

17 March, 2023

The Mackenzie Study

A Longitudinal Survey of
Nuffield and Kellogg Scholars'
Entrepreneurial Leadership Skills

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The Mackenzie Charitable Foundation has undertaken research alongside the New Zealand Rural Leadership Trust to investigate the contribution of Kellogg and Nuffield alumni to Food and Fibre. The research period covers 72 years of Nuffield and 43 years of Kellogg Rural Scholarship.



ISBN 978-1-7385880-0-8

Abstract

The objective of this report is to collect data measuring within-person gains in entrepreneurial leadership in the service of accumulating a world-class evidence base that documents the entrepreneurial capability-building that occurs as a result of the Kellogg and Nuffield leadership development programmes.

We conducted our first alums survey³ with the New Zealand Nuffield Alums (178 at the time of the survey). Through this process, we learned several ways to refine the survey and then ran a similar survey with Kellogg Alums (960 at the time of the survey).

The results from the New Zealand Nuffield and Kellogg Alums are remarkable. One of the extraordinary findings is the very high rate of self-employment compared to New Zealand as a whole (over 60% for Nuffield and Kellogg, respectively, compared to 7.5% nationally,⁴ 28% in the dairy industry and 30% in the red meat and wool industries⁵).

Entrepreneurship is frequently measured in economics as the proportion of workers in self-employment. By that admittedly broad measure, farm entrepreneurship is sky-high and very much alive and well among alums. We have seen very few data sets in New Zealand with self-employed proportions that large.



NUFFIELD
NEW ZEALAND
FARMING SCHOLARSHIPS



KELLOGG
RURAL LEADERSHIP
PROGRAMME

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³The first survey used upper-band data sets. This final report uses mid-band data sets to generate a more conservative measure of in-person gains attributable to either the Nuffield or Kellogg Programmes.

⁴Fabling, R., (2018), *Entrepreneurial beginnings: Transitions to self-employment and the creation of jobs*, [Motu Working Paper 18-12], Motu Economic and Public Policy Research, p. 3, Retrieved from https://motu-www.motu.org.nz/wpapers/18_12.pdf (Accessed 15 October 2022).

⁵Ministry of Primary Industries, (2022), *Food and Fibre workforce: snapshot*. Retrieved from: <https://www.mpi.govt.nz/dmsdocument/50932-Food-and-fibre-workforce-Snapshot>

■ Introduction

The Mackenzie Study aims to build a rigorous evidence base documenting within-person gains in entrepreneurial leadership skills (using before-after surveys for individual cohort members) attributable to participation in the Kellogg or Nuffield programmes.

This report builds on the initial progress report dated February 2021. It focuses on the Nuffield and Kellogg alums surveys conducted in June and November 2021, respectively. The methods used to measure entrepreneurial leadership skills (ELS) draw on international peer-reviewed academic literature in experimental economics, psychology, and management science. In addition, we measured 30 theory-based ELS behaviours, and more than 10 ELS-influenced real-world outcomes and collected demographic information such as age, sex, ethnicity, geographic region, farm type(s), and which industries in New Zealand's agricultural economy participants have worked in.

Among the most widely cited and influential academic approaches to ELS are Lumpkin & Dess's (1996) entrepreneurial orientation⁶ (EO) and dynamic capabilities (from New Zealand's own David Teece and colleagues⁷), which the NZ Productivity Commission is currently using and MBIE as a framework for designing policies that increase productivity, export revenue generated by New Zealand's primary industries, and improve well-known economic development outcomes. EO is defined as innovativeness, proactiveness, and willingness to pursue purposeful risk-taking. Teece's dynamic capabilities have been defined as sensing opportunities (and threats), seizing opportunities, and transforming or reconfiguring production processes (including both intangible and tangible assets). Experimental economists have focused on measuring risk tolerance, future-orientedness, and trust. We have applied the best available measurement techniques and extended them to focus on entrepreneurial network formation (size, quality of information flows, trust, and frequency of interaction⁸).

⁶One of the most highly cited articles influencing management science and the overlapping behavioural sciences that work on measuring entrepreneurial behaviour, Lumpkin & Dess (p. 136) define EO as "processes, practices, and decision-making activities that lead to new entry" (i.e. new product development and/or new business starts).

Lumpkin, G.T. and Dess, G.G. (1996) Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. *Academy of Management Review*, 21, 135-172. <https://doi.org/10.5465/amr.1996.9602161568>

⁷Teece, D.J. (2007). Explicating dynamic capabilities: the nature and micro foundations of (sustainable) enterprise performance, *Strategic Management Journal*, 28(13), 1319-1350.

Teece, D.J. (2016.) *Dynamic capabilities and entrepreneurial management in large organizations: Toward a theory of the (entrepreneurial) firm*. *European Economic Review*, 86, 202-216.

Teece, D. & Brown, K. (2020). *New Zealand Frontier Firms: A Capabilities-Based Perspective*. White Paper: NZ Productivity Commission.

Teece, D., Pisano, G. & Shuen, A. (1997). *Dynamic Capabilities and Strategic Management*. *Strategic Management Journal*, 18 (7), 509-533.

⁸Berg, N., Boyle, Z., Clink, R., Cummings, S., Pirini J. (2020), *Entrepreneurship Nurturing Organisations (ENOs) foster business growth and well-being* [with foreword by the Minister of Economic Development]. *NZ Entrepreneur* (Sept. 11, 2020).

<https://nzentrepreneur.co.nz/entrepreneurship-nurturing-organisations-enos-foster-business-growth-and-well-being/> (Accessed 15 October 2022).

Clink, R. and Berg, N. (2021) *Measuring multiple dimensions of Entrepreneurial Capital (EC): How to do it and why it matters for NZ's productivity, standard of living and wellbeing*. White Paper: Ministry of Business, Innovation and Employment, NZ.

■ Introduction - *continued*

Finally, we have measured real-world entrepreneurial achievements by counting new business starts, FTE jobs created, export revenues, the number of leadership roles of various kinds, volunteer work, and engagement with environmental and Iwi-led organisations. The result is a rather long list of theory-based, real-world measures specific to each participant referred to as the participant's ESL profile.

Nuffield and Kellogg Alums provide a valuable survey population. Each programme is longstanding. The Nuffield Farming Scholarship has been operating continuously in New Zealand since 1950 and has international linkages through Nuffield International. The Kellogg Rural Leadership Programme has been operating in New Zealand since 1979 and has international linkages through the International Association of Programs for Agricultural Leadership (IAPAL). While Scholars are selected for each programme and produce a substantive individual research report, the programmes have distinctly different approaches.

Nuffield Scholars are, on average, in their 40s. They are rigorously selected and undertake a largely self-guided international exploration of significant Food and Fibre challenges and opportunities. The Nuffield Scholarship is conducted over 15 months and includes at least 16 weeks of international travel. Scholars travel some of the time with an international cohort in their year group. The Programme aims to develop insight and foresight that helps keep New Zealand at the global forefront of Food and Fibre-producing nations. Leadership development is an outcome of each Scholar's experiential journey rather than an output of the Programme. At the time of the survey, 178 Nuffield Scholars had been selected since 1950.

By contrast, Kellogg Scholars are, on average, in their 30s. The Kellogg Programme is a facilitated programme run over six months. Again, Scholars are selected for the Programme. Each programme can take up to 24 Scholars, meaning more Kellogg Scholars graduate than Nuffield Scholars. Leadership capabilities are a defined learning output of the Programme. At the time of the survey, New Zealand had produced 960 Kellogg Scholars.

■ Overview of work completed

Two populations of leadership programme alums were surveyed: the Nuffield alums and Kellogg alums. We collected 68 responses from Nuffield alums and 234 responses from Kellogg alums.

The ‘strength of evidence’ in the evidence base can be quantified using the technical concept of ‘statistical power,’ which is the probability of detecting unusual achievements in farm-related entrepreneurship of a hypothesized size and type. The motivation for constructing this evidence base is so that, as its sample size increases through time, the signal-to-noise ratio increases with the sample (i.e., the precision of measurement improves as a function of sample size or, equivalently, that ‘noise,’ which is defined as sampling error, decreases).

The design’s objective is to measure the multiple factors that determine ELS, which, in turn, influence substantial real-world outcomes such as new business starts, job creation, export revenue generation, leadership roles, and productivity gains. Once measured precisely and meaningfully enough, the ELS can be made observable and measured to compare genuine differences between the Nuffield and Kellogg alums populations’ achievements in entrepreneurial leadership against population averages, or, with an appropriately defined control group, compared with non-alums that had similar opportunities to demonstrate entrepreneurial behaviours and achievements in leadership. Thus, as the sample size increases in the future, the evidence base we are building will give increasingly precise results with increasing ‘statistical power’ to detect gains in entrepreneurial-leadership skills.

Drawing on international peer-review literature backed by numerous replication and validation studies, the multiple outcome variables summarised in this report (measuring frequencies or proportions of specific professional outcomes achieved and theory-based behaviours and attitudes exhibited) should be interpreted as a measurement of the multiple factors that define entrepreneurial leadership.

■ Overview of work completed

- *continued*

With the current sample sizes, we can be increasingly confident that the results reported in the previous Progress Report showing significant gains in entrepreneurial-leadership capability from baseline through programme completion among the current cohorts of Nuffield Scholars and Kellogg Programme Participants are real and well-distinguished from sampling error. Continuing to collect before-after surveys in the future would achieve greater precision and an ever-strengthening evidence base documenting gains in entrepreneurial leadership associated with participation in the Nuffield and Kellogg programmes. This evidence base, therefore, provides a meaningful way to assess how Rural Leaders' Nuffield and Kellogg programmes influence participants' ELS profiles which, in turn, translate into expected economic and social benefits of substantial size.

The Otago team working on The Mackenzie Study has developed purpose-designed measurement instruments and computer code to provide consistent statistical evaluation of the evidence base and each additional cohort's contribution. To the greatest extent possible, we have automated the analysis of each additional round of survey data to ensure consistency across cohorts and specific leadership programmes. This work on automation is ongoing. The goal is to stand up a largely automated system that will enable the Rural Leaders' evidence-base to continue accumulating into the future with before-after surveys after the currently contracted study is complete. In addition, the automation will enable more statistical precision (which increases as a function of sample size) as future cohorts' baseline and exit surveys are added.

The alums' surveys recorded the professional accomplishments of the Nuffield and Kellogg alums, such as new business starts, jobs created, and the number of senior leadership roles alums have served across different sectors of society. The alums' surveys also document alums' views on how they benefited from participating in the Programme.

Nuffield Alums Survey



Invitations to 135 valid email addresses for Nuffield alums were sent in June 2021. Over half responded, achieving an unusually high participation rate despite the floods in the Canterbury region, which unfortunately coincided with the timing of email survey invites.

Key results

Figure 1. Year Entered Programme in 5-year bands starting in 1965, frequencies (top) and percentages (bottom), N=61

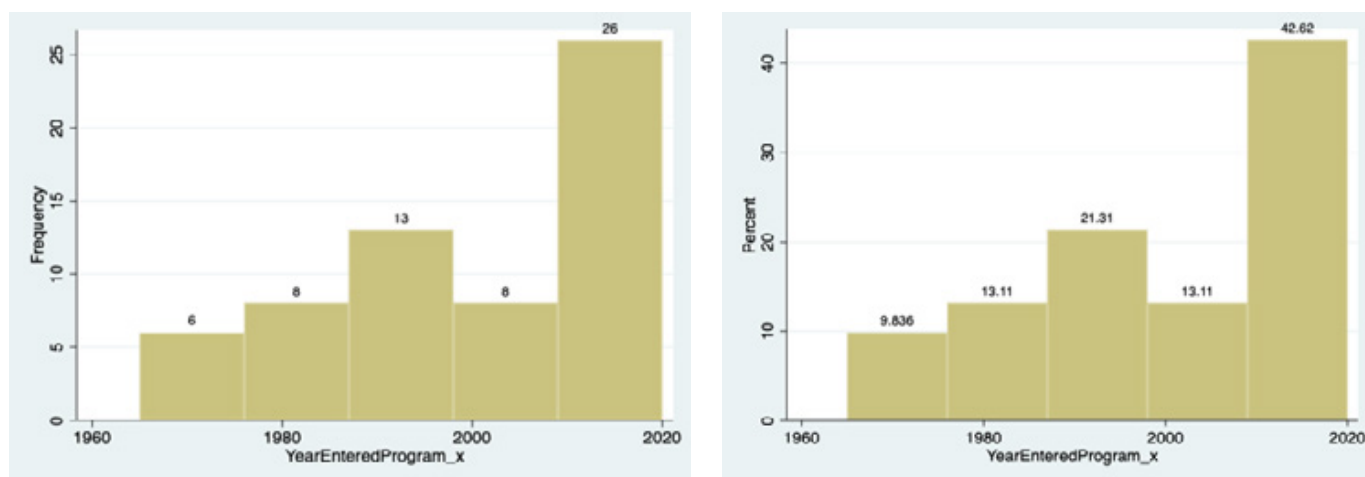


Figure 1 shows the year in which Nuffield alums entered the Programme. It shows the alums network's broad range of ages. In **Figure 1**, 'year-of-entry' cohorts are binned into 5-year bands (1965-1969, 1970-1974, 1975-1979 ... to the present). More than half of the alums participated post-2000.

