Connecting Food and Fibre Education

Immersive agricultural education models to engage Australian primary school-aged students in the classroom and beyond

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Aimee Snowden

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I acknowledge the traditional custodians of the lands throughout Australia and their continuing connection to land, water, and communities. I value, respect, and celebrate Indigenous knowledge and storytelling to share wisdom from generation to generation over tens of thousands of years.

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

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Executive Summary

This report highlights case studies from around the world that showcase food and fibre education excellence that can be used as models to build immersive experiences for Australian primary school students in the classroom and beyond. Successful programs from Canada, USA, UK, Ireland, and New Zealand were explored and referenced.

This report emphasises the need for collaboration, transparency, and a whole-sector approach to creating more connected food and fibre education in Australia. By working together and providing a unified food and fibre education platform, the next generation can be engaged through programs that fill their 'agbags'.

Programs must use a common language, remove sector-based silos and nuances, connect to a common foundation in the Australian Curriculum, and represent modern Australian agriculture.

Food and fibre education resources should encourage the use of technology while providing tactile experiences for students through incursions and excursions where possible. A centralised hub of digital and physical resources should allow the ordering of samples, and the downloading of editable, regularly updated classroom resources that are customisable to each teacher's needs.

The Australian agriculture industry needs to invest long-term in food and fibre education programs and halt short-term programs. There is a need for relationship-building programs that focus on impact to all stakeholders, rather than transactional programs driven by resource downloads or video views.

The next generation of engineers, plant scientists, farmers, geneticists, agricultural journalists, agronomists, veterinarians, and marine biologists are sitting in our classrooms. To attract them into agriculture, there is a strong need for reinvigorated delivery of food and fibre education that is modern, collaborative, inclusive, accessible, and showcases the whole agriculture industry from paddock to plate, from field to fabric, from forest to furniture, and from ocean to entrée.

Keywords: Food and Fibre Education; Agricultural Education; LEGO®; Collaboration; Agricultural Shows; Classroom Resources; Primary School; Agriculture in the Classroom;

Accessibility: For increased accessibility, this report has been recorded as a podcast read by the author. To listen to the podcast search "Aimee Snowden + Nuffield" on Spotify.

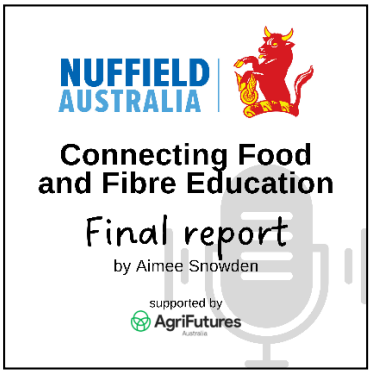


Table of Contents

Connecting Food and Fibre Education

Foreword

We are currently educating

the consumers of 2050

~ Marcus Görlich, German Delegate to Global Youth Ag-Summit, 2015

Nearly ten years ago at the Global Youth Ag-Summit, I had a lightbulb moment thanks to the words of another delegate (as noted above). Indeed, the consumers of tomorrow are sitting in our classrooms today.

And yet, this is not a new issue. The need to engage with the next generation, as not only the consumers of today and tomorrow, but also as our industry's future workforce, is a conversation we've been having for many decades. Robert Menzies, then Leader of the Federal Opposition, noted in July 1945 the need to increase scientific research and education in our agricultural and pastoral industries, and that our agricultural education resources and infrastructure needed desperate investment to grow our prosperity (Australia, House of Representatives, 1945).

Figure 1: The author at Nuffield Place, the home of Lord Nuffield from 1933 to 1963 near Henley-on-Thames, Oxfordshire, England (source: Author)

My family farm in southern New South Wales (NSW) is a mixed farming operation based on irrigated lucerne hay. I have worked in agricultural education programs and initiatives in northeast Victoria, South Australia's Yorke Peninsula, and Central

Queensland. Through this work, I have found we are constantly dividing agriculture into industry sectors to use these as the basis for teaching and learning.

Growing up on a lucerne farm we would never fit into an industry box.

Throw into the mix being on an irrigation farm and we weren't the most liked, especially during the millennium drought which coincided with my formative years of high school. But I was proud of what we produced, our innovation and efficiency, and the diversity of our region.

Ten years ago, I discovered LEGO® photography online and created the LEGO® Farmer as shown in Figure 2, to celebrate Australian agriculture by sharing everyday farm happenings on social media. It is through the LEGO® Farmer, and its subsequent growth, that my interest in agricultural education grew.

Figures 2 - 4: Celebrating Australian agriculture with the LEGO® Farmer (source: Author)

I fell into agricultural education because of a passion to connect. I am not a teacher. My love for agriculture, in all its sectors, and my passion for agricultural education and engagement ultimately led to my Nuffield Scholarship.

In 2022 I accepted a position as a Farm Education Leader for Gwynn Valley Summer Camp in North Carolina. I was going to work the summer, and then travel to North America and the United Kingdom (UK) looking at agricultural education programs. I tested positive for Covid-19 and the trip was cancelled.

Having some idea of an itinerary, I put in a Nuffield Scholarship application. It was clear from reading scholar reports, and talking to alumni, that more research was needed to explore agricultural education programs that targeted younger students (who are also my favourite to work with). From working in schools, I knew that the curriculum had food and fibre production linkages, but that the school program was full, and squeezing in additional excursions, resources and incursions was becoming harder. As a passionate agricultural show volunteer, I wanted to explore agricultural engagement that occurs beyond the classroom where education is a byproduct of a fun day out.

I met so many incredible people around the world, as summarised in Table 1, and discussed many challenges, opportunities, and ideas. Whilst not every meeting, visit and report is touched on in this report, I detailed many more as individual case studies on my blog at www.littlebrickpastoral.com/nuffield-diaries

There are many more questions to answer, and indeed more ideas to uncover, but I am confident in developing more inclusive and immersive agricultural education models to inspire and engage Australian primary school-aged students in the classroom and beyond.

Figure 5: Map of travels illustrated using LEGO® (source: Author)

Table 1: Travel itinerary including Contemporary Scholars Conference (CSC) and Global Focus Program (GFP)

Travel Dates	Location	Visits
12 - 15 September 2022	Australia: Tamworth, NSW	Nuffield Australia Conference Nuffield Australia Regional Tours
27 - 31 October 2022	Australia: South East QLD	Macadamias Australia Maleny Dairies Paradise Country, Gold Coast Scenic Rim Farm Gate Trail
21 - 28 February 2023	Canada: Alberta	Ag for Life (Agriculture in the Classroom, Alberta) The Farm School, Airdrie Project Agriculture, Edmonton AgTech STEAM, Beiseker Journey 2050 with Nutrien
6 - 17 March 2023	Canada: British Columbia	BC Agriculture in the Classroom, Abbotsford Pre-CSC Tour with Nuffield Australia, Vancouver Island CSC and CSC Tours hosted by Nuffield Canada
20 March - 16 April 2023	New Zealand	Pre-Triennial Tour with Nuffield Australia Nuffield International Triennial Tours 2023 Rural Leaders Agribusiness Summit, Christchurch Nuffield International Triennial Tours & Technical Tour
30 April - 2 May 2023	Australia: Canberra, ACT	PIEFA Conference
22 - 25 May 2023	Singapore	GFP in Singapore
26 May - 2 June 2023	India: Madurai India: Punjab	GFP in Southern India GFP in Northern India
3 - 6 June 2023	Qatar	GFP in Qatar

7 - 14 June 2023	Germany	GFP Meetings in Berlin GFP in Germany
15 - 20 June 2023	USA: Washington DC USA: Pennsylvania	GFP Meetings in Washington GFP in Pennsylvania
26 June - 31 July 2023	USA: Orlando, Florida USA: Brevard, North Carolina USA: Raleigh, North Carolina USA: Hamburg, New York USA: Pennsylvania USA: Columbus, Ohio USA: Indiana	LEGOLAND Florida National Agriculture in the Classroom Conference Disney EPCOT Theme Park Gwynn Valley Summer Camp 2023 International Scholar Laura Kilian Erie County Fairgrounds York State Fair Pennsylvania Friends of Agriculture Lebanon Area Fair Ohio State Fair Indiana State Fair Fair Oaks Farms
6 - 13 January 2024	Australia: Victor Habor, SA	NAAE National Conference
3 - 5 April 2024	Australia: Launceston, Tasmania	Hagley Farm School Agriculture Learning Centre Rural Youth
29 April - 4 May 2024	Australia: Wagga Wagga, NSW Australia: Sydney, NSW	Professor Jim Pratley Kimberlin Education RAS of NSW Calmsley Hill City Farm
16 - 24 May 2024	Ireland: Dublin Ireland: Wexford	Dublin Zoo Lidl Farm to Fork Experience Irish Agricultural Museum Aquaculture Remote Classroom

