

BUILDING CAPACITY IN AUSTRALIA'S RANGELANDS

John A. Taylor

Rangelands Australia, Faculty of Natural Resources, Agriculture and Veterinary Science, The University of Queensland, Gatton Campus, Gatton, Queensland, 4343 Australia. E-mail: john.taylor@uqg.uq.edu.au

1. INTRODUCTION

Rangeland users and those who support them (i.e. advisers/extension officers, land care facilitators, trainers, researchers, etc.) face a time of discontinuous change. The key business challenges are not simply doing better at what they currently do, but learning to do new things and address new issues to meet changing market and community expectations. The wider community is driving change through new specifications on food and fibre products, changing landscape values and generational change, and is increasingly involved, directly and indirectly, in decisions that influence what can be done in the rangelands and how it should be done. No enterprise is an island, ecologically or socially (Bellamy *et al.* 2002), and no sector or community can isolate itself from the surrounding society (Falk 2001) or from change.

Change is not new to the rangelands, be it in Australia (Holmes 1994, 1997) or, for example, the United States of America (Heady 1999, McLaren, Brunson & Huntsinger 2001), but the momentum in Australia has been modest compared to the American situation (Holmes 1995). Change is often a trigger for learning (Arnott *et al.* 1999, Bellamy *et al.* 2002), and change can be seen as a learning process during which individuals and communities develop new knowledge, skills and values (Bellamy *et al.* 2002; Kilpatrick, Falk and Harrison 1999). Formal and informal education and training are widely recognized strategies for building capacity for change (Falk 2001, Kilpatrick 1997), and the Americans have been reviewing and revising their educational offerings in rangeland management to meet the changing circumstances (Malachek and Call 1999, McLaren 2000, McLaren *et al.* 2001). The need for education and training in rangeland management to address key business challenges has long been recognised in Australia (Agtrans Research 1998), but until recently there have not been any vocational, undergraduate or postgraduate programmes/curricula specifically in rangeland management.

The establishment of Rangelands Australia is a strategic response to a national report (Agtrans Research 1998) on 'Education and training to support sustainable management of Australia's pastoral industries' that highlighted the lack of programmes/curricula in range management in Australia and deficiencies in related offerings.

Rangelands Australia has adopted a participatory, social marketing approach to the development of Australian programmes in rangeland management. Social marketing places the client at the centre of every strategic decision, and focuses on changing behaviour (Andreasen 1995). Programmes developed by Rangelands Australia are intended to address future challenges, to better position people for individual, enterprise and community success, and to facilitate change. People who use the rangelands to produce cattle and beef or sheep and wool, and those who support them, are the obvious (but not the only) clients for this initiative. These two groups of stakeholders have common views on many issues, but differ in their perspectives on rangeland sustainability (MacLeod & Taylor 1994) and the importance of factors in rangeland management (Burnside & Chamala 1994). Within these two groups, women and youth are seen to be under-utilised resources in direction setting and planning (Bellamy *et al.* 2002, Kelly 2001).

This paper reports on the outputs of a strategic initiative to engage stakeholders in defining the education and skills that will be required to ensure the sustainability of Australia's rangelands, the success of its industries and the development of its people. It highlights the context and imperatives for change in the rangelands, and the personal qualities and knowledge that, stakeholders believe, will be required for individual, enterprise and community success in 5-10 years time. This paper focuses on the gaps in human capacity - especially among the land managers who are the custodians of most of Australia's rangelands (i.e. corporate, family and indigenous grazing enterprises) and those who are expected to support them (i.e. advisers/extension officers, land care facilitators, trainers, researchers, etc.). The paper also explores perceptions of the adequacy of the information base for building capacity for a bright future for Australia's rangelands.