When the Programme started, the issuance of scholarships was limited to one to two scholars per year. From 1994 to 2012, scholarships expanded up to three. Since 2013 up to five scholarships have been awarded per year.

Table 1. As a result of being a Nuffield Scholar, I was better able to...
(N = 59 respondents)

variable	frequency	percent	description
BA2farm	49	83.1	Improve my own farming systems and production
BA2createNewProduct	17	28.8	Create a new brand or product
BA2startBiz	15	25.4	Start a business
BA2startOrg	18	30.5	Start another type of new organisation
BA2createJobs	22	37.3	Create jobs
BA2export	16	27.1	Export to overseas markets
BA2productivity	32	54.2	Improve productivity in an organisation that I worked for (e.g. improve yields, product quality, revenue per fulltime worker, reduce waste, etc.)
BA2infoNetwork	55	93.2	Expand my social network of people with high-quality information/expertise
BA2earn	22	37.3	Earn more money than I would have otherwise
BA2wellbeing	39	66.1	Achieve greater overall wellbeing than I would have otherwise
total # ways they benefitted cited:	285		
			Serve in a governance or leadership role...
BA2leadership_corp_board	37	62.7	on a corporate board or for-profit industry group
BA2leadership_industry_good	42	71.2	in an industry-good organisation
BA2leadership_not4profit	35	59.3	in a not-for-profit or charity organisation
BA2leadership_education	15	25.4	in an education/training organisation
BA2leadership_other	4	6.8	in another type of organisation
			Serve in government...
BA2government_appointed	26	44.1	in an appointed or invited role
BA2government_elected	13	22.0	in an elected role
			Serve in leadership roles in local community organisations...
BA2communityORG_volunteer	35	59.3	as a volunteer
BA2communityORG_empIORconslntr	9	15.3	as a paid consultant or employee
BA2other	2	3.4	Another thing I was better able to do as a result of being a Nuffield Scholar (e.g. Maori investment trusts)
total # leadership roles of note:	218		

The mean number of ways in which Nuffield Scholarship alums were able to do better than they would have otherwise (i.e. boxes selected in the table above) was 8.5 per alumnus (503 among 59 respondents), which includes 3.7 different types of leadership roles per alumnus (218 leadership role types among 59 respondents). Note that this table does not count the number of leadership roles (shown on a later table), because many alumni serve in multiple leadership roles in a single category.

Table 1 shows specific ways alums report having benefited from their participation in the Programme: “As a result of being a Nuffield Scholar, I was better able to...”.

Most alums (83.1%) reported that the Nuffield Programme allowed them to improve their farming systems and production. One in four alums (28.8%) were able to create a new brand or product after the Programme. Similarly, one in four alums (25.4%) started a business after the Programme.

Due to the Programme, almost one in three alums (30.5%) started another type of new organisation or created jobs (37.3%). One in four alums (27.1%) exported to overseas markets, and one-third of the alums reported being able to earn more money than they would have otherwise after the Programme. Notably, half of the alums (54.2%) improved productivity in the organisation they worked for. Almost all alums (93.2%) expanded their social network of people with high-quality information or expertise. Two-thirds of the alums (66.1%) reported achieving greater overall well-being than they would have had otherwise as a result of participating in the Nuffield Programme.

Figure 2. “How many businesses have you created?,” Percentages (top) and frequencies (bottom).
Note - The frequency of 10-19 businesses created was 0.

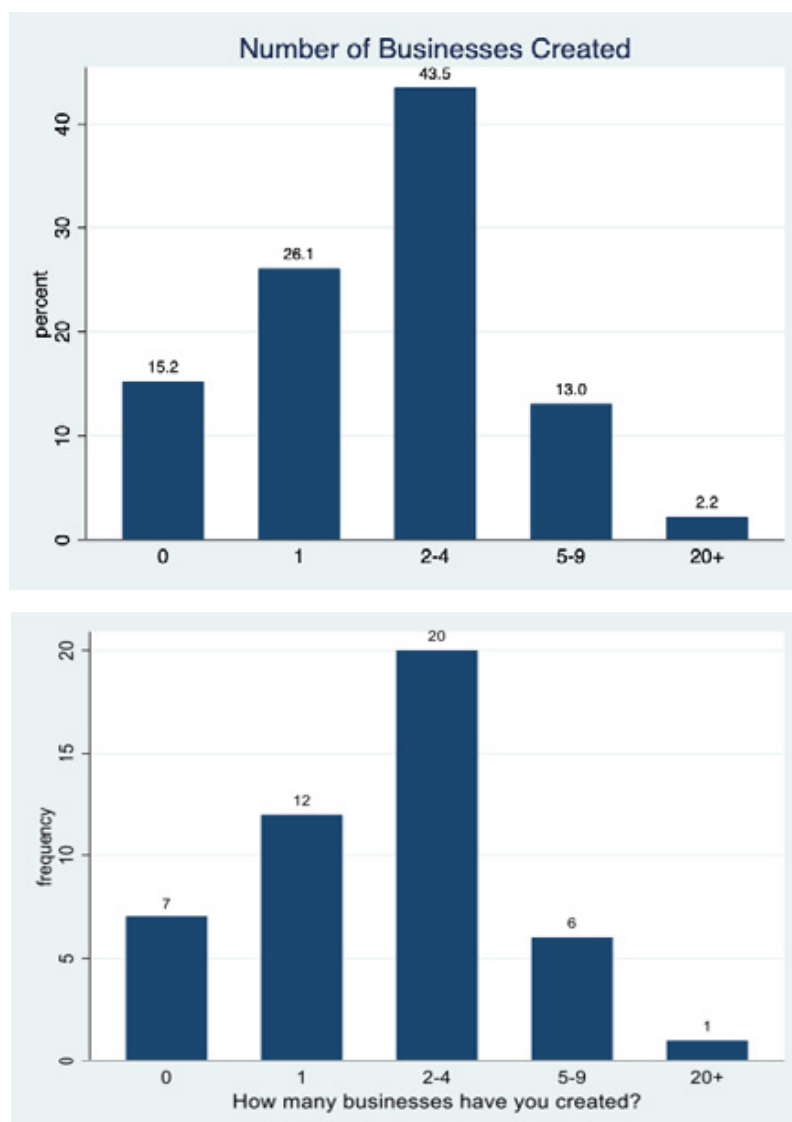


Table 2 (below) and **Figure 2** (previous page) demonstrate remarkable entrepreneurial achievement as measured by count data measuring the number of new businesses created. For the Nuffield cohort, 85% of alums have started one or more businesses. In comparison, the national average in New Zealand is less than 25% (computed as the ratio of existing enterprises [approximately 0.5 million] to the working-age population [approximately 2 million]), which is an over-estimate due to multiple enterprises being owned by the same person and many inactive businesses included in the 0.5 million.⁹ Nevertheless, nearly all alums have created significant numbers of jobs and served in a large number of leadership roles.

Table 2. *How many businesses have you created?*, N=46

<u>number of business created</u>	<u>frequency</u>	<u>percent</u>
0	7	15.2
1	12	26.1
2 to 4	20	43.5
5 to 9	6	13.0
20+	1	2.2

Table 3. *Number of governance and senior leadership roles held*

<u>type of leadership role</u>		<u>#</u> <u>respondents</u>	<u>total # of senior</u> <u>leadership roles</u> <u>served in sample</u>	<u># roles per</u> <u>alumnus</u>	<u>projected total</u> <u>(sampled + unsampled)</u> <u>among current alumni</u> <u>network</u>
Nroles1	"Industry-specific or publicly-listed NZ enterprises (e.g. Fonterra, Zespri, NZ Merino, Synlait, CRT, Farmlands, etc.)"	51	127	2.5	443.3
Nroles2	"International firms or industry-specific organisations"	39	61	1.6	278.4
Nroles3	"Other national firms/organisations"	38	85	2.2	398.2
Nroles4	"Other regional/local firms/organisations"	39	100	2.6	456.4
Nroles5	"Social/community organisations/initiatives"	48	134	2.8	496.9
Nroles6	"Environmental organisations/initiatives"	33	77	2.3	415.3
Total leadership roles (excluding government):			584	14.0	2,488.5

⁹The alums population's proportion of business creators compares very favourably with even the most entrepreneurial overseas population averages. Statistics New Zealand (2022) Available at: <https://www.stats.govt.nz/information-releases/new-zealand-business-demography-statistics-at-february-2020> (Accessed: 15 December 2022).

Table 3 (previous page) is based on self-reported counts of leadership roles of different types, projected from the sample onto the known alums population size. The results are estimated counts of the numbers of specific senior leadership roles (listed in the summary above).

The typical Nuffield alumnus has:

- started 2.6 businesses,
- played a direct role in creating 46.6 FTE jobs, and
- served in 14.0 senior leadership roles, which include:
 - 2.5 New Zealand corporate boards or for-profit industry groups
 - 1.6 international boards or industry groups, and
 - 5.1 social/community/environmental organisations.

Table 4 shows how sensitive the projected number of business starts per alum depends on the point estimate used to represent the unbounded highest band (200 or more business starts), ranging from the most conservative assumption (200) upwards to 800.

***Table 4.** Low/medium/high assumptions about the top bracket in highlighted boxes below*

	low	medium	high
	"response band average assumed"	"response band average assumed"	"response band average assumed"
sample proportions			
26.4	2.5	2.5	2.5
22.6	7	7	7
34	15	15	15
7.5	75	75	75
3.8	150	150	150
5.7	200	500	800
expected # business starts per alumnus:	30.1	46.6	63.7

Figure 3 below shows that the Nuffield alums sample exhibits the so-called Pareto principle, qualitatively replicating a well-documented finding from numerous academic studies of entrepreneurs and entrepreneurial ventures: rather than a bell-shaped curve in which the average is representative of the entire population.

We can infer from **Figure 3** that a relatively small proportion within this elite alums' population generates an out sized proportion of new businesses. For example, approximately 55% of the businesses started were generated by the top 15% of alums who generated between 5 to 20 and over businesses.

Figure 3. Percentage (y-axis) of the total # of business starts among all alums in the sample generated by different proportions of the alum sample (x-axis)

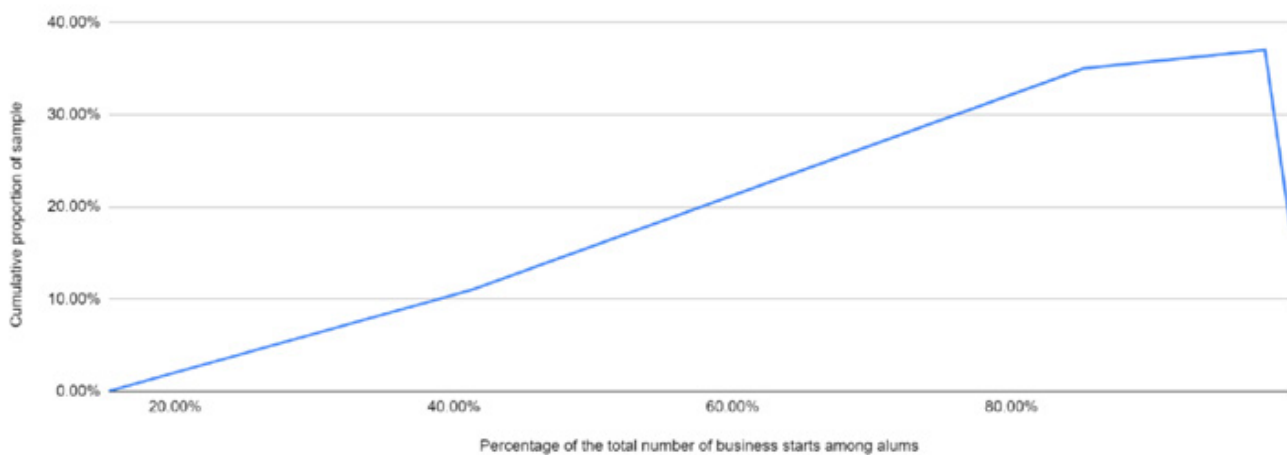


Figure 4. Job creation measured as “the maximum number of full-time-equivalent (FTE) jobs that you’ve played a direct role in employing in any given year?”, Top) count, (Bottom) percent, N=53
Note - The frequency of 30-49 FTE jobs created was 0.