25 - 29 May 2024	Denmark	LEGOLAND Billund LEGO House Danish Crown, Horsens
30 May - 1 July 2024	UK: England	Royal Bath & West of England Show, Somerset Cotswold Farm Park South of England Show, Ardingly Open Farm Sunday National Farmers' Union British Beekeepers Association, Stoneleigh Park 2006 UK Scholar Ian Beecher Jones Cereals UK Nuffield Place, Oxfordshire AHDB Education 1983 UK Scholar John Alvis, 2014 UK Scholar Johnny Alvis, and 2002 UK Scholar Nick Green 2021 UK Scholar Chris Manley
	UK: Scotland	RASC Pre-Conference Tour Royal Highland Show, Edinburgh RASC Conference
2 - 16 July 2024	New Zealand	*Farmers Weekly* 2021 NZ Scholar Daniel Eb Huka Prawn Park, Taupó FMG Young Farmer of the Year Season 56 Grand Final

Acknowledgments

He aha te mea nui o te ao?

What is the most important thing in the world?

He tāngata, he tāngata, he tāngata!

It is people, it is people, it is people!

~ Māori whakatauki (proverb)

My purpose is the people, particularly our young people - our future consumers, future workforce, and future advocates. It is the pure joy and excitement that I witness when delivering food and fibre education programs that led me on my Nuffield journey. The learning and elation I have seen worldwide continues to inspire and shape my work.

Thank you to Nuffield Australia and AgriFutures Australia for their organisation, support, and investment, without whom this journey would not have been possible.

To the wider Nuffield family across the world who I leant on, reached out to, and learnt from. My special thanks to the scholars and delegates in attendance at the CSC in Vancouver, Canada, the alumni at the Triennial in New Zealand (NZ), and the incredible scholars and hosts who joined GFP #5 through Singapore, India, Qatar, Germany, and the United States of America (USA).

Figure 6: Nuffield Scholars and Delegates at the CSC in Vancouver, Canada, March 2023 (source: Ingrid Johnston, Nuffield Canada)

To the ultimate travel buddies who packed light, smiled for every photo and tourist stop, and sparked many conversations as shown in Figures 7 to 10.

Figures 7 - 10: The LEGO® Farmers of Little BRICK Pastoral enjoying Nuffield travels around the world from the USA and Canada, to Ireland and Denmark (source: Author)

To the teachers in Australia and around the world who invited me into their classrooms, staffrooms and excursions, and who shared their agricultural education resources, trials and triumphs.

To my family who embraced my dream of a Nuffield Scholarship, supported my return to the family farm, answered video calls at random hours to hear my learnings with excitement, and balanced my enthusiasm with the realities of the Australian climate and education system. And to the two little boys who during my scholarship gave me the most special role to date: Aunty Aimee.

Thank you to the amazing people around the world who made it possible through their inspiring and challenging conversations, their connections, opening their homes, and opening doors. You each have influenced me and shaped my knowledge and ideas.

And a special thanks to Phil & Lynda Snowden, Beth Donaldson, Matt Champness, Ian Beecher Jones, Ali Donaldson, and Fritz Bolten for their valuable feedback and insights in proofing this report.

Abbreviations

ACARA	Australian Curriculum, Assessment and Reporting Authority
ACT	Australian Capital Territory
AHDB	Agriculture and Horticulture Development Board
ALC	Agricultural Learning Centre
ARC	Aquaculture Remote Classroom
BIM	An Bord Iascaigh Mhara
CEVAS	Countryside Educational Visits Accreditation Scheme
CSC	Contemporary Scholars Conference
DECYP	Department for Education, Children and Young People (Tasmania)
GFP	Global Focus Program
HASS	Humanities and Social Sciences
LEAF	Linking Environment And Farming
NAAE	National Association of Agricultural Educators
NFU	National Farmers' Union
NSW	New South Wales
NZ	New Zealand
PD	Professional Development
PIEFA	Primary Industries Education Foundation Australia
RASC	Royal Agricultural Society of the Commonwealth
RDCs	Research and Development Corporations
RHET	Royal Highland Education Trust
SA	South Australia
TAP	Timboon Agriculture Project
UK	United Kingdom
USA	United States of America
USDA	United States Department of Agriculture
VET	Vocational Education and Training
WWCC	Working with Children Check

Objectives

Education, workforce development, and next generation engagement are priority areas for many farming organisations and Rural Research and Development Corporations (RDCs). To achieve such goals, a collaborative effort which extends beyond the classroom is required.

The objectives of this Nuffield Scholarship were to:

- Build on the research of previous Australian and international scholars,
- Explore immersive agricultural education models specifically targeting primary school-aged students,
- Explore whole-of-industry agricultural education programs and resources,
- Explore agricultural engagement activities beyond the classroom including agricultural shows,
- Identify key drivers for program success.

Agricultural education and its role in workforce attraction and development is no small topic. The study of secondary school initiatives and programs, tertiary education programs and attraction, industry-specific training including Vocational Education and Training (VET), and industry retention and career development programs are outside the focus of this report.

Introduction

The curriculum references food and fibre production.

The subject is agriculture, not the individual sectors we operate in.

~ Anthony Lee, Rural Press Club of Queensland Ekka Breakfast, 2022

Agricultural education is integral for the whole industry to become the next $100 billion industry by 2030 (National Farmers Federation, 2019). There is a need for all-encompassing agricultural education experiences that allow students to learn about the industry as one industry, remove sector silos and build their individual agriculture capital: known as filling their 'agbags' (Peltzer, 2020).

In 2023, there were over four million students enrolled in 9,629 schools in Australia (Australian Bureau of Statistics, 2024), with over 537,820 people employed as teachers (Australian Bureau of Statistics, 2021). There is a need for more broad-reaching solutions that provide immersive experiences for students without burdening teachers with more resources to understand.

In each country visited from India to Qatar, Singapore to Germany, and the USA to Denmark, labour shortages in agriculture were noted and the challenges in attracting the next generation to consider a career in food and fibre production. Innovation in delivering food and fibre education and engagement driven by those connected to the target audience is needed.

Case studies throughout this report have been used to highlight exemplary programs and their key drivers to success.

Young people's perceptions and visions

Young people's perceptions of agriculture are often the subject of research and opinion pieces as the industry unpacks labour shortages and the lack of agricultural graduates. Young people are passionate about agricultural education across the world. Instead of researching and writing about them and their solutions, the agriculture industry should invest in their ideas. Failing to listen to young people, and create space for their innovations, means we are failing to transform the agriculture industry (Hawkes, 2023).

Mount Albert Grammar School students who competed in the FMG Junior Young Farmer of the Year Season 56 Grand Final in Hamilton, NZ, were asked to speak on the ageing population of farmers. They summarised their speech, by highlighting one solution: "increase agriculture in schools" (Chandler & Smith, 2024).

In 2023, Linking Environment And Farming (LEAF) Education, UK, supported by Harper Adams University, UK, undertook research to challenge the views that young people are disconnected and disinterested in agriculture. 75% of students believe that agricultural education should play a larger part in the school curriculum, and over a third would like to see better links between farms and schools to support their understanding (LEAF, 2023).

Young people ranked experiential learning as the most useful way to inspire, engage and motivate themselves (LEAF, 2023). 71% of students noted that they would encourage young people to enter the industry by funding schools to visit farms and agricultural colleges, followed by 44% of students noting that they would make agriculture a compulsory subject at school (LEAF, 2023).

These views were reflected in Australia when AgriFutures Australia undertook research with participants of the Horizon Scholar program. The vision of the participating Horizon Scholars is for every student to have an agricultural experience and ongoing touchpoints with the industry from primary school onwards (Ives, 2023).

A brief history

Agricultural education has had a mixed history, with periods of strong leadership and development, against a past where there was little support from the sector for formalised education (Pratley, 2021). By the late 2000s, Emeritus Professor Pratley's research highlighted the lack of graduates from Australian tertiary institutions. Subsequently, various industry organisations, including the RDCs, began to develop leadership and capacity-building programs (Pratley, 2021).

