

## Chapter 3

### Key issues in agriculture and agribusiness education

3.1 This chapter considers the key issues explored by the committee in agribusiness education. Topics covered include the:

- Delivery and content of agricultural and agribusiness education;
- Attraction of students at the secondary and tertiary levels;
- Costs of agricultural education for students and education providers; and
- Role and importance of research in agriculture.

#### Content

3.2 The committee received a diversity of views regarding the content and skills that should be included in agricultural education. The committee received evidence illuminating the tension between, on the one hand, industry's wish for vocationally orientated graduates, and the universities' emphasis on high-level academic skills, on the other.

3.3 It was put to the committee that it was necessary for courses to provide a combination of knowledge from both technical and business fields.<sup>1</sup> While universities enjoy considerable freedom to design their own courses, at the Vocational Education and Training (VET) level, courses adhere to a relevant National Training Package (NTP). As explained by the *Training Packages Development Handbook*:

Training Packages specify the skills and knowledge required to perform effectively in the workplace...The development and endorsement process for Training Packages ensures the specifications are developed to an agreed quality standard and are highly responsive to industry's existing and future demand for new skills.<sup>2</sup>

3.4 The committee heard some criticisms of the content of the NTPs including that the size of the curricula makes it difficult to fully understand them.<sup>3</sup> Furthermore, some included subjects such as 'Interpersonal Communication' and 'Quality Assurance' were argued to be extraneous and served to crowd-out fundamental competencies in areas such as biology and business.<sup>4</sup>

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1 Marcus Oldham College, *Submission 5*, p. 4.

2 Department of Education, Employment and Workplace Relations, *Training Package Development Handbook*, available from: <http://www.deewr.gov.au/Skills/Overview/Policy/TPDH/Trainingpackages/Pages/Overview.aspx>, accessed: 23/04/2012.

3 Mr Ian Joseph, Agribusiness Council of Australia, *Committee Hansard*, 15 May 2012, p. 5.

4 Mr Joe Garnham, *Submission 65*, p. 3.

3.5 Many education providers emphasised the importance of endowing students with a diverse skill set that allows them to acquire more vocational skills following graduation. Representatives from UWA emphasised that agriculture courses needed to teach students more than just how to do a job. The committee heard about the qualities a student from UWA possesses:

Our students come out with their degree with a critical mind. They have embedded generic skills within their degree and they have a clear focus on the important issues in agriculture and how to address them.<sup>5</sup>

3.6 The Northern Melbourne Institute of TAFE (NMIT) similarly argued that it was the job of tertiary institutions to teach students high-level analytical skills so they can pursue any number of careers:

There are a number of degrees—you can take law or medicine—and they have extra training on the job or whatever it is. Agriculture is no different to that. Are they going to be work ready for the wide range of organisations? It is pie in the sky, really. We have got to teach them how to think in an agricultural context so when they go on to a farm or into an agribusiness or wherever it is they can work out the problems and be developed into the sort of employee that Elders or Rural Finance might want or NAB bank might want.<sup>6</sup>

3.7 On the other hand, industry tended to argue that universities and other training institutes needed to create work ready graduates. The committee heard that at present, many tertiary institutions are producing graduates with strong theoretical knowledge, but lacking in practical know-how which industry considers essential.<sup>7</sup> The Dairy Industry People Development Council (DIPDC) reported a common comment they received when consulting with their constituents: 'There is no point giving a person a Diploma of Agriculture, and expecting industry to value the qualification if they cannot milk the cows.'<sup>8</sup> The importance of hands-on experience was cited as essential to ensuring that agriculture and agribusiness graduates (be it of VET or tertiary facilities) were equipped to launch their careers. The committee received evidence that the misalignment between what is taught and what industry requires may result in scepticism towards the value of education in general.

3.8 The Australian Beef Industry Foundation (ABIF) noted that unless a student is from a rural background, it is possible for them to complete some agricultural courses without actually acquiring practical experience in the sector.<sup>9</sup> The on-going success of

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5 Professor Lynette Abbott, Faculty of Natural and Agricultural Sciences, the University of Western Australia, *Committee Hansard*, 26 March 2012, p. 58.

6 Mr Gavin Drew, Northern Melbourne Institute of TAFE, *Committee Hansard*, 15 May 2012, p. 36.

7 Mr Alan Fisher, Farm Machinery Dealers Association of Western Australia, *Committee Hansard*, 26 March 2012, p. 23.

8 Dairy Industry People Development Council, *Submission 54*, p. 18.

9 Australian Beef Industry Foundation, *Submission 56*, p. [3].

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Marcus Oldham College was cited as testament to the value that industry, and importantly students, place on a practical approach to education and training.<sup>10</sup>

3.9 Education providers and industry need to work together to strike a balance between graduates being work-ready and possessing a broad education. The committee heard of a number of positive examples whereby employers were working with education institutes to provide hands-on training and career pathways to students to complement students' theoretical learning. For example, Landmark reports that it has:

[P]artnered with one of the largest agricultural universities in Australia and offered 'scholarships' to carefully selected third year students who then undertake a block assignment with Landmark as well as casual work over the year as part of their degree. They are then taken into the graduate program the following year.<sup>11</sup>

3.10 The committee also received evidence from Skills Tasmania indicating the dairy industry in Tasmania had developed strong links with local Registered Training Organisations (RTO) that had both increased the number of enrolments and also helped the industry meet its own skills needs.<sup>12</sup> These examples suggest to the committee that the most effective training is provided through partnerships between industry and training institutions.

### ***School age education***

3.11 The committee heard compelling evidence of the importance of introducing students to agricultural education from an early age. Around 40 per cent of children are thought to determine their preferred careers while still in primary school.<sup>13</sup> What is included in the curriculum and the manner in which it is taught impact upon the efficacy of agricultural education in schools. Students interested in agriculture can undertake VET subjects in secondary school – which introduce them to some of the more practical elements – as well as choose subjects such as maths and sciences which will enable them to study agriculture and agribusiness related fields at university.

3.12 The committee received some evidence suggesting agricultural literacy in schools is very low. A recent Australian Council for Educational Research survey revealed that nearly half of year 10 students (usually around 16 years of age) believed cotton socks were an animal product, and that 10 per cent of first-year undergraduate students at the University of Sydney believed that beef counted towards their vegetable intake.<sup>14</sup> It was put to the committee that it was necessary to increase the

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10 Australian Beef Industry Foundation, *Submission 56*, p. [3].

11 Landmark Operations Limited, *Submission 27*, p. [1].

12 Tasmanian Government, *Submission 42*, p. 7.

13 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 39.

14 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 39.

level of agricultural literacy in the population in general, and that doing so would have the added benefit of attracting more students to the field.<sup>15</sup> One frequently recommended means of raising the profile of agriculture in schools was the inclusion of relevant material in the national curriculum.<sup>16</sup> This would not necessarily need to be a stand-alone subject: agriculture can be successfully integrated into the study of other areas.<sup>17</sup> For example, agricultural case studies in business classes, animal welfare in philosophy classes, and soil sciences in biology or chemistry would introduce student to agricultural issues. It was posited by ACDA that:

[T]he national curriculum should include food and fibre production in its cross-curriculum perspective, so that in all the subjects that students do food and fibre production is used as part of the general education in those curricula.<sup>18</sup>

3.13 The Australian Curriculum and Reporting Authority (ACARA) was enthusiastic about the potential of the new curriculum to bring about improvements:

[A]s a result of the learning opportunities provided by the Australian curriculum, young people will have a better understanding of the origins of food and fibre – the two terms that we have started using – and have a better understanding of what it takes for us as a country to sustain that capacity.<sup>19</sup>

3.14 There appears to be widespread support among teachers for exposing students to agriculture related content. One hundred per cent of primary school teachers and 91 per cent of secondary school teachers in a recent survey stated that they believed it was either very or somewhat important that students learn about food and fibre production.<sup>20</sup> Despite this enthusiasm, the committee heard that agriculture in schools is in decline and that it is likely that 'agriculture will disappear from many schools, even at the level of discussion in the curricula, much less as individual subjects.'<sup>21</sup>

3.15 Based on the evidence, it appears clear that if the resources available to teachers are user friendly and readily available there is an appetite in the teaching community to teach the material. Unfortunately, although there are numerous resources available to teachers, they are often hard to find and not optimised for contemporary educational practice. The

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15 Professor Richard Roush, School of Land and Environment, University of Melbourne, *Committee Hansard*, 15 May 2012, p. 18.

16 University of Adelaide, *Submission 22*, p. [5].

17 Australian Beef Industry Foundation, *Submission 56*, p. [4].

18 Professor Jim Pratley, Australian Council of Deans of Agriculture, *Committee Hansard*, 26 March 2012, p. 42.

19 Mr Robert Randall, Australian Curriculum and Reporting Authority, *Committee Hansard*, 15 May 2012, p. 10.

20 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 39.

21 Australian Council of Deans of Agriculture, *Submission 36*, p. [4].

Primary Industries Education Foundation (PIEF) is currently undertaking a significant program of consolidation and outreach to make materials readily available to educators.<sup>22</sup> The committee also heard that PIEF is attempting to facilitate a resource that would allow schools and industry to connect so that students can gain a critical first-hand look at agriculture.<sup>23</sup> The committee considers these projects of critical importance.