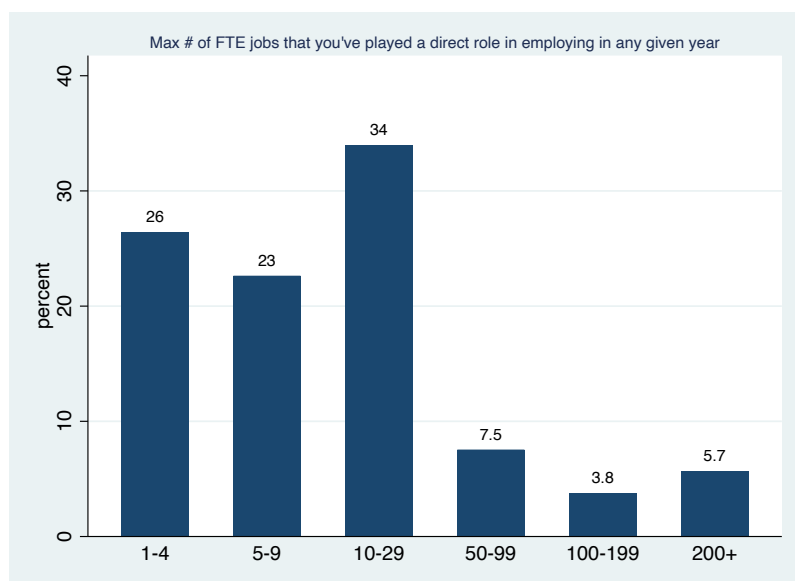
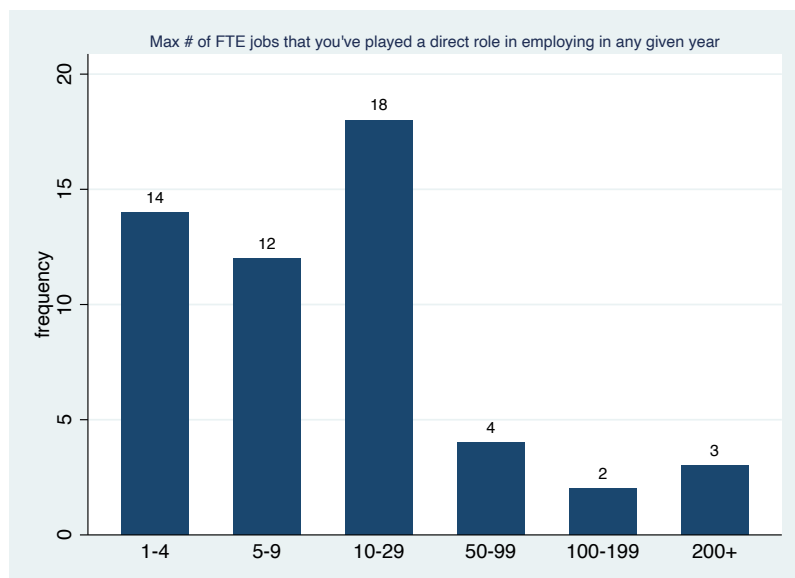
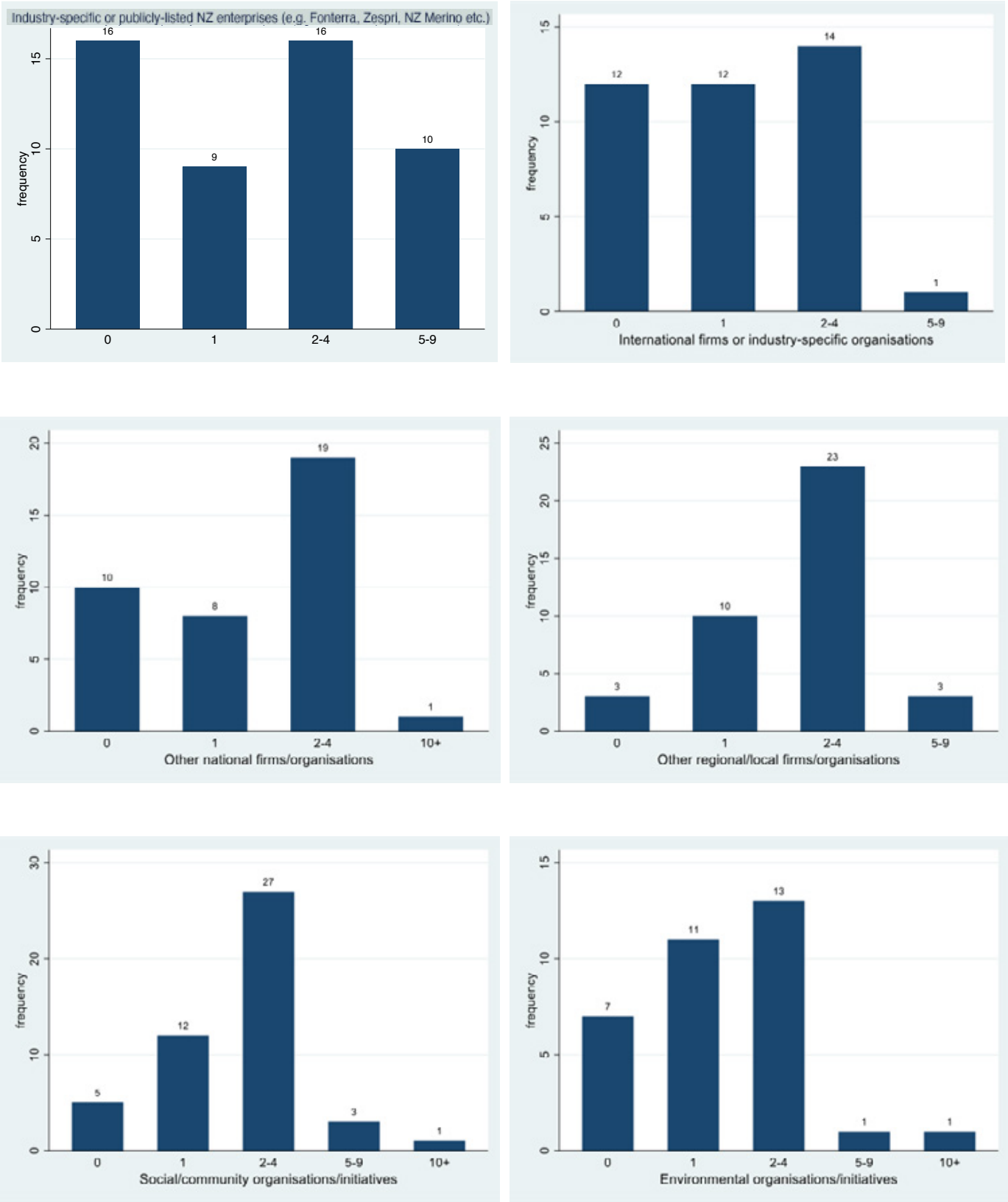


Figure 5. “How many governance and senior leadership roles have you had in....?”
 Note - The frequency of “Other national firms/organisations” for 5-9 category, was 0.

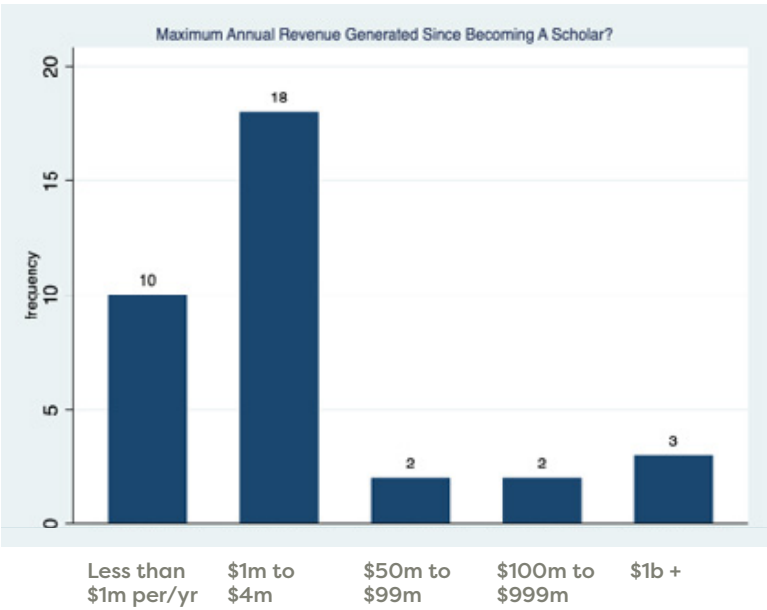


Approximately two in five alums (40.6%) have served in government in an appointed or elected leadership role.

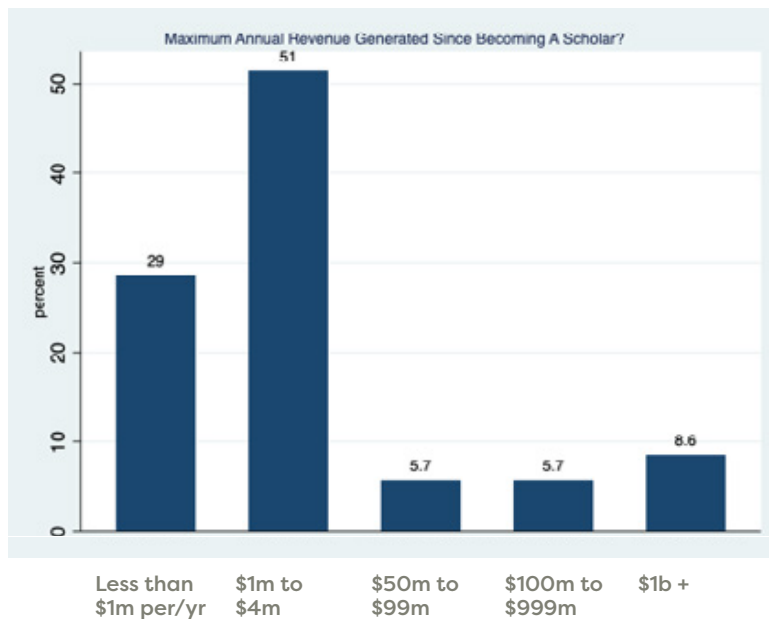
At the time of data collection, New Zealand had produced 178 Nuffield Scholars since 1950¹⁰; extrapolating the results from the alums survey across the total alums network of 178 members allows the total number of leadership roles that Nuffield Scholars have held over time to be estimated. The estimated number of leadership roles is 2489, which includes:

- 443 board roles in industry-specific or publicly-listed New Zealand enterprises (e.g., Fonterra, Zespri, NZ Merino, Synlait, CRT, Farmlands, etc.
- 278 international firms or industry groups
- 398 other national firms/organisations, including ‘industry-good’ group
- 456 regional/local firms/organisations
- 497 social/community organisations/initiatives, and
- 415 environmental organisations/initiatives.

Figure 6. Maximum Revenue Generated: “Approximately what was the maximum annual revenue (or other gross value flow) in today’s dollar equivalents that your work has generated in any year since you became a scholar?” (Top) Frequency, (Bottom) Percent, N = 35
Note - The frequency for category 5m to 49m, was 0.



¹⁰Between 1950 and 2023 185 Nuffield Scholarships have been awarded.



Half of the alums reported having generated annual revenue between \$1 to \$4 million in a given year. In comparison, national firms with 1-19 employees generated an average revenue of \$846,574 per annum¹¹. Two-thirds (66.7%) reported productive engagement with iwi in the agricultural sector over the span of their career. More than 96% said their work focused on improving environmental sustainability.

¹¹Ministry of Business, Innovation & Employment. (2016) Annual Enterprise Survey.
Available at: <https://www.mbie.govt.nz/assets/30e852cf56/small-business-factsheet-2017.pdf>. (Accessed: 20 Oct 2022).

