2018 Regional Telecommunications Review Secretariat
Regional Telecommunications Independent Review Committee
Department of Communications and the Arts
GPO Box 2154
CANBERRA ACT 2601

By email

05 Aug 2018

Dear Regional Telecommunications Review Committee

Re: Cotton Australia submission to 2018 Regional Telecommunications Review

Cotton Australia values the opportunity to provide comment and, as the peak representative body, speak on behalf of cotton growers regarding regional telecommunications.

Telecommunications remains one of the key policy/service concerns for our members and is key to the advancement of our industry and important to the wellbeing of its people and communities.

Cotton Australia is a founding member of the Regional, Rural and Remote Communications Coalition alongside like-minded organisations advocating on telecommunications issues experienced by regional and remote users. We are member of the National Farmers' Federation (NFF) and an active participant in the NFF's Telecommunications and Social Policy Committee.

Our members represent individual Cotton Grower Associations, ginning (processing) companies, and some industry service organisations. Cotton Australia is the Representative Organisation providing industry advice on Research and Development priorities to the Cotton Research and Development Corporation (CRDC).

In our submission (overleaf), we respond to most of the Issues Paper's questions.

Thank you for the opportunity to engage with this important process. We would be pleased to provide further information on our position; please contact Angela Bradburn, Policy Officer, angelab@cotton.org.au, 02 9669 5222.

Kind regards,

Policy Officer, Cotton Australia

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Executive Summary

The digital revolution is at a critical time and the Precision to Decision project showed that with maturity, digital agriculture could increase the gross value of Australian agricultural production by $20.3 billion (25% increase on 2014-15 levels) (Leonard 2017).

Australia's cotton industry is already technologically advanced and the industry has seen major achievements through the adoption of technology. Continued advancements have been necessary to ensure competitiveness, and maximise efficiency and sustainability. Cotton farming is data intensive and it is anticipated that there will be ongoing adoption and update of new machine-to-machine (M2M) and internet of things (IoT) technology.

While Australian cotton growers are the biggest adopters of digital agriculture technologies to improve productivity across the sector, they are also the least satisfied with current options for connecting and analysing digital information (Zhang 2017).

A lack of access to mobile and internet telecommunications infrastructure is a major impediment to the adoption of digital agricultural systems. While connectivity is only one of the five constraints to the progression to digital agriculture, it is the engine.

Use of digital technologies remains limited by the fact that only a minority of farms have reliable mobile data coverage over their farm and the NBN is still in the roll-out phase. Grower are limited by poor internet speed, download limits, high cost and/or reliability.

Cotton business and supporting service providers need fast and reliable services at a fair cost, that compares with cities and competitors.

Increasing competition to ensure the provision of improved broadband services in regional areas is important and second tier providers can play an important role in helping to extend existing telecommunication networks.

There is a need for improved transparency of telecommunications information e.g. infrastructure and customer needs to enable strategic planning and investment.

As well as connectivity, improving digital literacy across the board is important to ensure people have awareness and the right skills to access and adopt the telecommunications technology they need. This includes clear, consistent information and support from service providers.

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Introduction

The Australian cotton industry is an agricultural success story, with a rich history that has led to an efficient, responsible industry that produces some of the highest quality, highest yielding cotton in the world – using fewer natural resources than ever before. Every year around 1,200 Australian cotton farms produce enough natural fibre to clothe around 500 million people. The industry earns about $2 billion for the Australian economy each year and is an important contributor to regional communities in NSW and Queensland, helping to underpin more than 150 rural communities.

Australia's cotton farmers operate in a challenging environment of relatively high input prices, unreliable supplies of water, a fluctuating global commodity market. The industry has invested in being as efficient and sustainable as possible, and an employer of choice in the agricultural sector.

The industry is made up of mainly family farms predominantly in inland eastern Australia, as well as cotton gins and a range of associated support industries including crop consultants, input suppliers, farming contractors, transport and warehousing facilities, cotton classers and merchants. The average Australian cotton farm is family owned and operated and directly creates jobs for 6-7 people.

The cotton industry has seen yields improve at 2% year-on-year, greater than in any other agricultural industry in Australia, 45% of the improvement due to better varieties, 55% due to better management. The 2014 Australian Cotton Sustainability Report (Cotton Australia and Cotton Research and Development Corporation), highlighted major achievements and the adoption of technology by the industry:

⟩ 40% increase in cotton water productivity over the last decade
⟩ 89% reduction in insecticide use
⟩ 70% use of soil moisture probes to manage irrigation application
⟩ 90% use of satellite navigation in tractors

The industry's success is driven by a culture of innovation partnered with access to research, development and

extension, as well as commitment to a (online) best management practices program (myBMP).

Digital technology is said to be behind the next big agricultural revolution. On-farm technology is rapidly developing with 'smart' farming applications. Technology is no longer a luxury, but a necessity to conduct a modern day business, able to compete in the global market, as Australian cotton growers continue to do with more than 99% of the crop exported.

