HUMAN RESOURCES FOR AGRICULTURAL RESEARCH: A PERSONAL PERSPECTIVE

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SUMMARY

The number of agricultural researchers (including animal researchers) in Australia has been at least maintained in recent years, and may have increased. However, the operating environment for agricultural research continues to change rapidly, driven by forces that are international in scale. Management of the research workforce in this new environment creates challenges for research and human resources (HR) managers. Some of these are considered under the headings of workforce planning, building and managing teams, and performance management. Advances in information and communication technology are improving organisational efficiency and effectiveness, but are creating new HR challenges that must be managed. Application of social capital theory to organisational development might provide new insights as to why some organisations struggle to adopt beneficial change while others do not.

Keywords: human resources, workforce planning, building and managing teams, performance management

INTRODUCTION: THE HR MANAGEMENT CONTEXT

Human Resource (HR) management contains several elements: workforce planning; training and development; performance management; organisation development; work environment; and staff administration (Elizabeth Gordon, *pers. comm*.). These topics have been well described in the literature, and it is not my intention to provide a textbook treatment. Instead, I will focus attention on a few issues that are particularly relevant at present to researchers working in fields of agriculture and livestock production. I will also share a few personal experiences. But first, I will describe the HR management context for agricultural research in Australia in 2004.

The changing research environment

There are strong forces operating nationally and internationally that are changing the face of science (Clements and Vercoe 1995). These include declining, static (steady-state) or slowly rising Government funding for agricultural research; a determination by funders to make research meet the needs of industry; enforcement of the user-pays principle; increasing demands for accountability; concern over fragmentation and duplication of research; increasing 'internationalisation' of research; changing community attitudes; and increasing complexity and cost of research. While it is not appropriate here to analyse these forces in detail, it is worth noting that they determine the current operating environment for research managers and for individual researchers. They underlie the trend towards reduced security of employment, caused by the need for employers to increase flexibility to shift scarce resources rapidly in response to the shifting sands of research priorities. This poses particular challenges for HR managers.

In response to these forces, there have been fundamental changes in Australia's agricultural research system since 1980. These include:

- the establishment of the rural industry research and development corporations,
- the development of other purchaser/provider models of various kinds,
- the creation of the Cooperative Research Centres,
- the frequent restructuring of research institutions,
- the commercialisation of agricultural extension,
- the protection of intellectual property, and
- alignment of research projects with Australia's National Research Priorities. These are:
  - An environmentally sustainable Australia,
  - Promoting and maintaining good health,
  - Frontier technologies for building and transforming Australia, and
  - Safeguarding Australia.

Numbers of agricultural and veterinary scientists

There is very little evidence, if any, that numbers of agricultural researchers (including researchers in the livestock industries) in the public sector have declined over the last 20 years. Some years ago, Leslie (1993) analysed the state of Australian support for agricultural research. His data showed no indication of reduced professional staffing in the public sector up to 1990, although the sources of funding for these staff were certainly changing. Between 1983 and 1990, on average, there were 3978 professionals (professional person years, including 1034 extension workers) in agricultural science. Approximately 59% of the personnel were in the State departments, 19% were in Commonwealth departments and agencies, and 22% were in tertiary institutions. Similarly, Alston *et al.* (1998, 1999) showed that investment in public-sector agricultural R&D in Australia had slackened off by 1980 after a long period of steady growth, but at least remained constant and perhaps even grew slowly in real terms until 1993. Private investment grew rapidly, especially in the decade to 1993. Spending on publicly-performed agricultural R&D was about $500 million in 1993.

Ten years later, the situation seems surprisingly robust. Gross expenditure on agricultural, veterinary and environmental sciences in 2000/01 was $1.11 billion (Department of Education, Science and Technology 2003), suggesting that investment in agricultural research had not declined in real terms and had probably risen. According to Radcliffe (2001), the number of people (full-time person years) in agricultural science in 1998/99 was 9542, including 726 in the business sector, 1552 in Commonwealth agencies, 4600 in State Departments and 2695 in the universities. The percentages of researchers in the State, Commonwealth and tertiary components (ie ignoring the private sector) were 52%, 18% and 30%, suggesting that investment by the States may have declined slightly in relative terms and investment by the universities may have increased. However, the figures are not directly comparable with those of Leslie (1993) and must be interpreted carefully.

