SARDI
STRATEGIC PLAN
2018-2023
November 2017
**OUR VISION**
Delivering applied science that grows South Australia’s primary industries, food and wine.

**OUR PURPOSE**
SARDI provides leading edge applied research and development, including practice change, on behalf of PIRSA. Our activities:
- improve productivity and develop new products and process
- drive high-value commercialisation outcomes for a diverse range of government and private sector clients
- are focused on core and emerging industries
- are underpinned by strong national and international collaborations with industry and academic partners
- maintain a strong commitment to our traditional role in applied ‘public science’
- help make South Australia’s primary industries and regions internationally competitive and ecologically sustainable
- support the food manufacturing industry in the development of new and improved products.

**OUR PEOPLE**
- Our people are highly skilled, experienced and passionate about their work. They pursue innovative research and practical solutions for our state’s primary industries and associated value adding activities.
- Many of our scientists have produced ground-breaking research and are considered world leaders in their field.
- All of our internal and external activities are driven by a commitment to onePIRSA.
The South Australian Research and Development Institute (SARDI), the research arm of Primary Industries and Regions South Australia (PIRSA), is the State Government’s principal primary industries research institute.

For 25 years, it has undertaken applied science that has helped increase the productivity, sustainability and adaptability of the state’s primary industries, food and wine enterprises, create opportunities for market growth, address barriers to growth and provide applied solutions.

SARDI is greatly valued by both industry and other government agencies and accordingly receives strong support from funding bodies.

However, Australia’s RD&E System is evolving in relation to funding and delivery models so it effectively supports industry sectors. It was therefore timely to develop this strategy to set the direction for SARDI over the coming years.

A review by ACIL Allen Consulting confirmed that SARDI has established a strong reputation for its technical excellence and is undertaking significant and important research at a national and state level.

Given the growing importance of our food and wine sectors, and therefore the need to support the full value chain, the review recommended that SARDI increase its emphasis on ‘post-farmgate’ research, to complement its recognised strengths in ‘pre-farmgate’ research that focuses on sustainable production. It also highlighted the need to explore new funding models and partnerships.

In response to the review’s findings, the State Government, through PIRSA, committed to four key actions in 2017:

• refreshing the SARDI leadership
• seeking expert advice through the establishment of a formal reference group
• developing an R&D strategy and action plan
• embedding a commercialisation ethos within SARDI’s R&D activities.

The first two of those actions have been completed. This strategy implements the third action and establishes the framework to implement the final action.

Through these actions SARDI will be supported to deliver policy driven applied research. This will provide benefits throughout the production value chain, realised through practice change and research commercialisation. Capacity and infrastructure will be built and collaboration expanded to address the complex industry challenges through a multi-disciplinary problem-based approach. Research outcomes will inform better regulation, reducing costs and impediments where appropriate.

As we enter a new era of excellence in primary industries, food and wine RD&E, we will work hard to ensure SARDI’s traditional role in delivering science outcomes for public good remains as strong as ever, while taking our opportunities to drive innovative and develop new industries and products.

SCOTT ASHBY
Chief Executive
Primary Industries and Regions SA
In 2014, the State Government announced 10 Economic Priorities for South Australia and tasked PIRSA to take the lead in delivering Priority 2: Premium Food and Wine Produced in our Clean Environment and Exported to the World.

Under Priority 2, South Australia will deliver on the following objectives:

- Increase international exports of differentiated and processed food and wine from $2.8 billion in 2013-14 to $3.6 billion in 2016-17
- Establish a global reputation for our premium food and wine industry
- Create opportunities for food and wine businesses to expand or co-locate
- Establish a global reputation for our food, wine and clean technology expertise.

More broadly, South Australia’s Strategic Plan sets an ambitious target to grow food industry revenue to $20 billion in 2020.

Our food and wine sector and primary industries are not just central to South Australia’s identity, they are crucial to its prosperity.

There are many reasons for optimism. The global demand for food is expected to increase 70% by 2050, with the fastest growing markets in Asia. South Australia is ideally positioned to build on its existing reputation for produce excellence and benefit from this growth.

The food and wine industries can work towards ‘globally preferred supplier’ status in selected markets, exporting our ideas, intellectual property, products and services and in doing so, support the growth of a diversified state economy.

However, there are also many challenges. Competition from imports and low-cost competitors poses a serious threat, many smaller local businesses struggle to be seen and heard in crowded global markets due to the scale of production, and we face a number of environmental issues around soils, water security, climate change and sustainable use of resources.