Access to reliable and fit-for-purpose telecommunications services are essential for anyone living and running businesses in rural Australia. Unfortunately, telecommunications services are not satisfactory for many residents in rural areas, and the cotton industry is not alone. We now have evidence through industry surveys and research to back up the anecdote pointing to poor service and coverage, ongoing issues with landline, mobile or internet and resulting high levels of frustration and business inefficiency. At the same time, cotton growers along with all other producers will benefit from a coordinated and focused effort to ensure operators have awareness the right skills to ensure they can access and adopt the telecommunications technology they need.

Responses to the Issues Paper List of Questions

We present responses to most questions posed in the Issues Paper.

Our responses include references to the P2D project reports. The Accelerating Precision to Decision Agriculture (P2D) project was supported by funding from the Australian Government's Department of Agriculture and Water Resources as part of its Rural R&D for Profit program. Led by CRDC, the P2D project involves all Rural Research and Development Corporations, and is focused on three main aims:

- Facilitating the development of digital technology in Australian agriculture.
- Fostering the establishment of appropriate legal frameworks, data systems and access to critical datasets.
- Identifying the data communications systems required to deliver the benefits of digital agriculture to the Australia farm and agribusiness sectors.

We encourage the Committee to consider this body of findings and recommendations. Individual reports as well as a useful summary report can all be found here: https://www.crdc.com.au/precision-to-decision In particular Reports 1 and 2 are most relevant to this review, as well as the summary report (Leonard et al 2017):

-) Producer survey of digital agriculture - The needs and drivers for the present and future of digital agriculture in Australia. (Zhang 2017)
-) A review of on-farm telecommunications challenges and opportunities in supporting a digital Agriculture future for Australia (Lamb 2017)

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Question 1: What are the main barriers to people in regional communities increasing their use of digital technologies and possible solutions for overcoming these barriers?

A lack of access to mobile and internet telecommunications infrastructure is a major impediment to the adoption of digital agricultural systems. As stated by Lamb (2017), producers are frustrated with the lack of coverage, reliability and speed of telecommunications in Australia. These are certainly issues felt in the cotton industry and these barriers limit advancement as well the ability to undertake basic farm management and business activities smoothly. Tasks take much longer, communication is broken and records cannot be easily integrated. In the NFF-led survey designed to inform Regional Telecommunications Review submissions (conducted late July 2018), around 60% of cotton grower respondents felt there were barriers to taking up digital technologies, *by far the main reason being that internet connection isn't strong enough*. The next most common reason was they '*don't have access to new technology*', followed equally by:

- *Technology is incompatible with other products I have*
- *Don't have technical support*
- *Not sure how to make it all work together*

Of a Cotton Grower Practices survey conducted in 2016 (139 respondents), 68% indicated that internet speed, download limits, cost and/or reliability restricts their use (is a major limitation and/or prevents use) of internet-based tools or information in their business. Limitations caused by restricted telecommunications connectivity include the ability to use online software or data sharing such as accounting tools or data uploads for analysis. For some farms this problem is so great that farm administration has to be done in town. Reliability, speed and cost were frequently mentioned. Some had no phone reception at all or it was intermittent. Regarding cost, the unavailability of affordable business grade data communication services is an issue.

In a survey of crop consultants undertaken following the 2016/17 crop season, it was found that of 65 respondents representing 513 cotton clients, 83% claimed that limited phone/internet coverage/reliability impacts their ability to do their job or to innovate.

In the producer survey (Zhang 2017) conducted as part of the Rural R&D for Profit 'Precision to Decision' project, Australian cotton growers were shown to be the biggest adopters of digital agriculture technologies to improve productivity across the sector. However, they were also the least satisfied with current options for connecting and analysing digital information.

As part of the P2D project, the Data to Decisions CRC undertook an assessment of the current state of digital maturity of the agricultural sector, with a particular focus on its use of data to drive decisions. The assessment is made against seven key pillars of success for digital maturity, namely strategy, culture, governance, technology, data, analytics and training (digital literacy). A key finding in P2D is that the overall digital

maturity of the agricultural sector is ad hoc, with technology (connectivity) a contributing factor. The impact of this is that the sector is missing out on opportunities to improve productivity and realise greater profits. All pillars need to be addressed in realising this.

Figure 1.1. A cross-industry approach to achieve the successful implementation and adoption of digital agriculture.

Source: Leonard et al (2017)

As stated in P2D, if digital agriculture is to be adopted, it needs to be sustained by consistency of service and support and the reliability of technology. Lamb 2017 provides a number of important observations and recommendations:

∫ An improved understanding of producers' data needs are required
∫ Local or remote technical support which will help producers engage
∫ While the NBN only supplies a single point of access per property and has speed and service limitations, frustration will remain
∫ The suggestion that the role of telecommunications in supporting a digital agriculture future is not necessarily technology constrained as technology solutions do exist. The real constraint is likely to be around who assumes technical risk, service and price.
∫ The need to centralise knowledge on data use 'behaviour' of producers and of the capability of existing or planned network infrastructure to cater for data use. At a national strategic level, there is no centralised knowledge of mobile network data carrying capacity by location.