In 2007 the Primary Industries Education Foundation Australia (PIEFA) was formed, becoming operational in 2010, to ensure the value of Australian food and fibre production became embedded in the national psyche (PIEFA, 2022). Their mission is to engage schools and the community through education as the leader in food and fibre education in Australia (PIEFA, 2023). PIEFA is supported by many RDCs and industry organisations and has developed a range of digital and physical resources.

Students in Australia have been surveyed about their agricultural knowledge through formal research, industry surveys, and individual questionnaires. These are regularly reported on with headlines such as "school students believe dairy farmers milk their cows by hand" (McLennan, 2022) and "schoolchildren can't see the yoghurt for the trees" (Howden, 2012).

The use of this research by industry to support the need for further food and fibre education is juxtaposed with how it further entrenches a rural-urban divide. Farmers see these results as further evidence of their worst fear: urban people believe their food simply comes from the supermarket (Jones, 2023).

Previous Nuffield study

The increased attention to agricultural education has been the focus of previous Nuffield Scholars. These reports, along with many others, influenced this study and research.

In the classroom, Ian Beecher Jones noted the need to centralise information and ensure the industry provided clear messages, resources and opportunities (2006), and went on to develop Tractors in Schools, UK (pers. comm., 2024). Becky Parker highlighted the need to act when students are younger, and not to wait until students have already selected a pathway (2015) and was instrumental in the development of ThinkAG with Agriculture in the Classroom, Canada (pers. comm., 2023). 2017 Australian Scholars Jamie Heinrich and Daniel Kahl reiterated the need for early exposure and agriculture's strong linkages to the STEM curriculum.

Irish Scholar Karol Kissane emphasised the need to repeat positive experiences from a young age, and to remove fragmented sectors into one coherent umbrella (2019). Clare Peltzer noted the importance of industry alignment right across Australia for effective delivery (2020). Australian Scholar Kathryn Fleay noted the issue of short-term industry funding and project siloing and reiterated the need for collaborative efforts that transcend individual organisations (2024). Daniel Eb went a step further and suggested that in New Zealand a new organisation was needed to find, train, and support community engagement (2022).

2002 UK Scholar Ian Pigott created Open Farm Sunday from his study. Ali Undorf-Lay noted the importance of small ongoing experiences rather than single one-off acts (2008), and 2015 UK Scholar Aled Jones explored the role of agricultural societies and shows in promoting, developing and innovating the industry.

Language: What is agriculture?

Agriculture is not crop production as popular belief holds

- it's the production of food and fibre from the world's land and waters.

~ Allan Savory

In 2021 primary school students in Years 4 to 6 across Australia were surveyed to determine their agricultural knowledge, including asking students to note three words they think of when they hear the word 'agriculture', (Cosby, et. al., 2022). Common responses included farming, farms, animals, and plants. Some identified the word 'culture' within agriculture and associated it with culture and history.

Kathryn Fleay noted the word agriculture commonly referred to farming rather than the full production pathway of the food and fibre supply chain (Fleay, 2024). As an industry, in Australia alone, we use a plethora of terms for agriculture from farming to primary production as shown in Figure 11.

Figure 11: Terms used for agriculture in Australia as noted during research (source: Author)

The most recent update of the Australian curriculum notes 'food and fibre production' rather than agriculture in a push led by PIEFA (Hughes, pers. comm., 2024). Curriculum Specialist of Technologies at the Australian Curriculum, Assessment and Reporting Authority (ACARA), Melanie Hughes, noted that this change has resulted in many teachers asking where the agriculture content went (pers. comm., 2024).

Agricultural education in Australia is defined by industry as agriculture, in the curriculum as food and fibre production, and led by a peak body called the Primary Industries Education Foundation Australia with an online resource hub *Primezone*. The Royal Highland Education Trust (RHET), Scotland, noted the importance of agriculture in one's name when delivering food and fibre education resources. Executive Officer Katrina Barclay pointed out that without an obvious name, vital funds are spent on

search engine optimisation and marketing so that teachers can find you, rather than on the important work of resource development (pers. comm., 2024).

Language is important, and for agricultural education in Australia, we have three key terms: agriculture, food and fibre production, and primary industries. We need consistency (Hughes, pers. comm., 2024).

In the classroom

Ideally, food and fibre education would be embedded into classroom programming from early childhood education through to tertiary and higher education, with links across all subjects. There are strong examples where schools provide exemplary studies in food and fibre education, or where students elect to study in the fields of agriculture, horticulture and rural studies.

Timboon P-12 School, Victoria, and Hermidale Public School, NSW, are examples of integrated food and fibre education for primary school students in Australia. Both programs are supported extensively by the local community, with the Timboon Agriculture Project (TAP) celebrating ten years in 2022 and 675 local community members and businesses sharing their expertise (Vallance, pers. comm., 2024). The success of these programs relies on providing a cross-curriculum approach, rather than existing in silos or individual disciplines.

However, for most students in Australia food and fibre education will only be touched on briefly as a context scenario in a core subject, the theme of a book they are reading, or as an example in an experiment or inquiry learning task. The extent to which food and fibre education is undertaken is driven by the teacher's knowledge and confidence with the subject matter and, in later years, the student's interest and the school's offering of specialist subjects.

The most prevalent food and fibre education program in Australian primary schools is the Stephanie Alexander Kitchen Garden Program, with 1,000 primary schools in their network delivering over three million experiences per year (Stephanie Alexander Kitchen Garden Foundation, 2023). Whilst not considered agricultural education by many in the industry, the program delivers food education that celebrates the growth and appreciation of seasonal produce (Stephanie Alexander Kitchen Garden Foundation, 2023). In comparison with agricultural education programs facilitated by industry organisations and RDCs, the impact and approach are far ahead.

Curriculum

The Australian Curriculum Version 9.0 references food and fibre education in Design and Technologies, Digital Technologies, Science, and Humanities and Social Sciences (HASS) for primary school students in Foundation to Year 6 (ACARA, n.d.). There are currently two versions of the Australian curriculum in use, in addition to state-based curricula which reflect additional priorities, as per Table 2.

Table 2: Current Curriculum taught in Australian Primary Schools

State	Curriculum
ACT	Australian Curriculum Version 9.0
Northern Territory	Australian Curriculum Version 9.0
NSW	NSW Syllabus
Queensland	Australian Curriculum Version 8.4 Version 9.0 will begin implementation in 2025 until 2027
South Australia	Australian Curriculum Version 8.4 Version 9.0 will begin implementation in 2025, and a new South Australian Curriculum for Public Education under development for completion in 2027.
Tasmania	Australian Curriculum Version 9.0
Victoria	Victorian Curriculum Foundation-10
Western Australia	Western Australian Curriculum

The curriculum is the base plate of education delivered in Australia. Like undertaking a LEGO® build, the base plate provides a strong foundation for building resources, lessons and outcomes. All resources created in Australia for school use by industry must be aligned to the curriculum. Currently, this involves the Australian Curriculum Version 8.4 and 9.0, and further linkages to the NSW Syllabus, Victorian Curriculum, and Western Australian Curriculum. Failure to align resources upfront and to each of the curricula in use, reduces uptake by teachers but is not often noted in impact reports focused on the number of downloads.

Resources

The importance of resources being curriculum aligned, as well as reflecting the language used in the classroom, are only two drivers for success. Resources, whether digital or physical, should reflect modern Australian agriculture, be regularly updated, audited, or retired, and be easily accessible and editable. Downloading a resource for classroom use only to find broken links renders a resource useless.

Teachers rely on digital hubs to find resources, and ACARA recommends *Primezone* as the agricultural education hub (Hughes, pers. comm., 2024). These digital hubs should be fully searchable by learning stage, topic and key outcome, regularly updated and checked. All food and fibre education resources must be of high quality and continue to be updated to reflect modern Australian agriculture practices and technologies. Resources that no longer reflect best practice should be retired if they cannot be updated, rather than being left on the shelf (physically or digitally).

There is an increasing need for resources that are easily modified to suit individual class needs such as editable worksheets, and more tactile hands-on resources (YouthInsight, 2022). Research undertaken for PIEFA by YouthInsight noted that teachers prefer interactive, hands-on and up-to-date tools that are easily adaptable and editable (2022). These parameters are not seen in the current resources produced by PIEFA and others in the industry.

