Agriculture Education &Training in NZ:

A report for the New Zealand Nuffield Farming Scholarship Trust

A review of the current New Zealand situation and recommendations for the future

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Disclaimer

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In submitting this report, the Scholar has agreed to Nuffield NZ publishing this material in its edited form.

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Foreword

Agriculture in New Zealand has long been the back-bone of the country's economy and is renowned around the world for its high level of skills, knowledge and innovation. Agriculture Education and Training (AE&T) is therefore fundamental to the on-going growth and development of New Zealand agriculture and maintaining its enviable position in the global food and fibre trade.

Internally there are many pressures on our AE&T, initially after the economic crash of the last 1980's that led to career changes out of primary industries and recently with the review in NZ education funding, particularly the Land Based Training review which has highlighted the many ways Agriculture differs from other more mainstream areas of Education and Training.

The current global recession has again put the squeeze on government finances and therefore funding of the tertiary sector. Anne Tolley (Minister of Tertiary Education) outlines her vision to create a 'world-leading system' from my observations the NZ AE&T has a lot of work to do to catch up let alone lead the world on a united and efficient system.

The aim of this report is to describe the current situation in New Zealand and discuss options for the future AE&T model to ensure New Zealand continues to be highly regarded for its agriculture industry and graduates.

Students learning shearing and woolhandling skills - photo courtesy of Telford

Acknowledgements

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I would like to firstly thank the Nuffield Farming Trust and the major sponsors for the opportunity and support to carry out this study tour. Mention needs to be made of the significance of attending the Australian Global Focus Tour group, made possible through the professional and dedicated work of Nuffield Australia CEO Jim Geltch.

Special thanks to the Telford Farm Board and Telford farm staff team for all their support over the last four years and for allowing me to be absent for significant periods this year. The work continued to get done on time, and to a high standard, which I have come to expect from a very capable and competent farm staff team who go out of their way to ensure the students and farms are well taken care of.

Appreciation to the government organizations and industry bodies who have provided a wealth of background information, in particular the Land Based Training Review report which has been valuable in collating this report.

Thanks also to my family and friends who continue to help sustain the passion and enthusiasm I have for New Zealand and our agriculture industry, and have provided valuable feedback and assistance with the compilation of this report.

Finally, to all those people who I met while on my travels around the world, agriculture, land stewardship and food production is a wonderful life and career choice, and we are all lucky to have the opportunity to be involved. I am very grateful for all your hospitality, knowledge sharing and guidance, my home will always be open to you as you made yours for me.

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Executive Summary

New Zealand Agriculture Education and Training (AE&T) has helped build a country that has been extremely successful - largely based on export of its primary industries, innovation and services to agriculture. Over time a multitude of providers and a plethora of qualifications have developed to meet the demand. There have always been challenges for education and training in agriculture, but it seems that more than ever we are being constrained by funding and other issues such as globalization and urban opinion regarding our primary sectors. This is an ideal time to review and re-design the way AE&T is provided in New Zealand.

While it is encouraging that the overall number of people studying agriculture has increased, the trends are in the opposing direction to which our funders request. Specifically, students in agriculture tend to require skills and knowledge at levels 2-4 and to study part time. The Tertiary Education Commission's aim is to increase the completion of higher level qualifications and provide more full-time courses rather than funding for short qualifications.

Increasing globalization offers both challenges and opportunities - the growth of developing nations such as India and South America mean that NZ agriculture could easily be squeezed from larger, faster growing countries and our skills and knowledge used by our competitors to enhance their production and export potential. At the same time, there are opportunities for NZ providers to grow internationally and expand our student funding base.

During my research I saw a range of other countries AE&T models, the majority have obvious focus on amalgamations, mergers and joint ventures. When compared to the AE&T models used overseas by other advanced agriculture nations including our main competitors on the export market, NZ appears to be at least a decade behind. The majority of the agriculture organizations I visited, in countries such as the United Kingdom, Ireland, North America and Australia have amalgamated horizontally, vertically or full integrated across the whole sector. The advantages being sharing governance, marketing and admin services and utilizing training farms and trainers across a wider range of courses. In some cases such as the Irish system AE&T has been fully collaborated with Research and Extension. If these models are common place and successful overseas then this begs the question as to why NZ is still serviced by a range of institutions and organizations, delivering locally designed and developed qualifications and courses while competing against, instead of complimenting, others in the sector?

Scale, efficiency and effectiveness have been created, whereas in New Zealand we bombard funders, politicians, students and other stakeholders with a range of different brands, courses and outcomes. Most providers in New Zealand are specialists in AE&T therefore they need to have some protection to ensure there is a committed and viable AE&T sector to service what is still the backbone of this country. If New Zealand is going to maintain an effective and economic education and training industry then we need to develop a collective vision and generate a larger, stronger, unified organization that will be able to take on the challenges and respond to the opportunities.

This must be led from the top down, funders, governance and stakeholders need to place pressure on organizations to simplify organizational structures, simplify and rationalize courses

and qualification and amalgamate providers. It is likely that bulk funding of agriculture will be required to ensure the conviction of change, to allow a collaborative team to distribute funding for agriculture across providers and ensure a minimum level of collaboration is achieve, and promote unification of qualifications and providers. While some work will be required from the ground up, especially in regard to reducing the number and range of qualifications and courses, ultimately it will be the vision and leadership that will drive change and ensure that New Zealand AE&T is structured and positioned in a way to achieve our goals of being an effective and efficient industry for our nation and potentially a significant global provider for Agricultural Education and Training.

Introduction

Personal Background

My background is in Canterbury dryland mixed livestock farming, predominately mid micron commercial ewe flock with a Super-Fine Merino Stud. I attended Rangiora High School which had a high standard of Agriculture teachers and an adjacent school farm at the time. For tertiary education I attended Lincoln University and gained an Honors Degree in Agricultural Science followed by a Diploma in Secondary Teaching from the Christchurch College of Education, specializing in Ag/Hort and Science.

I then worked for AgResearch as a farm technician on their Mid-Canterbury Winchmore research farm and completed four years with them, finishing as a Research Associate at the Lincoln Campus. My next role was with Meat and Wool New Zealand as the Southland Region Manager overseeing the collection of Economic Service information and facilitation of the extension activities including the three sheep and beef monitor farms in the region.

My Current role is Farm Director for the Telford Rural Polytechnic (known as the Telford Division of Lincoln University as of 1st January 2011), based on a 900ha farm in South Otago. The farm has commercial scale dairy, sheep and deer units and covers a wide range of Land-based training for 140 on-campus students in courses ranging from Apiculture to Equine. Telford Rural Polytechnic also delivers training throughout New Zealand via correspondence, the Farmsafe brand, and to around 200 high schools through internet based classes.

The Farm Director's role is to implement the Farm Board of Directors vision for the commercial farms, to liaise with the teaching staff, optimizing student training opportunities and oversee the day to day operation of the farm units. The Director's role is mostly administrative, to oversee production and financial performance, resourcing including staff, management of the various research projects and carry out teaching and practical farm work when necessary.

As a member of the Telford management team and being involved in various aspects of the agriculture industry it is clear there are, and will continue to be some major challenges ahead for agriculture training. The New Zealand agriculture education system needs thorough investigation and strong leadership and vision to ensure we have viable and valuable agriculture training in the future. The Land-based Training Review conducted in 2009 covered many similar issues and discussions as this report, while I have been aware of the general direction of those

recommendations I purposely did not review the review in detail until the later stages of completing this report to ensure my travels and study were with fresh and independent eyes. In my opinion the Land-Based Training Review should be read in conjunction with this report.