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Business needs fast & reliable services at a cost equivalent to that paid for these services in our capital cities to enable businesses in regional Australia to be competitive with those in our capital cities or internationally.

Question 2. How are people in regional communities currently using their broadband service and how might they increase the benefits of using this technology?

Often services that are below the quality that would be ideal are used. Businesses do the best with what they can get access to. Examples include mobile data services, where available ADSL or satellite. These technologies all limit expansion of technologies which would improve productivity.

In the NFF Regional Telecommunications Review survey, 60% of cotton grower respondents indicated they are not connected to the nbn. Of the 40% who are, most are on Sky muster satellite and a small number on fixed wireless with the majority satisfied with their internet. For those not connected to the nbn, reasons were unavailability either of nbn or fixed line or wireless not being available. The rest are on either 3G or 4GX for internet, with lower levels of satisfaction. A couple reported being on fixed wireless and reported being extremely satisfied. The P2D producer survey also found compared to the other connection options, the mobile phone network was the most used internet connection method, and had particularly high use in cotton (and grain only) industries.

Connectivity, price and digital service capacity need to be optimised/competitive. Customer (producer) awareness of options and their general digital literacy and appropriate supporting services will increase benefits.

Question 3. What data-intensive activities are occurring in regional, rural and remote Australia? What digital technologies are needed for these?

Telecommunication services do not just underpin basic communication between people anymore, but essential business activities. For example, on any given day a cotton grower may rely on telecommunications to communicate with employees, online banking, online trading, online ordering, monitoring weather conditions, monitoring soil moisture levels, crop canopy conditions, uploading drone footage and data to share with consultants and agronomists in town, remotely monitoring irrigation systems, accessing data from machinery and more. Telemetry units such as weather stations, probes, mace meters and dam monitors require internet and the ability to upload frequently to update. Table 1 shows the activities requiring on-farm telecommunications on cotton farms as presented in Lamb (2017).

Data from multiple sources e.g. other locations within organisation other organisations in the supply chain is exchanged for transaction processing, reporting and communications. These are vital in supporting the timely and ever reducing cycle times that business must achieve to be competitive. Technologies used includes Mobile Apps,

Cloud or other Online/Realtime applications that support information and transaction processing out in the field or wherever deals or work is being done.

Farm businesses as well as their supporting services have increasing data needs. Crop consultants that service cotton growers are using digital technology, cloud based apps eg Agworld (farm management software) for record keeping and decision support. Consultants work involves in field monitoring, liaising with clients and teams, reporting and data transfer and travelling between fields, farms and town office. Basic lack of connectivity and mobile services across what seems to be significant areas of their working footprint affects the timeliness, ease and efficiency of operations, the cost and inconvenience of which would amount to be significant. E.g. inability to upload/download data in field and during the working day, communicate with clients and team on the job, no access to internet to help in solving problems and forming recommendations during the day. Communications have to be lumped together once in a service area, or done back at the office or after hours.

TABLE 1. A series of 8 stakeholder workshops were conducted during December 2016 – April 2017 as part of the P2D project. The activities requiring on-farm telecommunications on cotton farms uncovered in this consultation is presented below.

Identified operations/functionality	Source of data - telecommunications mode	Existing or required access – telecommunications mode
Yield monitoring/mapping and quality (Bales)	Harvester operations store on board to later access	Mobile network to allow streaming
Weather - actual	Radio or mobile network devices (shared)	Internet access (Office) Smart phone (for live 'alerts'- e.g. departure from spray conditions
Irrigation decisions via soil moisture	Radio or mobile - connected probes	Smart phone (in situ) Internet (Office)
Irrigation control	Radio connected valves	Smart phone (in situ) Internet (Office)
Weed management	Patch maps (generated insitu) and then robotics	Mobile access for guidance andcontrol
Compliance (e.g. fertilizer, spray chemical batch, time/date application)	Written records/offline entry onto smart phone/tablet	Smart/tablet phone app (in situ eg. on tractor)- live
Field scouting and decision making- nutrition	Internet- Cloud-based farm data management services	Smart phone/tablet
Decision support - e.g. for CottASSIST (www.cottassist.com.au/)	Internet- Cloud-based farm data management services	Smart phone/tablet, NBN (Office)

Source: Lamb (2017)

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It is anticipated that there will be ongoing adoption and update of new machine-to-machine (M2M) and internet of things (IoT) technology by the cotton industry.