2. SKILLS NEEDS AND GAP ANALYSES

In defining the education and skills that will be required for individual, enterprise and community success in 5-10 years time, Rangelands Australia has engaged representatives from a wide range of stakeholder groups in a two-stage process involving: 1) focus groups and 2) surveys. The key steps in the process included:

- 1a. Groups of stakeholders identifying the current issues and challenges,
 - 1b. Groups of stakeholders defining a likely scenario for the rangelands in 5-10 years time, prompted by a consideration of global, national and regional forces driving change, as well as the current issues and challenges,
 - 1c. Within the context of the likely scenario, stakeholder groups identifying:
 - personal qualities critical for individual success, and
 - key areas of knowledge for enterprise and community success.
2. Surveying stakeholder perceptions of the qualities that require further development and the gaps in knowledge among 'most' members of two rangeland stakeholder groups:
- beef and wool producers, and
 - those who are expected to support them.

The focus group stage has engaged over 400 'forward looking' individuals with a strong interest in the future of the rangelands. These people were identified through national and regional networks, and represent the pastoral (n = 169), mining (15), tourism (15) and 'new' industries (e.g. bush tucker) (8), Commonwealth (15), State (82) and Local (18) Government organisations/agencies, education and training providers (26), indigenous (24) and other community groups (39). Their views were captured in the outputs of 24 focus group meetings, each with a mix of stakeholders, held across Australia in 2001-2. Two focus groups were held in the national capital to elicit policy maker, peak body and R&D corporation perspectives; three in state capitals to elicit industry body and senior agency perspectives; and the remaining 19 were held in various regional centres within Australia's rangelands. The mix of generations (34% < 30 years old) and gender balance (42% women) achieved has probably enriched the outputs of the regional meetings (Bellamy *et al.* 2002), but the process has not allowed analysis of their specific contributions.

Perceptions of deficiencies in personal qualities, gaps in knowledge and the adequacy of the information base were determined by surveying three groups with a continuing interest in the rangelands:

- focus group participants (respondents = 74),
- attendees at the North Australia Beef Research Council (NABRC) meeting in Broome in September 2002 (21), and
- attendees at the session on 'Capacity to Manage Change' at the Australian Rangeland Society's (ARS) conference in Kalgoorlie in September 2002 (96).

Of the 191 survey responses reported in this paper, 60 were from beef or wool producers, 96 from support staff, and the remainder (35) from other stakeholder groups.

Participatory and social marketing approaches to the development of educational programmes are not common in tertiary education institutions, and, from the feedback, have been a beneficial experience for many participants. For example, comments from the evaluation forms for each focus group include:

"Better understanding and appreciation of the broader issues"

"Interaction with people from different backgrounds in rangeland management"

"Hearing a diverse range of ideas and opinions"

"Realising that other people had similar ideas"

"Realising that people you wouldn't normally meet/talk to are thinking in a similar way"

"Opportunity to hear a diverse range of views, all (surprisingly) directed at the same general end"

"Many great ideas ... from a male and female perspective"

"Made me see the bigger picture"

3. A LIKELY SCENARIO FOR AUSTRALIA'S GRAZED RANGELANDS

The overwhelming majority of participants in the focus groups believe that there will be significant change in Australia's rangelands over the next 5-10 years, and especially in the nature of enterprises and in their operating environment. While some stakeholders believe that livestock will be excluded from environmentally sensitive and marginally productive lands, it was widely agreed that grazing would persist on the majority of Australia's rangelands for the foreseeable future.

A collation of focus group outputs provides a future scenario for grazing (and other) enterprises and their operating environment in 5-10 years time (after Taylor 2002):

3.1 Nature of Enterprises

- Enterprises will focus on excellence/‘best practice’ in the production of quality assured products (e.g. food, fibre and/or rangeland experiences) and be able to demonstrate that the production system is environmentally sustainable.
- Enterprises will be more complex (because of diversity in business type and in geography), and more business like and professional in their operations.
- New products (e.g. bush food) or services (e.g. farm stays), value adding and off-farm investments will provide opportunities for diversification and risk management, but will complicate day to day management.
- Larger enterprises will develop through increasing corporate ownership and new partnerships (geographically and along the supply chain).
- Younger, more educated and informed managers will take control as an outcome of inter-generational change and succession planning, but there will be less of them.

