Committee on Investment, Industry and Regional Development

LEGISLATIVE ASSEMBLY

Technology and the agriculture and mining sectors

Report 4/57 – November 2022

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The motto of the coat of arms for the state of New South Wales is “Orta recens quam pura nites”. It is written in Latin and means “newly risen, how brightly you shine”.

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Chair's foreword

I am pleased to present the report of the Committee on Investment, Industry and Regional Development's inquiry into technology and the agriculture and mining sectors. The Committee commenced this inquiry to examine opportunities that technology and innovation present the agriculture and mining sectors. The inquiry also examined what needs to be done to support and overcome barriers to the use and adoption of these technologies. The Committee has made eight findings and 11 recommendations aimed at addressing some of the issues raised during the inquiry.

Inquiry participants broadly agreed that technology will be critical to the future of the agriculture and mining sectors. The Committee found that the adoption of emerging technologies enhances the ongoing and future productivity of the agriculture and mining sectors and has the potential to assist industries adapt to, and manage complex, long term challenges such as climate change and biosecurity. We also found that technologies adopted in these sectors have improved work health and safety outcomes.

As new and emerging technologies are continually adopted in the agriculture and mining sectors, inquiry participants agreed that this will have transformative impacts on the local workforce and the communities in which these sectors operate. The Committee found that, as technologies continue to be adopted, regionally-based agriculture and mining industries have the potential to attract a diverse and skilled workforce to their local communities. This could drive economic and cultural development in regional NSW.

Inquiry participants highlighted a number of key challenges and barriers limiting the ability of primary producers, industries and regional communities from fully realising the potential benefits of emerging technologies. The Committee found that, while primary producers welcome technologies, there may be a reluctance to adopt new technologies due to a lack of confidence in private commercial technology providers and a lack of clarity about the tangible costs benefits of these technologies. We have made recommendations to facilitate the adoption of agriculture technologies by primary producers.

Workforce skills to meet the technological future of these sectors was another concern raised during the inquiry. The Committee found there is a low uptake of careers in the agriculture and mining sectors and made recommendations to the NSW Government to investigate programs promoting careers in agriculture and mining to students as well as continuing to invest in the uptake of broader STEM subjects.

The Committee also heard from stakeholders that skills shortages are a current issue for agriculture and mining industries and further found that, as technology evolves, there may be fewer opportunities in these industries that have been traditionally available for unskilled workers. Concerns were raised that existing education and training programs offered in NSW may not meet the future skills required by industry, particularly for digital technologies which may transform how these businesses operate. The Committee has recommended that the NSW Government consult with industry stakeholders to identify and address gaps in education and training programs, as well as to design short courses that will meet expected future skills needs.

Inquiry participants highlighted that existing regulatory approaches may limit technological adoption and drive up costs. We have made recommendations to the NSW Government to investigate opportunities for regulatory 'sandboxes', and to assist with the financial challenges for primary producers and the mining industry in adopting and using new technologies. The Committee has also recommended that the Government continually review existing regulations in light of emerging technologies.

Stakeholders consistently raised the issue of connectivity in regional NSW as a key priority throughout the inquiry. Inadequate or unreliable regional connectivity was found to be one of the biggest barriers to the adoption of technology. To address this the Committee has recommended that the NSW Government continue to engage with the Federal Government on the issue, and that it support expanding NSW Government programs for delivering regional connectivity.

On behalf of the Committee, I thank all those who contributed to this inquiry through making a submission, meeting with the Committee and appearing at the public hearing.

I also thank my fellow Committee members for their valuable contribution to this report and dedication to the work of the Committee. I also acknowledge the work of Mr Justin Clancy MP, the previous Committee Chair and former members of the Committee, Mr Peter Sidgreaves MP, the previous Deputy Chair, the Hon. Steph Cooke MP, and Mr Geoff Provest MP.

Finally, I would like to thank the Committee staff for their support and work throughout this inquiry.

As my first role as Chair of a Parliamentary Committee since being elected in February, 2022, I have very much appreciated the opportunity and along with finding it of great value, it's also proven a very enjoyable experience.

Nichole Overall MP
Chair

Findings and recommendations

Chapter One – Benefits of technology for the agriculture and mining sectors

Technology will increase output and ensure ongoing viability of industries

Finding 1

The Committee finds that the adoption of emerging technologies enhances the ongoing and future productivity of agriculture and mining in New South Wales.

1.1 This inquiry examined opportunities that technology presents for the agriculture and mining sectors. A key message from the inquiry is that the adoption of technology supports the viability and future productivity of agriculture and mining in New South Wales.

1.2 We heard that technology is important for meeting long-term agricultural goals. Charles Sturt University (CSU) referred to the 'Ag2030' target - a goal adopted by the Australian Government and the National Farmers' Federation (NFF) to boost the value of farm gate output to $100 billion by 2030.[1] CSU submitted:

> In adopting the target both the NFF and the Australian Government have recognised the importance of technological development, adoption and adaptation to sustainable, high-quality agricultural production and environmental management.[2]

1.3 The NSW Farmers' Association indicated they are driving the target for the New South Wales agricultural sector to reach $30 billion in farm gate productivity by 2030. According to research by the Australian Farm Institute, this growth is possible through the adoption of technology on farms.[3]

1.4 We also heard that the emergence of automation and drone technologies can increase agricultural production and profitability, not only through reduced labour costs, but from more efficient use of agricultural inputs such as pesticides and fertiliser.[4]

1.5 For example, the use of drone technology for spraying crops can lead to more precision than the traditional method of using a tractor. It can also reduce pesticide exposure to workers.[5]

1.6 Similarly, the NSW Government recognised that integrating current and emerging technology into agricultural businesses is important for the long-term prosperity and stability of Australia's agriculture industry. The NSW Government estimates a

[1] Submission 2, Charles Sturt University, p 4.

[2] Submission 2, Charles Sturt University, p 4.

[3] Ms Jenny Bradley, Chair, Innovation and Technology Group, NSW Farmers' Association, Transcript of evidence, 27 July 2022, p 28.

[4] Submission 9, NSW Government, p 9.

[5] Submission 9, NSW Government, p 10.

25 per cent increase in the gross value of production in New South Wales through the acceleration of technology in NSW agricultural businesses.[6]

1.7 Narrabri Shire Council submitted that they are reliant on agricultural success and that diversification and innovations are crucial to the region's future economic stability.[7]

1.8 We also heard that the adoption of technology in the mining sector is necessary to secure the future of the minerals industry. The Association of Mining and Exploration Companies (AMEC) submitted that the adoption of emerging technologies is necessary for identification of new mineral deposits and for mining deep or otherwise difficult to mine ore bodies.[8]

1.9 Importantly, both the agriculture and mining sectors have a history of supporting innovation to drive future productivity.[9]

Technology is important for addressing workplace safety and long-term challenges

Finding 2

The Committee finds that technology adopted in the agricultural and mining industries has resulted in improved work, health, and safety outcomes.

1.10 A significant opportunity that technology presents the agriculture and mining sectors is improved work, health, and safety outcomes.

1.11 In the *Future of Agricultural Technologies* report by the Australian Council of Learned Academies, it was noted that adoption of digital technologies and devices in agriculture is likely to transform the sector and affect the nature of farming. For example:

> … by performing the more dangerous tasks on farms and in forestry operations, digital technologies and devices (robotics) could improve workplace conditions, health and safety.[10]

1.12 In the mining sector, technology can lead to increased safety outcomes in hazardous environments. The NSW Minerals Council commented that in some environments automation is an effective way to limit risk to human life.[11]

[6] Submission 9, NSW Government, pp 4-5.

[7] Submission 5, Narrabri Shire Council, p 1.

[8] Submission 4, Association of Mining and Exploration Companies, p 2.

[9] Ms Bradley, Transcript of evidence, p 28; Submission 3, NSW Minerals Council, p 8.

[10] Lockie, S., Fairley-Grenot, K., Ankeny, RA., Botterill, LC., Howlett, BJ., McBratney, AB., Probyn, E., Sorrell, TC., Sukkarieh, S., Woodhead, I., (2020) The future of agricultural technologies. Report for the Australian Council of Learned Academies, p 60.

[11] Mr Andrew Abbey, Policy Director, NSW Minerals Council, Transcript of evidence, 27 July 2022, p 18.

1.13 The NSW Government also submitted that transitioning from diesel to electric vehicles on mining sites can minimise worker exposure to harmful diesel particulate matter.[12]

Case study: SmartHog Underground Inspection Vehicle - Newcrest Mining

In July 2022, we toured the gold and copper mine at Cadia, operated by Newcrest Mining. During the tour we saw examples of the impact of technology and innovation on the mining industry and, in particular, its workforce.

One such innovation is the SmartHog Underground Inspection Vehicle (SmartHog). Developed by members of the Newcrest Mining graduate scheme, the autonomous vehicle is one example of the move towards automation within the mining industry. The graduates constructed both electrical and mechanical systems, wrote computing code and were able to apply custom radar technology to control the vehicle. By using radar instead of LiDAR, the graduates were able to ensure the autonomous vehicles could continue mapping mines even with mud, dust or other mining debris, all of which usually force LiDAR to cease operating. In utilising innovative technologies, autonomous vehicles are now able to conduct tasks previously dangerous for workers.

Source: J Harris, Newcrest Cadia's SmartHog Underground Inspection Vehicle, ugminingtech.com, 22 June 2022, viewed 30 September 2022.

Finding 3

The Committee finds that new technologies have the potential to assist industries to adapt to, and manage complex, long term challenges such as climate change and biosecurity issues.