Question 7. What skills do people need to get the most from their digital technologies, and where can they learn these skills?
Cotton grower's knowledge of on-farm telecommunication options tends to be higher than most other industries. This was shown in both the P2D producer survey and the recently conducted NFF RTR survey (survey undertaken to inform Regional Telecommunications Review 2018). However there were still responses indicating low digital literacy. Most roles on farm in cotton these days require a familiarity with computers, machinery and other on farm technology and devices.   Currently, people learn on the job, from service providers and other trusted advisors (private and public, extension). When asked, cotton respondents to the NFF RTR survey indicated they have gone about building their knowledge and skills in digital technology by learning by user experience, peers, family etc, as well as online resources e.g. blogs, videos and tutorials.

The P2D project found that ad hoc digital literacy across the agriculture sector is an issue and it highlighted the importance of digital literacy to achieving digital maturity. P2D2 (the follow on project, currently in planning) will have a significant focus on addressing the digital literacy recommendation D10: *That the 15 Research and Development Corporations and the university sector strategically invest in education and capacity building for students, producers, agribusinesses, rural industries and their stakeholders to increase digital literacy and application in the agricultural sector*.

The P2D project found: *There is a need, both in the R&D sector and in industry, for people with digital skills who also understand the agricultural sector….Education and training are required at all levels within the industry to increase knowledge and understanding of connectivity options, best practice in data management and use and data licensing. New programs should also be developed to provide the relevant skills to the emerging agricultural workforce that will be required to progress decision agriculture…. The establishment of demonstrator sites could be considered to enable producers to gain first-hand experience of innovations and best practice in data management in a practical environment. Skill gaps have already been identified in the areas of on-farm telecommunications and data science.*

CRDC also has a relevant project underway one examining the future skills needs of our industry. The work of Dr Tristan Perez of Qld University of Technology has provided guidance on skilling the future workforce in digital agriculture.

Whilst many industries have already been incorporating digital agriculture and new technology into existing forums for producers such as Conferences and field days, there is a need for a more concerted effort to drive improvements in awareness and skills.

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Agriculture is not alone in regards to digital transformation and can look to other sectors (eg manufacturing) and what is being done at the school, VET and university levels. Some state government and regional initiatives are helping to provide upskilling opportunities for businesses as part of state digital strategies (eg NSW TAFE digital skills for business, digital QLD). The important thing is to ensure these suit agricultural businesses in content and delivery.

The market and service providers have an important role to play also in ensuring messages and information is clear, correct, targeted/available – on what's available and how to set it up. Eg improving software providers' understanding of optimising their products/services to work via Sky Muster.

For individuals with interest/more familiarity with IT, there are many online/OnDemand training courses e.g Udemy, noting that good data communications are needed to enable these.

Question 8. Have you had ongoing issues affecting your satellite or fixed wireless broadband service? If so, how have you overcome these issues?
Some growers on satellite or fixed wireless broadband reported ongoing issues mainly slow internet or complete loss of service. Most directly contacted provider to resolve issues (others did this plus pursued a fix through other/all other available channels).

In feedback from a large corporate producer with operations across a number of sites (Olam), ongoing issues with nbn Fixed Wireless meant the company discontinued its use for primary site data service and are now using Telstra Mobile Data instead. The Fixed Wireless NBN is a backup only as it is lower quality than Telstra Mobile at the remote locations they have tried it out on to date.

Question 9. If you are in an area with access to the Sky Muster satellite service and you have not taken it up, why not?
Also see question 2. Generally high latency of satellite is not ideal for many business applications. As an alternative, we have had reports that Mobile Data enabled by external antennas have been available & provide a superior service to Satellite.

Question 10. What economic or social indicators could be used to guide investment to further improve mobile coverage?
A number of the recommendations (1 to 4) from Lamb (2017) speak to this question and more broadly convey the need to improve transparency of service for better planning and targeting of investments. Recommendations imply the need to look at indicators such as: equitable access in rural and regional areas and future proofing (e.g. speed/volume) in light of changes in usage (e.g. connected devices on farm) and growth and complexity in web based services available to producers. This requires improved transparency and monitoring. A high level Recommendation of P2D (E11 of the Summary Report is:

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That DATA (a suggested Taskforce comprised of government and RDCs) collaborates with peak industry bodies and the Carriage Service Providers to establish baseline patterns of data usage and an on-going national mobile network coverage (data speed and volume) database.

Quantifying on-farm coverage will help support strategic planning of future national connectivity initiatives.

Question 11. Is information readily available regarding how to use devices to improve mobile reception in areas with poor coverage? E.g. information about external antenna equipment?

Poor mobile coverage (eg across half or more of the farm) plagues a significant portion of cotton businesses. Some farms face these issues even despite being close enough to towers and others have complained of worsening mobile reception over time.   In the P2D producer survey (Zhang 2017), beef and cotton reported most strongly in the patchy or no coverage classes and this is likely reflective of the spatial density of these farms and proximity to urban centres.

Therefore communities and farms in these categories have had to explore ways to improve reception and invest in antennas and CelFi boosters, repeaters and car kits. These come at a cost though.   Information seems to be available for those who seek improvements.

Question 12. What emerging digital services will be of most benefit to regional businesses and what are the data needs of these services?