This report focuses on the tertiary level study, it should also be noted that the terms ‘agriculture education’ and ‘land-based training’ are used interchangeably and where possible horticulture and other education areas are removed from land-based statistics and discussion.

Setting the Scene

New Zealand has enjoyed a high standard of living which initially relied on its strong relationship with the United Kingdom, and the resulting stable market for its commodity agricultural exports which still endures today. However, New Zealand's economy was built upon on a narrow range of primary products, such as wool, meat and dairy products. As a result, peaks and troughs abound, creating periods of economic prosperity, such as the ‘pound for a pound’ wool boom during the war years when NZ surpassed living standards in countries such as Australia and Western Europe. Relative economic hardship also occurs, for example during international events such as the oil crises in the 1970’s, New Zealand was at the mercy of international commodity prices and catalysts such as this, effectively reduced NZ to the lowest in per-capita income of all the developed nations by the early 1980’s. This was a challenging period for NZ and in particular agriculture, since 1984, successive governments have delved into economic restructuring, transforming New Zealand from a highly protectionist and regulated economy to a liberalized free-trade economy. This is still now the major difference between NZ and its major competitors (especially in the northern hemisphere subsidized countries which are our major markets).

Since 2007 New Zealand has made substantial gains in median household income although during the financial crisis of 2007 to the present, GDP has shrank for five consecutive quarters, the longest recession in over thirty years in this country. In 2009, agriculture represented 12% of the GDP and a similar percentage of the national employment.

The current challenges for NZ agriculture abroad are around free-trade agreements and competing in commodity markets with the developing nations such as South America. While at home our costs of production have increased markedly and of particular concern is the slowing of our labour productivity growth. In the tertiary AE&T sector the main challenges are around funding, attracting suitable students, brain drain, efficiency and critical mass.

Economy & Value of Agriculture to New Zealand

New Zealand is an island country, dominated by a temperate climate with a key feature of the native fauna and flora being the absence of mammals, very few existed except for bats and sea inhabitants such as seals until the advent of European settlement. New Zealand covers a total area of 26.8 million hectares and is very mountainous, especially in the South Island where they cover over half of the area. Despite the rugged terrain, over half of the total land area is used for primary production with 75% of this area under pastoral farming systems. There are approximately 63,000 holdings, half of these are sheep and a beef farm, the average farm size is 232ha.

The main islands were first settled by the Maori people and subsequently in the 18th century by Europeans, predominately from the UK. The indigenous Maori culture was not skilled in agriculture but had significantly changed the landscape in areas, for example burning grass lands when hunting birdlife.

New Zealand is a young country but developed quickly to a stage that it ranks highly in international comparisons (including economics and education). European settlers which dominate the population of around 4 million, make up around 78%, (Maori 15%, Asian 9% and 7% Pacific islanders) The European settlers brought with them their farming practices and many of their domesticated animals, this completely changed the way of life in New Zealand and opportunities for enterprise. The economic development of NZ can largely be attributed to the production and export of agricultural products, primarily back to the UK.

New Zealand farmers are at the leading edge of technological development and implementation on farms, particularly in pastoral farming. As a result they are often showcased to farmers from other countries, both as delegates to international events and conferences and through farm tours to NZ.

Agriculture produce is the largest export from New Zealand. In 2009, dairy products accounted for 21% ($9.1 billion) of total merchandise exports, the largest company of the country, Fonterra a farmer cooperative, controls almost one-third of the international dairy trade. Meat exports made up 13.2%, whereas wood, fruit, and fishing where minor players. New Zealand also has a thriving wine industry, which in 2007 replaced wool exports as the countries 12th most valuable export.

Being colonized and predominately settled by English, and as a commonwealth country many of the English systems and traditions were put in place, English is the first language and the schooling and university systems were set up to mirror those in England. This system has worked well for New Zealand, each year the United Nations develops a ‘Human Development Index’ including an education index, of which, NZ consistently sits at the top and is currently ranked first equal (alongside Australia, Denmark and Finland). It also features highly for literacy (21st) and Education attainment from kindergarten to postgraduate study.

The UN Human Development Index state “ Education is a major component of well-being and is used in the measure of economic development and quality of life, which is a key factor determining whether a country is a developed, developing, or underdeveloped”.

This Nuffield Scholarship report will discuss the current New Zealand Agriculture Tertiary education structure, and discuss options to meet the challenges in the future.

Objectives

The objectives of my Nuffield Scholarship were:

1. To research and describe the current New Zealand Agriculture Education and Training model
2. To study the Agriculture Education and Training models used in a range of other countries
3. To explore the options to ensure the Agriculture Education and Training model used in New Zealand will allow future growth and development

Nuffield Study Tour Process

During my travels overseas studying agriculture training models I covered a range of countries, primarily those associated with successful agriculture industries and close alliances with NZ agriculture exports and systems. The countries visited included: Australia, England, Wales, Ireland, France, USA and Brazil. The aim was to cast a wide network of visits, firstly to gauge the diversity and success of different industries in each country and study their value chains. This process opened up a lot of opportunities to talk to a variety of people, often with different skills, experiences and tertiary education backgrounds. It was through talking to many of these people that opened opportunities and contacts for tertiary providers and recent graduates.

Not surprisingly, there were many differing education paths and avenues taken to becoming involved in agriculture, but by using industry people to establish which organizations to visit for me ensured that I was covering a wider range and level of training organizations than promoters and the internet would have offered. Often the initial visits and contacts in agricultural training led onto further contacts primarily due to the higher rate of integration and amalgamations than currently occurs in NZ. For example, visits to an agricultural college would open doors for meetings at high schools, and universities that are all working together to promote agriculture education. Besides education and training organisations, the research process also included visits to a wide range of other operations including services organizations, processing plants, industry good bodies, farms and retail outlets. Meetings were held with a broad range of individuals covering the mentioned sectors and including farmers, recent graduates and prospective employers.

Current position

Education Overview

The New Zealand education system is divided into four areas; early childhood, primary, secondary and tertiary. Education is provided for free for 5 to 19 year olds, but after the age of 16, secondary training is voluntary. Education is regulated within the New Zealand National Qualifications Framework, which ties together qualifications across a range of deliverers including schools and vocational training organizations. The New Zealand Qualifications

Authority is charged with administering the framework and also quality assurance of secondary and tertiary qualifications contained within it, and their providers (excluding universities). This report concentrates on the delivery of tertiary level AE&T.

Tertiary Agriculture Education and Training- Facts and Figures[1]

Funding

In 2007 there was $84 million dollars (4% of the national tertiary education budget) spent on students subsidies in agriculture tertiary education. There is also some industry funding of the AgITO. During the period 2003 to 2007 the subsidy for agriculture students increased by 25% to $10,228/EFTS, the second highest gain behind health, making agriculture education the third most expensive course. The combined effect of an increase in student numbers and fees meant that the total funding of agriculture education doubled from 2003 to 2007.

Student Body

In 2007, 37,000 (8000 equivalent full time students EFTS) students studied agriculture and related subjects at tertiary level compared to just over 16,000 in 2003 (5,000 EFTS). The 53% increase was the second largest rate of increase across all subject areas (behind building and architecture). While this is impressive growth, the issue taken up by TEC is that agriculture is unique in that there are more people trained in levels 1-3 than from levels 4 -10 (1 = secondary school level, 10= PhD level) and the percentage of students at the higher levels has actually decreased. This trend is in the opposite direction for all tertiary courses as shown in Figure 2 below and unfortunately, also the TEC strategy. Agriculture education is also unique in that the majority of students do part-time short courses, this is represented by a ratio of .22 people per full time student, the second lowest (slightly above building) and only half of the average across all study areas and again this is in contrast with the TEC objectives. AgITO plays a key role in providing tertiary level agriculture training to students in employment. The organisation had nearly 6000 students enrolled in 2007, the majority studying at Level 4, the concerning factor is that the completion rates are extremely low, at around 15% half of that achieved through other providers.

