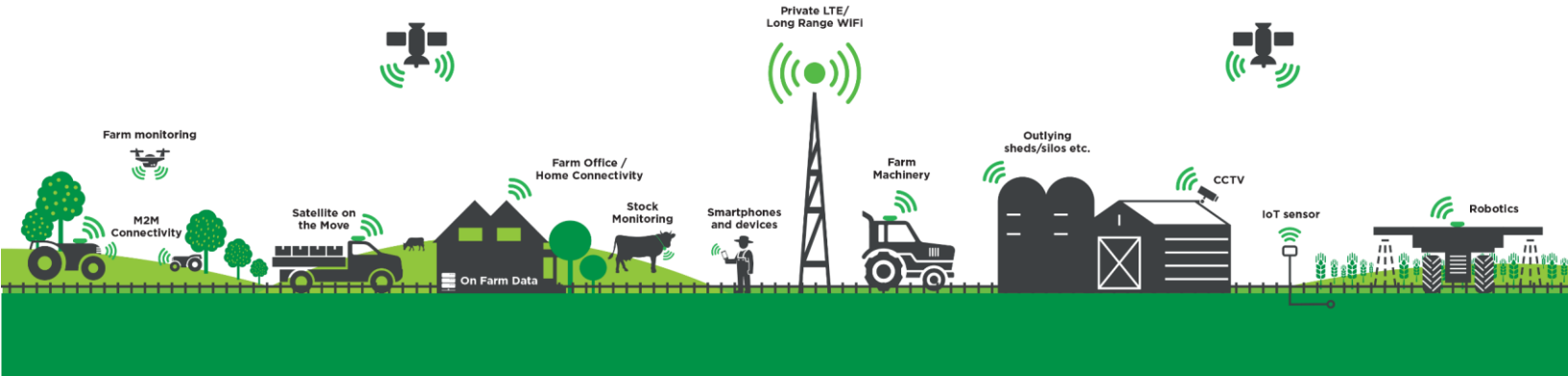
1800 Mhz and 2 GHz bands

ACMA review of planning arrangements outside of spectrum licensed areas

Submission prepared by Connected Farms

26 July 2024



RTIRC consultation

Connected Farms welcomed the opportunity to brief RTIRC committee members on 4 June 2024. During that meeting, Committee members sought follow up information from Connected Farms on a range of matters including:

- Spectrum access issues in rural regional and remote Australia
- Digital adoption figures in the agriculture sector
- Economic uplift associated with widespread adoption of digital agriculture and associated connectivity
- Population based MNO business models versus place-based business models of specialised telcos
- Connectivity literacy challenges
- Fit for purpose connectivity solutions for the agriculture sector

Based in Regional NSW, Connected Farms is an Australian-owned licenced carrier specialising in on-farm connectivity technology designed and customised for agricultural applications throughout Australia. Our solutions give farmers the means to increase their yields and reduce their inputs by enabling digital agriculture. We enable wide-area mobile (4G) broadband, narrowband IoT (LoRaWAN) and satellite on the move (SoTM) mobility connectivity across the farm which allows growers to adopt digital agriculture. Digital agriculture (including decision, precision and automation practices) cannot be adopted without accessible farm-wide high-speed connectivity.

Spectrum access issues in rural and remote Australia

A key barrier in the ability of small or specialist telcos to deliver innovative and low-cost services to rural and remote Australia and agricultural communities is access to appropriate lower band spectrum (sub 1GHz spectrum). With much of the sub 1Ghz spectrum held under spectrum licenses by the Mobile Network Operators (MNOs), spectrum access is a significant barrier for new entrants to address unmet demand. Currently regional and specialist telcos are effectively locked out of accessing spectrum licenced bands in the sub 1GHz frequencies and therefore need to use a combination of higher band and less cost-effective apparatus and class licensed spectrum.

