

## YEAR 10 STUDENTS' PERCEPTIONS OF AGRICULTURAL CAREERS: VICTORIA (AUSTRALIA)

Ms. Bernadette Matthews  
Institute of Land and Food Resources  
The University of Melbourne  
Melbourne, Australia

Professor Lindsay Falvey  
Dean and CEO  
Institute of Land and Food Resources  
The University of Melbourne  
Melbourne, Australia

### Abstract

This study was conducted to assess the knowledge and perceptions of metropolitan and non-metropolitan Year 10 students in the Australian state of Victoria, concerning careers in agricultural and environmental fields. A survey of 550 Year 10 students was undertaken to determine factors involved in decision making: about careers by high school students, the knowledge of such students about careers available in agricultural science; and whether the perceptions of students about agriculture affect decisions to undertake university study in agriculture and related fields. The study showed that a greater number of non-metropolitan students had considered a career in agriculture than metropolitan students. It was also found that the most important influence on student knowledge about agricultural careers came from parents, school, and the media; that overall student knowledge of the various careers available to graduates of agricultural science was limited, and, where such knowledge existed, it was biased by misconceptions of the role and activities of agricultural scientists. Furthermore, students were interested in high paying careers, yet did not consider that agriculture offered these.

### Introduction

The number of students enrolling in agricultural and related tertiary courses in Australia has increased over the past decade. The percentage growth in graduates in agriculture from 1981-1990 was 40%; however, in comparison, the increase in areas such as health, business and economics, and law were over 100% (Elliot, 1995). The selection system for universities in Australia is based on Year 12 students prioritizing courses and being granted admittance to a course and institution on the basis of their school results. The number of students choosing agriculture as their first preference has decreased over this same time (VTAC, 1996).

Falling numbers of students with high academic results has seen institutions reduce their minimum entry scores in order to attract sufficient student numbers (McColl, 1991; Monteith & Field, 1995). Negative community

attitudes concerning agriculture's affect on the environment are also considered to be one of the influences on the number of students opting to study agriculture and related areas (Monteith & Field, 1995; Wilkins, 1995).

The public image of agriculture in the United States is that of farming (Meyer, 1992) which is seen as destructive of the natural environment. In Australia, the negative image of agriculture held by the largely urban-based community is reflected in the general press (Monteith & Field, 1995). Destruction of the environment, floods, drought, and bankruptcy, are typical of images portrayed in the media (Wilkins, 1995).

Problems of land degradation and pollution amongst other environmental damage caused by previous agricultural practices have, understandably created a poor image of agriculturalists. According to many connected with agriculture and related areas a common perception amongst the public at large is that

agricultural and related education is a training ground for individuals who, by working in agriculture, are somehow likely to have negative impacts on the environment.

According to Wilkins (1995) community concerns lie in the areas of environment, animal welfare, and food safety along with biotechnology and rural infrastructure decline. Such concerns are not unfounded considering the past record of agricultural practices, particularly the areas of land degradation and overgrazing which continue. While farmers are making concerted efforts to rectify such problems, it is perhaps understandable for the community to retain a negative view of the industry.

The portrayal of the embattled farmer by media releases showing remediation of salination and stream eutrophication aim to create a sympathetic view towards farmers. However, they do not display agriculture as being a dynamic, socially and environmentally responsible, profitable industry. A more profitable agriculture may therefore be viewed as a more environmentally robust production system. Furthermore, greater publicity concerning improved farming practices for example in irrigation and usage of particular chemicals would also help foster a more positive public image of farmers as responsible caretakers of the land.

It would assist agriculture for more students in total, including more academic high-achieving students, to be attracted to study agriculture, concurrent with a better informed urban community on agriculture and its related economic benefits and the ways resources are used and conserved. If students do possess a negative image of agriculture, it is suggested that improving the image of agriculture in the community would be one step towards improving the number of student enrollments in agriculture and related areas. An improved image focusing on better farming practices and research and development in agriculture would serve to increase the profile of agriculture, along with careers available in agriculture and related areas, thus helping improve student enrollment.

The general decline in rural populations has led to an increased proportion of students from urban areas entering college and university courses related to agriculture. The opinions of these students toward agriculture are influenced by negative media coverage which is likely to contribute to the declining numbers of students choosing careers in agriculture (Mallory and Sommer, 1986).