[1] Facts and Figures are sourced mostly from the Land-Based Training Review based on 2009 AE&T data, which is the most comprehensive report available at the time of writing.

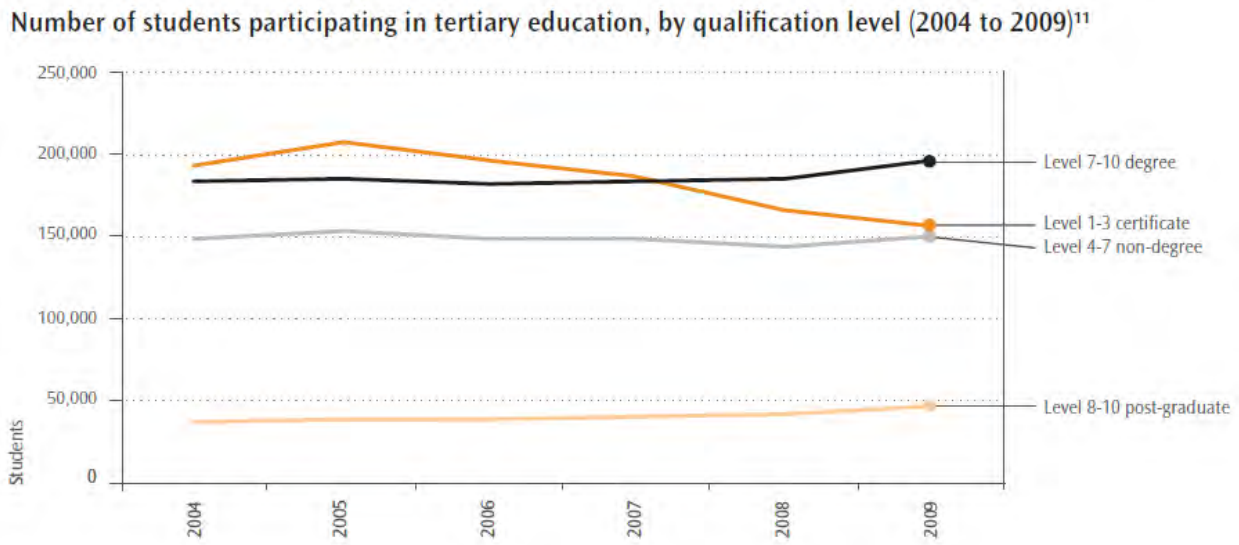


Figure 2- Source: Tertiary Education Annual Report 2010

Student Demographics

The agriculture student demographics are quite different to other courses, this is well documented in the Land-Based Training Review report. Up to two thirds of all students enrolled in land-based courses are male, and over half of these are studying at levels 1-3.

The largest age group of students is 36-45 year olds with a decrease in 18-25 year group during the period 2003 to 2006. This age group is predominately studying at level 7 degree or higher, with female students making up the biggest proportion.

The average completion rate is 30%, with the highest completion rates from the <19 age group and the worst in the 18-25's. In general females have higher completion rates than males, in particular for those aged over 40 where females are nearly double the rates of male students.

Providers

New Zealand's eight universities offer a wide range of tertiary education studies, all include science and most have courses in aspects of technology. However, only Massey in the North Island and Lincoln in the South Island have agriculture courses, Massey University is a much larger provider than Lincoln (850 science with agriculture majors degree students compared to 278 students at Lincoln in 2007, and also twice the number of PhD students studying land based topics), with a broader range of qualifications.

University providers integrate research with education, undertaken and delivered both from staff and post-graduate students. Massey and Lincoln Universities are internationally known for their agriculture and horticulture qualifications. Massey University is solely responsible for training New Zealand's veterinarians.

Around twenty-five polytechnics and several private training establishments complement the universities' role in tertiary AE&T. Telford Rural Polytechnic is the only specialist land-based polytechnic education facility in New Zealand and is based in Otago. There are several private specialist land-based education organizations spread throughout NZ, these are with varying levels of partnership with University and polytechnic providers, primarily sub-contracted for training and service provision for example Agriculture New Zealand.

Most students studying tertiary level AE&T do so through specialist land-based providers, therefore there is merit in developing a model that differentiates funding for agriculture from other sectors and that allows the sector to have input as to where funds should be targeted for the best value. Because of their specialization it is difficult (and in some cases prohibited), for providers to have alternative streams of income, and there are other issues such as retaining quality staff and capability in times with reduced demand.

New Zealand has a range of different Industry Training Organisations (ITO's), including agriculture. The AgITO trains around 8000 students per year, while the students are in paid work, across a range of primary industries. The courses are a blend of practical and theory and cover a wide range of topics from wool harvesting to water industry services. Students attend classes mostly through contracted training providers, and have a local AgITO advisor who assists with keeping them informed and motivated. The ITO's are funded largely through the TEC with support from industry and student fees. The AgITO offers nationally recognized and NZQA approved courses, under a more collaborative model as is often seen overseas, this organization could become part of a combined agriculture industry organization. However, in New Zealand there are currently moves to amalgamate the ITO's and because of this proposed direction, this report will not consider further options of including the AgITO in any potential structural changes.