1.14 Technology has the potential to meet long term challenges such as climate change and biosecurity concerns. One issue discussed during the inquiry was drought resilience and the advances in research and development aimed at mitigating the impacts of drought.

1.15 We heard about the University of Newcastle's Collaborative Research Centre for High Performance Soils (Soil CRC). Established in 2017, the Soil CRC aims to provide farmers with tools to increase the performance of soils and to make better decisions on complex soil management issues.[13] Professor Alan Broadfoot referred to work using satellite monitoring of in-ground sensors to determine the optimal time to fertilise and water crops.[14]

1.16 We also heard from CSU about the Southern NSW Drought Resilience Adoption and Innovation Hub. One of eight Hubs established across Australia, the Southern

[12] Submission 9, NSW Government, p 12.

[13] Submission 11, University of Newcastle, p 4.

[14] Professor Alan Broadfoot, Executive Director, Newcastle Institute for Energy and Resources, University of Newcastle, Transcript of evidence, p 5.

NSW Innovation Hub is based at CSU's AgriPark and is focused on water management, food security and farming systems.[15]

1.17 The AgriPark at CSU brings together farmers, researchers and industry in a shared precinct that fosters collaboration and innovation. The AgriPark encompasses the:

- Global Digital Farm
- Agriculture, Water and Environment Institute
- Southern NSW Drought Hub
- AgriTech Incubator
- Extended Reality Centre
- Red Meat Innovation Centre
- Food and Beverage Manufacturing Innovation Centre

1.18 CSU submitted that by 2025 the AgriPark will expand to be able to meet demand for over 200 staff and 30 organisations.[16]

1.19 Similarly, Narrabri Shire Council highlighted the importance of research facilities in the Narrabri area, such as the University of Sydney's Plant Breeding Institute, which has progressed the creation of drought resistant cropping and other climate resistant varieties.[17]

1.20 Technology can also assist in mitigating risks to biosecurity. The NSW Government submitted that artificial intelligence, machine learning, satellites, and autonomous vehicles will be critical in environmental monitoring and pest control.[18]

1.21 We also heard that biosecurity could largely become a by-product of technology and systems working together. Mr Johnathon Medway, Senior Research Fellow in Spatial Agriculture at CSU's Gulbali Institute, commented:

> …if you have systems in place that boost productivity and efficiency, compliance and biosecurity becomes a by-product of how some of those things come together. The use of online GIS systems and being able to automatically share data makes a lot of that biosecurity a lot easier.[19]

[15] Submission 2, Charles Sturt University, p 9.

[16] Submission 2, Charles Sturt University, pp 7-8.

[17] Submission 5, Narrabri Shire Council, p 1.

[18] Submission 9, NSW Government, p 6.

[19] Mr Jonathan Medway, Senior Research Fellow, Spatial Agriculture, Gulbali Institute, Charles Sturt University, Transcript of evidence, 27 July 2022, p 14.

Technology can assist in attracting a diverse and skilled workforce to regional communities, boosting regional economies and driving development

Finding 4

The Committee finds that, as technologies continue to be adopted, agriculture and mining industries located in the regions have the potential to attract a diverse and skilled workforce to these communities. This has the potential to drive economic and cultural development in these regions.

1.22 Many inquiry participants commented on the importance of agriculture and mining to the economic development of regional New South Wales. The use of technology can enhance this economic development by attracting a diverse and skilled workforce to the regions.

1.23 Narrabri Shire Council submitted that the mining and agriculture sectors currently employ a third of Narrabri Shire's working population. The adoption of new technologies will bring new job opportunities which 'may promote domestic migration to the Shire boosting both economic and social progression.'[20]

1.24 The NSW Farmers' Association also submitted that as the adoption of technology becomes more widespread, the need for a skilled workforce will bring growth opportunities to the regions.[21]

1.25 This was also the view of the NSW Minerals Council. While the adoption of technology can present challenges, it can also bring opportunities, including a workforce with new transferable skills living in the regions, and new education programs in regional areas that are more aligned with emerging skill requirements.[22]

1.26 The Committee considers that, while there will be opportunities for an increasingly skilled workforce in agriculture and mining, there is the potential for a decrease in employment opportunities for unskilled workers.

[20] Submission 5, Narrabri Shire Council, p 3.

[21] Submission 10, NSW Farmers' Association, p 5.

[22] Mr Abbey, Transcript of evidence, pp 16-17.

Chapter Two – Challenges to the adoption and use of technology in agriculture and mining sectors

Lack of confidence in technology providers

Finding 5

The Committee finds that, while primary producers welcome technology, there is also a reluctance to adopt technology because of a lack of confidence in private commercial technology providers, and a lack of clarity about tangible cost benefits of agriculture technologies.

2.1 While the value of new and emerging technologies as outlined in chapter one was recognised by stakeholders, there remain barriers to adopting these technologies, related to confidence and understanding.

2.2 Ms Irma Dupuis, PhD Candidate at the University of Newcastle, submitted that 'trust is an important technology acceptance factor'.[23] She noted that new technologies do not tend to attract consumer trust, and that past studies have found trust was the main determining factor for use of blockchain applications.[24]

2.3 Concerns relating to trust were also raised in the context of agriculture technology. Mr Jonathon Medway, Senior Research Fellow at CSU, told us that there was significant lack of trust in agriculture technology, citing a 2017 report found 56 per cent of primary producers do not trust 'agtech'.[25]

2.4 This issue of confidence is further complicated by the difficulty of communicating the value of agriculture technologies. We heard from the NSW Government that economic benefit is the main driver of adoption for agriculture technologies. The Government noted that primary producers require 'evidence and strong, clear pathways towards profitability and sustainability outcomes'.[26]

2.5 Dr Jason Crean, Director of Climate in the NSW Department of Primary Industries (DPI), told us that technology adoption is a multifaceted and complex problem. He highlighted that people usually do not adopt technologies when the relative advantage of that technology is unclear. There can be various factors to that question of advantage, like profitability, riskiness, being able to trial it, and the skills needed to use it.[27]

[23] Submission 6, Ms Irma Dupuis, p 9.

[24] Submission 6, Ms Irma Dupuis, pp 2, 10.

[25] Mr Medway, Transcript of evidence, p 9.

[26] Submission 9, NSW Government, p 15.

[27] Dr Jason Crean, Director Climate, NSW Department of Primary Industries, Department of Regional NSW, Transcript of evidence, 27 July 2022, p 39.

2.6 The NSW Government noted that it takes long timeframes to develop, use and adapt agriculture technologies. The Government submitted that:

> One reason for slow rates of adoption is that the true impact is not always easily or quickly identified. Very often, adoption is a slow process even where there is a clear value proposition, and no one technology or innovation will be applicable to all farming systems or individual businesses. [28]

2.7 We also heard that the volume of agriculture technologies marketed to primary producers has resulted in 'adoption fatigue', overwhelming farmers with unclear choices and leading to more risk aversion due to past failures.[29]

2.8 Representatives from CSU raised the issue of communicating the value of technologies in an integrated system. Professor Michael Friend, Pro Vice Chancellor (Research and Innovation) at CSU, told us that many agriculture technologies 'in isolation, don't necessarily stack up, but when you put them together they can make a really strong value proposition'.[30]

Recommendation 1

The Committee recommends that the NSW Government prioritise research initiatives in the agriculture and mining technology sectors that are co-designed with primary producers and industry stakeholders, and supports the commercialisation of the outcomes from the research and development.

2.9 We heard that more consultation during the research and development (R&D) stage could improve the adoption of technologies. We recommend that the NSW Government prioritise research initiatives in agriculture and mining technologies that are co-designed with primary producers and industry stakeholders. These initiatives should also support the commercialisation of the outcomes from the research and development.

2.10 The NSW Government recognised that developing and implementing new agriculture technologies requires a 'whole of supply chain and whole farm business approach', including an understanding of the current context of commercial farming businesses.[31] This was echoed by Ms Annabel Johnson, Head of Policy and Advocacy at NSW Farmers' Association, who suggested technology developers need to better understand the issues both on and off the farm, from the start of the R&D stage.[32]

2.11 The NSW Farmers' Association emphasised the importance of meaningful engagement with primary producers to ensure agriculture technologies are 'fit for use'. They suggested that collaboration with farmers by agriculture technology developers 'in the early stages of development' could add value for

[28] Submission 9, NSW Government, p 14.

[29] Submission 9, NSW Government, p 15; Professor Michael Friend, Pro Vice Chancellor (Research and Innovation), Charles Sturt University, and Mr Medway, Transcript of evidence, 27 July 2022, p 12.

[30] Professor Friend, Transcript of evidence, p 12.

[31] Submission 9, NSW Government, p 14.