In a survey of Western Australian university students' choices, agriculture was ranked below engineering, economics, environmental science, and science, in terms of perceived job prospects, and nearly 80 % of students had not considered agriculture as a field of study (UWA, 1996). A related study indicated that, while students claimed they chose university courses on the basis of career prospects, academic results, interest, prerequisites and flexibility, their school teachers believed that a student's academic score was the primary determinant of their course of study. A study of new entrants to courses related to agriculture, forestry and natural resource management at the University of Melbourne suggested that the reputation of an institution exceeds the importance of course content in student choice of an institution.

A study of school students in Canberra conducted as a comparison with USA secondary students indicated that negative perceptions of agriculture were less prevalent in the Canberra sample (Mallory and Sommer, 1986). Canberra students taking agricultural courses in Years 9 and 10 showed a higher interest in agricultural careers than their peers in schools without such programs. The study recommended more agricultural programs in later high school years, improved media presentations of agriculture and careers, greater student contact with agriculture, and a focus on students before Year 11 (Cecchetti, Sommer and Leising, 1991).

Most studies of Australian student choices concerning agricultural and related subjects have concentrated on students in Years 11 and 12, or at a tertiary level (Falvey, 1997). This study, therefore, investigated student perceptions and factors influencing career choice at Year 10 level, which is when students make their first subject selections limiting future choices about fields of study.

### **Purpose of Study**

The purpose of this study was to investigate students' knowledge of agriculture and careers, factors important in career choices, students attitudes to agriculture, and opinions about major environmental issues and the role agriculture plays in the environment.

The main objectives of the study were to determine:

1. Students= knowledge sources about agriculture and careers in agriculture.
2. Factors students consider important when choosing a career and whether they consider that agriculture would meet these factors/needs.
3. Students= knowledge of agriculture and the careers available by studying a degree of agricultural science.
4. Attitudes of students toward agriculture and the study of agriculture and whether those with a greater knowledge of agriculture would be more inclined to pursue a career in that area.
5. What students consider to be the major environmental concerns of today and whether they perceive agriculture as having a positive or negative influence on the environment.

### **Methodology**

A mail-out questionnaire, following procedures by Dillman (1978) achieved a significantly large sample size. A total of 564 questionnaires were sent out and a 97.5% response rate was received. A trial survey was administered initially to 20 Year 10 students from a metropolitan secondary school in Melbourne. The results from the trial were used to amend the survey. Changes to layout and in particular the wording of one question were made for easier interpretation of questions.

An optimum sample size of 400 was chosen using the simple random sampling method (Levy & Lemeshow, 1991). The population was first divided proportionately on the basis of metropolitan and non-metropolitan areas. Schools were further divided into Government, Independent and Catholic according to State Government definitions (Directorate of School Education, 1995). Once separated into categories, each school was numbered alphabetically and using random numbers generated from the Minitab computer program the schools were selected. Of the schools selected, each one was sent a letter addressed to the Science Coordinator asking if they would participate by administering the survey to one class of Year 10 students with a minimum 25-30 students required from each school, this being the size of approximately one class. Twice as many schools as required for the optimum sample size were contacted.

The survey was handed out during a class and completed in approximately 10-15 minutes. Forms were not to be completed at home as one of the objectives of the survey was to test the knowledge of the students of different areas of agriculture.

A total of seven questions were asked. These focused on:

- whether students had previously considered a career in agriculture
- factors influencing their knowledge of careers in agriculture
- importance of certain factors in their career decision making
- extent to which the same factors were considered to apply to a career in agriculture
- knowledge of various listed careers available in agricultural science
- whether students wished to pursue the same listed careers available in agricultural science
- perceived importance of environmental issues and perceived affect of agriculture on these same environmental issues

The multiple categories used for questions throughout the survey were developed from related studies (Mallory & Sommer, 1986; Reis & Kahler, 1995; UWA, 1995). Careers in agricultural science were selected from the 1996 Australian Institute of Agricultural Science careers guide to agri-industry supplemented with suggestions from persons engaged in relevant fields. The word 'agricultural' was not included when listing careers such as an agricultural consultant, agricultural economist, or agricultural engineer to reduce bias. Current environmental issues were selected from Connolly and Keohane (1996), and supplemented by opinions of peers.