At evokeAG 2024 Future Young Leader Guy Coleman asked, “Why in agriculture, have we decided that reinventing base recipes every month, every funding call, is better than building and sharing those base recipes?” Guy’s presentation highlights the need for open-source principles of community and collaboration across agriculture (Coleman, 2024). These principles can be applied to agricultural education when we allow teachers to edit and adapt resources to suit their requirements.

The open-source principle of community is required to represent the whole of agriculture through food and fibre education rather than individual sectors. Research funded by the Livestock Export Program in 2023 noted that whilst agriculture often operates and advocates in separate silos, the broader community sees all the sectors as a whole (Voconiq, 2023). There is a need for more food and fibre education resources that reflect agriculture as one industry and address cross-curriculum priorities, rather than market one sector over another.

The following case studies provide examples of programs internationally that prioritise cross-sector collaboration, and editable and updated resources.

Case Study: Project Agriculture, Alberta, Canada

Project Agriculture provides students the opportunity to explore agricultural themes and challenges (2023). The program is a collaboration between eight provincial commodity groups in Alberta, however, individual branding of these is not visible, and the educational content is industry-wide. Project Manager and Learning Designer, Patricia Ramsey, noted the content must be educational not individual sector marketing, as teachers see through this and will not utilise the resource (pers. comm., 2023).

After the initial two-year build, an ongoing financial commitment was made to ensure its accuracy and maintenance. This includes yearly audits to ensure there are no broken links, in addition to imagery audits to ensure all visuals are representative of best practice Canadian agriculture (Ramsey, pers. comm., 2023).

The use of multiple formats including printable handouts, videos, and a digital platform was important in project design. The interactive platform is broken into two interfaces, one for students and one for teachers as captured in Figure 12. A team of practising teachers reviewed all content, and their input was important in shaping early content drafts (Ramsey, pers. comm., 2023).

Figure 12: The Project Agriculture teacher interface for elementary grades (source: www.projectagriculture.ca, Project Agriculture, 2024)

Case Study: Agriculture and Horticulture Development Board, UK

The Agriculture and Horticulture Development Board (AHDB) was five separate levy boards until 2009. Today AHDB represents levy payers in beef, lamb, dairy, cereals and oilseeds, and pork (AHDB, 2023). In 2018 the sector-specific education initiatives came together under one umbrella: *Food - a fact of life* (Healey, pers. comm., 2024).

Many of the resources provided for food and fibre education are in PDF format which does not allow for easy adaptability but protects the organisation's branding. AHDB resources are editable and provided on an open website. AHDB is also a partner in Countryside Classroom and supports LEAF's Open Farm Sunday with physical resources as shown in Figures 13 and 14. Countryside Classroom is an online resource hub for food, farming and natural environment education providing teachers with inspiration, resources, key contacts, and accredited farms to visit.

Figures 13 & 14: *Open Farm Sunday Explorer*, supported by AHDB, from Open Farm Sunday 2024 at Brixworth Farming, and AHDB resources and posters at the South of England Show (source: Author)

LEAF Education, as the manager of Countryside Classroom, ensures that all resources meet the hub's standards. A full-time moderator, with a Quality Assurance background, audits and checks all resources (Madge, pers. comm., 2024).

Teacher Professional Development

Engaging students is great, but for teachers to feel informed and more confident in teaching food and fibre education they need to be directly engaged (Barclay, 2024). Katrina Barclay, RHET's Executive Officer, in her address to the Royal Agricultural Society of the Commonwealth (RASC) 30th Commonwealth Agricultural Conference, noted the importance of industry organisations having a teacher advisory panel (2024). A panel of current practising teachers provide advice to RHET on what resources and support are required.

PIEFA and the National Association of Agricultural Educators (NAAE) in Australia each hold conferences that are accredited for Professional Development (PD). The biennial PIEFA Conference tries to achieve several things, including being a showcase to government of current industry programs and is thereby held in Canberra (Mesiti, pers. comm., 2024). The annual NAAE Conference is coordinated by the state agriculture teachers' associations and moves location with regional tours as part of the PD experience. Teacher attendance at both conferences focuses on secondary agricultural educators.

Given the shortage of qualified agriculture teachers in Australia, it is important to support those who are charged with teaching food and fibre education. In 2023 over 100 agriculture teaching positions were advertised across Australia, and a number remained unfilled (Pratley, pers. comm., 2024). The NAAE Conference is held in the January school holidays to maximise attendance, whereas the PIEFA Conference is held in early May. Many teachers personally fund their attendance in their own time. The NAAE Conference in Victor Habor, SA, in January 2024 noted a call for all agriculture teachers in Australia to attend with financial support.

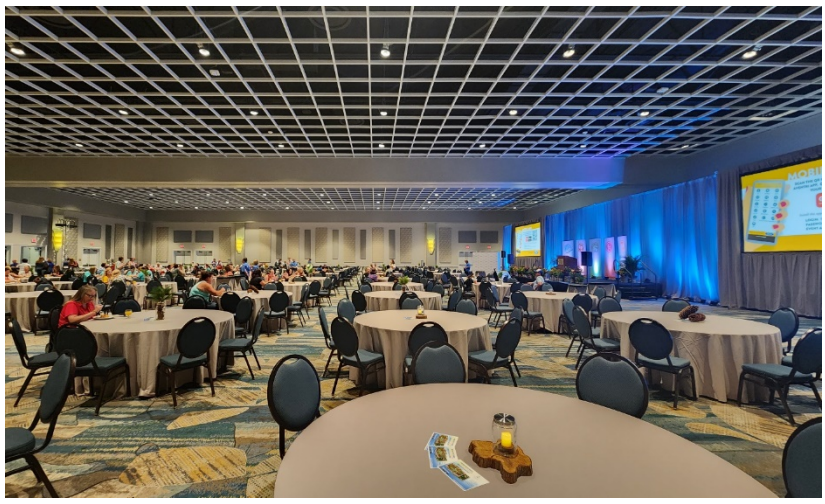
The National Agriculture in the Classroom Conference held in Orlando, Florida in late June 2023 was a standout in professional development, networking and collaboration, as highlighted in the following case study.

Case Study: Agriculture in the Classroom, Canada & USA

Agriculture in the Classroom exists in each state of the USA and is supported by National Agriculture in the Classroom, with funding from the United States Department of Agriculture (USDA) and many state-based Farm Bureaus. In Canada, again there are provincial organisations as well as the national Agriculture in the Classroom. The *Agriculture in the Classroom* program was developed in 1977 by an Illinois farmer and teacher, and by 1981 the USDA Secretary had invited representatives of agriculture and education groups to create a coordinated effort (Guffey & Stewardson, 2023).

Agriculture in the Classroom aims to increase agriculture literacy. An agriculturally literate person is someone who understands the food and fibre system, its significance economically, socially and environmentally, and can communicate that value (Guffey & Stewardson, 2023).

The National Agriculture in the Classroom Conference is the premier, national PD opportunity for agricultural educators. The 2023 Conference was held in Orlando, Florida, from 26 to 29 June. With over 500 agricultural educators in attendance, many teaching primary school students, the conference focused on collaboration and networking. Industry organisations were not present upselling their resources, but rather passionate educators shared their successes and provided editable resources that could be adapted across the country. Resources focused on key agriculture and cross-curriculum priorities rather than sector-specific representation.



Figures 15 & 16: The author attending the National Agriculture in the Classroom Conference, Orlando, Florida (source: Author)

School incursions

In addition to resources, industry organisations are increasingly delivering school incursions or offering farmers and other agricultural professionals as classroom speakers. Unlike an excursion, an incursion is delivered within the school environment, often in the classroom, removing barriers to participation including transport cost and excursion risk assessments.

Successful incursions provide opportunities and experiences for the students that they would not normally be offered, through access to people, technology and equipment. Incursions must offer more than a classroom activity or watching a video that could be undertaken ordinarily. This was witnessed as students planted potatoes as part of the BC Agriculture in the Classroom Spuds in Tubs program in Figure 17.

Figure 17: The author attending a BC Agriculture in the Classroom Spuds in Tubs incursion at a French Immersion Elementary School in Abbotsford, British Columbia (source: Author)

FarmerTime created by Tom Martin, UK, is a great example of a relationship-building program that provides students with the opportunity to connect with a farmer over a live video every two weeks, asking questions and learning about farm happenings. The importance of this program not being transactional, a one-off, or prerecorded cannot be overstated.

