. Its producer networks and training programs offer a conduit for scientific findings to reach an enormous number of intended users. In short, the institutional arrangements in grazing science are intimately tied to the institutional arrangements of the grazing industry.

Genesis of the SGS

In late 1995, a relatively ambitious national grazing research program was coming to an end and an even more ambitious program was envisaged to replace it. The Temperate Pastures Sustainability Key Program (TPSKP) had been initiated by the MRC in July 1993, and undertaken with joint financial support from Land & Water Australia, then LWRRDC, and research support from NSW Agriculture, Agriculture Victoria, CSIRO and the Universities of Melbourne and New England. The TPSKP was essentially a science program, with nearly all of the activities associated with it relating to field and laboratory-based research. As a program, it was largely an aggregation of individual research projects, encompassing around thirty sites across the HRZ in New South Wales and Victoria, one in South Australia and three in Tasmania. Two major sites, based in the Northern and Southern Tablelands of New South Wales, specifically dealt with the natural resource management issues of nutrient and water cycling. A review of the TPSKP had found the program goals to be overly ambitious given the short-term nature of the program and the complexity of grazing management that had to be dealt with (PDP Australia 1996). Moreover, the program was shown to be more weighted towards productivist interests than those of sustainability, despite the intent of the program objectives (SGS Management Team member, pers. comm., 10 Oct. 2001).

In the face of increasing producer awareness about issues of sustainability, the MRC stated its commitment to ensure the new program would be far more comprehensive than the TPSKP, and that it would deal substantively with natural resource management issues. There were additional reasons why the MRC adopted this stance. The first was the pressure faced by the MRC Board to demonstrate to government the value that the public received for its contribution to matching industry levy payments. The second was the influence of potential program partners, in particular those willing to provide much needed cash-based investment into the new program. This represented very early evidence of interests being

exerted and negotiated in what science was performed, and how it was performed, in the SGS program. In an interview, a member of the management team of the program revealed the importance of advocacy in shaping the program:

In practice, when it came to implementing the National Experiment and those things, if we hadn't had Land and Water at the table, the production elements would have got the upper hand. MLA wouldn't have driven the sustainability issue so hard. It might now because people like Jack are fired up about those issues, but back in 1995-96, sustainability was a bit of a novel concept.

(SGS management team member, 23 October 2001)

From its genesis, the program planners, including members of the MRC, Land & Water Resources R&D Corporation (LWRRDC) and a group of about ten graziers chosen by MRC managers, expected the new program to be significantly different from the TPSKP. MRC managers and the graziers alike referred to need for a *paradigm shift*, and my early meetings with them revealed an earnest interest in developing a program that would be at the forefront of MRC's efforts in natural resource management. Many of them were participants in Landcare and had participated in the TPSKP but had felt distanced from the TPSKP's sustainability research because the effort had been restricted to two isolated sites.

These same producers also insisted that research was to be only one component of a more expansive network of activities that would embrace significant producer participation and governance, wide-spread on-farm demonstration of recommended grazing management practices, and extensive training packaging and delivery to graziers. MRC managers originally intended that the research sites would number no more than six so as to ensure that a critical mass of activity could be supported within each site. LWRRDC also insisted that there should be a site in Western Australia as well as sites in New South Wales and Victoria, the only two States which had benefited from sites in the TPSKP. Recognising the importance of producer involvement in the program, the extension staff of the MRC advocated a program which would adopt co-learning principles consistent with other MRC programs. Their interpretation of co-learning referred to a process of:

developing an understanding and appreciation of new practices as a result of direct participation in research or other activities designed to improve participants' understanding of particular topics. It involves collaboration among producers, researchers and extension agents. (Ison & Ampt 1992: 363).

The planning process for the program was extensive, commencing in June 1995 and finishing in June 1996. The national coordinator of the TPSKP program and a senior program manager of the MRC were given a budget of \$150,000 to develop the program. With this they established the Producer Planning Group, previously alluded to, and contracted a strategic planning specialist, PDP Australia. The Producer Planning Group comprised fourteen members, including ten producers, two departmental agronomists (from NSW Agriculture and the Tasmanian Department of Primary Industries and Forests), the MRC program manager and the national program coordinator, who was an independent consultant engaged by the MRC. The Planning Group's task was to develop an initial business plan for a new program, which it did following an intensive two-week consultation and investigative tour that encompassed the HRZ regions of both Australia and New Zealand. Throughout the course of the SGS, the MRC made much of the role of this Group in reinforcing the prominence of graziers in nearly every aspect of the program. PDP Australia took the Group's business plan and developed a *Preparation Report*, incorporating an assessment of the TPSKP, a situation analysis of the grazing industry in the HRZ and recommendations on the structure and processes required to implement the plan.

A pivotal element of converting the business plan into a preparation report was a national workshop facilitated by PDP Australia in March 1996. It was pivotal in the sense that for many years after, participants in the program referred to the workshop as being the first time when they felt a sense of the program being: *egalitarian, a true partnership* (SGS grazier and Steering Group member, 14 November 1999). The workshop involved around sixty people, with participants evenly divided between producers, researchers, and those affiliated with funding and other related institutional interests. The workshop, and the subsequent Preparation Report set the tone for the new, as yet un-named program. Throughout the planning process, the MRC and PDP Australia utilised rigid design principles and strategies based on the tools of economic rationalism (e.g. cost benefit analysis). The process reflected MRC's dominant influence over the program, for it was primarily the body that established the parameters within which others could participate. MRC's managerialist disposition in the contextualisation of the program's research effort is nowhere more profoundly expressed than in the SGS goal, developed at the workshop, and fulfilling the MRC's stated desire to have an aim that was explicit and measurable in its targets:

By 2001, at least 2000 producers (about 9% of the total) in the HRZ (High Rainfall Zone) will have adopted changes to their grazing systems that can be shown to be at least 10% more profitable and also more sustainable than those they used prior to participating in SGS. A further 5000 producers will have trialed at least part of the recommended changes to grazing management systems. (PDP Australia 1996:1)

During the course of the workshop, several attempts were made to establish a program goal, working around variations of one initially proposed by the Producer Planning Group but which did not satisfy MRC's criteria of 'measurability'. In the end, the consultant developed the final version, which the workshop participants adopted. Over time reaction to the goal varied, but there was a consistent feeling that the achievement of the goal would be contingent upon a number of fortuitous factors. My early interviews of program participants indicated a consensus view that the program was extremely ambitious, and that it would require a level of cooperation among participating institutions beyond that previously accomplished in MRC programs.

Institutional collaboration was seen as a potential limitation, with many interviewees sceptical about the ability of individual organisations to defer their particular interests to those of the collective. Respondents who were researchers were particularly skeptical about the ability of the program to reach the adoption targets set out in the SGS goal, not least because of what they viewed as an inherent conservatism characteristic of graziers. A typical comment to this effect included:

What I have seen at the moment is that nationally it's going to take a lot to get everyone working together so that at 2001 we're going to have a national result. I think that 2,000 farmers is an awful lot of people to change, and I think it is being a bit optimistic. (SGS researcher, 15 April 1998)

By June 1996, the Boards of MRC and LWRRDC had given their final approvals to support the program, enabling the program Preparation Report to be resourced and implemented. The title *Sustainable Grazing Systems Key Program* emerged from within the MRC approval process, with the term *Key Program* subsequently dropped for ease of communication.

It was at this point that I commenced an anthropological study of the program.

The SGS Tribal Structure and Tribal Work

During my early association with the SGS program, I spent considerable time attempting to understand the structure of the program from the perspective of those individuals participating in it. Although members of an SGS management team had developed a number of schematic diagrams to explain SGS relationships from their own, functionalist perspective, I was keen to observe whether participants saw themselves this way, or in other ways. Becher's work on university academics (Becher 1989) had shown that relationships in science were frequently stronger at the levels of disciplinary networks and problem-focused collaborations than at the level of formal organisational structures. What I observed among SGS participants over time was an emergence of a single community, or *tribe* in Becher's parlance, of common identity based on the overlapping of particular social spaces. Within this, membership was stratified, largely upon each individual's capacity to traverse the multitude of social spaces within and beyond the immediate SGS program (Price 2003a).

At this point, some preliminary discussion is required to define what is meant by community and by stratification, at least as I intend their use here. The concept of scientific community from the perspective of scientific disciplines and norms is well covered by the literature (Price 2003b). While a scientific community existed within the boundaries of the SGS, the term community here is intended to convey the broader community of participants within the program. This community is defined by boundaries of recognised common characteristics, including common identity (Kenny 1994). Oxley (1978:1) observes that it is *rare to find a "community" with unambiguously clear cut boundaries*. But it was clear throughout this study that many participants in the SGS, whether associated with the research effort, producer network or other components, identified themselves as participating in a longstanding relationship within a unitary SGS cloak. The relationship was not merely a short-term, causal interlude. Managers, researchers and producers alike spoke commonly of a close, shared journey characterised by harmony, trust, goodwill and camaraderie.

The concept of stratification within the SGS is somewhat more of an abstraction. As suggested previously, a sense of egalitarianism was fostered among SGS relationships that cut across any perception of strata. However, degrees of authority and leadership did mark some discernible levels of community stratification. Following Oxley (1978), a distinction is made here between authority and leadership, whereby authority is exercised impersonally between defined offices, and leadership is exercised between individuals. The significant difference is that *a leader can only request, an authority can require* (Bierstedt 1954:71). The notion that different sets of individuals and offices can influence other sets through leadership and authority is the basis of stratification in the following sub-sections.