A five point, Likert scale was used for questions concerning factors influencing career choices, and issues relating to careers and the environment. Respondents were asked to circle their preferred response with 1 being 'not important' and 5 'extremely important' or 1 being 'does not apply' and 5 'definitely applies.' For the question regarding the effect of agriculture on the environment, 1 equaled 'negative effect' and 5 equaled 'positive effect.' For the purposes of analysis responses 1 and 2 were combined into one category, 3 in a separate category (being 'neutral' or 'undecided') and 4 and 5 were also combined

into another category.

Frequencies, percentages, medians and chi-square tests were calculated by the programs. Differences between metropolitan and non-metropolitan student responses were considered significant at  $p < 0.05$ .

## Results

### *Consideration of a Career in Agriculture:*

A significantly ( $p = 0.000$ ) greater percentage (33.2%) of Year 10 students from non-metropolitan schools had considered a career in agriculture compared with their metropolitan counterparts (16.1%).

### *Factors Influencing Knowledge of Careers in Agriculture:*

Of the students surveyed, 57.3% stated that their knowledge of agriculture came from teachers (Table 1), followed by parents/relatives (52%), media (46.4%), and friends (27.1%). The Internet (3.6%) was found to be the least contributing factor. Significantly ( $p < 0.01$ ) more students in non-metropolitan regions gained their knowledge from parents (64.6%) rather than schools (51.3%). In comparison, students in metropolitan regions gained their knowledge of careers in agriculture from school (61.4%), media (47.2%) and lastly from parents (43.2%), this difference was again found to be significant. Percentages of respondents from metropolitan and non-metropolitan regions did not vary significantly.

Table 1

Factors Influencing Students Knowledge of Careers in Agriculture by Region.

Option	Metro (%) n = 324	Non-Metro (%)	Total (%) n = 550
Parents/Relatives	43.2	64.6	52.0 **
Television/Radio/Newspapers	47.2	45.1	46.4 **
School/Teachers	61.4	51.3	57.3 **
Internet	4.0	3.1	3.6 **
Friends	27.4	26.6	27.1 **

\*\* , p < 0.01

**Factors Involved in Choosing a Career:**

Factors regarded by a majority of students as being important in choosing a career were: interesting work; good income; opportunities for advancement; work location; job prospects; social responsibility and the prospective growth of the industry, respectively. Table 2 provides a summary of chi-square analyses indicating the significance of differences between metropolitan and non-metropolitan students. Students from metropolitan areas differed from non-metropolitan students with significantly more (p = 0.000) ranking good income as important, above interesting work. Non-metropolitan students placed job prospects equally with opportunities for advancement and above work location.

**Factors Applying to a Career in Agriculture:**

Factors seen as applying to a career in agriculture were (in decreasing order of frequency): conservation/environmental concerns; interesting work; work location; prospective growth of industry; opportunities for advancement; job prospects; good income; social responsibility, and helping those in less developed countries. A greater number of students in both metropolitan and non-metropolitan regions thought that family approval did not apply or were uncertain about whether it applied to a career in agriculture. More students from non-metropolitan regions ranked family approval as applying to a career in agriculture, compared with metropolitan students, however this was not considered

significant (Table 3). Significantly (p < 0.05) less metropolitan students ranked job prospects as applying to a career in agriculture compared with non metropolitan students. When placing the factors in order of relevance to a career in agriculture, metropolitan students differed from non-metropolitan students in rating social responsibility above job prospects and a good income.

**Knowledge of Agricultural Careers:**

For eight out of the 17 careers listed, between 75-90% of respondents in each case thought that these careers would be available to someone with a degree in agricultural science (Table 4). Those careers with a mid-range response (40-60%) were, Ateacher,@ Amicrobiologist@ and Ascientist.@ Careers which most respondents thought unavailable to someone with a degree in agricultural science were; Abusiness advisor,@ Aconsultant,@ Aengineer@ and Aeconomist.@ Land and environment manager@ received the highest percentage of responses followed by, Aenvironmental scientist@ and Afarmer@ (differing by 0.4%). Chi-square analysis (Table 4) showed that these differences were significant (p < 0.01). Significantly (p < 0.05) more students from non-metropolitan areas thought it possible to become a property manager by completing an agricultural science degree.