With regard to more emerging services, lower cost networks such as LoRaWAN & Sigfox that can only support small packet technology that enable sensors, Internet of Things & similar devices to be deployed where other data networks do not provide coverage will allow remote business to get insights into such things as temperature, humidity and moisture levels to make better informed decisions (where previously they may have been estimating or using less precise information).

Grower respondents in the NFF RTR survey also reinforced real-time drone applications, autonomous farming vehicles, being able to send prescription maps to machines etc. automation of certain tasks. Machine to machine systems.

In the 2016/17 cotton Crop Consultants survey, when consultants were asked if they could automate or have a new technology developed to support one component of their in-crop monitoring activities (pest monitoring, plant stress levels, input status ie water, nitrogen) a plethora of suggestions were provided. Common themes related to apps and tools to enable:
  - improved (eg higher resolution) data capture, transfer via drones (autonomous), live stream visuals etc
  - better communication between field – team – client in a timely fashion

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⌐ Improved record keeping and reporting eg collaborative Cloud based
Many mentioned the need for basic phone and internet coverage to do their job properly.

Question 13. What broadband services are people using other than those available through the NBN?

Telstra where available/affordable and emerging are second tier providers for example Just-ISP (parent company Field Solutions Group), NuSkope who supply Fixed Wireless data services.

In particular, Field Solutions Group's offerings has been of interest to cotton growers north west NSW and business arrangements are already in place in a couple of areas or being discussed. See Attachments A, B and C for case studies on this technology provider and how it is servicing Moree and surrounds, and cotton farms in those areas.

See Lamb (2017) from page 104 on 'Getting more out of our radio frequency spectrum' which considers a whole range of different options eg mobile broadband network, LORA WAN, white space, NGARA.

Question 14. How can more competition be encouraged in the provision of broadband services in regional Australia?

Overall, there is a need for improved transparency to enable strategic planning and investment. A key policy Recommendation (A3) of the Precision to Decision summary report states: *That the Federal Government considers policy and investment options to improve telecommunications to farms and rural businesses including the potential for public/private investment models for telecommunications infrastructure.*

Areas of need relating to connectivity highlighted through the P2D project include:
- Improving wireless backhaul infrastructure.
- Enabling multi-point NBN satellite access to rural properties.
- Improving software providers' understanding of optimising their products/services to work via Sky Muster.

There has been a significant increase in the development of end-to-end telecommunications technologies and services offered to producers. Enabling access to affordable wireless backhaul infrastructure to cater for the growing demand of emerging players, to support on-farm networks, including efficient methods of using spectrum (including white space) and physical assets is important. This is a priority addressed in Recommendation 9 of Lamb (2017).

Smaller organisations looking to use technologies similar to NBN Fixed Wireless to get data services the last mile to regional customers need access to back haul data services which allows large volumes of data to transverse the backbone of Australia's data network at prices are in line with equivalent services in capital cities. The lack of

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competition often results in backhaul being too expensive to enable these competitors to the large telecommunications companies to provide a cost attractive proposition.

Attachments

A: TELECOMMUNICATIONS CASE STUDY: Bringing high speed internet to cotton businesses in north west NSW
B: Case study extract from Lamb, (2017)
C: Case study extract from Lamb, (2017)

References

Lamb, D. (2017). Accelerating precision agriculture to decision agriculture: A review of on-farm telecommunications challenges and opportunities in supporting a digital agriculture future for Australia. University of New England and Cotton Research and Development Corporation, Australia.

Leonard, E. (Ed), Rainbow, R. (Ed), Trindall, J. (Ed), Baker, I., Barry, S., Darragh, L., Darnell, R., George, A., Heath, R., Jakku, E., Laurie, A., Lamb, D., Llewellyn, R., Perrett, E., Sanderson, J., Skinner, A., Stollery, T., Wiseman, L., Wood, G. and Zhang, A. (2017). Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia. Cotton Research and Development Corporation, Australia.

Zhang, A., Baker, I., Jakku, E. and Llewellyn, R. (2017). Accelerating precision agriculture to decision agriculture: The needs and drivers for the present and future of digital agriculture in Australia. A cross industries producer survey for the Rural R&D for Profit 'Precision to Decision' (P2D) project. CSIRO and Cotton Research and Development Corporation, Australia.

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TELECOMMUNICATIONS CASE STUDY:

Bringing high speed internet to cotton businesses in north west NSW

The rural telecommunications 'data drought'

Adoption and use of technology in the agriculture sector is being hindered by the 'data drought' and poor telecommunications coverage and service experienced by rural, regional and remote Australia. This is a barrier to increased productivity, profitability and social and environmental gains.

The agriculture sector is geographically dispersed, presenting unique challenges, however adoption is also impeded by a belief that systems cannot be cost effectively implemented. Technology is increasingly available, though awareness of options is low.

Broadband connectivity is important for the use of innovative agricultural technologies including spatially-enabled agriculture and big-data supported decision tools.

