



Submission to Parliamentary Enquiry into Agricultural Innovation
From the chairs of Southern Farming Systems and the Australian Controlled Traffic
Farming Association

Dear Committee Secretary,

Thank you for the opportunity to contribute to the parliamentary enquiry into agricultural innovation.

Southern Farming Systems (SFS) is a farmer-driven, non-profit organisation focussing on sustainable farming systems in the higher rainfall regions of southern Victoria and Tasmania (www.sfs.org.au). It has five regional branches. The geographic spread of these branches reflects the diversity in soil types, production systems, climate, seasonal rainfall patterns, and market opportunities that occurs across the region. It has over 500 financial members. The main focus of **SFS** is on-farm management and improving on-farm production systems. SFS undertakes research and trials for research and development corporations, private companies and federal and state government stakeholders.

The Australian Controlled Traffic Farming Association (ACTFA) is dedicated to improving the profitability and sustainability of Australian agriculture through the promotion and support of controlled traffic farming (CTF) systems, in grain, cotton, sugar and horticulture (www.actfa.net). Over the past 10 years ACTFA has successfully hosted 9 conferences, including the First International CTF Conference in Toowoomba, 2013. The ACTFA committee is also a significant contributor to the research, development and extension of CTF and sustainable farming principles and is currently running substantial projects for the Grain Research and Development Corporation and the federal Department of Agriculture.

SFS is a regional farming systems group and ACTFA is a cross-industry body. Both organisations have made separate submissions to this enquiry. However, as the chairs of these two organisations, we recognise the importance of a regional perspective as well as a broader cross-industry perspective. We would like to emphasise the importance of innovation and the role it plays in successful farm businesses.

Having contributed to and observed closely the Agricultural Competitiveness Whitepaper process we welcome the initiatives that have been established, particularly **Priority 4: Farming Smarter**.

Firstly we applaud the “**\$100 million** extension of the Rural R&D for Profit Programme to 2021–22 to get research onto the farm.” Both our organisations have contributed to other elements of this priority and are endeavouring to contribute further with our submission to this enquiry. We see this enquiry as an integral part of developing “**New RD&E priorities** to direct levy funds to areas that will improve farm gate returns.” We have also contributed to the consultation process with GRDC on the changes to its structure and governance which meets the Whitepaper aims to “**Reduce RDC administration** costs to leave more money for RD&E.”

Drilling down to the priorities of the **Rural R&D for profit Programme** we see a number of clear relationships with key elements of SFS and ACTFA objectives as well as the cross cutting objectives of

the Department of Agriculture to enhance profitable farming and optimise the use of public funds. This enquiry provides the opportunity for the government and the Department of Agriculture to engage directly with farmers through these organisations that have as their primary objectives the use by farmers of innovative technologies.

For ease of reference the priorities in the Rural R&D for profit Programme have been copied into the table below and comments on the relevance to the terms of reference of this enquiry have been made in the right hand side of the table.

The submissions tendered by SFS and ACTFA refer specifically to the following terms of reference, as published on the Parliament of Australia website:

1. improvements in the efficiency of agricultural practices due to new technology, and the scope for further improvements;
2. 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
3. barriers to the adoption of emerging technology.

Rural R&D for profit programme priorities	Related TOR	Relevance to innovation enquiry in SFS and ACTFA Recommendations.
<p>1.) advanced technology, to enhance innovation of products, processes and practices across the food and fibre supply chains through technologies such as robotics, digitisation, big data, genetics and precision agriculture</p> <p>For example, RD&E relating to sensors, GPS technology, drones, data utilisation, software tools, autonomous systems, or developing new or improved products.</p> <p>By applying advanced technology, including technologies from other industries, the project should help primary producers increase yields, reduce costs, manage risks, benchmark performance and/or exploit opportunities in the supply chain or markets to increase returns.</p>	1	Both organisations have well established knowledge of advanced technologies and are leading the adoption and validation of such innovations.
	2	SFS has a particular interest in how “advanced technology” relates to the value chain particularly on managing production, environmental and crop quality aspects as they relate to markets. ACTFA in its submission states; “improvements in established and emerging technology, particularly disruptive applications can leverage real time and historic data to continuously improve farms at the enterprise and business levels.”
	3	Both organisations would like to see more emphasis on extension and adoption mechanisms for CTF and other aspects of agricultural research and development.
	3	Both organisations would also like to see an increased commitment of government to regional and community communication infrastructure to enable data capture and information storage and transfer.
<p>2.) biosecurity, to improve understanding and evidence of pest and disease pathways to help direct biosecurity resources to their best uses,</p>	2	SFS undertakes variety trials and field trials for new crop protection products. CTF technologies maximise the in-field