Tertiary training statistics in agriculture and animal husbandry do not indicate a reduction in student numbers in recent years. In fact, according to statistics provided by the Department of Education, Science and Technology (1997), numbers of agriculture and animal husbandry students have risen from 6127 in 1983 to 7603 in 1988, 10,988 in 1997 and 12,137 in 1997. (Care must be taken in interpreting these figures too, because the categories may have changed with time - note also that approximately one third of these students in 1997 were non-degree students). In veterinary science, the numbers of students are more static: 1466 in 1983, 1494 in 1988, 1718 in 1993 and 1639 in 1997. Nonetheless, the figures do not indicate a reduction in the output of graduates.

In summary, the available data do not indicate a reduction in investment in agricultural R,D&E in the public sector, or a reduction in the workforce. What *is* changing is the nature of the investment, the extent of competitive funding, the sources of funds, the fields of research, and the incidence of tenured employment.

Against this background of continued investment in agricultural R&D in a rapidly changing operating environment, I will provide a personal perspective of 3 aspects of human resource management: workforce planning; building and managing teams; and performance management. I will also mention some new challenges.

WORKFORCE PLANNING

Like many research managers who have emerged from a background in hands-on research, I learnt about workforce planning the hard way, on the job, when my organisation was faced with a major staff reduction challenge. I was most fortunate to have the support of a gifted HR manager, Elizabeth Gordon, who understood the principles very well and helped me by sharing some of her wisdom. The HR plan she prepared for the CSIRO Division of Tropical Crops and Pastures in 1993 was a watershed in my understanding of research management, and I still refer to it.

Matching resources to objectives

Workforce planning has been defined as getting the right people, with the right skills, in the right jobs at the right time. It starts with strategic planning, when the organisation's future directions are established. The task then is to identify future skill requirements that will be required to achieve the mission or goals. If the mission and goals are to be achieved, organisational resources need to be aligned with the research priorities and delivery pathways. A key step is to analyse the existing

workforce in order to identify skills gaps and areas of excess research capacity. Staff self-assessment can help, but many staff over-claim competence in particular areas, particularly if they have never been exposed to a modern performance management system. Staff who have never received honest feedback on their performance find it particularly hard to assess their own capabilities.

A key lesson from workplace planning is that there are many ways to skin a cat. Often it is efficient to train an existing staff member to undertake a new task. However, not all skills must be owned by the organisation. Sometimes it is more efficient to 'buy in' the skills through contracting or outsourcing. At other times, skills can be 'borrowed' by forming strategic alliances with suitable partners. In these days of Cooperative Research Centres and other strategic alliances, this is well accepted, but a decade ago it was much less common for organisations to work together, particularly when industry funding regimes were forcing organisations to compete strongly.

Another lesson for organisations that have to cut staff numbers is to cut more than the bare minimum, in order to provide room for future growth.

BUILDING AND MANAGING TEAMS: BALANCING SKILLS

There is a vast literature on managing teams, and a growth industry in team management training. Since most scientific research is now conducted on a project basis, and since most projects involve more than one researcher, teams are an inevitable fact of life for agricultural researchers. Since I am not an expert on team management, I am at a disadvantage in writing about it, at least at a theoretical level. However, from half a lifetime of working together with others to achieve shared objectives, I offer a few personal observations.

Self-managing teams

First, I do not believe the view of some experts that teams are only created by research managers. In my experience, this is not so. Many are created by individuals who understand instinctively that it is necessary to create collaborative groups in order to achieve objectives. A typical example from my own experience was the development of the team that bred, tested and commercialised new, disease-resistant, aphid-resistant lucerne varieties for Queensland during the late 1970s and early 1980s. This team contained numerous researchers in Queensland (a plant breeder, an entomologist, a plant pathologist and several agronomists), 3 farmers from South Australia who were expert seed producers, South Australia's seed certification experts including a breeder who personally took responsibility for planting the foundation seed, a brave seed merchant in Queensland who purchased the entire first 2 years production from the South Australian seed growers, and at least 1 crucial extension worker who promoted the varieties in Queensland. The members of this team came from at least 3 scientific organisations (and 3 branches of 1 of these), the farming community and the private sector. This team was 'blessed' by management, who identified the first 3 researchers, but it then emerged almost spontaneously as the evolving workforce identified critical issues that had to be solved in order to achieve a shared outcome, and found the people to solve them. When the outcome had been achieved, the team dissolved as rapidly and smoothly as it had begun.