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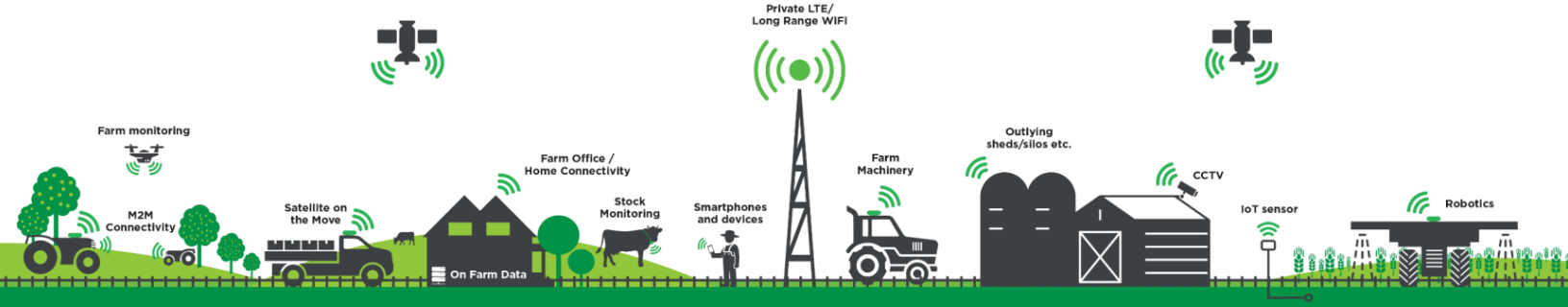
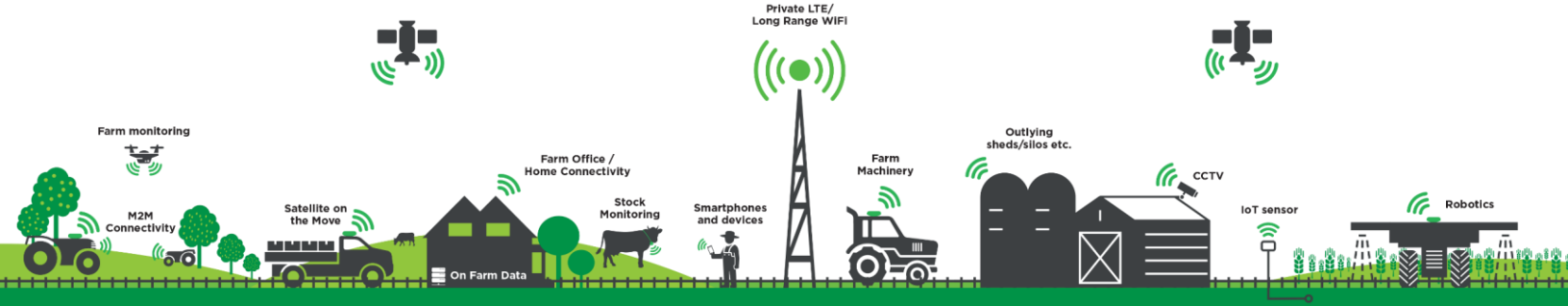


Using apparatus licensed spectrum (1800/2100MHz) in rural and remote locations and across agricultural lands imposes a build cost of approximately 4:1 (1800Mhz versus sub 1GHz spectrum e.g. 700Mhz) because of different radio propagation characteristics, additional tower requirements for signal reach and equipment costs. By removing spectrum access as a barrier to entry, alternative providers may well be able to service these locations with low-cost place-based delivery models.

In rural and remote areas of Australia there are patterns of long-term unused or under-utilised low band spectrum held by MNOs (sub 1GHz spectrum). This is despite high levels of unmet demand and digital exclusion across these areas. Digital exclusion is pronounced in rural and remote areas, and as the ACMA notes approximately 11% or 2.8 million Australians experiencing digital exclusion. Spectrum access is a key enabler of digital inclusion.

Connected Farms delivers innovative low-cost services, including private 4G networks, to underserviced rural and remote agricultural lands, however access to allocated but under-utilised low band spectrum is a barrier to meeting this demand. In some circumstances access to apparatus licensed spectrum in 1800 and 2100Mhz bands is also a barrier in some rural and remote areas. For example, Connected Farms was recently commissioned by an agribusiness in remote northern NSW to deliver a private 4G network across the entire farm. The farm has some connectivity to the farmhouse but not sufficient coverage over the land to enable digital agriculture adoption and automation. This is a common experience across agriculture lands. Approximately 85% of the farm lacks acceptable connectivity from the major mobile networks. Decision and precision digital agriculture practices require farm wide high-speed connectivity to realise the benefits of digitisation and automation.

