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For Love not money: Insights on the Career Choice of Early-Career Agricultural Scientists



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Abstract There is concern about the declining number and quality of people entering careers in agricultural science, a situation which may reduce the human capacity to support agricultural industries in the future. The perceptions and experiences of some early career agricultural scientists may provide some insights into how the appeal of a career in agricultural science might be improved. We surveyed 24 early-career agricultural scientists to investigate why they chose to study agricultural science, and their perceptions of the advantages and disadvantages of that choice. Four main reasons for pursuing a career in agricultural science were given by respondents: a connection with agriculture (80%); an interest in science and learning (68%); the real-world applications of job possibilities (35%); and lifestyle benefits (30%). The main disadvantages were perceived to be: low pay (64%); the lack of continuity in the career path (50%); and tenure or job security (36%). The main advantages of the career choice included job satisfaction and flexibility, personal satisfaction, diversity of work opportunities, and an agreeable lifestyle. This research indicates that people working in agriculture generally chose to do so for personal satisfaction rather than remuneration. However, the results do raise issues of job security and continuity, which may deter some from either entering or continuing a career in agricultural science. Improving the appeal of agricultural science as a career seems to depend on creating greater awareness among rural school leavers and their advisors about what agricultural science involves as a profession. Moreover, providing greater continuity and clarity of career path is also likely to contribute to its appeal. Universities, professional organisations, and research and development agencies all have a stake in helping to achieve this.

Introduction

The demand to study agriculture at universities across Australia has been in decline since the early 1990s. Some commentators believe that the resulting shortage of agricultural scientists is compromising the agriculture's present and future capacity to supply a trained workforce to meet its needs (Pratley 2008). The trend is thought to be associated with a general decline in demand for science subjects, as well as with the poor perception of agriculture in the wider community (Falvey 1998). Some universities have responded with strategies aimed at broadening the public appeal, such as the introduction by agriculture faculties of courses in natural resource management and environmental science. While the National Report on Higher Education in Australia (2001) shows that the total number of agriculture students has increased by 13% over the previous 9 years, this figure includes enrolments in the non-professional tertiary courses available at TAFE colleges (Falvey 1998). More recent and precise statistics from the Australian Council of Deans of Agriculture suggest that the decline is continuing, with 18% fewer graduates enrolled in agricultural degrees at Australian universities between 2001 and 2006 (Pratley and Copeland 2008; Pratley and Leigh 2008).

Although traditional agricultural science courses do attract a number of very high calibre students, course quotas must still be filled by lowering entry requirements (Falvey 1998). This raises the question of what can be done to attract students with high to very high tertiary entrance rankings to choose agricultural science degrees over other options such as engineering, accounting, business or law? For those few who choose agriculture, society confers only limited prestige on the career, and there is limited understanding of the profession in the wider community (Falvey 1998). Finally, stable and secure employment is the most important factor in career choice, and agricultural careers rate very low in this regard (Cecchetti *et al.* 1992). Overall, this situation hardly seems conducive to attracting and retaining the best and brightest to agriculture.

Several studies have demonstrated that experience of agriculture has a strong influence on the selection of an agricultural degree. In particular, high school agriculture courses create a positive attitude towards agricultural careers (Thompson and Russell 1993; Dyer *et al.* 1996). However, there is generally a negative perception of agricultural careers amongst high school students in Australia, and a lack of awareness about the range of career opportunities (Cecchetti *et al.* 1992; Matthews and Falvey 1999).

This evidence suggests that, in order to understand how to improve the appeal of agriculture, information about the choices made by those who have decided to pursue a career in agricultural science would be valuable. What motivated their choice and what are their views regarding the consequences of that choice? The research reported here sought to shed some light on

these questions by conducting a survey of early-career agricultural scientists. The results suggest that the profession offers great personal satisfaction despite lower remuneration, but the lack of job continuity and security diminishes its appeal.