This was an extraordinarily effective team. Starting from scratch, it produced, evaluated and commercialised 2 new lucerne varieties within 8 years; indeed, cv Trifecta was in commercial hay production in farmers' fields 7 years after the first crosses were made (Clements *et al*. 1984). Looking back, it had many of the elements of today's holy grail of the 'self-managing team'. It had a very clear objective and a defined output; it was responsible for its own control and coordination - it set its own goals, work processes and schedules; membership was under the control of the team; leadership was shared; individuals were largely responsible for their own actions; the set of necessary skills evolved with time; and the team became extinct when the job was done.

Research organisations are built around 'stars'

Almost in contradiction to what I have just said, I think it is true that strategic and basic research organisations are built around a handful of 'stars' - individuals whose personal research capabilities are well above those of the rest of the organisation. These are the individuals who provide the creative spark – the critical intellectual insight that lifts and motivates the entire organisation. Most researchers are honest toilers, and they are essential to achieving project outcomes, but only a handful of researchers are truly creative. Teams that are built around 'stars' are quite different from the team I

have described above. For managers of strategic research organisations, the challenge is to acquire, retain, resource and direct these rare individuals. They can be extraordinarily difficult to manage - demanding, and sometimes arrogant. When they are lost, often the whole project team is intellectually rudderless and the work becomes repetitive and uninspired, and is eventually abandoned.

Research projects

After more than 30 years of working in, managing and funding research projects, I still wonder whether or not this is the most effective way of organising science. Many projects are artificial constructs that are designed for organisational and reporting purposes. These artificial projects often do not have time-bound objectives, or stop/go milestones or decision points. Instead, they are created in order to provide long-term homes for staff. Sometimes these projects provide service activities which really do not belong in project mode at all. Often members of such projects are engaged in 1 or more smaller, shorter-term, externally-funded projects, or are marking time until the next big project comes along, or until they are retrenched.

PERFORMANCE MANAGEMENT

Fitting people to jobs: Myers-Briggs personality types

Many of us are familiar with so-called personality types, such as those defined by Myers and Briggs in their Myers-Briggs Type Indicator (MBTI). The MBTI identifies 16 personality types, and I'm sure many people in the audience have been through the exercise of determining their Myers-Briggs personality type.

I will not go through the details of the Myers-Briggs classification, but it is helpful to recognise that many scientists fall into a single category, the INTJ group; indeed, this group is sometimes called 'the scientists'. It is interesting to read some of the characteristics of this group (my quotations are from The Personality Page; BSM Consulting 2004). They are "able to absorb extremely complex theoretical material; love difficult theoretical challenges; are bored when dealing with mundane routine; value knowledge and efficiency; have no patience with inefficiency and confusion; have very high standards of performance, and apply them most strongly to themselves; are reserved and detached from others, extremely logical and rational; work alone, and prefer to work alone".

Does this sound like someone you know?

A small, but significant, group of scientists falls into the ISTJ group. This group has many things in common with the INTJ group (e.g. a profound respect for facts, and very high standards of performance that they apply most strongly to themselves). However, they have some other characteristics. They "possess a vast, rich inner store of facts which they rely on to understand problems which they encounter in their lives; appreciate structured, orderly environments; dislike change, and value tradition, security and peaceful living; make decisions objectively, applying logic and rational thinking; have strong opinions about the way things should be done; and are not naturally in tune with other peoples feelings". Perseverance is a very strong personality trait. A very strong ISTJ can play absolute havoc in a team.

