Untapped Potential: The Neglected Urban Interest in Secondary Agriculture

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Abstract

Agriculture in a secondary school context in Australia has had a poor reputation amongst students and parents. Consequently, there have been historically low enrolments for many decades. This has contrasted with the reality of well-paid, knowledge-intense and increasingly urban-based jobs in the sector. This disparity has led to a significant shortage of university agricultural graduates needed to fill vital jobs to support the economy and society. Through a case study at one high school, this paper demonstrates how the reputation of the subject in the view of students and parents can be changed to more closely align with the modern reality of jobs in the agriculture sector. It shows that urban high school students, who traditionally would not be expected to take roles in agriculture, are not only interested in the concept of 'paddock to plate' but are willing to devote their lives to a career in the industry in order to make a difference.

Introduction

The agricultural discipline faces a major shortage in university degree graduates in Australia and has done so for well over a decade (Pratley & Hay, 2010; Pratley, 2012; Pratley, 2016; Pratley & Crawley, 2018). Unsurprisingly, Randall (2019) shows this is mirrored by a decline of approximately 1000 students in the annual candidature completing the NSW HSC Year 12 leaving examination in Agriculture over the period from 1990 to 2018 (Figure 1). Despite this decline, NSW still has the highest number of students studying agriculture-related courses through to the end of secondary school, with more graduates than all other states combined (Table 1). Despite NSW having 32% of the Australian population (ABS, 2016), it accounts for 58% of Year 12 agriculture graduates (Randall, 2019).

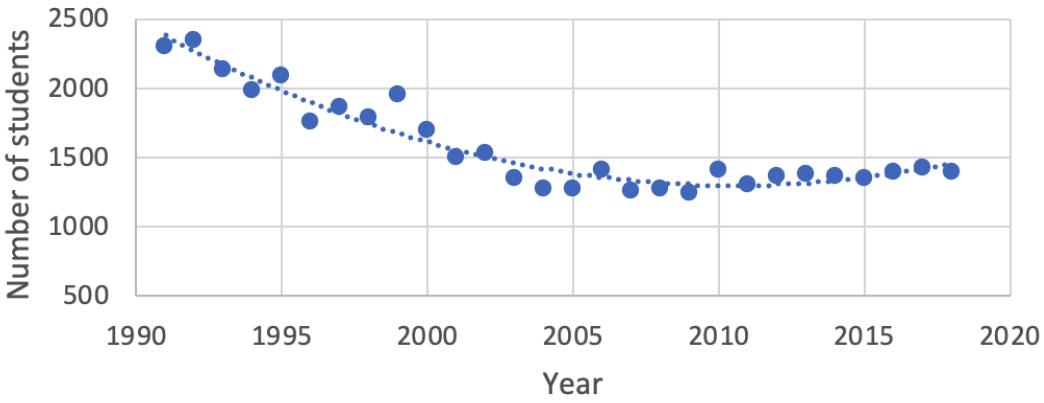

Figure 1. Number of students sitting Higher School Certificate (HSC) agriculture Year 12 leaving examination in NSW (1990-2018) including trend line (Randall, 2019).

Table 1. Number of students sitting Year 12 leaving examinations in agriculture courses in each state of Australia in 2018 (Randall, 2019).

State	Number of Students	Percentage
NSW	1396	57.8
QLD	642	26.6
VIC	191	7.9
TAS	0	0
SA/NT	71	2.9
WA	110	4.8
Total	2415	100

Given the shortfall in university Agriculture graduates compared to the large number of jobs in the agricultural sector, this lack of students who have studied Agriculture coming out of secondary school is unlikely to help improve this situation in the short term. Further, research has shown that the biggest influences on students' reasons for joining the agricultural sector after school are *agricultural background and family influence* (Barber, 2015). Clearly students who live in an urban setting are far less likely to have these agricultural backgrounds and family influences (*i.e* experiences with agricultural production) in the same way as those living in rural areas. Given that almost 90% of Australians live in urban areas (and this figure is increasing - ABS, 2016), I believe significant effort needs to be focused on enticing urban students to study agriculture-related courses in later secondary school, inspiring them to progress to university and into the agriculture sector.