Materials and Methods

The survey was conducted during June and July 2006. The target population was agricultural science graduates under 36 years of age at the time who were working in or had worked in agricultural research and development in Australia. Fifty surveys were distributed by email to graduates who matched these criteria. A 'snowball' sampling process was employed to distribute the survey across a wider range of networks. Twenty-four responses were received (response rate of 48%), with all Australian States and a wide range of roles and employers represented. A pilot survey was tested prior to survey distribution to ensure that the questions were clear and easily interpreted. The questionnaire consisted of three parts. Part 1 included questions on demographic information. Part 2 asked three open-ended questions which sought respondents' perspectives on a) the reasons why they had chosen agriculture as a career, and (b) what they felt were the advantages of the profession, and (c) what they felt were the disadvantages of the profession. This approach allowed for a diversity of answers and opinions to be expressed, which were categorised into common themes through qualitative data analysis. Questions in Part 3 were designed to explore particular elements of agricultural career in more detail in order to provide supporting evidence for the answers provided in Part 2. Issues considered included pay/remuneration, public recognition of their work, job security, support and training, and overall job satisfaction. This section included a diversity of questions that required responses along a five-point Likert scale (1-very low to 5-very high), as well as questions that required a yes/no/unsure response.

Demographics of Respondents

The average age of the respondents was 28 years and they comprised 70% male ($n=17$) and 30% female ($n=7$) (Table 2). All had completed a bachelor level degree in science, with 75% in Agricultural Science, and the remainder in Biological or Environmental Science (17%) or Agribusiness (8%). Just over 35% of respondents had completed or were undertaking postgraduate studies. Over half of the graduates (58%) had grown up on a farm, while 17% were raised in a rural town and 25% from an urban environment. All respondents had some prior experience in agriculture before commencing their university education. Workplace experience ranged from 2 to 13 years, with most currently employed by universities and state governments (Table 2). Over 50% of respondents were employed on short-term contracts of between 6 months and 3 years in length. The target of the survey was agricultural scientists who had worked



in research and development and hence the majority of respondents were currently employed by government and universities. Notably the agribusiness and service sector was underrepresented relative to its employment of professional agriculture graduates.

Table 1. Summary of the demographics of survey respondents (n = 24)

Age	%	Employer	%	Industry focus	%
≥25	20	State government	42	Grains	42
26-30	63	Federal government	8	Livestock/Pasture	29
31-35	17	University	38	Mixed systems	8
		Consultant/Farm group	8	Sugar	4
		Banking	4	Economics	4

Results

Reasons for Pursuing a Career in Agricultural Science

Four main themes emerged from the qualitative analysis of responses to Part B, which asked what had motivated respondents to pursue a career in agricultural science. Firstly, over 80% mentioned a connection with agriculture, and the wish to contribute to future environmental or production improvements in the sector. Those who did not express an attachment to agriculture arrived in the profession by more serendipitous means; mostly after redirecting their interests, or in response to recommendations from friends or family. Secondly, almost 70% of the respondents were interested in science and the potential for continual learning in the profession. Thirdly, over 35% of people liked the real-world applications of agricultural science and the feeling that they were benefiting others. And fourthly, 30% considered that lifestyle was also important, in particular working outdoors and /or living in rural communities. Two examples quoted below typify the main reasons mentioned for pursuing a career in agriculture: *‘I grew up on a farm and enjoyed maths and science subjects at school so felt drawn to a career in the agricultural or natural sciences’*; and *‘A career in agricultural science offered both the mental stimulation I needed and the self-satisfaction of contributing to something real and worthwhile’*.

Perceived advantages of agricultural science careers

Although a wide range of advantages of a career in agriculture were provided by respondents, most related to issues of personal fulfilment and job satisfaction. The main rewards mentioned were: an opportunity to contribute to knowledge; helping people and the environment; collaborating with diverse range of people (from farmers to other professionals); and the ability to pursue your own interests. Interestingly, 100% of respondents felt their work was making a positive contribution, indicating general satisfaction with their job. For example, on respondent said *‘I could have equally pursued other areas of plant science, but was attracted to agricultural science...because I felt my input would make a difference’*. Job satisfaction was also the most important factor in career choices (Fig. 1). This exceeded issues of pay, funding opportunities and job security.