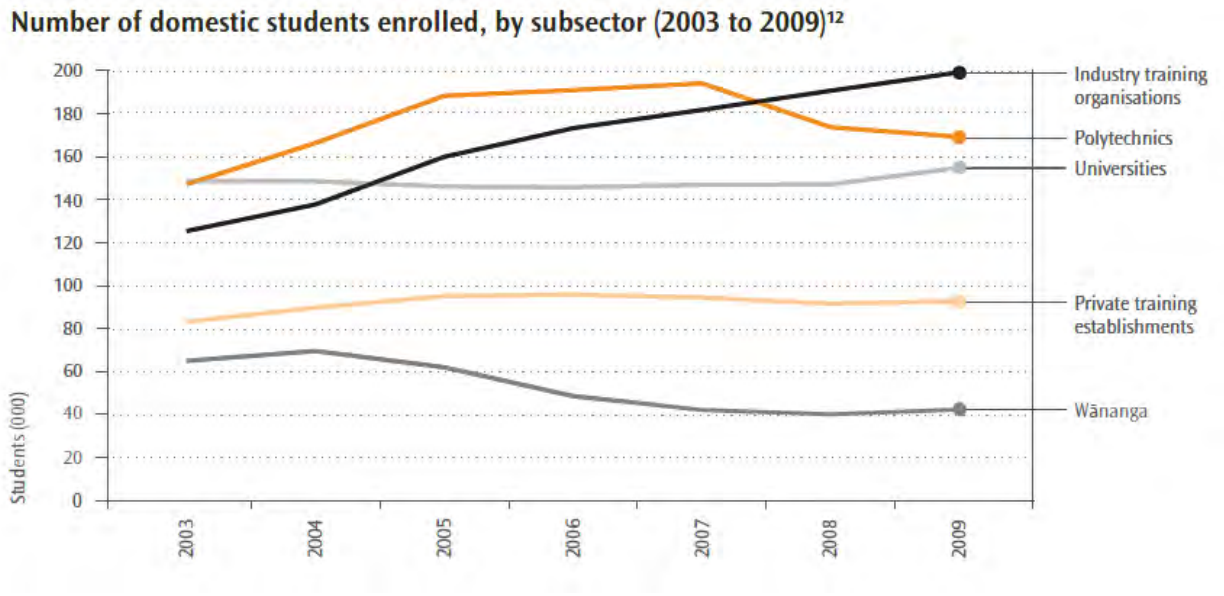


Figure 3- Source: Tertiary Education Annual Report 2010

Value of Agriculture Training

MAF Rural NZ Overview discusses the efficiency of New Zealand farmers, and points out that they are amongst the most efficient in the world and their efficiency is constantly rising. The statistics show that in 1991, the value of GDP per agricultural worker in current terms was $74,000, by 2001 this had risen to $89,000 per employee. The gain in productivity of over 20% is impressive given that during the same period the NZ general economy overall only gained 7%. Much of this gain can no doubt be attributed to the high level of education of our farming community, both recognised formal training and through informal industry provision such as the DairyNZ Focus Farm and Meat and Wool NZ monitor farm programmes. Promoting and delivering high quality training will always be a key driver of ensuring the NZ agriculture industry grows and develops and continues to be competitive and a global leader.

Agriculture Research

New Zealand benefits from an educated farming population, and an extensive network of research and development organizations, and extension services. The Ministry of Agriculture and Fisheries through the Foundation for Research, Science and Technology manage the government's investment in research and development. The Ministry's role is policy development and the Foundation is responsible for purchasing specific science services on behalf of the government. The Crown Research Institutes (CRIs, the biggest being AgResearch Ltd) and universities carry out the majority of the government-funded research and development.

The structure of New Zealand CRIs is perhaps unique in the world. They have been set up as limited liability companies with their shares held by the government. Each has a Board of up to

nine government-appointed directors. The CRI structure provides an open and flexible framework for the management of science, intended to create better collaboration between the public and private sectors in research, development, and technology transfer.

Extension Services

Agricultural extension in New Zealand has gone through a series of transformations since the mid-1980s. The agricultural and horticultural extension service provided by the government was reformed in 1987 when it began to charge farmers and other client's fees for services. In 1992, the service was formed into a stand-alone business unit, MAF Agriculture New Zealand. This unit was subsequently sold to the private sector and now trades as a wholly owned subsidiary of New Zealand's largest agribusiness company. This change is now well accepted by farmers. It has created a profitable consultancy business while delivering a valuable service to the sector. Extension programmes have been improved as commercial entities respond to the demands of clients and funding agencies, again, because of the thorough network of extension services and no formal ties with tertiary education.

Research and Development and Extension

It is unlikely that the New Zealand system will change in the near future for research and extension, as was demonstrated for example, with the failure of the proposed merger between Lincoln University and AgResearch Ltd. Therefore this report will focus on opportunities in tertiary education only and not the trilogy of research, extension and education which is commonly operated through a single organization overseas, such as Teasgc in Ireland or the State Agriculture Colleges in the USA.

It needs to be noted however that the amalgamation of education services and therefore closer links with the research carried out at institutes such as Massey, Lincoln and Telford would provide more appeal and potential for extension services to be closely aligned. Ideally through a holistic approach to education, research and extension from a single organization. In addition, integration of these services could reduce the implications of extension services which are tied to commercial motives, (e.g. seed and fertilizer sales) as is often the case in New Zealand Agriculture.

International Students

The New Zealand agriculture tertiary educational providers cater for foreign fee-paying students, many of whom are now working back in their home countries using the farming skills learned in New Zealand. There are also specialist courses offered as foundation studies for example Lincoln University's courses in English, computing, mathematics, economics and statistics to help prepare international students for New Zealand university courses. Many rural high schools and colleges in New Zealand teach courses on agriculture and horticulture, and many now enroll small numbers of fee-paying students of school age. This is a growing area of education and it is likely as we move towards a global economy, transportation and communication

improves that this will continue to be a growth area, especially for NZ due to its high reputation in Agriculture, and as a safe, friendly, English speaking country to visit.

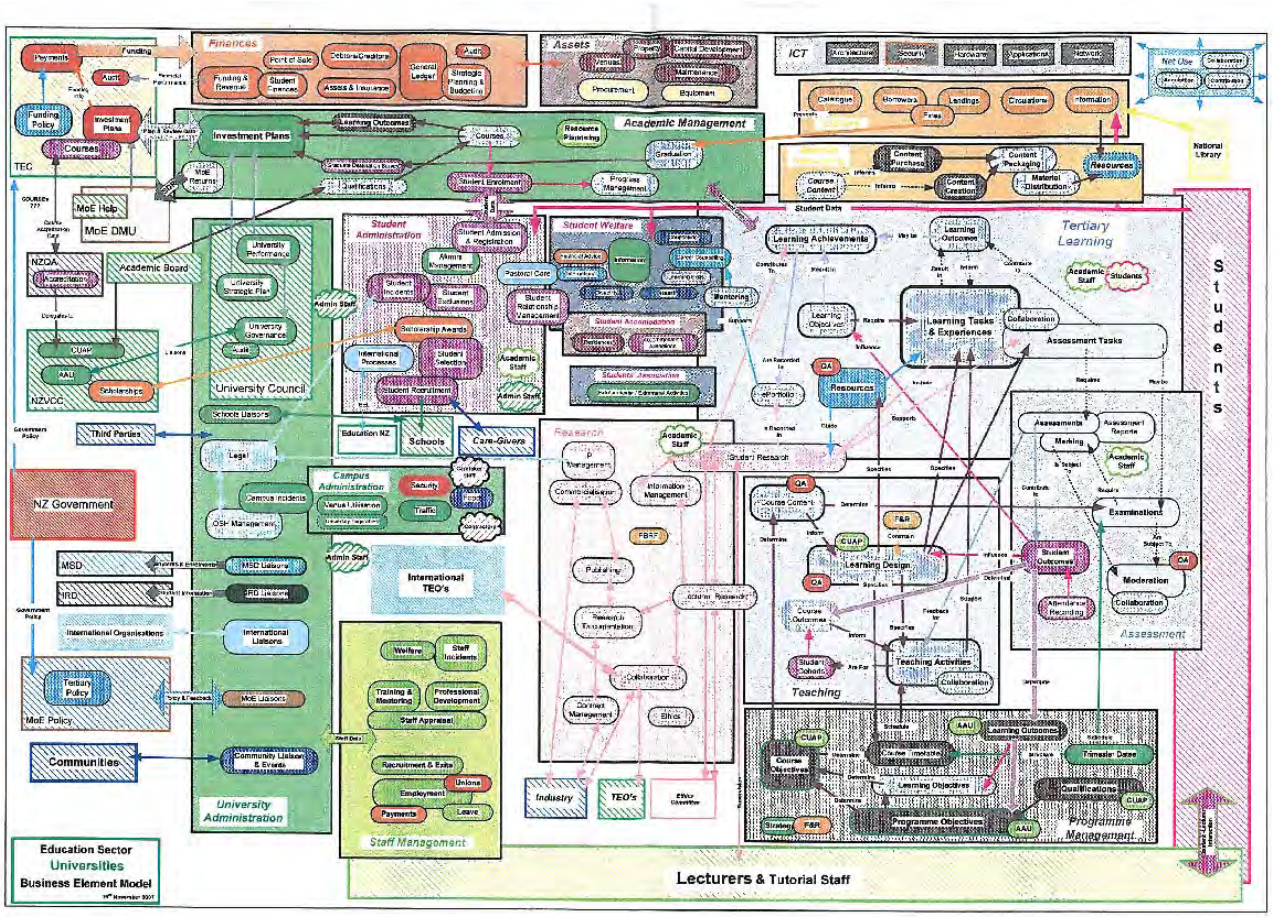
Secondary School initiatives

The secondary education sector has a range of initiatives that help to stimulate entrants into agriculture careers and industry-based education. These initiatives, over time have included programmes such as Education for Enterprise, STAR (block courses), Gateway (industry experience and qualifications), the Youth Apprenticeships Scheme and more recently the Modern Apprenticeship Scheme. The initiatives help to build ties with industry and are supported through relationships with the AgITO, in particular with assistance with work-based assessments. Tying these initiatives together across all providers would really add strength to attracting and retaining people into tertiary agriculture training - successful campaigns from organizations like the New Zealand Police and New Zealand Armed Forces illustrate the value of a single brand and focus.