Reflection on my experience

For a student growing up in suburban Sydney, it was not a 'normal' thing to study Agriculture in secondary school. I began taking classes in agriculture early in my schooling as it was mandated in Years 7 and 8 at my high school. This led me to develop a significant interest in, and passion for, the subject. I subsequently continued to choose the subject throughout middle and senior high school, and this eventually led me to studying Agricultural Science at university.

However, throughout this time of taking agriculture at high school, I was constantly reminded by my suburban peers how 'unusual' my subject choice was. The common refrain I would hear almost weekly was "Why would you study agriculture if you aren't going to be a farmer"? It is a phrase that was so common and came from so many sources that it still echoes loudly in my mind today. Despite the widespread nature of this view amongst my peers, I was never quite able at that age to articulate a clear or convincing defence against what I perceived to be their erroneous assumptions. However, as I progressed through school, I became increasingly aware of the significant proportion, indeed majority, of agricultural careers that simply did not involve 'being a farmer'.

Upon reflection in later years, the wider societal trend became clearer to me, of which my school experience was simply a microcosm. Many suburban people are disconnected from the paddock to plate journey of much of their food (Pratley, 2013). This seems to have happened over generations, indeed over a century or more. It is not an attitude I believe modern urban people have consciously chosen; rather it is a consequence of living an urban way of life (NRC, 2009; Hillman & Buckley, 2011). This has led to a lack of knowledge of where food comes from and the processes that occur to get it to people's plates (Hillman & Buckley, 2011). As a

result, there is a lack of understanding of the nature of the jobs, particularly of those city-based that happen in the supply chain in agriculture (Youth Insight, 2017). Further, there has been a significant decline over the past few decades in numbers of students completing Year 12 agriculture in both New South Wales (NSW) and across Australia. Indeed, they are at historically low levels (Randall, 2019) despite research that shows there are around six jobs per graduate from agricultural degrees at university (Pratley, 2016).

This paper predominantly investigates one urban school, Barker College, on the upper north shore of Sydney, and its journey with agriculture as an academic subject. Agriculture was nearly discontinued in the mid-2000s due to low enrolments, but it now has the largest cohort of Year 12 students studying Agriculture in secondary school in Australia.

The question to be considered is that changing the focus from production to science, and increasing academic rigour in that process, is a key to increasing school student participation and in turn greater student intakes to university agriculture courses. Other components include promotion of employment opportunities, particularly off-farm.

As discussed earlier from my own experience, agriculture at school was perceived by my peers as leading to 'being a farmer' and 'a bludge'. I believe historically this perception has held the subject back in terms of enrolments in high schools and needs to change for any chance at increasing university enrolments and increased progression to employment in the agricultural sector.

Rationale

I have had the privilege of teaching high school students for the past decade at Barker College in Sydney. Although I originally started as a teacher of middle school science with some agriculture, I have taught Agriculture exclusively for the last six years due to the increased number of classes.

Throughout my teaching career I have observed the significant and widespread curiosity amongst these urban students in the concept of 'paddock to plate' with respect to the food they eat. It seems that many students and parents alike have an inherent desire to understand where their food comes from, and the processes involved in getting it to them. In particular, I have also noticed a deep interest in the emerging technological and off-farm careers, even with the Year 9 Agriculture students. My experience is that urban students respond very positively to the thought that, through technology, they could have a significant impact on the world through a career in agriculture.

It is clear to me from what I have seen at my school that there is a deep unmet need to re-engage urban students and parents in the processes that occur 'paddock to plate'. Neither I nor those that came before me set out seeking the large number of students we currently have enrolled in agriculture. This deep interest from parents and students is a phenomenon that we have observed increasingly over the years; and we have endeavoured to understand the nuances involved so that subsequently we can fulfil their interest and desires in agriculture. There appears to be little existing research into this specific phenomenon so there is undoubtedly a place for further research into this specific area of motivation around choosing agriculture at school level.

