SUBMISSION

AGRICULTURAL INNOVATION

I. INTRODUCTION

The Cattle Council of Australia (CCA), the Australian Lot Feeder's Association (ALFA) and the Sheepmeat Council of Australia (SCA) welcomes the opportunity provided by the House of Representative Standing Committee on Agriculture and Industry to comment on the current and future opportunities to grow productivity within the red meat industry through greater utilisation of technological innovation.

Cattle Council is the peak industry body representing Australia's grassfed beef producers. The primary objective of the Council is to represent and progress the interests of Australian cattle producers. The membership of Cattle Council is comprised of both State Farming Organisations and also individual producers, through a direct membership function.

ALFA is the peak industry body representing grain fed beef producers. The key roles of ALFA are to advocate on behalf of the cattle feedlot industry, to allocate and prioritise the expenditure of the grain fed cattle transaction levy, to undertake capability development activities for the sector; and to provide valued membership services.

SCA is the national Peak Industry Council representing and promoting the needs of Australia's lamb and sheepmeat producers. The Council draws on many mechanisms to bring a diverse range of issues and needs to the policy making process. Principal amongst these is input from the State Farming Organisations, which have extensive networks within their jurisdictions.

This submission focuses on the production sector. There are many other aspects along the red meat supply chain related to innovation, which have not been covered. It is worth noting though, that the red meat sector is now Australia's largest manufacturing industry and in order to maintain this and the exports that the industry generates, it is critical to have a productive livestock sector.

II. RECOMMENDATIONS

1. That the Australian Government encourages and supports industries to invest in innovative technology to improve productivity through expansion of the 'Rural R&D for profit' or a similar programs, focusing on the application of new technology.

2. That the Australian Government considers ways to improve telecommunications and technology infrastructure in regional areas, to enable producers to take full advantage of current and future technological developments and avoid limitations on their business associated with satellite broadband rationing.

3. That the Australian Government review legislation regarding the use of drones and remove restrictions to better enable them to be used as a tool for producers on-farm.

4. That Australia's agricultural and veterinary chemical registration process be streamlined and mutual recognition frameworks introduced to allow producers to more readily access these vital tools.

5. That the Australian Government provides greater support for the development of private sector extension to enhance uptake of innovative technology by producers.

6. That the Australian Government supports the adaptation of overseas research to the Australian market by continuing reforms to improve efficiency of the assessment and registration process for new chemicals and medicines.

7. That the Government retains the R&D tax incentive to enable on-farm research to continue to be classified as a tax deduction by producers.

II. TERMS OF REFERENCE

The Committee will inquire into and report on the role of technology in increasing agricultural productivity in Australia. The inquiry will have particular regard to:

- improvements in the efficiency of agricultural practices due to new technology, and the scope for further improvements;

- emerging technology relevant to the agricultural sector, in areas including but not limited to telecommunications, remote monitoring and drones, plant genomics, and agricultural chemicals; and

- barriers to the adoption of emerging technology.

IV. BACKGROUND

Productivity measures how efficiently inputs are combined to produce outputs. The most commonly used productivity measurement is to examine the ratio of the total quantity of outputs produced by a farm against the total quantity of inputs.

In the case of the red meat industry this is the production of live animals and meat products from the inputs of land, labour, machinery, farm inputs and services. The rate of productivity growth in the beef industry has been modest over the past 30 years, with the northern industry outperforming southern beef production as shown in Figure 1 below.

Figure 1: Beef industry total factor productivity growth 1977-78 to 2011-12

Source: ABARES (Thompson and Martin 2014)

Productivity growth is necessary to balance the long-term decline in producers terms of trade, (the value of outputs divided by the cost of inputs) experienced in broadacre agricultural industries.

The role of technology in increasing agricultural productivity therefore includes any technology that can increase the value of beef cattle and sheep produced relative to the value of inputs used.

The scope is very broad and encompasses the whole research, development and extension system, which has been discussed extensively in recent years by the Productivity Commission review of research and development corporations (2010), parliamentary inquiries into agricultural levies (2014) and the Agricultural Competitiveness White Paper (2015).

There is also much published research, including by ABARES on the relationship between public agricultural RD&E investment and technology overflow from overseas research on productivity growth.

The potential gains of the red meat industry to grow productivity by taking up new research outputs is also outlined in the recently released Meat Industry Strategic Plan (MISP), with an upside potential of $2.11 billion of on-farm benefits arising from industry investment in productivity focused RD&E to 2030 (RMAC 2015).