SGS Authority: The Funding Bodies

The SGS program was a creation of the MRC. While many participating institutions and individuals enthusiastically embraced it, the dimensions and structure of the SGS were as much defined by contractual arrangements compelled by the MRC as by enthusiastic participatory consensus; arguably more so. It was a program nestled within a network of program structures funded and managed by the MRC, and the MRC was responsible for contracting nearly every conceivable component of the program where an exchange of money was required. This ranged from engaging planning consultants and program coordinators to contracting research, communication and training activities. The program ultimately existed only as long as the MRC, and later the MLA, was willing to continue support for it. Continued support was dependent on annual resource allocations determined by MRC's levy payers through their peak councils, something which was not automatically guaranteed. MRC managers were annually required to justify to these councils why the program should continue to receive the financial support of the industry through the levy system. Budget time, around December each year, was always a stressful and frustrating time for MRC managers, and, according to one senior manager, justifying expenditure on natural resource management was a particularly hard task when the councils were more focused on short-term productivity gains.

Despite MRC's unique enabling position, the great majority of the SGS participants I interviewed suggested that it did not play an overtly interventionist role in the management of SGS. Only a minority of researchers indicated that the reporting process required by MRC through its contracts was onerous; one venturing to suggest that the concept of milestones is an anathema to good research and that contracts were a means of *conquering and dividing the research fraternity* (SGS researcher, 28 February 1998). MRC certainly maintained tight control of the SGS behind the scenes through its budgetary, legal and communication functions. For example, program budgeting was the sole responsibility of MRC, most activities supported within the SGS framework were done so under MRC contract, and MRC was the only partner to have its logo and funding acknowledgment placed on the front page of SGS paraphernalia (Plate 1). Members of the management team, mostly consultants contracted by MRC, were aware of the general perception that the program was seen to be run fairly independent of MRC authority. At the same time, however, they were also aware that MRC could, at any time, exercise its authority if warranted:

MLA [MRC] have been far more passive than the size of their investment. MLA has not really been active in making sure the program was MLA-centred. They basically expect us to run the program, and we do. I'm sure if word was coming back to them via their networks, etc, that things were off the rails, then they would become more interventionist. They have so many other contacts around the industry, that just says to me that they haven't been getting sufficient negative feedback about SGS to get them to feel the need to be interventionist.
(SGS management team member, 23 October 2001)

The function of legal contracts cannot be underestimated in positioning MRC at the top of an SGS hierarchy. Contracts not only bestowed MRC with a bureaucratic sense of authority, they also obligated other partners in the program to them. Within a research-funding climate where many research agencies are highly reliant upon external funding, bodies such as MRC can wield enormous power. The SGS experience proved no different as this typical statement reveals:

Research corporations such as MRC, well they come to the party. They have almost total influence. I couldn't be a researcher – the Department doesn't really supply grants to do research. They just supply, well they don't even supply decent chairs for visitors to sit on. That's tongue in cheek, but you can put a circle around 'total' when it comes to funding bodies' influence over my working life.
(SGS researcher, 10 April 1997)

While the SGS experience highlighted the extent to which the contractual process obligated researchers to the MRC, it also demonstrated that MRC was open to negotiation in respect to the nature of such obligations. Reporting arrangements and intellectual property ownership, for example, could be bargained, although sometimes only at considerable expense – an expense usually associated with legal costs in the case of intellectual property. The bargaining process, however, revealed how different groups were treated differently by MRC. Research groups, for example, underwent a much more rigorous process of contractual negotiation than did MRC's contracted consultants, as the following contrast suggests:

MRC are the ones that initiated this contractual research and the legality of it, and now we feel a right, an absolute right, for the University to seek legal advice when confronted with that – with what we saw as a totally unworkable contract. You know, I guess they were dividing and conquering me. Bill came and hit me with negotiations. Jan hit me – sort of over the time I had the heart attack. But I had to seek legal advice then, and then write these suggestions, most of which were rejected.
(SGS researcher, 14 May 1998)

I've written my own contract every year. And in about May each year, the Management Team get together, review their performance, plan their activities for the milestones or key things that need to happen over the next year or so, and write that into draft contracts and send that off to MLA. The contracts we draft rarely, if ever, get changed. My feeling is that because MLA are part of the Steering group and they're in fact assessing and making decisions about the program all the time as we go along, that the annual round of contracts have been an administrative rather than a management tool.

(SGS management team member, 23 October 2001)

While the contractual elements of the SGS highlighted MRC's authority, the organisation was also in a position to demonstrate a unique level of leadership. Dr Phil Price, former Executive Director of LWRDC, describes the singular position that the RDCs have in being able to bring together often disparate components of an innovation system to establish programs such as the SGS (Price, P. 1993). This unique position enabled MRC to demonstrate leadership in the planning and management of the SGS, and to work across institutional boundaries with the confidence and assurance their significant discretionary funds and stakeholder backing afforded them. The ultimate artefact of exercising this leadership was the very existence of the SGS, for it is unlikely to have been created through alternative means.

Participants in the SGS readily acknowledged MRC's motivations as the *raison d'être* for the program, and recognised MRC as the ultimate authority despite the large number of collaborating partners involved. In an early round of interviews I conducted with SGS researchers, the responses revealed that while all respondents could identify MRC as a primary funding partner in the program, less than half could identify any other funding partner. I had little doubt that MRC's prominence was actively constructed and reinforced by members of the management team throughout the course of the program. MRC logos were positioned, for example, most prominently on SGS marketing material, and when the occasion called for it, MRC representatives acted as the public spokespeople for the program.

MRC's sole occupation of the top stratum of an SGS hierarchy was occasionally contested, particularly by members of LWRDC, which invested its discretionary funds in the SGS through MRC. Board members of LWRDC saw the SGS as a means of increasing the level of natural resource management research undertaken directly with graziers (LWRDC Board member, pers. comm. 5 March 2002). They considered that investing funds through MRC rather than directly with grazing-related research agencies would help legitimise natural resource management research in the eyes of a grazing audience increasingly sceptical of Landcare and its associated natural resource management activities. A legally binding *Management Agreement* between the MRC and LWRDC specified that the MRC would manage the SGS Program on LWRDC's behalf against outcomes specified in the *Preparation Report*. Unlike its previous investment in the TPSKP, however, LWRDC insisted that it was not buying into any particular component of the SGS, but into the program in its entirety. Its funds, in other words, were totally untied, and as a result members of the LWRDC Board considered they should have a greater voice than most in SGS decision making if they so chose to exercise it. Contesting MRC's sole authority was therefore a deliberate strategy on the part of LWRDC to ensure that its interests in natural resource management outcomes were duly acknowledged and pursued.

During the planning phase, LWRDC's investment did gain its staff privileged access to certain decision-making processes. Indeed, prior to the commencement of my study, I was party to some of these processes. For example, at the commencement of the program, I was involved in processes involving only the MRC and LWRDC in the selection of consultancy tenders and in the site selection for SGS research experimentation. However, over time, and with the establishment of a program Steering Group, LWRDC's role became less distinct from that of other program partners. Some LWRDC Board members, who saw the SGS as a MRC / LWRDC joint venture, were concerned that LWRDC was not

given sufficient credit for having influenced the design of the program or for having contributed substantial cash funds. As a consequence, the LWA Board commissioned a mid-term review of the SGS in late 1998, causing considerable discomfort in the relationship between LWRDC and MRC. At the end of the day the review strongly endorsed the directions and effectiveness of the SGS, and supported LWRDC's ongoing funding of the program. The stance taken by LWRDC Board members had been little more than posturing intended to remind MRC and other partners that LWA had a significant stake in the SGS. More importantly, the stance was taken to demonstrate that LWRDC too held a significant level of authority through its ability to allocate or withdraw cash contributions to the overall program budget (LWRDC Board member, pers. comm. 5 March 2002).

The status of *external funding body* was something recognised, although not always respected, by other partners in the program. In particular, bureaucrats representing State research agencies regularly sought recognition of their in-kind (non-cash) contributions to the program. In my many interviews with State representatives, whether from NSW, Victoria or Western Australia, I was constantly informed that State non-cash contributions to the program should be given equal status to the cash contributions. Moreover, State members of the Steering Group took great pains to ensure that comments to this effect were included in the minutes of Steering Group meetings whenever possible and appropriate. Discussions with State agency representatives, particularly in the formative years of the program, clearly indicated to me that they were frustrated with the near exclusive authority enjoyed by MRC, whose decisions greatly influenced agency resource flows.