[32] Ms Annabel Johnson, Head of Policy and Advocacy, NSW Farmers' Association, Transcript of evidence, 27 July 2022, pp 29, 32.

farmers and promote the adoption of the technologies by the market. However, we heard from the Association that primary producers are often unaware of opportunities to engage with developers or they lack the time needed to take on this additional work.[33]

2.12 Witnesses from the NSW Farmers' Association emphasised the value primary producers placed on 'independent research', as opposed to information provided by private agriculture technology developers. Ms Jenny Bradley, Chair of the Innovation and Technology Group at the Association, told us that her and other farmers believe 'independent research' provides the best information about new agriculture technologies to help make management decisions.[34]

2.13 CSU submitted that universities play an important role in promoting the uptake of new agriculture technologies by industry and producers.[35] Professor Friend and Mr Medway from CSU stated that universities are a trusted independent intermediary to assess the quality of new technologies being marketed.[36]

2.14 In its submission, the NSW Farmers' Association called on the Government to increase its focus on 'industry specific R&D projects through government or university programs'.[37] We heard about a number of research initiatives by CSU and University of Newcastle (UON) that incorporate collaboration/partnerships with industry and primary producers. These initiatives demonstrate the benefit of stakeholder engagement throughout R&D to ensure outcomes are industry supported.[38]

2.15 Professor Alan Broadfoot, Executive Director of UON's Newcastle Institute Energy and Resources (NIER), emphasised the value of NIER's research workshops, which allow large-scale demonstrations of emerging mining technologies and innovations. He noted that there were limited opportunities for developers to demonstrate the commercial value of technologies and told us that UON has been able to scale these technologies to independently verify questions around application.[39] The NSW Farmers' Association also recognised that, while the onus to consult primary producers should fall on technology developers, developers may not have the resources to do so.[40]

2.16 The NSW Government highlighted numerous government programs and initiatives to support industry adoption of new technologies. These include government funded or led research initiatives in the agriculture and mining technology sectors.[41] We support prioritisation of government support for those

[33] Submission 10, NSW Farmers' Association, p 7.

[34] Ms Bradley and Ms Johnson, Transcript of evidence, p 34.

[35] Submission 2, Charles Sturt University, p 4.

[36] Professor Friend and Mr Medway, Transcript of evidence, 27 July 2022, p 12.

[37] Submission 10, NSW Farmers' Association, p 10.

[38] Submission 11, University of Newcastle, pp 1, 25; Professor Broadfoot, Transcript of evidence, p 3; Professor Friend, and Ms Samantha Beresford, Acting Strategic Advisor Government Relations and Regional Engagement, Charles Sturt University, Transcript of evidence, 27 July 2022, p 10.

[39] Professor Broadfoot, Transcript of evidence, p 6.

[40] Submission 10, NSW Farmers' Association, p 7.

[41] Submission 9, NSW Government, pp 17-21.

research initiatives that are co-designed by industry and primary producers and better support commercialisation of R&D outcomes.

Recommendation 2

The Committee recommends that the NSW Government review the existing regulations applying to data collected by agriculture and mining technologies, to clarify issues of ownership and use.

2.17 Concerns were raised in this inquiry about data collection by agriculture and mining technologies. We recommend that the NSW Government review existing regulations applicable to data collected by these technologies to clarify issues of ownership and use.

2.18 We heard that concerns about data security and ownership will only grow as technology transforms agriculture and mining. The NSW Farmers' Association noted that concerns about data collection, storage, ownership, privacy and quality will only grow as farmers continue to integrate different systems and technologies into their work.[42] Ms Bradley told us that farmers want more certainty about how service providers will collect, store, and use the data collected by agriculture technologies on farms.[43] Primary producers want access to and control over their on-farm data.[44]

2.19 We heard that, as a result of these concerns about the use of collected data, farmers may not trust these technologies. For some farmers, this is because they are not exposed to them. For farmers who do understand the technology, they may want assurances that their data will not be sold or value-added.[45]

2.20 CSU noted that a growing emphasis on intellectual property and the value of data can complicate the relationship between technology developers, industry, and primary producers. These tensions could create a barrier to innovation and technology adoption.[46] Mr Medway described how data concerns can prevent farmers from realising the value of monitoring and sensor technologies:

> … a lot of that data is still sitting on the harvesters because farmers don't know what to do with it. At the moment, their only access to understanding it is going to someone who's trying to sell them fertiliser as well. So their adviser could be completely legitimate and not be trying to just sell product, but there's a perception that they might be. [47]

2.21 Dr Crean also echoed this challenge. He told us that, for farmers, the issue is not collecting relevant data. Rather, the issue is being able to use that data, by having the systems in place to use this data to support decision-making.[48]

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[42] Submission 10, NSW Farmers' Association, p 8.

[43] Ms Bradley, Transcript of evidence, p 28.

[44] Ms Kathy Rankin, Policy Director – Rural Affairs & Business Economics & Trade, Transcript of evidence, 27 July 2022, p 29.

[45] Ms Bradley, Transcript of evidence, p 29.

[46] Submission 2, Charles Sturt University, p 5.

[47] Mr Medway, Transcript of evidence, 27 July 2022, p 12.

[48] Dr Crean, Transcript of evidence, pp 40-41.

2.22 We heard support for the *Australian Farm Data Code* by the National Farmers' Federation.[49] The code is intended to ensure best practice for the collection, use, and sharing of data collected on farms, by setting out overarching principles for farm data.[50]

2.23 Some inquiry participants noted existing regulatory framework around data management and security is not keeping up with technological development. Ms Bradley told us that there is no regulation for on-farm data specifically, and that regulation of on-farm data would give farmers certainty and clarity around the use of that data.[51] Similarly, Ms Dupuis submitted that, in the context of blockchain technologies, government regulations safeguarding the authenticity and integrity of information is important to consumer acceptance and trust.[52]

2.24 We acknowledge that the state's data regulatory framework has not kept up with the advance of big data and sensor technologies, and there are regulatory gaps around data collected by agriculture and mining technologies. We consider a review of these regulations could identify opportunities to clarify issues of data ownership and use.

Workforce capability and shortages

Finding 6

The Committee finds that there is a low uptake of careers in the agriculture and mining sectors.

Recommendation 3

The Committee recommends that the NSW Government investigate programs that promote careers in agriculture and mining, with a focus on primary and secondary school students.

2.25 A common theme throughout this inquiry was the challenge of building the future agriculture and mining workforce, given the low uptake of careers in these sectors.

2.26 We heard that our agricultural workforce is ageing and less people are seeking careers in agriculture, despite the growing demand for workers.[53] Inquiry participants told us that the mining industry is similarly grappling with access to labour and, as a consequence, is facing critical skills shortages.[54]

2.27 These challenges will only get more acute as technology transforms the capabilities needed from future workers in agriculture and mining. Many stakeholders recognised that increasing adoption of new and emerging technologies in agriculture and mining will diversify and expand the skills

[49] Mr Medway, Transcript of evidence, p 9; Ms Bradley and Ms Rankin, Transcript of evidence, pp 28-29.
[50] National Farmers' Federation, *Farm Data Code*, 1st edn, February 2020, pp 2-4, viewed 26 September 2022.
[51] Ms Bradley, Transcript of evidence, p 28.
[52] Submission 6, Ms Irma Dupuis, p 10.
[53] Submission 9, NSW Government, p 21; Submission 10, NSW Farmers' Association, p 11
[54] Submission 3, NSW Minerals Council, p 13; Mr Abbey, Transcript of evidence, p 16, 18-19.

required from workers in these sectors.[55] Mr Andrew Abbey, Policy Director at NSW Minerals Council, noted that increased technological adoption across all industries, including agriculture and mining, will also increase the competition for skilled labour.[56]

2.28 CSU referred to its submission to the consultation on the National Agricultural Workforce Strategy (NAWS), which highlighted that the sector faces low interest in agriculture careers.[57] That submission to the NAWS highlighted a serious difference between the number of graduates and graduate jobs in agriculture. It noted past analysis that 4000 students enrol in the undergraduate agricultural programs, but only 850 graduate annually despite over 3000 graduate jobs being advertised each year.[58] Professor Friend told us that, while CSU is seeing increased interest in agriculture, the disconnect between demand and supply of agriculture graduates persists.[59]

2.29 Similarly, we heard from Mr Abbey that volume of staff is an issue across the mining industry in Australia, and that university enrolments have significantly declined over the last decade or so. He told us that the NSW Minerals Council and other industry representative bodies across Australia are actively running education programs to promote interest in future mining careers.[60]

2.30 A number of inquiry participants suggested that promoting skilled careers in agriculture or mining through schools can help build this future workforce. As an example of this, Mr Abbey highlighted the NSW Minerals Council's career promotion initiatives that target secondary school students.[61] He told us that it is a challenge to attract young people to the mining industry and doing this requires a range of measures, including investing in education.[62]

2.31 Mr Medway noted that exposing students from a young age to agriculture technologies can instil an interest in the industry based on the innovative work that is currently taking place.[63] He and Professor Friend agreed that teachers are important for engaging students with agriculture and encouraging them into science, technology, engineering and mathematics (STEM) pathways throughout secondary and tertiary education.[64]

2.32 In its submission, the NSW Government highlighted the Regional NSW Youth Framework. They submitted that the Framework includes initiatives aimed at

[55] Submission 9, NSW Government, pp 21-22; Submission 5, Narrabri Shire Council, p 3; Submission 10, NSW Farmers' Association, pp 4, 11-12; Submission 2, Charles Sturt University, p 4; Submission 3, NSW Minerals Council, pp 9, 13; Ms Lucy McClean, Director – New South Wales, Victoria & Tasmania, Association of Mining and Exploration Companies (AMEC), Transcript of evidence, 27 July 2022, p 24.

[56] Mr Abbey, Transcript of evidence, p 16.

[57] Submission 2, Charles Sturt University, p 5.

[58] Charles Sturt University, *Submission to the National Agricultural Workforce Strategy Discussion Paper*, June 2020, p 5, viewed 26 September 2022.

[59] Professor Friend, Transcript of evidence, p 9.

[60] Mr Abbey, Transcript of evidence, pp 17-19.

[61] Mr Abbey, Transcript of evidence, p 20.

[62] Mr Abbey, Transcript of evidence, p 19.

[63] Mr Medway, Transcript of evidence, pp 10, 11.