Table 2

Factors in Choosing a Career (Metropolitan Students n = 324, Non-Metropolitan Students n = 226).

Factor		Not		
		Important	Uncertain	Important
Interesting Work	Metro (%)	3.5	8.0	47.5
	Non-Metro (%)	1.5	5.3	34.4
Good Income	Metro (%)	2.9	8.4	47.6 ***
	Non-Metro (%)	1.8	9.6	29.6
Opportunities for Advancement	Metro (%)	3.5	13.8	41.6
	Non-Metro (%)	3.3	12.0	25.8
Work Location	Metro (%)	7.8	11.3	39.8
	Non-Metro (%)	5.6	10.0	25.5
Job Prospects	Metro (%)	4.2	18.2	36.5
	Non-Metro (%)	4.2	11.1	25.8
Social Responsibility	Metro (%)	11.6	16.0	31.3
	Non-Metro (%)	9.1	12.5	19.5
Prospective Growth of Industry	Metro (%)	8.7	20.4	29.8
	Non-Metro (%)	5.8	14.9	20.4
Family Approval	Metro (%)	18.5	20.5	19.8
	Non-Metro (%)	13.6	13.8	13.6
Conservation/ Environmental Concerns	Metro (%)	20.5	19.3	19.1
	Non-Metro (%)	12.5	15.5	13.1
Helping Those in Less Developed Countries	Metro (%)	22.7	19.8	16.4
	Non-Metro (%)	17.5	14.5	9.1

\*\*\*,  $p < 0.0001$

***Pursuit of Agricultural Careers:***

Table 5 indicates low numbers of students wishing to pursue the listed careers (between 4-33%). Differences between metropolitan and non-metropolitan students' responses were not significant. However, when noting the percentage differences between metropolitan and non-metropolitan students, 12.4% more non-metropolitan students were interested in pursuing a farming career and approximately nine percent more wanted to become a national

park ranger (not significant).

Table 3

Factors Applying to a Career in Agriculture (Metropolitan Students n = 324, Non-Metropolitan Students n = 226).

Factor		Does not apply	Uncertain	Applies
Conservation/ Environmental Concerns	Metro (%)	6.2	10.2	42.5
	Non-Metro (%)	3.23	9.6	28.2
Interesting Work	Metro (%)	6.4	14.0	38.5
	Non-Metro (%)	2.9	10.0	28.2
Work Location	Metro (%)	8.9	11.5	38.5
	Non-Metro (%)	4.9	9.8	26.4
Prospective Growth of Industry	Metro (%)	8.6	17.5	32.9
	Non-Metro (%)	4.2	12.9	24.0
Opportunities for Advancement	Metro (%)	8.4	17.3	33.3
	Non-Metro (%)	5.5	12.4	23.3
Job Prospects	Metro (%)	10.7	21.1	27.1 *
	Non-Metro (%)	4.2	14.5	22.4
Good Income	Metro (%)	12.5	19.5	26.9
	Non-Metro (%)	6.4	14.2	20.5
Social Responsibility	Metro (%)	12.7	18.2	28.0
	Non-Metro (%)	9.1	16.0	16.0
Helping Those in Less Developed Countries	Metro (%)	19.1	15.8	24.0
	Non-Metro (%)	12.9	11.3	16.9
Family Approval	Metro (%)	28.5	16.5	13.8
	Non-Metro (%)	16.5	11.6	12.9

\*,  $p < 0.05$

Table 4

Careers Respondents Considered Available to Someone With a Degree in Agricultural Science by Region  
(Includes Percentages and Chi-Square Results).

	Metro(%) n = 324	Non-Metro (%) n = 226	Total(%) n = 550
Land & Environment Manager	90.1	89.4	89.8
Environmental Scientist	87.4	89.4	88.2
Farmer	87.4	88.5	87.8
Environmental Science Teacher	85.5	84.1	84.9
Soil Scientist	86.1	83.2	84.9
National Park Ranger	83.0	81.9	82.6
Botanist	80.9	74.3	78.2 **
Horticulturalist	74.4	83.2	78.0
Environmental Engineer	76.2	72.1	74.6
Property Manager	55.9	69.9 *	61.6
Scientist	54.3	59.7	56.6
Microbiologist	45.4	49.6	47.1
Teacher	43.5	40.3	42.2
Economist	38.3	36.7	37.6
Engineer	21.3	25.2	22.9
Consultant	17.6	19.0	18.2
Business Advisor	15.1	19.9	17.1

\*\* $, p < 0.01$ ; \* $, p < 0.05$

Table 5

Careers Respondents Wished to Pursue, by Region (Includes Percentages and Chi-Square Results).

