

PRESIDENTIAL ADDRESS

ARE WE TRAINING ENOUGH AGRONOMISTS?

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ABSTRACT

Recent production of agricultural graduates in New Zealand is reviewed. Agricultural graduates are currently experiencing little trouble in gaining employment and few are undertaking further study, especially when compared with graduates in science.

Advertised vacancies in the press in the past year suggest that currently the supply of graduates trained in agronomy does not equal the demand and substantial numbers of science graduates have been employed as agronomists. In particular there appears to be a major shortage of graduates with honours and Ph.D. degrees as few students are encouraged to undertake higher degree studies by the poorly paid studentships offered.

INTRODUCTION

The Agronomy Society of New Zealand is now twelve years old. The first meeting of the Society was held at Lincoln College in August 1971 and since that time Presidential Addresses have ranged over a diversity of topics. However, the problem of training members of our profession in New Zealand has not been considered.

A survey of the literature indicates that the last time any concern was expressed about the training of scientific manpower for agriculture was the 1973 Presidential Address to the New Zealand Grassland Association by White (1974). In that talk he drew attention to a drift away from sciences towards management subjects by agricultural science students and suggested that the time had come to restore the balance in agricultural training. White (1974) also suggested that the University Grants Committee, government departments, commercial firms and farmers should attract students into agriculture by the provision of bursaries and studentships. This has not happened and I will suggest in this paper that, unless something is done to redress the balance towards science, New Zealand could face a serious shortage of trained agricultural scientists to keep our agricultural industries functional. My remarks will be mainly concerned with agronomy but there are also problems in other areas of agriculture - e.g. that last five appointments in the Soil Science Department at Lincoln College are Australian or United Kingdom graduates.

At present, New Zealand is an advanced cropping nation by world standards. Inspection of the FAO Production Yearbook (FAO, 1981) shows that yields of all major crops in New Zealand are above world averages and in two crops farm yields are the highest in the world. (Table 1).

Internationally comparable measures of grassland productivity are harder to find but, when I was in the United Kingdom in 1979 and the "lamb war" was raging

TABLE 1: Mean New Zealand crop yields compared with world levels (kg/ha).

Crop	\bar{x}	World maximum	New Zealand
Barley	1952	4826 Netherlands	3753
Oats	1598	5190 Netherlands	3610
Wheat	1873	6202 Netherlands	3847
Maize	2995	8653 New Zealand	8653
Potatoes	12519	37333 New Zealand	37333
Peas	1086	4168 France	2458

From FAO (1981)

between Britain and France, figures were released in the press which indicated that the average French sheep farmer kept 10 sheep, the average British farmer 100 and the average New Zealand farmer 1000. These figures indicate that our farmers are good at both growing and utilising pasture by world standards. It was my impression in the United Kingdom that few pastoral farmers there were aware how much dry matter they produced on a unit area basis and therefore did not utilise it efficiently. Given our major dependence on agricultural production, our continued survival as a trading nation will depend upon our continued ability to grow crops and pastures more efficiently than the rest of the world. To do this requires well trained agronomists in both extension and research.

PRODUCTION OF AGRICULTURAL GRADUATES

Each year the New Zealand Vice-Chancellors Committee publishes a report on graduate employment in New Zealand (NZVCC,1981). In 1981 a total of 892 students graduated in Agriculture and Forestry (the two are combined in the survey). Compared with science and social science, very few agricultural graduates continue onto further university study. However the proportion is about the same as in Engineering and Architecture and considerably higher than in Commerce (Table 2). This would imply that few agricultural graduates perceive research as an attractive career particularly if it involves several years of further study and they can get a well paid job without it notwithstanding the reduced employment by Government Departments.

TABLE 2: Graduates continuing to further University study on completion of first degrees (%).

Faculty	1979	1980	1981
Agriculture & Forestry	10.3%	13.4%	13.3%
Architecture	13.7	13.5	9.9
Commerce	4.3	5.3	8.0
Engineering	11.8	11.2	10.5
Science	29.8	28.0	28.5
Social Science	20.4	19.5	22.3

From NZVCC (1981)

Losses of graduates returning to their own country at completion of studies, or not being available for employment and a very small number who had not yet found a job reduced the total pool of graduates in agriculture and forestry to 587.