<p><i>minimising biosecurity threats and improving market access for primary producers.</i></p> <p>For example, RD&E relating to surveillance systems, diagnostics, pre- and post-harvest controls, disinfestation treatments, data management and interpretation or sterile insect technology.</p> <p>By improving biosecurity measures the project should help primary producers reduce costs, increase productivity and competitiveness, protect and industries, manage risks or gain, maintain or regain market access.</p>	<p>1 & 2</p>	<p>utilisation of crop protectants and fertilisers.</p> <p>SFS and ACTFA are mindful of the increasing levels of traceability relating to customer and other stakeholder scrutiny that will be placed on farm production systems. Both organisations recognise that the information gathered for environmental, quality and OH&S purposes (particularly as they relate to on-farm use of chemicals for example) can all be used to drive productivity and efficiency as well as satisfy customers who have increasing interest in where their food comes from.</p>
<p>3.) soil, water and managing natural resources to manage soil health, improve water use efficiency and certainty of supply, sustainably develop new production areas and improve resilience to climate events and impacts.</p> <p>For example, RD&E relating to integrated management practices at a farm or regional level, nutrient use efficiency, managing soil and water efficiency and constraints, managing soil carbon, or weed and/or pest animal management.</p> <p>The project should help producers improve soil, water and natural resource management practices for productivity, long-term use and profit, and improved environmental outcomes.</p>	<p>1, 2 & 3</p>	<p>ACTFA and SFS believe that accurate and efficient farm operations and judicious allocation of resources underpin viable farm businesses today. However it is the pursuit of innovation that will enhance the viable farms of tomorrow.</p> <p>SFS was established 20 years ago with the founders adopting raised bed technology from the irrigation industry. Since then modern technologies such as satellite guidance and geographic information systems have become integral to farm practice. ACTFA has fostered the development of this technology across grains, cotton, sugar and horticulture. SFS fully endorses ACTFA's criteria for TOR 1. Wider adoption of CTF would:</p> <ul style="list-style-type: none"> -Improve Australia's productive land by minimising random compaction damage by heavy machinery; improve crop productivity on those uncompacted soils; -maximise the amount of rainfall harvested and used by plants, yet prevent waterlogging; -allow new areas to be opened up for food production, such as the north and the high rainfall south; -allow machine standardisation for efficiency and interchangeability;

		<p>-increase the application efficiency and the efficacy of all crop inputs, and reduce off site impacts;</p> <p>-provide a platform for data collection, transfer and analysis; and maintain Australia's agricultural markets by improving product reliability, quality and traceability.</p>
<p>4.) adoption of R&D, focusing on flexible delivery of extension services that meet primary producers' needs and recognising the growing role of private service delivery.</p> <p>For example, RD&E relating to extension delivery options and infrastructure, reducing barriers to adoption, improving private sector extension services or innovative means for co-ordinated delivery of extension services.</p> <p>The project should facilitate producer adoption of new technological innovations and research and development outcomes to increase productivity growth and profitability. This priority is not intended to replace state or privately provided extension services.</p> <p>Adoption of research outputs is key to the success of the programme. The applicants must consider how primary producers will use the outcomes and must build pathways to adoption or benefit into projects.</p>	1, 2 & 3	<p>ACTFA and SFS provide here a unique opportunity for the government to work within a significant Australian cropping region, namely the High Rainfall Zone of the south. SFS and ACTFA are also willing to work with and share knowledge and innovations across other industries.</p> <p>Both organisations are accessible, flexible and provide information not only directly to growers but increasingly via the growing array of private extension services.</p> <p>At the same time these organisations uphold a culture of objectivity and rigor that is critical when a farmer is faced with judging whether information, technologies and advice is coming from a trustworthy source.</p>

SFS has developed very significant expertise in the use of manures, composts and other organic amendments to improve difficult sub-soils. These innovations are ground-breaking in the true sense of the term and the principles of this innovative technology and practice together with CTF are applicable across grains, cotton, sugar and horticulture (both annual and perennial).

The current operating environment in Australia is somewhat restrictive in facilitating adoption and dissemination of innovations like this. Countries like India and China, however, are not. They both now have significant emphasis on reduction of emissions, recycling of nutrients as well as a focus on improving farm profitability. We are optimistic that we will see similar policies with multiple objectives emerge from this parliamentary enquiry process.

To maintain and build competitiveness, Australian agriculture has to understand;

- what are the high value products buyers want
- what are the quality standards to command the premium price
- what are the assurance standards that buyers need before they will buy.

The whole value-chain needs to know how to produce that product, and how to play its role collaboratively in delivering the product to the market place cost-effectively. The technological approaches supported by ACTFA and SFS are well placed to meet the needs of current and future value chains in agriculture.