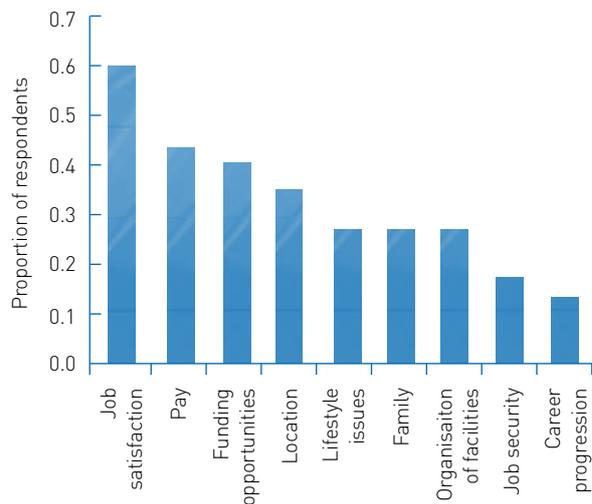


Figure 1. Job satisfaction was the most important factor influencing career choices of early-career agricultural scientists, exceeding issues of pay, funding opportunities and job security.

Several other advantages mentioned were: the diversity of work and the range of opportunities available; the lifestyle offered in the profession; job flexibility; and opportunities to travel. Examples of these perceived advantages include, *‘You have enough office work to keep your head busy and enough technical work to keep the hands busy’* and *‘Agriculture provides an incredibly diverse range of options in early career and ... allowed me to be very flexible with my career choice, changing focus from soil science to economics without altering my degree’*.

Perceived Disadvantages of Agricultural Science Careers

The main disadvantages of perceived by early career agricultural scientists were remuneration and lack

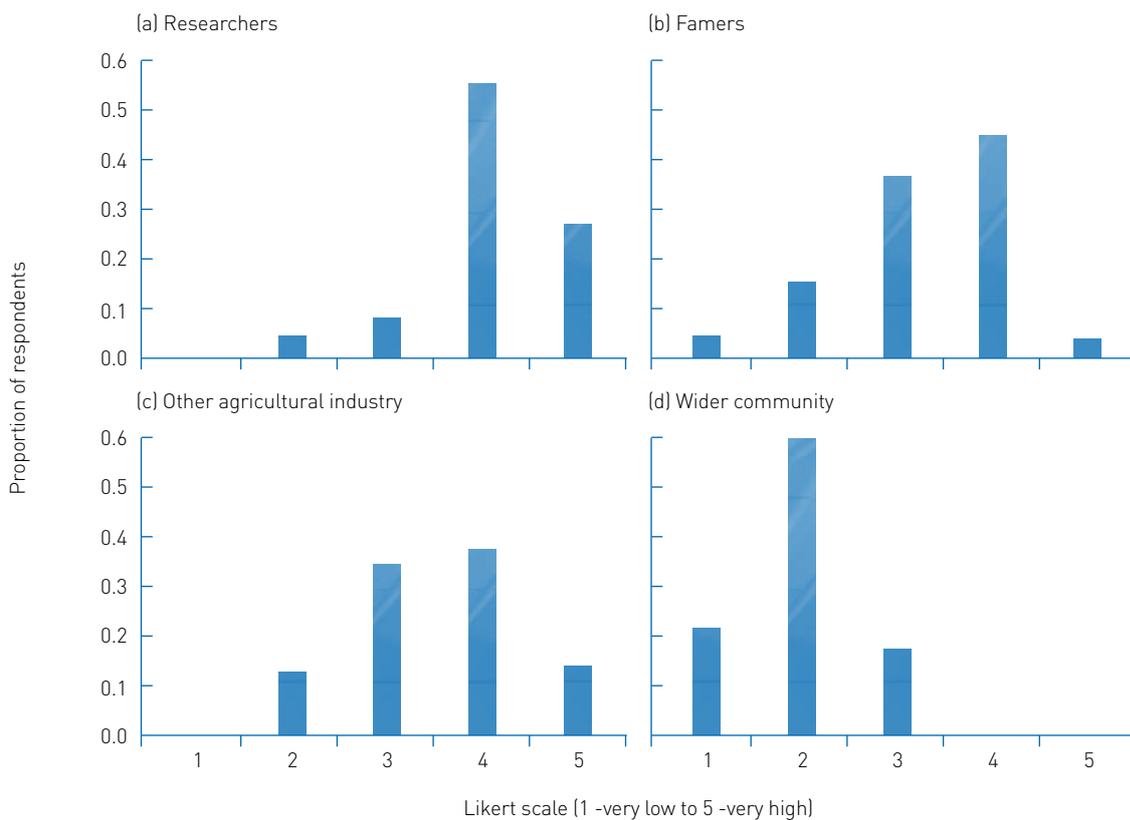


Figure 2. Perceptions of early-career scientists on how well the contributions of agricultural research is recognised by (a) fellow researchers, (b) farmers, (c) other agricultural industry and (d) the wider community.

of job continuity and security (Table 2). Over 60% of respondents felt that the pay rate was a significant disadvantage in agriculture, especially compared to other fields of employment. For example, comments such as “Agriculture has a low pay scale compared to jobs that require less skilled education and training i.e. mining, building sector” were common. When asked more specifically, the majority of respondents felt that pay for agricultural professionals compared favourably with teachers (58%), but not well compared to accountants (21%) and engineers (4%). Despite these comments, most graduates (78%) considered their salary to be satisfactory or more than satisfactory (3 or 4 on the Likert scale).