Graduation photo - courtesy of Massey University

Flow Chart

As mentioned, the New Zealand AE&T model is complex and confusing. The flowchart below shows the tertiary education model for the university sector. It is not intended to be read or interpreted but merely provides an illustrated of the complexity that abounds even just within one level of the sector.



Challenges for Tertiary Agriculture Education and Training

Funding

Tertiary AE&T funding is administered through the Minister of Education with a small amount of funding (to some providers) sourced from the Minister of Agriculture. In addition, industry good bodies sponsor some in-work training organizations such as Agriculture Industry Training Organization (AgITO). As with all businesses, education organizations need to be profitable to exist long term, there is a high level of competition for funds and in general agriculture is more expensive to deliver due to the locations and resources required. Woodford (NZIPIM, 2003) in his review of Tertiary AE&T in 2003 stated that that major issue was around funding and that government funding of Agriculture had declined up to that period. Funding is still the major

challenge for AE&T, however, during the period 2003-2009 funding to Tertiary AE&T increased. Government funding is being reduced across many areas currently due to the impacts of the global recession, tertiary education is suffering and subject areas such as agriculture in particular are at higher relative risk as it is a small component of the overall education budget, and agriculture is one of the most expensive courses to deliver. Anne Tolley (Minister of Tertiary Education) in the Tertiary Education Strategy 2010-2015 states that 'Forecasts show that the Government will not be able to draw on new money for some time. This means that we face difficult choices about where to focus our efforts'. Tertiary AE&T all providers are submitted to close scrutiny from the funding bodies, partly due to a lack of 'fit' within key performance criteria when compared to other industries, such as increasing the following areas- completion rates, the level of study (4<), stair-casing of students onto higher qualifications and the number of under 25's studying. These key areas are clearly spelled out in the Tertiary Education Strategy, and in terms of Tertiary AE&T these issues are magnified because of a lack of critical mass and unity, which will need to be addressed for the industry to make significant improvements in these key performance areas.

The issue of funding being prioritized at higher levels of study is raised and support by the Land-based Training Review, figure 1 below illustrates the numbers of students across all tertiary graduates from lower to high levels, and therefore the imbalance between the numbers of high level compared to low level students. From my background experience I feel the vocational skills are undervalued, a degree, while academically robust did not offer me the variety or quality of on-farm skills that are vital for a successful farming career. It was through my own interest and initiative that I ensured I had the necessary skills to be able to be practically competent on an operating farm. As farms become larger and amalgamated, more technology and internet based systems are used, but these tools do not require Information and technology graduates as future generations are more IT savvy anyway. There is a potential trend for a reduction in the number of degree level staff required per operation, as farms become larger amalgamated, for example Landcorp is forming clusters of farms overseen by a single supervisor. In addition, there is a lot of further work required in technologies such as robotic milking before they will be able to be economic and practical enough to reduce the amount of labour to effectively operate a commercial size farm.

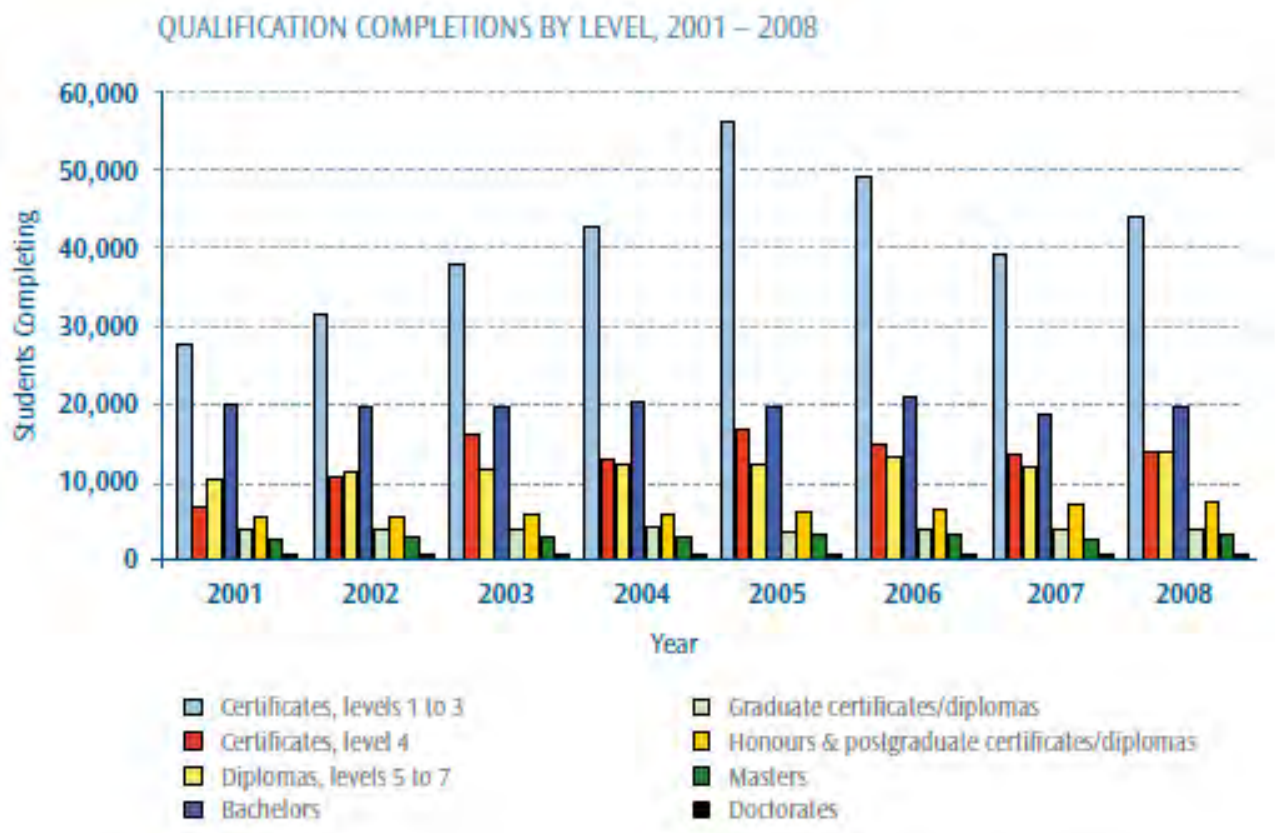


Figure 1- Source: Tertiary Education Strategy 2010-2015

Suitable Students

New Zealand Agriculture's reputation as a career is still recovering from an occupation hang over that started in the 1980's. During this period the NZ economy was in dire straits and agriculture in particular suffered. The result, in many cases was farmers struggling to make a decent living, some went out of business and farming as an occupation was not promoted to the next generation. In recent times there have been excellent opportunities for careers in agriculture but it has taken nearly a generation for people's attitudes and interest in agriculture to change.

