final report

Project code:	P.PSH.1021
Prepared by:	Stephen Montgomery March IT Pty Ltd T/A MarchNet
Date published:	17 January 2020

Producer Connectivity Engagement Final Report

Abstract

The current state of connectivity technology for Australian cattle, sheep and goat producers is ad hoc and a lack of access to mobile and internet telecommunications is a major impediment to the adoption of digital agricultural systems. MarchNet attended eight key industry events across two years to demonstrate connectivity solutions and allow producers to access information about the options available to them.

This report identified that of the approximately 800 producers that were spoken to, approximately 90% of producers could benefit from improved connectivity. This ranges from the internet service they are currently operating on and/or the distribution of an internet service throughout their property. Producers need to be able to accurately demonstrate what type of return on investment on telecommunications services will provide for their business so they can justify the costs to increase their connectivity.

More producers with improved connectivity and access to data and feedback on animal performance to inform production decisions remains a key objective for MLA in developing a data culture.

Executive summary

In a recent Precision to Decision survey over one third of respondents reported that they knew nothing at all about the options available to connect devices on their farm. The current state of connectivity technology is ad hoc and a lack of access to mobile and internet telecommunications is a major impediment to the adoption of digital agricultural systems. The 2016 'Smart farming – inquiry into agricultural innovation' had telecommunications as a key issue in 5 of the 17 recommendations.

To provide information and address these issues, MarchNet attended 8 key industry events over the course of two years to demonstrate connectivity solutions and allow producers to access information about the options available to them. Events included key industry occasions such as the MLA AGM, SmartBEEF, LambEx and Beef Week. Ultimately, connected producers will enable innovation and R&D within red meat industry and across regional/rural Australia.

MarchNet attended each of these events with a trade presentation typically displaying two 3m lattice masts that can be connected together and guyed to reach heights of 30 metres as a cost effective way to engineer height when required to overcome difficult terrain or send communications over long distances. Attached to the masts different mobile communications equipment was installed for producers to view. Where possible MarchNet also set up and provided a Wi-Fi network for the event that showcased MarchNet's Wide Area Wi-Fi (WAWIFI) equipment.

MarchNet's involvement at a number of events also provided an opportunity to provide presentations on telecommunications services for producers/processors in regional and remote locations. MarchNet also provided internet backhaul and a Wi-Fi solution for a couple of the events with configuration and delivery of Wi-Fi networks involving setting up a number of High Powered Indoor and Outdoor Wi-Fi Access Points, which form a common part of our agricultural solutions.

Throughout our involvement in these eight key red meat industry events we spoke to a total of approximately 800 producers highlighting the type of connectivity they each require, what their barriers to improved connectivity are, and what their current state of connectivity are.

MarchNet registered thirteen producers for a Connectivity Evaluation and Design Study through our involvement at these eight key red meat industry events. From the thirteen direct registrations received, six Connectivity Evaluation and Design Studies were completed. None of the producers that committed and completed a Connectivity Evaluation and Design Study for their property committed to a co-branded case study.

Producers reported they require reliable internet services at their regional and remote properties, that does not drop out or suffer from variable internet speeds that render their service useless at peak usage times. The typical producer has a single internet connection for each of the homesteads on their properties. Producers often asked how they could make one single internet connection work across all of the homesteads for staff and families living on their property.

The regional and remote nature of producers within the red meat industry provides difficultly in accessing appropriate telecommunications services for their individual property requirements. Producers reported difficulty in their ability to attract and retain staff and their families at their properties without sufficient telecommunications services. Sufficient telecommunications ranges from basics, such as the ability for staff working on remote properties to call/skype family/friends

etc. to individuals living at a regional or remote property accessing online education platforms through to entertainment services such a streaming services. Without the ability to offer these services, producers are finding attracting and retaining staff difficult.

This project has identified that of the approximately 800 producers that we spoke to approximately 90% of producers could benefit from investment to improve connectivity. This ranges from the internet service they are currently operating on and/or the distribution of an internet service throughout their property. With a sufficient internet service that was distributed through a properties key operational areas, producers have the ability to operate their business without limitations that poor connectivity prohibits. Producers are then also positioned to access the growing range of agricultural technology solutions that present opportunities to increase operational efficiencies and productivity, whilst also providing the opportunity to increase revenue/profits.