This submission focuses on new and emerging technologies and barriers to their uptake on-farm within the sheepmeat, grass and grain fed cattle sectors. The inquiry's terms of reference highlighted telecommunications, remote monitoring and drones, genomics, and agricultural and veterinary chemicals; so the on-farm applications of these technologies will be the focus of this submission.

V. PROPOSALS

Improvements in the efficiency of agricultural practices due to new technology, and the scope for further improvements.

One of the most important ways by which producers have remained viable is by maintaining productivity growth - 0.9% per annum for beef enterprises and 0.5% per annum for sheep enterprises over the long term. Increased returns to the farm gate are found to be more effective when R&D delivered is closely coordinated with marketing.

The industry, together with matching government funds, invested $36.02 million in programs to improve on-farm productivity in 2012-13. These investments included implementation of the feed base investment plan, lamb and weaner survival programs, priority projects in northern Australia targeting reproductive efficiency, as well as supporting investments in Future Farm Industries CRC, and Sheep CRC.

The major inputs to red meat production are land, labour and livestock. For example, the northern beef situation analysis report (MLA 2014) found that 94% of assets from the sample producers comprised land and livestock. The largest operating expense for the sample producers from 2010-2012 was wages and an allowance for the owner operator wages, accounting for 33% of total operating expenditure (MLA 2014).

It therefore follows that the greatest scope for new technology to improve productivity is in reducing these major inputs to red meat production, being land, livestock and labour. This section of the submission provides more information on the key improvements due to technology and where there is scope for further advances.

1.1 Labour

Labour is an area where new technology is already allowing business owners and managers to use their time more effectively, reducing workplace injuries and to save costs. For example, technology is enabling producers to be more productive through allowing for water points to be remotely monitored instead of engaging in the expensive and time consuming ‘bore run’ on extensive pastoral properties. R&D into automation and robotics at feedlots has the potential to further reduce the need for employees to come into physical contact with cattle thereby reducing injuries, workers compensation claims whilst improving employee productivity and cattle welfare.

The Sheep CRC program 2014-19 includes a section focused on auto-monitoring systems that reduce the significant labour costs of monitoring in order to reduce ewe, lamb and weaner mortalities on-farm and improve culling decisions. This program will also lead to improved well-being and productivity through providing timely responses to defined risks for grazing sheep, allowing producers to make more informed assessments.

1.2 Land- Feed base development

New technology has the potential to increase the productivity of land through better feed base development and improving control of grazing in extensive and cropping regions by better managing livestock movements. The use of satellites in the grains industry for monitoring crop growth and health is slowly being applied to some grazing systems but further work is required to ensure that the cattle and sheep industries are able to capitalise on this information.

Over the years, the red meat industry has collaborated through programs such as ProGraze, Grain&Graze and Ever Graze to develop new pastures and to educate producers on pasture and animal assessment. These programs also included climate risk management and environmental benefits. It is also worth noting that in order to improve drought management, more R&D is need on pastures and land management in low rainfall (or drought) conditions.

Public and industry funding has been a critical component of these programs, and must be continued into the future to build profitable and sustainable enterprises.

1.3 Livestock- Genetics

The use of gene markers to allow producers to more accurately select and breed for specific cattle or sheep traits such as feed efficiency, marbling or reproductive performance provides large potential opportunities into the future. Ultimately an accurate determination of the genetic potential of animals when they are young, will allow producers to focus on the best performing and more profitable animals.

Reproductive performance is a major driver of livestock productivity. New technologies in the form of autonomous monitoring and management systems in the cattle and sheep industry have the opportunity to increase the number of animals born.

The use of objective measurement and selection indices is already widespread in the cattle industry. Approximately 75% of commercial bulls in southern Australia are sold with Estimated Breeding Values (EBV's). The use of EBVs has helped to increase the rate of genetic gain on desirable traits but genomics has the potential to increase the rate of improvement, particularly for difficult to measure traits such as fertility and feed conversion efficiency in cattle.