Context of Barker College

Barker College is an independent school located on the upper North Shore of Sydney. The School has approximately 2,400 students enrolled from Pre-kindergarten to Year 12, with around 1,900 of these being in Years 7 to 12. Agriculture is a voluntary subject which can be taken from Years 9 to 12 and, in these years, there are around 1,300 students. Almost all students at the School reside on the North Shore and Northern Beaches of Sydney, with about 60 boarders usually split fairly evenly between urban and rural backgrounds. Approximately 5 of these rural boarders study Agriculture annually. Around 95% of students who graduate from Year 12 proceed to study university degrees.

Barker College is an urban campus, in which space is highly contested for buildings, sporting fields and the like. This means we have not had the space available for traditional agriculture field activities which many schools that teach the subject enjoy. This space constraint is one of several factors that led us to run agriculture in a unique way at Barker over the recent decade.

Case Study: The 'Barker Model'

Barker College was founded in 1890 and agriculture as a subject has been a part of the curriculum since those early days. In the mid-2000s, agriculture as an academic subject was very nearly discontinued by the School due to low enrolments. To address this issue, the goal at Barker therefore needed to be a change in the mindset of students from "Why would you study agriculture?" to "Why wouldn't you try agriculture at some point?".

The new Head of Agriculture at this time, Allison Arnott, changed the focus from being more production-focused, to more science-focused. Thus, Agriculture was treated as a science in the same way as Biology, Chemistry and Physics. The strategy was to position the subject to be fun and engaging in Years 9 to 10, with progression of academic expectations developed in subsequent years, stepping up significantly in Years 11 and 12 to correct the perception amongst many students that agriculture is a "bludge" (Table 2).

Table 2. Progression of academic expectations of agriculture as a subject at Barker College from Year 9-12.

Year	Practical: theory as per syllabus requirement	Progression of academic expectations
9	50:50	• Focus on practical experience, enjoyment and engagement, connecting students with 'paddock to plate' • Study production of vegetables, orchards, broiler chickens, chillies and ethical eating • Limited homework
10	50:50	• Focus on practical experience and linking students to current and future consumer habits • Study production of prime lamb, beef, viticulture and alternative enterprises such as coffee, cocoa and bees • Limited homework

11	30:70	• Greater focus on theory aspects and deeper thinking • Students to practise past paper questions regularly for each syllabus outcome to improve exam responses • Discussion increasingly of 'big issues' and how students might help solve them • Subject marketed and taught 'on par' with science subjects such as biology (in terms of academic rigour) • Significant work outside class time expected
12	30:70	• Continued significant focus on theory aspects and deeper thinking • Students given 9 years of past HSC questions on every syllabus outcome: worksheet to be completed, submitted for marking and responded to marked teacher feedback • Students have access to YouTube videos on every syllabus outcome for reference and review • Subject marketed and taught 'on par' with science subjects such as biology • Publicly stated aim is for 80-95% of students to achieve Band 5 or 6 (80-100/100) in the HSC. This is achieved almost every year

By moving from a production-focus to a science-focus in the teaching of Agriculture, the management of animals has changed. Animals are now kept only temporarily for a school term or two to cover required syllabus outcomes, rather than retained year-round in breeding programs. Further, the preparation and showing of animals at local and state agricultural shows ceased, since this tended to give the impression, amongst non-agriculture students, of a production focus instead of a science focus. Also, excursions for each year group are tied specifically to academic outcomes. These modifications have supported the goal of changing the reputation of Agriculture within the school to be a science subject.

Given the urban demographic of the school, part of the strategy which worked well over time was targeting units of work related to metropolitan lifestyles. Even for students who would not end up working in an agriculture discipline, there was a focus on making units of work align with their current and future urban lifestyles. This included looking at enterprises such as viticulture, coffee production, vertical gardens, raised garden beds, as well as alternative enterprises such as bees, honey and mushrooms.