The MRC and LWRDC were clearly differentiated within a stratum of SGS authority. So too were other external funding bodies associated with the program. The Murray Darling Basin Commission (MDBC) directly funded two of the six sites that made up the SGS National Experiment. Research on these sites had been contracted by the MDBC prior to the establishment of the SGS, but were incorporated into the program for a number of reasons. First, the sites gave a better regional balance to the program. Second, the MRC was keen to have Commonwealth agencies with policy ties closely involved in the program. For this reason the Commonwealth conservation department, Environment Australia, and the agricultural department, Agriculture Fisheries and Forestry Australia, through the Bureau of Rural Sciences, were also invited to nominate representatives onto the Steering Group although they contributed no funds or in-kind support to the program. These partners held little authority within the SGS. Indeed, their membership on the Steering Group was often a source of friction between partners. Criteria for sharing space within the SGS's authority stratum appeared, therefore, to include pledging some form of allegiance to the program over and above making a funding commitment. The following conversation reveals something of this unstated criteria:

SGS management team member

We've never had a good relationship with Organisation X, on the Steering Group or off it. They've never been true partners in the program. They've always funded projects independently, instead of putting funds into the pool, and that's always created a less close relationship than with, say, Organisation Y, even though Organisation X put in about the same amount of money. I think that what makes a relationship is trust. Organisation X never trusted the Program. They were doing some things at a similar time and got alongside the program, but I don't reckon they ever became part of the program in the way other partners did. End of sermon.

Interviewer

What about Organisation Z?

SGS management team member

Well, Organisation Z was an interesting one. They were never a funding partner, but we kept inviting them along, and they kept coming along, and their attendance at Steering Group meetings has been almost 100 percent. And sometimes the relationship was a little bit tense, but they really hung in there and wanted to argue the issues. You can't ask for much more than that.

Interviewer

So it was another form of commitment they gave?

SGS management team member

Yes, and they'd get rolled on quite a few occasions, but they just kept coming back and stayed engaged – they didn't go home and say "Well, bloody hell, we're not going back to any of that." So I actually gained quite some respect for Organisation Z.

(Interview with 23 October 2001)

SGS Leadership: The Management Team

The SGS was managed through the efforts of a four-man (male) Management Team, comprising the SGS National Coordinator, a Research Facilitator, an Extension Facilitator and a Prograze (training and delivery) Facilitator. The MRC contracted the SGS National Coordinator as a private consultant following his engagement as the TPSKP coordinator. The position remained part-time throughout the program. MRC also appointed the Research Facilitator as a consultancy position – a position that changed from full-time to part time after the first twelve months. The other two positions also began as full-time, subsequently becoming part-time after the initial establishment workload was accomplished. MRC appointed the successful applicants to these latter positions as employees rather than as contracted consultants. Except for the Research Facilitator, all of the management team were residents of the New South Wales town of Orange. They were also former employees of New South Wales Agriculture, which has its headquarters located in that town. Despite the eventual part-time nature of the four positions, the team members perceived themselves as being committed to the SGS full-time:

I see myself as a full-time member conceptually. In a way, I mean, I don't work days generally. Only when I am at a workshop am I working full days for SGS. Mostly its an hour here, two hours there, half an hour there because a lot of what I do is respond to emails, doing stuff in short bursts. But, in a sense, SGS is always on my mind.

(SGS Management Team member, 10 October 2001)

Many participants in the SGS associated the management team as being the public face of the MRC, acting on its behalf to organise and lead the program. To some, accountability to the MRC was synonymous with accountability to the management team. In many conversations I had with SGS participants, even where people were clear about the distinction between the SGS management team and MRC management, it was frequently the management team that was seen to command the greater attention:

You know, we have an SGS Management Team that we are answerable to. So we can't – the team just can't decide that we want to do something and go and do it. We have to refer those things back to the Management Team.

(SGS researcher, 10 April 1997)

The Management Team performed many of the functions associated with the MRC's authority, such as making budgetary decisions and assessing and approving research and other reports against contractual obligations. Its major role was to ensure that the program worked efficiently and effectively as perceived first by MRC managers and second by the Program Steering Group. The team saw themselves as being

primarily accountable to the MRC (and later to the MLA), largely because of the obligation that the contractual arrangements brought:

We are consultants contracted and paid by MLA to do a job and we are answerable to MLA for doing that job, and so therefore it's a master-servant relationship, even though clearly we are given a lot of freedom and whatever. It's harder for us to say to an MLA program manager, "That's irrelevant; let's move on."

(SGS Management Team member, 23 October 2001)

The program, with its multi-faceted sub-programs, could easily have become a loose conglomeration of unrelated activity, but the overriding expectation of the funding bodies and the Program Steering Group was that the program was to be a tightly integrated package. The strategies pursued by the Management Team were therefore as much about giving the program some cohesion, and the appearance of cohesion, as it was about making it effective. These strategies, dealt with in detail later, included providing opportunities for participants in each of the program components to become involved in other components they would not normally associate themselves with.

The term *team* is an appropriate descriptor. During six years of closely observing and interacting with the management team, I came to admire the tremendous rapport among members. This rapport was also evident to others close to them and to the SGS program. It was reflected in the way they handled their day to day business, and how they jointly interacted with other SGS participants. They worked collaboratively and with no sense of hierarchy. The rapport established a template that applied not only to their own working relationship, but to how they would run the program. As one producer put it, the enthusiasm and collaboration shown within the Management Team was *infectious throughout the whole program* (SGS producer and Steering Group member, 14 March 1999).

The team actively worked to foster an all-embracing sense of *esprit de corps*, camaraderie and egalitarianism across all elements of the program. They did this through facilitation techniques employed in meetings and workshops to engage SGS participants in joint discussion. They encouraged social activities among SGS participants as often as possible in conjunction with formal activities. They sought to take participants from environments where they could be distracted to ones where they could concentrate on working together. Meetings were not forums for pontificating, but factory floors for building alliances and completing specific tasks. The management team ensured that working groups contained a mix of different participant stakeholders. Researchers worked alongside graziers who worked with bureaucrats. Fun was often the order of the day, but only as a means to reaching highly specified ends defined by members of the management team.

Using an expression coined by Oxley (1978:188), I regarded members of the management team as *minor charismatics*. This term distinguishes certain leaders from those described by Max Weber as *charismatic leaders*. Weber's definition of charismatic leaders endows such people with supernatural, superhuman or specifically exceptional powers or qualities not accessible to the ordinary person. *Minor charismatics* on the other hand *denotes people who differ vastly from the great charismatic leaders in degree but resemble them in kind . . . They are not seen as divinely directed but as being unusually admirable humans strongly identified with the group goals. . . They do not inspire awe, but they can inspire confidence and enthusiasm* (Oxley 1978:188). SGS producers and Steering Group members in particular viewed members of the Management Team in this light:

The other thing I want to say, and I'm a bit worried about big heads getting out the door of this restaurant, so I won't name names, but there has certainly been a lot of people on this team, within MLA, with whom it has just been fantastic to work with – to see how the Management Team think, how they coordinate, how they can act together on their feet very

smartly, think through the issues precisely and come to an answer that at the end of the day is the right one. That has been fantastic. It has certainly been most enjoyable to see how they operate and just mix with those sorts of people. I've learnt a lot about leadership from these guys.

(Grazier and SGS Steering Group member, 7 March 2001)

Leadership attributed to individuals within the management team was based less on recognition of personal attributes than on behaviours; the team lead by example. Moreover, throughout the course of the SGS program, Management Team members actively encouraged particular behaviours among participants, especially behaviours that reinforced the notion that the SGS program was a strong, unified entity. *One for all and all for one* was one catchcry used by Management Team members in their interactions with SGS participants.

SGS Coalitions of Interest: The SGS Steering Group

It is not unusual for national research programs of the magnitude of the SGS to adopt a steering committee to oversee its operations. Among RDCs it is almost the norm, primarily as a means of engaging producer involvement in program management. The Producer Planning Group, dealt with earlier in the paper, first recommended a *Producer Reference Group* during the formative stages of planning the SGS (Lamb 1996). The group was to comprise no more than four graziers, the relevant MRC program manager and the SGS national coordinator. The MRC agreed to the formation of a SGS Steering Group, but wanted its representation broadened to include all financial contributors, the major research providers, additional producers and policy interests. The SGS national coordinator was a leading advocate for broadening the representation beyond producers so that the Group would also provide a one-stop point of accountability to program stakeholders. Consistent with the findings of many studies on gender representation in rural-based decision-making fora (Teather 1999), the Steering Group comprised an obvious bias towards masculine representation.

The function of the Steering Group was not clearly defined prior to its establishment, and there were certainly no terms-of-reference ever drafted. Indeed, the first meeting of the Group, which took place in Sydney on 29 and 30 August 1996, didn't even include an agenda item covering the purpose of the Group. However, members at the meeting insisted they formalise their role before proceeding with the business of the day. The Minutes of the meeting show that the Steering Group adopted a role placing greatest emphasis on program accountability, with the Group acting similarly to a board of management and holding itself accountable primarily to the MRC Board.

The Group also adopted a policy and decision-making role, a role that evolved over time and complemented the activities of the Management Team. What I observed during meetings was that the Group acted to provide some semblance of equity in the ownership of the program. The management team, for example, reported to the Group as if they were accountable to all SGS participants and not just to the MRC, but at the same time, they used it as though it was a working group for accomplishing their own workplans. The implication of this observation is significant, for it begins to signify the extent to which the management team influenced nearly every aspect of the program and were critical to the processes of integration.