Reproduction rate is known to be a key contributor to profitability in northern Australian beef breeding businesses. However, it is a low heritability trait that requires detailed data to enable estimation of generic merit by BREEDPLAN. The required data is difficult to collect in large bull breeding herds run under extensive conditions in northern Australia. Research supported by MLA, through the Beef CRC, and subsequently the Animal Genetics and Breeding Unit has delivered genomic days-to-calving breeding values for the Brahman breed. Days-to-calving, an expression of how quickly a cow conceives after being exposed to a bull and gestation length, is a key component of reproductive success and achieving an annual calving. Brahman breeders can now use a DNA test to have Days-to-Calving breeding values estimated for animals evaluated in Brahman BREEDPLAN.

In sheep, MLA and co-investors, UNE and CSIRO, have developed a genomic Parentage Test. This is a low cost test that dramatically improves the accuracy of parentage assignment, an important component contributing to the accuracy of Australian Sheep Breeding Values. The Sheep CRC has further refined the test to a high throughput version and are delivering the test to industry. Results are provided to Sheep Genetics to improve the accuracy of Australian Sheep Breeding Values produced by Sheep Genetics.

The Sheep CRC program 2014-19 includes a section focused on more accurate identification of genetically superior animals at lower cost that will significantly increase industry participation in genetic improvement, allow more sophisticated and comprehensive breeding programs and result in accelerated genetic gain. This will be of particular advantage to the Merino industry, which is composed of many strains of the breed and more genetically-diverse than meat breeds.

There is also more genetic work needed to further assess factors, which effect lamb survival. This genetic work when coupled with studies on the time of lambing/ environmental factors has a large potential to increase the lamb survival rates and therefore productivity.

1.4 Livestock- Individual Animal Identification.

Individual animal identification in the cattle industry is mandatory and utilises the radio frequency identification devices (RFID) in the form of ear tags or rumen boluses. The sheep industry mandatory traceability system is based on a mob based visual approach that allows some of the following practices to occur. Sheep producers have the option to build individual animal systems into their management practices on farm.

Technology linked with animal identification, mob based or individual, is evolving to allow the collection and transfer of a range of animal health, residue, yield and meat quality information along the supply chain. This information transfer gives producers more knowledge to improve their management efficiency and livestock productivity.

For example, MSA provides cattle producers with data and tools to analyse the eating quality related measurements of the livestock they produce. The red meat industry has several current projects to improve the flow of yield, quality, food safety and animal health information along the red meat value chain.

These projects aim to:

1. Provide a common, consistent standard for the exchange of information across value chain members to improve value and/or reduce costs.
2. Facilitate the exchange of regulatory and voluntary industry information efficiently and effectively.
3. Enable more effective integration of industry systems and an enhanced capacity to use available data for research, development and adoption opportunities for the value chain.

4. Provide a mechanism for advanced value chain collaboration to respond to consumer drivers and support opportunities for value-based payments.
5. Support relationships with stakeholders and commercial providers in adding value and identifying opportunities for business efficiency and profit.

The productivity gains stem from real time feedback and options to improve value chain efficiency and profitability; enhancing the commercial offerings of processors; creating better relationships between commercial producers and processors to achieve specifications that underpin branded products; and directly linking measures of carcase quality and yield into the industry genetic improvement programs.

While industry continues to utilise the existing technology and build on this work there is also room for R&D that considers other, newer, forms of individual identification. The use of technology that recognises individual animal characteristics, nose prints, retinal patterns etc., could be revolutionary in the industry, removing the need for plastic ear or rumen devices that can be become inactive or be displaced. Further to this research, this type of individual animal recognition could be used for wild dogs, allowing for better control and management of the pest, which is very destructive to the cattle and sheep industries. The Invasive Animals CRC is currently considering R&D in this space.

Finally, R&D that considers new forms of technology improves the incentive for commercial entities to become involved in the industry. The drawback of leveraging existing technology to improve supply chain productivity is that without a new widget to sell and with the benefits spread to multiple parties along the chain, there is less incentive for single commercial entities to drive uptake. To improve individual animal identification, data management and traceability systems it is critical that the R&D is funded by government and that the legislated industry levy arrangements are both flexible and nimble to enable funds to be diverted to their most pressing need.

1.5 Livestock / supply chain -objective carcass measurement

New technology is currently being assessed to address the issue created by subjective human assessment of carcase quality at plant. Through introducing more objective carcase measurement technologies, issues surrounding perceptions of processor bias and conflict of interest can be removed, more transparent market signals can be provided to producers to improve the quality of animals bred, and a more accurate system can be introduced to ensure livestock are paid according to their true market value. For example, Meat & Livestock Australia (MLA) is currently conducting research into the use of video cameras to more accurately estimate P8 fat and muscle score in carcases. According to MLA, halving non-compliance with weight and fat specifications will result in $92 million of additional value to the cattle industry over 12 years.