Another key part of the strategy was to 'normalise agriculture'. Research has shown that most teenagers want to be 'normal' and that working in agriculture is considered 'not normal' (Youth Insight, 2017). Typically, a large part of the problem, as discussed earlier, is that urban people are disconnected from the paddock to plate aspects of agriculture. School agriculture plots may also be located in areas where the general student population has limited access, which does not support engagement with this important area of study. When I was at school, all of the students who did not study agriculture had little idea what was done in the study of agriculture. At Barker, normalising agriculture included the previously mentioned use of urban-relevant units and enterprises, but also locating parts of our agriculture plots throughout the school grounds. For example, raised garden beds used by Years 9-10 are located such that more than 800 students walk past each

day and see them on their way to the train station. 'Normalising agriculture' also involves encouraging kindergarten students to visit the vegetable plots and to see the sheep, while for Years 3-6 to participate in the BEAT Team (Barker Environmental Action Team (BEAT)), a lunchtime group which maintains a vegetable plot and keeps chickens.

Research has also shown that, when it comes to careers, students place high importance *inter alia* on aspects such as large numbers of jobs, industries that are growing, industries that are sustainable, high salaries and significant variety within the roles amongst others (Youth Insight, 2017). However, these particular traits have a low association with agriculture, thereby resulting in few students choosing the subject both at school and university.

Another key aspect of the strategy at Barker College has been to promote heavily the high number of jobs university graduates have available to them, as well as promoting the 'future' jobs with an emphasis on technology and STEM related skills and backgrounds. Emphasis on agricultural careers helping 'feed the world' is attractive to many students and it enables them to engage with the subject. Our experience has been that showing students the challenges faced by the global population with regard to agriculture and food production is one of the strongest motivators for student interest in the subject and their choice of agriculture degrees at university.

The measure of success or otherwise of this new model lies in the data generated. The key measurements include parent satisfaction, derived by survey of parents, increases in participation number in agriculture subjects by students and by the change in number of students sitting for the HSC over time.

Parent satisfaction

A major factor in the choices of subjects for many students is their parents' opinions. Barber and Pratley (2016) showed that 35% of secondary students rank *family / home* as their main source of agricultural information, second only to *school / teacher*. At Barker College, students often mention the influence or encouragement parents have given them, in choosing a particular subject. This encouragement can be of an historical nature (*i.e.* they did that particular subject at school and wish for their child to do the same) or they attended various curriculum or subject selection evenings and formed the opinion that a subject would be an ideal fit for their child. It therefore follows that a high parent satisfaction rate with teaching of academic subjects should lead to increased enrolments in a subject. This has been observed at Barker, where agriculture enrolments have increased in conjunction with high parent satisfaction levels for the subject. Parents are surveyed biannually and asked to rate their satisfaction with subjects. Those that select either 'very satisfied' or 'satisfied' are expressed as a percentage. These surveys have shown that agriculture has consistently been the number one rated subject with parents in Year 10 out of 23 subjects considered (Figure 2). Further, the subject has gone from 7th to 5th rank out of 32 subjects from 2015 to 2019, and from 85% to 95% in parent's percentage satisfaction in Year 12 over the same period (Figure 3). My experience is that improved understanding of what agriculture involves amongst parents, as well as their child enjoying and doing well in the subject, leads to the increased parental satisfaction. It is acknowledged however that numbers of responses for some subjects are low.