3.16 Schools and teachers in regional areas are not exempt from the challenges of distance. Organisations such as PIEF have limited funds available to achieve their goals and need to prioritise. As part of the 2011–12 Budget, the government announced the Regional Education and Jobs Plan initiative. One element of this program was the recruitment of 34 Regional Education, Skills and Jobs Coordinators (Coordinators) in regional communities.<sup>24</sup> The committee was informed that: 'Regional Education, Skills and Jobs Coordinators will draw from the range of locally available organisations, program and initiatives.'<sup>25</sup> These Coordinators represent an existing network of links with local industry and education bodies. This network may be an effective means to disseminate the work of organisations such as PIEF to teachers beyond what is currently possible with their modest budgets.

3.17 There is also a strong role to be played by local communities themselves in promoting agricultural education. Teachers, local chambers of commerce, and industry can work together to introduce students to possible career opportunities.<sup>26</sup> Much depends on the knowledge and resources available to the teacher. The committee believes that one practical way of achieving progress would be for local communities to bridge the gap between new teachers and local industries, as many teachers who move into rural areas may not have any connection with agriculture or the food sector. The committee can foresee more and better exposure by students to the realities of the industry through field visits, visiting speakers, and work experience, all of which could be facilitated through better engagement by local industry with teachers. This investment in time and energy would continue to pay dividends even if teachers return to metropolitan areas, where they would continue to disseminate a realistic (and hopefully attractive) image of rural life to their urban students.

3.18 Before new teachers reach the classroom, there is the potential to engage them with agriculture. Many tertiary institutes offering teacher training are co-located with

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22 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 41.

23 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 43.

24 Department of Innovation, Industry, Science, Research and Tertiary Education, *Answer to Question on Notice*, 1 February 2012 (received 13 March 2012).

25 Department of Innovation, Industry, Science, Research and Tertiary Education, *Answer to Question on Notice*, 1 February 2012 (received 13 March 2012).

26 Mr Ben Stockwin, Primary Industries Education Foundation, *Committee Hansard*, 1 February 2012, p. 43.

faculties of agriculture, such as the University of Melbourne in Victoria and Curtin University in Western Australia. The potential exists to expose trainee teachers in agriculture during their time at university; knowledge they can later take to the classroom. Despite this obvious advantage of being able to reach new teachers before they stand in a classroom full of students (and potential agriculturalists), the committee heard that minimal engagement actually takes place. Representatives from the University of Melbourne reported: 'We have not done a lot of work on it, frankly, but the Dean of Education, the Dean of Science and I have talked about this a lot.'<sup>27</sup>

### **Recommendation 1**

**3.19 The committee recommends that the Australian Council of Deans of Agriculture considers working with the Australian Council of Deans of Education to strengthen engagement between agriculture and education faculties during teacher education programs.**

3.20 In the later years of schooling, students can also participate in the VET-in-schools program. VET-in-schools provides students with the opportunity to acquire vocationally focused skills. Skills Australia argued that VET in schools has value in broadening opportunities for school students and providing links to the local economy. However, stakeholders have expressed concerns in relation to the quality and consistency of the program. As such, it is argued that industry has insufficient confidence in the outcomes of this initiative to maximise its potential.<sup>28</sup>

3.21 Providing students access to industry on more than an observer basis was put to the committee as a way of increasing the likelihood of students pursuing agriculture and agribusiness careers post school. It is argued that schools that consciously match the curriculum to local opportunities not only benefit their students by enabling more hands-on opportunities, but also enables those students to pursue careers locally following graduation.<sup>29</sup> It was suggested by Charles Sturt University (CSU) that initiatives to encourage the agribusiness sector to accept students on work experience should be developed.<sup>30</sup>

3.22 Critical in ensuring the success of VET-in-schools is the inclusion of hands on experience and strong connections with local industries. Skills Australia advocates for workplace training to be included as part of VET-in-schools arguing that:

Adequate workplace training is essential for ensuring students are work-ready upon graduation, but also allows students access to the most up-to-date technology used by industry.<sup>31</sup>

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27 Professor Richard Roush, School of Land and Environment, University of Melbourne, *Committee Hansard*, 15 May 2012, p. 21.

28 Skills Australia, *Submission 63*, p. 11.

29 Ricegrowers' Association of Australia and Ricegrowers' Limited, *Submission 58*, p. [6].

30 Charles Sturt University, *Submission 11*, p. 4.

31 Skills Australia, *Submission 63*, p. 12.

3.23 Although the higher education sector is strongly in favour of VET in schools as a way of promoting agriculture to students, some sectors of industry have reservations. It was reported to the committee that the dairy industry, for example, would consider it appropriate that Certificate II level qualifications were offered through schools where appropriate work placements and employment skills are included.<sup>32</sup> The DIPDC cautioned against offering Certificate III level qualifications in schools:

The industry has expectations that Certificate III graduates are competent farm hands on a par with other 'trade' graduates and are able to work on a dairy farm. The industry has strong reservations about the capacity of secondary schools to teach this level of study and provide the industry and workplace currency required.<sup>33</sup>

### ***Committee view of VET-in-schools***

3.24 Given the importance of agriculture to Australia and humanity, the committee considers that serious efforts need to be made to ensure that today's students understand the fundamentals of agriculture to ensure they are equipped with the skills and knowledge to overcome tomorrow's challenges. Only through regular, meaningful exposure will students develop the necessary passion for food and fibre to inspire a future career in that field. However, VET in schools qualifications must meet industry standards and include necessary practical elements to ensure that industry has confidence in the training on offer.

### **Recommendation 2**

**3.25 The committee recommends that the Government continues to provide financial support for the promotion of agriculture in primary and secondary schools, such as the work undertaken by the Primary Industry Centre for Science Education and the Primary Industries Education Foundation.**

### ***Animal welfare in education***

3.26 Animal welfare – along with food safety and product provenance – is an important matter for consumers.<sup>34</sup> The committee heard that agricultural education needs to deal with animal welfare issues to reflect the concerns of consumers and retailers.<sup>35</sup> Some groups argued to the committee that this rising consumer awareness requires the incorporation of animal welfare principles into the agricultural curricula.<sup>36</sup> As consumers are increasingly considering social concerns in their purchase decisions,

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32 Dairy Industry People Development Council, *Submission 54*, p. 20.

33 Dairy Industry People Development Council, *Submission 54*, p. 20.

34 Tasmanian Government, *Submission 42*, p. 9.

35 Mr David Lock, Food Industry Association of Western Australia, *Committee Hansard*, 26 March 2012, p. 15.

36 Murdoch University, *Submission 25*, p. [9].

it is important for industry to react to these market changes by including appropriate standards in agricultural production.<sup>37</sup>

3.27 The majority of submissions received were in favour of including animal welfare principles in agricultural education, so long as those principles are practically based and strike a balance between the needs of the animals and the realities of primary industry.<sup>38</sup>

3.28 Animal rights activist organisations like Animals' Angels advocate for specific training in animal welfare and proper animal handling. Animals' Angels argue that: 'Compliance with the Animal Welfare Acts, Australian Standards for the Export of Livestock and Codes of Practice can be achieved when the industry is required to initiate training schemes.'<sup>39</sup>

3.29 On the other hand, some stakeholder groups argued to the committee that additional requirements regarding animal welfare are unnecessary, given the Australian industry already follows best practice. Similarly, ACDA argues that in tertiary education 'animal production is taught in the context of best practice and that necessarily includes animal welfare principles.'<sup>40</sup> However, Animals' Angels argues that as there are no statutory definitions of 'best practice' or 'competent' in Australia, such claims are entirely subjective. Animals' Angels points to the example of the European Union and Israel who both have clearly articulated definitions.<sup>41</sup>

3.30 Further, many submitters argued that there already exists significant consideration of animal welfare in the tertiary curriculum. For instance, UWA includes the subject *Clean, Green and Ethical Production Systems* as part of its teaching program in animal welfare principles<sup>42</sup>, and Murdoch University offers the unit *Animal and Human Bioethics*.<sup>43</sup>

3.31 The committee recognises that there is growing community interest in animal welfare, including in the primary production sector. However, based on the evidence received, and noting that improvements are always possible, it appears to the committee that universities and RTOs adequately address animal welfare issues in their courses.

## **Education Delivery**

3.32 Discussions of what is included in, and the focus of, agricultural and agribusiness education inevitably lead to discussions of its delivery. Agricultural and agribusiness education face several challenges. This section discusses issues such as

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37 Tasmanian Government, *Submission 42*, p. 9.

38 For example, see: Australian Beef Industry Foundation, *Submission 56*, p. [5].

39 Animals' Angels, *Submission 34*, p. 2.

40 Australian Council of Deans of Agriculture, *Submission 36*, p. [4].

41 Animals' Angels, *Submission 34*, pp 2–3.

42 The University of Western Australia, *Submission 16*, p. 4.

43 Murdoch University, *Submission 25*, p. [9].

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thin markets and provision of hands-on experience, which are of particular relevance to the delivery of agriculture related education.

3.33 At the tertiary level, there is a variety of delivery options to allow students to pursue agricultural careers. These options include different course structures, as well as the option to study at the under- and post-graduate levels.

3.34 Traditionally, students wishing to pursue careers in agriculture and agribusiness have undertaken a 4-year undergraduate degree specialising in a single area such as 'agriculture' or 'agronomy', or a broad degree such as a 3-year Bachelor of Science with majors in areas such as 'agricultural science'. Early degree courses in Agribusiness were built around an industry placement component mid-way through the course. This had the benefit of the student understanding the relevance of study undertaken to date, better focus on subsequent subject matter in the latter part of the course and often a guarantee of employment post graduation back at the company they had worked as a student.