The Sheep CRC 2014-2019 Program has a section, which focuses on 'Quality-based sheepmeat value chains'. Both yield and quality have a profound effect on profitability at every stage in the supply chain. Additional research is needed to develop a measurement and knowledge system that can be used as the basis for

abattoir grading of carcases to underpin value-based trading in sheepmeat supply chains. It is estimated that around 30% of carcases fail to meet optimal specifications and this results in losses through wastage – time spent trimming excess fat and lower prices for downgraded carcases. These costs are currently absorbed across the full supply chain.

Machine-based grading of individual carcases to predict value, based on cuts of meat and their eating quality, will be a transformational development for the sheep industry.

A new cuts-based grading and MSA certification for sheepmeat will have implications beyond the lamb industry. The research will be extended to establish a new science-based system for grading cuts from larger lean carcases (>25kg) that currently fall outside lamb specifications, particularly for some domestic markets, and for grading cuts of yearling Merino carcases that are currently classified as 'mutton'. This collaborative model allows for researchers, service providers and industry to work together, with the support of government, to achieve specific industry outcomes directed to production and sustainability goals. CRCs have delivered valuable tools that have benefitted sheep producers through the support of long-term research in areas that can be developed through to commercialisation and adoption.

The Sheep CRC program 2014-19 includes a section on alternative market opportunities identified with a preference for MSA-verified yearling Merinos that are currently discounted to mutton prices. These market opportunities would allow wool growers to get two wool cuts off their wethers and market yearling animals to produce a valued meat product.

Recommendation:

1. That the Australian Government encourages and supports industries to invest in innovative technology to improve productivity through expansion of the 'Rural R&D for profit' or similar programs, focusing on the application of new technology.

Emerging technology relevant to the agricultural sector, in areas including but not limited to telecommunications, remote monitoring and drone, plant genomics, and agricultural chemicals.

2.1 Telecommunications: Connectivity and capacity access

There are many opportunities in the sheep and cattle industries to improve productivity, through efficient systems, however these are limited by the poor internet coverage in rural Australia. Even in areas close to urbanisation there is a lack of coverage. It is also important to note that in some regions that have coverage, there is not the capacity to be able to fully utilise systems. It is critical that telecommunications are improved to give producers greater connectivity, with ample capacities to access new technologies but also so commercial companies are willing to invest in the industry.

For example, the cattle and sheep industries have been working with existing technologies to develop systems that allow information flow along the supply chain. In particular, the development of an electronic National Vendor Declaration, which can be produced on-farm and flow through the transport process through to the sale would be hugely beneficial to the industry. However the current limitations on internet connectivity greatly hinders the ability of industries to achieve the development and utilisation of such as system.

2.2 Telecommunications: Virtual Fencing for Managed Grazing

The development of new technologies will dramatically alter on-farm operations in the future. A major emerging technological development could be virtual fencing, through the use of wireless sensor nodes and other sensors, that enable static virtual fencing whereby devices emit warnings and deliver tactile stimuli to manage animals within pastures. Linked to other sensors within the wireless network, this technology would enable livestock and environmental monitoring/management in real time.

Within Northern Australia, the cost of fencing and labour are major impediments to increasing pasture utilisation. Increased ability to manage the movement of grazing animals through technology would enable a greater degree of flexibility and provide an opportunity for precision management strategies. By utilising the technology large scale paddocks will be able to be grazed more efficiently.

Some of the most promising avenues for early delivery of a virtual fencing application include automated mustering, environmental protection (e.g. riparian zones) and variable grazing and pasture budgeting control at the patch level (i.e. taking into account within paddock variation in land condition) without the need to erect expensive fences.

There is good opportunity for this technology to be used to improve penetration of livestock into cropping areas, enabling increased flexibility around using pastures and grazing within cropping rotations for improved weed control and increased livestock production. This technology could also be used to improve the management on livestock on crop stubbles to improve options for out-of-season finishing.

Recommendation:

2. That the Australian Government considers ways to improve telecommunications and technology infrastructure in regional areas, to enable producers to utilise current and future technological developments and avoid limitations on their business associated with satellite broadband rationing.