The Steering Group's meeting procedures were relatively formal, and included the prior circulation of an agenda and position papers, recording of discussion and preparation of minutes (Plate 4). It was not so formal as to include requirements to move, second, vote on and carry motions. A senior MRC staff representative chaired the Group for the first two years, after which the Group agreed at the behest of MLA managers that it would be more appropriate for a producer to take over this responsibility. This change occurred at the time the MRC transformed into MLA. For the graziers appointed to the Group – selected by MLA staff in response to an open advertisement – the Group's procedures initially presented

considerable cultural discomfort. During the course of my study, I became familiar with all of the Steering Group producers, and recognised a rapid acceptance among them to the bureaucratic processes that came with the responsibility of overseeing the program. The following quotes express some of their initial discomfort, but also reveal the extent to which the producers underwent a process of conversion, becoming not only comfortable with previously unfamiliar rituals, but also highly appreciative of them:

Once I got over the initial first SGS meeting in Sydney, SGS became the benchmark that I measured all other committees by. It was well organised and meant serious business. Agendas were sent out at least ten days before, papers were always called for, and if you missed the deadline, you missed it. There was a 2 set-page format to follow, and if you had not read your agenda and papers then you were seriously left behind at the meeting. Meeting attendance was expected from all members and serious thought and contributions were the norm.
(Grazier and SGS Steering Group member, 7 March 2001)

I mean, most times when I have been on committees with esteemed academics and bureaucrats and people like that, we were there as token producers - I don't know - because we were supposed to be there. But all of a sudden we were given the baton, and told, "Okay, you guys, what do you want to do?" And it was a little bit daunting for a while. After a while we sort of could warm to it and suddenly realised that this was actually fair dinkum. So it was really quite a challenge, and it was also rewarding, in that for the first time we were valued for what we had to contribute to the Program. That was really enlightening for me and really quite developmental I suppose.
(Grazier and SGS Steering Group member, 7 March 2001)

The relationship between the Steering Group and the management team was not typical of a relationship between a corporate board and its management. Although conventional wisdom might expect it to be the role of management to support a Steering Group (Demb & Neubauer 1992), the Minutes of the first meeting aptly captured the relationship that was to follow in overtly suggesting that it was the role of the Steering Group to *provide support for the Management Team* (SGS Minutes, Meeting No.1, 29-30 August 1996). Over the course of the SGS, the Steering Group operated very much like a working group, with sub-committees formed and given the responsibility of preparing key program documents, including the marketing and communication strategies. Rarely was a Steering Group meeting convened – which was about twice per year – without members of the Management Team giving Group members one significant task or another to complete. This relationship formally engaged Group members in elements of the program that they might not otherwise have.

In my discussions with the Management Team, members were frank about using the Group as a tool to accomplish various managerial tasks, and in particular to gain legitimacy for certain actions through procuring implicit Steering Group sanction. At the same time, Group members were aware of what was occurring and many considered this a practical and democratic way of enabling the various partners to contribute in a substantial way to the SGS. In an interview, the national coordinator of the Management Team suggested that the team interacted with the Group as they did because they could not afford a lack of consensus on important SGS issues as it made implementing the program difficult. Most of all, he suggested, it gave the producers in the program the sense of leadership that was critical for the program to be effective:

Informally, the Steering Group - particularly some members of the Steering Group - started to have a mentoring role and a supporting role for the management team. The producers in particular started to offer it through the sub-committees and helped to put together the communication plan, the marketing plan and those sorts of things which basically drove out --

drove the integration and the selection of the Producer Network. It drove out things like Prograzier and National FarmWalk and some of those things.
(SGS Management Team member, 23 October 2001)

During the first two years of the SGS, I discerned growing tension between certain Steering Group members. In particular, the State agency representatives, all of whom had traditional agricultural production backgrounds and a long association with MRC research programs, were circumspect about the natural resource management newcomers and their motives for becoming involved in the program. Their agencies, in some cases, owned significant intellectual property in elements of the SGS program, and the decisions of the Steering Group had the potential to affect their interests. These tensions did not amount to significant conflict or open antagonism, but manifested more in snide asides during meetings. Over the life of the program, as the institutions of agricultural science began to evolve in response to an increasing focus by governments on natural resource management issues, the productivist views of the State agency representatives on the Steering Group softened. Without doubt, this broader contextualising evolution helped coalesce previous divergent views of Group members.

Factionalism existed on the Steering Group, but not overtly. Indeed, its open manifestation was actively discouraged by MLA managers and the Management Team. In interviews, Management Team members appeared highly aware of the individual and sectoral interests of the Steering Group, and of the potential for meetings to become embroiled in political debate. Team members structured meetings to include significant time dedicated to working-group activities to deflect the Group from getting involved in protracted discourse on matters the Management Team considered peripheral to the SGS. Moreover, the effect of having significant producer presence on the Steering Group was to discourage a dominance of inter-agency discussion on issues before the Group. A number of conversations with Management Team members revealed that they depended closely on an alliance with the producers to ensure that the best interests of the SGS – from the Management Team’s perspective - were served. The following best reflects the subtlety to which the alliance was put to effect:

The guts of the steering committee has always been the producers. The half a dozen producers have been an exceptional group of individuals, and they have been by far the intellectual force in the steering group - partly because they are producers and therefore everyone pays them some degree of reverence, but partly because they are just an exceptional group of individuals, most of whom I expect to be personal friends for the rest of my life. They are really, really a top group. There's three groups on the Steering Group: the producers, the funders and the agencies. And as a group I don't have that same consistent, warm feeling about the other groups. They stop - not necessarily by the force of their own personalities - they stop people having silly discussions at those meetings. They stop people arguing about other things and irrelevancies - not by them saying, "You can't argue about that", but just by them being there and moving the discussion on when some of those other things arise.
(SGS Management Team member, 23 October 2001)

The Steering Group fulfilled an important symbolic function for the SGS. In addition to acting as a practical working group to bring the combined managerial, scientific and production skills of its members to bear on particular issues, it also acted as a device to give legitimacy to SGS activities. Particularly with its level of producer membership, a decision of the Group was considered to have the imprimatur of the broad stakeholder base. For example, on several occasions the Management Team used Steering Group members to test and endorse SGS training and decision-support materials. Producer members of the Steering Group frequently appeared in SGS paraphernalia to demonstrate to the grazing community a significant level of producer involvement in the program’s management. The Steering Group reinforced this message by ensuring that it met across the country, so as to enable the breadth of its membership to meet face-to-face with local SGS stakeholders and to engage in joint activities and discussions.

SGS local clans: The Regional Steering Committees

A feature distinguishing the SGS markedly from its predecessor, the TPSKP, was its support for a national Regional Producer Network (RPN). The Producer Planning Group saw the establishment of the RPN as the *cornerstone* of its Business Plan (Lamb 1996:5). At the very commencement of the SGS, a national Extension Facilitator was appointed to the management team to establish a network of ten regionally based producer committees (Regional Steering Committees) that made up the RPN. These committees extended across the diversity of regions associated with the HRZ. The role of the committees was originally envisaged in the Preparation Report Plan, where Sub-Program 3, dealing with information exchange, stated that the Sub-Program objective would be achieved by:

establishing a Producers' Network whose members would actively participate in the On-farm Evaluation of the most promising findings from Phases 1 and 2 and by facilitating the development of management skills amongst those producers interested in improving the profitability and the sustainability of their grazing systems.
(PDP 1996:46)

More specifically, the Regional Producer Network would:

create and support a network of producers extending over the eleven regions of the HRZ. The Producer Network would comprise groups of meat producers interested in improving the profitability and sustainability of their grazing enterprises and wanting to participate more fully in the research and extension associated with improving grazing systems for their regions.
(PDP 1996:46)

It was the task of the committees to *determine the suite of activities that will be needed within each region, and to be responsible for allocating the available resources within the region* (Lamb 1996:24). Unlike the Steering Group, which wrote its own terms-of reference at its first meeting, the regional steering committees had formal terms-of reference that had been prepared by the management team to guide their operation, activities and accountability obligations.

The Regional Steering Committee guidelines recommended each committee should comprise no more than ten members, with a majority being producers. In practice the ten committees which were established comprised between nine and sixteen members. Each Committee was supported by a locally engaged group facilitator funded by MRC. Members were identified through responses to advertisements placed in rural newspapers across the country. A sociological assessment of the RPN undertaken in late 2000 (Andrew 2001) showed that producers in the HRZ viewed this process as the fairest and most equitable means of attracting Committee members. Some producers, however, were critical of the process in that it had potentially attracted particular graziers who only wanted to pursue personal interests not necessarily consistent with the SGS goal. As with the SGS Steering Group, more than three-quarters of the RPN membership was male.

The relationship between the Committees and MRC began with an emphasis on formality. Each Committee, having been allocated an annual budget to allocate towards regional site activities, was obliged to develop a business plan to assure the MRC that any investments made would be well considered. Funds were also made available for each Committee to attend a Working-In-Groups course, to help foster team *esprit de corps* and a cooperative working approach. While the Committees themselves selected their local facilitator, the MRC contracted the positions directly. Meeting procedures were also fairly formal, working to clearly outlined agendas and with minutes of meetings recorded. The facilitators largely drafted the agendas, in response to either producer requests or the need to organise coming events such as field days. For many producers, meeting procedures were foreign rituals reflecting the culture of

bureaucracy. Notably, a significant number had no prior experience with committee work prior to the SGS program. Some members stated that they would have liked more practical guidelines about how to go about their business. Most relied heavily on the skills of the SGS Extension facilitator to assist them in their responsibilities. The following is a typical statement made by producers:

There was also a feeling of too much bureaucracy at first, and once we got through our mission statement and business plan, we then had to spend too much time on evaluating any field days or farm walks we held. There was a definite feeling that once we were on top of these matters, we preferred to do the rest of our committee business out in the paddock.