Incidentally, the hopes of increased agricultural input into the secondary school syllabus looks like being a very long time coming. In 1981 only 5 agricultural graduates entered Teachers College at the end of their University course. This was despite efforts having been made to attract agricultural graduates in secondary teacher training, (NZVCC,1981).

The exact numbers of New Zealand agricultural graduates taking their first job overseas is not given in the survey. However the survey commented on active recruiting by Australian employers in New Zealand for better quality graduates. These employers were able to offer terms that New Zealand employers found difficult to match. Given that it now cost little more to fly from Christchurch to Sydney than from Christchurch to Auckland, the potential loss of our graduates to Australia should not be discounted. In the last year, Australian agricultural chemical firms, The Queensland Agricultural College, and even the Victorian Department of Agriculture have advertised for staff in the New Zealand press.

The survey further shows that there was a substantial increase in employment of graduates in agriculture and forestry in 1981 and that over 70.3% of all graduates entered employment directly. It was further claimed that the practical experience required for graduates in agriculture is seen by employers as a valuable asset. This contrasts markedly with the situation for graduates in science where the number of graduates in employment was only 35.6% and the outlook for graduates in biological science was described as uncertain (NZVCC 1981).

New Zealand currently produces a limited number of agricultural graduates who are finding a strong demand for their qualification. To get their share of this pool, particularly of high calibre graduates, employers are going to have to actively sell their jobs to potential employees.

If we now look more closely at agronomy, the report shows that in each of the last three years, almost exactly the same number of graduates have become agronomists (Table 3). However, that we are not producing enough agronomists in the agricultural faculties is highlighted by the fact that in 1981 nearly half of all persons who commenced work as agronomist were trained in science not agriculture.

TABLE 3: Number of graduates who listed their first occupation as agronomist (1979-1981).

Year	Agricultural graduates	Science graduates	Total
1979	20	10	30
1980	20	6	26
1981	15	14	29

From NZVCC (1981)

These graduates may be called agronomists but they are not trained agronomists. The strength of our agricultural degrees lies in their large component of compulsory study on a wide diversity of subjects. This ensures that the student gets some knowledge of how the whole farm system works i.e. a holistic approach. However, employers are being forced to accept less qualified alternative graduates because at present we in the universities are not training enough agronomists.

THE DEMANDS FOR AGRONOMISTS

For the last two years the Plant Science Department at Lincoln College has kept press cuttings of jobs advertised in the plant science area. These advertisements reveal the demand for staff with qualifications in agronomy. The jobs listed in Table 4 were those advertised during only one year and which required an agronomy background. I have not included jobs which could be done by agronomists but did not call for specific training in that area.

Probably the most surprising feature is the high demand for graduates with either honours degrees or a Ph.D. In the last twelve months, 29 vacancies were advertised by DSIR, the Ministry of Agriculture &

Fisheries., Ministry of Works and the Universities which required higher qualifications than a pass degree. This is considerably higher than the annual output of such graduates from the Agronomy Department at Massey and the Plant Science Department at Lincoln College combined.

However, it is not only from the public sector that the demand for graduates with agronomy training has been high. An increased demand for graduates in agronomy has also come from the private sector. The growth area is in the weed control, plant protection field. However, fertiliser and seed companies were also significant employers of agronomists (Table 5).

TABLE 4: Vacancies advertised in the Press that required an Honours or higher degree in Agronomy (1 August 1981 to 31 July 1982).

Employer	Number of vacancies
DSIR	10
Ministry of Agriculture & Fisheries	11
Ministry of Works	1
University	7

From Christchurch Press (1981/82)

TABLE 5: Vacancies advertised in the Press in commercial enterprises that required Agronomy training (1 August 1981 — 31 July 1982).

Type of position	Number of vacancies
Plant Protection Extension and Research	14
Fertiliser Company	5
Seed Company	3+

From Christchurch Press (1981/1982)

THE SUPPLY

At Lincoln and Massey the number of fourth year undergraduates taking agronomy as a final year subject is currently about twenty to thirty at each institution. As already indicated, the number of those who proceed to graduate study is not great. This can be seen from the total number of students who have completed higher degrees in agronomy in the last five years from the two institutions (Table 6).