2.3 Remote monitoring and drones

Remote monitoring has enormous potential to improve productivity by reducing land, labour and livestock inputs. MLA has conducted research with technology partners to develop and deliver autonomous data collection and management systems to enhance both production efficiencies and market opportunities for cattle operations in northern Australia. Remote management of water points has been developed and tested in partnership with technology businesses, and current effort is on demonstrating the cost-effectiveness of these systems in different regions of Australia. The savings in labour and vehicle costs, through reduced physical checking of water points, can result in a payback period of as little as 12-24 months.

The widespread use of individual animal identification in the cattle industry provides opportunities for automatic collection of information on cattle located in remote locations and to link this with automated management options. Such as collection of weight information with walk over scales or automated drafting of livestock into yards at watering points.

The type of remote monitoring applications that can be used on-farm are however likely to be limited by internet access, rationing of satellite broadband and current legislative CASA restrictions, which require drones to only be used within the line of sight of the operator.

The potential application of drones on extensive and intensive livestock properties is enormous. For example, they have application for video monitoring of water points and stockyards. Moreover, they can be equipped with behavioural, temperature and location sensors to provide early diagnoses of animal health issues such as heat stress or Bovine Respiratory Disease (BRD) in a feedlot or live export environment. A serious heat stress event can affect cattle health, productivity and profitability by up to 40% in a year. BRD is the single costliest disease affecting feedlot cattle, with losses estimated at $60 million annually. It is estimated to cause 50-90% of illness and death in Australian feedlots. Early identification of animals exhibiting signs of heat stress or BRD would enable improved management and treatment of these individuals and potentially greatly reduce the impact of these conditions on profitability and wellbeing. In addition, improved diagnostics via drones can reduce treatment costs (and potential antibiotic resistance) and cattle stress (via not having to treat animals that may appear ill) thereby further improving potential profitability.

Drones also have the potential to accurately monitor feed availability in extensive and intensive operations. Collection of data on feed availability in extensive pastoral

operations can assist with early decision making on adjusting stocking rates to meet feed availability. In intensive operations, drones have been trialled to monitor feed remaining in bunkers with data used to adjust feeding rates. As mentioned above, there are however regulatory impediments to the use of drones, the key one being CASA restrictions that require drones to only be used within the line of sight of the operator. Moreover, privacy issues surrounding drone use still require resolution.

Recommendation

3. That the Australian Government review legislation around the use of drones and remove restrictions to better enable them to be used as a tool for producers on-farm.

2.4 Vet medicines, agricultural chemicals, and dietary supplements- Methane emissions

Methane emissions from ruminant animals account for more than 10% of Australia's greenhouse gas production. Commonly, 6-10% of the energy consumed by ruminants is lost as methane thereby reducing animal productivity.

Research into fundamental mechanisms of rumen function through the National Livestock Methane Program has led to an enhanced understanding and the belief that the amount of energy captured from digestion of feed in the rumen could be greatly increased. With an appropriate change in biochemical pathways within the rumen, energy capture could be enhanced and methane emissions substantially reduced. Further investment in this area by the cattle industry is considered to be of high priority because of the large potential benefits in national methane mitigation and animal productivity and the opportunity to develop novel technologies for the ruminant industries.

Example future technologies for increased rumen efficiency include:

- Red marine macro-algae evaluation (reduced methane production by up to 80%) in different classes of ruminants and development of a commercial growing, harvesting and drying process
- Manipulation of rumen function and biochemical pathways to allow markedly enhanced capture of energy from digestion and reduced methane emissions
- Evaluate two selected plant bioactive compounds in sheep for reducing methane emissions and quantify effects on productivity. If positive results are achieved then there is the need to pursue a commercialisation plan.

2.5 Vet medicines, agricultural chemicals, and dietary supplements- Agvet chemical access

Criticism is often levelled at the APVMA's rigorous regulatory requirements surrounding the registration of new agricultural and veterinary chemicals. Although our regulatory system is considered a strength in Australia's participation in the

global red meat market, it is also known that new chemicals seem to reach the market earlier in some countries which compete with Australia in the global market. For example the two newest sheep drenches (new modes of action) to be registered in Australia were on the market in New Zealand for a number of years prior. Restricted use of, or access to products can compromise productivity and animal welfare whilst placing Australia at a competitive disadvantage in the international arena.