Launched in 2016, the nbn Sky Muster™ satellite service was to deliver a revolution in broadband to regional Australia. However, the service was plagued by poor upload and download speeds, reliability and latency and didn't deliver the business grade services needed by many. The nbn maintains a commitment to providing access to fast broadband services throughout regional and remote Australia, and has forged closer ties with regional customers, focused on improving performance in Sky Muster and Fixed Wireless services, established the 'nbn Local' team and is readying a new wholesale product for remote and rural businesses via the Sky Muster™ satellite.

As well as the nbn there are other internet service providers on the market. **This case study features one example that has improved connectivity for cotton businesses and communities in and around Moree NSW.**

New technology for Moree and surrounds

How it was done?

Moree Plains Shire Council and Narrabri Shire Council are leading the way to help their residents, businesses and agribusinesses overcome the data drought and connect to high-speed internet. The Council provides important access to infrastructure.

After Moree Plains Shire Council formed a partnership with JustISP to increase the connectivity of their region, JustISP have created their own fibre network in the area. To enhance coverage and availability of broadband to the community JustISP has also implemented a fixed wireless network to extend beyond the reach of the fibre and provide access to growers. So far JustISP have connected residential, business and agribusiness properties both in Moree and up to 40km away from town, with the network growing based on demand each quarter.

JustISP built a township fibre ring in Moree servicing new customers who required true symmetric broadband. The township fibre service was provisioned into B&W Rural (image a) and from on top of the flour mill connect a licensed microwave link to a tower 7km west of Moree. From there they have another licensed microwave link across to a grain elevator on a local rural property 35km away. JustISP have utilised the top of this grain elevator to create a telecommunications PoP (Point of Presence; a location to place key network infrastructure) where they service surrounding properties and "Keytah".

The owner of "Keytah" and his neighbour Rimanui Farms, both west of Moree, have invested in the project, allowing smaller properties within a 15km radius the opportunity to connect.

Image a: B&W Flour Mill Moree hosting the fibre service (above) and Bonaldoon Grain Elevator in Moree (right)

The benefits

Under this service all plans are data unlimited and provide high speed uploads. This is critical for emerging technologies such as 'big data', agricultural producers using input from drones and effective video-conferencing such as Skype for business. Because JustISP control the number of users on each node, they can maximise the bandwidth and the speeds available to customers.

With these improvements, the Cloud becomes a genuine option for business functions (i.e. Office 365 and accounting packages) and for disaster recovery (i.e. backup and storage).

Increased connectivity facilitates stronger social networks between farmers, parents, children and the community. Boarding school will no longer feel so remote with Facetime or Skype videoconferencing a genuine option. Farms ability to attract and retain staff is improved now that there is connectivity; an important consideration for people looking to relocate to regional areas. Councils can enable better services.

Sundown Pastoral Company is already seeing major benefits after "Keytah" was connected. The technology enabled the business to host a Ritchie Brothers agricultural auction in September 2017, which saw bidders from all over Australia and the world participating online (Image b).

B&W Rural were sending staff to Narrabri to download drone images, this is now all done locally at their site in Moree. What used to take hours, now takes minutes. The data capability also extends to paddock with tractors, headers, JD Links and pickers all having data capture requirements met.

With more reliance on data capture, upload and download speed, capability and reliability are becoming more critical. Increased automation in agriculture is now looking achievable with this type of technology coupled with other technology such as CSIRO led Data 61 which

Image b) The new technology enabled 'Keytah' to host a Ritchie Brothers agricultural auction, with bidders from over Australia and the world participating online

About the technology provider: Field Solutions Group (FSG) and JustISP

Field Solutions Group is an ASX listed licensed Telecommunications Carrier and Technology Company providing connectivity and business solutions for rural, regional and remote areas.

JustISP is a subsidiary of Field Solutions Group and Internet Service Provider. JustISP's aim is to reduce the "data drought" experienced by Australians living and working in regional, rural and remote areas. This has driven JustISP to implement a solution that works, using the latest in fibre and wireless technology, providing an exceptional service to customers.

Just ISP has a unique business model where the focus is finding an entire community solution. This often starts by partnering with the local council or multiple large businesses to initiate the service in a region. The service then has the potential to connect farms, residences and agribusinesses to a network that is fast, reliable and affordable.

If you would like more information about getting your farm or community connected please get in contact.

Call - 1300 000 477
Website - www.just-isp.com
Facebook -
https://www.facebook.com/JustISP.FSG

LOCATIONS

JustISP's footprint covers the northern NSW and Southern QLD cotton growing regions including Emerald, Moree, Narrabri, Mungundi and Weemelah with expansions planned. With the acquisition of additional networks in Feb 2018, Winton, Longreach, Ilfracombe, Barcaldine, Blackall, Emerald, Gindie, Springsure, Moree, Narrabri, Mungundi, Weemelah Junee, Temora and Galong are available now.