The numbers available are further reduced by the large proportion of overseas graduate students being trained at the two institutions. Over the last 5 years, 29% in the case of Masters candidates and 42% in the case of the Ph.Ds were from overseas. (Table 7). The number available drop still further when from the remainder are subtracted those graduates who are already Univeristy, DSIR or Ministry of Agriculture & Fisheries staff members and therefore do not

enter the labour market. Such information is not readily available but I can identify at least six of the remaining 14 Ph.Ds as being in that category.

TABLE 6: Total production of graduates with higher degrees in Agronomy produced by Lincoln College and Massey University 1977-1981.

Year	Degree	
	M.Agr.Sc.	Ph.D.
1977	7	2
1978	5	5
1979	3	3
1980	7	9
1981	13	5
Total	35	24

From Lincoln College and Massey University Calendars (1978-1982).

TABLE 7: Number of New Zealand graduates with higher degrees in Agronomy produced by Lincoln College and Massey University 1977-1981.

Year	Degree	
	M.Agr.Sc.	Ph.D.
1977	6	2
1978	2	3
1979	3	2
1980	6	4
1981	8	3
Total	25	14

SUGGESTED SOLUTIONS

At present, because of high demand for agricultural graduates, there is little attraction for students to undertake graduate studies. There is no co-ordinated attempt by government departments to recruit scientific manpower. This is in spite of the fact that, based on advertised vacancies in the press, the government was the largest potential employer for graduates in the last year. Probably the first and most important step that is required is for DSIR and the Research Division of the Ministry of Agriculture & Fisheries to get together and produce long term projection as to their demands for scientific personnel. Having done that there is a need to positively encourage the best students to enter the sciences and to enrol for higher degrees.

At present the known preference of employers for first class honours degrees acts as a strong disincentive to students to enter the honours stream. Few students at the degree III level consider that they will get first class honours

no matter how well they have done up to that stage in their course. The active recruiting campaign by the Advisory Division of the Ministry of Agriculture who do not require students to take honours courses but do insist on management subjects and who virtually guarantee jobs if students take the right subject combinations has to be compared with the lack of interest in scientists by the employers.

A major factor preventing students continuing to higher degree studies is money - or a lack of it. At present a student who gets a first class honours degree can get a UGC fellowship on \$4,020 a year tax free. This compares with a \$13,500 starting salary for a new pass graduate with the Ministry of Agriculture & Fisheries. Even allowing for no increments to the new graduate a student who completed a three year Ph.D will be over \$28,000 worse off than the student who goes directly into employment (at today's prices).

The issuing of research contracts by the DSIR and Ministry of Agriculture to universities has been a very cost effective way of getting research done and training graduates. However, funding of research contracts has traditionally been on the same level as the UGC Fellowships and often contracts have not been filled because universities have been unable to find students willing to take the contracts.

It would seem more logical to consider the method used by the CSIRO in Australia to get students to complete graduate studies in a particular field. The CSIRO offers each year a number of post-graduate studentships in its areas of interest. Firstly and probably most important, the value of the studentship is higher than that offered by the Commonwealth Government for general postgraduate training and the fellowships are therefore seen to be prestigious. Secondly the fellowship is awarded by CSIRO to the student who then selects the University where he wishes to undertake his study. This matches the student to the project. The areas of study which are financially

supported are quite specific which allows for continual adjustment to the supply of scientific manpower. There is no obligation for the student to take employment with CSIRO but they do expect to be given first right of refusal.

The adoption of a similar system in New Zealand would improve the supply of scientific manpower and would be far cheaper for the taxpayer than the current system of sending employees back to university on full salary two or three years after their graduation. It would however mean that government departments would have to look very carefully at their demand for science trained graduates and predict their long term demand. This might be difficult for as a recent vocational guidance bulletin from Auckland commented, "Employment is probably the least known aspect of the agricultural industry. The Ministry of Agriculture and Fisheries which knows and records so much about animals, crops, machinery and other non-human features of the industry, maintains no systematic data, or even a watching brief, of the people involved and undertakes no overall manpower forecasting and planning". (Anon, 1982).

I suggest the time has come for this situation to change, we can no longer rely on chance to get the best people into the right positions.

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