A second major issue, raised by 50% of respondents, was the lack of continuity in both industry funding and tenure of employment (Table 2). In particular, graduates raised concerns about the difficulties associated with developing and sustaining a career when employment was often offered on a contract basis, and when industry funding directions are continually changing. One respondent considered ‘this [to be] a more difficult and less predictable environment to develop and sustain areas of research’. Greater than 50% of respondents answered that contract length was likely to affect their career choices and a number had considered, or would consider, leaving the industry if they continued to be

employed on contracts. For example, one response was; ‘If my employment was changed from permanent to contract of less than 3-5 years in length, then I would seriously consider changing employer or leaving the industry.’ Another response showed that contract employment had changed the career aspirations of some; ‘You cannot do research in an organisation on a long-term basis on contract, that is why I left research and took up a permanent position with a bank.’ Meanwhile, some respondents had a more positive attitude towards contract-based employment. For example, ‘Being on contract means that you evaluate your career far more often than you would otherwise and you are more open to radical ideas of career change’ and, ‘Ending a contract can force you to look at other options and often leads to better pay.’

Responses also show two other potentially important disadvantages of careers in agriculture (Table 2). Firstly, the location of work is often outside metropolitan areas, which can limit career opportunities for partners, increase the cost of living, and limit access to education and other facilities. However, a rural location was an advantage for some. Secondly, female respondents noted that the career is still very male-dominated, and women’s career can be substantially impacted by family obligations and the continued existence of a ‘boys club’.





Discussion

Three issues emerged as pivotal in the career choices of these young agricultural scientists: (a) previous awareness and experience of agriculture and (b) an expectation that job satisfaction and personal fulfilment would be offered by the profession were significant for students deciding to study agriculture at university; but (c) a lack of continuity and security of employment as a major negative.

As in other studies, we found that experience of agriculture greatly influenced intentions to study the field at university (Hoover and Scanlon 1991b; Matthews and Falvey 1999; Osborne and Dyer 2000). It was evident that a small proportion of graduates in this study came from non-rural or urban backgrounds. Those that did either had friends or family in agriculture and/or had completed agriculture subjects at school. This suggests that few people from non-agricultural backgrounds take up roles in agricultural science. Thus, to at least maintain current enrolments it is essential that rural schools be an important component of student recruitment programs. As part of such programs, tertiary education institutions could encourage greater understanding and awareness of the diversity and benefits of agriculture as a career amongst teachers and advisors in rural areas.

Most graduates surveyed in the present study also felt that the public perception of agriculture was negative and that the contribution of agricultural science was poorly recognised in the wider community (Fig. 2). Supporting this, Cecchetti *et al.* (1992) and Matthews and Falvey (1999) found that there was a negative perception and a lack of awareness of agricultural careers amongst urban children in Australia. Contrary to this, in Illinois, US, parents, counsellors and students in large urban communities were shown to have favourable views of agricultural careers and the authors considered this to be a potential growth area for agricultural education (Thompson and Russell 1993). In Australia too, ways of attracting students from non-farming backgrounds need to be considered, as the pool of students with a connection to agriculture is ever decreasing.

Table 2. Main career disadvantages perceived by early career agricultural scientists were remuneration and lack of job continuity and security.