Figure 7. Iwi Engagement: “Have you had a productive engagement with iwi in the agricultural sector over the span of your career? Optional comment boxes below”, N = 48

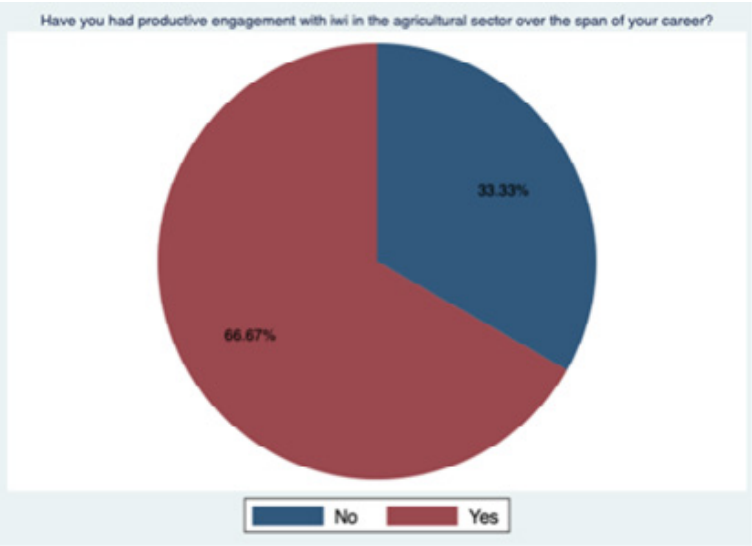
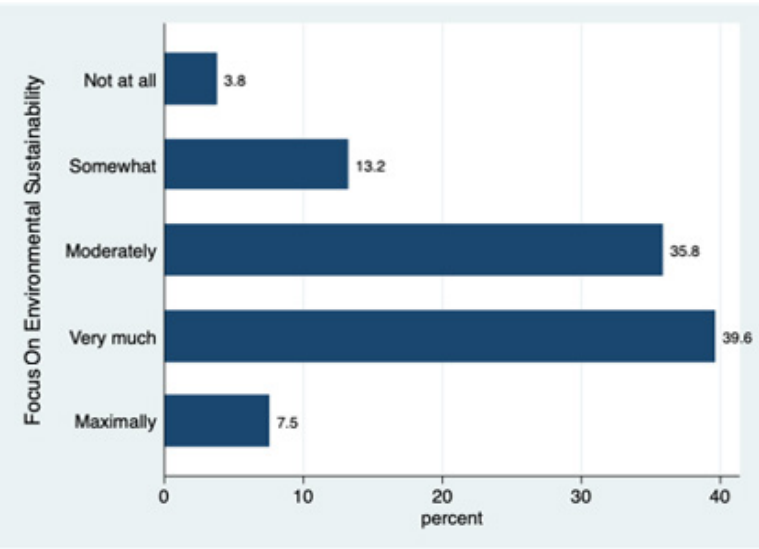
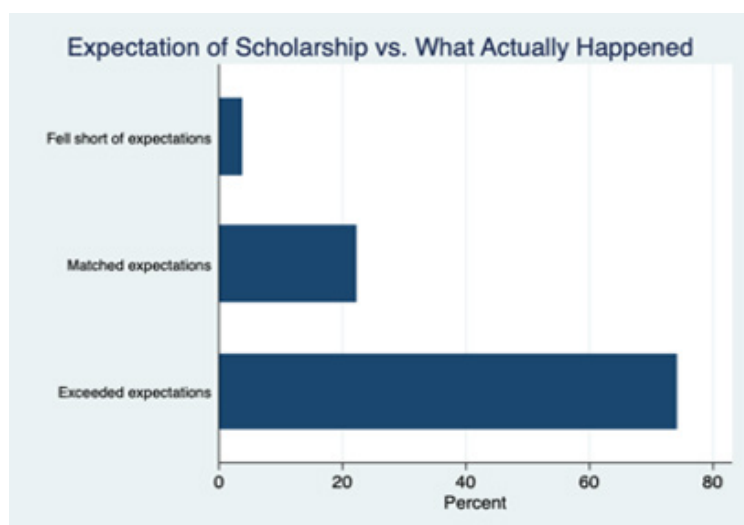


Figure 8. Focus on Environment Sustainability: “To what extent has your work focused on improving environmental sustainability in New Zealand’s agricultural sector?”, N = 53



When asked about how alums felt about the Nuffield Scholarship Programme, nearly all alums reported that the Nuffield Programme had met or exceeded their expectations.

Figure 9. Expectation of Nuffield Scholarship Programme, N=53



Nuffield Alums' Characteristics

The majority of the alums identified as New Zealand European (72.1%), while the majority identified as male (see **Table 5** and **Figure 10**). The majority of alums identified as coming from the Canterbury region (23.5%) (see **Table 6**).

Figure 12 demonstrates that the proportion of female alums joining in recent years has increased as the Programme continues running. Only male scholars were accepted during the Nuffield Programme's early years.

Table 5. Ethnic Group(s): "Which ethnic group do you belong to? (Select all that apply to you)."; N=54

Ethnicity	Frequency	Percent	*Alums can select more than one ethnic group that they identify with.
New Zealand European	49	72.1%	
Māori	5	7.4%	
Samoan	0	0.0%	
Cook Islands	0	0.0%	
Tongan	0	0.0%	
Niuean	0	0.0%	
Chinese	0	0.0%	
Indian	1	1.5%	
Other	2	2.9%	

Figure 10. Gender, N = 53

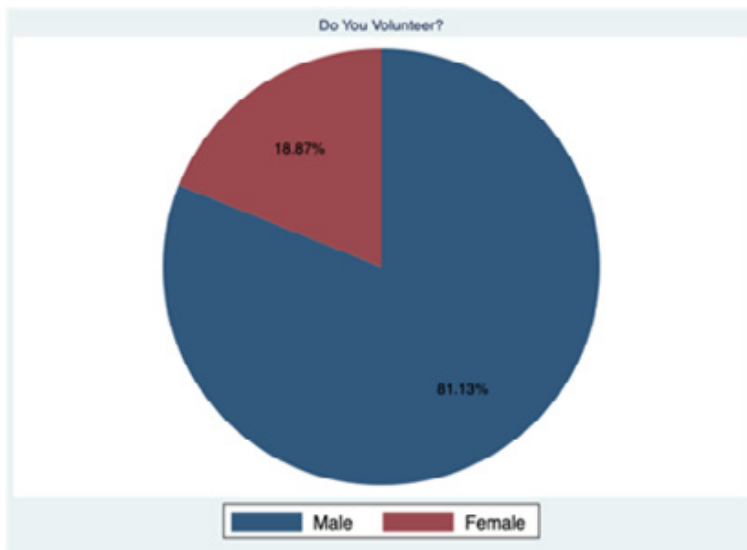


Figure 11. Year Born In, N = 61

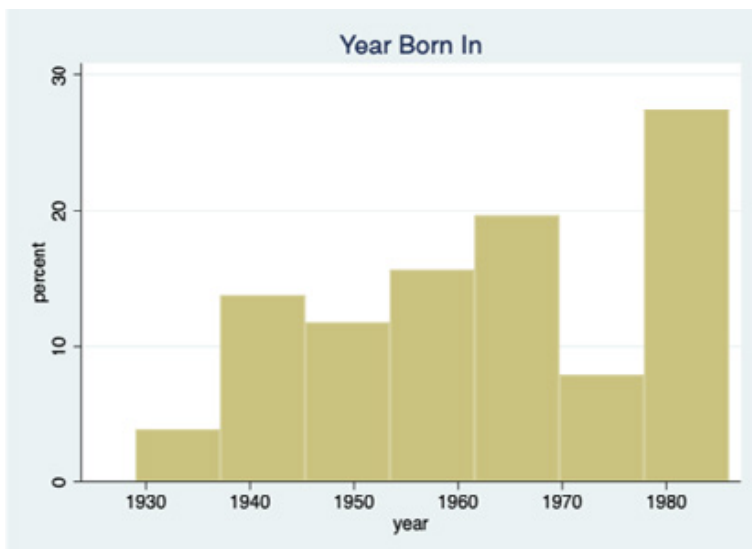


Figure 12. Gender of Alums as a function of when they entered the Programme, (Top) count, (Bottom) percent

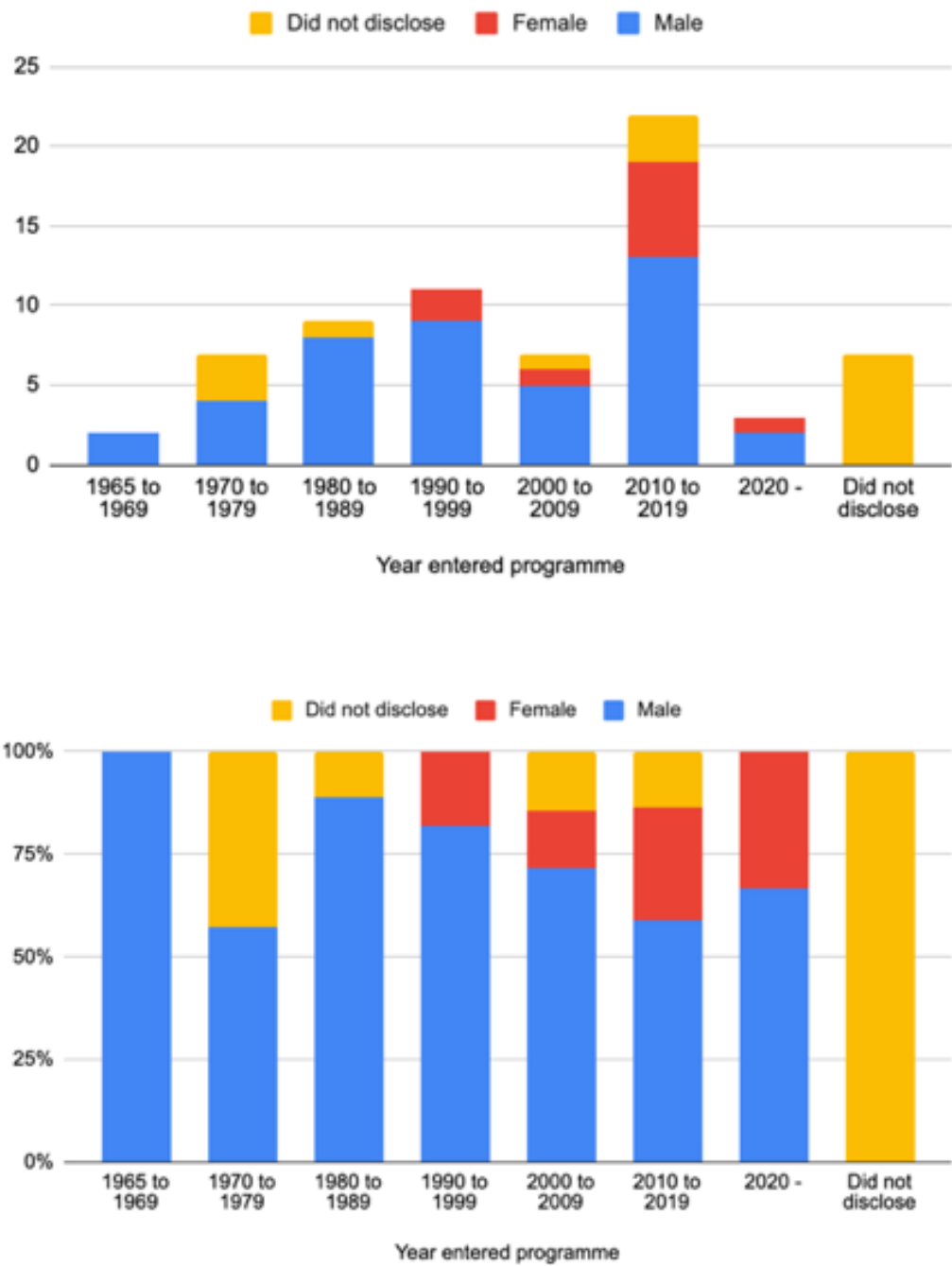


Table 6. Region Alums are from: “Which region do you most strongly identify with as “where you’re (originally) from”?”, N=56

Region	Frequency	Percent	*Alums can select more than one region which they identify from.
Northland	3	5.4%	
Manawatū-Whanganui	5	8.9%	
Auckland	0	0.0%	
Waikato	7	12.5%	
Bay of Plenty	8	14.3%	
Gisborne	0	0.0%	
Taranaki	4	7.1%	
Wellington	1	1.8%	
Tasman	4	7.1%	
Nelson	0	0.0%	
Marlborough	2	3.6%	
West Coast	1	1.8%	
Canterbury	13	23.2%	
Otago	2	3.6%	
Southland	2	3.6%	
Hawkes Bay	1	1.8%	
Overseas	3	5.4%	
Total	56	100.0%	

The majority of Nuffield alums hold a Bachelor’s Degree or a Graduate Diploma (47.2%), and almost two-thirds (62.3%) reported being exclusively self-employed. Half (49.0%) reported having a professional role on and off farms, and 41.5% of alums reported working in multiple industries such as Beef & Sheep, Horticulture, Dairy, and Forestry. Additionally, a majority (84.6%) of alums reported being a volunteer. However, it is essential to note that volunteering was a desirable criterion when deciding on the issuance of the Nuffield Scholarship.