Thank you for the opportunity to contribute.

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Southern Farming Systems



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Chairman
Australian Controlled Traffic Farming Association



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Submission to the Australian Government's inquiry into Agricultural Innovation

By

Southern Farming Systems

Inverleigh Victoria



Southern Farming Systems (SFS) is a farmer-driven, non-profit organisation focussing on sustainable farming systems in the higher rainfall regions of southern Victoria and Tasmania. It has five regional branches. The geographic spread of these branches reflects the diversity in soil types, production systems, climate, seasonal rainfall patterns, and market opportunities that occurs across the region. It has over 500 financial members.

Our Vision

Diverse integrated farming systems in the high rainfall zone driven by innovative practices and people. As can be seen by our vision, **SFS** believes innovation is the key to future success and sustainability.

This submission refers specifically to the terms of reference published on the Parliament of Australia website:

1. improvements in the efficiency of agricultural practices due to new technology, and the scope for further improvements;
2. 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
3. barriers to the adoption of emerging technology.

SFS welcomes the opportunity to contribute to this enquiry. In this submission we identify some of the major issues that we believe can foster agricultural innovation in Australia. We also make recommendations on ways to alleviate impediments and create a more favourable operating environment for agriculture and the agricultural value-chain in regional Australia.

SFS believes that addressing these issues will build capacity to drive greater productivity and regional development through innovation.

The funding situation for farming systems groups is concerning. Government funded projects initiated by previous governments will be winding down over the next few years with little in sight in the way of new programs from the Federal Departments of Agriculture or Environment. State departments are also under pressure and are withdrawing from their traditional roles. This means that farming systems groups and cross-industry organisations have been endeavouring to re-establish themselves in the vacuum created by the change in these more traditional research partners. **SFS** believes this is an opportunity to build capacity and be responsive to grower needs, be efficient in execution and delivery of research and be cognisant of the role our farmers and regional businesses all play in innovative agricultural value chains.

Australian agricultural productivity has increased steadily by about 2% per year since the 1950's and much of this can be attributed to improvements in cultivars, agronomy, farming systems and technologies brought about through structured research and development conducted either directly or indirectly through Australia's Rural Research and Development Corporations.

Research by farmers also contributes substantially – as they continually explore new and innovative agricultural techniques, largely with their own resources. Research funders that were established to address cross-commodity issues or systems research have been wound back in recent years.

There is opportunity now to ensure that research to address agricultural innovation; on farm, through the value chain and for markets in the Southern Rainfall Zone is led by **SFS** in partnership with governments, industry and academia. All Government decisions relating to agriculture and regional development should be made through this prism of the agricultural value-chain; i.e. the government must consider the impact of all policy decisions on Australia's capacity to target high-value global markets and the flow-back effects throughout the value-chain. Examples would be decisions relating to free trade agreements, foreign investments, resource and infrastructure ownership, regional development, and biosecurity. Such an approach would facilitate regional development, global trade and local well-being.

Recommendations:

1. Through professional regional farming systems groups evaluate and implement the best new innovations and bring across into agriculture the best of the disruptive innovations that are changing the trade and consumer landscapes.
2. To drive innovation provide the opportunity for farming systems groups to identify, develop and commercialise the best innovations in a timely manner.
3. Ensure responsive and nimble producers by empowering grass roots organisations to manage RD&E so that innovations in emerging technology can be adopted and adapted to meet specific global and local markets.
4. Attract human resources from the city and from within regions: develop their skills and applications within the regions. The cross-relevance of these innovations will liberate them to a world of opportunity at home and abroad.
5. The development of smarter farms with management down to the individual plant level will depend on their capacity to adopt emerging technology; and this will be dependent on their capacity to manage information quickly and decisively. Preference should be given to regional Australia for accelerated roll-out of the national broadband network.

Terms of reference 1. Improvements in the efficiency of agricultural practices due to new technology, and the scope for further improvements;

The Australian Government can, through professional regional farming systems groups take a lead in evaluating and understanding the future and changing needs of consumers in Asia, it can evaluate and implement the best new innovations and bring across into agriculture the best of the disruptive innovations that are changing the trade and consumer landscapes. This will increase Australia's competitiveness and improve performance at the farm level.

Cooperative research centres (CRC) have been a successful model for Australia, however in the case of innovations in agriculture CRCs led by grower groups would be preferred. Traditionally major research establishments with significant financial clout but less attachment to grass roots farm businesses have led these CRC's, consequently there has been significant lag time in adoption and an inability to commercialise innovations in a timely manner. Time to market in the emerging technology front is an important factor otherwise findings can be redundant before they make it to the field.