Like the National Farmers Union (NFU) Farmers for Schools ambassadors, students must have the opportunity to build a relationship with those working in agriculture. They cannot be what they cannot see, and having the opportunity to meet someone, connect and ask questions is key. These programs positively impact the farmers and other agricultural professionals involved who often lament their disconnect with consumers.

All visitors to a school in Australia are required to hold a Working with Children Check (WWCC) or equivalent as per the state legislation. The lack of a national WWCC system, and differing procedures and costs between states, is an administrative burden.

The following case studies showcase exemplary school incursions with a strong use of technology and equipment.

Case Study: Pennsylvania Mobile AgLabs, USA

Pennsylvania Friends of Agriculture, with funding provided by grants, sponsorship, donations and fundraising, and the Pennsylvania Farm Bureau, has six Mobile AgLabs as shown in Figures 18 and 19. Each AgLab is a mobile classroom built in a semi-trailer fitted with over 30 agriculture experiments and lessons.

Figure 18: Outside view of a Pennsylvania Mobile AgLab (source: Author)

Figure 19: The author inside a Pennsylvania Mobile AgLab (source: Author)

The idea of mobile agricultural classrooms is not uncommon in the USA with Pennsylvania Friends of Agriculture taking inspiration from labs seen in Maryland. The need for incursions increased as school excursions became harder to deliver with bus driver and nurse shortages, and schools found it harder to get parent helpers (Shoop, pers. comm., 2023).

The first Pennsylvania Friends of Agriculture AgLab, at 20 years old was being replaced in 2023 at a cost of over USD 200,000 including fit-out (Shoop, pers. comm., 2023). The state's fleet of six AgLabs is at full capacity going into each school year providing hands-on, educational, and fun lessons. Pennsylvania Friends of Agriculture also has a smaller Immersion Lab, sponsored by supermarket *Giant*, which travels to events as shown in Figures 20 to 22.

Figure 20 - 22: The Farms to Families Immersion Lab powered by *Giant* onsite at the Lebanon Area Fair, Pennsylvania (source: Author)

The Pennsylvania Mobile AgLabs highlight the importance of long-term investment in agricultural education and delivering impactful incursions that teachers rely upon for their programming. Life Education Australia has been delivering preventative health education for over 40 years in mobile learning classrooms. *Healthy Harold* helps over 710,000 students every year across Australia to achieve physical health, safety, and mental health and well-being outcomes aligned with the Australian curriculum (Dix, et. al., 2021).

Life Education began in 1979, and for many families, the *Healthy Harold* programs are an inter-generational mainstay in their schooling experience providing opportunities for further student-parent discussions (Dix, et. al, 2021). Incursions are an increasingly rare feature of educational programs today (Dix, et. al, 2021), and the impact of Life Education, supported by long-term investment, highlights the opportunity for a whole-sector approach to food and fibre education.

Case Study: Aquaculture Remote Classroom, Ireland

The Aquaculture Remote Classroom (ARC) is a mobile classroom fitted on the back of a truck, then hydraulically lowered and expanded to become full size as shown in Figure 23. The classroom is fully powered by the truck's generator requiring only a flat carpark. The ARC has been designed to raise students' awareness of aquaculture and a career in the sector (BIM, n.d.).

Figure 23: The ARC positioned at Kilrane National School, Rosslare (source: Author)

The Irish Seafood Development Agency, An Bord Iascaigh Mhara (BIM), developed the ARC as part of a European-wide campaign, #FarmedintheEU, with European Union funding, although Ireland is the only member with a remote classroom (BIM, n.d.).

The ARC is provided free to schools, with a focus on primary school delivery. It can host one class of up to 35 students per day and currently has a waiting list of 500 schools (Shannon, pers. comm., 2024). Project Facilitator, Áine-lisa Shannon, noted students love the classroom because of its unique use of technology, with many rural students having lots of questions about the mechanics of the truck (pers. comm., 2024).

There's a strong technology focus to activity delivery including a virtual reality experience to take students along the aquaculture supply chain as shown in Figure 24. The ARC is fully curriculum-aligned with lessons ranging from the history of farming and aquaculture to geography and climate.

Figure 24: Kilrane National School Year 6 students exploring virtual reality in the ARC (source: Author)

School excursions

School excursions offer the opportunity for students to visit agricultural businesses across the supply chain, providing an unprecedented level of access and insight. The observation of food and fibre education excursions in Australia and internationally from touring Danish Crown's pig slaughterhouse in Horsens, Denmark, to joining a primary school excursion with the British Beekeepers Association in Stoneleigh Park, England, highlighted the importance of accessibility and providing a range of tactile, hands-on learning experiences.

Successful excursions provide opportunities for both students and teachers beyond the classroom with access to agricultural professionals, technology, equipment and new environments. Excursions need to be well facilitated to maximise learning outcomes and manage risks. Successful excursions centred on learning outcomes require facilities, shade, alternative spaces, hands-on learning, and subsidised or funded transport.

It is not enough to provide a location and spokesperson at an excursion site. Excursions should include a range of learning activities that cater for different learning styles and make use of the location. The addition of activities which result in items to be taken home not only impresses students but also continues the learning and sharing at home.

Through the Australian Government's Educating Kids about Agriculture initiative, $4.75M in funding was provided to state farming organisations until 30 June 2022, and then extended to 30 June 2023, to take primary school students to farms, otherwise known as *Kids to Farms* (Australian Government, 2024). *Kids to Farms* in Tasmania was often an excursion to Hagley Farm School Agricultural Learning Centre (ALC), noted in the following case study. These excursions provided a "holistic experience and leave a lasting impression" with many students wanting to learn more about growing food and fibre, and agricultural careers (Lang, Shelley & Fitzallen, 2022).

The following case studies on excursions highlight the importance of strong industry support in delivering a well-rounded experience.

Case Study: Hagley Farm School Agricultural Learning Centre, Tasmania

The Hagley Farm School ALC is one of five Department for Education, Children and Young People (DECYP) Field Study Centres in Tasmania, and the only one dedicated to offering experiential learning through history, animals and farming (Tasmanian Government, 2024). Being owned by the Tasmanian Government and administered by DECYP makes facilitating school excursions easier for local schools, as they are visiting another site with similar risk assessment frameworks (Harris, pers. comms., 2024).

Excursions delivered at the Hagley Farm School ALC align with the Tasmanian Agricultural Education Framework to grow, make, protect, and experience. Hagley Farm School teacher Scott Watson, who is also Revitalising School Farms Network leader for the north, noted the need for more tactile resources provided by industry (Watson, pers. comm., 2024).

Andrew Harris is Statewide Coordinator of Food and Fibre Production with DECYP and Revitalising School Farms Program. His role supports teachers across the state delivering food and fibre education, with the program protected by state legislation. A similar lead agriculture teacher role to support secondary agricultural education in South Australia is funded by industry and filled by Sue Pratt. There is a need for lead agriculture teachers across Australia in each state and/or region to support food and fibre education and to connect teachers with industry.

Figure 25: Exeter Primary School complete an infield experiment whilst on an excursion at Hagley Farm School Agricultural Learning Centre in April 2024 (source: Author)

Case Study: Calmsley Hill City Farm, NSW

Australia has several urban farms and theme parks with an agriculture focus that also offer food and fibre education excursions, including Paradise Country owned by Village Roadshow Theme Parks, Gold Coast, and privately owned Calmsley Hill City Farm in Western Sydney. Whilst these would not be considered typical farms, and many are commercial agritourism ventures rather than agribusinesses, their reach surpasses traditional food and fibre education programs.

Calmsley Hill City Farm is a commercial farm set across 400 acres in Sydney's backyard with views of Sydney Harbour Bridge. Open all year round, it offers the public, in addition to 30,000 students per year, the opportunity to get up close to a range of native and farmyard animals (Moseley, pers. comms., 2024).

General Manager, Noah Moseley, acknowledged the role the business plays in representing the industry to the public and students but also noted the difficulty in engaging with multiple industry organisations to gain up-to-date resources (pers. comms., 2024). Industry organisations and RDCs are not the first to offer support and for Noah, increasing educational signage or investing in upgrading assets to reflect industry best practice or the latest innovation does not increase ticket sales (Moseley, pers. comms., 2024). The agricultural industry needs to do more to support successful programs and facilities that are already attracting thousands of annual guests and students, to ensure these facilities and shows are the best representation they can be, such as those seen at Fair Oaks Farms, USA.