In this context, a priority for PIRSA – through SARDI – is to provide world-leading, applied research and development services to help businesses across the agriculture, food and wine industries to improve productivity, develop new and improved products and make the most of their natural and human resources.

South Australia is ideally positioned to build on its existing reputation for produce excellence and benefit from this growth.
SARDI has established a strong reputation for its technical excellence and is undertaking significant and important research.

**OATS**
Over the past 20 years the National Oat Breeding Program led by SARDI has accounted for up to 85% of south-east Australian milling oat and up to 75% of Australian export hay varieties. Investment in fodder R&D has yielded a benefit-cost ratio of 4:1 for oat projects, with the majority of benefits the result of the program’s activities.

**AQUACULTURE**
SARDI’s investment in the aquaculture sector has been a major contributor to the development of new industries, particularly the Southern Bluefin Tuna and Yellowtail Kingfish industries. The Fisheries Research and Development Corporation assessed the first Southern Bluefin Tuna project that they funded with SARDI as providing a benefit-cost ratio of 44:1.

**VITICULTURE**
SARDI’s targeted research investment in various aspects of wine grape production is reducing many of the risks associated with climate change, root zone salinity, pests and disease as well as addressing incursions. The benefit-cost ratio for major viticulture programs has ranged between 8:1 and 16:1.

**FISHERIES**
SARDI research and development has supported fisheries management decisions to ensure the ongoing ecological sustainability of each fishery. As well as ensuring sustainability, SARDI research and development has informed management decisions that have resulted in higher economic returns.
SARDI, as the research arm of PIRSA, undertakes applied primary industries, food and wine research and development, including practice change, on behalf of the South Australian government. We provide services to government, primary industry stakeholders and a range of other clients to support the state’s policy objectives.

SARDI operates on the research and development continuum and bridges the gap between university research and industry. This is a critical space on the continuum where research results can be turned into public value through commercialisation and industry uptake. This is achieved in part through SARDI’s engagement of researchers with applied experience, project delivery approach, sound contractual arrangements, customer orientation and dual outcomes relating to customer benefit and scientific publication across all projects.

DIVERSE INDUSTRIES

The food and wine industries encompass primary producers such as growers, farmers and fishers; packers and processors; wineries and food and beverage manufacturers; wholesalers, marketers and retailers; and food service enterprises such as restaurants, cafes and bars.

Agriculture and fishing have been two of the fastest growing sectors in the South Australian economy.
Building research and development competencies is a long-term process. SARDI holds the research and development capabilities required to support the policy outcomes of the state and its primary industries. At present, our competencies support the animal, mixed farming, cropping, horticulture, wine, aquaculture, wild harvest fisheries and food industries. The majority of these skills, with the exception of food, are in the pre-farmgate area. SARDI will continue to align its competencies with future needs, including in post-farmgate research; recognising the transition of competencies must occur in a systematic fashion.

Our researchers are the key to our current and future success. SARDI researchers have a deep knowledge of the local agricultural sector, they understand the value chain and most importantly, they recognise how science can underpin innovation to sustain industry growth into the future. They are creative, practical problem-solvers and work collaboratively with primary producers to boost productivity, adopt new technology, support new market opportunities and better manage risk - these are just some of the drivers behind SARDI’s diverse and talented workforce.

PIRSA will continue to support its scientists through training, development opportunities and infrastructure development. PIRSA also provides SARDI with a linkage to government policy objectives and policy development.

Applied research institutes need to work closely and collaboratively with industry and a range of stakeholders. SARDI researchers will continue to work collaboratively with industry to identify future research needs and projects. It will also work collaboratively with industry, other research providers and stakeholders to deliver public value to South Australia.
This Strategic Plan sets out activities to develop our approach to science investment and delivery over the next 5 years.

The Plan supports PIRSA’s Corporate Plan and the State Government’s 10 Economic Priorities for South Australia. It has been developed in consultation with a new Reference Group established following the SARDI Review.

Our initial focus is on:

• setting up a greater commercialisation capability and ethos
• working with industry to identify and develop priorities and bring about practice change
• building even stronger global connections to capitalise on emerging trends
• better understanding and developing our potential revenue streams and investment portfolio
• defining the role of the modern SARDI in the current global environment and as a consequence the in-house capabilities and collaboration partners needed.