JustISP are currently in negotiations with Narrabri, Gunnedah and Goondiwindi councils with the aim to connect those communities and others such as Wee Waa, Merah North and Burren Junction in early 2019. A tower will either be built on Bald Hill (near Narrabri) or at Bellata to move the signal west towards those communities and farms.

Their next project will be connecting the Croppa Creek and Crooble areas with the construction of two towers – one at AFF Red Mill Farms and a second at 'Yamboon'. These towers are currently under construction with the aim to have the signal switch on by the end of 2018.

Case Study #SP4- End to end telecommunications solutions – Field Solutions Group

The Business

Business location: 38/23 Narabang Way, Belrose NSW, www.fieldsolutions-group.com

Key enterprise: Field Solutions Group has 5 aspects to its business; development of business software systems, managed applications services such as online office suites and email services, assist businesses transition to the cloud, assist businesses with managing business and IT priorities by optimising their investments tecnhology architecture, and is also a licensed telecommunication carrier.

Date established: 2012

Contact: Andrew Roberts, CEO

Size of Business: 32 staff spanning software development, cloud hosting, IT and data transition management and telecommunications rollouts.


Key activities/Geographical footprint:
As a licensed Australian communications carrier, Field Solutions Group (FSG) partners with other Telcommunications Carriers to offer a private network that runs from Tasmania to Far North Queensland, and across to Perth. This is achieved by designing and delivering access solutions utilising connectivitiy options inlcuding lit and dark fibre, microwave (through lease or purchase of bandwidth at nearby telco point of presence (POP) sites), establishing ethernet links and WiFi cells, or via NBN (fibre and wireless) and satellite. Field Solutions have a focus on regional Australia, where they currently provide wholesale and retail products. Field Solutions can build software, establish private and public cloud hosting, design and deploy private networks and migrate existing products and software to the cloud; fully manage, monitor and optimise a client's cloud infrastructure and build disaster recovery scenarios. FSG is presently developing relationships with third party IoT solution providers to extend their telecommunications reach into the paddock. Examples of current rollout activities include northern and southern NSW, north Queensland and Tasmania.

Telecommunications solution on offer

As a licensed telecommunications carrier, and with staff experience covering WANs, backhaul telecommunications (including fibre rollout) and core infrastructure development and management, FSG is an exmaple of a business capable of offering full end-to-end solutions for producers. An example of a recent telecommunications solution developed for a large producer client (western NSW) is depicted below:
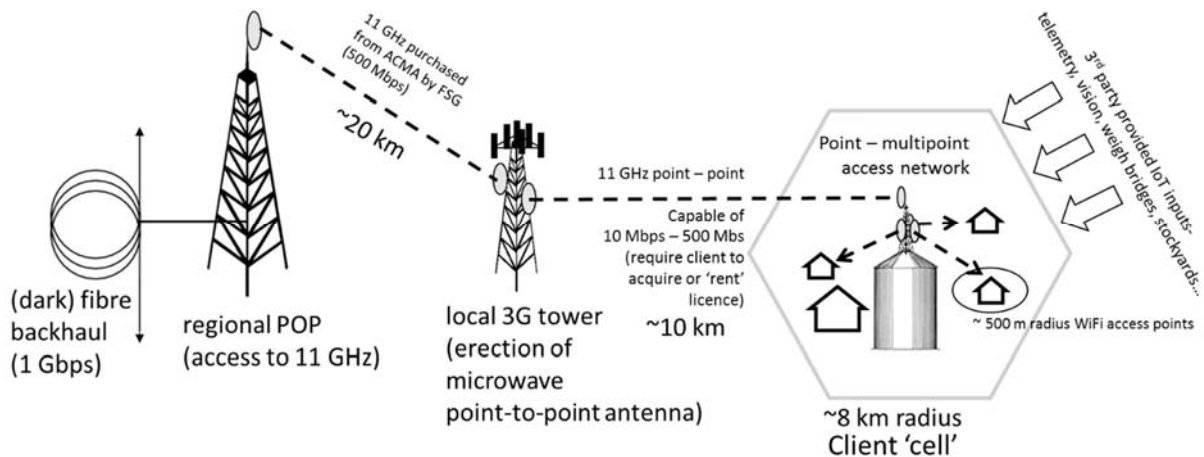
All aspects of the connectivity are included, including reserving of a portion of the 11 GHz beam (POP – local 3G tower), installation of the antenna on the 3G tower, establishing the point-to-point 11 GHz link to the client cell and establishing the point-to-multipoint connections to outlying buildings and regions within the farm. Point to multipoint access network is then designed for optimal speeds at each location; for example speeds are facilitated by time division multipoint access (TDMA) and if 360° coverage is required then the cell is divided into, say, 4 sectors- with, for example 100 Mbps capacity per sector (hence 400 Mbps capacity in full cell radius). The networks are built for low latency, hence supporting voice (e.g. VOIP) and video as well.