Figure 26 - 28: Kamaba Junior School students visit Calmsley Hill City Farm in May 2024, including milking a cow after washing their hands, and watching a shearing demonstration together with another school (source: Author)

Fair Oaks Farms is a leading agriculture attraction in Indiana, complete with multiple attractions, dining options, and a hotel. Enrichment Programs Manager at Fair Oaks Farms, Matt Rudy, noted the need for agricultural education to be fun and engaging, and thereby educational (pers. comm., 2023). The attractions at Fair Oaks Farms are highly engaging and staged like interactive museums with special pavilions on dairy (Figure 29) pork and crops, and tours taking guests to a rotary dairy, robotic dairy, and pig barn.

Figure 29: The gamified milking activity inside the Dairy Adventure at Fair Oaks Farms, Indiana, (source: Author)

Case Study: Lidl Farm-to-Fork Experience, Ireland

The Farm-to-Fork Experience located at Lidl's Newbridge Distribution Centre, Ireland, and facilitated by Agri Aware hosts two school groups per day. Lidl is a German supermarket brand, and Agri Aware is the Irish agricultural education body funded by industry to educate, advocate and engage.

Agri Aware provides a curriculum-aligned agricultural education excursion for primary school students near Dublin. The Lidl Farm-to-Fork Experience is unique and was developed by the Lidl events team (Byrne, pers. comm., 2024). Agri Aware Education Officer, Roisín Byrne, shared with excitement the growth of the Lidl Farm-to-Fork Experience which is expected to welcome 5,000 students in 2024, up from 3,500 in 2023.

The Lidl Farm-to-Fork Experience includes a classroom presentation and activity, and a walk through the fields or purpose-built greenhouses, as shown in Figure 30, to pick and taste fresh fruit and vegetables. Students explore the importance of soil, photosynthesis and pollination, before a safety briefing ahead of the Distribution Centre "train" journey, as shown in Figure 31.

Figures 30 & 31: Lidl Farm-to-Fork Experience greenhouse, and "train", located at the Lidl Newbridge Distribution Centre (source: Author)

The Lidl Distribution Centre was built over 10 years ago, with the Farm-to-Fork Experience a recent addition on neighbouring vacant land. The "train" completes a short 20-minute escorted circuit. Whilst in the Distribution Centre, students undertake a scavenger hunt from the "train" finding aisles of fresh fruit and vegetables, frozen items, cereals, canned food, dairy products, and non-food items.

Beyond the classroom

It is unrealistic to expect schools to pander to the requests from

an individual sector for greater exposure in the education system.

~ Emeritus Professor Jim Pratley, Review into Agricultural Education and Training in NSW, 2013

The agriculture industry needs to think beyond the classroom when it comes to food and fibre education. The curriculum is full and overcrowded, and it is unrealistic to expect more information can be continually added (Pratley, 2013). Every industry from construction to health, and every societal concern from bullying to obesity, would love additional exposure in the classroom.

The agriculture industry needs to be more creative and innovative and explore food and fibre education through the lens of agricultural engagement. The sector has an obligation to bring all audiences, from young to old including families, along in engaging experiences that offer learning in a fun environment where education is not a key outcome, but a bonus due to smart design.

Any agricultural engagement activity must be representative of an industry that is innovative, technologically advanced, sustainable, and thriving economically and socially. Sector-specific activations, or those that promote a particular farming method, should be careful not to divide and degrade other sectors or methods. As Anna Jones asks in *Divide*, who are we really fighting against? Is it each other? (2023).

Just like with *In the classroom* initiatives, industry participants need to take responsibility for enacting some *Beyond the classroom* engagement activities. To enable greater uptake and success, support that provides a framework for hosting safe, meaningful and memorable farm visits would be a worthwhile investment for industry and government. In the UK farmers are supported to not only undertake Countryside Educational Visits Accreditation Scheme (CEVAS) training, but funding is available to build or upgrade facilities including on-farm classrooms.

Agricultural shows and fairs

Agricultural shows, from the one-day country show in a local town to the multi-day capital city Royal Shows or state fairs, are ideal events for agricultural engagement. Education, entertainment, and engagement are separate elements of a successful show. When the elements become combined, as is often the case for *edutainment*, inevitably one element suffers, be it either the agricultural accuracy of the education or the appeal of the entertainment.

An agricultural show is an opportunity to showcase the best of agriculture and should not be a museum. Engagement activities must demonstrate industry best practice, such as the milking activations at the Erie County Fair Education Barn (Figures 32 to 34). It is easy for a milking activation to stop at Figure 32 where guests hand milk a fibreglass cow, but that is not representative of the wider industry.

Figures 32 - 34: The milking activation at the Education Barn of Erie County Fair, Hamburg, New York, with a hand-milked cow, machine-milked cow, and robotic milked cow (source: Author)

Museums that showcase agriculture, like agricultural shows that include old-world elements, have an opportunity to also showcase the current innovations and technology used. Why should a museum stop at yesterday, when today becomes history tomorrow? Focusing on history without including modern innovations and today's sustainability has the potential to leave guests with a negative view of the entire sector.

Case Study: Little Farmers, State Fairs, USA

Little Farmers is a hands-on activation for young children from two years old that has spread from the Minnesota State Fair, USA, across the world. In Australia, we see Little Backyard Farmers at Brisbane's Ekka, and Little Hands on the Land at the Sydney Royal Easter Show. These activations allow children to learn through play by making their way along a designated path exploring the paddock-to-plate process.

Renée Alexander, CEO of Minnesota State Fair, shared that Little Farmers has been activated for 25 years at their annual show, and they now see teenagers coming back through the experience to relive their childhood memories (2024). The latest research notes that learning through play is the best way to support learning (Zosh, Hassinger-Das & Laurie, 2022).

Play and entertainment should not just be an event filler, with the characteristics of successful play being meaningful, joyful, interactive, social, and actively engaging (Zosh, Hassinger-Das & Laurie, 2022). The Little Farmers activation encapsulates these characteristics as well as delivering a collaborative agricultural engagement experience.

Renée Alexander noted the importance of providing an entry-level experience as "the majority of our fair audience has never stepped foot on a farm" (2024). When exploring the Little Farmers experience at state and county fairs, it was pleasing to see this activation built in collaboration with commodity associations to represent the peak agricultural outputs of each state, as shown in Figures 35 to 37.

Figures 35 - 37: Little Hands on the Farm during set up of the Erie County Fair, Little Farmers with a career focus at Ohio State Fair, and Little Hands on the Farm at Indiana State Fair, (source: Author)

Many smaller country shows and fairs struggle to enact large-scale activations to provide free entertainment for guests. There is scope for the creation of a travelling activation and central platform for physical resources and industry samples, to allow shows and events to access existing resources.

Competitions and gaming

There are many competitions that young people are already engaged with that have linkages to growth areas in agriculture. The increase in gaming and the success of *Farming Simulator*, coupled with the success of *Journey 2050* and *Farming 2050*, highlight the opportunities for gaming to be used as an agricultural engagement tool.

Video game creator, Dylan Bennett, notes “there is a boom happening where there are a lot more games now that are less about shooting people and more about growing things” (Brann, 2022). The success of *Farming Simulator* has inspired an Australian version. Titled *Pasture: The Livestock Simulator*, gamers will be set in the Northern Territory to manage cattle stations, muster stock by helicopter, and improve herd genetics (Brann, 2022).

VEX and LEGO® robotics competitions are global competitions using coding and robot-building skills in a scaling series of events. Given the rise of robotics in agriculture and the need for more technology-skilled participants, it seems fitting that these competitions would benefit from real-world examples of agriculture. At the very least, the industry has an opportunity to present diverse career pathways to engaged participants considering where coding and robotics skills may take them.

The following case studies showcase the Journey 2050 game, and a prestigious competition in New Zealand grounded in agriculture.

Case Study: Journey 2050, Canada

Journey 2050 is a virtual farm simulation game across multiple levels designed for students to explore food sustainability whilst balancing economic, social and environmental factors with farming families from Canada, Kenya, and India. Nutrien developed the educational program with several industry and education partners as a classroom resource. *Farmers 2050* has been created for students who wish to continue playing at home.