Such an approach could rapidly improve efficiency in farm practices and address big issues essential to Australia's agricultural and regional prosperity and to Australia's international competitiveness. These opportunities are being sadly overlooked by current funding structures; namely cross-commodity issues, farming systems and resource use, landscape design, vertical integration through supply chains (production, processing, transport, marketing), the changing global environment, and regional development.

A significant number of cross-commodity and industry issues could be addressed with the establishment of a Centre of Excellence as a think tank to increase our understanding of the agricultural value-chain in Australia, in particular the management of product and financial flows between the different elements of the value-chain and the drivers for investment in each step of the value-chain. This would allow the establishment of an information resource base relating to innovation management in agricultural value chains in Australia. It would provide knowledge and operational support to build scale and manage risk in targeting high value markets where Australia has, or will have, a competitive edge.

Terms of Reference 2. Emerging technology relevant to the agricultural sector, in areas including but not limited to telecommunications, remote monitoring and drones, plant genomics, and agricultural chemicals;

There are many emerging technologies that are relevant to the agriculture sector. One such technology is that used by Uber. Uber has significantly disrupted the taxi industry. It has allowed a direct linkage between a consumer and a service. Australia's agricultural competitiveness will be best served by national and regional transport systems based on effective integration of road and rail, so that the transport functions within Australian agriculture can be best matched with the most efficient and cost-effective means of delivery for each specific need. The matching of functions with needs can be done with application programming interfaces that are commercially and industry agnostic. Populating agriculture with technologies from outside is as viable as doing the reverse.

An example of this happened ten years ago when a technology driven taxi company utilised the concept of "yield-mapping", borrowed directly from grain-farming and using relevant data

demonstrated where the best yielding areas for taxi drivers were. Passengers were not where drivers expected them to be and by following recommendations they reduced customer wait times by 40%.

Another example of adopting globally available knowledge lies in the genetic research capacity of a country such as India. Here plant traits can be identified and used to accelerate genetic improvement without the more radical steps of transgenic manipulation. These improvements can be applied to the Australian production system, thereby increasing our competitiveness in large scale but customer specified wheat production.

One example, relevant to **SFS** in the way that the current research and development structures constrict innovation and development of new industries, relate to red wheats. Red wheats have very high production in the regions that **SFS** members farm – in excess of 10 tonnes per ha. Some varieties produce high quality feed for the animal industries and but could also produce high quality flour for flat breads. Australia's wheat research for years has been dominated by producing flours that rise not go flat and stay flat like a tortilla or a chapatti. Some research investment is required to ensure that the whole value-adding production system involving genetics, growing, processing and marketing at least matches or preferably exceeds world's best practice - so that Australia can guarantee competitiveness in world markets.

We have used just two examples here to illustrate how innovations in emerging technology can be adopted, adapted and developed to meet specific regional needs for specific global and local markets. The closer we can get the management of R&D to grass roots organisations the more responsive and nimble our producers will be.

Increased commitment of government to regional education and training, including universities and colleges of advanced education and involving regional institutional networks, remote learning facilities, and application of advanced communication will ensure that young innovators and entrepreneurs can develop their skills and their applications in the regions. The cross-relevance of these technologies will liberate them to a world of opportunity at home, in the cities and abroad. To attract highly capable people from the Australian cities, the waiving of HECS debt repayment for the year that a graduate is working in regional Australia on advanced technology in agriculture or agribusiness could help develop a wider and more connected skills base.

Terms of reference 3. Barriers to the adoption of emerging technology.

Improved information technology and communication facilities are vital for businesses in regional Australia to compete in world markets. Preference should be given to regional Australia for accelerated roll-out of the national broadband network. The amounts of data that can be captured by technologies such as drones is very significant. The development of smarter farms where management down to the individual plant level will depend on their capacity to adopt emerging technology and this will be dependent on their capacity to manage information quickly and decisively.

SFS believes that the contraction of cross-commodity and farming systems research is severely hindering development of better whole-of-production systems, and reduces the opportunities for creating synergies between production types – such as between fodder production, fibre production, and animal production; synergies that are essential to overcome barriers to adoption of emerging technology in and between our agricultural industries.

The issues of ownership of information and its safe-keeping, is a complex and ongoing one. It will be a matter of trust and people will store information as they do grain or money, whereby the use of that information will have a value, for which the owner of it should be paid. Collecting and storing masses of information is certainly not something most farmers want to be doing. When it benefits them to do so they will use the services of people who specialise in that area. Suffice to say that people will only participate if they trust that the information is safe and it is used for the benefit of the farmer who supplied it. This issue is a significant barrier to adoption. As discussed above management of research and data should be done by farm organisations with farmer interests at the forefront.

Kim Russell

Chairman

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