[64] Professor Friend and Mr Medway, Transcript of evidence, p 10.

connecting local businesses with tertiary and late-secondary education 'to help young people build skills in technologies and the mining and agri-business sectors'.[65]

2.33 While we are pleased by the Government's commitment to supporting young people in regional areas to be 'work ready', we note that the Framework does not set out targeted programs promoting agriculture and mining careers.[66] We recommend that the NSW Government investigate programs that promote careers in agriculture and mining, with a focus on primary and secondary school students.

Recommendation 4

The Committee recommends that the NSW Government continues to invest in programs to promote the uptake of a broader range of STEM subjects in schools, and that it supports schools in the delivery of these subjects.

2.34 During the inquiry, stakeholders emphasised the importance of building STEM skills in our future workforce, particularly in the agriculture and mining sectors. We recommend that the NSW Government continues to invest in programs to promote the uptake of a broader range of STEM subjects in schools, and supports schools to deliver these subjects.

2.35 We discussed earlier how the adoption of new and innovative technologies will change and expand the skills required from future workers in the agriculture and mining sectors. A number of stakeholders said that STEM skills will be critical for the future workforce as digital technologies are more widely adopted. Industry demand for STEM skills will continue to increase in time across all sectors, not just mining and agriculture.[67]

2.36 Many inquiry participants emphasised the importance of a targeted focus on increasing uptake of STEM based courses and subjects in the present, in order to meet this future demand.[68] Professor Friend emphasised that strategies to promote uptake of STEM subjects should start early on in schooling. He noted existing strategies that focus on increasing interest and engagement in early secondary school students, and said that:

> We could actually provide some really tangible opportunities at that level about the application of the STEM technologies in high schools as it applies to agriculture, so you really sow that seed early on that agriculture is a high-tech industry that is going places and has a very strong career path. Governments, in particular, and Department of Education can really push that agenda. [69]

[65] Submission 9, NSW Government, p 21.

[66] NSW Government, *Regional NSW Youth Framework: Empowering youth in regional NSW*, 2020, viewed 26 September 2022.

[67] Submission 3, NSW Minerals Council, p 13; Submission 9, NSW Government, p 21.

[68] Submission 3, NSW Minerals Council, p 7; Submission 9, NSW Government, p 21; Professor Friend, Transcript of evidence, p 9; Mr Abbey, Transcript of evidence, p 17.

[69] Professor Friend, Transcript of evidence, p 9.

2.37 UON submitted that establishing targeted STEM programs in schools could contribute to promoting greater participation across the mining sector.[70] Professor Broadfoot noted the example of a targeted program run by UON, the 'HunterWISE' (Women in Science and Engineering) program, which involves female academics and PhD students speaking to Year 10 students about career paths in science and engineering. He told us that, as a result of the HunterWISE program, the majority of chemistry students at Muswellbrook High School were girls engaging in the course for the first time. This outcome demonstrates the value of these targeted school programs.[71]

2.38 We heard from Ms Lorimer-Ward, Deputy Director-General, Agriculture at DPI, that the Department has a number of initiatives to encourage greater uptake of STEM subjects and courses. She told us that DPI has a dedicated schools program which provides agricultural education resources to deliver STEM education through an agriculture lens. The Department also has a registered training organisation, Tocal College, which takes in students from 16 years of age to learn digital agriculture skills in a vocational education and training (VET) setting.[72] Professor Hugh Durrant-Whyte, NSW Chief Scientist and Engineer, also noted that the Office of the Chief Scientist and Engineer also runs a number of regionally focused STEM programs in schools.[73]

2.39 We are encouraged by the Government's support for targeted programs that promote STEM education in schools. Technology adoption in the agriculture and mining industries will continue to transform these sectors in unexpected ways. This may be best supported by building broader STEM capacity in the next generation of workers.

Finding 7

As technology evolves, there may be fewer opportunities in agriculture and mining for unskilled workers, who have traditionally been at the core of these industries. Future workers will need education, training and technologically complimentary skills.

Recommendation 5

The Committee recommends that the NSW Government consult with industry stakeholders to identify existing gaps in education and training, including vocational education training, and to develop programs that will meet future skill needs and upskill current workers to transition to the future workforce.

2.40 As new technologies are adopted across agriculture and mining sectors, we heard that the necessary skillsets required will change from those traditionally associated with those industries.[74]

[70] Submission 11, University of Newcastle, p 9.

[71] Professor Broadfoot, Transcript of evidence, p 7.

[72] Ms Kate Lorimer-Ward, Deputy Director General, Agriculture, NSW Department of Primary Industries, Department of Regional NSW, Transcript of evidence, 27 July 2022, p 37.

[73] Professor Hugh Durrant-Whyte, NSW Chief Scientist and Engineer, Transcript of evidence, 27 July 2022, p 38.

[74] Submission 10, NSW Farmers' Association, p 4; Submission 3, NSW Minerals Council, p 9.

2.41 However, Narrabri Shire Council submitted that a significant proportion of the current agricultural workforce are trade based or school leavers. They raised concerns that, where regional communities lack the education or courses for upskilling workers, local workers will not have the knowledge needed to use new agriculture technologies.[75]

2.42 We heard from Ms Johnson of the NSW Farmers' Association that planning needs to commence now in order to prepare agriculture businesses 'for what technology might be able to offer'.[76] Ms Kathy Rankin, Policy Director at the NSW Farmers' Association, told us that there needs to be a focus on building entry-level skills and upskilling for agriculture workers, particularly around financial and digital literacy, and business management.[77] Even if a new generation of primary producers brings increased digital literacy, additional training and upskilling will continue to be necessary for advancing data and technology uses.[78]

2.43 Similarly, Mr Abbey from the NSW Minerals Council told us that the technological transition of the mining sector will involve both building the necessary capabilities in new workers as well as upskilling existing workers. He emphasised that education programs, particularly in STEM, to upskill the local employment base is critical.[79]

2.44 The NSW Minerals Council emphasised the critical need for appropriate education and training programs in mining, which can flexibly respond to emerging technical and practical skill requirements. Investment in education should be across all levels of the education system including VET. This investment should also target higher participation in regional communities, particularly in STEM-related areas.[80]

2.45 Governments across Australia have also recognised the importance of delivering training, in order to build future workforce capability and upskill existing workers. We heard that the Australian Government's *National Agricultural Workforce Strategy and Roadmap* has a focus on upskilling and equipping the agricultural workforce, in preparation for the technological advancement of the industry.[81] The NSW Government highlighted its 'AgSkilled 2.0' program, which is investing in VET to upskill and better prepare the agricultural workforce as the industry is transformed by innovation and technology.[82]

2.46 We are encouraged by the NSW Government's investment in training and upskilling through the AgSkilled program. Technology will continue to diversify and expand the skillsets needed from workers in both agriculture and mining sectors, but these industries are already facing skills shortages. We recommend that the NSW Government consult with industry stakeholders to identify existing

[75] Submission 5, Narrabri Shire Council, p 2.
[76] Ms Johnson, Transcript of evidence, p 32.
[77] Ms Rankin, Transcript of evidence, p 32.
[78] Submission 10, NSW Farmers' Association, pp 7-8.
[79] Mr Abbey, Transcript of evidence, pp 16-18, 20.
[80] Submission 3, NSW Minerals Council, pp 9, 13.
[81] Submission 9, NSW Government, p 21.
[82] Submission 9, NSW Government, p 19.

gaps in education and training, including VET, and develop programs to meet future skill needs and upskill current workers for the future workforce.

Digital agriculture and mining skills

Recommendation 6

The Committee recommends that the NSW Government continues to consult with stakeholders to design practical and accessible short courses in digital agriculture and mining skills.

2.47 Digital technology will change how agriculture and mining industries operate. We heard that new digital skills and jobs will be required to support and service digital technological systems, as agriculture and mining sectors increasingly use digital technologies. This will impact traditional operating models in these sectors.[83]

2.48 A number of inquiry participants submitted that the adoption of digital technologies may reduce the demand for workers in more traditional operational areas of agriculture and mining. However, they also suggested that the need for new jobs to operate and service new technologies presents opportunities to upskill and transform the existing workforce.[84]

2.49 Stakeholders noted that digital technologies could have productivity, safety and land management benefits for agriculture and mining businesses.[85] However, CSU submitted that digital agriculture technologies are not in wide use, nor are they well understood. CSU added that the digital maturity of agriculture sectors has been described as 'ad hoc'.[86]

2.50 We heard that the level of training and digital literacy required is a barrier to adoption of digital agriculture technologies.[87] The NSW Farmers' Association called on dedicated government support for upskilling primary producers in relation to their digital literacy and digital agriculture skills.[88] They submitted that:

> Many producers do not have the adequate range of skills within their workforce to make the use of new technologies effective on farm. Although there are options to purchase the skills through service providers, this creates additional cost barriers for smaller operations. The training requirements for some technologies is also quite rigorous and time consuming for producers once they are in full operation. [89]

[83] Submission 9, NSW Government, p 22; Submission 10, NSW Farmers' Association, p 5; Mr Abbey, Transcript of evidence, p 17; Ms McClean, Transcript of evidence, p 25.

[84] Submission 9, NSW Government, p 22; Mr Abbey, Transcript of evidence, pp 17-18; Submission 5, Narrabri Shire Council, p 2.

[85] Submission 9, NSW Government, p 22; Submission 3, NSW Minerals Council, pp 8-9; Submission 5, Narrabri Shire Council, pp 2-3; Submission 2, Charles Sturt University, p 8.

[86] Submission 2, Charles Sturt University, p 8.

[87] Submission 2, Charles Sturt University, p 8.

[88] Submission 10, NSW Farmers' Association, pp 7, 10.

[89] Submission 10, NSW Farmers' Association, p 7.