Challenges and Opportunities with clients

The majority of clients have little or no telecommunications background and so the team needs to have great 'retail engineering' skills. Surprisingly, cost is not a perceived barrier, even though solutions can range from $15-40k plus data, Usually innovative producers who are seeking solutions know their own business and the value of the connectivity to their business- both from enhancing the on-farm living experience of their workers, through to the value of accessing remote connectible devices.

Access to baseline telecommunications infrastructure can be as challenge. For example a nearby telecommunications tower may not have the mechanical scalability to support the additional installation of antennae and a new or strengthened tower may incur a ~$125,000 investment. The 11 GHz spectrum is affordable (< $1,000 p.a.) and supports lots of data throughput. However if this spectrum becomes fully utilized, for example with an increasing number of other parties also seeking to establish private links), then the lower frequency alternatives, for example 8 GHz have less capacity and significantly higher licence costs (~3-4 x). Antenna size also gets bigger, heavier (hence more tax on the infrastructure) and more expensive (e.g. ~$7,000). Solutions providers are not keen to rely upon the lower frequencies, such as the ISM Public Park bands because it is difficult to guarantee clients from interference and congestion.

The cost of accessing MNO infrastructure can be prohibitive; for example just feasibility studies required for tower access can cost tens of thousands of dollars, plus an application fee costs $4-5,000, plus infrastructure rental for that access can cost ~ $900-1100 per month. All of this must be translated onto the client.

Case Study #F6 – Cotton - "Keytah"

The Business

Business location: 32 km West Moree NSW

Key enterprise: Cotton, Grains, pulses

Property Size: 25,042 Ha (incl. ~ 10,000 Ha irrigated, ~10,000 Ha dryland)

Rainfall: 584 mm average (269 mm November – February)

Date established: In 1984 Sundown Pastoral Co purchased Keytah, latter purchasing adjoining Cudgildool, and then in 1986 added Wathagar and Boorondarra stations.

Contact: David Statham, Owner

Key activities and production capacity indicators:
Keytah Station has a capacity to grow up to 150,000 bales of cotton or 140,000 Mt of grain per annum. In the 2016/17 season Keytah planted 4865 ha irrigated and 1443 ha dryland cotton, 2154 ha long fallow and 2952 ha short fallow wheat, 3033 ha chickpeas, 1187 ha faba beans, 2103 ha oats and 923 ha lab lab beans. Cotton yields range from 11-12 bales/ha (dryland cotton) through to 1-2 bales/ha dryland. Cotton is processed from field to bale, all on one site.   Keytah's joint venture ownership with Wathagar Gin provides significant cost savings and efficiencies within the operation. The on-farm grain storage facility is capable of handling more than 50,000 t of grain/pulses per annum. Keytah is one of Australia's largest water license holders irrigating from the nearby Gwydir and Mehi Rivers.

Connectivity
External: Mobile network for office (4G tower in Moree located ~32 km away) and machine telematics (3G tower located ~ 9 km away)

Internal: UHF Radio (soil moisture probes, automatic weather stations, water level sensors etc), 3G (tower located ~ 9 km away; pickers, headers and tractors operating on JDLink™ and MyJohnDeere)

Key technologies requiring or utilizing on-farm connectivity

Considered one of Australia's leading innovators in precision agriculture for dryland and irrigated agriculture, Keytah is heavily reliant upon both static and mobile sensors for its operations including;
-50 soil moisture probes;
-11 pump sites where monitoring includes pump RPM, bearing temperature, prime/not prime status and fuel, and environmental data such as rain gauge, water level at pump intake and water storage level;
-2 automatic weather stations; and
-4 MACE meter monitors for monitoring river heights;
- 23 machines equipped with onboard telematics (John Deere) including 5 cotton pickers, 3 headers and 15 tractors.

Static sensors are linked via radio to a single, 3G gateway (farm office). The pump site diagnostics includes an essential alert capability which rings a sequence of mobile phone numbers (not SMS which is considered 'risky'). Machine telematics are connected via 3G network

Challenges and Opportunities
External connectivity is a primary challenge for this highly-innovative operation. Although Keytah is within visible line of sight to a mobile 3G tower (~ 9 km away), slow data speeds have necessitated installing a booster to access the 4G tower in Moree (~32 km away) for their offices. Machine telematics requires a 3G sim card per machine (~$4-500 p.a.) which equates to a significant annual data/machine service charge. Internet connectivity both across the farm landscape, to support the full capability of machine telematics and to facilitate staff access to live datasets, and within offices and the numerous living complexes is a significant challenge. From a purely lifestyle perspective Keytah management cite internet access for staff as a key decision point for them and their families deciding whether to live onsite or in Moree located 32 km away. Keytah are currently exploring farm wide network solutions with a number of service providers, including private network options to avoid what they consider are significant institutional impediments to them accessing the mobile network.

Farm and tower location rendered from Oztowers (Source: www.oztowers.com.au) and Google Earth. (N = NBNCo, T = Telstra, O = Optus, V = VHA). Distance marker = 8.3 km