The virtual farm simulation's levels are timed to allow players to explore at their own pace after a video introduction highlighting the challenge ahead. Each level introduces farming best management practices as well as social and environmental improvements that players can choose to undertake, as shown in the sugarcane example (Figure 38).

Figure 38: Farming sugarcane in India in Journey 2050 during a Grade 5/6 excursion onsite with Calgary Stampede Education (source: Author)

Case Study: AgriKids, New Zealand

The FMG Young Farmer of the Year competition is a prestigious contest showcasing the outstanding skills and knowledge of not only young farmers, but also schools. Supported by a network of 65 NZ Young Farmer Clubs across the country, Young Farmers, Junior Young Farmers and AgriKids compete through district events, regional finals, and then a national grand final.

Primary school students from 8 to 13 are eligible to compete in teams of three in AgriKids, and high school students until the age of 18 are eligible to compete in teams of two in the Junior Young Farmer of the Year. The AgriKids complete seven practical modules, a race-off as shown in Figures 39 and 40, and an exam. Each component of the competition tests the students' skills, knowledge and teamwork. Curriculum-aligned resources developed by NZ Young Farmers are available for schools to support student learning while preparing for AgriKids.

Figures 39 & 40: Students competing in the AgriKids Season 56 Grand Final in Hamilton on 12 July 2024 (source: Author)

Season 56 Competition Coordinator, Joseph Watts, shared "the competition is designed to develop new skills, and whilst it is setting out to find the best young farmer, the best kids, everyone will get something out of it" (2024). In discussions about the competition at the 2024 Grand Final in Hamilton, students noted how they enjoyed learning about new things and being challenged with everything from making a calf halter to testing nitrates in foods.

The Australian Young Farmer Challenge is a restricted event at agricultural shows for teams of four aged 18 to 35, inspired by the Agri-Sports component of the FMG Young Farmer of the Year contest. There is scope for the competition to be extended in Australia into a premier showcase of excellence supported by industry sponsorship. The New Zealand model is backed by a family of sponsors who activate the competition modules and provide thousands of dollars in prizes.

Conclusions

The next generation of the Australian agriculture workforce is sitting in our classrooms around the country. A lack of consistent language and collaboration, resources that appear more like marketing materials, and inaccessible or adaptable formats result in the current ad hoc delivery of food and fibre education.

Australian agriculture already has the building blocks for delivering quality food and fibre education. Whilst there is no need for one singular block type with patented clutch power, there is the need to ensure all blocks connect and use complementary language building on the strong foundation of a base plate: the Australian curriculum.

The Australian curriculum features food and fibre education. As an industry, it is our role to come together, use one language, and help students build their careers upon the base plate. Students will add their own building blocks, just like filling 'agbags' as they go through life. Maybe they will select Primary Industries as a VET course in Year 10. Maybe they will be studying engineering at university and remember the challenges of technology in agriculture to frame their work. Maybe when they are shopping for groceries, they will remember studying about what's in season, and how climatic conditions affect supply and demand. Whatever path they choose, whether they're inspired to undertake a career in agriculture or they are an engaged consumer and voter, they will have a strong foundation.

The Australian agriculture industry needs to go beyond investing in food and fibre education through short-term transactional programs, rejuvenated resources with no long-term legacy, and constant research and strategic reviews. Collaboration is required across the whole of agriculture with the removal of sector-based programming except in localised contexts.

A centralised platform is needed that prioritises the quality of editable and accessible resources through rigorous quality control, auditing, and regular updating. Resources that do not meet the hub standards of regular updates, representing modern Australian agriculture, and alignment to the Australian curriculum should be retired. Greater transparency to ensure accessibility for all within the education paradigm from state schools to independent and private schools, and home-schooling parents, is required through a free hub without access verifications or log-ins.

The addition of providing comprehensive physical resources including cross-sector samples without branding or marketing would be beneficial to a centralised hub. These would assist teachers, agricultural shows, urban farms, competitions and events, improve the perceptions of Australian agriculture and deliver whole of industry engagement.

The implementation of international models should focus on key drivers of success including programs that build relationships between students and those within the agricultural industry. The current disregard for the essence of programs when replicating for the Australian context results in poor uptake and impact.

The reinvigorated delivery of food and fibre education is required to attract the next generation into agriculture. Driven by long-term investment, food and fibre education of the future needs to be modern, transparent, collaborative, inclusive and accessible to realise its true impact.

Recommendations

- Ascertain the number of schools currently delivering food and fibre education, including a national stocktake of resources in use.
- Use consistent language: the curriculum calls for food and fibre education.
- Remember the base plate. All resources should be aligned to the Australian Curriculum noting all versions currently in use.
- Ensure resources are regularly updated, checked, audited and reviewed, and if necessary retired and removed.
- Provide open-source resources that allow teachers to edit and adapt.
- Provide comprehensive resources to address cross-curriculum priorities for agriculture, not sector-specific resources or marketing.
- Listen to our customers. Involve teachers, as the customer, in resource development and updating.
- Support and invest in long-term ongoing programs.
- Provide financial support for all agriculture teachers in Australia to attend national conferences and professional development.
- Fund and legislate lead agriculture teachers in each state or region.
- Develop a best management guide for hosting school excursions in agricultural environments, including requirements for host training.
- Provide cross-sector tactile resources in one location for dispatch.
- Provide industry support to urban farms, including professional development for guides and infrastructure upgrades.
- Support agricultural professionals to be further engaged in food and fibre education with training.
- Ensure agricultural shows, museums, and agritourism, represent modern Australian agriculture.
- Provide support to existing competitions outside of the sector to increase alignment with agriculture.

References

ACARA. (n.d.). *Understand this Curriculum Connection: Food and fibre*. Retrieved from v9.australiancurriculum.edu.au/teacher-resources/understand-this-curriculum-connection/food-and-fibre/

AHDB. (2023, July 18). *Agriculture and Horticulture Development Board Annual report and accounts 2022-2023*. Coventry: AHDB. Retrieved from ahdb.org.uk/reports-reviews

Alexander, R. (2024, June 25). *Minnesota State Fair* [Conference Presentation]. Royal Agricultural Society of the Commonwealth 30th Commonwealth Agricultural Conference, Gogarburn Conference Centre, Edinburgh, Scotland.

Australian Bureau of Statistics. (2024, February 14). *Schools: Data on government and non-government students, staff and schools*. Retrieved from www.abs.gov.au/statistics/people/education/schools/latest-release

Australian Bureau of Statistics. (2021, October 15) *Census of Population and Housing: Occupation*. Retrieved from www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/income-and-work/occupation-occp

Australian Government: Department of Agriculture, Fisheries and Forestry. (2024, May 20). *Agricultural Workforce*. Retrieved from www.agriculture.gov.au/agriculture-land/farm-food-drought/agricultural-workforce

Australia, House of Representatives. (1945, July 26). *Parliamentary Debates: Education Speech*, pp 4613. Retrieved from parlinfo.aph.gov.au/parlInfo/genpdf/hansard80/hansardr80/1945-07-26/0027/hansard_frag.pdf;fileType=application%2Fpdf

Barclay, K. (2024, June 27). *Royal Highland Education Trust* [Conference Presentation]. Royal Agricultural Society of the Commonwealth 30th Commonwealth Agricultural Conference, Gogarburn Conference Centre, Edinburgh, Scotland.

Beecher Jones, I. (2006). *Agricultural Engagement with Education*. Hambridge: Nuffield Farming Scholarships Trust. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2006_UK_Ian-Beecher-Jones-2005-Scholar_Agricultural-Engagement-With-Education.pdf

BIM. (n.d.). *The ARC*. Retrieved from bim.ie/a-seafood-way-of-life/the-arc/

Brann, M. (2022. October 15). *Gamers are flocking to online farms - what does this mean for agriculture?* Australian Broadcasting Corporation. Retrieved from www.abc.net.au/news/rural/2022-10-15/gamers-flock-to-online-farming-opportunity-for-agriculture/101513610

Chandler, S. & Smith, H. (2024, July 12). *FMG Junior Young Farmer of the Year Awards*, Heaphy Rooms, Claudelands Events Centre, Hamilton, New Zealand.