2.51 We heard from CSU and UON about the growing interest from business to provide industry-aligned short training courses and micro-accreditation programs. These industry tailored/aligned training programs have received meaningful sector support as a means of upskilling existing workers, which is particularly important given existing skills shortages.[90] Professor Friend from CSU told us that demand will increase for tailored and other short courses in digital agriculture skills, in order to meet skill demands and to reskill the existing workforce.[91]

2.52 We are encouraged by the initiatives highlighted by the NSW Government in seeking to improve digital literacy and skills capability in agriculture, including a training and support program in conjunction with the Farms of the Future grants program.[92] We recommend that the NSW Government continues to consult with stakeholders to design practical and accessible short courses in digital agriculture and mining skills.

Regulatory and investment constraints

Recommendation 7

The Committee recommends that the NSW Government investigate 'sandbox' programs for trialling new technologies in agriculture and mining, while co-developing appropriate regulations with industry stakeholders.

Recommendation 8

The Committee recommends that the NSW Government continually review existing regulations in the agriculture and mining industries in light of emerging technologies.

2.53 One challenge to the successful adoption of technology in the agriculture and mining sectors is the development of appropriate regulations that foster innovation but also manage safety and other risk factors.

2.54 We heard that regulatory schemes are generally inflexible, thereby creating operational and technical hurdles for the timely and efficient introduction of new technologies.[93]

2.55 We also heard that regulatory frameworks are lagging behind private sector innovation.[94] Some examples of where regulation is trailing technological advances include the use of drones, remote sensor technology, and proximity detection technologies.[95]

[90] Submission 11, University of Newcastle, p 2; Professor Broadfoot, Transcript of evidence, pp 2-3; Professor Friend and Mr Medway, Transcript of evidence, p 11.

[91] Professor Friend, Transcript of evidence, p 11.

[92] Submission 9, NSW Government, p 17.

[93] Submission 3, NSW Minerals Council, p 11.

[94] Ms Bradley, Transcript of evidence, p 28.

[95] Submission 3, NSW Minerals Council, p 11; Submission 1, NSW Productivity Commission, pp 1-2.

2.56 Based on interactions with their stakeholders, CSU suggested that government needs to engage in better consultation with regional communities and end user stakeholders when introducing new regulations for agriculture technology.[96]

2.57 AMEC submitted that a key barrier to the take up and use of mining technologies and innovations is access to capital. This is due in part to the 'multiplicity of fees, charges and levies faced by explorers and operators based on cost recovery, such as administration levies and rental fees'.[97]

2.58 We also heard that large amounts of paperwork and the time taken to assess mineral projects contribute to the significant investment required for companies.[98]

2.59 The NSW Government noted in its submission that regulations are often perceived to be a barrier to technological innovation in the mining sector. They do not contain sufficient flexibility to enable the uptake of technology.[99]

2.60 To support the uptake of innovation and technology, the NSW Resources Regulator's Innovation Policy aims to support the development and use of new technologies by providing pathways to explore alternatives.[100] Mr Peter Day, Executive Director, Resources Regulator, commented:

> The Resources Regulator operates an Innovation Policy, where we can consider applications from industry—and we do quite regularly—around where we can apply an exemption process where innovation is used and new technology is put forward to us for consideration to work through and around the actual legislation or technical standards that may inhibit its uptake.[101]

2.61 In their submission, the NSW Productivity Commission highlighted three broad principles for regulating emerging technologies:

- Regulations should be outcomes-focused and technology-neutral (future-proof and maximising opportunities)
- Governments should be regularly scanning the horizon for new technologies and updating regulations
- Governments should implement regulatory trials and refining the rules based on these trials.[102]

2.62 The NSW Minerals Council also made suggestions about how the NSW Government could continue to pursue practical regulatory reforms. They proposed the use of the regulatory trial or 'regulatory sandbox' concept, which

[96] Submission 2, Charles Sturt University, p 2.

[97] Submission 4, Association of Mining and Exploration Companies, p 2.

[98] Ms Lucy McClean, Transcript of evidence, p 26.

[99] Submission 11, NSW Government, p 16.

[100] Submission 11, NSW Government, p 16.

[101] Mr Peter Day, Executive Director, Resources Regulator, Mining, Exploration and Geoscience, NSW Department of Regional NSW, Transcript of evidence, 27 July 2022, p 42.

[102] Submission 1, NSW Productivity Commission, p 2.

involves testing new technologies within a controlled environment, but not under the current regulatory settings. The NSW Minerals Council submitted that this concept:

> …would allow a more rapid pathway for the evaluation and development of new technologies with the endorsement of the appropriate regulatory authorities.[103]

2.63 Both the NSW Minerals Council and the AMEC acknowledged the importance of a regulatory framework for the mining industry. However, they also highlighted the need for government and industry to work together to ensure there is appropriate regulation.[104]

2.64 We acknowledge the challenges in developing the right regulatory framework for emerging technologies in the agriculture and mining sectors. We consider the use of regulatory trials of new technologies in consultation with industry, to be a useful tool which finds the right balance between keeping pace with innovation while ensuring any risks to safety and the community are considered.

2.65 We also acknowledge the NSW Resources Regulator's *Innovation Policy* and encourage the Government to continue to review existing regulations in light of emerging mining technologies.

Recommendation 9

The Committee recommends that the NSW Government investigate ways to assist with the financial challenges for primary producers and the mining industry in adopting and using new technologies.

2.66 Cost was identified as a barrier to the adoption of new technologies by primary producers.

2.67 We heard that even though the direct cost of technology has been decreasing, the complexity of technologies and the systems that support them have become more intensive to install. This exacerbates producers' concerns about the value of technology matching its price.[105]

2.68 The NSW Government acknowledged that, while economic benefit can be the biggest driver of technology adoption across the agriculture sector, technology can be an expensive investment. The availability of capital, and knowing the cost/benefit ratio of the investment are additional considerations for primary producers.[106]

2.69 We note the NSW Government's Farms of the Future program, which assists primary producers to adopt agriculture technologies. As part of the program, grants for farmers in the 11 target local government areas will be provided to

[103] Submission 3, NSW Minerals Council, p 12.

[104] Mr Abbey, Transcript of evidence, 27 July 2022, p 18.

[104] Submission 9, NSW Government, p 16; Ms McClean, Transcript of evidence, 27 July 2022, pp 26, 27.

[105] Submission 10, NSW Farmers' Association, p 8.

[106] Submission 9, NSW Government, p 15.

purchase approved digital agriculture devices. The grants will commence in 2023.[107]

2.70 We are encouraged by the NSW Government's assistance to primary producers through the Farms of the Future Program. Adopting and implementing technology can be an expensive investment, particularly for smaller producers. We recommend that the NSW Government continue to look at new ways to assist primary producers and the mining industry with the financial challenges of adopting technology.

Regional connectivity

Finding 8

The Committee finds that inadequate or unreliable regional connectivity is one of the biggest barriers to the adoption of technology.

2.71 A consistent theme we heard in this inquiry was the importance of reliable digital connectivity for technology adoption. The NSW Government recognised that connectivity infrastructure underpins the successful adoption and use of new technologies, such as any Internet of Things (IoT) system which is dependent on reliable internet access.[108]

2.72 Many inquiry participants acknowledged that poor or inconsistent digital connectivity is a persistent issue in regional and rural NSW. We heard that connectivity and telecommunications are increasingly essential services. Poor connectivity significantly limits the adoption and implementation of new technologies, and negatively impacts on the productivity and efficiency of agriculture businesses.[109]

2.73 The NSW Farmers' Association submitted that unreliable and intermittent digital connectivity is preventing primary producers from adopting new agriculture technologies. This is a serious issue, as agriculture businesses require greater access to more accurate monitoring and forecasting tools. These tools rely on existing connectivity infrastructure.[110]

2.74 At the public hearing, Ms Bradley from the NSW Farmers' Association emphasised that connectivity is the biggest barrier to primary producers adopting technologies on farms. She told us that farmers:

> … do embrace change. Nearly all farmers love new technology, new toys and ways to make use of them. It drives our businesses, but if we can't reach it or use it in a trusted way that it's not going to drop out, it makes that technology really difficult.[111]

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[107] NSW Department of Primary Industries, Farms of the Future Program, viewed 22 September 2022

[108] Submission 9, NSW Government, p 14.

[109] Submission 9, NSW Government, p 14; Submission 5, Narrabri Shire Council, pp 1-2; Submission 7, Gwydir Shire Council, p 1; Ms Bradley, Transcript of evidence, pp 28, 29-30; Submission 10, NSW Farmers' Association, pp 4, 6; Submission 8, Narromine Shire Council, p 2.

[110] Submission 10, NSW Farmers' Association, pp 6, 8.

[111] Ms Bradley, Transcript of evidence, p 34

2.75 This was echoed by community stakeholders who we met with during our site visits to Wagga Wagga and Orange. We consider that unreliable regional connectivity remains a major barrier to the adoption of new and emerging technologies.

Recommendation 10

The Committee recommends that the NSW Government continue to engage with the Federal Government on improving regional connectivity.

Recommendation 11

The Committee recommends that the NSW Government support expanded programs for delivering regional connectivity like the Farms of the Future program.