	Metro(%) n = 324	Non-Metro (%) n = 226	Total(%) n = 550
National Park Ranger	23.8	32.3	27.3
Engineer	26.2	25.7	26.0
Farmer	16.4	28.8	21.5
Business Advisor	19.1	18.6	18.9
Teacher	16.4	19.0	17.5
Scientist	17.0	14.6	16.0
Consultant	14.2	14.2	14.2
Environmental Scientist	14.5	12.4	13.6
Property Manager	10.2	17.7	13.3
Land & Environment Manager	10.8	15.9	12.9
Horticulturalist	10.5	15.5	12.6
Environmental Engineer	11.1	13.7	12.2
Microbiologist	13.6	10.2	12.2
Economist	9.6	15.0	11.8
Botanist	7.7	10.2	8.7
Environmental Science Teacher	8.0	6.2	7.3
Soil Scientist	4.6	8.9	6.4

**Importance of Environmental Issues (Part A):**

When asked whether or not environmental issues were of major concern today, approximately 80% of respondents answered in the positive while less than 5% said that environmental issues were not of major concern. Responses between regions did not vary significantly. Upon listing several environmental issues all were considered important (Table 6). The environmental issues

selected most frequently were; pollution of rivers and streams (84.9%), air pollution (81.8%) and reduction of the ozone layer (81.6%). Increasing soil salinity (52.9%) was considered to be less important in comparison to the other issues. In all cases except for the increase in soil salinity, pollution of rivers and streams and soil erosion, significantly ( $p < 0.05$ ) less non-metropolitan students saw environmental issues as being important.

Table 6

Level of Importance of Environmental Issues (Metropolitan Students n = 324, Non-Metropolitan Students n = 226).

Factor		Not Important	Uncertain	Important
Pollution of Rivers and Streams	Metro (%)	2.0	6.2	50.7
	Non-Metro (%)	1.3	5.6	34.2
Air Pollution	Metro (%)	1.8	6.6	50.5 **
	Non-Metro (%)	3.3	6.6	31.3 **
Reduction of Ozone Layer	Metro (%)	2.0	6.2	50.7 **
	Non-Metro (%)	3.1	7.1	30.9 **
Clearing of Tropical Rainforests	Metro (%)	3.8	7.6	47.5 *
	Non-Metro (%)	5.3	6.6	29.3 **
Decrease in the Number of Species Present in the Environment	Metro (%)	3.6	8.7	46.5 **
	Non-Metro (%)	4.6	10.0	26.5 **
Global Food Shortage	Metro (%)	5.3	10.2	43.5 **
	Non-Metro (%)	3.6	12.2	25.3 **
Global Warming/Climate Change	Metro (%)	5.1	11.1	42.7 **
	Non-Metro (%)	4.6	12.7	23.8 **
Soil Erosion	Metro (%)	7.8	14.5	36.5
	Non-Metro (%)	5.1	12.2	23.8
Increase in Soil Salinity	Metro (%)	10.0	18.4	30.5
	Non-Metro (%)	6.0	12.7	22.4

\*\* ,  $p < 0.01$ ; \* ,  $p < 0.05$

***Perceived Effect of Agriculture on the Environment (Part B):***

When students were asked to rate the effect of agriculture on the same listed areas, responses were evenly distributed (Table 7). A significantly ( $p < 0.05$ ) greater number of non-

metropolitan than metropolitan students responded that agriculture had a negative effect through clearing of tropical rainforests and reducing biodiversity.

Table 7

Perceived Effect of Agriculture on the Environment (Metropolitan Students  $n = 324$ , Non-Metropolitan Students  $n = 226$ ).