Negative attitudes in the past have created a lack of interest from students which led to secondary schools not providing courses and therefore career advice to encourage students into alternatives to the agriculture sector. Unfortunately, in addition, the schools that do run agriculture classes, often will consist of students that struggle academically or are expected to exit secondary schooling early and agriculture classes are seen as a way of providing them with some knowledge to start a 'trade' in farming. It is also difficult for agriculture (along with other practical industries) to gain recognition and credits for practical skills awards so students have some concrete qualifications behind them to build their curriculum vitae.

The issues around promotion of careers in the rural sector is apparent not just in farming occupations but there is also a perceived weak financial reward for agriculture research careers which is resulting in New Zealand losing research capability overseas and to other sectors.

David Carter outlined that ‘all of us in the sector need motivated, keen young people to help run our farms. We need farm assistants, managers, sharemilkers, contractors, and ultimately, farm owners. Off farm, we need more research scientists, farm advisors, bankers and vets. The challenge, it seems, is to make the industry appealing. We must make agriculture more attractive.’ (Speech to AgITO May 2009)

Recently, industry bodies such as DairyNZ and Beef and Lamb NZ have provided open days for high school careers advisors, bringing in young successful people in the agriculture industry, the feedback has been excellent and often there is surprise and interest in the range of new careers and opportunities available now in agriculture.

Brain Drain (or Gain)

Over the last few decades NZ has experienced increasing ‘Brain Drain’ a term used to explain the loss of work age residents, particularly after graduation or in early stages of their career. Overseas countries such as the United Kingdom and Australia were seen as providing improved career opportunities and incomes. Over time, lifestyle and family connections motivate some of the expatriates to return, and it is likely with the global recession starting in 2007 that many ex-pats will not have the same opportunities and may return to work in NZ. The agriculture sector has not been spared, there have been many opportunities for land-based skills globally and New Zealanders are seen as being the cream of the crop, particularly in terms of pasture management and agribusiness knowledge. Of additional concern is the static or declining numbers of students in traditional agricultural courses at university level in the last decade, this is causing a loss of teaching and research capability in these areas as universities are forced to rationalize staff.

However, it could also be argued that over the last decade there has actually been a ‘Brain Gain’ to NZ; many highly qualified people from countries such as South Africa and Asia have moved to NZ to seek opportunities and often a safer political environment. Data from the Ministry of Science and Technology indicates that in 2007 there were more people with university level qualifications arriving in New Zealand than leaving. In many cases the immigrants have high level qualifications in agriculture related areas but lack suitable experience relevant for New Zealand agricultures stock types, scale and intensity. Due to the demand for agriculture staff and services in NZ, we have welcomed the influx of immigrants and the dairy industry in particular has put systems in place to encourage, educate and retain overseas employees. It is likely that in the future NZ will have to continue to improve and develop its means of attracting and educating agricultural employees both nationally and internationally.

Efficiency and Critical mass

Land-based Training Review

In 2009 the Tertiary Education Minister requested a review of New Zealand Tertiary Education in sectors of high socio-economic importance, and the land based industry was used as the pilot sector. A representative group covering a wide range of skills and backgrounds in the agriculture education industry was put together and the resulting document was the Land-based Training Review. The report, after much study and contact with stakeholders compiled comprehensive and well documented recommendations to the TEC and the Minister. The basis of the report was that NZ land-based training needed to make significant changes to continue to be viable in the future.

There were some key comments provided during the consultation process, and I will outline some of the more pertinent areas of interest to this report.

Complexity & Critical Mass

There was some interesting commentary regarding the current complexity of tertiary agriculture education and that it includes a variety of overlapping funding and a plethora of courses and qualifications (323 accredited qualifications and 4376 courses). Feedback suggested this leads to a perception that there is no liaison or co-ordination among the different providers within a level e.g. polytechnics, or between levels, e.g. between universities and polytechnics. This results in unnecessary duplication and costs of operating courses and institutions. It could also be argued that given the relatively small size of the New Zealand agriculture tertiary education sector compared to our global counterparts that there is insufficient critical mass and therefore little or no advantage in having so many providers and the competition and the 'patch protection' that exists between them. Another issue that needs to be addressed is the high amount of sub-contracting carried out in the agriculture tertiary sector, this can be perceived to increase overheads and a degree of ticket clipping and education services being impacted by the retention of profit margins for multiple institutions through the funding of a single student, an fully amalgamated agriculture tertiary sector would eliminate sub-contracting to a large degree.

Agriculture Study Design

Another point that was raised through the consultation process was that agriculture education was often more attractive and valuable when it was lower levels such as 3-4 and was able to be conducted in short periods and to fit within the seasonal nature of agribusiness. This was in contrast to the standard education system where long-term, full time study produces more valuable higher level qualifications. Woodward (NZIPIM, 2003) stated that 'it is likely that tertiary study will increasingly be undertaken on a part time basis by mature-age people and often in extramural mode'. The statistics demonstrate this was a correct assumption but as such is in contrast to the key areas set out by the Tertiary Education Strategy 2010-2015.

For various reasons the recommendations of the Land-Based Training Report were not instigated by the Minister, however, several of the themes are evident in the merger proposal between Lincoln University and Telford Rural Polytechnic.

International Structures

In terms of agriculture education structure and models, the consistent theme overseas was that amalgamations and collaborations are standard. It would therefore seem logical that in New Zealand, if these initiatives are not undertaken voluntarily then it will be implied through funding or governance changes. New Zealand AE & T has been for some time, and will continue to be, under the same challenges as our overseas counterparts. It is naive of us to think that the model that has worked for us in the past will continue to do so in the future, change is inevitable, and in my opinion so is simplification of our model to gain efficiency and critical mass.

The merger business case for Lincoln University and Telford arose during the course of my study year - this merger has now proceeded and is being implemented in 2011. The business case lists some advantages in strategic alliances, observed from business strategies overseas, these include:

1. Increased efficiency and effectiveness
2. Under-performing institutions addressed
3. Reduced competition for funding and students
4. Critical mass, particularly around staffing quality and quantity
5. Advantages in compatibility and complementarities
6. Increased favour with government bodies

These advantages concur with the research discussions I had with various institutions overseas. There were also some negatives that were discussed. These include changes or loss of brand, perceptions around reputation for example a university taking on vocational training or students at a lower academic level. For the land owners, there were some concerns raised as to the maintenance and development of the land and facilities when under new governance and asset stripping was a concern for some parties.

International relationships

Overseas NZ technologies and knowledge particularly around pasture management, stock handling and technology is well regarded. There is a large amount of interest into NZ farming systems and technologies which could be realized with increased education of international students, exchange programmes and NZ education facilities based off-shore.

During the international Nuffield tour I presented to several farmer groups, discussing NZ agriculture education and training and management of our pasture based systems.

Rationalisation of Qualifications

The Land-based Training Review recommends that the plethora of courses and qualifications in the agriculture tertiary education sector needs to be rectified. There are over 200 accredited qualifications in the sector, the majority at certificate and diploma levels with only around 25% of these being National with the balance being locally developed. The local qualifications have been developed by individual providers, in a collaborative model there would be no sense in the duplication of these qualifications. More than ever before we anticipate graduates to move throughout the country and the world, applying their skills to a range of industries and systems over the span of their career, this undermines the argument that locally provided qualifications provide more value than nationally developed qualifications.