3.35 As well as the standard three-year undergraduate degree traditionally offered, The University of Melbourne (UoM) and UWA both encourage students to undertake broad 3-year undergraduate degrees, followed by 2-year specialised Masters' degrees in a specific area. This model reflects the education system used in the United States of America and in European countries covered by the Bologna Treaty. It is argued by UWA that this model will 'raise the expectation of students that a minimum standard for agricultural tertiary education is a 3-year undergraduate degree followed by a 2-year masters' degree'.<sup>44</sup>

3.36 One argument in favour of this new model of tertiary education is that more students will be attracted to agricultural careers by being exposed to it in their undergraduate degree, and that students will be able to make more informed career decisions by deferring specialisation until after they have completed their undergraduate education.<sup>45</sup> However, the model has also been criticised in the past as being more expensive for students who have to study for an additional year.

3.37 Another approach, currently being used by Victoria's La Trobe University, to better facilitate the needs of rural students is the use of multiple campuses. In the case of La Trobe University, students can undertake their first year of study at the Albury-Wodonga campus and then complete their studies in Melbourne. The benefits of this program, as explained by the university:

This helps students by reducing the costs incurred in the relocation to Melbourne for one year. The regional campus also provides a very supportive environment in which regional students can make the critical transition to university studies.<sup>46</sup>

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44 The University of Western Australia, *Submission 16*, p. 2.

45 Professor Lynette Abbott, Faculty of Natural and Agricultural Sciences, the University of Western Australia, *Committee Hansard*, 26 March 2012, p. 55.

46 La Trobe University, *Submission 50*, p. 7.

3.38 In the VET sector, many of the NTPs include blocks of education in which students attend classes for a block of time in between extended industry placements. The committee heard concerns that the NTPs for many agriculture related courses are not meeting their objectives because they fail to take into account the unique requirements of agriculture, or specific elements of agribusiness. Vocational training for professions such as a motor mechanic, book-keeper or hairdresser can be delivered at any time of the year, whereas the 'block release' methods of instruction are not suited to agricultural professions. As succinctly put by Rural Skills Australia: 'Our industries generally do not or cannot cater for educational activities that go on for a long period of time.'<sup>47</sup>

3.39 This is different in industries such as horticulture however due to the seasonal nature of the work. For example:

A trainee might be programmed for specific training delivery based on seasonality of subject matter but, a major deviation from the scheduled crop production program may occur, then, in principle both theory and practical demonstration must wait for a further twelve months before the timing is right for the delivery of that subject matter...It is important to deliver theory and practical application of that theory as close together as possible. The National Training Package does not recognise or acknowledge the primary fact that plants 'Do Not' take the weekend off.<sup>48</sup>

3.40 The committee heard that in many instances, a trainee or apprentice may be the only full-time employee of a business. They will likely have discrete responsibilities and be intimately involved in the operation. For the employer to have to release that person for a month at a time can severely disrupt the business for limited benefit to the employee.<sup>49</sup> The committee heard that stakeholders of Skills Tasmania strongly emphasized that production should not be compromised in the name of training.<sup>50</sup> A more flexible model of training that recognises the specific requirements of agribusiness may encourage more employers to hire unskilled staff and support their development.

### ***Thin markets***

3.41 The committee heard that thin markets in regional and rural areas present special problems in providing skills training for agribusiness. A 'thin market' is one which lacks sufficient demand to create a viable supply. It was reported to the committee that the primary production sector has the characteristics of a thin market where demand for VET services has been modest and delivery made more difficult by the geographic diffuseness of the industry.<sup>51</sup>

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47 Mr Wayne Cornish, Rural Skills Australia, *Committee Hansard*, 1 February 2012, p. 11.

48 Mr Joe Garnham, *Submission 65*, p. 2.

49 Mr Joe Garnham, *Submission 65*, p. 2.

50 Tasmanian Government, *Submission 42*, p. 8.

51 Dairy Industry People Development Council, *Submission 54*, p. 13.

3.42 The committee heard that even well-resourced businesses struggled to provide their staff with the training they would like because of the challenges of geography. SunRice benefits from well developed internal training mechanisms, but related to the committee an example in which they attempted to facilitate their future leaders completing 'Manufacturing Management' programs. SunRice reports however that:

Due to the distance from Sydney and Melbourne-based tertiary institutions, these programs have not got off the ground – with insufficient numbers to run a series of programs that would be necessary for shift workers. Even despite our efforts, our labour force suffers from a lack of exposure to other 'ways of working', and experience gained elsewhere to benchmark, understand and aspire to best practice in each professional field.<sup>52</sup>

3.43 Although the competition among RTOs is driving quality and price improvements for students, excessive competition in thin trading markets can have a negative overall influence, especially in regional areas. In some cases, thin markets preclude the involvement of private enterprise altogether. Lower class sizes lead to higher delivery costs, and also reduce the funds available to hire 'industry credible specialists' as teachers.<sup>53</sup> Skills Australia recommends that the role of public providers in regional and remote areas be clearly spelt out to ensure the ongoing availability of high quality, afforded training in isolated areas.<sup>54</sup> If public institutions adopt private-sector models too closely, there is a risk that thin regional markets may not be serviced at all.

3.44 Tocal College's submission articulated the current tension between existing funding arrangements and servicing thin markets:

The current focus primarily on state based funding makes it difficult for agricultural training markets to be properly serviced. The markets are thin and dispersed and as a result no one state can offer a critical mass of individuals to undertake training. An RTO finds it extremely difficult to run the one course funded across a range of state authorities. Therefore, thin markets are difficult to address and are often missing out. This particularly applies to agriculture which has not only thin markets by nature, but also highly dispersed.<sup>55</sup>

3.45 There are signs that industry is currently attempting to overcome the challenges posed by thin training markets. An example is provided by the DIPDC:

[T]he NCDEA has commenced piloting a national NCDEA Diploma in Agriculture that will meet the needs of the Australian dairy industry and will be jointly delivered by alliance partners in line with their teaching capacity. This approach aims for the cross delivery of units between RTOs in different states using e-learning. It seeks to get economies of scale with

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52 Ricegrowers' Association of Australia and Ricegrowers' Limited, *Submission 58*, p. [6].

53 Dairy Industry People Development Council, *Submission 54*, p. 14.

54 Skills Australia, *Submission 63*, p. 10.

55 Tocal College, *Submission 6*, p. 1.

student numbers as well as access to specialist teaching expertise of each of the partners.<sup>56</sup>

3.46 The rapid advancement of information and communications technology has the potential to be a critical tool in providing greater access to education and training in rural and remote areas.<sup>57</sup> This is discussed further in the following section of this chapter.

3.47 Consistent with evidence from Sunrice, Tocal College and the DIPDC, the committee considers that addressing the challenges of thin training markets is critical to ensuring an adequate supply of skilled workers to facilitate industry growth. The committee understands that there are initiatives afoot through the Council of Australian Government Reform Council's *National Agreement for Skills and Workforce Development* to improve the national delivery of VET.<sup>58</sup> As a state administered function serving a national industry, there needs to be a partnership between industry, RTOs and governments to address the problem.

### **Recommendation 3**

**3.48 The committee recommends that the Department of Innovation, Industry, Science, Research and Tertiary Education reviews the impediments to seamless national delivery of agriculture and agribusiness education in the Vocational Education and Training sector.**

### **Recommendation 4**

**3.49 The committee recommends that the Department of Innovation, Industry, Science, Research and Tertiary Education consult with state and territory agencies and relevant industry bodies to determine the most appropriate delivery model for Vocational Education and Training in the agricultural and agribusiness sector with a view to ensuring adequate funding which will deliver the most effective training outcomes for employees and employers alike.**

### *Distance education*

3.50 The geographical diffuseness – and sometimes isolation – of the agriculture and agribusiness workforces can make the delivery of agribusiness education difficult. In order to cater to this isolated market, many universities and RTOs now offer

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56 Dairy Industry People Development Council, *Submission 54*, p. 17.

57 Skills Australia, *Submission 63*, p. 11.

58 Council of Australian Governments, *National Agreement for Skills and Workforce Development*, 2008, available from: [http://www.federalfinancialrelations.gov.au/content/national\\_agreements/skills\\_workforce/skills\\_agreement.pdf](http://www.federalfinancialrelations.gov.au/content/national_agreements/skills_workforce/skills_agreement.pdf), accessed: 28 May 2012.

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courses via distance education enabling students to learn at home and access support and materials via the internet.<sup>59</sup>

3.51 The use of new web-based learning platforms was suggested to the committee as a means to help overcome the difficulties of distance and also encourage professional networking and knowledge sharing.<sup>60</sup> Online education is particularly promising when it comes to overcoming thin training markets as it allows students to undertake training in their own time, wherever they are, without having to go and sit in a classroom.<sup>61</sup> On the balance of evidence received, it appears that online learning will be a significant tool in addressing the skills shortage, especially as it relates to up-skilling the existing workforce.

3.52 Distance education also offers the opportunity for workers in other industries to undertake courses at the same time as meeting their current commitments. The fly-in, fly-out timetables used by the resources sector appear to be a natural fit in this regard. It is anticipated that at some point the mining boom will either slow down, or workers will search out new challenges.<sup>62</sup> Many employees in the resource sector have already demonstrated willingness to work in non-metropolitan areas and many of the skill sets in the resources sector, such as skilled tradespeople, intersect with agriculture and agribusiness. The ease with which many agricultural workers were able to transition into the mining sector offers hope that the reverse could occur in the future. Accessing agriculture or agribusiness related education while working in the resource sector may offer a promising source of workers to alleviate the current skills shortage, but also ensure that those workers who wish to stay in rural areas are not forced back to the city for want of furthering their education.