In this circumstance, following detailed technical radio frequency planning work, it was identified that there were no spectrum bands available for Connected Farms to meet this demand and deliver the service to the agriculture customer. Low band spectrum is not available for apparatus licensing and only parts of the 1800MHz and 2000Mhz bands are available for private apparatus licensing in remote Australia and this is subject to technical planning parameters. In this location, of the six existing PTS apparatus licensed services, five are already assigned to MNOs effectively locking out alternative providers from delivering services in the PTS bands. This prevents operators like Connected Farms providing connectivity tailored to enhancing digital agriculture in this location.



Digital adoption rates in the agriculture sector and economic uplift associated with access to connectivity and digital agriculture.

Agriculture sector

Within the agriculture market, numerous studies have shown the significant unmet demand and value to be unlocked by enabling digital agriculture and connectivity across farmlands. The Australian Farm Institute, in its 2017 modelling and analysis of the economic benefit and strategies for the delivery of digital agriculture in Australia, determined that:

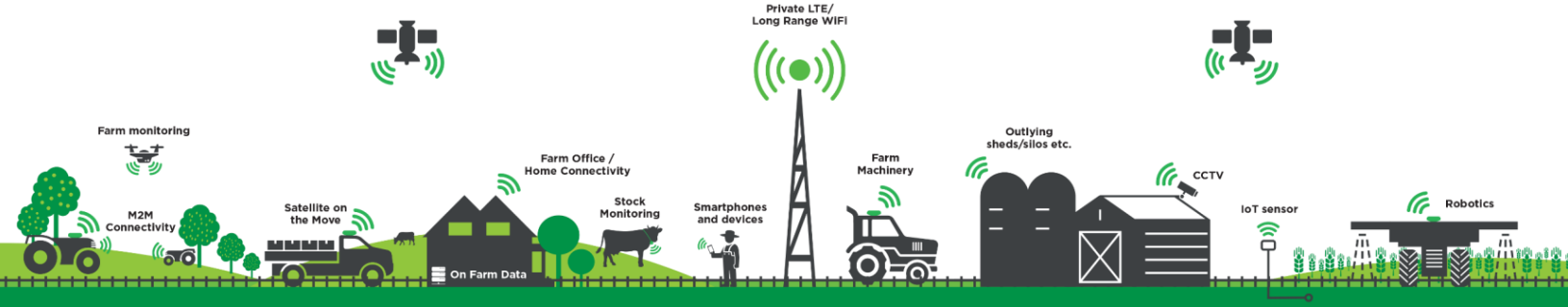
"If decision agriculture was fully implemented it would deliver an estimated boost to the value of agriculture of 25 per cent ($20.3 billion) and lift the Australian economy by an estimated 1.5 per cent ($24.6 billion)."

Separately, the Bureau of Communications, Arts and Regional Research estimates that the additional economic benefit from digital technologies could be between $3.0 and $10.6 billion per year (in 2017–18 dollars) for the agricultural sector by 2029–30, which represents an additional boost to economic activity in agriculture of between 4.7 to 16.9 per cent by 2030.

In 2021, The Department of Agriculture, Forestry and Fisheries (DAFF) noted that digital adoption in the Australia agriculture industry is estimated at just 10% and that a 3-fold increase in active technology users is required for agriculture to reach its ambitious goal to move to a $100 billion industry by 2030. Digital technologies and data can enable farmers and the broader supply chain to make faster, more informed decisions, automate processes and predict future events. Uptake of digital technology could create a $20.3 billion per year increase to industry production.

The Australian Bureau of Statistics Characteristics of Australian Business 2021-22 shows that only around 12% of agriculture businesses had used IoT in 2021-22 and almost half of surveyed businesses faced barriers to using ICT, compared with only 38% if all Australian business. Regardless of whether gains have been made since 2021, connectivity barriers continue to have a significant impact on the productive potential of agriculture sector.