SGS Regional Steering Committee member, 7 October 2001

The discourse of both the management team and the Steering Committee suggested they saw the Regional Steering Committees as the backbone of the Program. It was not that the SGS intended exclusively to serve the specific interests of the Committees, but rather, the Committees provided a tangible representation of an otherwise amorphous mass of producer stakeholders towards which the SGS was targeted. For this reason, the agglomeration of the Steering Committees was formally referred to as the Regional Producer Network, around which, at least for communication purposes, different elements of SGS revolved.

The Regional Steering Committees were also initiators of SGS activities at the local level. With their combined budgets, they were able to establish and maintain 118 regional on-farm research and demonstration sites; around ten sites per region. Ideas for these activities were generated through discussions at committee meetings, although they required MRC approval through the Management Team before funding and implementation could go ahead. On some occasions, ideas were put forward to MLA that were not considered consistent with the SGS goal, and were therefore rejected. On other occasions, ideas came forward that MRC might not have ordinarily invested in, but which they approved because they remained consistent with the goal, and added dimensions to the program that the management team considered valuable.

In addition to managing their local research and demonstration sites, Committee members were also involved in organising field days and other regional communication activities. These were often initiated locally by individual Committees, but were sometimes associated with broader SGS initiatives, such as the national SGS Farmwalk, which involved simultaneous demonstration of SGS activities across the country during a single week each year. The workload that these combined activities generated for Committee members was significant, and despite the assistance given to them by their local facilitator, workload and burn-out were issues constantly raised in reviews of the RPN (Andrew 2001; Makin 1999). Despite this, members of the Committees appeared highly dedicated, many working tirelessly on a voluntary basis for the SGS at the regional level. For this reason, some of the facilitators took it upon themselves to devise strategies to protect their committee members from burn-out, including limiting the number and length of meetings, spreading the workload, and mixing work with social activities.

Over the life of the SGS, program partners showed increasing interest in reporting the success of the program against the concept of the *triple bottom line*. Here the Regional Producer Network came into its own. To members of the Steering Group, the Regional Producer Steering Committees were the point at which the social, economic and scientific elements of the Program came together. Despite the apparent preciseness of the program goal, the desired social and economic objectives of the SGS were not well defined and poorly funded in comparison with the biophysical research effort directed towards grazing management. The Regional Steering Committees, however, fulfilled an important social function as much as a delivery one. The sociological assessment of the RPN (Andrew 2001) found that it was through the activities of the Committees that the co-learning process outlined in the *Preparation Report* was most evident. In particular, participants on the Committees indicated that their involvement in the SGS gave

them a significantly higher level of confidence. A common element in the interviews of both this study and the Andrew (2001) study was the significant number of times that graziers remarked that the SGS program gave them not just the material upon which to make decisions, but the sense of confidence to make them.

The relative autonomy given to the Committees, and the faith placed in them by devolving to them budget allocation responsibility, added to their cohesiveness and sense of ownership of the SGS program. Moreover, the Committees acted as important conduits for social interaction between graziers. Committee meetings were generally held in local club venues, and usually involved informal gatherings in conjunction with conducting formal committee business (Plates 5 and 6). The Andrew (2001) assessment found a high degree of *esprit d'corps* across all of the committees, something I observed in my close interactions with two of the Committees in northern NSW in particular.

The RPN played an important role in the conduct of the SGS and in demonstrating its producer-focused ethos. Despite this, the RPN ran independently to some of the other program components. This was most notable in the disjuncture between the management of the Committees' local research and demonstration sites and SGS researchers' National Experiment sites (dealt with in the next section). These two SGS activities were established in parallel through starkly different processes, partly as a result of timing, and partly because the issue had not been considered adequately at the commencement of the program (SGS Management Team member, pers. comm., 21 October 2001). The SGS Management Team did not afford to the local research sites the same level of scientific attention given to the National Experiment sites. Data emanating from the local sites was certainly not integrated into the program's national research database or used in the program's national research model. As a consequence, there was a separation of not only two important SGS science performance activities, but also two important sub-communities of the program; the regionally-focused producers and the nationally-focused scientists. This was not a universal problem, for good relationships were sometimes built between local graziers and national researchers where they were cohabitants of certain regions. Indeed, in some cases the personal relationships were quite strong, and here the involvement of the researchers in the activities of the regional Committee was positive. However, in some regions, such as in the North West Slopes of New South Wales, the separation of the RPN and National Experiment components of the program resulted in considerable conflict, particularly over ownership of SGS activities undertaken within a shared location.

The degree of producer involvement in the SGS, especially at the regional management level, was for MRC managers and the management team something of an experiment. Reviews of other MRC programs suggests the organisation has a strong record of supporting participatory and producer initiated research, but the devolution of funds directly to regional committees to independently allocate was something new. From my own observations, the RPN played a critically important role in providing a common social fabric that expanded across the program. The SGS program was portrayed as a producer-driven program, and it was really only within the RPN, whether in the central highlands of New South Wales or the southern coastline of Western Australia, that producers were publicly seen to be driving the process. Unlike the producers on the program Steering Group, whose work and leadership was often performed within closed meetings, the RPN producers were out and about, providing the public face of the program's producer drive.

With this drive came a sense of the SGS being a social-based activity as much, if not more, than a science-based one. The point here is not made from a constructivist perspective, although it is highly pertinent to it, but rather from the perspective of many of the participants themselves. In the Andrew (2001) review, it was noted that many of the graziers participated in the regional producer committees for reasons other than improving their grazing practices. As Campbell (1994) found with participation in Landcare groups, participation in SGS activities gave some graziers a sense of community and an opportunity to socialise with neighbours under the guise of learning new grazing practices. In addition, the SGS provided some

graziers with the means of exploring their own hunches, or the opportunity to expound their own philosophical dispositions. Advocates of the Holistic Resource Management (Savory 1988) philosophy, for example, tried to increase the adoption of Savory's principles through gaining a foothold within the SGS program. To them, alignment with the SGS program brought legitimacy.

Management Team members were well aware of the highly social nature of the SGS program, and found this to be both a boon and an impediment to performing their own activities. In my discussions with them, Management Team members openly revealed that they actively played upon personal relationships to advance the program towards meeting its goal. At the same time, however, they recognised that they were part of a complex network of close relationships, and that this had the potential to colour their view about what success meant. The following conversation reveals something of this dilemma:

But we always looked on them, on that network, as an experiment in its own right. And we've actually got some processes that we're going through at the moment, trying to assess the results of that experiment; trying to assess how each region has performed. We have an opinion on each of the regions, and I've always been afraid that our opinion of the effectiveness of a region depended on our opinion of the people that facilitated the committee running the region. If we liked them, did that mean we think they were successful? And so in the producer survey, we made sure that we were able to analyse that survey down at the regional level. And so we can now look at what changes occurred in that region over time and then see whether our perception of how well the region operated has any basis in what changes occurred in that region over the time. That's going to be quite interesting to see how that turns out.

(SGS Management Team member, 23 October 2001)

SGS science performers: The National Experiment team

The essence of the SGS program was intended to be knowledge generation, including the support of experiential methods that translate information into knowledge. While the program invested significantly in experiential activities, including the RPN and extension, training and delivery, by far the largest proportion of SGS resources was directed towards R&D (55 percent). In the *Preparation Report*, the research component was accorded prominence as *Sub-program One: Addressing the Knowledge Gaps*.

Although R&D was not explicitly the highest priority of the SGS, the earliest planning meetings focused mainly around establishing research priorities and activities that would accord with graziers' needs. Indeed, by the time the RPN component of the SGS was considered, momentum in R&D planning had reached a stage where it became difficult to integrate the two components. Over time, however, an evolution occurred, stimulated by the pressure of closer relationships forming between some SGS researchers and some grazer groups, and greater demand from other grazer groups to influence the process of research at both local and national levels. The evolution saw the management team attempt to bring the two components closer together.

Both the Producer Planning Group's *Business Plan* and the *Preparation Report* envisaged that the SGS would establish a small number of large, integrated national sites in which research activity would be concentrated. Unlike the TPSKP, which had separate production and natural resource management sites, each site was to combine these emphases into an integrated package of activity addressing the sustainable management of grazing. This was a prerequisite to LWRRDC participation, and a non-negotiable priority reaffirmed by the MRC. For scientists involved in the grazing industry, this was a watershed decision that marked a new direction for research performance. As noted by one of the Management Team members, breaking out of a productivist mould was not an easy step for many of the researchers to take:

There was a lot of resistance from researchers to incorporating the sustainability stuff. They had come pretty well all from production backgrounds, and TPSKP was really about production and the bit of sustainability stuff was separately done. This was about a new model of doing sustainability and production work together at the same sites, and that was a bit of a paradigm shift - probably the first paradigm shift we had to get over.
(SGS Management Team member, 10 Oct 2001)

Combining production and natural resource management research across all sites was not the only novel aspect of establishing the SGS research component. In April of 1996, I participated in discussions with three senior program managers of the MRC to select research teams to participate in the SGS. It was an unusual process; one that I had not experienced as a research program manager myself before. The MRC had advertised for research teams from around the HRZ to submit Expressions-of-Interest to participate in the SGS. The assessment process was based not on the proponents' proposed research activities, but on the perceived capabilities of the proponents to contribute in an unspecified way to a proposed National Experiment. The MRC budgeted to establish up to six national research sites, with the location of the sites determined according to the location of the successful research teams. In all, we assessed eleven proposals from around Australia, cognisant of the need to ensure that the successful teams represented the diversity of the landscapes across the HRZ. To this extent, we biased the assessment process towards research teams that represented particular regions of Australia.