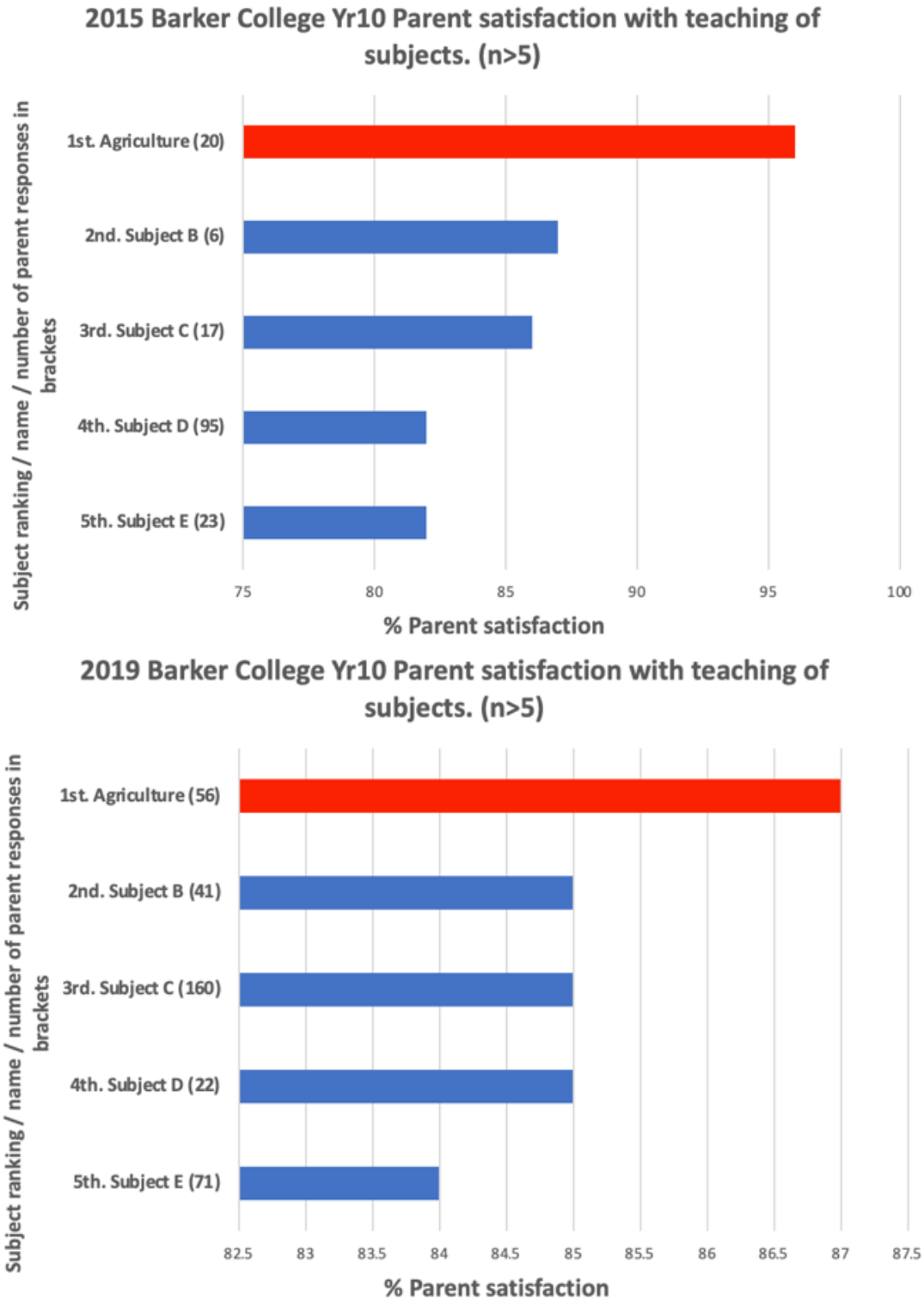

Figure 2. Parent satisfaction of the top 5 out of 23 Year 10 academic subjects – 2015 (top) v 2019 (bottom). Number of parent responses shown in brackets next to subject name (Barker College, 2020 pers. comm.).