### *Learning in stages*

3.53 The committee heard that a move away from formal accreditation and qualifications towards a 'skills passport' approach may attract more workers to complete further training in agriculture, as industry values skills over certificates.<sup>63</sup> As expressed by the National Farmers' Federation:

The Government model is a one-size-fits-all, that being that training packages result in qualifications. Industry is calling for skill sets where employees can take training as needs be at an operational level.<sup>64</sup>

3.54 The Department of Industry, Innovation, Science, Research and Tertiary Education articulated for the committee the government's position on the structure of education:

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59 Charles Sturt University, *Submission 11*, p. 2.

60 Marcus Oldham College, *Submission 5*, p. 4.

61 Mr Wayne Cornish, Rural Skills Australia, *Committee Hansard*, 1 February 2012, p. 14.

62 Mr Ian Joseph, Agribusiness Council of Australia, *Committee Hansard*, 15 May 2012, p. 3.

63 Tasmanian Government, *Submission 42*, p. 6.

64 Mr Brian Duggan, National Farmers' Federation, *Committee Hansard*, 1 February 2012, p. 20.

If we think about the [Council of Australian Government] targets, what we are trying to do is get people full qualifications, so we actually do want them to finish and get a full certificate III and above. That is certainly where we are wanting to go in terms of COAG and of halving the number of people who do not have a certificate at that level.<sup>65</sup>

3.55 In spite of the government's targets, statistics provided by AgriFood Skills Australia highlight the emphasis on skills rather than full qualifications in industry and among workers:

The issue for us is skill sets. There are important. There are 87,000 people now enrolled in vocational training. Only 20 per cent ever finish those things...People are going in and doing what they want, but they are also running with their feet in that they get what they want out of a course and that is enough to do a job and get a job, but then they pull out.<sup>66</sup>

3.56 The low levels of take-up and completion of formal qualifications may also be indicative of industry attempting to maximise productivity and minimise costs associated with their workforce. The Food, Fibre and Timber Industry Training Council (WA) Inc. argued that the greatest productivity gain from training comes from providing unqualified workers with basic skills.<sup>67</sup> This may work against the government's objective of increasing the number of people with more advanced qualifications.

3.57 Evidence provided to the committee indicates that the lower education completion rates in agriculture are not the result of any inherent difference in the composition of the workforce, but are a reflection of the environment in which they do business. The following example was provided to the committee:

Where you have a requirement – such as having to get a qualification to get a meatworker – there are completion rates of between 80 per cent and 90 percent. Where it is not absolutely required to get or stay in a job, you do what you want. Secondly, our industries often do not need full qualifications, so they probably do not promote it as much as they should, either.<sup>68</sup>

### **Attracting students to agriculture and agribusiness careers**

3.58 Although the content and delivery of agriculture and agribusiness education are critical in ensuring that industry and academia have qualified people available to them, it becomes something of a moot point if there are no students to teach. A key issue raised during this inquiry has been the problem of attracting and retaining

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65 Ms Linda White, Department of Innovation, Industry, Science, Research and Tertiary Education, *Committee Hansard*, 1 February 2012, p. 57.

66 Mr Arthur Blewitt, AgriFood Skills Australia, *Committee Hansard*, 1 February 2012, p. 7.

67 Mr Brad Armstrong, Food, Fibre and Timber Industry Training Council (WA) Inc., *Committee Hansard*, 26 March 2012, p. 62.

68 Mr Arthur Blewitt, AgriFood Skills Australia, *Committee Hansard*, 1 February 2012, p. 9.

students at both tertiary and Vocational Education and Training (VET) level and secondary school level.

3.59 As early as 1991, the McColl Report spoke of the decline in student enrolments in higher education agriculture-related courses. The report contended that this decline was due to the poor perception of agricultural careers by the general public, and the failure of the agricultural sector to promote the courses and opportunities available.<sup>69</sup> Skills Tasmania put it to the committee that negative perceptions of agriculture remain a significant factor impacting on student recruitment.<sup>70</sup>

3.60 Many students possess a narrow or non-existent understanding of the career opportunities and courses available to them in agriculture and agribusiness.<sup>71</sup> It is difficult for students to choose to pursue a career in agriculture when they do not know what options are available to them, or what their careers might look like.<sup>72</sup> As noted by Dr Livingstone of Marcus Oldham College:

[W]hen you think about what does a doctor do, what [does] a lawyer do, what does an accountant do – all of society have a fair grasp of what those people do. But if we say you are a farmer or a grazier or you are studying agriculture then the population really does not have a very good idea about what that person does.<sup>73</sup>

3.61 In order to overcome the challenge of attracting a sufficient number of students to agriculture to meet future demand, the committee heard that it is necessary to reshape existing perceptions of the sector. It was argued to the committee that:

...the first-and-foremost task would be to convince those people who might want to pursue a career in agriculture that it is not about regional services being less than they might expect in a metropolitan region, that it is not about seasonal conditions that are depressing, that it is not about depression itself, that it is not about suicide—it is not about all those social factors that one reads about when you talk about agriculture.<sup>74</sup>

3.62 In order to address the lack of knowledge in the community at large, and in students in particular, there are a number of programs currently underway. The Primary Industries Centre for Science Education program (PICSE) aims to 'foster and support young people's interest in science, and their subsequent participation in tertiary study leading to research or careers relating to the Food Security sector.'<sup>75</sup> Similarly, PIEF's mission is to 'inform students, teachers and the broader community

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69 La Trobe University, *Submission 50*, p. 9.

70 Skills Tasmania, *Submission 42*, p. 1.

71 Ms Barbara Grey, *Submission 61*, p. [1].

72 Mr Bruce Hutchinson, *Committee Hansard*, 26 March 2012, p. 12.

73 Dr Simon Livingstone, Marcus Oldham College, *Committee Hansard*, 1 February 2012, p. 50.

74 The Hon. Dr Hendy Cowan, *Committee Hansard*, 26 March 2012, p. 3.

75 Primary Industries Centre for Science Education, *Submission 4*, p. [4].

about the primary industries and the career opportunities which they offer.<sup>76</sup> The *raison d'être* for both these programs is to advance the knowledge of, and interest in, agriculture among school age students.

3.63 There was widespread support for both of these bodies from industry, and numerous key stakeholders expressed support of the work of PIEF and PICSE as they continue to introduce students to agriculture and equip teachers to bring agriculture to the classroom.<sup>77</sup> The committee notes and supports the government's commitment of \$225 000 over three years to the PIEF to ensure they can continue their work.<sup>78</sup> As well as continuing to support PIEF, the committee considers that ongoing support of PISCE – an industry and education partnership program designed to stimulate student interest in studying science at university with a pathway into primary industry – is critical to ensure that there is a flow of students from schools into further education and careers in agribusiness.

### **Recommendation 5**

**3.64 The committee recommends that the government explores options for the Regional Higher Education, Skills and Jobs Coordinators to work with organisations such as the Primary Industries Education Foundation to raise the profile of agriculture in schools.**

3.65 Just as primary and secondary students are now being informed of the opportunities available to them, tertiary students also need to be informed of their opportunities. The Birchip Cropping Group's submission calls for future employers to reach out to tertiary students from a variety of disciplines – not necessarily exclusively agribusiness – by offering specific, real world career examples, familiarisation tours, work experience and cadetships.<sup>79</sup> Similarly, the University of Tasmania argues that: 'Industry peak bodies need to sell agricultural careers, they need to be the ones in the market promoting the sector to students.'<sup>80</sup>

3.66 Re-writing the food sector narrative to inspire young citizens, revitalise the existing workforce, and tighten the bonds that have loosened between metropolitan and regional areas was highlighted as a key area of concern for stakeholders. The community – young people in particular – need to be informed of the challenging, varied and rewarding careers available in food and fibre production, value adding, processing, marketing and retailing for both Australian consumers and the rapidly

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76 Primary Industries Education Foundation, *Submission 47*, p. 1.

77 Tocal College, *Submission 6*, p. 2; University of Adelaide, *Submission 22*, p. [7]; The University of Western Australia, *Submission 16*, pp 2-4.

78 Senator the Hon. Joe Ludwig, Minister for Agriculture, *Primary Industries Education Boosted*, media release, 11 May 2012, available from: [http://www.maff.gov.au/media\\_office/media\\_releases/media\\_releases/2012/may/primary-industries-education-board](http://www.maff.gov.au/media_office/media_releases/media_releases/2012/may/primary-industries-education-board), accessed: 28 May 2012.

79 Birchip Cropping Group, *Submission 62*, p. [2].

80 University of Tasmania, *Submission 21*, p. 2.

increasing populations in Asia. As succinctly put by GPA, attracting students is the only way to solve the challenges facing agribusiness:

If we want to attract sharp minds that are going to solve the productivity dilemmas that we face into the future, we need to make this somewhere that is attractive to be.<sup>81</sup>

### **Cost of agriculture and agribusiness education for students**

3.67 The costs of post-secondary and higher education are likely to act as a deterrent for many students, and employers considering further training for their workforce. This section will discuss the cost of agriculture and agribusiness education for students at both the VET and tertiary level.

3.68 Agriculture, and the students who are considering careers in it, are both price sensitive. Analysis undertaken by the Victorian Department of Primary Industries and the National Centre for Dairy Education Australia (NCDEA) revealed that price sensitivity is a relevant factor in industry engaging in formal qualifications.<sup>82</sup> Deloitte Access Economics also found that agricultural students are more susceptible to price change than most other sectors.<sup>83</sup> Although the reasons behind the high levels of price sensitivity in industry and among students are difficult to identify, it is clearly a barrier to education that should be considered in formulating policy.