The process involved biases in other ways. Inherent in this unique way of selecting R&D participants was a level of subjectivity about how the research teams would fit into a desired SGS ethos. As such, the attitude of research teams was an important, if unstated, criterion in our selection. In interviews afterwards, participants in the process were surprisingly frank about how the nature of the SGS science performance was contextualised more by the subjectivity of personal perspectives than objectivity of scientific need. For example:

That was one of the innovations of SGS; we didn't call for research proposals, we called for expressions of interest to be part of a national team to develop this SGS Program. I think we selected the teams more on attitude than on trying to balance up disciplines and stuff. I think I prepared a great, big Excel sheet and we sort of looked at that, but really we were looking for people who had the right attitude, who were prepared to be part of this adventure, not necessarily people who had particular disciplines, say, because we must have been aware at that stage it was going to be a challenging and interesting thing. That's why we called for teams, not for proposals - because we wanted to have the research plans evolve out of the interaction of all those people.
(SGS Management Team member, 10 Oct 2001)

Although the RPN and the National Experiment were established separately, the involvement of producers in the research planning process that took place following the selection of the research teams was critical. In particular, the minority representation of producers at two major research planning workshops - the first in Mount Gambier in October 1996, the second in Melbourne in December 1996 - still had considerable influence on shaping SGS research directions. At the first workshop, the research teams arrived with firm research projects for which they were seeking MRC endorsement. Through the encouragement of the Management Team, the producers questioned these projects and demanded that they be significantly modified. The research teams acceded to these demands. At the second workshop, the Management Team accorded the producers the status of *arbiters*, who the researchers needed to convince and receive approval from before the MRC would agree to the final research directions of the National Experiment. This process was part of an ongoing Management Team strategy to bring the producer and research groups closer together over the life of the program.

Initially four sites were selected through the competitive process previously described to participate in the SGS National Experiment. By early 1997 the Experiment incorporated the two additional sites envisaged to make up a network of six. In 1997, the MDBC had recently established both of the two additional sites and, as a partner in the program, sought for the sites to be designated as SGS sites as recognition of its contribution to the program. As described previously, MDBC insisted on separate contractual and reporting arrangements for these sites, causing considerable angst within the Management Team. The researchers involved in the two sites, faced with the prospect of running their previously autonomous sites within a network of seven sites, cautiously welcomed the MDBC decision. On the one hand, they were pleased that it put them in contact with a considerable grazing science network, but on the other, found the loss of autonomy frustrating. The issue of autonomy is an important one in the context of how the researchers sought to operate, and I discuss this later in this section.

With the two additional sites, the six sites of the National Experiment gave an almost complete coverage of the geographical diversity of the HRZ (three sites in NSW, two in Victoria and one in WA). Over 70 researchers and technical assistants were engaged in the experiment across the six sites. Again in terms of gender, as with other components of the program, over three-quarters of participants in this component were male.

Collectively, the six National Experiment sites were to explore *all the major production and sustainability issues within the following objectives:*

- 1. to demonstrate that grazing management can increase pasture productivity and longevity;*
- 2. to determine the profitability of the various grazing strategies within sustainable parameters;*
- 3. to determine the management needed to provide critical ground cover for erosion and soil health;*
- 4. to develop strategies which maximise water use and minimise rising watertables, salinity and acidity;*
- 5. to identify strategies which optimise annual production and reduce nutrient losses; and*
- 6. to determine the impact of grazing systems and management intensifications on biodiversity.*

(Mason & Andrew 1998).

As part of its process to create a single National Experiment from six separate sites, the program supported the development of experimental protocols across five integrating themes (animal production, pastures, water and soils, nutrients and biodiversity). These themes were conceived by the Management Team in collaboration with researchers during the initial research planning workshop, although the means of implementing them had not been originally budgeted for. The theme protocols (Lodge 1998), outlining how data was to be collected at each site against each theme, was published by LWRRDC to encourage non-SGS researchers to adopt SGS experimental standards.

Specifically, the protocols required each site to collect a minimum set of data against all themes, and for some sites to collect additional, detailed data for particular themes. One researcher from each of five sites volunteered to act as a Theme Coordinator, responsible for heading a Theme Team to oversee data collection and analysis for a theme. Theme Teams comprised at least one representative of each site.

The themes served a number of purposes. First, they were an attempt to avoid the pitfalls of the TPSKP by taking a systems approach to properly exploring natural resource management issues relevant to the grazing industry. Second, they were to ensure that each site would add value to the program as a whole by adding value to each other site, and by sharing expertise across sites. Third, they acted to ensure a level of cooperation across State borders and institutional and disciplinary boundaries. Finally, and less explicitly,

they acted to foster a team rapport across the National Experiment that might not have otherwise developed. In interview, Management Team members were candid about how they attempted to utilise the theme approach to keep a tight reign on the research effort so as to bring it to closure on-time. For them it was a management tool. The researchers, on the other hand, mainly acknowledged the power of the themes from a scientific perspective:

Well, I mean, the themes were set up primarily because different researchers had different sets of skills. So Dave and I, for example, and Bobby in the North-East Victorian site, we had some of the better skills in terms of assessing water and nutrient losses. Now, those same skills weren't at some of the other sites. And similarly, we didn't have animal skills, the same level of animal skills as George did or the same level of pasture skills as some of the others did. So the idea of the themes was that we'd develop this common set of protocols, which was very successful - we all largely did the right thing and all measured the same things at each site - but when it then came to analysing ... the idea of the themes was that I would be allowed to - or the Theme Leaders and theme members would be allowed to - collectively analyse results from other people's sites. And so the basis of the themes was on this level of trust and understanding that we would be able to analyse each other's data and then report it in a collective paper.

(SGS researcher, 20 February 2002)

To strengthen the theme approach to the National Experiment, the program supported the development and maintenance of a single, national database to act as a repository of all SGS data, and to assist both the individual site teams and the theme teams to manipulate and analyse enormous datasets. The MRC commissioned the development of the SGS Database at the University of New England (UNE), which was to make it available for use by all program research teams. One UNE researcher, who had advocated the development of the Database within the UNE during the TPSKP, felt a high degree of personal ownership of the database. From his perspective, the Database enabled him to analyse the results of a previous TPSKP project and to complete his outstanding obligation to finish that project. Most of the other SGS researchers, however, found it an invaluable tool for storing and analysing data in their current SGS research.

In addition to the database, the MRC commissioned the development of a complex biophysical process model as a means of testing grazing management scenarios and predicting their impact. As much as anything, however, development of the model, like the database, was a strategy of the Management Team, endorsed by MRC managers, to break down potential barriers between sites, institutions and disciplines. But among the Management Team were those individuals who believed that the primary benefit of the tools was in improving the interactions and collaboration between scientists and those who believed the primary benefit was in underpinning the application of good, positivist scientific rigour and predictive capacity. The following conversations contrast these positions respectively:

And when I look back on the modelling process, I don't think it's actually the model that's got the value, it's the process that the researchers have been involved in developing the model... ..And so I think, if I went back again, I would re-engage the same modelling process, irregardless of whether we ever came up with a model that worked or not.

(SGS Management Team member, 23 October 2001)

We needed a model that let us move away from being trapped by the sites. You see, the power of SGS, in theory, is not the individual site results - even though they're nice, elegant experiments in their own right - but it's being able to generalise, out free in space and time, away from those results so you can say, "What would have happened had we done this work

in this location, in this rainfall period?", We haven't quite got there yet, but we are heading towards that direction. That's what the themes and database and modelling allow us to do.
(SGS Management Team member, 10 Oct 2001)

Both the database and the model became focal points of the National Experiment; artefacts of a strategy to drive coordinated and integrated experimentation. These artefacts not only stored and manipulated data; they also acted to define agendas of Research Executive meetings convened regularly by the Management Team throughout the SGS. The Research Executive comprised site and theme leaders as well as those associated with the model and database. The database and model both acted to bring to light issues about the relationships between the different research teams as well as between the researchers and the management team. Shortly after the development of the database, for example, the issue of intellectual property came to the fore and remained prominent at each and every meeting of the Research Executive.