3.2 Operating Environment

- Greater environmental awareness and responsiveness will be expected of land users and managers, driven by market specifications (global and national) and environmental regulations and restrictions (e.g. biodiversity, pest control) at the catchment and regional level.
- Greater scrutiny and accountability will be expected of land users and managers by banks, investors, insurers, government and other stakeholders.
- Decision-making will be more complex, especially in monitoring, managing and adapting for multiple uses and values at enterprise and catchment scales.
- Traditional knowledge, ‘best practice’ and new scientific knowledge will be integrated and applied in decision-making.
- Urban attitudes and perceptions will drive rangeland policy, but urbanites will have a greater empathy with (but limited understanding of) the rangelands through tourist experiences.
- Land degradation will increase as the longer-term consequences of salinity, pests and weeds become evident over time.
- Social decline will continue through out-migration and cessation of social events, but people in rural and remote Australia will be better connected nationally and internationally.

Although this integrated scenario was developed at a time when a major drought was developing across Australia's rangelands, drought has not dominated thinking, even among those sectors hardest hit. The majority of the 'forward thinkers' involved in the development of this scenario were accepting of the scale of change anticipated, and optimistic. However, many noted that the likely future will provide significant challenges for many rangeland users, managers, advisers etc., and for some the likely changes will probably be very threatening and confronting (Taylor 2002).

4. GAPS IN CAPACITY FOR FUTURE SUCCESS

Gaps in capacity are examined in relation to stakeholder-derived lists of the personal qualities and areas of knowledge that focus group participants believe will be required in the future (see Taylor 2002). Gaps in capacity are reported for only two groups of rangeland stakeholders - producers and support staff.

4.1 Personal Qualities for Success

As there was only a slight difference in the rank order of the top five personal attributes identified as requiring development by all three groups of respondents, viz. focus group participants, NABRC participants and ARS Conference participants, the data sets were combined.

4.1.1 Producers

Seventy-five percent of all respondents believe that most producers' ‘commitment and passion for the rangelands’, and their ‘determination and persistence’, does not warrant further development. Notwithstanding, these are critical factors for success (Taylor 2002).

However, 50% of all respondents believe that the following personal qualities need further development among most of our beef and wool producers (listed in descending rank order):

- Positive attitude to change,
- Open-mindedness,
- Communication skills,
- Sensitivity to other values and cultures,
- Willingness to learn,

- Networked and connected,
- Adaptability, and
- Interpersonal skills.

Both support staff and the producers themselves identified the same top five deficiencies, albeit with a slightly different order among the lower rankings. For example, the need for greater ‘communication skills’ and a ‘willingness to learn’ was ranked higher by the producers themselves, and the need for greater ‘sensitivity to other values and cultures’ was ranked higher by support staff.

Importantly, the deficiencies identified are also the critical qualities that emerge in stories of successful individuals and communities in Australia’s Outback (Rees and Fischer 2002), and appear in literature on transformational (Parry 1996) and enabling leadership (Falk and Mulford 2001).

4.1.2 Support staff

Fifty percent of respondents believe that the following personal qualities are in need of further development among most of our support staff (listed in decreasing rank order):

- More practical,
- Communication skills,
- Sensitivity to other values and cultures,
- Open-mindedness,
- Interpersonal skills, and
- Being innovative.

Both producers and the support staff themselves have identified the same six deficiencies, again in slightly different order among the lower rankings. For example, the need for greater ‘innovation’ and ‘interpersonal skills’ was ranked higher by the support staff themselves, and the need for greater ‘sensitivity to other values and cultures’ was ranked higher by producers.

Seventy-five percent of respondents believe that the self-confidence of most of our support staff does not warrant further development, but given the deficiencies identified above (and below), this self-confidence could be misplaced and is potentially dangerous if people are not aware of their limitations.

Overall, these findings suggest that the capacity of many producers and support staff to engage effectively in cross-sectoral debates, to negotiate an agreed future for the rangelands, and to work in partnership with stakeholders, will be limited by deficiencies in personal qualities - especially ‘open-mindedness’, ‘sensitivity to other values and cultures’, and ‘communication skills’. The capacity of both stakeholder groups to learn, either formally or informally, would also be limited by these deficiencies.