Figure 13. Qualification: “What is your highest academic qualification?”, N = 53

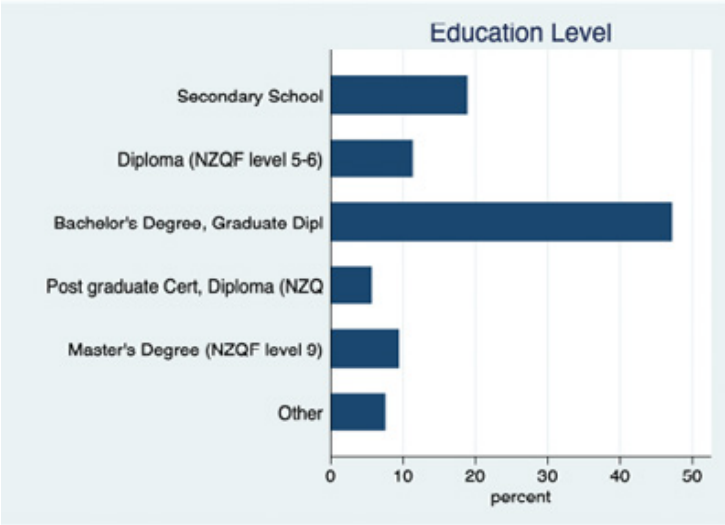
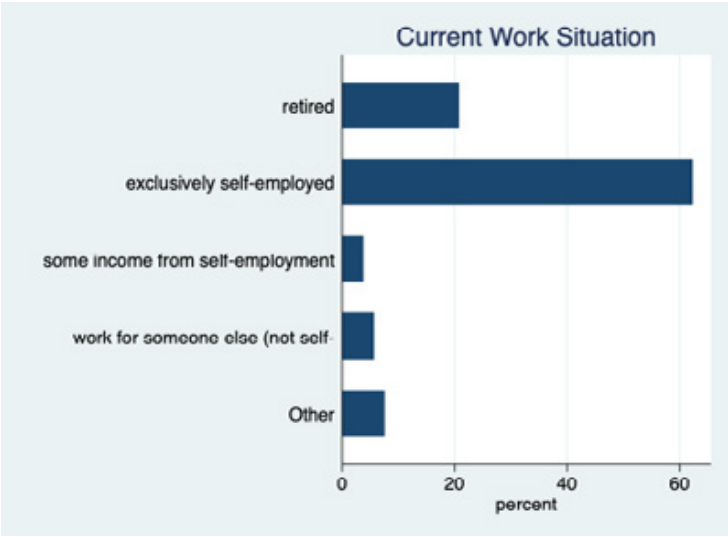


Figure 14. Current Work Situation: “How would you describe your current work situation?” N = 53



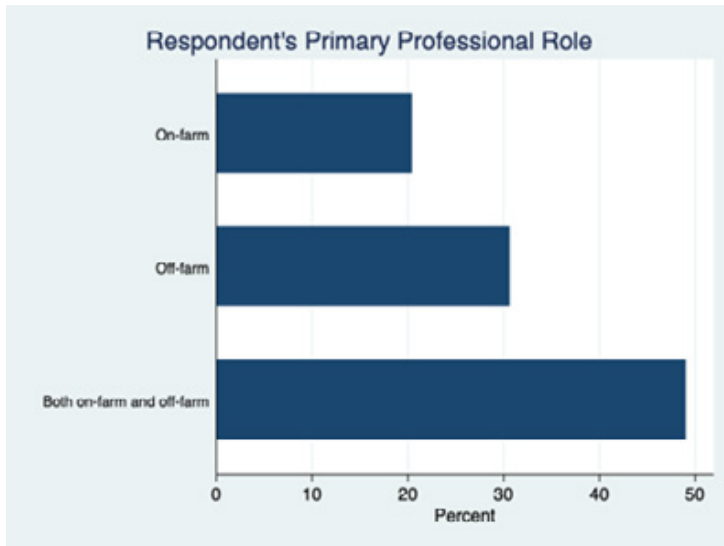


Figure 15. Whether Alums work On or Off-farms: “Regarding your current professional roles, would you describe your primary roles as...”. N=49

Figure 16 summarises which industry of New Zealand’s Food and Fibre sector the alums were professionally active in. Although many alums’ careers were active across multiple industries, this question was a forced-choice item asking about the alum’s last professional role or industry they were ‘predominantly’ associated with.

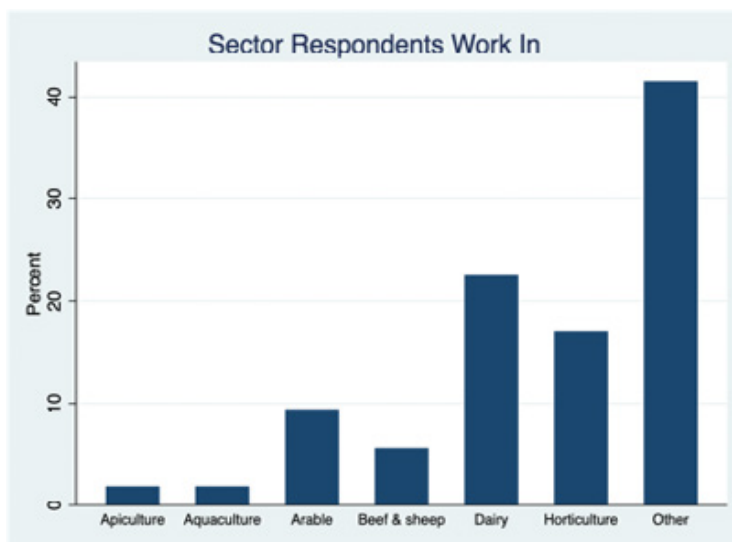


Figure 16. Applicable Industry Sector: “In which of the following sectors do you carry out your primary professional roles? (select all that apply)”, N = 54

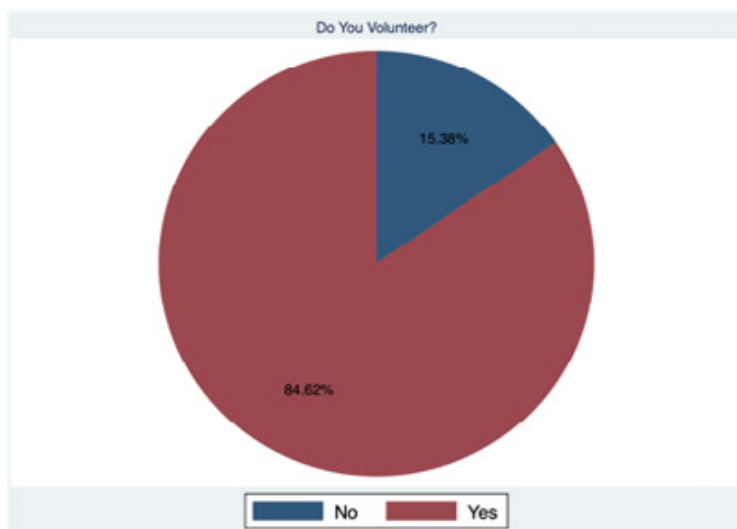


Figure 17. Volunteer: “Do you volunteer?”, N = 52

Kellogg Alums Survey

Invitations to 799 valid email addresses for alums were sent in November 2021, and 234 responses were received.

Key results

Figure 18. Year Entered Programme in 5-year bands starting in 1965, frequencies (top) and percentages (bottom), N=202

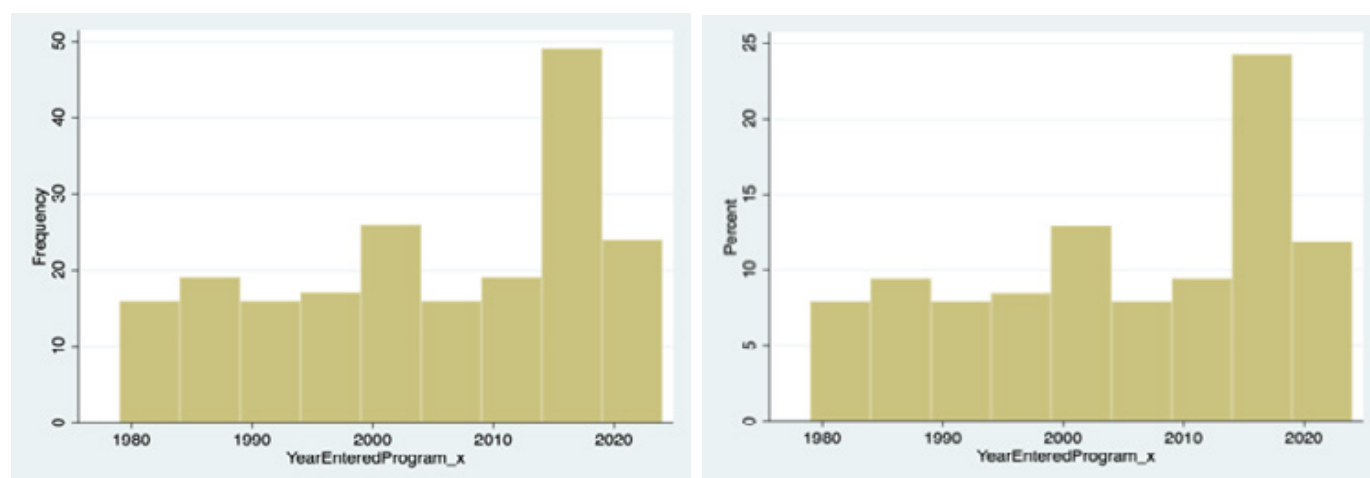


Figure 18 shows the year in which Kellogg alums entered the Programme. It shows the alums network's broad range of ages. In **Figure 18**, 'year-of-entry' cohorts are binned into 5-year bands from (1975-1979, 1980-1984, 1985-1989 ... to the present). About half of the alums participated post-2000. Between 1979 – 2014 the Kellogg Programme was run once a year (with exceptions 1981, 1987, 1991, 1993, 1997 and 1998, where no programme ran).

Since 2015 the Programme has been run twice a year, except for 2021 and 2022, when it was run three times a year. Consequently, programme capacity has doubled since 2015.

Table 7. As a result of being a Kellogg Scholar, I was better able to...
(N = 234 respondents)

<u>variable</u>	<u>frequency</u>	<u>percent</u>	<u>description</u>
BA2farm	62	26.5	Improve my own farming systems and production
BA2createNewProduct	23	9.8	Create a new brand or product
BA2startBiz	28	12.0	Start a business
BA2startOrg	14	6.0	Start another type of new organisation
BA2createJobs	22	9.4	Create jobs
BA2export	13	5.6	Export to overseas markets
BA2productivity	79	33.8	Improve productivity in an organisation that I worked for (e.g. improve yields, product quality, revenue per fulltime worker, reduce waste, etc.)
BA2infoNetwork	168	71.8	Expand my social network of people with high-quality information/expertise
BA2earn	44	18.8	Earn more money than I would have otherwise
BA2wellbeing	107	45.7	Achieve greater overall wellbeing than I would have otherwise
total # ways they benefitted cited:	560		
Serve in a governance or leadership role...			
BA2leadership_corp_board	88	37.6	on a corporate board or for-profit industry group
BA2leadership_industry_good	102	43.6	in an industry-good organisation
BA2leadership_not4profit	104	44.4	in a not-for-profit or charity organisation
BA2leadership_education	59	25.2	in an education/training organisation
BA2leadership_other	18	7.7	in another type of organisation
Serve in government...			
BA2government_appointed	43	18.4	in an appointed or invited role
BA2government_elected	35	15.0	in an elected role
Serve in leadership roles in local community organisations...			
BA2communityORG_volunteer	125	53.4	as a volunteer
BA2communityORG_emplORconsltnt	35	15.0	as a paid consultant or employee
BA2other	2	0.9	Another thing I was better able to do as a result of being a Nuffield Scholar (e.g. Maori investment trusts)
total # leadership roles of note:	611		

The mean number of ways in which Kellogg Scholarship alums were able to do better than they would have otherwise (i.e. boxes selected in the table above) was 2.4 per alumnus (560 among 234 respondents), which includes 2.6 different types of leadership roles per alumnus (611 leadership role types among 234 respondents). Note that this table does not count the number of leadership roles (shown on a later table), because many alumni serve in multiple leadership roles in a single category.

Table 7 shows multiple ways alums report having benefited from their participation in the Programme: “As a result of being a Kellogg Scholar, I was better able to...”. Close to half of the alums (45.7%) reported achieving greater overall well-being than they would have otherwise after participating in the Kellogg Programme.

One in ten alums (9.8%) was able to create a new brand or product after the Programme. Similarly, one in ten alums (12.0%) started a business after the Programme. One in sixteen alums (6.0%) reported that the Kellogg Programme allowed them to start another type of new organisation.

One in ten (9.4%) alums created jobs as a result of the Programme, one in eighteen alums (5.6%) exported to overseas markets, and one in three (33.8%) improved their farming systems and production.

While one-fifth (18.8%) of the alums reported being able to earn more money than they would have otherwise after the Programme, we noted that more than two-thirds (71.8%) expanded their social network of people with high-quality information or expertise after participating in the Kellogg Programme.