During the course of the National Experiment, there were two major areas of conflict. The first was over intellectual property. The second, albeit closely related to intellectual property, concerned data-sharing within and across themes and sites. In the case of intellectual property, the contracts between the MRC and participating research agencies did not deal clearly with the question of ownership of SGS-generated data, the SGS Database or the SGS Model. Lack of clarity existed both about the short-term, when data-sharing was critical during the life of the SGS, and the long-term, when ongoing access to SGS generated data might be required. The SGS database and model acted to highlight the problem of who owned the data generated by the individual sites, and were themselves subject to intellectual property ownership. One leading advocate in particular was adamant that the individuals involved in their development should have their rights duly protected. In practice, separating the intellectual property between SGS data and the SGS database was difficult. For example, to manipulate data one also had to have, and manipulate, the database. Potentially all the researchers were in constant breach of intellectual property rights while remaining blissfully unaware of the fact.

The intent of the management team in dealing with intellectual property was to ensure that during the course of the program, nothing impeded the sharing of data. This was critical in ensuring that the themes would work. In 1998, the management team developed an intellectual property protocol based on *pooling* all SGS-generated data, whereby anyone contractually involved in the SGS could draw freely from the pool. This protocol clashed with the intellectual policy positions of partner organisations, leading to long, protracted discussions at each Executive Committee meeting as to how to handle intellectual property. Even in the sixth and final year of the SGS, a conclusive position on intellectual property was not resolved. In the meantime, intellectual property considerations *per se* did not hinder the exchange of data.

What did hinder the exchange of data related less to the legal nature of intellectual property than to the personal performances of science in the program. In 1998, about half way through the program, many SGS researchers sent a very positive signal in support of the theme approach by cutting their own site budgets in favour of supporting the growing needs of the cross-site research. In the final year, however, it became particularly noticeable when the Theme Leaders were required to write-up the results of their theme based efforts that the level of data-exchange was less than that envisaged by the Management Team and, indeed, by most of those associated with the SGS program. In fact, during the final year there were quite apparent manifestations of tension and frustration among the researchers about the lack of data exchange that was taking place in reality. Some researchers were keen to vent their frustration through me to ensure that I did not paint an overly glossy picture of the SGS. A few blamed the institutional arrangements of the program that encouraged researchers to concentrate their efforts on their home territory, pointing to the fact that regional site work was contracted but theme work was based on goodwill. Others accused fellow researchers of preferring to work within the disciplinary comfort zone that their own site work offered. One in particular was scathing of the fear some researchers have of losing control over the destiny of their data.

In the context of the science performance in the SGS, these conflicts strongly support the findings of Latour, Woolgar and others that suggest the artefacts of science are strongly influenced by the relationships and negotiations that take place in its performance. At the same time, this study also confirms the findings of Becher, Ziman and others that suggest the performance of science is fiercely competitive and individualistic. This is clearly evident in the collection of quotes outlined in the table below. These quotes are significant because they suggest that while traditionalist modes of scientific practice continue to dominate contemporary scientific practice, they are at odds with emergent collaborative modes of science that are becoming commonplace. Moreover, not only are they at odds with emergent management regimes in science, but also with the expectations of many scientists themselves. These tensions are reminiscent, indeed microcosms, of phenomena occurring at many scales. Bauman (2001) attributes tensions such as those described here as part of a growing global phenomenon of unease between individualism and conformism, self-interest and altruism and place and space.

Table1: Quotes reflecting the autonomy and contingent nature of science

We didn't crack the mould on sites. The research is still deeply embedded in the "This is our site and we collect our data and we own it". They're sharing it in a way that in some ways is extraordinary. I don't believe yet we've actually broken their outstandingly-strong attachment to their own site and their own data. So while they've played on a larger field - and participated pretty actively - it's been from the safety of their home base, their own research, their own data. And I hesitate to say that's been a disappointment. (SGS management team member, 22 October 2001)

I think what it boils down to is sites are traditional, sites are about your own work, even if it's in a broader context where you're sharing that site with a range of other people, measuring a range of other things. At the end of the day, you've got your bit of information that you've collected; you've got unarguable ownership over the data that you've collected. The person you're working with has unarguable ownership over the data that he or she has collected. And when you come down to write papers or to analyse it, you've got a reasonably-simple process to work through. (SGS researcher, 23 February 2002)

What I have seen at the moment is that nationally it's going to take a lot to get everyone to work together so that at 2001 we're going to have a national result. I mean, it just seems like there's people that want to do their own thing and they will probably always do their own thing, and I think that comes in research. I think people like to do their own little research - my Honours supervisor was really bad for that. I mean, when he died half the people didn't know what he was doing, so they had to try and finish up all his work. (SGS researcher, 15 April 1998)

I think it's too simplistic to say it's a personality type, but it's about trust and relationships, and some scientists who have been used to having large amounts of ... oh, it's about control! If you're used to having autonomy and control of your own experimental patch - which all of us are because we've only ever worked with our own experiments before - then some people are more likely to be able to cope with letting go because you can see the benefit in giving someone else your data because they can interpret it better than you can. And others are not suited to that. I mean, you'd almost do - I mean, this sounds silly, but you'd almost want to do some sort of (a) bonding and (b) personality testing of the scientists. (SGS researcher, 20 February 2002)

I detect a strong commitment to writing those theme papers, but there's a level of frustration out there at the moment that it's proving a little more difficult than they thought. My call - at what's only the tenth hour, not the eleventh hour yet - my call at this time is that they will make it, but there's pretty significant hurdles that they've got to overcome. They've got to actually give up some of their information, some of

their thinking, some of their intellectual property, before they can get a reward. They've actually got to give that up without any proof that they're going to get a reward at all. I reckon they'll do it. But how they're going to go about it and how they're going to achieve it is not clear to me yet.
(SGS management team member, 23 October 2001)

SGS final fling: Revealing the fragility of the SGS integration rhetoric

The original duration of the SGS Program was 1996-2001, a five-year period in total. By the fourth year of the program the Steering Group started to plan for a post-SGS program that would continue to support the needs of graziers in the HRZ. A number of issues needed addressing. Representatives of the funding bodies were concerned that, generally, many research programs fail to adequately manage the transition from one phase of activity to another. In particular, they were cognisant that at the completion of the TPSKP, the researchers had not published their research results until about three years into the life of the SGS Program. They were also aware that the incorporation of themes into the National Experiment provided an intellectual challenge that would not be fully achieved during the five-year life of the Program. Elsewhere, members of the Management Team were concerned that if left to their own devices, the researchers would at best deliver research papers out of the National Experiment and not a range of products that might be of immediate benefit to the producers. As a result, members of the Steering Committee unanimously agreed in November 1999 to support an additional year of activity specifically directed towards collaboratively *harvesting* the results of the 5 year research effort.

Across the range of SGS participants, the concept of a *Harvest Year* was appealing. Graziers were excited by the notion that the research in which they had invested would actually be packaged into useful materials. One suggested to me that it was going to be the *icing on the cake*. Management Team members saw the additional twelve months as an opportunity to bring the program to closure from the perspective of accountability, scientific rigour and product development. Many researchers told me openly that they were relieved they had an additional year in which to complete and document their experiments; and while the Management Team did not encourage further data collection during the Harvest Year, data collection in fact occurred right up to the final weeks. As part of a process of closure, some saw the Harvest Year as an important period of reflection:

But the vision or the concept behind the harvest year is that in the case of SGS we've spent five years – producers running demonstration sites, researchers doing this, PROGRAZE deliverers doing that – and we've actually amassed a collective..... We've learnt a shitload of stuff about grazing systems and the harvest year is a concept about “Let's just take a bit of time to pause and reflect. Let's get some researchers and producers, and everyone else, let's sit down and just reflect on what we've learnt – more importantly, what we might do with what we've learnt”.

(Management Team member, 23 October 2001)

A vast array of products was envisaged to result from the Harvest Year. The product needs were identified at a meeting of the producers, Management Team and the Research Executive. In order to drive the development of these products, the Management Team established five Harvest Teams based loosely around the themes, but also incorporating social considerations. Each team comprised three researchers, three producers drawn from the pool of Regional Steering Committee members, and one independent expert. An additional team concerned with theme integration drew membership from the Management Team and producers on the Steering Group. A Theme Leader for each team was appointed from amongst the producers. These teams met regularly throughout the year to further progress product development.

The management team members employed a number of strategies during the course of the Harvest Year to ensure that the goals of the year would be delivered. Some researchers and consultants were contracted to undertake product development work on behalf of the teams. On the scientific front, the management team negotiated to have a special edition of the *Australian Journal of Experimental Agriculture*, slated for June 2003, dedicated exclusively to SGS research. This placed pressure on both site and theme researchers to complete their obligations in respect to peer reviewed publication of their work.

The Harvest Year provided an excellent contrast to the years that preceded it, and offers an insight into the overall nature of the science performance in the SGS program. In the next section, which deals with the culture of the SGS community, I suggest that the SGS program embraced the characteristics of equality, justice, faith, sincerity, trust, goodwill and the like. A high degree of producer participation was evident in nearly every aspect of the program, and program camaraderie extended to friendships forged within and between the producer, researcher and management groups. A consultant employed by MLA to evaluate the program recognised these cultural characteristics as the *heart* of the SGS (Hassall Pty Ltd 2002). However, during the Harvest Year, the focus on product development showed how quickly the program could appear to revert to traditional, linear, non-participative modes of research performance. Despite the make-up of the Harvest Year teams, the effort was largely researcher-driven, with largely one or two of the researchers left to undertake most of the work and with very little consultation taking place.