4.2 Areas of Knowledge for Enterprise and Community Success

4.2.1 Producers

A significant proportion of all respondents believe that most producers know enough about ‘basic bush skills’ (80% respondents), ‘livestock management’ (50%), ‘pest and weed management’ (40%), and ‘cultural and historical appreciation’ (25%). However, fifteen areas of knowledge, expected of producers in the future (Taylor 2002), were identified by 75% of respondents as needing development among most producers. These include (in descending rank order):

- Environmental management systems and certification,
- Multiple-use management,
- Sustainable production systems,
- Recruiting, managing and coaching people,
- Communication, negotiation and conflict management,
- Systems/holistic management,
- Marketing,
- Landscape processes and function,
- Awareness of forces driving change,
- Property, catchment and regional planning,
- Business management and planning,
- Self-awareness and self-management,
- Legislation and regulations,
- Stakeholder values and perceptions, and

- Basic understanding of natural resources.

These findings acknowledge the ability of most producers to manage a livestock-focused enterprise, but highlight important deficiencies in systems, social and business skills and in bio-physical understanding. These deficiencies will limit many producers' ability to be proactive about emerging market opportunities and potential threats, and to make the most of their natural and human resources and collaborative or partnership opportunities.

4.2.2 *Support staff*

The top five areas of knowledge that 50% of all respondents believe most support staff know enough about now, are (in descending rank order):

- Basic understanding of natural resources,
- Management of pests and weeds,
- Livestock management,
- Legislation and regulations, and
- Landscape processes and functioning.

However, 75% of respondents believe that most support staff do not know enough about (in descending rank order):

- Systems/holistic management,
- Self-awareness and self-management,
- Sustainable production systems,
- Stakeholder values and perceptions,
- Marketing,
- Environmental management systems and certification,
- Multiple-use management,
- Awareness of forces driving change,
- Basic bush skills,
- Business management and planning,
- Communication, negotiation and conflict management,
- Diversification,
- Cultural and historical appreciation, and
- Recruiting, managing and coaching people.

These findings acknowledge the strengths of most support staff in the bio-physical and technical areas, but highlight serious deficiencies in their training and professional development in systems, social and business skills. These deficiencies will make it all the more difficult to build the trust and relationships that are fundamental to effective participatory approaches (Kelly 2001), and to capture the knowledge and experience that exists in agencies. These deficiencies will also limit the effectiveness of support staff in assisting and supporting producers to position themselves for emerging market requirements and to seize new resource use and market opportunities, and in engaging with stakeholders and fostering new alliances and partnerships.

Overall, the knowledge gaps identified relate primarily to enterprise success, but also emphasise the need for a greater external focus (i.e. catchment and regional issues, understanding other stakeholders, forces driving change) and areas for personal development (i.e. self-awareness, communication and interpersonal skills).

These findings also highlight the need to significantly expand the knowledge and skills base of many rangeland managers and support staff, and mirror recent calls in America for:

- Improving communication skills and applications of sociology and psychology in working with diverse groups (Sowell 1997),
- Development of management expertise, systems perspectives and integration skills (Gerrish 1999),
- Inclusion of communication skills, conflict resolution, critical thinking, problem solving, environmental impact assessment, restoration ecology and environmental economics (Knight 1999),
- More of the social sciences in a systems context (Malachek and Call 1999), and
- Greater social skills (i.e. communication, working with diverse groups, conflict management) and interdisciplinary skills (McLaren 2000).

However, there is an obvious tension here between student needs and the realities and financial constraints of those in the business of education. Indeed, the current trend in Australia is to reduce options and favour shorter (i.e. 3 vs 4 year) degrees.

5. ADEQUACY OF THE INFORMATION BASE

Information and understanding are the key to a sustainable future for Australia's rangelands (NLWRA 2001). Human capacity can be built, through learning, from a range of information sources, including traditional and indigenous knowledge, and new information generated by research and development. However, while an adequate information base is essential, it is the ability to access, organise and use information that enables stakeholders to identify threats and opportunities.