3.69 The committee heard that the cost of some agricultural university courses may be dissuading some students from pursuing those courses. For example, a veterinary science degree usually lasts between five and six years with tuition fees ranging up to \$250 000.<sup>84</sup> A four-year agriculture degree would cost in excess of \$30 000 in course fees alone. It was pointed out that in the current market three-year science and natural resources management degree graduates were having no trouble finding work in the sector. Traditionally agriculture has been a four-year degree. With the current shortage of labour in the agribusiness sector there is little incentive for students to undertake a four-year degree when a three-year degree offers the same opportunities upon graduation, may attract lower fees, and results in a reduced debt upon graduation.<sup>85</sup>

3.70 The committee received many recommendations to include agriculture on the National Priority Disciplines list.<sup>86</sup> Inclusion on this list would reduce student

81 Mr Pete Mailler, Grain Producers Australia, *Committee Hansard*, 1 February 2012, p. 29.

82 Dairy Industry People Development Council, *Submission 54*, pp 14–16.

83 Deloitte Access Economics, *The Impact of Changes to Student Contribution Levels and Repayment Thresholds on the Demand for Higher Education*, 2011, p. 53.

84 Dr Barry Smyth, Australian Veterinary Association, *Committee Hansard*, 1 February 2012, p. 33. Dr Smyth appears to be referring to full-fee veterinary science courses. Veterinary Science is normally a five- or six-year degree attracting Band 3 student contributions (up to \$9425 per year in 2012) when enrolled as a Commonwealth Support Student resulting in a student debt upon graduation of almost \$60 000.

85 Dairy Industry People Development Council, *Submission 54*, p. 22.

86 Murdoch University, *Submission 25*, p. [5].

contributions by around \$3500 per year and importantly would send a clear message that the government considers agriculture to be a national priority.<sup>87</sup> Unfortunately, the government's decision to cease funding reduced student contributions for national priority areas has closed a promising avenue to increase the profile and appeal of an agribusiness education. Listing agribusiness as a 'National Priority' would also have sent a strong positive message to future students.

3.71 The committee heard that some kind of student loan relief could be used as a way to attract young graduates to rural and regional areas and overcome, at least to some extent, price sensitivities.<sup>88</sup> In order to attract metropolitan students, a significant vein of largely untapped talent, some kind of loan relief could be considered as an incentive.<sup>89</sup> Additional student financial assistance such as scholarships were also suggested.<sup>90</sup> However, La Trobe University argues that the provision of scholarships alone is insufficient to adequately address the agricultural skills shortage without efforts to address the misconceptions that surround agribusiness careers.<sup>91</sup>

3.72 The committee also heard about the high costs for students undertaking VET courses. Students undertaking VET courses through an RTO are ineligible to receive HECS-HELP which would enable a student to fully defer their student contribution until after they have graduated and commenced working. Instead, VET students undertaking a diploma-level course or above can receive FEE-HELP which carries a loan fee of 20 per cent, but allows students to defer payment until they graduate.<sup>92</sup> Due to the loan fee applied, a three-year course that attracts fees of \$12 000 per year would result in a student owing almost \$44 000.<sup>93</sup> Although this situation is not specific to agriculture, very high costs may discourage potential students.

3.73 Students wishing to pursue agricultural higher-research degrees face related cost challenges. The road to a research career is a long and Spartan one, especially in the early years. The committee heard that the stipend received by postgraduate scholars, in the region of \$22 000 per annum with no superannuation, was a primary discouraging factor for students. Professor Spithill from La Trobe University related a common refrain from students: 'why would I do a PhD on \$22 000 a year? Make it

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87 University of Adelaide, *Submission 22*, p. [6]; Professor Jim Pratley, Australian Council of Deans of Agriculture, *Committee Hansard*, 26 March 2012, p. 43.

88 Dr Barry Smyth, Australian Veterinary Association, *Committee Hansard*, 1 February 2012, p. 35.

89 Mr Ken Severson, *Committee Hansard*, 26 March 2012, p. 31.

90 Murdoch University, *Submission 25*, p. [5].

91 La Trobe University, *Submission 50*, p. 8; Department of Agricultural Sciences, La Trobe University, *Committee Hansard*, 26 March 2012, p. 69.

92 VET FEE-HELP, *Study Assist*, <http://studyassist.gov.au/sites/studyassist/help-payingmyfees/vet-fee-help/pages/vet-fee-help#IsThereALoanFee>, accessed: 22 May 2012.

93 Dr Damien Adcock, Northern Melbourne Institute of TAFE, *Committee Hansard*, 15 May 2012, p. 35.

\$40 000 and I'm interested, but I'm just not interested in being poor, basically.<sup>94</sup> The stipend value is around 80 per cent of the minimum wage.<sup>95</sup>

3.74 It was pointed out by the University of Adelaide that the brightest students who have the potential to become excellent research scientists, were likely to be offered well-paying jobs when they graduate from their undergraduate degrees, rendering them unavailable to undertake research degrees.<sup>96</sup> Although unable to compete with the salaries on offer from the mining sector, some graduates from agricultural courses command competitive salaries of up to \$60 000 per year.<sup>97</sup> The committee heard that some bodies, the GRDC for example, were offering excellent scholarships that meant researchers may receive around \$40 000 per year, but this still compares poorly with industry.<sup>98</sup> It was argued to the committee that the funds disbursed through postgraduate scholarships might be more effective if there were fewer scholarships offered but with a higher value attached to them.<sup>99</sup>

### *Cost of education for non-metropolitan students*

3.75 The students who are most attracted to formalised education in agricultural sectors – those from the country – need to overcome some of the greatest barriers to accessing that education. The 2008 Federal Government Review of Higher Education (the Bradley Report) highlights the issue of regional underrepresentation:

People from regional and remote parts of Australia remain seriously under-represented in higher education and the participation rates for both have worsened in the last five years...Retention of the regional group has also been decreasing relative to urban students and retention rates are now 3 per cent below the rates of the remainder of the student population. The success and retention patterns for remote students are of much greater concern. The indicator levels are very low compared with their non-remote peers. For example, success rates are currently 9 per cent below and retention is 13 per cent below the rates of other students.<sup>100</sup>

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94 Professor Terry Spithill, Department of Agricultural Sciences, La Trobe University, *Committee Hansard*, 26 March 2012, p. 66.

95 University of Tasmania, *Submission 21*, p. 1; La Trobe University, *Submission 50*, p. 5.

96 University of Adelaide, *Submission 22*, p. [6]; Murdoch University, *Submission 25*, p. [8].

97 The Hon. Dr Hendy Cowan, *Committee Hansard*, 26 March 2012, p. 4; cf. Mr Ken Severson, *Committee Hansard*, 26 March 2012, p. 30; cf. Associate Professor David Miller, School of Veterinary and Biomedical Science, Murdoch University, *Committee Hansard*, 26 March 2012, p. 37; cf. Dr Peter Sale, Department of Agricultural Sciences, La Trobe University, *Committee Hansard*, 26 March 2012, p. 64.

98 Professor Kadambot Siddique, Faculty of Natural and Agricultural Sciences, the University of Western Australia, *Committee Hansard*, 26 March 2012, p. 60.

99 Australian Council of Deans of Agriculture, *Submission 36*, pp [2–3].

100 *Review of Australian Higher Education: Final Report*, December 2008, p. 31.

3.76 It is widely recognised that students from rural backgrounds face additional financial hardships in accessing tertiary education.<sup>101</sup> Several submissions noted that the recent changes to the eligibility requirements for Youth Allowance have 'disproportionately affected rural students, providing a disincentive for them to move from home to study at university.'<sup>102</sup>

3.77 The committee heard that a potential way to attract more rural students to university involved modifying or waiving the qualification time required to establish independence in relation to student income support. It was argued by ACDA that 'for prospective students who take the "gap" period in order to qualify, the attrition rate is high and is thus counterproductive in priority areas.'<sup>103</sup>

### **Cost and funding of agricultural and agribusiness education for institutions**

3.78 The committee heard that agriculture is a very expensive course for universities to deliver due to the necessity of acquiring and maintaining up-to-date equipment, facilities and low staff-to-student ratios.

3.79 Agriculture courses are expensive because of a combination of low student numbers and high fixed costs from salaries and infrastructure.<sup>104</sup> It is difficult to teach agricultural courses without significant hands-on components and these require access to facilities such as land, animals, and machinery. As explained by CSU:

[I]n-field and other 'hands-on' practical experience is a vitally important component of the education of agricultural science students to enable them to rapidly and competently contribute to meeting the national challenges of enhancing agricultural productivity, export earnings, and the quality of environmental stewardship. The provision of these practical skills requires the funding of appropriately specialised and experienced academic and technical staff at lower than usual student:staff ratios to satisfy both the requisite learning outcomes and meet the necessary health and safety, and where necessary, animal welfare requirements associated with those activities.<sup>105</sup>

3.80 As student cohorts decrease in size through falling enrolment levels, the costs associated with teaching students increase as economies of scale are lost. It was reported to the committee that the cost of utilising field facilities, laboratories, excursions and the like become prohibitive as student numbers decline, and this can result in declining course quality.<sup>106</sup> For example consider the following hypothetical. Suppose that a university maintains a working farm to allow students to undertake

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101 Australian Council of Deans of Agriculture, *Submission 36*, p. [6].