I use the term *appear to revert* deliberately here. For some members of the program Steering Group, it came as a surprise to hear from consultants that the Harvest Year was less reflective of an overall image they had built of the program. But in reality, while the cultural marks of the SGS Program were largely evident across the program, the specific science performances during the Harvest Year were essentially characteristic of the science performances over the preceding five years. That is, much of the research effort was driven by researchers and involved minimal direction and participation by producers. The separation of the National Experiment from the network of producer research sites is in part evidence of this.

Despite these realities, many participants in the SGS program saw the program and the Harvest Year in a different light. Producers and researchers alike spoke to me of how they worked closely together, which they did mainly through workshops. A number of producers remarked, in different ways, that they saw the Harvest Year as symbolic of the cooperative nature of the SGS program, with one going so far as describing it as a period of *hope, expectation and conflict*, where the key elements of success *are contingent on trust and a degree of goodwill rarely rewarded to this point in time* (SGS Steering Group member and grazier, 25 June 2002). The contrast between perception and reality here raises important questions about how participatory do participatory modes of research need to be before they satisfy the expectations of all participants?

Community and Culture in the SGS

Was the SGS a community? As much as I lived with the SGS for seven years of my life and felt part of an SGS community, it was. As much as there was a *sense of common identity* (Kenny 1994:8) and a *particular kind of association* (Wild 1981:14) among those who participated in SGS activities, it was. And as much as it involved people who felt *part of a network; with a sense of solidarity, trust and mutual security* (Kenny 1994:35), it was. The evidence was in the everyday language of SGS participants, their phrases and associations during interviews and informal discussions, and in their stories. A short selection of snippets from participant stories begins to paint a picture of a close-knit group with a sense of cohesion, common purpose and camaraderie:

SGS is all about the people you rub shoulders with.

(Grazier, 7 October 2001)

SGS is about growing pastures and growing people.
(SGS Steering Group member, 5 November 2002)

[Barnsley] was in earnest discussion with one of the other colleagues in the project, and one of the techos was watching this earnest discussion – and [Barnsley] can be very earnest – and he leant over and asked if they were a couple. “Are they a couple?”, he said, which was very interesting because it’s a fairly close-knit group we’ve become.
(SGS researcher, 12 February 2002)

But the camaraderie and the networking, it was fantastic in the TPSKP. It’s no less – probably much greater – in the SGS.
(SGS researcher, 12 February 2002)

The other part that comes through is they’ve really made friends. There is a personal warmth between the researchers across the country that you can’t actually manufacture, that’s got nothing to do with MLA or anyone else. And they like each other, they respect each other, they fight with each other, but because they like each other they do a lot of things they normally wouldn’t do.
(SGS Management Team member, 23 October 2001)

In her analysis of the Regional Producer Network, Andrew (2003, 2001) found that recurring themes in interview responses among SGS producers were that of confidence and trust. My own study found the themes of *trust*, *camaraderie* and *sense of network* proliferated throughout the discourse of SGS producers, management and researchers alike and was not limited to any one component of the program. But as in any community (Kenny 1994) there were dissenters to the perception that the SGS was a totally harmonious community, and dissenters to particular beliefs about components of the SGS. For example, a small number of researchers in the National Experiment drew to my attention instances of a lack of goodwill in sharing data, while some of the producer participants on the Regional Steering Committees argued that the degree of flexibility they were given to make local funding decisions was more constrained than MLA suggested. These comments were usually made in the context of individuals expressing how they valued the sense of a SGS community and became disappointed when other participants did not live up to their expectations about the aspects of the program they most valued, such as trust and goodwill. In this sense we can see how the participants of the SGS defined their own sense of an SGS community, consistent with constructionist view of community (after Hillery 1955).

Distance did not impede a sense of community among SGS participants. It was not a community of site and place in the sense of locality or localism (Gyford 1985), but rather in the sense of belonging (Cohen 1982). Relationships between community members crossed geographic boundaries, as did the distributed actions and consequences of power, authority and leadership. A form of social stratification existed, manifested largely in terms of power and influence. Recognition of any form of status tended to be in respect to formal components of the program such as where contracts obligated researchers to report to MLA managers and the management team.

There was not a form of stratification where one part of the SGS community aspired to become another. The wielding of power and influence was about generating a sense of community and egalitarianism so as to *get the SGS job done* (SGS management team member, 23 October 2001).

I described members of the Management Team as *minor charasmatics*, after Oxley (1978). They may also be described as an *elite*, using strategies to promote a sense of community *pluralism*. These terms may

appear at odds with one another. Michels (1959) sees the masses as basically incapable of making complex decisions in complex environments and so need to be organised by leaders drawn from an elite group. Elitist leadership, he argues, shakes ordinary citizens out of their apathy and organises them to achieve certain things. Pluralism on the other hand sees leadership and influence as more distributed, certainly beyond a small, impenetrable elitist core (Oxley 1978). In the SGS, influence was indeed exerted from many directions, but in many instances it needed to be encouraged - sometimes coaxed - and given legitimacy by an elite. The management team operated with enormous autonomy, and their decisions were defacto decisions of MLA. Rarely were they over-ruled.

Boundaries existed to help construct the SGS community. In many cases these boundary-setting mechanisms were formal; for example positions on SGS groups and committees, receipt of SGS funds to undertake SGS activities, and privileged invitations to certain SGS forums and events. These mechanisms worked to promote a sense of common identity. However, few communities have unambiguous boundaries (Oxley 1988; Hillery 1955), and at the grazier level in particular, levels of participation in specific SGS activities sometimes stretched, if only temporarily, the limits of the SGS boundary. Here, people would sometimes identify themselves as members of an SGS community, and at other times not, depending on their daily routines.

A sense of time was another important factor underpinning a common sense of community. Here, a theme constantly referred to in SGS discourse was the notion that the SGS was a journey. In this sense there was a strong, but implicit, understanding that the SGS community was a temporary apparition; an experience shared by the like and the unlike:

But it's an adventure; it really is!
(SGS researcher, 10 October 2001)

I once said, "If you join the good ship SGS, we don't know where we're going but we can guarantee that it won't be a boring ride". And I think we've lived up to that.
(SGS management team member, 23 October 2001)

I guess there's many other things one could say about SGS, but I think it's been a great adventure.
(SGS grazier, 5 November 2001)

I started with SGS on 20 October 1953. My mother said to me, "Some day son, if you are lucky, you will be associated with something that made a difference". She'd never heard of SGS, but she headed me in that direction. She said, "Align yourself with people who are going somewhere". This Program's gone somewhere and we need to make sure we don't lose sight of that.
(SGS management team member, 12 February 2002)

If the SGS was a community, then it was a very masculine one. Where were the women? The profiles of participants spread throughout the chapter show very few women members of the SGS community. They were not represented in the SGS elite, the Management Team in particular. Three of fourteen Steering Group members were women, while 15 of the 71 people involved in the research were women. Among the research community, full-time male researchers out-numbered full-time female researchers five to one. Within the Producer Steering Committees, 25 of 127 members were women, of whom only three filled the ten facilitator positions. The findings of this study are quite consistent with other studies intersecting with Australian agriculture, where a masculine hegemony dominates (Gray and Lawrence 2001) and only men have the qualities that define *good farmers* (Phillips 2000). They are also consistent with more general

studies about science, where women are found to be under-represented in positions of scientific influence (Nowotny *et al.* 2001; Harroway 1989; Harding 1986).

The cultural markers of the SGS program were distinct and recognised widely across participants. Within the overall discourse, concepts such as equality, justice, devotion, trust, goodwill, sincerity, heroism and camaraderie appeared consistently. These concepts were ones that, in the story-telling of participants, defined the sense of an SGS community. Significantly, these concepts appeared consistently in the discourse of producers, researchers and bureaucrats alike. More significantly, these concepts became ones by which people assessed the contribution of others to the program and to the sense of community.

Reflections and implications for integration

This is an ethnographic study with two backdrops. I have described in this paper a broader background to the scientific performances undertaken in the SGS program, with the greater emphasis placed on structure, but some attention paid to cultural factors. It is largely contextual and introduces some of the key social relationships within an emergent SGS community. I was inescapably a part of that community, both professionally and as an observer drawn into a network of alliances, dependencies and friendships during the course of my study.

An SGS community emerged because of the contrivances of various actors, and in particular those of members of the Management Committee. Establishing an esprit de corps across and between different disciplinary groups, stakeholder groups, and professional groups was directed towards maximizing collaboration and integration. From this social base, various structures and tools could be introduced to aid the performance of interdisciplinary science. These tools included the introduction of methodological protocols to be adopted across sites and research groups as well as the use of themes and reporting arrangements. Structures included the establishment of multidisciplinary teams and committees responsible for overseeing and guiding integration activities.

Elsewhere (Price 2003b), the development of cohesion within an SGS community is attributed to the development and exchange of cultural capital between SGS participants. Those seen to contribute more to the ideals of the program, such as participating in collaborative activities and sharing data, were rewarded with greater cultural capital. Commitment to the program over and above parochial interests was viewed very highly, and the Management Team members played upon this factor in an attempt to drive integration across the program, and within the program's different components.

Integration in the SGS program was as much a product of social processes as an intended result of the application of tools and structures. Indeed, the SGS program shows that these two factors are inseparable.

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