Fifty percent of respondents believe that adequate information is readily available on aspects of business management and planning (i.e. business analysis, budgeting, tax and asset management, cost of production, etc.), livestock management (i.e. behaviour, nutrition, reproduction, health and welfare), basic bush skills (i.e. four-wheel driving, plant and machinery maintenance, first aid, fencing, survival skills, etc.), basic understanding of natural resources (i.e. soils, water, vegetation, biodiversity, etc.), marketing, and management of pests and weeds. However, 75% of all respondents believe that there is inadequate information on the following (in decreasing order of importance): multiple-use management (i.e. monitoring and managing for multiple uses and values), stakeholder values and perceptions, environmental management systems and certification, forces driving change, systems management, sustainable production systems, diversification, and landscape processes and functioning.

Furthermore, the stakeholder response suggests that if the information is available, in print or other media, they are not aware of it or where to find it, and it is not getting to those who need it. This highlights the importance of learning how to learn, as well as the importance of being networked and connected, and having strong communication skills to find and gather information (Arnott *et al.* 2001).

6. IMPLICATIONS FOR CAPACITY BUILDING

Significant change is anticipated in Australia's rangelands over the next 5-10 years. Change and learning are inter-linked (Bellamy *et al.* 2002), and just as change is ongoing so is the need for continuous or life-long learning.

Stakeholders have highlighted a diverse array of personal attributes, skills and knowledge that will need to be developed for future success in Australia's rangelands. It will be difficult for most individuals to possess or develop all, and this highlights the importance of a team with complementary skills - be it a family partnership, an action group or a corporation - in achieving success in the rangelands. Fortunately, there are models for success among even the simplest teams in Outback Australia (Rees & Fischer 2002), and these should be promoted more widely through industry and regional initiatives such as Bestprac/Beefplan and landcare/catchment management groups.

Extension processes, incidental learning, informal and formal education and training all have a place in building capacity in different segments of the market for learning in the rangelands. However, the challenges of the rangelands for the education sector must not be under-estimated. From this study and Strachan's (2001) work on the personality types in the northern rangelands, many range managers will be resistant to new ideas and uncomfortable with the anticipated pace of change. This presents challenges in motivating people for change. Further, from market research commissioned by Rangelands Australia, a significant proportion (24%) of the people in rural and regional Australia fear learning and have high internal barriers to learning, and a further 30% are only interested in job-related learning (and then only if directed by the employer) (Quay Connection 2003).

Segmenting the market for learning in Australia's rangelands has identified barriers to participation in education and training, and incentives to encourage life-long learning and participation in formal and informal learning (Quay Connection 2003). These will be embodied in Rangeland Australia's marketing strategies and messages.

Rangelands Australia is currently using the skills needs and gap analyses to develop the framework and content of innovative short-courses, postgraduate coursework and undergraduate programmes, progressively available from 2003. Participatory approaches will continue to guide course development and upgrades. For example, new courses will be developed to meet expressed needs by small teams comprising experienced rangeland managers, knowledge experts, users and other relevant stakeholders, led by Rangeland Australia's educational designers. The need for tailoring content to the local context will be explored with regional partners in the national network of education and training providers. Accreditation of relevant offerings from partners in the network of providers will provide flexibility for an increasingly mobile clientele. Courses will be modularised to accommodate time constraints, seasonal work demands, home study, etc., and accessed through modes of delivery appropriate to the needs of the learner and the subject matter. Development of key personal qualities will not be approached by stand alone units/courses, but embedded in all courses in realistic learning activities that expose people to the range of views on an issue, involve integration of biophysical, economic and social dimensions, and encourage debate, understanding and negotiated outcomes.

7. CONCLUSIONS

This paper has drawn attention to a number of personal attributes, skills and areas of knowledge that stakeholders believe will be important for future success in Australia's rangelands and increasingly expected of managers and support staff. By using a participatory approach to identify these expectations, Rangelands Australia is modeling the processes that will be increasingly important in the future, and demonstrating the benefits of the contributions of others (see earlier - focus group feedback) in addressing future challenges.