This project highlighted the lack of knowledge regarding alternative solutions outside satellite and Telstra 3G/4G internet services. MarchNet's display at these industry events demonstrated that solutions did exist to solve the issues that red meat producers were facing. MarchNet presented alternative technology solutions with costs varying depending on the scale and type of solution provided. Producers reported they found it difficult to determine the benefits and cost savings/increases in productivity that an investment in improving connectivity would provide. They did not seem to have the ability to justify the expense or evaluate the return on investment.

Without investing in telecommunications services to improve a producer's connectivity, producers reported they were unable to access and deploy agricultural technology solutions at their properties. Solutions such as Wide Area Wi-Fi, which extends an internet connection throughout a property through microwave links that provide Wi-Fi at nominated end points, was a solution that enabled producers to provide internet access wherever an agricultural technology solution required.

MarchNet's attendance across these eight red meat industry events highlights the limited knowledge that producers have regarding what alternative telecommunications services are available. It is our recommendation that future investment is required to communicate and demonstrate what telecommunications services are available. The ability to report on and demonstrate what return on investment improved telecommunications can provide, alongside the deployment of existing agricultural technology solutions will provide great benefit to red meat producers to assist in justifying the costs to increase their connectivity.

Producers should be researching what alternative telecommunications services are available to them. This might involve researching products and services online or by engaging with industry professionals to obtain this information on their behalf. Producers no longer have to accept the limited service options that mainstream telecommunications providers offer.

Producers should also be engaging in Agricultural Technology groups, these can be online or in person. Many local communities are creating different forums to discuss how producers in a particular area are utilising agricultural technology and what type of telecommunications services are required to deploy this technology.

By investing in telecommunications services producers/processors can remove any of the limitations that poor telecommunications provide. The ability to adopt and employ new technology often hinges on the telecommunications infrastructure that a producer/processor has in place. Agricultural technology solutions have the ability for producers/processors to increase efficiency and productivity to which maintaining a competitive presence in the market and future sustainability is required.

Producers who are interested in deploying agricultural technology solutions should invest the time to understand what the cost/benefit this technology offers, which will assist them in being able to justify expenditure on telecommunications services for their business.

Table of contents

1   Background

In a recent Precision to Decision survey (P2Dproducersurvey--FinalReport_OnlineISBN.pdf) over one third of respondents reported that they knew nothing at all about the options available to connect devices on their farm. The identified operations for which they envisage using on farm telecommunications included compliance (fertilizer spray, chemical batch, time and date of application), inventory tracking and rotation grazing, field scouting and decision making (biomass, nutrition), safety (in yards and paddocks), market access and decision support.

The current state of connectivity technology is ad hoc and a lack of access to mobile and internet telecommunications is a major impediment to the adoption of digital agricultural systems. The 2016 'Smart farming – inquiry into agricultural innovation' had telecommunications as a key issue in 5 of the 17 recommendations.

To provide information and address these issues, MarchNet attended 8 key industry events over the course of two years to demonstrate connectivity solutions and allow producers to access information about the options available to them. Events included key industry occasions such as the MLA AGM, SmartBEEF, LambEx and Beef Week. Ultimately, connected producers will enable innovation and R&D within red meat industry and across regional/rural Australia.

2   Project objectives

By the 15th of November 2019 MarchNet will:
- Attend a minimum of 8 key industry events*; events will exhibit (subject to facility limitations):
  - A connectivity demo showcasing working mobile communications equipment (used in the field).
  - Demonstrate working solutions and discuss individual producer requirements.
  - There will be the opportunity to register producers for Connectivity Evaluation and Design Studies (20 off, first come first served).
  - There will be the facility to register producer interest for future innovative R&D investment.