Factor		Negative Effect	No Effect	Positive Effect
Global Food Shortage	Metro (%)	15.5	16.5	26.9
	Non-Metro (%)	9.3	14.9	16.9
Pollution of Rivers and Streams	Metro (%)	16.2	16.9	25.8
	Non-Metro (%)	11.5	12.2	17.5
Increase in Soil Salinity	Metro (%)	15.1	18.4	25.5
	Non-Metro (%)	12.0	13.8	15.3
Soil Erosion	Metro (%)	18.0	15.6	25.3
	Non-Metro (%)	14.4	12.2	14.5
Clearing of Tropical Rainforests	Metro (%)	18.2	14.7	26.0 **
	Non-Metro (%)	17.1	12.4	11.6 **
Reduction of Ozone Layer	Metro (%)	16.7	19.8	22.4
	Non-Metro (%)	11.3	15.8	14.0
Decrease in the Number of Species Present in the Environment	Metro (%)	16.7	17.8	24.4 **
	Non-Metro (%)	14.5	14.9	11.6 **
Air Pollution	Metro (%)	17.6	19.6	21.6
	Non-Metro (%)	12.0	15.1	14.0
Global Warming/Climate Change	Metro (%)	17.8	21.1	20.0
	Non-Metro (%)	10.7	18.5	11.8

\*\* ,  $p < 0.01$

## Conclusions

According to the minimum sample for a population of this size suggested by Krejcie and Morgan (1970), the sample population size of  $n = 550$  Year 10 students was sufficient to apply to the entire population of Victorian Year 10 students. While the numbers of students considering to undertake a career in agriculture were very low, at just over 100 (17.1%), significantly ( $p < 0.0001$ ), more non-metropolitan students said that they had considered a career in agriculture. Low overall numbers could be attributed to students not having sufficient understanding of the breadth of careers available to people trained in agriculture, with the majority of students choosing 'land and environment manager', 'environmental scientist' and 'farmer' as careers they thought available to a graduate in agricultural science.

The high response rate to careers prefixed by the adjectival descriptor 'environmental' may indicate a lack of knowledge about careers in general. The relatively small number of students considering a career in agriculture may also be due to the negative public image of Australian agriculture. Future studies are recommended to determine whether a relationship exists between knowledge of agricultural careers and the intention to pursue agricultural careers.

The sources from which Year 10 students learned about careers requiring tertiary study were largely consistent with findings in the United States (Lam, 1982; Martin, 1985; Kotrlík, 1987). If students do possess a negative image of agriculture, this may also be associated with the sources of information about careers in agriculture. This suggests that parents, school and the media could be viewed as potential foci for agricultural educators and industry in improving the image of agriculture. The potential value of presenting a different balance of negative and positive media images of agriculture is reflected in the high numbers of students influenced by this source.

Income was seen as one of the most important ( $p < 0.05$ ) more non-metropolitan students

factors in choosing a career. Importantly, income was also one of the lowest ranked factors in relating to a career in agriculture. On the other hand conservation and environmental issues were the highest ranked considerations relevant to a career in agriculture, but these issues were not seen to be as important to students when choosing a career. It may be concluded that students are not looking for the type of career that places an emphasis on these issues.

The importance of interesting work in choosing a career was 10% greater than that which was seen to apply to a career in agriculture, suggesting students did not see agriculture as offering particularly interesting careers. This also suggests a need to portray agriculture as interesting, particularly to metropolitan students. The view that agriculture is not interesting may be related to negative student views of agriculture as suggested by Monteith and Field (1995) and Wilkins, (1995). However, whether the image students possess of agriculture was strongly positive or negative was not able to be fully determined from this study.

Students seemed to be unaware of the variety of careers available to them from a degree in agricultural science. This is seen by the low percentage of students responding to 'scientist' as a potential career and the greater percentage choosing 'environmental scientist' and 'soil scientist'. The greater number of non-metropolitan students choosing 'property manager' as a potential career could be due to a greater knowledge of the activities of property managers.

Greater numbers of students, particularly from metropolitan backgrounds, wanted to pursue at least one of the listed careers than wanted a career in agriculture. This may suggest that some students did not realize that they could pursue such careers from an agricultural training. While the issues of clearing of tropical rainforests and decreasing biodiversity showed significantly

viewing agriculture as having a negative impact,

overall metropolitan students did not have a significantly more negative view of the effects of agricultural practices on the environment than non-metropolitan students.