The National Farmers Federation, in its National Connectivity and Digital Agriculture Policy Statement, outlined that connectivity and digital agriculture are intrinsically linked, with connectivity



advancements underpinning the adoption of digital agricultural practices. Connectivity improving connectivity services are key to materialising the estimated $20 billion AgTech opportunity.

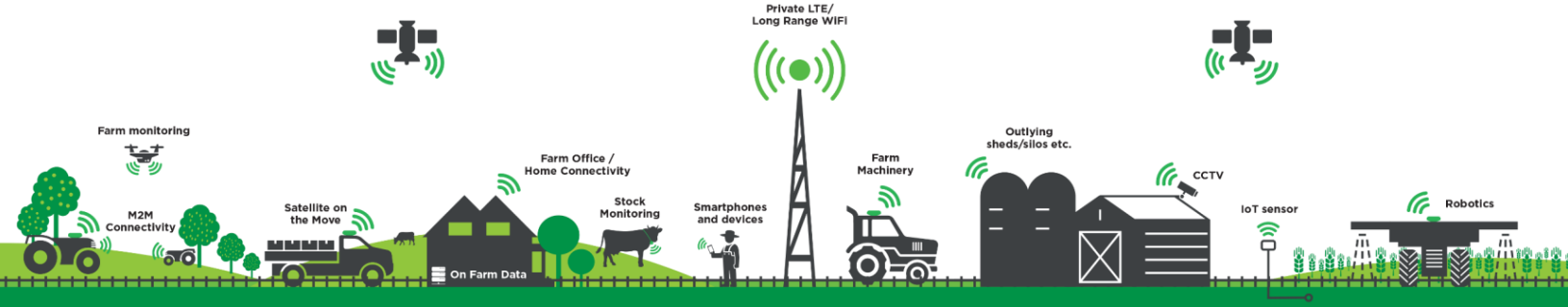
Digitising agriculture will be critical to unlocking key markets, increasing sustainability, efficiency and productivity. Widespread adoption of digital agriculture is critical to the achievement of the government's goal to grow the sector to $100 billion by 2030. A key enabler to realising these benefits is access to appropriate low band spectrum in these areas. Spectrum allocation policy must promote opportunities for innovative and low-cost alternative solutions in rural and remote areas and across agriculture farmlands to deliver voice and data mobile network services, via access to bands that are most appropriate to the use case and geographic area (including private networks).

Population-based MNO business models versus place-based business models of specialised telcos

National carrier business models of MNOs are fundamentally based on population density, connecting premises and servicing transport corridors. The economics of building towers and networks in rural and remote areas is challenged by these business models whereby multiple layers of subcontracting drive higher build costs, while lower population density reduces ability to secure returns on investment.

The economic challenges associated with delivering infrastructure and services to rural and remote Australia are well understood and documented for MNO business models, for example in a submission to the 2021 Regional Telecommunications Review Telstra noted that *'because of the challenging economics, there are likely to be few new economically viable sites in regional and remote areas without support from government funding'* and that *'difficult terrain and low population density means that there will always be large parts of Australia's land mass that will not get terrestrial based mobile coverage, even with funding initiatives.*

While this is undoubtedly the case for MNO business models, this does not have regard to smaller regionally focused place-based operators with lower deployment and infrastructure costs and the growth of private network operators to address market failure in some rural/remote locations and agriculture sectors. The emergence of smaller specialist providers with alternative low-cost place-based business models introduces alternative economics and investment value into servicing rural and remote areas. The population-based business models of MNOs mean that there is unmet demand across productive agriculture lands and opportunities exist to provide contiguous coverage to these areas.