Recent work done by Rural Industries Research Development Corporation (RIRDC) showed the agricultural industries are facing productivity challenges including the management of pests and diseases. To be able to overcome this issue, industry needs access to new and safer pesticides and veterinary medicines. Unfortunately however, the case for commercial investment is not always sufficient given the regulatory cost for chemical registration and the relatively small size of the market. Australia is no longer on the global priority list for pesticide and veterinary medicine commercialisation as it was 20 years ago. The current framework for registering products of veterinary chemicals including timeliness and costs relative to commercial return on investment, limits the number of commercial companies investing in the cattle and sheep industries.

AgVet chemicals are essential tools for ensuring an economically successful red meat sector as they allow for producers to improve their profitability and productivity by controlling disease. Australia must ensure that the AgVet chemical system allows for producers to have access to newest products and technology whilst remaining internationally competitive.

It is recommended that Australia consider the adoption of mutual recognition with respect to the registration process previously undertaken by other countries for new agricultural and veterinary chemicals so that the process can be streamlined.

Recommendation

4. That Australia's agricultural and veterinary chemical registration process be streamlined and mutual recognition frameworks introduced to allow producers to more readily access these vital tools.

Barriers to the adoption of emerging technology.

3.1 Aspects that effect adoption on farm

A recent review of adoption of innovation conducted by MLA developed the following framework by which innovations are adopted on-farm:

1. Anticipation of a need for productivity gains.
2. Experiencing declining profitability.
3. Seeking information on innovation.
4. Weighing the alternatives and risks of innovating.
5. Making a decision about innovating.
6. Undertaking a trial innovation.
7. Making a change in production.
8. Reaffirming the decision based on the feedback loop that productivity has been enhanced.

The process by which innovations are sought, tested and adopted is influenced by a large range of factors that vary by producer and property, including:

- Management style (e.g. interest in detail)
- Farming approach (e.g. preference for organics)
- Farmer personality (e.g. preference for solitude)
- Existing enterprises (e.g. keeping an existing Merino flock)
- Existing infrastructure (e.g. maximising use of pivot irrigation)
- Labour limitations (e.g. maintaining within a single labour unit)
- Farm planning (e.g. size of paddocks)
- Natural landscape and environment (e.g. water availability)
- Debt (e.g. capacity or desire to further invest)

Identifying precisely what the barriers to adoption of new technology are at an industry scale is difficult with so many variables.

There are numerous pathways to the adoption of new technology on-farm, including commercial pathways, publicly funded extension and a combination of public and industry funding through the rural research and development corporations.

The decline in publically funded extension activity has been well documented however there are strong arguments for a continued role for publically funded extension of new technology with high proportion of public benefits, particularly while the capacity of privately delivered services is still developing.

Recommendation:

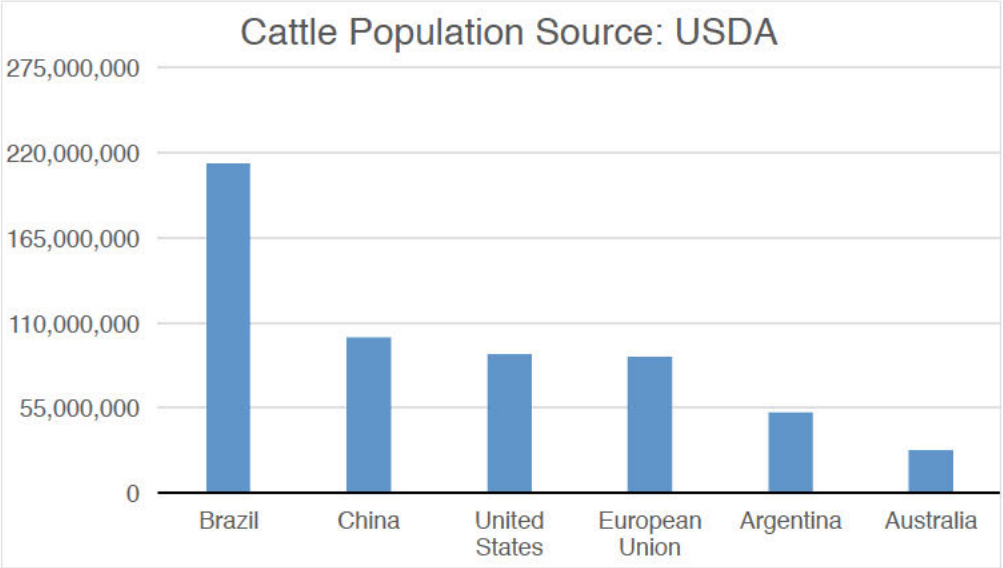
5. That the Australian Government provides greater support the development of private sector extension to enhance uptake of innovative technology by producers.