A number of knowledge and skill deficiencies have been identified in most producers and support staff that could limit their capacity to be more responsive to market opportunities and community expectations, and more proactive about change. They include: environmental management systems and certification, multiple-use management, sustainable production systems; recruiting, managing and coaching people; communication, negotiation and conflict management; systems/holistic management, marketing, awareness of forces driving change, business management and planning, self-awareness and self-management, and stakeholder values and perceptions. Learning activities might be developed to meet some of these needs, but stakeholders perceive that information is inadequate in the case of environmental management systems and certification, multiple-use management, sustainable production systems, systems/holistic management, forces driving change, and stakeholder values and perceptions. It may be that the information products in these areas need to be improved (S. Lloyd, personal communication), that information seeking (and management) skills need to be developed, or that there are real deficiencies in data or in the accessing and integration of information from non-traditional sources.

Of greater concern are the deficiencies in key personal qualities that will limit learning and the effectiveness of participatory activities (i.e. communication skills, open-mindedness, sensitivity to other values and cultures, and interpersonal skills). Exposure to ideas and information may improve capacity in some of these areas (Bellamy & Dale 2000, Taylor & Braithwaite 1996), but where people are negative about change and narrow-minded, the task will be all that more difficult. This is the fundamental challenge in building capacity in the rangelands.

At this stage, enterprise development, regional development initiatives and cooperative action on biophysical issues in Australia's rangelands appears to be limited more by the personal traits and qualities of many producers and support staff, than by technical knowledge. This is not to say that technical knowledge is not important, rather that it does not appear to be the most limiting factor in enterprise and community development, at least in the Australian rangelands today or in the near future. It's an issue of balance, which must be addressed in education and training offerings if we are to build capacity for a bright future for our rangelands. The greatest resource a nation has is its people. Strategic investment in them will ensure that the rangelands deliver economic, social and environmental outcomes into the future.

8. ACKNOWLEDGEMENTS

I would like to thank the stakeholders who engaged in the needs analysis and survey with great enthusiasm, and especially those who assisted with local arrangements for the focus groups or drove/flew large distances to participate.

Meat and Livestock Australia, The University of Queensland and Agriculture Fisheries and Forestry - Australia have strongly supported this initiative.

Jenny Bellamy, Oekie Bosch, Jeff Coutts, Denise Hart and Wal Whalley provided valuable comments on a draft of the manuscript.

9. REFERENCES

Agtrans Research 1998. Education and training to support sustainable management of Australia's pastoral industries. Report to the Meat Research Corporation. pp 48.

Andreasen A 1995. Marketing social change. Jossey-Bass, San Francisco.

Arnott A, Benson R, Crawford K, Herbert S, Leybourne M, Shaw K & Speirs R 1999. Learning processes and the impact of change on pastoralists in the tropical savannas of northern Australia. In: Eldridge D and Freudenberger D (eds.). People and Rangelands - Building the Future. Proceedings VI International Rangeland Congress 1:377-378.

Arnott A, Benson R, Crawford K, Herbert S, Leybourne M & Speirs M 2001. More than can be said: A study of pastoralists learning. Tropical Savannas Cooperative Research Centre, Darwin, pp 82.

Bellamy J and Dale A 2000. Evaluation of the Central Highlands Regional Resource Use Planning Project: A synthesis of findings. Report to the Land & Water Resources Research and Development Corporation. CSIRO Sustainable Ecosystems, Brisbane. pp 193.