2.76 We heard calls for governments to prioritise improving connectivity across the productive agricultural areas of NSW.[112] A number of inquiry participants acknowledged that issues about connectivity and telecommunication infrastructure fall within the Federal Government's jurisdiction.[113]

2.77 However, Professor Friend from CSU told us that government support in this area is critical.[114] Ms Rankin emphasised the value of the NSW Farmers' Association's advocacy work at the federal level to improve regional connectivity. While she acknowledged that the association has not achieved all of its goals, she said:

> … one of the benefits of what we have been doing is that we have identified that there needs to be a greater engagement by the telecommunications companies with farmers, talking about what they are buying rather than just selling them a product so that the farmers actually understand what it is that they are able to do with the product.[115]

2.78 We acknowledge regional connectivity is a nationwide challenge for the Federal Government. However, we consider that all levels of government can promote further action in this area. We recommend that the NSW Government continue to engage with the Federal Government with the aim of improving regional connectivity.

2.79 The NSW Government recognised the importance of improving regional connectivity to improve regional productivity and growth and support technology-enabled primary industries. It highlighted the Department of Regional NSW's Regional Digital Connectivity program, which seeks to address mobile black spots and improve internet quality in remote, rural and regional NSW.[116]

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[112] Submission 5, Narrabri Shire Council, p 2; Submission 7, Gwydir Shire Council, p 1; Submission 10, NSW Farmers' Association, p 8

[113] Professor Friend and Ms Beresford, Transcript of evidence, pp 12-13; Ms Rankin, Transcript of evidence, p 31.

[114] Professor Friend, Transcript of evidence, p 12.

[115] Ms Rankin, Transcript of evidence, p 31

[116] Submission 9, NSW Government, pp 9, 14; Ms Lorimer-Ward and Dr Crean, Transcript of evidence, 27 July 2022, p 36; Answers to questions taken on notice, Department of Primary Industries, p 1.

2.80 Many stakeholders noted that significant progress has been made by the private sector to provide digital connectivity solutions in the agriculture and mining sectors.[117] Ms Samantha Beresford, Acting Strategic Advisor for Government Relations and Regional Engagement at CSU, noted there are opportunities for the NSW Government to incentivise or require companies to extend their private connectivity infrastructure to the regional communities in which they operate, and to nearby areas.[118]

2.81 While private regional connectivity solutions are available, we heard that primary producers may not always be able to access them.[119]

2.82 A key initiative to support access to regional connectivity solutions which was highlighted by the NSW Government's submission is the Farms of the Future program. As earlier noted, the program was expanded under the recent Future Ready Regions program to deliver on-farm connectivity solutions to participating farms in 11 target locations.[120]

2.83 The Government told us that it will construct and operate a Long-Range Wide Area Network in these target locations. These networks would enable telecommunications and complement existing connectivity services.[121] The program will also provide grants to assist farmers in the target local government areas to purchase approved connectivity solutions.[122]

2.84 The NSW Farmers' Association acknowledged the Government's support through the Farms of the Future program. They submitted that, for regional precincts outside of the 11 targeted locations, the Association has Digital Technology officers in place. These officers deliver targeted advisory services and information campaigns so that primary producers are more aware of their 'on-farm' technology options.[123]

2.85 We are encouraged by the NSW Government's support for primary producers to access regional connectivity solutions through the Farms of the Future program. Poor and unreliable digital connectivity is a persistent issue across NSW regional, rural and remote communities. It significantly limits the productivity of farming businesses who are not able to take up and use new technologies as a consequence. We recommend that the NSW Government supports expanded programs for delivering regional connectivity, like the Farms of the Future program.

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[117] Ms Bradley, Transcript of evidence, p 30; Mr Day and Professor Durrant-Whyte, Transcript of evidence, p 37; Submission 2, Charles Sturt University, p 9.

[118] Ms Beresford, Transcript of evidence, pp 13-14.

[119] Ms Jenny Bradley, Transcript of evidence, 27 July 2022, p 30.

[120] Submission 9, NSW Government, p 17; Submission 10, NSW Farmers' Association, p 9; Dr Crean, Transcript of evidence, p 36; Answers to questions taken on notice, Department of Primary Industries, p 1.

[121] Submission 9, NSW Government, p 17.

[122] NSW Department of Primary Industries, Farms of the Future Program, viewed 27 September 2022.

[123] Submission 10, NSW Farmers' Association, p 9.

Appendix One – Terms of reference

That the Committee on Investment, Industry and Regional Development inquire into and report on technology and the agriculture and mining sectors, with particular reference to:

a. opportunities for regional NSW presented by agricultural and mining technologies and innovations;

b. barriers to the take up and use of agricultural and mining technologies and innovations;

c. measures to support the use of agricultural and mining technologies and innovations;

d. the impact of technologies and innovations on the past, current and future agriculture and mining workforce; and

e. any other related matters

Appendix Two – Conduct of inquiry

Terms of reference
On 12 November 2021 the Committee resolved to conduct an inquiry into technology and the agriculture and mining sectors. The full terms of reference are at Appendix One.

Call for submissions
The Committee called for submissions and wrote to key stakeholders inviting them to make a submission. A media release was issued and information about the inquiry was posted on the Legislative Assembly's social media accounts. Submissions to the inquiry closed on 14 February 2022. A list of submissions is at Appendix Three and copies of submissions are available the inquiry webpage.

Briefing with the Australian Council of Learned Academies
On 10 June 2022, the Committee met with the following representatives from the Australian Council of Learned Academies (ACOLA)to discuss ACOLA's *The future of agricultural technologies* report:

- Professor Salah Sukkarieh
- Professor Barbara Howlett
- Mr Ryan Winn, Chief Executive Officer and Director, ACOLA

Site visits

1. **Visit to Wagga Wagga – 27 and 28 June 2022**
   In June 2022, Committee members, Mrs Nichole Overall (the Chair), Mr Gurmesh Singh (the Deputy Chair), Mr Clayton Barr, Mr David Harris and Ms Felicity Wilson travelled to Wagga Wagga and toured the Wagga Wagga campus of Charles Sturt University (CSU) and the site of manufacturer, Flipscreen.

   During the tour of CSU, the Committee visited the:

   - National Life Sciences Hub
   - Biomedical Sciences Building
   - Extended Reality Centre
   - Global Digital Farm, including tour of the Rhizolysimeter

   While at CSU, the Committee also participated in a roundtable luncheon with a number of industry, business, government and university representatives.

   The Committee concluded its site visit by touring the site of manufacturer, Flipscreen.

   The Committee thanks all the staff and students of CSU who assisted the Committee with its tour. The Committee also thanks all the participants in the roundtable luncheon for sharing their views. The Committee also thanks the staff of Flipscreen for their time and assistance with the Committee's visit.

2. **Visit to Orange – 13 and 14 July 2022**
   In July 2022, Committee members, Mrs Nichole Overall (Chair), Mr Gurmesh Singh (Deputy Chair), Mr Clayton Barr and Mr David Harris travelled to Orange and toured the

gold and copper mine at Cadia, operated by Newcrest Mining. During the tour, the Committee visited the:

- Ore Treatment area
- Site Assets Operation Centre
- Heavy Vehicle Workshop
- Remote Operations Centre, including SmartHog Underground Inspection Vehicle and electric vehicles
- Molybdenum Plant

The Committee thanks all staff of Newcrest Mining who assisted and met with the Committee during its visit.

Public hearing

The Committee held a public hearing at Parliament House on 27 July 2022. Members and witnesses attended either in person or remotely. A list of witnesses who appeared at the hearing is at Appendix Four. A transcript of evidence taken at the hearing is available via the inquiry webpage.

The Committee thanks all witnesses who participated in the Committee's hearing.

Appendix Three – Submissions

No.	Author
1	NSW Productivity Commission
2	Charles Sturt University
3	NSW Minerals Council
4	Association of Mining and Exploration Companies (AMEC)
5	Narrabri Shire Council
6	Ms Irma Dupuis
7	Gwydir Shire Council
8	Narromine Shire Council
9	NSW Government
10	NSW Farmers' Association
11	University of Newcastle

Appendix Four – Witnesses

Public Hearing, 27 July 2022
Jubilee Room, Parliament House.

Witness	Position and Organisation
Professor Alan Broadfoot	Executive Director, Newcastle Institute Energy and Resources, University of Newcastle
Ms Irma Dupuis	PhD Candidate, University of Newcastle
Professor Michael Friend	Pro Vice Chancellor (Research and Innovation), Charles Stuart University
Mr Jonathon Medway	Senior Research Fellow, Gulbali Institute – Spatial Agriculture, Charles Stuart University
Ms Samantha Beresford	Acting Strategic Advisor Government Relations and Regional Engagement
Mr Andrew Abbey	Policy Director, NSW Minerals Council
Ms Lucy McClean	Director, Association of Mining and Exploration Companies (AMEC)
Ms Annabel Johnson	Head of Policy and Advocacy, NSW Farmers' Association
Ms Kathy Rankin	Policy Director-Rural Affairs and Business Economics & Trade, NSW Farmers' Association
Ms Jenny Bradley	Chair, Innovation and Technology Group, NSW Farmers' Association
Professor Hugh Durrant-Whyte	NSW Chief Scientist and Engineer
Mr Peter Day	Executive Director Resources Regulator, Mining Exploration and Geoscience, Department of Regional NSW
Ms Kate Lorimer-Ward	Deputy Director General, Agriculture NSW Department of Primary Industries, Department of Regional NSW
Dr Jason Crean	Director Climate, NSW Department of Primary Industries, Department of Regional NSW

Appendix Five – Extracts from minutes

MINUTES OF MEETING No 22
10.02am, Friday 12 November 2021
Jubilee Room or via videoconference

Members present
Mr Justin Clancy (Chair), Mr Peter Sidgreaves (Deputy Chair), Mr Clayton Barr (by video conference), Ms Steph Cooke, Mr Philip Donato, Mr David Harris (by video conference), Mr Geoff Provest

Officers in attendance
Rohan Tyler, Emma Wood, Cheryl Samuels (by video conference), Anna Tran (by video conference), Mohini Mehta (by video conference)

1. **Apologies**
   Nil

2. **Confirmation of minutes**
   Resolved, on the motion of Mr Provest, seconded Mr Barr: That the minutes of the meeting of 13 September 2021 be confirmed.