3   Methodology

3.1   Events Attended

At each of these events MarchNet's trade display presentation typically displayed two 3m lattice masts that can be connected together and guyed to reach heights of 30 metres as a cost effective way to engineer height when required to overcome difficult terrain or send communications over long distances. Attached to the masts different mobile communications equipment was installed for producers to view. Where possible MarchNet also set up and provided a Wi-Fi network for the event that showcased MarchNet's Wide Area Wi-Fi (WAWIFI) equipment.

Any specific activation information for a specific event has been included below under the relevant event. In total over 800 producers had the opportunity to see MarchNet's offering.

3.1.1 SmartBEEF 2017 – Armidale, NSW

3.1.2 Red Meat 2017 – Alice Springs, NT

3.1.3 Beef Australia 2018 – Rockhampton QLD

3.1.4 LambEx 2018 – Perth, WA

A business grade satellite display was installed at the SmartBEEF 2017, Red Meat 2017, Beef Australia 2018 and LambEx2018 to highlight the range of communication technologies that are available. The installation of an Industrial Internet of Things (IoT) solution was displayed with a live demonstration for producers to engage with. A digital radio solution that also provides low bandwidth coverage was available for demonstration purposes. This type of solution is very cost effective at providing coverage up to 20kms with clear line of sight. MarchNet installed and provided event organisers, exhibitors and delegates with internet access via Wi-Fi.

3.1.5 BeefEx 2018 – Brisbane QLD

MarchNet was a Ruby Sponsor for the BeefEx event. The purpose of this display was to highlight the types of equipment we utilise on-farm within feedlots specifically to provide connectivity.

MarchNet's Ruby Level Sponsorship of the event also provided an opportunity to provide a presentation throughout the conference. Geoff Marsh, MarchNet's Director – Business Development, completed a presentation preceding the session on Big Data, Big Picture.

3.1.6 Red Meat 2018 – Canberra, ACT

During Red Meat 2018, MarchNet was also involved in the Digital Forum portion of this event where Geoff Marsh, MarchNet's Director – Business Development, completed a presentation which highlighted connectivity solutions and control centres using one of our existing client's Stanbroke Chinchilla Feedlot. Geoff's presentation assisted in demonstrating the value that connectivity can provide red meat producers with the ability to highlight some key outcomes from this particular case study.

3.1.7 SmartBEEF 2019 – Dalby, QLD

MarchNet provided internet backhaul and a Wi-Fi solution for the duration of the conference. We provided delegates and other exhibitors with internet access throughout all locations of the conference layout. This involved coordinating an appropriate level of backhaul to supply services via a Wide Area Wi-Fi deployment at the conference. MarchNet utilised an existing point of presence in Dalby for backhaul purposes. We deployed a trailer at the venue, which had a microwave dish installed to connect to our point of presence, which is a typical piece of equipment we use within our agricultural Wide Area Wi-Fi deployments. The configuration and delivery of this Wi-Fi network also involved setting up a number of High Powered Indoor and Outdoor Wi-Fi Access Points, which form a common part of our agricultural deployments also. Wi-Fi Access Points were strategically located throughout the Smart Beef 2019 Event in Dalby to provide full coverage for all conference locations.

3.1.8   Young Beef Producers Forum 2019 – Roma, QLD

4   Results

MarchNet attended and exhibited at eight key red meat industry events prior to 15th November 2019. Throughout our involvement in these eight key red meat industry events we spoke to a total of approximately 800 producers highlighting the type of connectivity they each require, what their barriers to improved connectivity are, and what their current state of connectivity are.

MarchNet registered thirteen producers for a Connectivity Evaluation and Design Study through our involvement at these eight key red meat industry events. From the thirteen direct registrations received, six Connectivity Evaluation and Design Studies were completed. A variety of factors such as: businesses being sold; lack of cash flow; insufficient internal support; and businesses negatively impacted from the drought contributed towards these Connectivity Evaluation and Design Studies not proceeding.

None of the producers that committed and completed a Connectivity Evaluation and Design Study for their property committed to a co-branded case study. Whilst a number of the Connectivity Evaluation and Design Studies progressed through to MarchNet delivering the proposed solution to meet each client's requirements. As a part of each Connectivity Evaluation and Design Study MarchNet evaluated each project with each producer to determine if a project application for co-funding with Meat and Livestock Australia met the innovation criteria for acceptance. To date, no projects proceeded to a co-funded project with Meat and Livestock Australia, which resulted in zero co-branded case studies as a direct result from this project.