The process outlined in this strategic action plan will support PIRSA’s core mission to underpin the growth and sustainability of South Australia’s primary industries, food and wine through excellence in research, development, extension and partnerships.

All of our investments of time, personnel and resources will be driven by State Government policy and industry needs to ensure they provide value for money to South Australia.

THE NATIONAL CONTEXT

South Australia, along with other providers are jointly implementing the National Primary Industries Research Development and Extension Framework. The Framework aims to encourage greater collaboration and promote the efficiency and effectiveness of the investment in research, development and extension nationally. Within the Framework, South Australia through SARDI leads on grains, wine, fishing and aquaculture, pigs and poultry.

To position South Australia within the national research and development system SARDI must:

• continue to lead and influence the National Primary Industries Research, Development and Extension Framework in the areas of strategic importance for South Australia
• in partnership with the Government and South Australian industry sectors, identify and deliver priority research to best support industry development and profitability
• maintain and develop capability and research infrastructure to deliver priority outcomes for South Australia
• collaborate on the global stage and develop new partnerships with industry and academia to share research knowledge, skills and resource more effectively.

SARDI’s research paper “Developing pruning wound protection strategies for managing Eutypa dieback” was selected as the winner of the 2017, Australian Society of Viticulture and Oenology Viticultural Paper of the Year Award. This work was selected as the potential application of research to industry was seen as the most significant.
A NEW ERA
FOR SARDI
SARDI’s core business is delivering applied science to South Australia’s primary industry, food and wine sectors. However, the nature of that science and the use we make of its outcomes are changing all the time.

Technology is one driver of that change. The world is constantly creating ways to do new things, or simply do old things more effectively and efficiently, and that impacts both on the way researchers go about their work and on the expectations of those who want to make use of the research findings.

The challenge for applied research institutions such as SARDI is to become increasingly agile and responsive to the needs of industry, government and potential funding bodies while retaining the strength and integrity of the key capabilities that make good science possible.

This Strategic Action Plan marks a key point in the evolution of SARDI as an organisation and, in particular, our transition from an almost exclusive focus on primary production to one that also highlights the importance of value adding.

Three important trends have emerged in SARDI’s work over recent years, and these will intensify in the years ahead.

The first has been a greater focus on the value and potential of general purpose and key enabling technology platforms such as robotics, drones, machine learning, digitisation and the analysis of big data. Linked to this is how we can leverage public data and knowledge banks into industry opportunities and operational decisions.

The second has been a greater investment in research to support the development and marketability of differentiated food and value-added products such as functional, luxury or native foods, rather than simply just the raw materials.

Over the past two years, for example, we have helped more than 120 small-to-medium enterprises to develop new food and beverage products or improve their production processes, and we are exploring commercialisation options related to the successful completion of the Functional Food Focus Program.

Areas of emerging interest for industry are markers for product differentiation and better ways to trace and authenticate food products, including animal welfare certification.

“Public applied research organisations like SARDI play a critical role by straddling industry and academia. This provides the foundation for rapidly addressing industry issues and for assisting industry in realising the opportunities presented by new technology and knowledge”.

Professor Göran Roos, member, Economic Development Board SA, SARDI Reference Group member
As the biosecurity threats to South Australia’s primary industries increase through global trade and movement, investment in new and novel technologies to monitor and respond to pest plants and animals has increased. We are exploring cost effective surveillance techniques and control methods to protect production and market access.

The third trend has been an increased emphasis on understanding both customer and consumer demand and preferences, so we can undertake research that will help local companies access new markets.

Our focus on core science and strategic partnerships remains strong. Recently, for example, we entered into a $50 million, five-year bilateral agreement with the Grains Research and Development Corporation to secure the future of grains research in South Australia. As such grains research will remain a cornerstone of SARDI.

We also finalised more than 300 individual projects, including:
- developing new smart trapping technology to support more selective surveillance of airborne pests and diseases
- trialing a new smartphone app that provides instant feedback to grape growers on the water status of their vines
- developing the world’s first molecular marker to help more accurately estimate the number of Snapper eggs in the ocean
- undertaking the Great Australian Bight Research Program, the first whole of ecosystem study of the area.

SARDI will work with public and private extension providers to achieve knowledge services that foster best practice, sustainable farming enterprises, market access and industry development.

"SARDI provides a very effective interface between academic research and industry. Importantly, SARDI's outcome focus helps ensure the state's agricultural research is driven by industry needs."