Attracting high achievers to agricultural and related courses appears constrained by students' knowledge of careers in agriculture. Students in a closer proximity to agriculture were more likely to consider a career in agriculture, although both metropolitan and non-metropolitan students related the study of agriculture mainly to farming. The reduced contact of city dwellers with rural areas probably means that opinions are oriented to past practices in farming. Attracting greater numbers of high achievers to agriculture is related, among other things, to improvement of the knowledge about and image of agriculture in the media and through other sources. There was seen to be a need to portray agriculture as a developing industry which plays a role in everyday life and offers exciting and rewarding careers.

Ignorance about agriculture influences the number of students considering a career in agriculture. As teachers, parents/relatives and the media were the most frequent sources of knowledge of careers in agriculture, they form potential target areas for programs to increase community knowledge about agriculture. Increasing agricultural awareness about all aspects of agriculture and agricultural careers in education at primary and secondary level may influence the perceptions of students towards agriculture in the long term.

### References

- Australian Institute of Agricultural Science and Elders Limited (1996). A Sustainable Career in Agri-Industry 1996. AIAS.
- Cecchetti, C. L., Sommer, R. & Leising, J. G. (1992). Australian Students' Perceptions of Agricultural Careers. Journal of Agricultural Education, 33(1), 30-35.
- Connolly, B., & Keohane, R. (1996) Institutions For Environmental Aid: Political Lessons and Opportunities. Environment, 38(5), 12-20, 39-42.
- Dillman, D. A. (1978). Mail and Telephone Surveys: The Total Design Method. New York: John Wiley and Sons.
- Directorate of School Education (1995). Summary Statistics: Victorian Schools. Based on the February 1995 Census of Victorian Schools. Directorate of School Education, Victoria.
- Elliot, M. (1995) Agricultural Science Cut-Off Scores - Why so Low? Agricultural Science, 8(3), 32-33.
- Falvey, L. (1997). Attracting the Shining Stars to Agriculture. Agricultural Science, 10(4), 20-23.
- Kotrlík, J. W. (1987). Factors Related to the Career Decisions of Seniors who Have Taken Vocational Agriculture. The Journal of the American Association of Teacher Educators in Agriculture, 28(4), 50-56.
- Krejcie, R. V. & Morgan, D. W. (1970). Determining Sample Size for Research Activities. Educational and Psychological Measurement, 30(2), 607-610.
- Lam, J. Y. (1987). Determinants of Educational Plans of the Indeterminant High School Graduate. The Journal of Educational Administration, 20(2), 213-229.
- Levy, P. S. & Lemeshow, S. (1991). Sampling of Populations: Methods and Applications. Wiley, New York.
- Mallory, M., & Sommer, R. (1986). High School Student Images of Agricultural Careers. California Agriculture, 40(3/4), 4-6.
- Martin, R. A. (1985). Perceptions by Nontraditional and Traditional Agricultural Students Towards Their High School Preparation and Work Barriers. The Journal of the American Association of Teacher

Educators in Agriculture, 26(2), 18-24.

McCull, J. (1991). Report of the Review of Agricultural and Related Education. Department of Employment, Education and Training and Department of Primary Industries and Energy. Volumes 1 and 2. Australian Government Publishing Service, Canberra.

Meyer, J. (1992). Rethinking the Outlook of Colleges Whose Roots Have Been in Agriculture. University of California, Davis.

Monteith, N. & Field, S. (1995). From the Valleys to the New Horizons. A paper delivered at a conference convened by the Australian Institute of Agricultural Science, November. Melbourne: AIAS.

Reis, R. E. & Kahler, A. A (1995). Factors Influencing Enrollment in Agricultural Education Programs as Expressed by Iowa Secondary Agricultural Education Students. <http://ssu.agri.missouri.edu/SSU/AGED/naerm/s-h-1.htm>.

University of Western Australia (The) (1996). Agricultural Careers Survey Report number 95/5. Prepared by the Institutional Research Unit, Planning Services, The University of Western Australia.

Victorian Tertiary Admissions Centre (1996). Extract from the VTAC Preference distribution analysis. November 1996 for agriculture and related courses.

Wilkins, J. (1995). Sowing the seeds. A paper delivered at a conference convened by the Australian Institute of Agricultural Science, November. Melbourne: AIAS.