102 University of Adelaide, *Submission 22*, p. [3].

103 Australian Council of Deans of Agriculture, *Submission 36*, p. [6].

104 Murdoch University, *Submission 25*, p. [3].

105 Charles Sturt University, *Submission 11*, p. 2.

106 Australian Council of Deans of Agriculture, *Submission 36*, p. [1]; La Trobe University, *Submission 50*, p. 2.

practical training, and the farm has the capacity for 100 students. Regardless of whether there are 80 students or 30 students using the facilities the costs do not vary greatly as the primary expenses are the capital expenditure to purchase property and plant and ongoing maintenance. La Trobe University in Melbourne noted that it may be forced to sell its on-campus farm reserve in order to restore other teaching infrastructure in the future.<sup>107</sup>

3.81 Murdoch University reported to the committee that government funding for agricultural education at the tertiary level is inadequate, forcing universities to subsidise agriculture courses. Even in courses that remain popular with students, such as veterinary science, institutions find themselves struggling with funding in order to maintain low staff-to-student ratios and hands-on components. For universities, it was reported that there is a funding gap of around \$7000 per student annually compared to the government contribution and the cost to deliver the course. When a faculty has several hundred students, this is a significant impost.<sup>108</sup>

3.82 The Commonwealth provides agricultural units of study with the highest level of funding support available through the Commonwealth Grant Scheme for higher education students. The Commonwealth contributed \$19 542 per Commonwealth Supported Place in 2011.<sup>109</sup>

3.83 VET training is substantially provided by state governments with the Commonwealth contributing through specific programs such as the Productivity Place Program for individual students, and through mechanisms such as the Education Investment Fund for infrastructure development. In 2010 around 47 per cent (\$3.3 billion) of VET operating revenue came from state and territory governments and 29 per cent (\$2 billion) from the Commonwealth government.<sup>110</sup>

3.84 During the inquiry the committee heard that funding for some VET qualifications has continued to diminish. For example, Longerenong College reported that the student contact hour rate has recently decreased from \$7.80 to \$5.25 for the Advanced Diploma of Agriculture. In order to continue to offer high quality courses student fees have to be raised as government funding falls.<sup>111</sup> Similarly, the Northern Melbourne Institute of TAFE (NMIT) noted that fee support has been

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107 La Trobe University, *Submission 50*, p. 2.

108 Dr Barry Smyth, Australian Veterinary Association, *Committee Hansard*, 1 February 2012, p. 33.

109 Skills Australia, *Submission 63*, p. 8.

110 National Centre for Vocational Education Research, *Australian vocational education and training statistics: financial information 2010*, available from: <http://www.ncver.edu.au/publication/s/2426.html>, accessed: 3 May 2012. The remainder is made up of fee for service activities (16 per cent or \$1.1 billion), student fees (4 per cent), and ancillary trading and other revenue (4 per cent).

111 Mr John Goldsmith, Longerenong College, *Committee Hansard*, 15 May 2012, p. 31.

effectively halved for diploma level qualifications in recent times increasing the costs for students.<sup>112</sup>

3.85 Clearly agricultural education is both expensive to teach and is facing competitive pressures within universities. In order to adequately fund the teaching of agribusiness at universities, and in particular regional universities, it was suggested by the Hon. Dr Hendy Cowan that the government apply funding loading of 50 per cent to agricultural colleges.<sup>113</sup> Some universities also suggested to the committee that increasing the loading for agriculture and agribusiness related education would be of great assistance.<sup>114</sup>

3.86 Even if the government is able to provide greater support to education in the short term, industry will be required to invest more money into scholarships, marketing and work experience to ease some of the budgetary pressure on education institutes.<sup>115</sup> The education sector needs to engage with industry regarding how they can work together, and not simply expect industry to provide money.

3.87 The Tasmanian Farmers and Graziers Association argued that practical training within industry would minimise costs for education providers while maintaining opportunities for hands-on training for students.<sup>116</sup> Universities would no longer have to maintain expensive agricultural facilities such as farming land and dairies. Students would also have the opportunity to gain practical experience in a cutting edge environment. Skills Australia similarly argued for a collaborative approach between industry, government and education providers.<sup>117</sup>

3.88 Industry has been supportive of research efforts in the past, but they need to contribute more to meeting their own human resource needs. The committee heard that there was already some industry involvement with groups such as the Australian Wool Education Trust and Meat and Livestock Australia providing support and encouragement to agricultural education.<sup>118</sup> Positive examples show the way, but industry needs to follow en-mass to ensure they have the skills they need.

### ***Demand-based funding***

3.89 From 2012, universities in Australia are being funded based on the number of students they enrol, a system known as demand-based funding. Demand-based funding models are increasingly in vogue as a means to ensure that training is

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112 Dr Damien Adcock, Northern Melbourne Institute of TAFE, *Committee Hansard*, 15 May 2012, p. 34.

113 The Hon. Dr Hendy Cowan, *Committee Hansard*, 26 March 2012, p. 5.

114 Associate Professor John Webb, Department of Agricultural Sciences, La Trobe University, *Committee Hansard*, 26 March 2012, p. 64.

115 Ms Adele Millard, *Committee Hansard*, 26 March 2012, p. 13.

116 Tasmanian Farmers and Graziers Association, *Submission 30*, p. 4.

117 Skills Australia, *Submission 63*, p. 10.

118 Associate Professor David Miller, School of Veterinary and Biomedical Science, Murdoch University, *Committee Hansard*, 26 March 2012, p. 35.

responsive to the needs of industry and individuals in a dynamic economy. In its submission, DEEWR reported that from 2012 public universities will no longer be limited in the number of student places they offer. As DEEWR explains: 'Under the demand driven funding system, higher education providers will decide how many places they will offer and in which disciplines in response to employer and student demand.'<sup>119</sup> At the most rudimentary level, this change means that universities will receive more funding the more students they enrol.

3.90 The 2010 report *Higher Education Base Funding Review* chaired by Dr Jane Lomax-Smith identified agriculture-related courses as in need of additional funding contributions from both the Commonwealth and students to accurately reflect the cost of the education provided under a demand-based funding system.<sup>120</sup>

3.91 The committee heard a number of concerns regarding the impact of demand-based funding on agriculture and agribusiness education at both the tertiary and VET-level. The Director of the Centre for the Study of Rural Australia at Marcus Oldham College, Dr Simon Livingstone, explains:

Faculties are being appraised against their ability to generate income. Agriculture rates unfavourably as a contributor to university financial health compared, for example, to business and law programs.<sup>121</sup>

3.92 One of the possible negative effects to emerge from the move towards demand-based funding in higher education is the mismatch between students' choice of course and the skills requirements of industry.<sup>122</sup> As put by one university, the new system is 'a funding regime that rewards large class sizes'.<sup>123</sup> It was noted by UWA that the decline of funding for university places limits the ability of institutions to be innovative, for fear that something new will not be as attractive to students as current options, thereby constraining them to older practices.<sup>124</sup>

3.93 Unfortunately, the Commonwealth appears not to have acted on Dr Lomax-Smith's call for additional funding for agriculture under the new regime. DEEWR submitted that:

Industries, such as agriculture, can work with schools, universities, and organisations like the Primary Industry Centre for Science Education, to encourage students to undertake courses that meet the needs of the labour market.<sup>125</sup>

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119 Department of Employment, Education and Workplace Relations, *Submission 40*, p. [2].

120 Skills Australia, *Submission 63*, p. 8.

121 Marcus Oldham College, *Submission 5*, attachment 1.

122 Skills Australia, *Submission 63*, p. 16.

123 University of Adelaide, *Submission 22*, p. [7].

124 The University of Western Australia, *Submission 16*, p. 4.

125 Department of Employment, Education and Workplace Relations, *Submission 40*, p. [2].

3.94 Some stakeholders in the VET arena expressed reservations about the potential future application of this model to agriculture courses in VET. It was argued that demand-based funding favours low-costs courses, and many prospective providers will focus their efforts on them. Courses such as agriculture are expensive to deliver and therefore less profitable for institutions leading to the decline of those courses.<sup>126</sup>

### ***Research funding***

3.95 It was reported to the committee that research funding provided to universities is generally insufficient to cover the actual costs of undertaking research. This underfunding is often in the order of 25–50 per cent which must be met from within the university's budget.<sup>127</sup>

3.96 One of the reasons put to the committee that agricultural education is so expensive is that many universities have moved to a funding model that charges fixed amounts for space and facilities used in research. Murdoch University explains the challenge this poses for agriculture:

Simply by virtue of the nature and scope of agricultural research, e.g., glasshouses, animal housing, laboratories, research farm infrastructure, faculties/schools conducting research are therefore charged more for space used to conduct the research.<sup>128</sup>

3.97 The committee heard that although the return on investment for agricultural research is relatively high, that benefit often does not accrue to the university itself. Furthermore, it was posited that:

The value of some of the work done by agricultural researchers is less obvious because it stops losses rather than producing gains. The program to counter rust in cereal crops is a prime example. If this program did not exist, annual losses of more than \$100m would occur.<sup>129</sup>

3.98 Funding for agriculture related research in universities through Australian Research Council Grants has not enjoyed a high success rate.<sup>130</sup> It was put to the committee that securing funding for agriculture was 'very, very hard'.<sup>131</sup>

3.99 Universities have historically been major players in agriculture research, but as student numbers decrease and funding is allocated away from agricultural faculties,

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126 Tocal College, *Submission 6*, p. 1; Dairy Industry People Development Council, *Submission 54*, p. 13.