Dr Leanna Read, Chief Scientist of South Australia
GROWING THE PRODUCTION AND PROFITABILITY OF PRIMARY INDUSTRIES, FOOD AND WINE

**Government** supports industry to be productive, innovative and market driven so it can capitalise on opportunities to increase their production, market share and profit margin.

**SARDI** investigates increasing the sustainable production of traditional products, reducing production costs and developing new primary industry opportunities.

INFORMING SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES THAT UNDERPIN PRIMARY INDUSTRIES PRODUCTION

**Government** supports the sustainable management of natural resources so South Australia maintains its reputation as a producer of high-quality agriculture, food and wine from a clean environment.

**SARDI** works with industry to develop sustainable and profitable production systems and, as part of PIRSA, SARDI plays a key role in meeting statutory obligations in biosecurity and aquatic resource management while providing the science capability to other agencies. SARDI also undertakes research to reduce regulatory costs and impediments where appropriate.

PROTECTING AND ENHANCING MARKET ACCESS FOR SOUTH AUSTRALIAN BUSINESSES AND PRODUCTS

**Government** facilitates access to new and existing markets for South Australia’s agriculture, wine and food sectors.

**SARDI**’s high-quality science assists market access through meeting the requirements of international and national agreements, standards, protocols and guidelines to ensure product quality, safety, sustainability and pest and disease-free status.

DRIVING FOOD INNOVATION

**Government** supports future opportunities for South Australia’s food and beverage industry by supporting innovation and encouraging commercialisation of new ideas and products.

**SARDI** helps industry to develop innovative products, minimise foodborne illness and food waste, develop health promoting functional foods and protect the reputation of South Australian businesses by reducing product fraud.

DELIVERING IMPACT FROM APPLIED SCIENCE

**Government** aims to deliver optimum community benefits through commercialisation or knowledge transfer of public sector developed intellectual property.

**SARDI** identifies and commercialises its intellectual property, through knowledge transfer, licensing or fee for service, to increase industry development. Revenue from intellectual property commercialisation is reinvested in relevant research and development.
SARDI investment will be driven by State Government policy priorities to ensure it provides value for money to South Australia. SARDI will continue to invest in traditional areas, with some refocusing to new strategic opportunities for the state.

As SARDI generates or leverages a significant proportion of its funding from non-state sources, it is important that where possible there is close alignment between the priorities for the state, industry and investors. SARDI will proactively use its funding base to leverage opportunities that align with state priorities and industry needs.

Industry growth can be achieved by increasing the production and profitability on a commodity basis, developing differentiated or value added products, or a combination of the two.

Much of SARDI’s work has previously been focused on a commodity growth basis and pre-farm-gate. This work will largely continue. It is a strength of the organisation.

Based on the direction of development for the industry sector or business, research investment and activity needed to be undertaken at the relevant parts of the value chain. In agriculture, the value chain begins at the natural resource base that underpins production and extends to food safety and product innovation.

Mapping investment and projects against the value chain for each sector will provide an understanding of how investment and projects align with the industry sector development needs (see pages 16-22 for a detailed sector breakdown).

Much of SARDI’s work has previously been focused on a commodity growth basis and pre-farm-gate. This work will largely continue. It is a strength of the organisation. However, some sector growth predictions now demand a much greater focus on new and emerging areas through non-commodity/value added research opportunities.
PIRSA investment in RD&E for industry sectors will change over time depending on alignment with State Government policy, South Australia’s current or desired comparative advantage (including developing new sectors), industry size and growth, and investment from industry.

Based on an assessment against these criteria, investment at the sector level may be maintained, start, increase, decrease or stop. However, any change in investment and capability must be undertaken in an orderly manner over time.

This research investment guide for SARDI will better align policy and research, and deliver outstanding research outcomes that benefit both industry and community. Investment in individual research projects will be undertaken based on alignment with government policy, industry need and return on investment.
Reinvigorating SARDI and shifting to a new way of doing business will require long term vision and commitment to ensure sustainable transformation. This is signified by a shift from a predominantly financially driven funding strategy to an evidence based policy model. This is a major change in thinking as well as operations.

Professor Mehdi Doroudi, Deputy Chief Executive, Primary Industries and Regions SA

STRATEGIC ACTIONS

These strategic actions are internal to PIRSA-SARDI to provide a forward looking research and development delivery framework.