3. **Inquiry – Inland Rail project and regional NSW**

   a) ***

4. **Potential new inquiry into technology and the agriculture and mining sectors**

   a) **Terms of reference**

      The Committee discussed the draft terms of reference.

      Resolved, on the motion of Mr Harris, seconded Mr Barr: That the Committee conduct an inquiry into technology and the agriculture and mining sectors, with particular reference to:

      a) opportunities for regional NSW presented by agricultural and mining technologies and innovations;
      b) barriers to the take up and use of agricultural and mining technologies and innovations;
      c) measures to support the use of agricultural and mining technologies and innovations;
      d) the impact of technologies and innovations on the past, current and future agriculture and mining workforce; and
      e) any other related matters.

   b) **Call for submissions**

The Committee discussed the draft stakeholder list.

Resolved, on the motion of Mr Barr, seconded Mr Donato: That the Committee call for submissions to be received by Monday 14 February 2022 and write to relevant stakeholders.

c) Indicative inquiry timeline
The Committee noted the indicative inquiry timeline.

5. General business
***

6. Next meeting
The meeting concluded at 11.02am to a date and time to be determined.

MINUTES OF MEETING No 23
11.03am, Thursday, 24 February 2022
Room 1136

Members present
Mr Justin Clancy (Chair), Mr Clayton Barr, Mr Philip Donato, Mr Geoff Provest.

Officers in attendance
Rohan Tyler, Emma Wood, Anna Tran, Mohini Mehta

1. Apologies

Mr Peter Sidgreaves (Deputy Chair), Mr David Harris, Ms Steph Cooke.

2. Confirmation of minutes

Resolved, on the motion of Mr Provest, seconded Mr Donato: That the minutes of the meeting of Friday 12 November 2021 be confirmed.

3. Inquiry – Inland Rail project and regional NSW

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4. Inquiry – Technology and the agriculture and mining sectors

a) Correspondence

The Committee noted the following items of correspondence received:

- Email, dated 1 December 2021, from Commonwealth Department of Agriculture, Water and the Environment indicating they will not be making a submission

- Letter, dated 9 December 2021, from Mr Rik Hart, Administrator, Central Coast Council, indicating they will not be making a submission

- Email, dated 15 February 2022, from Australian Council of Learned Academies (ACOLA) indicating they will not be making a submission. ACOLA provided a copy of a recent report titled, *The Future of Agricultural Technologies*.

The Committee agreed to a potential meeting with ACOLA at a date and time to be determined.

b) Publication of submissions

The Committee noted requests for an extension to lodge a submission from the NSW Government, NSW Farmers' Association and the University of Newcastle.

Resolved, on the motion of Mr Provest, seconded Mr Barr: That the Committee accept and publish submissions 1-8 in full.

c) Site visits

The Committee discussed dates and locations for possible site visits as part of the inquiry.

The Committee agreed to confirm the locations and dates of the site visits pending circulation of possible site visit itineraries from the secretariat.

Resolved, on the motion of Mr Barr, seconded Mr Donato: That the Committee, subject to funding approval from the Speaker, undertake up to two site visits as part of the Committee's inquiry.

d) Public hearing

The Committee discussed possible dates for a public hearing.

Resolved, on the motion of Mr Provest, seconded Mr Donato: That the Committee conduct a public hearing on a date to be determined.

5. Next meeting

The meeting concluded at 11.16am until a date and time to be determined.

MINUTES OF MEETING No 24
9.02am, Thursday, 12 April 2022
Room 1136 or via videoconference

Members present
Mrs Nichole Overall, Mr Gurmesh Singh, Ms Robyn Preston, Mr David Harris

Officers in attendance
Helen Minnican, Rohan Tyler, Emma Wood, Anna Tran

Apologies
Ms Felicity Wilson, Mr Philip Donato, Mr Clayton Barr

1. **Membership changes**

The Clerk read extracts from the Votes and Proceedings of the Legislative Assembly, Thursday 31 March 2021:

17 PARLIAMENTARY COMMITTEES

Mr Alister Henskens moved, That:

…

(5) Felicity Lesley Wilson, Robyn Anne Preston, Nichole Lorraine Overall and Gurmesh Singh be appointed to serve on the Legislative Assembly Committee on Investment, Industry and Regional Development in place of Justin Paul Clancy, Peter Bryan Sidgreaves, Stephanie Anne Cooke and Geoffrey Keith Provest, discharged.

…

Question put and passed.

2. **Election of Chair**

There being a vacancy in the office of Chair of the Committee, the Clerk called for nominations for the office of Chair.

Mr Singh nominated Mrs Overall as Chair, seconded Mrs Preston. No further nominations were received. There being only one nomination, the Clerk declared Mrs Overall to be the Chair.

3. **Handover to Chair**

The Clerk handed the meeting over to the Chair to preside.

4. **Election of Deputy Chair**

There being a vacancy in the office of Deputy Chair of the Committee, the Chair called for nominations for the office of Deputy Chair.

Mrs Preston nominated Mr Singh as Chair, seconded Mr Harris. No further nominations were received. There being only one nomination, the Chair declared Mr Singh to be the Deputy Chair.

5. **Confirmation of minutes**

The Chair noted that the minutes of the meeting of Thursday 24 February 2022 could not be confirmed in the absence of Mr Donato and Mr Barr.

The Chair postponed the confirmation of the minutes of the meeting of Thursday 24 February 2022 to a later date.

6. **Inquiry into technology and the agriculture and mining sectors**

6.1 Committee activity previously arranged

The Committee discussed the following Committee activity previously arranged:

- Site visit to Albury and Wagga Wagga – Tuesday 26 April and Wednesday 27 April
- Public hearing – Friday 20 May
- Re-scheduling meeting with ACOLA representatives – this was scheduled for Friday 1 April and was postponed after the membership changes announced on Thursday 31 March.

The Committee agreed to: postpone the dates canvassed for future Committee activity; and, reschedule the activities after the Committee has received a briefing on the inquiry by the Secretariat.

6.2 Publication of submissions

Resolved, on the motion of Mr Harris, seconded Mr Singh: That the Committee accept, and publish in full, submissions 9, 10 and 11.

7. General business

***

8. Next meeting

The meeting adjourned at 9.09 am to a date and time to be determined.

MINUTES OF MEETING No 25
3.06pm, Thursday, 16 May 2022
Room 1043 or via videoconference

Members present
Nichole Overall (Chair), Clayton Barr, Robyn Preston, Felicity Wilson

Officers in attendance
Rohan Tyler, Emma Wood, Anna Tran, Mohini Mehta

Apologies
Phil Donato, David Harris, Gurmesh Singh

1 Confirmation of minutes

Resolved, on the motion of Mr Barr: That the minutes of the meeting of Thursday 24 February 2022 be confirmed.

Resolved, on the motion of Ms Preston: That the minutes of the meeting of Tuesday 12 April 2022 be confirmed.

2. *

3. Inquiry into technology and the agriculture and mining sectors

3.1. Update on inquiry

The Secretariat updated the Committee on the inquiry. The Committee considered the inquiry terms of reference, the briefing note on the inquiry topic and the submissions received.

3.2. Inquiry timeline

The Committee considered the draft inquiry timeline, incorporating Committee activities previously arranged.

The Committee agreed to conduct the following activities:

- a private briefing with representatives from the Australian Council of Learned Academies regarding the *Future of agricultural technologies report*
- a site visit to the Wagga Wagga campus of Charles Sturt University

4. ***

5. Next meeting

The meeting adjourned at 3.41pm until a date and time to be determined.

MINUTES OF MEETING No 26
9.33am, Thursday, 10 June 2022
Room 1043 or via videoconference

Members present
Nichole Overall (Chair), Gurmesh Singh (Deputy Chair), Clayton Barr, David Harris, Robyn Preston (by Webex).

Officers in attendance
Rohan Tyler, Emma Wood, Anna Tran, Mohini Mehta

Apologies
Phil Donato, Felicity Wilson.

1. Confirmation of minutes

Resolved, on the motion of Mr Barr: That the minutes of the meeting of Monday 16 May 2022 be confirmed.

2. Inquiry into technology and the agriculture and mining sectors

2.1. Meeting with representatives from the Australian Council of Learned Academies (ACOLA)

Resolved, on the motion of Mr Harris, seconded by Mr Barr: That the following representatives from ACOLA be admitted to the meeting to discuss *The future of agricultural technologies* report:

- Professor Salah Sukkarieh

- Professor Barbara Howlett
- Mr Ryan Winn, Chief Executive Officer and Director, ACOLA

The Committee discussed the *The future of agricultural technologies* report with the ACOLA representatives. At the conclusion of the discussion the ACOLA representatives left the meeting.

2.2. Correspondence

The Committee discussed the following item of correspondence received:

- Email dated 19 May 2022 from Mr Simon Troeth, Manager Government and Investment Relations, Newcrest Mining, inviting the Committee to visit a mine at Cadia

The Committee agreed to visit the Cadia mine on a date to be determined.

2.3 Public hearing witnesses

The Committee considered the suggested list of witnesses.