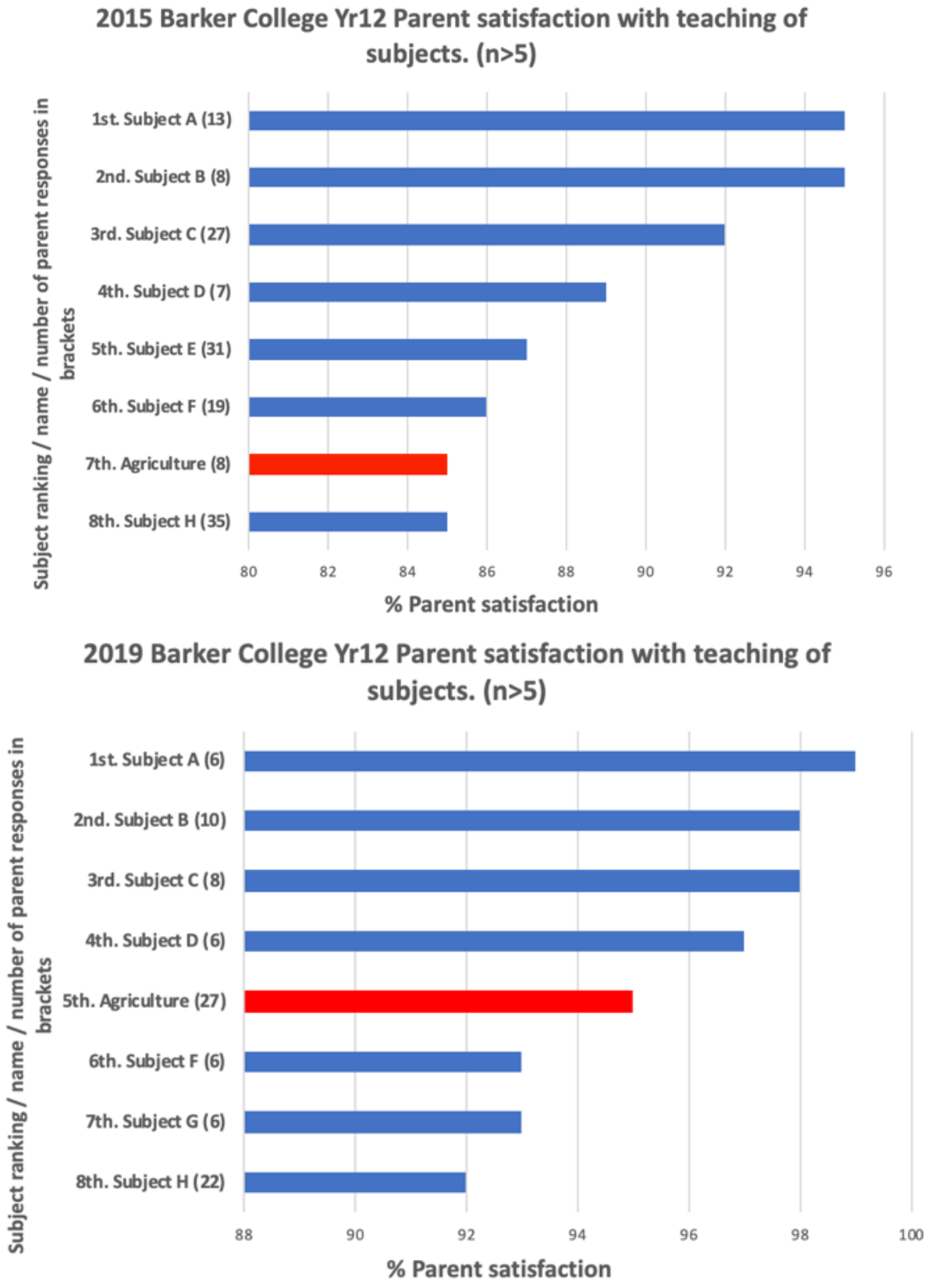

Figure 3. Parent satisfaction of the top 8 out of 32 Year 12 academic subjects – 2015 (top) v 2019 (bottom) (Barker College, 2020 pers. comm.).