Some scientists are INTPs. The INTP scientists are "driven to build knowledge; love new ideas; seem dreamy or distant; hate to work on routine things; do not like to lead or control people; are usually not in tune with how people are feeling; and are very independent, unconventional and original". The INTP is "at his best when he can work on his theories independently." I have known a few INTP scientists, including some at senior management level, where they often drive their teams to distraction because of their inability to make decisions or sense what is important to the group.

Without wishing to over-emphasise the value of personality indicators, I want to make a few points about MBTI personality types. First, you will have noticed that neither INTJs nor ISTJs (and hence, most scientists) are natural team members. Since research these days is increasingly organised in teams, this poses an interesting challenge to research managers. Second, when teams are composed of managers themselves (as, for example, in the higher-level teams in large public organisations), it should not be assumed automatically that such teams of managers will be functional. Teams often require a combination of personality types, and teams without such diversity may be dysfunctional. Third, in my experience, people who are not natural decision-makers are often disastrous as research

managers. One of the features of a good research manager is the ability to weigh up the options, often in an environment of ambiguity or information shortage, make a decision and move on.

Lifting performance
Performance management is very big these days. As resources and expectations get tighter and milestones get tougher, every person on the team needs to perform at a high level. The inadequacies of 1 team member are felt all along the chain.

A wise consultant from the private sector once told me how to get people to do a good job. First, they have to know what the job actually is. If they don't know what the job is, it's likely that they won't do it well. A surprising number of employees don't fully understand what their job is. Second, they have to have the right skills. If some key skills are lacking, training is required to plug the gaps. Third, they need to have the right resources. In the case of scientists, this means not only the scientific equipment and other operational resources, but also a supportive managerial and administrative environment. If they are battling the apathy (or downright antagonism) of their boss, or if bureaucracy is stifling creativity, they won't perform well even if they know what the job is and have the right skills and equipment. And finally, the job has to meet their personal values and aspirations. This is another way of saying that if an employee's heart is not in the job, he won't do it well.

These 4 requirements for high performance are so obvious that they are practically self-evident, yet it is surprising how many people in science do not know what their job really is, or how many lack the skills or resources to do the job well. Every performance agreement should start with a shared view of what the job is about and an honest assessment of the skills of the person for the job. At the other end, every good boss should be trying to help the staff to achieve their career aspirations, using the argument that a motivated employee will usually do better than a non-motivated 1.

Delegating
A manager who cannot delegate is doomed to do the jobs of his staff for them, and is, therefore, sure not to do his own job as well as it should be done. Managers who can't delegate tasks to others usually don't have time to do what is truly important in their own jobs. Of course, when jobs are delegated, there is a risk that they won't be done properly. Managers must be willing to let people fail in order that they can learn. Failure is a great teacher!

Balanced against this need to delegate, there are some tasks that simply must be done properly. In a research organisation, I would say that areas where failure is not permitted include financial reporting, other accountability requirements of governments, and some aspects of staff administration (e.g. salary payments).

NEW CHALLENGES

Here I would like to comment briefly on some new or emerging HR management challenges.

Workplace bargaining
Of all the HR management changes that have occurred in my time, the requirement of management to negotiate workplace agreements with staff is the most unpleasant. Terms and conditions of employment, including personal remuneration, are extraordinarily sensitive. Negotiating them requires knowledge of relevant legislation that is outside the experience of most managers and staff, and often outside the experience and competence of HR personnel. Workplace bargaining has the capacity to divide staff and management, and I think the potential benefits are probably modest.

Information and communication technology
A revolution in information technology is under way, and it has significant implications for managing human resources. One element of this is mobile telephone technology. My first introduction to the power of this was in 1993, when the sowing of a major field experiment at the relatively remote Narayen Research Station (situated 70 km SW of Mundubbera, Queensland) was monitored and managed by mobile telephone from the grounds of Massey University, New Zealand, at intervals during the International Grassland Congress. Just a few weeks ago, I participated in a 5-way telephone conference involving other participants in New York, Lincoln (Nebraska, USA), Beijing (China) and Freetown (Sierra Leone); at the time, I was communicating by mobile phone in a taxicab

travelling 20 kilometres across Brisbane. Examples like these are now commonplace, and many organisations now communicate routinely using audiovisual linkages.