- Bellamy J, Webb V, Mayocchi C and Leitch A 2002. Improving resource management through rural women's use of new technology: A pilot study on impediments and opportunities for learning activities. Report to AFFA 'Skilling Farmers for the Future' program. CSIRO Sustainable Ecosystems, Brisbane. pp 74.
- Burnside DG and Chamala S 1994. Ground-based monitoring: A process of learning by doing. *Rangeland Journal* 16:221-237.
- Falk I 2001. Challenges facing rural regional Australia in new times. In: Falk I (ed.). *Learning to Manage Change: Developing regional communities for a local-global millennium*. NCVER, Adelaide. pp 3-11.
- Falk I and Mulford B 2001. Enabling leadership: A new community leadership model. In: Falk I (ed.). *Learning to Manage Change: Developing regional communities for a local-global millennium*. NCVER, Adelaide. pp 219-228.
- Gerrish J 1999. Teaching new ideas needs new ideas in teaching. In: Eldridge D and Freudenberger D (eds.). *People and Rangelands - Building the Future*. Proceedings VI International Rangeland Congress 1:339-343.
- Heady HF 1999. Perspectives on rangeland ecology and management. *Rangelands* 21 (5):23-33.
- Holmes JH 1994. Changing values, goals, needs and expectations of rangeland users. *Rangeland Journal* 16: 147-54.
- Holmes JH 1995. Land tenures, property rights and multiple land use issues for American and Antipodean rangelands. In: Cliff AD, Gould P, Hoare AG and Thrift N (eds.). *Diffusing Geography*. Blackwell, London. pp 262-88.
- Holmes JH 1997. Diversity and change in Australia's rangeland regions: Translating resource values into regional benefits. *Rangeland Journal* 19:3-25.
- Kelly D 2001. Community participation in rangeland management. Report to the Rural Industries Research and Development Corporation. RIRDC, Canberra. RIRDC Publication 00/130.
- Kilpatrick S 1997. Promoting learning networks for small business. How can group learning facilitate change? In *Lifelong learning: Reality, rhetoric and public policy*. University of Surrey. pp 188-194.
- Kilpatrick S, Falk I and Harrison L 1999. Learning in rural communities: A response to rapid economic change. Centre for Research and Learning in Regional Australia, Tasmania. CRLRA Discussion Paper D13/1998.
- Knight RW 1999. Future changes in range management education. In: Eldridge D and Freudenberger D (eds.). *People and Rangelands - Building the Future*. Proceedings VI International Rangeland Congress 1:369-372.
- MacLeod ND and Taylor JA 1994. Perceptions of beef cattle producers and scientists relating to sustainable land use issues and their implications for technology transfer. *Rangeland Journal* 16 (2):238-253.
- Malachek JC and Call CA 1999. A flexible curriculum for university study in rangeland resources. In: Eldridge D and Freudenberger D (eds.). *People and Rangelands - Building the Future*. Proceedings VI International Rangeland Congress 1:364-365.
- McLaren MP 2000. History of the rangeland curriculum: Are there new trails? *Rangelands* 22(6):23-27.
- McLaren MP, Brunson MW and Huntsinger L 2001. Future social changes and the rangeland manager. *Rangelands* 23(6): 33-35.
- NLWRA 2001. *Rangelands - Tracking changes*. National Land and Water Resources Audit, Canberra. pp 174.
- Parry K 1996. *Transformational Leadership: Developing an enterprizing management culture*. Pitman Publishing, Melbourne.
- Quay Connection 2003. *The Market for Rangeland Education and Training*. Report to Rangelands Australia. pp. 32.
- Rees P and Fischer T 2002. Tim Fischer's Outback Heroes and communities that count. Allen & Unwin, Sydney.
- Sowell B 1997. What professional and technical skills will tomorrow's range managers need? *Rangelands* 19:21-22.
- Strachan R 2001. Leadership styles in the pastoral industry. In Proceedings North Australia Beef Industry Conference, Kununurra WA. pp. 149-153.
- Taylor JA 2002. Key personal attributes and areas of knowledge for future success in the rangelands. In: Proceedings of the 12th Biennial Conference of the Australian Rangeland Society, Kalgoorlie WA. pp. 74-78.
- Taylor JA and Braithwaite RW 1996. Interactions between land uses in Australia's savannas: It's largely in the mind. In: Ash A (ed.). *The Future of Tropical Savannas: An Australian Perspective*. CSIRO, Melbourne. pp 107-118.