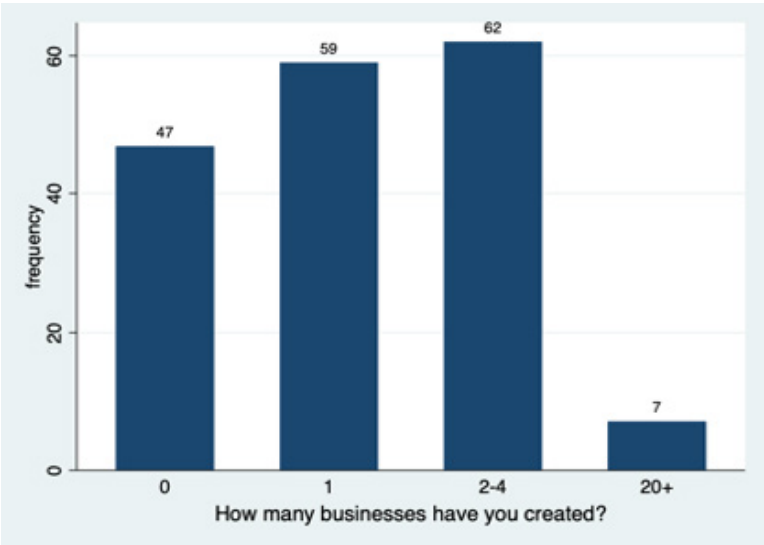


Figure 19. “How many businesses have you created?”, frequencies (top) and percentages (bottom), N=175
Note - The frequency for categories 5 to 9, and 10 to 19, was 0.

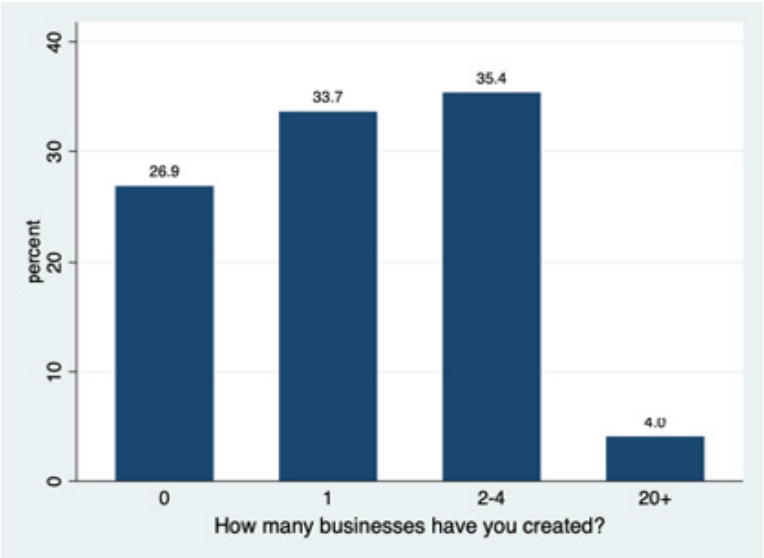


Table 8 (next page) and **Figure 19** (above) demonstrate remarkable entrepreneurial achievement as measured by count data measuring the number of new businesses created. For the Kellogg cohort, 73.0% of alums have started one or more businesses. In addition, nearly all alums have played a direct role in creating significant numbers of jobs and have served in multiple leadership roles.

Table 8. “How many businesses have you created?”, frequencies (top) and percentages (bottom), N=175

<u>number of business created</u>	<u>frequency</u>	<u>percent</u>
0	47	26.9
1	59	33.7
2 to 4	62	35.4
5 to 9	0	0.0
20+	7	4.0

Table 9. “Number of governance and senior leadership roles held

	<u>type of leadership role</u>	<u># respondents</u>	<u>total # of senior leadership roles served in sample</u>	<u># roles per alumnus</u>	<u>projected total (sampled + unsampled) among current alumni network</u>
Nroles1	"Industry-specific or publicly-listed NZ enterprises (e.g. Fonterra, Zespri, NZ Merino, Synlait, CRT, Farmlands, etc.)"	157	287	1.8	1,645.2
Nroles2	"International firms or industry-specific organisations"	39	95	2.4	2,192.3
Nroles3	"Other national firms/organisations"	38	194	5.1	4,594.7
Nroles4	"Other regional/local firms/organisations"	39	176	4.5	4,061.5
Nroles5	"Social/community organisations/initiatives"	48	486	10.1	9,112.5
Nroles6	"Environmental organisations/initiatives"	33	131	4.0	3,572.7
<u>Total leadership roles (excluding government):</u>			1369	28.0	25,179.0

Table 9 is based on self-reported counts of leadership roles of different types, projected from the sample onto the known alums’ population size. The results are estimated counts of the numbers of specific senior leadership roles (listed in the summary above).

On average, the Kellogg alums have:

- started 3.0 businesses
- played a direct role in creating 35.0 FTE jobs
- served in 14.0 senior leadership roles, which include, but are not limited to:
 - 1.8 New Zealand corporate boards or for-profit industry groups
 - 2.4 international boards or industry groups, and
 - 5.1 social/community/environmental organisations.

Figure 20. Percentage (y-axis) of the total # of business starts among all alums in the sample generated by different proportions of the alum sample (x-axis).

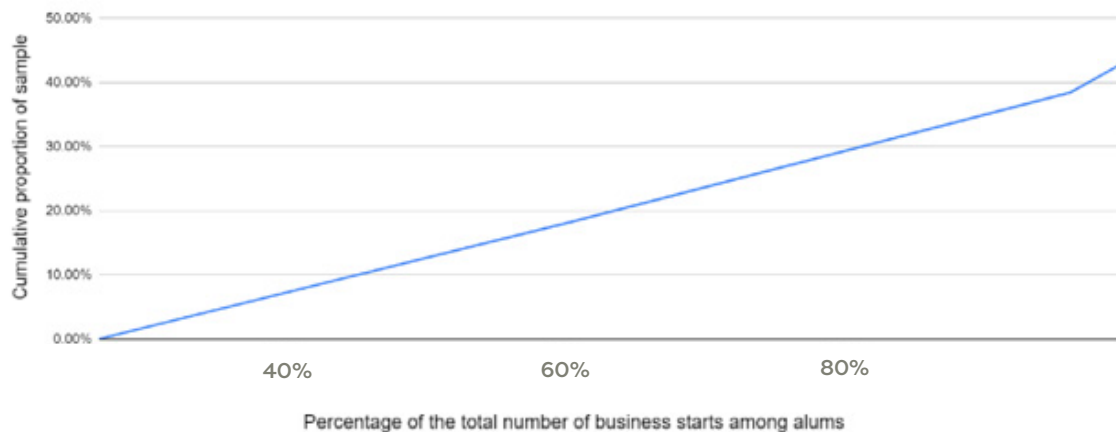


Figure 20, similar to **Figure 3**, also shows that a relatively small proportion within this elite alums’ population generates an out sized proportion of new businesses. For example, approximately 43% of the businesses were created by the top 4% of the alums who created 20 or more businesses.

Figure 21. Job creation measured as “the maximum number of full-time-equivalent (FTE) jobs that you’ve played a direct role in employing in any given year?”; (Top) count, (Bottom) percent, N=176

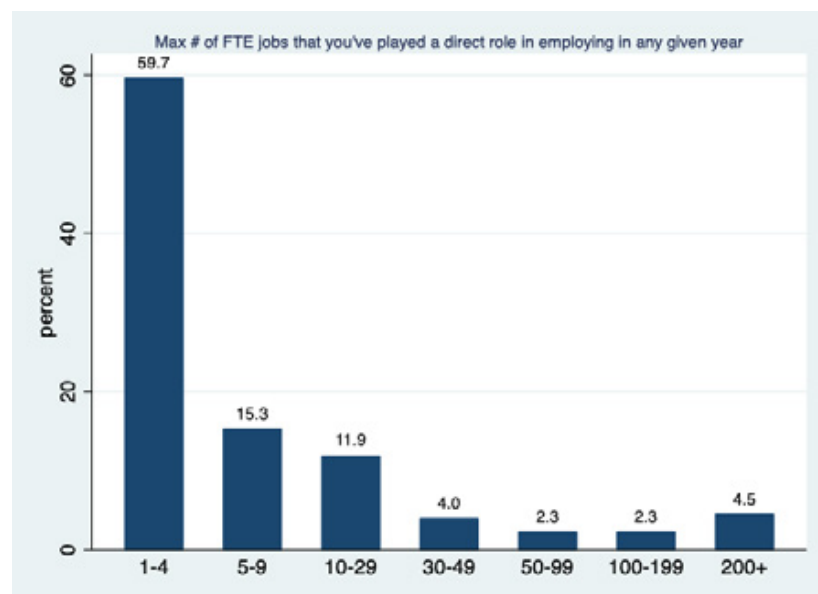
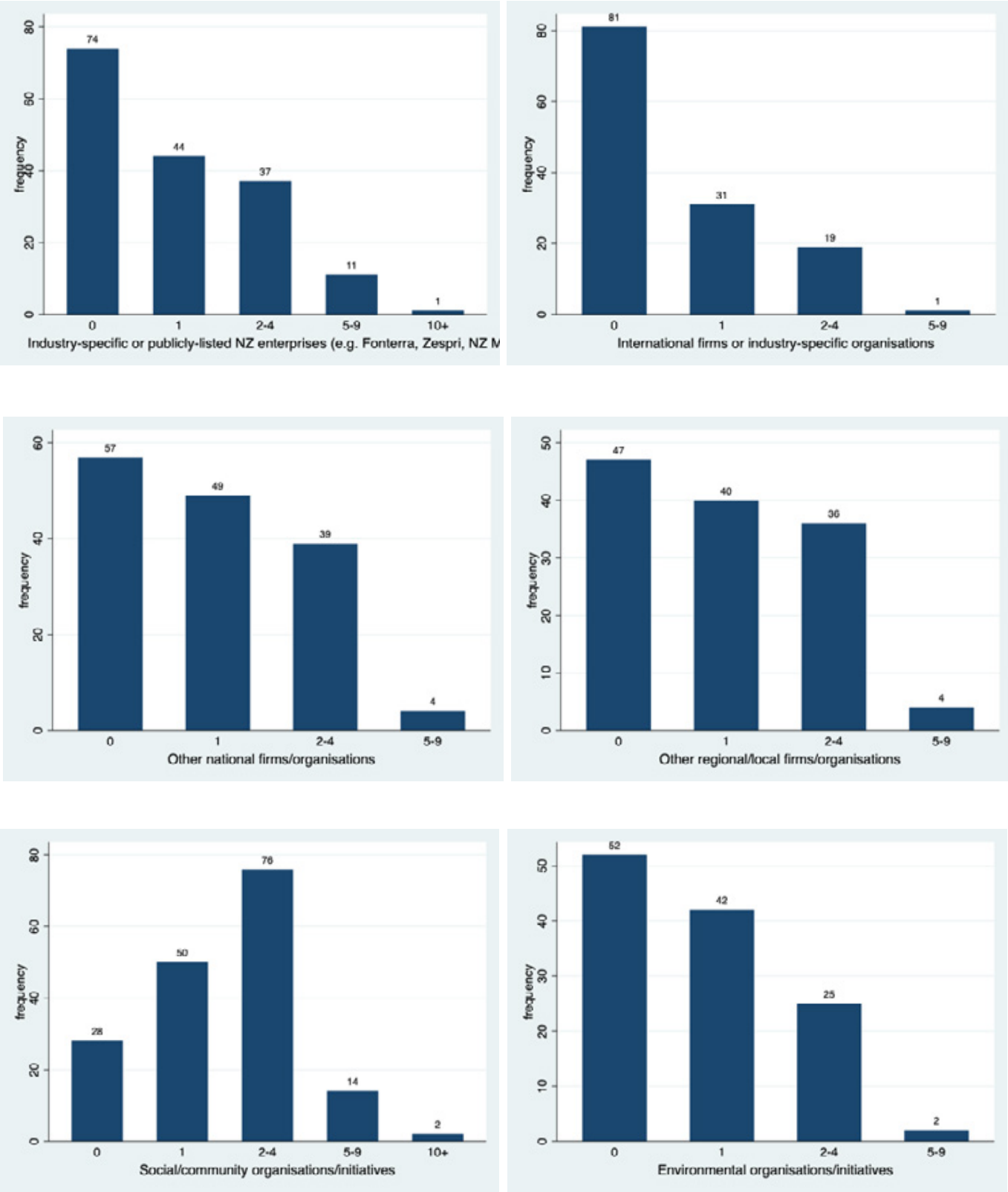


Figure 22. “How many governance and senior leadership roles have you had in....?”