5   Discussion

5.1   Producer requirements

Producers reported they require reliable internet services at their regional and remote properties, that does not drop out or suffer from variable internet speeds that render their service useless at peak usage times. Producers want affordable access to an internet solution that provides sufficient speeds and large data bundles that their current services do not offer. Without sufficient speeds and large enough data bundles producers advised that they cannot sufficiently access a range of connectivity services such as communications platforms such as Skype; entertainment services such as Netflix, and off-site storage solutions such as cloud based servers. Producers often reported that families and workers living at their property need to be able to complete online education which requires a reliable internet connection. Producers report that their current internet services are often insufficient to support the requirements for online education.

The typical producer has a single internet connection for each of the homesteads on their properties. Producers often asked how they could make one single internet connection work across all of the homesteads for staff and families living on their property. Producers also asked how they could distribute Wi-Fi throughout their operations, i.e. offices, induction yards, workshops, pens, homesteads, mills, etc. Producers wanted to be able to provide Wi-Fi coverage within the high traffic areas on their properties. Without widespread Wi-Fi coverage producers reported their inability to deploy agricultural technology options throughout their operations.

Producers who are located in regional and remote locations reported that there is most often areas of their property that has no mobile telephone coverage. Producers wanted to know how they could provide coverage within the high traffic areas on their property so that they could utilise their

mobile phones to make calls and/or access data services on their mobile phone without traditional carrier reception. Producers were advised that by providing Wi-Fi at these high traffic areas, a range of the latest model mobile phones offer a feature called Voice over Wi-Fi, which enables phone calls and data usage on their mobile devices using the Wi-Fi without the requirement of coverage from their mobile phone carrier.

5.2   Producer Barriers

Producers located in regional and remote location were not aware of any other internet service options besides a satellite solution. Producers advised that satellite services are not fit for purpose due to their slow speeds, limited data allowances and poor reliability. Slow service speeds at peak usage times, resulted in a speeds which could not cater for many required functions such as online banking as a primary example. When a producer consumes their available data allowance, their service speed is then slowed for the remainder of the month, which also results in speeds that producers report are not useable.

Producers advised that they are interested in deploying agricultural technology solutions on their property, however do not have the connectivity required. Any agricultural technology device that requires connectivity outside of the main homestead was not an option. Only agricultural technology solutions that provided their own satellite internet connectivity for any components that required installation away from the homestead were possible. Producers also reported that the costs of providing individual internet access to multiple components located at different areas on their property was not a commercial option for wide-spread distribution.

Producers located in regional and remote locations often have limited/no access to mobile phone and/or data reception from major telecommunications carriers like Telstra and Optus. This limited the types of connectivity that are available for these properties. Producers range from no reception at all, which requires a telecommunications solution not involving these carrier services at all, to patchy reception areas, which could utilise these carrier services with mobile phone signal boosters. Many properties would also require distribution of these services via a Wide Area Wi-Fi solution to distribute this service to the required location within each property. Quite often the distance from a carrier's tower was a primary contributor, however difficult terrain also caused issues for producers without a clear signal to one of the carrier's telecommunications towers.

The cost to install and access connectivity solutions is also a major barrier to adoption of new technology and telecommunication services for producers. Solutions that involve infrastructure to deliver services are often too expensive for the producer to undertanad and realise the benefit. Solutions that involve high on-going costs also prohibit producers from deploying different technology or service solutions to improve their connectivity situations. The size and scale of each producer operation made a considerable difference to their ability to realise benefit from investment.

5.3   Current State of Connectivity

Producers advised that they did not know about alternative connectivity options beyond major telecommunications mobile coverage, such as Telstra and/or Optus, or satellite based internet services. Producers were looking for specialists in telecommunications that could cater customised solutions to suit individual property requirements. Mainstream residential services do not cater well for regional and remote property locations with limited to no ability to customise solutions to fit the purpose of individual producers.