Coleman, G. (2024, February 20). *Future Young Leader Presentation*, [Conference Presentation] evokeAG, Perth Convention and Exhibition Centre, Perth, Australia. Retrieved from www.evokeag.com/recipe-please-the-base-biscuit-for-farmer-and-community-driven-innovation/

Cosby, A., Manning, J., Fogarty, E., Snowden, A., McCosker, A., McDonald, N., Lancaster, L., & O'Dea, M. (2022). *Ag Knowledge in Schools: What do Australian primary and secondary students know about agriculture?* Rockhampton: CQUniversity Australia. Retrieved from agri-techeducation.com/agknowledge-2021

Dix, K., Ahmed, S., Carslake, T., & Sniedze-Gregory, S. (2021) *Evidence of impact underpinning Life Education Programs: Report for Life Education Australia*. Sydney: Australian Council for Education Research. Retrieved from doi.org/10.37517/978-1-74286-643-7

Eb, D. (2022, December). *The Home Paddock: A strategy for values-led redesign of the domestic food system*. Lincoln: New Zealand Nuffield Farming Scholarship Trust. Retrieved from ruralleaders.co.nz/wp-content/uploads/2022/11/The-Home-Paddock_Nuffield-NZ-2021_Daniel-Eb.pdf

Fleay, K. (2024, April). *Advancing agricultural opportunities through higher education: Empowering youth, especially those from non-agricultural backgrounds, to pursue careers in agriculture*. Kyogle: Nuffield Australia. Retrieved from www.nuffieldscholar.org/sites/default/files/2024-06/Kathryn%20Fleay%20FINAL.pdf

Guffey, A. & Stewardson, D. (2023) Sowing Agricultural Literacy: The National Agriculture in the Classroom Organization, *Journal of Agricultural & Food Information*, 24 (1-4), 40-46. Retrieved from doi.org/10.1080/10496505.2023.2277433

Hawkes, C. (2023, October 17). *From Policy to Action: Youth Shaping Global Agrifood Systems*, Food and Agriculture Organisation of the United Nations Headquarters, Rome, Italy.

Heinrich, J. (2020, September). *Attracting and Retaining Young People in the Sheep Industry*. Kyogle: Nuffield Australia. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2017_AU_Jamie-Heinrich_Attracting-And-Retaining-Young-People-In-The-Sheep-Industry.pdf

Howden, S. (2012, March 5). *Cultural cringe: schoolchildren can't see the yoghurt for the trees*. The Sydney Morning Herald. Retrieved from www.smh.com.au/education/cultural-cringe-schoolchildren-cant-see-the-yoghurt-for-the-trees-20120304-1ub55.html

Ives, B. (2023, May). *Listen up: Young people's perspectives on the future of Australian agriculture and rural industries*. Wagga Wagga: AgriFutures Australia. Retrieved from agrifutures.com.au/wp-content/uploads/2023/06/23-079.pdf

Jones, A. (2023). *Divide: The Relationship Crisis Between Town & Country*. London, UK: Kyle Books.

Jones, A.R. (2016, July). *Agricultural societies and shows: where do we go from here?* Hambridge: Nuffield Farming Scholarships Trust. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2015_UK_Aled-Rhys-Jones_Agricultural-Societies-And-Shows-Where-Do-We-Go-From-Here.pdf

Kahl, D. (2019, February). *Who will help run the farm? Creating a pathway on farm for the next generation of farm managers*. Kyogle: Nuffield Australia. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2017_AU_Daniel-Kahl_Who-Will-Help-Run-The-Farm-Creating-A-Pathway-To-A-Career-On-Farm-For-The-Next-Generation-Of-Farm-Managers.pdf

Kissane, K. (2019, September). *Review of Perceptions of Agriculture in Primary School Students and opportunities for developments*. Nuffield Ireland. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2018_IE_Karol-Kissane_Review-Of-Perceptions-Of-Agriculture-In-Primary-School-Students-And-Opportunities-For-Developments.pdf

McLennan, C. (2022, September 14). *School students believe dairy farmers milk their cows by hand, survey shock*. Farm Online National. Retrieved from www.farmonline.com.au/story/7898678/school-students-think-dairy-farmers-milk-cows-by-hand/

National Farmers Federation. (2019). *2030 Roadmap: Australian Agriculture's Plan for a $100 Billion Industry*. Canberra: National Farmers Federation. Retrieved from nff.org.au/wp-content/uploads/2020/02/NFF_Roadmap_2030_FINAL.pdf

Lang, M., Shelley, B., & Fitzallen, N. (2022). *"Kids to Farms" Child-led Program evaluation: Final Report*. Hobart: University of Tasmania. Retrieved from www.utas.edu.au/__data/assets/pdf_file/0008/1704446/Final-report-Kids-to-Farms-Tassie-Researchers.pdf

LEAF. (2023). *How Do Young People Perceive and Value the Agri-Food Industry?* Stoneleigh Park: LEAF (Linking Environment And Farming). Retrieved from issuu.com/linking-environment-and-farming/docs/issuu_teenager_research_report_2023_40fa0272f10dd3?fr=sYjM1MDYyMzQ4MTE

Parker, B. (2016, November). *Inspiring Gen Z to Consider Careers in Agriculture and Food*. Nuffield Canada. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2015_CA_Becky-Parker_Inspiring-Gen-Z-To-Consider-Careers-In-Agriculture-And-Food.pdf

Peltzer, C. (2020, June). *Attracting Youth into Agriculture: Developing a strategic framework to encourage young people to pursue a career in agriculture*. Kyogle: Nuffield Australia. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2019_AU_Clare-Peltzer_Attracting-Youth-Into-Agriculture-Developing-A-Strategic-Framework-To-Encourage-Young-People-Into-Agriculture.pdf

PIEFA. (2022). *Strategic Plan 2021 - 2026*. Barton: Primary Industries Education Foundation Australia. Retrieved from www.piefa.edu.au/wp-content/uploads/2022/10/piefa_strategic_plan_2021_2026.pdf

PIEFA. (2023). *Primary Industries Education Foundation Australia Annual Report 2022/2023*. Barton: Primary Industries Education Foundation Australia. Retrieved from www.piefa.edu.au/wp-content/uploads/2023/11/FINAL-PIEFA-2022-23-Annual-Report.pdf

Pratley, J.E. (2021). Agriculture Education 'Rebooted' in Australia. *International Journal of Innovation in Science and Mathematics Education*, 29 (4), 1-10. Retrieved from doi.org/10.30722/IJISME.29.04.001

Pratley, J.E. (2013). *Review into Agricultural Education and Training in New South Wales Report*, NSW Department of Education and Community.

Project Agriculture. (2023). *About Project Agriculture*. Retrieved from www.projectagriculture.ca/elementary/

Stephanie Alexander Kitchen Garden Foundation. (2023). *Positive food habits for life*. Abbotsford: Stephanie Alexander Kitchen Garden Foundation. Retrieved from www.kitchengardenfoundation.org.au/sites/default/files/Files/SAKGF_Impact-Report_web.pdf

Tasmanian Government Department of Education. (2024). *About Us: The Hagley Farm School Agricultural Learning Centre*. Retrieved from www.hagleyfarmalc.education.tas.edu.au/about

YouthInsight for PIEFA. (2022, October). *Teachers and Primary Industries: Insights into teachers' needs in order to improve student engagement with Primary Industries*. Darlinghurst: YouthInsight powered by Student Edge. Retrieved from www.piefa.edu.au/wp-content/uploads/2022/10/piefa_teachers_survey_report.pdf

Undorf-Lay, A. (2008). *Bridging the Divide: How farmers can improve their relationships with non-farmers*. Lincoln: New Zealand Nuffield Farming Scholarship Trust. Retrieved from www.nuffieldscholar.org/sites/default/files/reports/2008_NZ_Ali-Undorf-Lay_Bridging-The-Divide-How-Farmers-Can-Improve-Their-Relationships-With-Non-Farmers.pdf

Voconiq. (2023, May 31). *Live Exports and the Australian Community 2019-2023: A National Program of Community Sentiment Research*. Bowen Hills: Voconiq. Retrieved from livecorp.com.au/report/3t42rgz0OfFfRxzddT6SVl

Watts, J. (2024, July 11). *FMG Young Farmer of the Year Opening Ceremony*, The Barn, Claudelands Events Centre, Hamilton, New Zealand.

Zosh, J., Hassinger-Das, B., & Laurie, M., (2022). *White Paper: Learning through Play and the Development of Holistic Skills Across Childhood*. Billund: The LEGO Foundation. Retrieved from cde-lego-cms-prod.azureedge.net/media/kell5mft/hs_white_paper_008-digital-version.pdf