Student enrolments

Since the inflection point of enrolments in agriculture at Barker in the mid-2000s, there has been consistent growth in student numbers in the subject, year on year, showing four-fold growth from 2007 to 2020 (Figure 4). In 2005 when Agriculture as a subject was considered for discontinuation, total enrolments remained under 100 students from Years 9-12. After the change in direction as described above, total numbers of students enrolled from Years 9-12 increased to over 100 students (11% of cohorts) for the first time in 2008. This was followed, for the first time, by more than 200 students (22% of cohorts) in 2016 and then over 300 total students (33% of cohorts) since 2017.

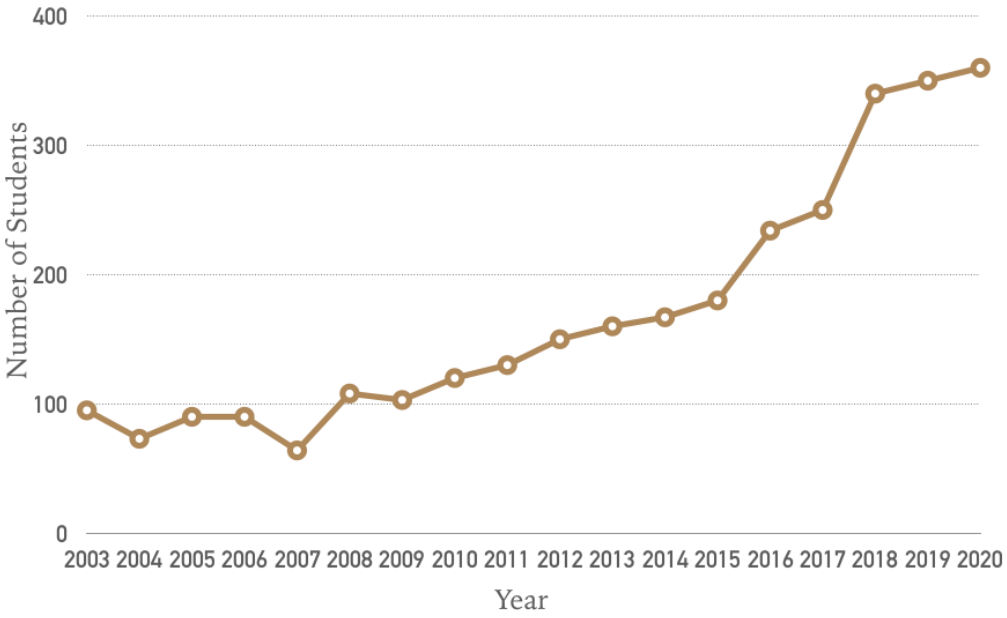

Figure 4. Student enrolments in agriculture (Years 9-12 inclusive) at Barker College from 2003-2020 (Barker College, 2020 pers. comm.).