Resolved, on the motion of Mr Barr: That the Committee invite the following witnesses to appear at a public hearing on Wednesday 27 July 2022:

- NSW Government
- NSW Farmers' Association
- Charles Sturt University
- NSW Minerals Council
- Association of Mining and Exploration Companies
- University of Newcastle and Ms Irma Dupuis

3. General business

Nil.

4. Next meeting

The meeting adjourned at 10.45am.

MINUTES OF MEETING No 27
9.26am, Thursday, 27 July 2022
Jubilee Room or via videoconference

Members present
Nichole Overall (Chair), Clayton Barr, Philip Donato (via videoconference), David Harris, Robyn Preston (via videoconference), Felicity Wilson.

Officers in attendance
Rohan Tyler, Emma Wood, Anna Tran and Mohini Mehta.

Apologies
Gurmesh Singh

Pre-hearing deliberative

1. Confirmation of minutes

Resolved, on the motion of Mr Barr: That the minutes of the meeting of Friday 10 June 2022 be confirmed.

2. Inquiry into technology and the agriculture and mining sectors

2.1 Media orders for public hearing

Resolved, on the motion of Mr Donato: That the Committee authorises the audio-visual recording, photography and broadcasting of the public hearing on 27 July 2022, in accordance with the Legislative Assembly's guidelines for the coverage of proceedings for committees administered by the Legislative Assembly.

2.2 Answers to questions taken on notice and additional questions

Resolved, on the motion of Mr Donato: That witnesses be requested to return answers to questions taken on notice and any additional questions within 10 business days of the date on which the questions are forwarded to witnesses.

2.3 Public hearing

The Chair opened the public hearing at 9.30 am and made a short opening statement.

At 9.30 am, the following witnesses from the University of Newcastle were admitted by videoconference:

- Professor Alan Broadfoot, Executive Director Newcastle Institute Energy and Resources, sworn and examined.
- Ms Irma Dupuis, PhD Candidate, affirmed and examined.

Professor Broadfoot made an opening statement.

The Committee questioned the witnesses. Evidence concluded and the witnesses withdrew.

At 10.16 am, the following witness from Charles Sturt University was admitted by videoconference:

- Professor Michael Friend, Pro Vice Chancellor (Research and Innovation), affirmed and examined.

The following witnesses from Charles Sturt University were admitted:

- Mr Jonathon Medway, Senior Research Fellow, Gulbali Institute – Spatial Agriculture, affirmed and examined.

- Ms Samantha Beresford, Acting Strategic Advisor Government Relations and Regional Engagement, affirmed and examined.

Professor Friend made an opening statement.

The Committee questioned the witnesses. Evidence concluded and the witnesses withdrew.

At 11.18 am, the following witness from the NSW Minerals Council was admitted:

- Mr Andrew Abbey, Policy Director, sworn and examined.

Mr Abbey made an opening statement.

The Committee questioned the witness. Evidence concluded and the witness withdrew.

At 12.02 pm, the following witness from the Association of Mining and Exploration Companies was admitted by videoconference:

- Ms Lucy McClean, Director, sworn and examined.

Ms McClean made an opening statement.

The Committee questioned the witnesses. Evidence concluded and the witness withdrew.

At 1.45 pm, the following witness from the NSW Farmers' Association was admitted by videoconference:

- Ms Jenny Bradley, Chair – Innovation and Technology Group, sworn and examined.

The following witnesses from the NSW Farmers' Association were admitted:

- Ms Annabel Johnson, Head of Policy and Advocacy, affirmed and examined.
- Ms Kathy Rankin, Policy Director – Rural Affairs & Business Economics & Trade, sworn and examined.

Ms Bradley made an opening statement.

The Committee questioned the witnesses. Evidence concluded and the witnesses withdrew.

At 2.34 pm, the following witnesses were admitted by videoconference:

- Professor Hugh Durrant-Whyte, NSW Chief Scientist and Engineer, affirmed and examined.
- Mr Peter Day, Executive Director Resources Regulator, Mining Exploration and Geoscience, Department of Regional NSW, affirmed and examined

The following witnesses from the Department of Regional NSW were admitted:

- Ms Kate Lorimer-Ward, Deputy Director-General, Agriculture, NSW Department of Primary Industries, affirmed and examined.
- Dr Jason Crean, Director, Climate, NSW Department of Primary Industries, affirmed and examined.

The Committee questioned the witnesses. Evidence concluded and the witnesses withdrew.

At 3.31 pm, the public hearing concluded.

Post-hearing deliberative meeting

2.4 Publication orders

Resolved, on the motion of Mr Harris: That the corrected transcript of public evidence given today be authorised for publication and uploaded on the Committee's webpage.

2.5 Acceptance and publication of tendered documents

Resolved, on the motion of Mr Barr: That the Committee accept and publish the following document tabled during the public hearing:

- Opening Statement from Charles Sturt University.

3. Next meeting

The meeting adjourned at 3.34 pm until Friday, 12 August 2022.

MINUTES OF MEETING No 28
9.32am, Friday, 12 August 2022
Room 1043 or via videoconference

Members present
Nichole Overall **(Chair)**, Gurmesh Singh **(Deputy Chair)**, Clayton Barr (by Webex), Philip Donato (by Webex), David Harris and Robyn Preston (by Webex).

Officers in attendance
Rohan Tyler, Emma Wood and Anna Tran.

Apologies
Felicity Wilson

1. **Confirmation of minutes**

   Resolved, on the motion of Mr Harris: That the minutes of the meeting of 27 July 2022 be confirmed.

2. **Inquiry into technology and the agriculture and mining sectors**

   2.1 Discussion of options for the inquiry report

   The Committee considered possible options for the inquiry report.

3. ***

4. **Next meeting**

   The meeting adjourned at 10.23 am until a date and time to be determined.

UNCONFIRMED MINUTES OF MEETING No 29
9.33am, Friday, 21 October 2022
Room 1254 or via videoconference

Members present
Nichole Overall **(Chair)**, Gurmesh Singh **(Deputy Chair)**, Clayton Barr, Philip Donato (via videoconference), David Harris (via videoconference), Robyn Preston (via videoconference).

Officers in attendance
Rohan Tyler, Emma Wood, Anna Tran and Mohini Mehta

Apologies
Felicity Wilson

1. **Confirmation of minutes**

   Resolved, on the motion of Mr Singh, seconded Mr Barr: That the minutes of the meeting of Friday 12 August 2022 be confirmed.

2. **Inquiry into technology and the agriculture and mining sectors**

   2.1 Answers received to questions taken on notice

   The Committee considered the answers to questions taken on notice at the public hearing held on 27 July 2022.

   Discussion ensued.

   Resolved, on the motion of Mr Barr, seconded Mr Donato: That the Committee write to the NSW Department of Primary Industries regarding the provision of adequate information in response to a question taken on notice at the hearing held on 27 July 2022.

Resolved, on the motion of Mr Barr, seconded Mr Donato: That the Committee accept and publish the following answers to questions taken on notice at the public hearing held on 27 July 2022:

- Mr Andrew Abbey, NSW Minerals Council, received 12 August 2022
- Professor Hugh Durrant Whyte, NSW Chief Scientist and Engineer, received 16 August 2022
- NSW Department of Primary Industries, received 17 August 2022

2.2 Consideration of Chair's draft report

The Committee considered the Chair's draft report, previously circulated.

Resolved, on the motion of Mr Harris, seconded Mr Donato: That the Committee consider the report *in globo*.

Resolved, on the motion of Mr Barr, seconded Mr Singh: That paragraph 1.4 be amended by inserting the words 'and profitability' after the words 'increase agricultural production'.

Resolved, on the motion of Mr Barr, seconded Mr Singh: That the following paragraph be inserted after paragraph 1.25:

> 'The Committee considers that, while there will be opportunities for an increasingly skilled workforce in agriculture and mining, there is the potential for a decrease in employment opportunities for unskilled workers.'

Resolved, on the motion of Mr Barr, seconded Mr Singh: That Finding 5 be amended by replacing the word 'faith' with the word 'confidence'.

Resolved, on the motion of Mr Singh: That Finding 5 be amended by replacing the words 'an unclear understanding' with the words 'a lack of clarity'.

Resolved, on the motion of Mr Singh, seconded Mr Barr: That Recommendation 3 be amended by replacing the words 'invest in' with the word 'investigate'.

Resolved, on the motion of Mr Barr, seconded Mr Singh: That Recommendation 4 be amended by inserting the words 'continues to' after 'NSW Government'.

Resolved, on the motion of Mr Singh, seconded Mr Barr: That the following new Finding be inserted before Recommendation 5:

> 'Finding 7
>
> As technology evolves, there may be fewer opportunities in agriculture and mining for unskilled workers, who have traditionally been at the core of these industries. Future workers will need education, training and technologically complimentary skills.'

Resolved, on the motion of Mr Barr: That Recommendation 9 be amended by deleting the words 'cost burden on primary producers of' and replacing with the words 'financial challenges for primary producers and the mining industry in'.

Resolved, on the motion of Mr Barr: That Finding 8 and Recommendations 10 and 11 be amended by replacing the words 'on-farm' with the word 'regional'.

Resolved, on the motion of Mrs Overall: That Appendix Two be amended by inserting the names of members who attended the site visits.

Resolved, on the motion of Mr Barr, seconded Mr Singh:

1. That the draft report, as amended, be the report of the Committee, and that it be signed by the Chair and presented to the House.
2. That the Chair and committee staff be permitted to correct stylistic, typographical and grammatical errors.
3. That, once tabled, the report be published on the inquiry webpage

3. General business

The Chair thanked the Committee members and staff for their contributions and work throughout the inquiry.

4. Next meeting

The meeting adjourned at 10.33am until a date and time to be determined.