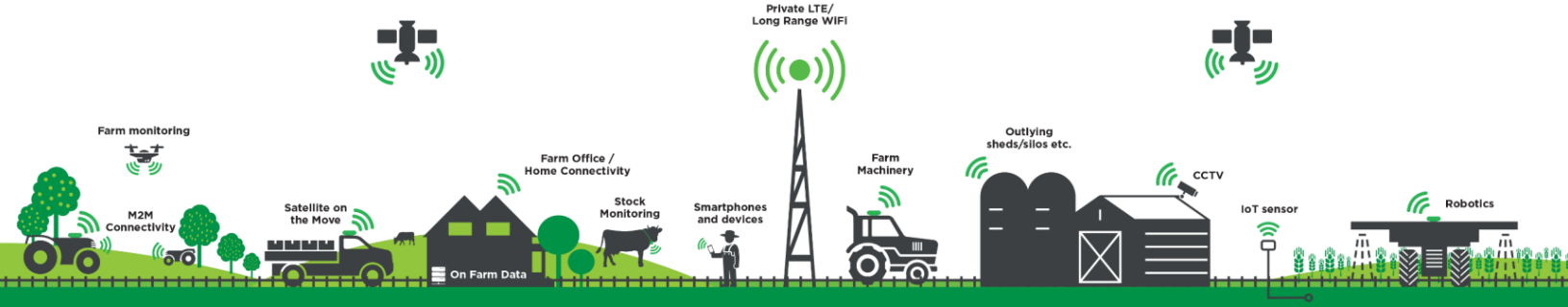
This is supported by the ACCC's findings in its 2023 Regional Mobile Infrastructure inquiry *"To the extent that regional-focused operators can develop alternative means of providing mobile coverage in regional Australia, there may be benefit in providing those operators with access to [currently* allocated, *and particularly low-band] spectrum, particularly where the spectrum may be not currently used".*

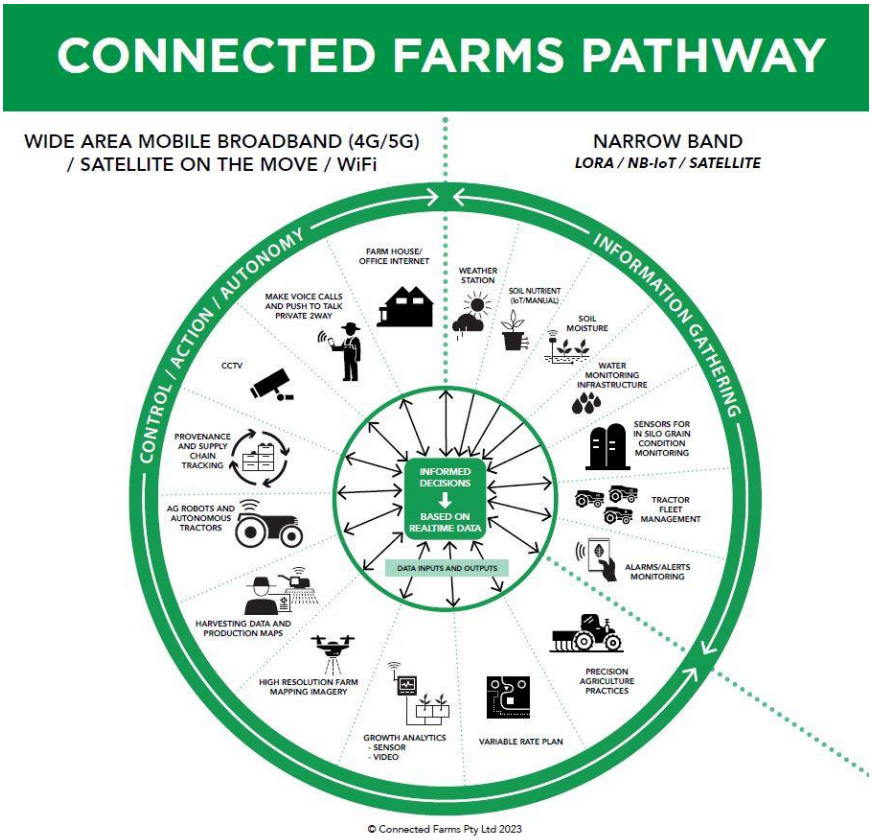
Lack of access to low band spectrum for non-MNOs removes the incentives for the incumbents to be competitive and acts as a barrier to the delivery of competing and innovative services to address unmet demand.