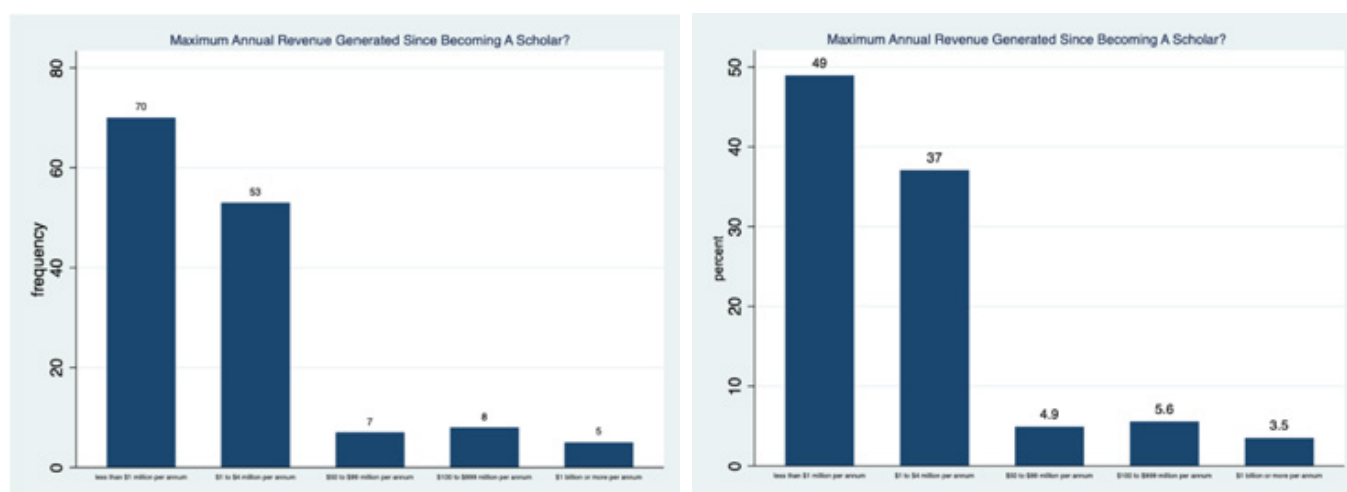
Approximately one in four alums (26.96%) have served in government in an appointed or elected leadership role.

At the time of the survey, there were 960 alums¹², and the estimated number of leadership roles held is approximately 26,858, which includes:

- 1,755 board roles in industry-specific or publicly-listed New Zealand enterprises (e.g., Fonterra, Zespri, NZ Merino, Synlait, CRT, Farmlands, etc.)
- 2,339 international firms or industry groups
- 4,901 other national firms/organisations, including industrial goods groups
- 4,332 regional/local firms/organisations
- 9,720 social/community organisations/initiatives, and
- 3,811 environmental organisations/initiatives.

Figure 23. Maximum Revenue Generated: “Approximately what was the maximum annual revenue (or other gross value flow) in today’s dollar equivalents that your work has generated in any year since you became a scholar?” (Top) Frequency, (Bottom) Percent, N = 143

Note - The frequency for category 5m to 49m, was 0.



Most Kellogg alums reported having generated annual revenue below \$1 million in a given year (49.0%). Almost half (50.6%) reported productive engagement with iwi in the Agricultural sector over the span of their career. Almost half of the Kellogg alums said their work had focused on improving environmental sustainability (33.5% reported ‘very much’ while 7.7% reported ‘maximally’; a total of 41.2%).

¹²However, at the time of reporting, there are approximately 1030 New Zealand Kellogg scholars who have completed the Programme to become Kellogg alums (as defined in this study).

Figure 24. Iwi Engagement: “Have you had a productive engagement with iwi in the agricultural sector over the span of your career? Optional comment boxes below”, N = 178

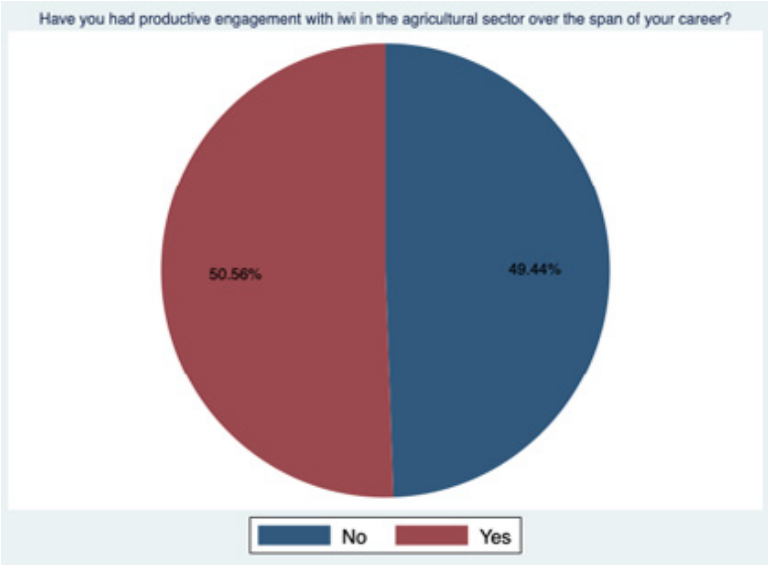
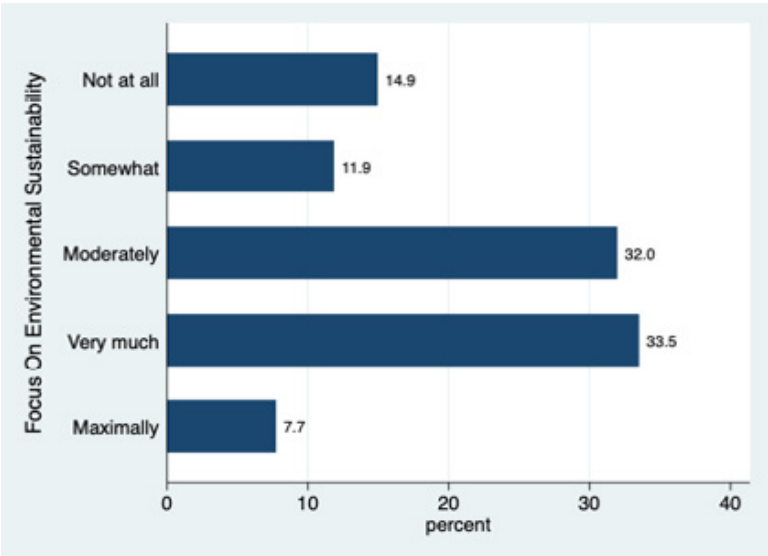
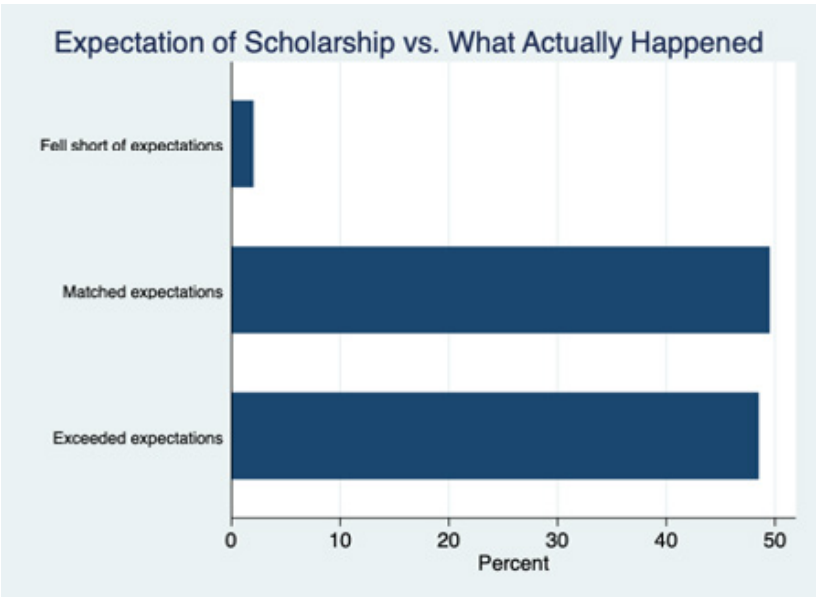


Figure 25. Focus on Environment Sustainability: “To what extent has your work focused on improving environmental sustainability in NZ’s agricultural sector?”, N = 194



When asked how alums felt about the Kellogg Scholarship Programme, 96.3% of the alums reported that the Kellogg Programme had met (22.2%) or exceeded their expectations (74.1%).

Figure 26. Expectation of Kellogg Scholarship Programme, N=198



The majority of the alums who responded to the survey identified as New Zealand European (77.4%), while the majority identified as male (see **Table 10** and **Figure 27**). The majority of alums identified as coming from the Canterbury region (21.8% (see **Table 11**). Additionally, **Figure 29** demonstrates that the proportion of female alums joining in recent years has increased as the Programme continues running. Of note, since 2010, there has been a 26% increase in female attendance on the Kellogg Programme, resulting in an approximately equal distribution of males and females (58% females between 2020-2022).

Kellogg Alums’ Characteristics

Table 10. “Which ethnic group do you belong to? (Select all that apply to you).”, N=234

Ethnicity	Frequency	Percent
New Zealand European	181	77.4%
Māori	13	5.6%
Samoan	0	0.0%
Cook Islands	0	0.0%
Tongan	0	0.0%
Niuean	0	0.0%
Chinese	0	0.0%
Indian	1	0.4%
Other	14	6.0%

*Alums can select more than more ethnic group they identify with.

Figure 27. Gender, N = 193

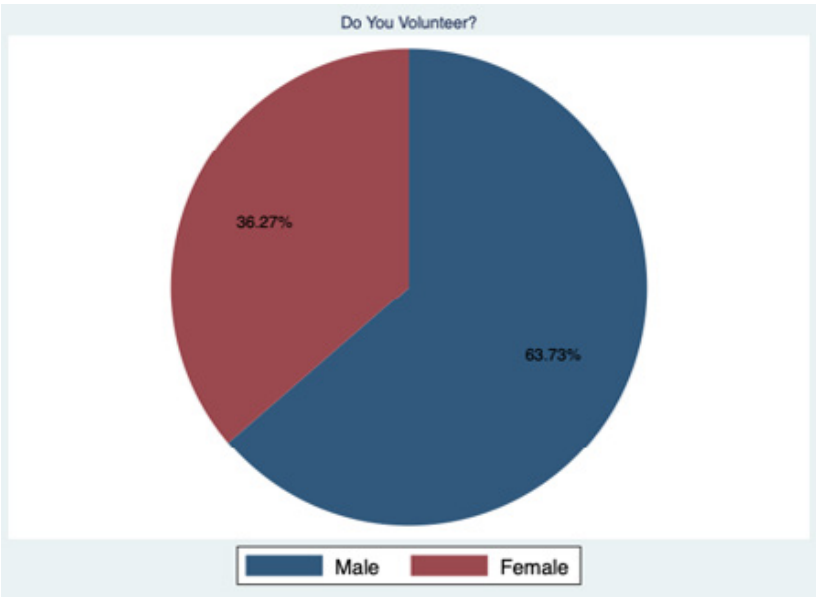


Figure 28. Year Born, N = 186

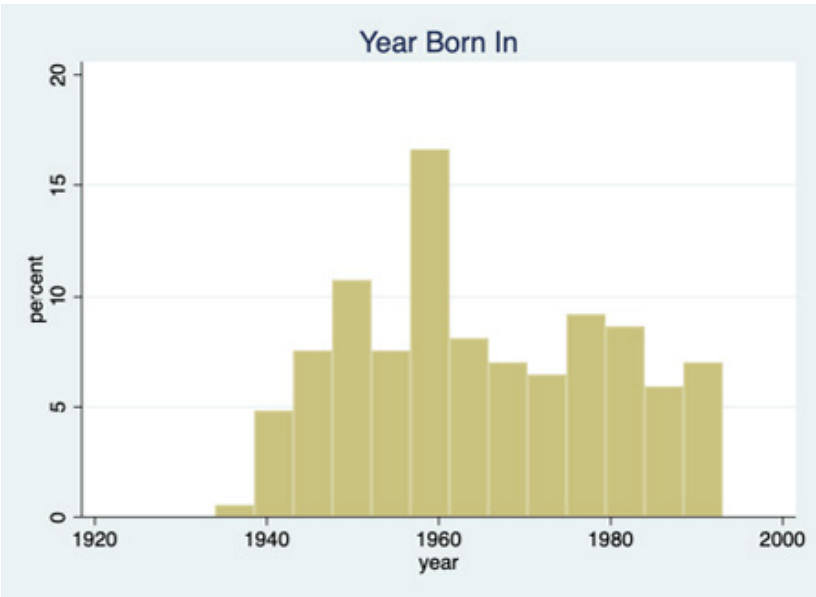


Figure 29. Gender of Alums as a function of when they entered the Programme, (Top) count, (Bottom) percent



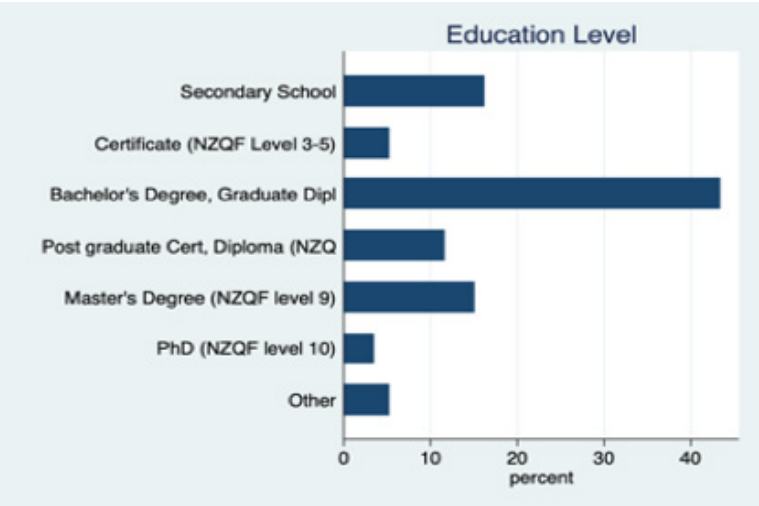
Table 11. Region Alums are from: “Which region do you most strongly identify with as “where you’re (originally) from”?, N=225

Region	Frequency	Percent	*Alums can select more than one region which they identify from.
Northland	13	5.8%	
Manawatū-Whanganui	17	7.6%	
Auckland	5	2.2%	
Waikato	28	12.4%	
Bay of Plenty	33	14.7%	
Gisborne	1	0.4%	
Taranaki	5	2.2%	
Wellington	8	3.6%	
Tasman	5	2.2%	
Nelson	1	0.4%	
Marlborough	7	3.1%	
West Coast	4	1.8%	
Canterbury	49	21.8%	
Otago	15	6.7%	
Southland	12	5.3%	
Hawkes Bay	14	6.2%	
Overseas	85.8%	3.6%	
Total		100.0%	

*Alums can select more than more region which they identify from.