Many producer operational processes such as payroll are required to process applications and software programs outside of peak hours, as this is the only time they can access sufficient speeds and data allowance to successfully complete these tasks. Producers require an internet service that provides reliability without service drop outs, consistent internet speeds irrespective of peak service operator times and larger data bundles that what current mainstream service options provide. The cost to access large amounts of data over main telecommunications services such as Telstra 3G/4G is too expensive for many producers to start transferring larger data sets throughout their properties.

Producers reported difficulty in their ability to attract and retain staff and their families at their properties without sufficient telecommunications services. Sufficient telecommunications ranges from basics, such as the ability for staff working on remote properties to call/skype family/friends etc. to individuals living at a regional or remote property accessing online education platforms through to entertainment services such a streaming services. Without the ability to offer these services, producers are finding attracting and retaining staff difficult.

The regional and remote nature of producers within the red meat industry provides difficultly in accessing appropriate telecommunications services for their individual property requirements. Mainstream services such as major telecommunication carrier services such as Telstra/Optus and satellite services do not provide sufficient services to cater for their operational needs. The distance from existing infrastructure and challenging terrain local to a property eliminate a lot of options for producers. Producers report that satellite services are typically their last resort and only provide a very basic service that does not meet their minimum operational requirements with no opportunity to improve telecommunications on property.

Producers are operating on sub-optimal telecommunications services that do not allow them to engage with and deploy many agricultural technology solutions. Agricultural technology solutions that require an internet connection to operate outside of the homestead are not an option for producers with insufficient connectivity. Producers are as a result limited in their ability to adopt agricultural technology solutions which are designed to improve their operations and provide an increase in efficiency and productivity. Producers are at risk of being left behind their competitors who have access to telecommunications that are fit for their purpose of operations.

Whilst there are options available for producers with properties located in regional and remote locations these are often too expensive to access from either a capital investment and/or ongoing operational expense. Larger producers, specifically feedlot operators in the red meat industry have shown the greatest interest in making significant investment in improving connectivity. Smaller producers have shown difficulty in justifying an increase in expenditure on telecommunications to improve connectivity throughout their properties. Producers who have been looking to deploy an agricultural solution that demonstrates a confident cost saving, have been most successful in evaluating the cost of installing new services to enable deployment of their proposed agricultural technology solution.

The ability for producers to cluster a number of local properties to share infrastructure and/or ongoing telecommunications services came up as a result of discussion with producers at these events. Producers reported they did not individually have the ability to fund a solution on their own, however if they had the ability to work with fellow local producers to band together, they could potentially afford a solution that all parties could invest and benefit from. Whilst cluster solutions were discussed with producers, none of these opportunities resulted in a real opportunity for MarchNet to progress beyond the discussion phase.

6   Conclusions/recommendations

This project has identified that of the approximately 800 producers that we spoke to approximately 90% of producers could benefit from investment to improve connectivity. This ranges from the internet service they are currently operating on and/or the distribution of an internet service throughout their property. With a sufficient internet service that was distributed through a properties key operational areas, producers have the ability to operate their business without limitations that poor connectivity prohibits. Producers are then also positioned to access the growing range of agricultural technology solutions that present opportunities to increase operational efficiencies and productivity, whilst also providing the opportunity to increase revenue/profits.

This project highlighted the lack of knowledge regarding alternative internet service solutions outside satellite and Telstra 3G/4G internet services. MarchNet's display at these industry events demonstrated solutions to solve the issues that red meat producers were facing. MarchNet's solutions included MarchNet provided business grade internet service options, improved Telstra/Optus reception for mobile and data services and providing distribution of an internet service throughout a property.

The most attractive option from producers was solutions that improved existing services and/or distributed their existing internet service to individually nominated key locations. These two solutions required a small capital expenditure with no increase in ongoing costs which most producers reported they could justify.