Fit for purpose connectivity solutions and connectivity literacy challenges in the agriculture sector

Agriculture is a diverse industry with a range of different sectors each requiring different connectivity solutions and tech 'stacks'. To enable digital agriculture, farmers firstly need connectivity solutions. This may be narrowband such as IoT to enable sensor equipment and applications and may also include broadband solutions such as 4G networks, satellite connectivity and WiFi networks. Broadband connectivity solutions enable precision and decision farming and automation which deliver higher input savings, ROI and yields. Not all connectivity solutions are fit for purpose across each agriculture sector. For example, while LEO satellite solutions may be appropriate for the broadacre sector to deliver digital agriculture capabilities, precision and decision farming practices, the same solution may not be effective in a horticulture orchard environment where tree canopies may interrupt the line-of-sight signal.

Our Connected Farms connectivity pathway places the farmer at the centre of these connectivity solutions and overlays them across the types of equipment, devices and farming operations. This is a useful way to view the range of different connectivity solutions, technology and equipment that is needed for farmers to adopt digital agriculture and connectivity.

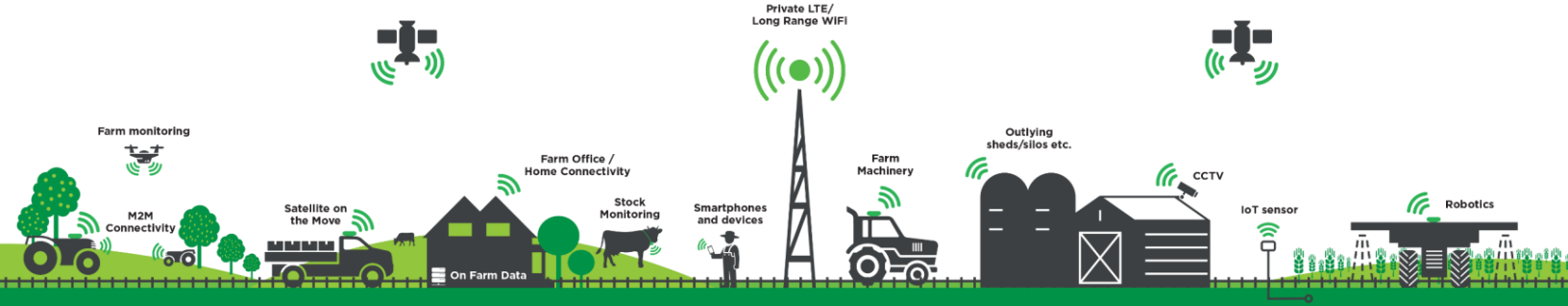




Successive regional telecommunications inquiries have detailed the profound social, economic, health and educative disadvantages experienced by rural and remote consumers because of lack of access to digital internet technologies and reliable connectivity. This includes challenges for worker safety, access to emergency services and other occupational health and safety issues. According to Safework Australia, in 2021-22, 88.5% of agriculture fatalities occurred on the farm, with agriculture again recording one of the highest rates of worker injury and fatality of all sectors in the economy.

The Australian Broadband Advisory Council found that in the agriculture sector:

Salt and pepper connectivity is holding back online business and administrative functions, the full use of digital functionality on existing equipment, the use of digital technologies that need reliable and



ubiquitous connectivity and is forcing costly offline work-arounds for farmers and agri-tech providers. It is also affecting regional economic growth by holding back online farm-based businesses and has particular social impacts on women and online learning for children.

A key challenge in realising the full use of digital functionality of technologies, solutions, equipment and applications is connectivity literacy. The Regional Tech Hub is to be congratulated in the work they are undertaking to provide information and advice around connectivity, but there is significant confusion and misinformation in the agriculture sector around connectivity needs, appropriate products, services and connected solutions. Farmers require fit for purpose connectivity equipment and are often sold products that do not work effectively within their connectivity coverage footprint or lack the robustness to withstand on farm conditions. Technology adoption roadmaps where farmers can identify what their digital agriculture adoption pathways and technology stacks look like are critical to improving digital adoption.

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