3.2 Commercialisation effects on adoption

Private sector research, development and extension will develop based on commercial opportunities available for new technology developers and suppliers. However, there are barriers to the efficient function of private sector extension in Australia driven by the small size and large geographic spread of the market, poor internet coverage inhibiting ecommerce, and a lack of willingness to pay for advice, driven in part on a traditional reliance on publically funded extension.

ABARES (2014) research suggests the relative contributions of foreign and domestic research activities (including domestic extension) to broadacre total factor productivity (TFP) growth have been roughly equal. However, research and technology from overseas sometimes requires adaptation and modification for the Australian market.

While Australia is a large beef, sheepmeat and live cattle and sheep exporter, the size of the cattle herd and sheep flock, and therefore the market for new innovative technologies is small compared to other nations and agricultural sectors (i.e. the grains industry).



Commercial uptake of new technologies can be impeded if those technologies need to be substantially modified for the Australian environment or require extensive testing to meet a different regulatory framework.

Examples of new technologies that need adapting for the Australian market include agricultural chemicals and veterinary medicines, which require local testing to ensure safety and efficacy in the Australian environment.

As a result of these issues, Australia is a relatively low priority for plant and animal health companies when considering whether to register their products in this country.

Recommendation

6. That the Australian Government supports the adaptation of overseas research to the Australian market by continuing reforms to improve efficiency of the assessment and registration process for new chemicals and medicines.

3.3 Internet Capability and Access effect on adoption

New technology is increasingly leveraging internet connectivity to help improve labour productivity. Without reliable internet connectivity, producers are restricted in the technology options and are forced to use more expensive options (such as using radio telemetry for remote sensing) and face limitations on sending and receiving information, responsiveness and management flexibility.

Robust and reliable sensor and data communications infrastructure will be important. It needs to be supported by appropriate data storage and processing architecture to enable not only individual data access but also the opportunity for data sharing.

The increasing opportunity to automatically collect information that is more detailed on cattle and sheep that are located in remote locations and to link this with automated management options should be facilitated by research and development on high-tech autonomous systems that can be established in remote locations.

The Australian Farm Institute published an article in its regular newsletter in May of this year highlighting some of the limitations on adoption posed by poor internet coverage. The article highlighted the relative disadvantage that producers face as small businesses in regional and remote areas of Australia compared to small businesses in urban areas and producers of competitor nations such as the United States. Lack of connectivity and limitations on usage will act as an inhibitor to the uptake of new technologies with high data requirements.

3.4 R&D tax incentive

The Research & Development (R&D) Tax Incentive is a targeted broad-based Federal Government program, introduced in 2011, that encourages businesses to undertake R&D by offsetting some of the costs involved.

It has two core components:

- a refundable tax offset for certain eligible entities whose aggregated turnover is less than $20 million
- a non-refundable tax offset for all other eligible entities.

The program is highly valued by producers, as it helps address the market failure associated with the inability of smaller producers, the vast bulk of Australian farmers, to fund R&D given limited capital raising capacity. It additionally, helps address the

extended lag times between idea development and R&D delivery (again a problem associated with smaller less well funded producers).

Recommendation

7. That the Government retains the R&D tax incentive to enable on-farm research to continue to be classified as a tax deduction by producers.

VI. REFERENCES

Sheng, Y., Gray, M & Mullen, John D. 2011, Public Investment in R&D and Extension and Productivity in Australian Broadacre Agriculture, ABARES Research Report 11.08

Thompson, T & Martin, P 2014, Australian beef: financial performance of beef cattle producing farms, 2011–12 to 2013–14, ABARES research report prepared for Meat & Livestock Australia, Canberra, August 2014.

MLA 2014, The Northern beef report: 2013 Northern beef situation analysis. Project code B.COM.0348 Meat & Livestock Australia Limited, Locked Bag 991 NORTH SYDNEY NSW 2059, April 2014

RMAC 2015, Meat Industry Strategic Plan MISP 2020 including outlook to 2030 Red Meat Advisory Cpincil, NFF House (Level 2) 14–16 Brisbane Avenue Barton ACT