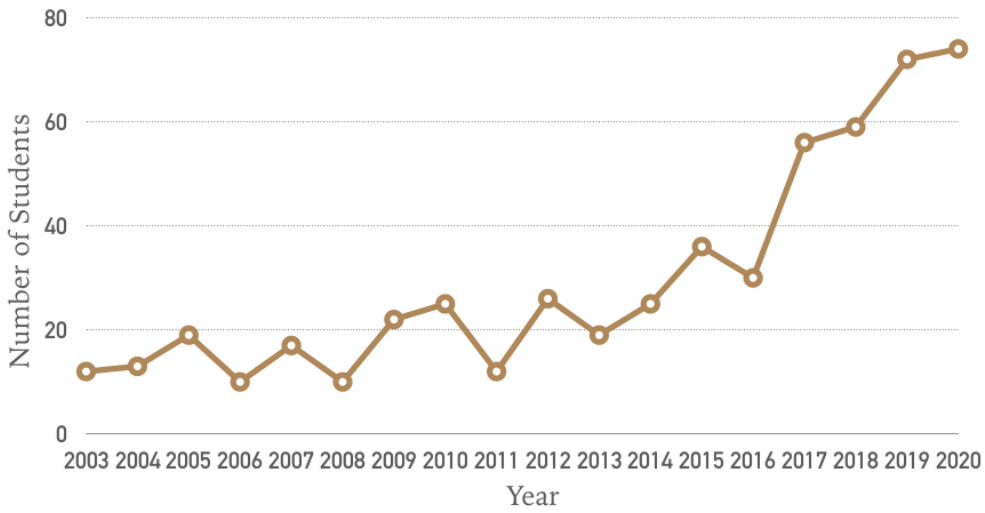

Figure 5. Year 12 student enrolments in agriculture at Barker College from 2003-2020 (Barker College, 2020 pers. comm.).

An important aspect of this overall growth is the increase in students sitting the HSC examination in Year 12 for agriculture at Barker (Figure 5). The first year in recent history with more than 20 students in Year 12 agriculture was in 2009, followed by over 40 students in 2017 and then over 60 students in 2019. A particularly important aspect of such enrolments in the subject is that having high numbers of students studying for HSC Agriculture leads to more students choosing agriculture-related degrees at university. One of the major barriers to higher education course selection for students is where they cannot see the opportunities available in the industry (Youth Insight, 2017). Clearly having more students studying Year 12 agriculture, during such an influential time for deciding degree options, helps them see and understand the opportunities in the industry and how they could be part of it. Indeed, in each of the last four years, around 25-30% of students studying Year 12 agriculture at Barker progressed to an agriculture-related degree at university (Barker College, 2020 pers. comm.).

Year 12 is a time when many students look for more academic subjects to enhance their Australian Tertiary Admission Ranks (ATARs). In our School context, students generally do not want to select a subject considered of low academic standard. Since framing the agriculture subject strongly in academic terms, and positioning it as a science, there has been a clear trend of increased enrolments in Year 12 at Barker College.

Concluding remarks – the way forward

Agriculture as an academic subject at senior high school level has suffered from a significant generational decline in enrolments across Australia in recent decades. It seems that the lower academic reputation of the subject amongst students and the population in general, has been both the cause and consequence of low numbers of enrolments (Youth Insight, 2017; Pratley, 2013). This has led to a six-fold shortage of graduates out of agriculture-related university degrees. This situation contrasts starkly with the reality of modern agricultural jobs, which are numerous, often heavily knowledge-based requiring tertiary qualifications, and located in urban areas in many instances. There appears to have been a lack of widespread success over the recent decades in connecting these two contradictory trends – that agriculture has the number and types of jobs many want, yet it has a ‘poor reputation’ for these particular aspects amongst school aged students, their parents and society more broadly.

However, modern agricultural secondary education is not an exercise in futility. Urban students absolutely show significant interest not only in wanting to understand the ‘paddock to plate’ of their food and fibre, but in many cases, wanting to be part of that process professionally through a tertiary degree and then a career in the industry. To achieve this in an urban senior school environment, agriculture as a subject needs to be seen to have ‘academic credibility’ and be on-par with other science subjects such as Biology and Earth & Environmental Science. There also needs to be a significant focus, in an urban environment, on city-based employment opportunities in the agricultural sector. There are many of these, as Pratley and Crawley (2018) show, and urban students respond well to this information. It is hypothesised from our experience that parental satisfaction with a subject is a strong factor influencing student choice of subjects and is an issue that merits further research.

Lastly, to achieve the ‘bridging of the gap’ by progressing increased numbers of students from school to university agricultural studies, careers and opportunities in the sector must be front of mind to students in the classroom on a regular basis in their senior years (Years 10-12). They need to be challenged to see the big picture problems the world faces in food and fibre supply

in the future and be inspired to see themselves as being part of the solution. The good news is that when this generation of students are shown these challenges, and when their interests and passions in agriculture are made clear to them, many are willing to make the commitment and pursue solutions for the future of agriculture and our society.

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