A MarchNet provided internet service was a very attractive option for producers, because this service offer an uncontended internet service at a specified service speed. The ability to install this type of MarchNet service relied on establishing or utilising existing local infrastructure to deliver an internet service to a property. The costs associated with installing associated infrastructure provided the largest barrier to adoption and these costs varied depending on the location of producers and the relative ease or access or locality of a backhaul location. The second barrier that producers reported was the ongoing costs to access a business grade reduced or uncontended internet service to their property. Low contention or uncontended internet services can reach up to a couple of thousand dollars a month compared to many producers existing residential service offerings that start from under $100 per month.

MarchNet presented alternative technology solutions with costs varying depending on the scale and type of solution provided. Producers reported they found it difficult to determine the benefits and cost savings/increases in productivity that an investment in improving connectivity would provide. They did not seem to have the ability to justify the expense or evaluate the return on investment.

Without investing in telecommunications services to improve a producer's connectivity, producers reported they were unable to access and deploy agricultural technology solutions at their properties. Solutions such as Wide Area Wi-Fi, which extends an internet connection throughout a property through microwave links that provide Wi-Fi at nominated end points, was a solution that enabled producers to provide internet access wherever an agricultural technology solution required. A cluster of local producers also provides a great platform for producers to work together to collectively improve their telecommunications services at a shared costs. To date, no cluster opportunities have progressed further than the discussion phase. The difficultly we have seen throughout our involvement at these events with cluster opportunities is the ability for a single producer to engage with their local community and drive an outcome that then represents any real opportunity.

MarchNet's attendance across these eight red meat industry events highlights the limited knowledge that producers have regarding what alternative telecommunications services are available. It is our recommendation that future investment is required to communicate and demonstrate what telecommunications services are available. The ability to report on and demonstrate what return on investment improved telecommunications can provide, alongside the deployment of existing agricultural technology solutions will provide great benefit to red meat producers to assist in justifying the costs to increase their connectivity.

7   Key messages

Producers should be researching what alternative telecommunications services are available to them. This might involve researching products and services online or by engaging with industry professionals to obtain this information on their behalf. Producers no longer have to accept the limited service options that mainstream telecommunications providers offer.

Producers should also be engaging in Agricultural Technology groups, these can be online or in person. Many local communities are creating different forums to discuss how producers in a particular area are utilising agricultural technology and what type of telecommunications services are required to deploy this technology.

By investing in telecommunications services producers/processors can remove any of the limitations that poor telecommunications provide. The ability to adopt and employ new technology often hinges on the telecommunications infrastructure that a producer/processor has in place. Agricultural technology solutions have the ability for producers/processors to increase efficiency and productivity to which maintaining a competitive presence in the market and future sustainability is required.

Producers who are interested in deploying agricultural technology solutions should invest the time to understand what the cost/benefit this technology offers, which will assist them in being able to justify expenditure on telecommunications services for their business.

Consideration for MLA's next steps is to continue to create awareness for connectivity options as part of its overall strategy to promote the benefits for producers to make decisions informed through data and insights. The behaviour change for producers to embrace Digital Agriculture and capability to adopt R&D outcomes that rely on improved connectivity for their properties remains a challenge for the industry.

8   Bibliography

1. Zhang, Airong & Baker, Isaac & Jakku, Emma & Llewellyn, Rick. (2017). Accelerating precision agriculture to decision agriculture: The needs and drivers for the present and future of digital agriculture in Australia ---A cross-industry producer survey for the Rural R&D for Profit 'Precision to Decision' (P2D) project.
2. Australia. Parliament. House of Representatives. Standing Committee on Agriculture and Industry (2016). Smart farming Inquiry into agricultural innovation

9   Appendix

9.1   MarchNet Display Images

9.1.1   SmartBeef 2017 – Armidale, NSW

9.1.2   Red Meat 2017 – Alice Springs, NT

9.1.3   Beef Australia 2018 – Rockhampton, QLD

9.1.4   LambEx 2018 – Perth, WA

9.1.5   BeefEx 2018 – Brisbane, QLD

9.1.6   Red Meat 2018 – Canberra, ACT

9.1.7   SmartBeef 2019 – Dalby, QLD

9.1.8   Young Beef Producers Forum 2019 – Roma, QLD