Overseas Agriculture Education and Training Models

There are a range of models used overseas, of particular note was the high amount of collaboration between institutions and taken to the extreme would be the Irish (Teagasc) and USA state (E.g. Georgia University) systems where research, extension and education are all run through the same organization.

NZ appears to have the most disintegrated agriculture education model. Most parts of Australia and the UK have combined colleges with universities to gain efficiency, critical mass and extension of new knowledge and technologies. This is similar to the Irish and USA models that combine education, research and extension in one organization.

Australia

Melbourne University, Australia is a good example of vertical integration with close relationships between the University, colleges and TAFE vocational training. They cover a range of education levels from short courses through to full time higher education with the more practical courses being provided at specialist sites such as Dookie Agriculture College. Amalgamating has improved its efficiencies in research, extension and secondary benefits such as student stair casing, admin, staffing and recruitment. Senior management at Dookie Ag College miss being stand alone but acknowledge that the college would not exist without amalgamating because of reduced student numbers and funding. Alternative funding from animal research into human health for example, have ensured the college campus is viable even though student numbers have reduced.

An interesting example of horizontal integration in Australia is the Australian Agricultural College Corporation (AACC) which was formed in 2005 when the Australian College of Tropical Agriculture (incorporating Burdekin Agricultural College and Mareeba Environmental College), Dalby Agricultural College, Emerald Agricultural College and Longreach Pastoral College joined forces. AACC combines agricultural education and training in a range of specialisations, across five campuses located in a range of different geographic and climatic regions.

Ireland

The majority of agricultural training in Ireland is organized and delivered by Teagasc. This organization was developed through the merging of research, education and extension services and covers university level, colleges, apprenticeships and farmer extension. Of specific interest was that Teagasc provides the qualifications which can either be delivered by their institutions or through private providers but this ensures efficient development and consistent qualifications across all providers, something that NZ does not do well. Ireland probably has the ideal system, but it does have its challenges. In discussions it was noted it took a generation of time to change the culture and improve the effectiveness and efficiency of the working relationships when the three separate entities were combined.

Wales

The Wales education system is focusing funding on encouraging improved education for years 14-19, in addition there is a focus for schools to provide more vocational training to increase work readiness. Both of these initiatives are increasing awareness for agriculture vocational training. In Western Wales, Caereinion High School has joined forces with two other secondary schools in the region, all of which could be at risk for closure due to small size. The schools have shown initiative and volunteered to work together to provide more vocational training, with each school being a lead provider for specific areas, including agriculture. The system includes moving either teaching staff and/or student classes to allow joint teaching. This has required some re-designs of timetables and other disruptions but is seen as having a lot of merit to improve delivery for the district and provide critical mass and a more secure future for the rural schools. Another initiative is the strong relationship formed with Llysfasi College where Year 10 & 11 students spend at least one week per year in practical training. The college provides its own tutors and facilities for the practical training and offers students further agricultural training options.

Llysfasi College is in the process of merging with a range of other colleges, the aim is to set up centers' of excellence, and for example equine ttudies will be focused at one campus, while dairy training will be provided at another. Again, as is the case at high school level, this is a means to increase critical mass, share back room services (marketing, administration, auditing, financials etc). The colleges are delivering significantly more higher level qualifications than in the past and are on many fronts competing with the Universities, this is the opposite trend to most other countries colleges who are being merged with universities rather than competing with them.

England

Harper Adams has an excellent reputation amongst agriculture training providers it is placed in the top ten higher education training providers in the UK, and has been named 'University College of the Year' for the last four consecutive years. Originally developed as an agricultural college it has its own University status. The institution is called the Harper Adams University College and still specializes in land based training but has extended the range of subject areas to include engineering and environmental studies. The grounds and facilities are very impressive and the recent regime of investing heavily into facilities is paying for itself in the increase in high quality scientific papers and post-graduate students. Their reputation is such that they attract many students from Wales and Ireland for undergraduate courses, and their post graduates come from all over the globe. Harper Adams has developed a role as an advisory and overseer for other providers, they have a range of colleges and institutions that deliver programmes which are endorsed and validated or in some cases, jointly developed and delivered with the university college.

Newton Rigg College campus now operating under the governance and management of the University of Cumbria, a typical example of the mergers and amalgamations throughout the United Kingdom

France

The passion and the flair of the French extend well into agriculture education. Agricultural training is funded through the Ministry of Agriculture not Education. There are around 2% of French 12-16 year olds attending specialist agricultural high schools, there schools cover all general subjects but specialize in agriculture and have three strands - general agriculture, technology, and professional. During these courses students can gain direct entry to university, or continue on to Agricultural School which provides qualifications up to diploma level. After that students can do a specialist Agriculture Degree, or attend any other university for post-graduate qualifications. Generally, each district (90 in France) has 1 major large scale specialist high school (and 2-4 Ag peripheral smaller High Schools with 1-2 Ag Schools.

USA

Agriculture has played an important part of the initiation and design of the North American Tertiary education system. In the early 1860's each state was offered a 'Land Grant College', a gift from the Federal Government to the Local Government to ensure that agriculture and land based training was catered for in each State. Today, the majority of these colleges still exist on the same gifted land, but have over time expanded their resources and in particular the range of subjects taught so that in most cases agriculture is a small part of the operation. The University of Georgia is a very well regarded and reputable university - as is the Agriculture College within. The university gains around US$80 million per year, of mostly State sourced funding. The main activities for the University are Research and Extension which are of equal size, the Teaching component is less than half the size; even though they have around 34,000 students (2,200 enrolled in the Agriculture College). Over half of the undergraduate 'Ag' students are enrolled in biological sciences, with around 400 in post-graduate studies. There have been some interesting trends, with historically the vast majority of students male and from farming backgrounds, today more than 50% of students are female and only 10% come from farming families.

The states have a fully collaborative agriculture model with universities responsible for providing education, research and extension. In Georgia there are in excess of 150 counties which all have a university appointed extension officer for consultancy ranging from agronomy to agribusiness and across a wide range of farm and crop types. The officers have direct access to the relevant university professors for research and technology transfer. However, due to the recession and restricted funds, (20% decrease in 2010, with another 20% reduction in 2011) the number of extension officers will be reduced.

Approximately 30% of the undergraduate students will do some study or work experience out of the USA, and around half of the post-graduate students are international.

Model Options

As discussed there are a range of models used overseas, however, the over-riding factor is the high level of collaboration and amalgamations. New Zealand AE & T has significant potential to review and change its current model, the options discussed are the 'Status Quo', 'Horizontal', or 'Vertical Integration' or a fully collaborate model.

Status Quo

David Carter (Minister of Agriculture) in his May 2009 speech to AgITO suggested 'currently we are disjointed in our approach to education and training. It is confusing to students and employers alike' He continued by stating that important aspects included attracting the right people to do the right training, which is relevant to industry demand and has close connections into the work force.

The most critical part of his speech was his comment that 'Strong leadership and vision is required in order to improve the state of agricultural training in New Zealand'. David Carter 14th May 2009

The current system does not have strong leadership or a united vision; therefore I don't think that status quo is a viable option, the only way forward is for a wholesale amalgamation of agriculture education and training in New Zealand.

New Zealand research is closely aligned with education via our university system, however extension provision is not, as there is a wealth of private agriculture consultants and service industry representatives that provide advice and consultancy to farmers. Firstly, New Zealand should amalgamate its education services before embarking on research and extension activities.