127 Murdoch University, *Submission 25*, p. [3].

128 Murdoch University, *Submission 25*, p. [3].

129 Mr Graeme Batten, *Submission 38*, p. 4.

130 Associate Professor David Miller, School of Veterinary and Biomedical Science, Murdoch University, *Committee Hansard*, 26 March 2012, p. 35.

131 Professor Kadambot Siddique, Faculty of Natural and Agricultural Sciences, the University of Western Australia, *Committee Hansard*, 26 March 2012, p. 60.

their research capacities are at risk of erosion.<sup>132</sup> In response to these pressures, some universities have pursued a path of collaboration with other bodies to maximise use of available funding. The University of Tasmania reported:

The School of Agricultural Science set the national trend in 1997 with the partial co-location and merger with the state agency research facilities via the Tasmanian Institute of Agricultural Research Joint Venture Agreement. This has allowed for staff consolidation, the sharing of specialist facilities and the maintaining of a critical mass of staff involved in agriculture within the University.<sup>133</sup>

3.100 Similarly, CSU and La Trobe University both reported that they have established partnerships with other government research bodies to maximise their research potential.<sup>134</sup> Along with strengthening ties to other government and private sector research bodies, the committee considers that it is important for universities to increase collaboration among academics, researchers and facilities. Some of the costs of agricultural research may be minimised by the sharing of facilities, data, and capital.

3.101 Due to a shortage of government funding, industry-funded research now represents a higher proportion of all agricultural research. This change has significantly narrowed the pool of available talent and also resulted in research that is more commercially focused as opposed to broader general industry advancement programs.<sup>135</sup>

### **Recommendation 6**

**3.102 The committee recommends that the Australian Council of Deans of Agriculture work with member universities to develop a collaboration framework to optimise research investment and improve knowledge transfer in agriculture and agribusiness research.**

### **The decline in the number of agriculture and agribusiness education providers**

3.103 The decline, and in some cases outright closure, of regionally based agricultural colleges is of particular concern to the committee. The decline of the old pillars of agricultural education in Australia such the Muresk Institute in Western Australia, the Hawkesbury Agricultural College in New South Wales – among others – are a sad indication of the health of the sector.<sup>136</sup> Shortly after the commencement of this inquiry it was announced that agricultural enrolments at the

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132 Professor Richard Roush, School of Land and Environment, University of Melbourne, *Committee Hansard*, 15 May 2012, p. 18.

133 University of Tasmania, *Submission 21*, p. 3.

134 Charles Sturt University, *Submission 11*, p. 3; La Trobe University, *Submission 50*, p. 7.

135 Landmark Operations Limited, *Submission 27*, p. [3].

136 Dr Damien Adcock, Northern Melbourne Institute of TAFE, *Committee Hansard*, 15 May 2012, p. 39.

Hawkesbury Agricultural College would be suspended due to a lack of student interest. The demise of one of the oldest and most prestigious agricultural colleges is a siren song that should not be ignored.

3.104 Australia currently has 39 universities but well under a third provide agriculture related courses.<sup>137</sup> Given that there were 23 campuses providing agriculture or agricultural science degrees in the 1980s and that now there are fewer than 10 in the 2010s, the decline is readily apparent.<sup>138</sup> The place of agriculture within universities has also been in decline: when the University of Western Australia was established in 1911 the School of Agriculture was the second largest faculty on campus, today it is the second smallest.<sup>139</sup>

3.105 A result of the closure of many regional agricultural colleges and campuses has been a consolidation of agricultural education providers in the major cities. There are now only four campuses in regional Australia offering agriculture related degrees.<sup>140</sup>

3.106 Some submissions argued that this geographic consolidation is more important than the overall decline in the number of facilities.<sup>141</sup> Metropolitan universities do not provide students with the same level of practical experience as regional agricultural colleges, and they may be more difficult for regional students to access.<sup>142</sup>

3.107 Falling agriculture enrolments and metropolitan consolidation threaten the ongoing existence of the agricultural colleges that remain, and which have previously been an important element in the education spectrum between the more theoretically-focused universities, and skills-orientated VET providers.<sup>143</sup> Graduates of tertiary agricultural colleges have a combination of practically orientated skills as well as a strong foundation in agriculture, business, science, and agriculture specific practical knowledge.<sup>144</sup> While university-based agricultural degrees are obviously important for producing tomorrow's researchers, developers, and scientists, the committee heard that at present, many tertiary institutions are producing graduates with strong theoretical knowledge, but lacking in practical know-how.<sup>145</sup> It was submitted that many

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137 Marcus Oldham College, *Submission 5*, attachment 2.

138 Australian Council of Deans of Agriculture, *Submission 36*, p. [2].

139 The Hon. Hendy Cowan, *Committee Hansard*, 26 March 2012, p. 2.

140 Australian Council of Deans of Agriculture, *Submission 36*, p. [2].

141 Professor Lindsay Falvey, *Submission 29*, p. 7.

142 Professor Lindsay Falvey, *Submission 29*, p. 8.

143 The Hon. Philip Gardiner MLC and the Hon Brendon Grylls MLA, *Report into the future commercial viability of the Muresk Institute*, February 2010, p. 13.

144 The Hon. Philip Gardiner MLC and the Hon Brendon Grylls MLA, *Report into the future commercial viability of the Muresk Institute*, February 2010, p. 10.

145 Mr Alan Fisher, Farm Machinery Dealers Association of Western Australia, *Committee Hansard*, 26 March 2012, p. 23.

employers prefer graduates from more vocationally focussed courses that also include sufficient theory to enable them to boost productivity, solve challenging problems, and implement new practices.<sup>146</sup>

3.108 The decline of agricultural colleges has also removed the clearest pathway from VET to higher education. The committee is of the view that more support needs to be provided to students to transition from VET courses – where many students discover their interests and professional aptitudes – to tertiary courses that will enable them to become leaders in their field. The committee heard that agricultural colleges – such as the Muresk Institute – once bridged the divide between research universities and VET providers. With the decline of agricultural colleges, alternative arrangements need to be put in place to ensure that students can seamlessly transition from VET to higher education.

3.109 The foremost factor put to the committee in explaining the decline of regional campuses is the costs associated with maintaining them. The financial metrics used by large metropolitan universities may result in negative outcomes for regional campuses. The move to a competitive, demand-driven, funding model was highlighted to the committee as a significant threat to the longevity of agricultural colleges which have higher funding requirements and comparatively low student numbers.<sup>147</sup> Describing the decision to close the Muresk Institute, the Hon. Dr Hendy Cowan commented:

[T]he Muresk Institute was closed by Curtin University because the financial administration of Curtin University determined that it was costing more to deliver an undergraduate degree to a student at Muresk than it was to deliver the same degree at Bentley [in Perth]. As a consequence, Muresk was to be wound down and the course offered at Bentley.<sup>148</sup>

3.110 A recent review of regional agricultural tertiary providers found that only two – the University of New England at Armidale in New South Wales and Marcus Oldham College near Geelong in Victoria – remain sustainable as independent entities.<sup>149</sup> Other regional campuses that offer agriculture related courses fall under the umbrella of larger city-based campuses who cross-subsidies their regional campuses.<sup>150</sup>

3.111 The example of Marcus Oldham College is an indication that the traditional structure of agricultural colleges that straddle research focused universities and

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146 Mr Bruce Hutchinson, *Committee Hansard*, 26 March 2012, p. 10.

147 The Hon. Philip Gardiner MLC and the Hon Brendon Grylls MLA, *Report into the future commercial viability of the Muresk Institute*, February 2010, pp. 12–13.

148 The Hon. Dr Hendy Cowan, *Committee Hansard*, 26 March 2012, p. 5.

149 The Hon. Philip Gardiner MLC and the Hon Brendon Grylls MLA, *Report into the future commercial viability of the Muresk Institute*, February 2010, p. 30.

150 The Hon. Philip Gardiner MLC and the Hon Brendon Grylls MLA, *Report into the future commercial viability of the Muresk Institute*, February 2010, p. 58; Professor Denise Bradley, *Review of Australian Higher Education – Final Report*, December 2008, p. 111.

vocationally orientated VET providers remain viable. The Principal of Marcus Oldham College – a private regional provider of agribusiness education that continues to maintain viable cohorts of students – posited to the committee that its success is:

Because we have been independent, we have been managed solely by [our] board. We have not been influenced necessarily by outside bodies that have said that we should be offering these sorts of courses or these sorts of programs, so I think there has been real strength in governance.<sup>151</sup>

3.112 The example of Marcus Oldham College highlights that regional campuses providing agricultural and agribusiness education and training still have the potential to remain economically viable. A key difference between the example of Marcus Oldham College and those universities that no longer offer agribusiness is that the decision to offer agribusiness courses is based on more than fiscal interests alone.

### *Committee View*

3.113 The committee is of the view that tertiary agricultural colleges are an important element in the agricultural education framework that fill an important void between research-focused universities and vocation-focused VET providers. In regions where there are no longer any tertiary agricultural colleges additional efforts need to be made to strengthen the arrangements to facilitate VET students and workers with considerable industry experience accessing higher education.

### **Recommendation 7**

**3.114 The committee recommends that the government commissions a study inquiring into the most appropriate higher education framework to support high-level, practically-focused agribusiness education with a view to implementing the national food plan. The review should consider governance and funding arrangements (recognising the significant costs of delivering agricultural and farm studies), the effectiveness of regional campuses, needs of industry and students, and pathways between VET and higher education.**

### **University staff**

3.115 A corollary of the decline in the number of agricultural and agribusiness education providers is the impact it has on the number of instructors and researchers available for agricultural education. Two seemingly contradictory trends coexist in Australian higher education institutions teaching agriculture and agribusiness: a shortage of qualified academics and teachers, and staff cuts that discourage students from pursuing academic careers.