The majority of Kellogg alums hold a Bachelor’s Degree or a Graduate Diploma (43.4%), and almost two-thirds (62.3%) reported being exclusively self-employed. Half of the alums (50.0%) reported having a professional role on and off farms, and most of the alums reported working in the Dairy industry (31.1), followed up by Beef & Sheep (20.1%) and the ‘Other’ (25.2%). Additionally, a majority (80.8%) of alums reported being a volunteer.

Figure 30. Qualification: “What is your highest academic qualification?”, N = 173



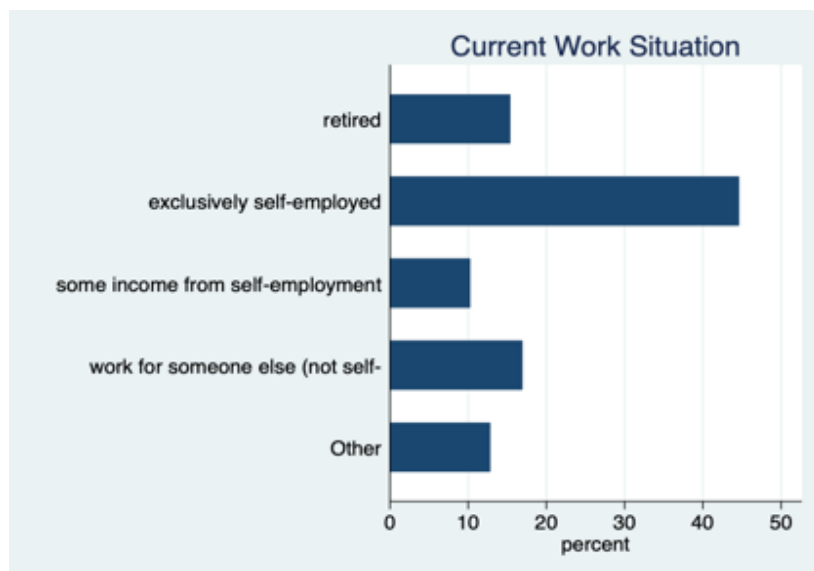


Figure 31. Current Work Situation: “How would you describe your current work situation?” N = 195

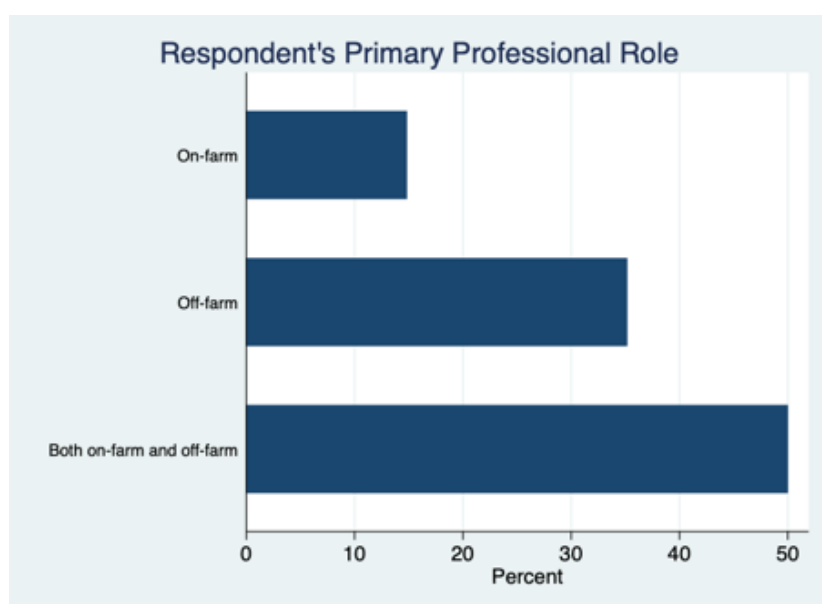


Figure 32. Whether Alums work On or Off-farms: “Regarding your current professional roles, would you describe your primary roles as...”. N=182

Figure 33 (next page) summarises which sector of New Zealand's agriculture-related industries the alums were professionally active in. Although many alums' careers were active across multiple sectors, this question was a forced-choice item asking about the alum's last professional role or sector they were 'predominantly' associated with. Half of Kellogg's alum reported professional roles both on and off farms (50.0%).

Figure 33. Applicable Agricultural Sector: “In which of the following sectors do you carry out your primary professional roles? (select all that apply)”, N = 182

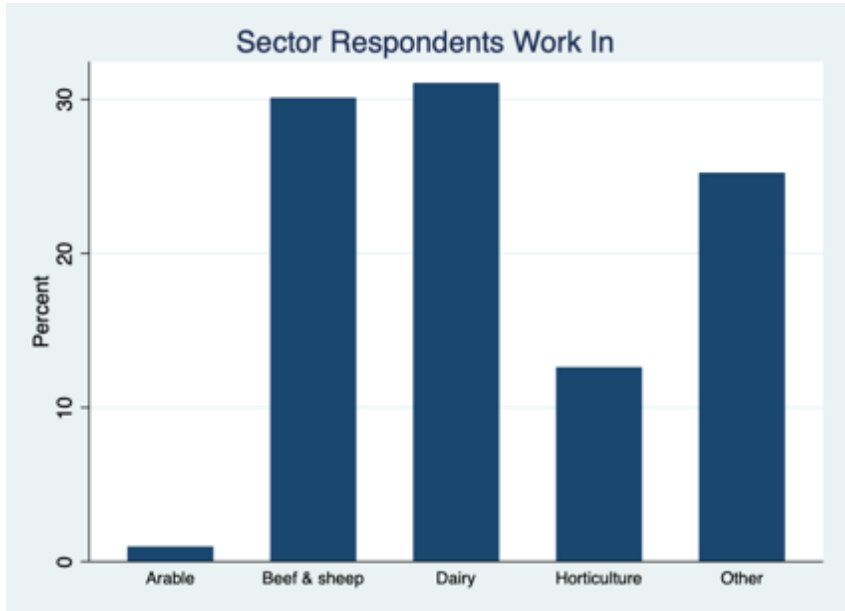
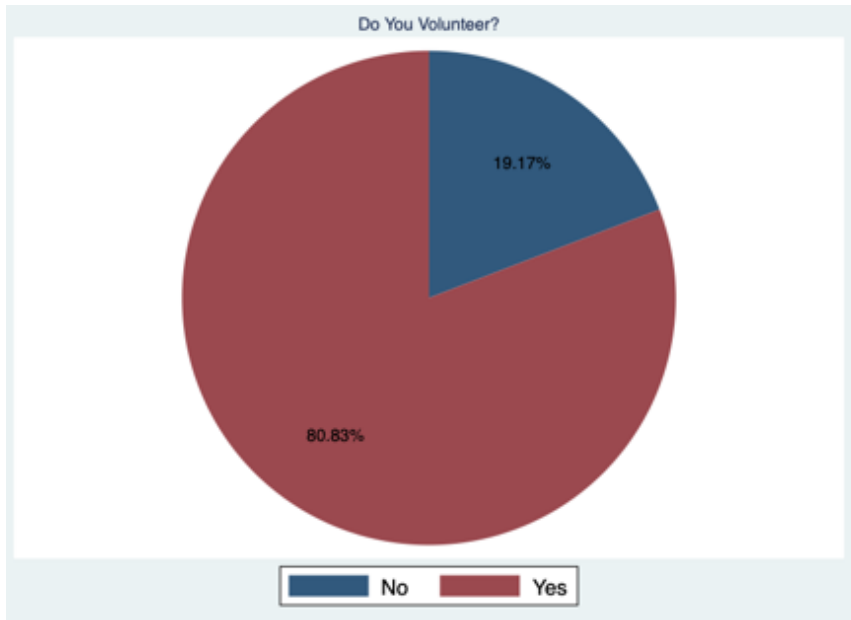


Figure 34. Volunteer: “Do you volunteer?”, N = 193



■ Conclusion

We are on the way to building a world-class evidence base documenting the entrepreneurial capability building during the Kellogg and Nuffield leadership development programmes. To our knowledge, this is a first-of-its-kind longitudinal study designed to rigorously compare each participant at multiple time points and thereby document within-person gains. In addition, statistical software is being developed so that the evidence base of before-after comparisons can be efficiently carried out and continued in future years.

This will give New Zealand's Food and Fibre sector a world-leading insight into the art and science of building entrepreneurial capability. During this reporting period, we conducted our first survey with the New Zealand Nuffield alums (128 invites). We have learned several ways to refine the survey, including clarifying the wording of some questions. We then ran a similar survey with Kellogg alums (799 invites).

The results from the New Zealand Nuffield and Kellogg Alums are remarkable. The average Nuffield alum has started **2.6 businesses**, played a direct role in creating **46.6 FTE jobs**, and served in **14.0 senior leadership roles**. **Over 40% of Nuffield alum have served in government-appointed or elected leadership roles**. At the time of survey, **178 Nuffield alums had served in an estimated 2,489 leadership roles (other than government roles)**, played a direct role in creating an estimated **463 businesses**, and **8,295 FTE roles**.

On the other hand, in comparison, the average Kellogg alum has started **3.0 businesses**, created **35.0 FTE jobs**, and served in **14.0 senior leadership roles**. Approximately **26.9% of Kellogg alum have served in government-appointed or elected leadership roles**. Since the inception of the New Zealand Kellogg Rural Leadership Programme, **960 Kellogg alums have served in over 26,858 leadership roles (other than government roles)**, played a direct role in creating an estimated **2,880 businesses**, and **33,600 FTE roles**.

Conclusion - *continued*

Taken together, the Nuffield and Kellogg contribution to New Zealand has included the creation of an estimated **3,346 businesses, 41,895 jobs**, and service in **29,347 leadership roles**. Just as importantly, both alum groups reported better personal outcomes after attending the programmes, including better well-being, expanded social networks, and higher earnings. This is an impressive contribution. Both alum groups demonstrated economic, social, and environmental contributions to New Zealand's Food and Fibre sector.

One of the notable findings is the very high rate of self-employment compared to New Zealand as a whole (over 60% for Nuffield and Kellogg, respectively, compared to 7.5% nationally¹³, 28% in the dairy industry, and 30% in the red meat and wool industry¹⁴). Entrepreneurship is frequently measured in economics as the proportion of workers in self-employment. By that admittedly broad measure, farm entrepreneurship is sky-high and very much alive and well among alums. We have seen very few data sets in New Zealand with self-employed proportions that large.

¹³Fabling, R., (2018), Entrepreneurial beginnings: Transitions to self-employment and the creation of jobs, [Motu Working Paper 18-12], Motu Economic and Public Policy Research, p. 3. Retrieved from https://motu-www.motu.org.nz/wpapers/18_12.pdf (Accessed: 24 Oct 2022).

¹⁴Ministry of Primary Industries, (2022), Food and Fibre workforce: snapshot. Retrieved from: <https://www.mpi.govt.nz/dmsdocument/50932-Food-and-fibre-workforce-Snapshot>