Main issues mentioned	% of respondents
Remuneration	64
Lack of job/funding continuity	50
Job security and contract arrangements	36
Location issues	18
Gender issues	9
High work load	9

To attract students from a diverse range of backgrounds, mechanisms that increase awareness of agriculture and promote the range of opportunities and positive attributes of the career are needed (Pratley 2008). First, raising the profile of agriculture and agricultural research and development in the media would increase awareness of the careers in the sector. Images and perceptions of the general public need to be changed. It is our opinion that too many people perceive agriculture to be synonymous with 'farming' and that few perceive agriculture as a legitimate land use which supports a diverse food and fibre production, processing and distribution system of a global nature. We need to assist people to develop more comprehensive perceptions relative to agriculture and the role agricultural scientists have and continue to play in meeting emerging threats and opportunities. Second, some studies have shown that agricultural courses taken at high school greatly increase interest in agricultural careers (Dyer *et al.* 1996). Similarly, there would be benefits in incorporating practical agricultural examples in basic science courses like biology, chemistry and physics. Third, we should not neglect educating teachers, guidance counsellors and parents about the virtues of agriculture as a career, as they greatly influence the decisions of students when selecting university courses, and in particular those in rural areas (Hoover and Scanlon 1991a; Osborne and Dyer 2000).

Our own personal experiences, as early-career agricultural graduates, suggest that most teachers, even in rural communities, have a poor understanding of the diverse range of agricultural careers available. When electing agricultural science as our preferred university option we were both actively dissuaded by many teachers from this choice. We were told that we should set our goals higher and do something more challenging than "just becoming a farmer". We still find this an amazing attitude and this demonstrates the lack of appreciation of agriculture science as a desirable career option. Finally, the features of agricultural careers such as job satisfaction, diversity of activities, real-world applications, stimulation and opportunities to travel need to be maintained and promoted.

Despite the opportunities to enhance and promote the positive attributes of agricultural professions, lower remuneration compared to many other professions, job security and continuity are very real issues that not only deter students but also prompt existing workers to leave the industry. A previous study of Australian high school students found that a stable and secure future were the most important factors in their choice of career (Cecchetti *et al.* 1992). Yet these same students did not consider a career in agriculture to rank well in this area. Interestingly, but not surprisingly, these perceptions were shared by the early-career agriculturalists surveyed here. Most respondents agreed that unreliability of external industry funding and reliance on contract employment is a major disincentive to pursue an agricultural research career. Some respondents had already left or felt they would be compelled to leave the industry if they continued to be employed under short-term contract arrangements. Particularly affected are the industry's young people, who do not have the experience or reputation to secure their own funding or a longer-term commitment from their employer.

In agricultural research and academia in particular, there are often significant risks and financial sacrifices in pursuing this career choice. In the present study, over 35% of respondents had undertaken postgraduate studies, mostly PhDs, and this high level of education is now almost obligatory to progress in research roles. Despite the presence of stipends, a significantly lower income is typically received over the 3-4 years it takes to complete a PhD, which may or may not be recouped subsequently (Pratley 2008). Upon completion, most postdoctoral positions are for contracts between 1 and 3 years with only a few hotly contested positions with longer tenure available. In this environment there is also significant pressure, and effort required, to attract funding and this compromises the time available to them to conduct the satisfying aspects of science and publish research findings (an increasingly prominent criterion required for career progression). Without continued support to pursue research it is also difficult to build a career and track record around a particular theme. In some cases, obtaining postgraduate training can also leave graduates overqualified to fill many positions. Thus, there are limited incentives for agricultural graduates to pursue further study required for an agricultural research career.

One of the major flaws of the current situation in agriculture is the unclear and discontinuous career path. In other professions such as medicine, accounting, teaching and engineering the career path is more apparent and perceptible to students. In agriculture, improvements in the awareness of possible or likely career paths would greatly reduce much uncertainty among students about the jobs they could expect on obtaining a degree in agriculture. Furthermore, funding agencies and major employers, such as government departments and universities, should be aware of the messages that their employment arrangements are sending to prospective and early career agriculturalists. If the industry is to continue to attract and maintain the desired expertise, significant improvements in job security and continuity are paramount.

Conclusion

The results of this study demonstrate that a desire to improve agriculture and an expectation of personal satisfaction were clearly major influences on those who chose agricultural science as a career. If the appeal of careers in agricultural science is improved then several approaches should be useful. Firstly, promoting greater awareness and recognition of the profession in the wider community and ensure levels of remuneration are comparable to other equally qualified professions. Secondly, promote features of the profession such as the personal satisfaction, contribution to society, diversity of work and the range of work opportunities available. Thirdly, improve the clarity of career path by improving job security and continuity. If the agricultural and the wider community wish to maintain a quality educated workforce to address current and emerging issues facing agriculture today and into the future then a coordinated systematic and supported program is needed.

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