3.116 Universities are facing a skills shortage of their own when it comes to finding adequate staff to teach agricultural courses and undertake research. The University of Western Australia reported that:

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151 Dr Simon Livingstone, Marcus Oldham College, *Committee Hansard*, 1 February 2012, p. 47.

We advertised for a professor of entomology and we had to advertise for almost two years. Finally we got one from the United States. So, for a lot of our highly talented scientists and teachers, we have to depend on overseas.<sup>152</sup>

3.117 At the same time as universities are struggling to fill available positions, La Trobe University's submission reports a steady decline of agricultural staff at that university.<sup>153</sup> The committee heard of the impacts on staff caused by declining students enrolments:

It has been a sad story of decline and constraint. It almost followed the student numbers down. They fell and then our staff numbers were cut by almost 50 per cent, and then we just had to pick up the pieces and survive. So it has been difficult. As you lose students you lose funding and as you lose funding you lose resources. As you lose resources you lose the technicians, tutors and secretaries.<sup>154</sup>

3.118 As the number of staff decline as faculties downsize to meet their budgetary constraints, additional administrative and teaching loads put pressure on the remaining staff and limit their ability to undertake research. Prospective teachers and researchers are also presented with an image of high-workloads and an uncertain medium-term future.

3.119 In order for graduates in the agricultural sector to gain the necessary skills to meet the changing needs of their professions, there needs to be sufficient numbers of teachers and researchers to support them. Training an agricultural researcher or teaching professional is extremely time intensive. As explained by GPA:

The plant pathologist or entomologist or plant breeder does not pick it up in six months and change in two years; these people hone their skills over 30 or 40 years, you get the best value out of them after 20 years and then you spend the next 10 years trying to train the next guy through so that you don't step back.<sup>155</sup>

## Research

3.120 Research in agriculture is important to ensure that Australia continues to improve productivity, adapts effectively to changes in the natural environment, and adequately manages risks such as pests and disease. This section will explore issues in agricultural research with a focus on attracting talent and ensuring that agriculture is well-placed to make the most of research findings.

3.121 Agricultural research is increasingly multidisciplinary and requires the collaboration of chemists, physicists, computer scientists, mathematicians and

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152 Professor Kadambot Siddique, Faculty of Natural and Agricultural Sciences, the University of Western Australia, *Committee Hansard*, 26 March 2012, p. 57.

153 La Trobe University, *Submission 50*, p. 4.

154 Dr Peter Sale, Department of Agricultural Sciences, La Trobe University, *Committee Hansard*, 26 March 2012, p. 68.

155 Mr Pete Mailler, Grain Producers Australia, *Committee Hansard*, 1 February 2012, p. 26.

engineers among others.<sup>156</sup> Although individual institutions will develop their own models, the future of agricultural research will be ensured through the development of greater ties between institutions and academic disciplines. This will ensure not only greater efficiencies in the use of infrastructure, but the spread of new ideas and expertise.

### *Attracting Academic Talent*

3.122 Chapter two highlighted the numerous skills shortages in the agriculture and agribusiness sector. Agricultural research is another branch of the profession that is at risk of suffering a shortage of appropriately qualified personnel. It was reported to the committee by ACDA that the agricultural research workforce is skewed towards older demographics with an estimated 50 per cent of researchers over 50 years of age.<sup>157</sup> By one estimate, half of all agricultural researchers will retire by 2018.<sup>158</sup> It was reported to the committee that there is an insufficient number of appropriately skilled researchers being trained to replace the current generation of researchers.<sup>159</sup> Over the period of 1999–2010 only around 20 per cent of agriculture graduates were in further study one year after graduation (compared to over 40 per cent for graduates of the humanities).<sup>160</sup> La Trobe University pointed out that it had not had a single agriculture graduate directly enrol in a PhD program in the last five years.<sup>161</sup> Although postgraduate courses in agriculture have been successful in attracting international students, there is limited growth from local students.<sup>162</sup>

3.123 A number of factors conspire to make a career in agricultural research less appealing than it once was. It was reported to the committee that a research employment pathway no longer provides the strong career path that it once did.<sup>163</sup> Most researchers subsist on short-term contracts (around three years) and need to frequently secure new funding to continue their research. As well as the professional challenges posed by this uncertainty, it also means that researchers often cannot access personal finance products like home loans that require proof of ongoing employment.<sup>164</sup> The continued decline in government research and development funding does not send an encouraging signal to students considering a research career.<sup>165</sup>

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156 Murdoch University, *Submission 25*, p. [4].

157 Australian Council of Deans of Agriculture, *Submission 36*, p. [3].

158 Mr Arthur Blewitt, AgriFood Skills Australia, *Committee Hansard*, 1 February 2012, p. 1.

159 Grains Research and Development Corporation, *Submission 43*, p. 3.

160 University of Adelaide, *Submission 22*, p. [4].

161 La Trobe University, *Submission 50*, p. 5; cf Professor Richard Roush, School of Land and Environment, University of Melbourne, *Committee Hansard*, 15 May 2012, p. 22.

162 The University of Western Australia, *Submission 16*, pp 2–3.

163 University of Tasmania, *Submission 21*, p. 1.

164 Australian Council of Deans of Agriculture, *Submission 36*, p. [3].

165 Ms Barbara Grey, *Submission 61*, p. [3].

3.124 Given the increasing number of post-graduate research students from overseas, it was put to the committee that more thought needs to be given on how to retain Australian-trained talent.<sup>166</sup> If, as currently suspected, most international post-graduate students return to their home countries, they are contributing their education and talents to the benefit of Australia's competitors. Encouraging those students to remain in Australia is one possible way of increasing the research talent pool and ensuring Australia maintains the research workforce it requires.

3.125 Climate change, corporatisation and technological innovation, among other developments, require the agricultural industries to be adaptable. The consequences of the skills shortage in trained researchers are felt across industry. It was put to the committee that one of the greatest impacts of a decline in agricultural researchers is in the ability of industry to adapt to changes quickly and efficiently. A declining number of agriculture graduates and education institutes has reduced the diversity of skills and knowledge at a time when agriculture is rapidly diversifying its outputs and processes.<sup>167</sup> At least one major research body argued that there was a direct link between decline in productivity growth and declining funding research.<sup>168</sup> The limited number of trained researchers also limits the ability of industry to undertake industry-funded research.<sup>169</sup>

### ***Extension Services***

3.126 A recurrent theme throughout the inquiry was the impact of the decline of 'Extension' on agricultural practice. Extension refers to the practice of researchers presenting their findings to businesses and operators currently working in the field. Extension can include a variety of topics from new crop varieties to pasture improvement, livestock management, plant and animal disease control, sales and marketing.

3.127 The steady decline in funding for extension services was reported to the committee as having an enduring impact on the effectiveness of research and agricultural practices generally. With a limited extension network, research findings take significantly more time to reach and influence industry practices and provide productivity improvements.<sup>170</sup> The Birchip Cropping Group described the decline of extension as 'probably the largest skill gap in our current situation and likely to get significantly worse over the next 10 years.'<sup>171</sup> It is estimated that at the present time Cooperative Research Centres – a Commonwealth Government initiative that supports end user driven research collaborations – have around \$100 million worth of research outcomes that have not been distributed to industry due to a lack of dissemination

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166 University of Tasmania, *Submission 21*, p. 1.

167 Marcus Oldham College, *Submission 5*, attachment 1.

168 Grains Research and Development Corporation, *Submission 43*, p. 2.

169 The University of Western Australia, *Submission 16*, p. 3.

170 Grains Research and Development Corporation, *Submission 43*, p. 2.

171 Birchip Cropping Group, *Submission 62*, p. [3].

services.<sup>172</sup> Echoing these sentiments, the University of Adelaide noted that: 'Extension of research is a critical factor in adoption of new findings and withdrawal of extension services has decreased the availability of independent advice.'<sup>173</sup>

3.128 Due to the ever decreasing amount of extension work undertaken by state Departments of Agriculture and Primary Industries, universities and other research bodies, industry is increasingly turning to consultants to provide advice on new practices and products.<sup>174</sup> It is estimated by the GRDC that around 60 per cent of grain growers in Australia have a private consultant or advisor, and in most cases they will have more than one as they seek very specialised expertise. It was argued that this move towards private sector involvement can increase the rate of uptake of new technologies and practices as they are advocated by trusted partners.<sup>175</sup> However, there are concerns that the decline of extension services is breaking the link between researchers and practitioners, and making it harder for smaller enterprises to compete.

3.129 The committee believes that extension services play a important role in both improving productivity and also creating closer links between the farming industry and researchers and should be encouraged.

## **Recommendation 8**

**3.130 The committee recommends that the Australian Bureau of Agricultural and Resource Economics and Sciences undertakes an analysis of the decline of Extension services and the impact of this on the dissemination of research outcomes through productivity improvement to agriculture and agribusiness.**

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172 Mr Arthur Blewitt, AgriFood Skills Australia, *Committee Hansard*, 1 February 2012, p. 3.

173 University of Adelaide, *Submission 22*, p. [7].

174 Mr Wayne Cornish, Rural Skills Australia, *Committee Hansard*, 1 February 2012, p. 16.

175 Mr John Harvey, Grains Research and Development Corporation, *Committee Hansard*, 15 May 2012, p. 47.