However, the truly remarkable revolution of course is in internet communication. Almost 1 in every 10 people on the planet now has access to the internet. In Australia at present, more than half of Australian households have internet access (Australian Bureau of Statistics, 2003; Caslon Analytics 2003), and 8.4 million people (three quarters of the adult population) are active internet users. This includes 43% of Australian farmers - more than 4 times as many as in 1998 (Australian Bureau of Statistics 2004). Only a small handful of countries (Sweden, the USA and perhaps the Netherlands) are more avid users of the internet than Australia.

According to 1 estimate, the average American email user receives about 12 messages per day, sends 6 messages per day, checks his email once or twice per day, and spends 7-8 hours per week online (Caslon Analytics 2004). In another analysis of people who use email on the job (so-called work emailers; Fallows 2002), it was found that 60% of work emailers receive 10 or fewer messages per day, 78% send 10 or fewer messages, and 73% spend 1 hour or less per day on email. I have seen no similar analysis for Australian users, but they may be assumed to behave similarly. These analyses do not categorise people by professions, so the daily email volume of a typical agricultural researcher is not clear. Fallows (2002) refers to a category of email user she calls 'power emailers' - college-educated professionals, managers and executives who typically handle more than 30 messages per day. I suspect that both in the USA and Australia, typical members of the agricultural research community would fall into this category. My own level is in this range. In a spirit of scientific enquiry, from time to time I have checked my email speed, and discovered that I can answer about 15 messages per hour. Thus, I spend about a quarter of my working day handling email.

Let me make a few quick points about some HR implications of the email revolution. First, in view of the amount of time that agricultural researchers devote to managing email, its management deserves much greater attention. Organisations are beginning to implement email policies and practices, with varying effectiveness. One issue here is the amount of tension and conflict that is created between busy people by careless use of words or the sending of inappropriate messages. Second, since 40% of all email in 2003 was categorised as junk mail or 'spam' (Spam Filter Review 2004), the filtering of unwanted messages is a significant challenge. Third, the high risk of infection of electronic records by computer viruses poses a particular threat to small organisations and independent operators. Fourth, since email messages using Australian government systems are considered to be official records, they must be managed accordingly, and proper records management systems must be implemented. This can be a source of very great friction and stress. Finally, the benefits of email to a 'virtual', or geographically dispersed, organisation are particularly notable.

Social capital

I am indebted to Rob Cramb (2004) for his paper on social capital and, in particular, for bringing to my attention the importance of balancing 'bonding' and 'bridging' social capital. There are several definitions of social capital, which is generally understood to be the social framework – e.g. the norms, networks, trust, shared information - that enables people to act collectively to achieve shared objectives. The social group is the reference unit, but "individuals … can invest in and appropriate the benefits" (Cramb 2004). Thus, individuals can possess social capital, which is often equated with networks and/or social status.

Bonding social capital is that which is *embedded* within a community; it is the internal social framework that allows communities to care for their members and survive as social units. Bridging social capital is the *extra-community* framework (e.g. networks) that enables individuals to gain information and resources from outside the community, with subsequent benefits to the community as a whole. A group that has a large amount of bonding social capital and very little bridging social capital may struggle to change beneficially.

Cramb (2004) applied his analysis to the adoption of Landcare technologies in the Philippines, and discovered that bridging social capital was more important than belonging to a Landcare group (partly because the community already had high levels of bonding social capital). However, it seems to me that there is a fertile field awaiting the brave socio-economist willing to apply this theory to research

organisations. In my career, I have observed a number of research organisations, including possibly 1 Cooperative Research Centre, that have appeared to possess a large amount of bonding social capital, but not enough bridging social capital to allow change to proceed smoothly. Conversely, I have observed another CRC that has an extraordinary level of bridging social capital, and not much bonding social capital. Indeed, while a high level of bridging social capital may contribute to the success of the CRCs, many CRCs may suffer from a lack of bonding social capital. Does this contribute to the high transaction costs of managing a CRC? It is a fascinating thought.

ACKNOWLEDGMENTS

I am grateful to Ms Elizabeth Gordon for helpful comments on this paper, but I absolve her from responsibility for the opinions expressed and from any errors or omissions.

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