Horizontal Integration

Horizontal integration has a range of possibilities in New Zealand Agriculture Training. There are substantial potential advantages for organizations like Taratahi, Telford, and Smedley to jointly develop resources and share marketing and administrative services. This would require a change in the status of some of the providers as at present they are structured and funded via different methods, even though they largely deliver the same training to the same target audience. Other potential risks to agriculture training would be the merging of Land-based training with general urban based tertiary education providers at the same level. Under this scenario it is likely that agriculture provision would decrease over time as the resources and cost of delivering agriculture courses is quite different to other more urban careers and trades. There would also be a risk that agriculture providers who generally have a much higher value of assets, such as training farms and facilities may be stripped overtime.

Vertical Integration

Vertical integration has opportunities to deliver to the TEC goals of increasing training pathways and offering more stair casing for students. An example would be a polytechnic or college merging with a university. Advantages to the merged institution would be the reduction in overheads via shared services, increased availability of experts for delivery of technology transfer and teaching. Tertiary education will then have the ability to provide the lead role, resources and personnel to help delivery of agriculture programs of study into secondary schools and trade academies.

The potential risks would be the loss of delivery and focus on agriculture if the merger was not between specialist land-based trainers. Within land-based training, there are risks that vocational training may be lost amongst a more academic based university system, and the converse also applies, that there could be a perceived reduction in the status/reputation of the university by providing vocational training. The proposed Lincoln University and Telford Rural Polytechnic merger is a good example of a potential vertically integrated Land-based training organization. A copy of the business plan can be found on either institutes, or the TEC websites.

Collaborative Model

Throughout the agricultural education world, amalgamations and collaborations are standard. New Zealand is probably at least a decade behind our international equivalents in terms of the vision and structure of agricultural training.

This is in line with, but will fast track, recent trends to increase working relationships and collaboration via initiatives such as the Lincoln Plus Model, Centre of Excellence, Lincoln-Telford Merger Proposal.

I think that for New Zealand to catch up and compete with International trainers we need to leap frog to a model that will be competitive in twenty years time, not tinkering for improvements in the next 2-3 years.

A wholesale collaboration of all tertiary agricultural providers in New Zealand has a broad range of advantages.

1. It provides us with critical mass to develop and strengthen relationships with stakeholders
2. Consistency of qualifications wherever you study
3. Streamlining and efficient QA and auditing procedures
4. Efficient and simplified course development systems
5. Improved ability to deliver to international students and internationally
6. Improve financial returns with reduced duplication and competition
7. Combined backroom services to improve systems for admin, reporting and benchmarking
8. Provide a single desk seller if New Zealand agriculture training is to be sold overseas
9. Improved ability to deliver a wide range of Ag training courses and levels through other avenues (trade academies, high schools, correspondence, e-learning etc)
10. Increased ability for individual providers to offer topics around current fringe topics such as marketing and environmental studies
11. Increase levels of student uptake by providing various mediums for enrolment and admin (internet, face to face etc)

12. Increased budget and focus on attracting more students into agriculture as a career choice

The above points will help to develop a strong NZ agriculture education system which will in turn help to continue to improve and develop means of attracting and educating agricultural employees both nationally and internationally.

For example if we are to tackle new areas of training, e.g. Maori agricultural training, it will be simpler and more efficient for one organization to develop the course and associated resources.

Any amalgamations, either vertical or horizontal that are not majority operated for land-based training will be at the detriment of the land based industries, for this reason I don't believe there is any long term value in agriculture training institutes merging with general education institutes as invariably the agriculture courses will be seen as too expensive, too difficult and the institute commercial indicators and personal on the directors boards are unlikely to be sympathetic to the needs of the land based sectors.

The TEC and industry groups have invested in a partnership for excellence between Massy, Lincoln and Industry called the Agriculture Life Sciences. This is an interesting initiative but again I see this as not driving deep enough, collaboration should be applauded this venture does assist some of the critical mass issues, but having these separate organizations with separate overheads and profit margins working together does not seem to provide a more cost effective basis for genuine long-term research advancement.

Overseas NZ technologies and knowledge particularly around pasture management, stock handling and technology is well regarded. There is a large amount of interest into NZ farming systems and technologies which could be realized with increased agriculture training off-shore. There is also potential for increasing international students and exchanges in agriculture, all of these opportunities are best developed and delivered through a collaborative model.

Proposed Model for New Zealand Agriculture Training

Collaborative Model:

Given New Zealand's isolation and small scale the most efficient model would be a collaborative Agriculture Training system where all qualifications in were developed, assessed and audited through a governing body, and the individual providers would be amalgamated. This would greatly improve the efficiency and simplicity of agriculture education by reducing duplication of resources and materials and ensuring consistency throughout the country.

The Minister for Agriculture, David Carter in his speech to AgITO in May 2009 stated, 'I encourage agricultural training organisations to work together to create pathways, and I would suggest that Ag ITO has an important leadership role in this. To this end, I understand that a primary sector group of ITOs, collectively representing 35,000 trainees, is being formed to cooperate in several areas including policy development, the development of joint qualifications, staff training and joint careers promotion.' David Carter 14th May 2009

I think there is a good justification for his comments but they don't go nearly far enough, collaboration needs to include all levels of agricultural education, not just in-work or vocational training. The whole industry needs to amalgamate to ensure there is a viable and successful future for all levels of Ag training.

The Land based Training Review suggested that many of the challenges raised around the current agriculture tertiary training model can be resolved by improved co-ordination and collaboration of the relevant agencies and entities. While this is a noble goal, I think that realistically in a competitive business where providers are grabbling to attract students and remain financially viable then business objectives and human nature will mean the collaboration will be limited in value and longevity. A longer term and more strict regime is required to enforce co-ordination and I feel that full collaboration of providers is required to achieve this. In addition, the assertions that initiatives such as the *Industry Strategic Training Plans and Regional Statements* will improve delivery through a network of providers is wishful thinking, the first priority should be to reduce the network of provision to a single provider with a range of locations. Formulating a single strategic statement and providing consistent training throughout the nation should be primary goals.

The boundaries of the collaborative model would need to be identified early on, for example the ITO's have recently investigated a merger of all of the primary industry ITOs which would include sectors such as horticulture, equine, forestry and seafood which are currently outside of the scope of this report. If the Primary Industry ITO's all merged then it may be that the ITO's would sit outside of the tertiary training model but ideally would use the same courses and resources but would be administrated through a separate governance body.

Implementation

There are a range of issues in tertiary AE & T that need to be resolved to have an efficient and effective sector for the long term. I believe it is vital that the decision making around objectives and design of agriculture tertiary training courses needs to be kept within the protection and control of the agriculture industry, the only way we can have sufficient power to affect this is to amalgamate into a strong sector and have funding for AE & T separate from general education. We also have to be realistic that as an Industry we have to be the makers of our own destiny, it will take strong vision and leadership from within our sector to make these changes possible, it is likely that the change will be driven from the industry sectors, using a vehicle such as the Industry Leaders Forum, currently chaired by DairyNZ's Mark Paine.

The Tertiary Education Commission as our funders, have clearly stated where they see the limitations of tertiary agriculture education and training. To be competitive for students and funding, (nationally and globally), we need to re-design our current disjointed system dramatically into a simplified, sustainable model. The only option that can realistically achieve the potential outcomes I have listed, and provide protection to what is a majority of specialist providers is a fully collaborated agriculture model, with separate funding from general education, which will provide the critical mass and business systems that will allow us to be a competitive and sustainable in the long term.

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