STRATEGY 1: RENEW THE RESEARCH INVESTMENT FRAMEWORK

Actions
1. In consultation with industry, identify the growth path of that sector
2. Based on the identified growth path for each sector, identify the parts of the value chain targeted by State Government investment
3. Assess each sector against the investment criteria to determine the long-term funding direction for each sector
4. Continue to fund statutory science and science services through cost-recovery from relevant industry sectors or the relevant agency
5. Set long-term research investment in line with the research investment framework.

STRATEGY 2: STRENGTHEN COMMERCIALISATION

Actions
1. Employ an in-house commercialisation expert to drive commercialisation activities within SARDI
2. Develop structure arrangements with commercialisation partners to enhance the commercialisation of research intellectual property
3. Work with industry sectors to identify the best way to transfer knowledge and create practice change in the industry
4. Identify additional opportunities for knowledge transfer in research investments and funding applications to support effective update of research and technology by industry.

ENHANCING COMMERCIALISATION

SARDI will refine the pathway to commercialisation of its intellectual property, focusing on stronger facilitation/brokering with external commercialisation partners. This includes enhancing SARDI’s commercialisation capability and structured commercialisation arrangements.
**ENHANCING KNOWLEDGE TRANSFER**

Significant public value is realised through the use and commercialisation by industry of state funded research and technical developments. Knowledge transfer is fundamental to achieving industry commercialisation. Modern technologies allow for more timely and efficient knowledge transfer to occur. Working with industry, PIRSA can improve knowledge transfer pathways to meet the needs of individual sectors.

---

**STRATEGY 3: BUILD INFRASTRUCTURE AND CAPABILITY**

**Actions**

1. Implement research capability and infrastructure transition in line with long-term priorities and funding directions
2. Undertake succession planning for critical research capabilities
3. Develop structured arrangements with global experts in capabilities where it benefits South Australia
4. Continue to develop research infrastructure including the Molecular Diagnostics Centre at the Waite campus, the Clare Research Centre, the Research Piggery and Poultry facilities, the Loxton Research Centre and the Aquatic Sciences Centre
5. Identify critical research infrastructure owned by the State Government or its partners and facilitate access by industry where appropriate.

---

**STRATEGY 4: EXPAND COLLABORATIVE ACTIVITIES**

**Actions**

1. Develop a stakeholder communication and engagement strategy
2. Continue to lead the National Primary Industries Research, Development and Extension Framework in seafood, grains, wine, poultry and pork
3. Develop research collaborations with private sector businesses
4. Develop and implement bilateral / partnership funding arrangements with investors that support the long term investment outlook
5. Enter into structured national and international collaborations to improve SARDI’s agility and access to knowledge
6. Continue to develop a collaborative, cross discipline problem-based approach to solving complex industry challenges.
The summary below includes a selection of projects that demonstrates the adoption of applied research and development activities driven by SARDI which leads over 300 projects annually. Where projects attribute benefit to more than one sector, the project is listed under the major beneficiary, but included in the value chain analysis for other sectors.

The projects listed below are current projects resulting from existing investments and contractual arrangements. They provide an assessment of the current portfolio balance of SARDI’s research and development activities. As these projects are completed the investment in these project areas will be aligned with the investment principles and sector investment guide to inform future decisions. The projects list and portfolio balance will be updated annually.

GRAINS / CROPPING

Key Actions

- Commercialise new milling oat varieties with functional food attributes, in addition to key production traits.
- Develop and trial novel tools for broad scale surveillance of emerging pest and disease threats.
- Further commercialise Predicta services.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting / Processing</th>
<th>Market Access</th>
<th>Extraction/ Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 24</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 42, 43</td>
<td>1</td>
<td>2, 17, 42, 43</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Project Name

1. Development and evaluation of new varieties for all key regions
2. Provide updates on key seasonal issues including snails and Russian Wheat Aphid
3. Develop and direct regionally focussed research programs through the regional research agronomists
4. Actively contribute to the GRDC Regional Cropping Solutions Network (RCSN)
5. New species and new ways of managing the existing legume varieties in low and medium rainfall zones.
6. Maintaining profitable farming systems with retained stubble – upper Eyre Peninsula
7. Identifying the causes of unreliable N fixation by medic based pastures
8. High performance soils to improve agricultural production across Australia
9. Understanding the amelioration processes of the application of subsoil amendments in the Southern Region
10. Increasing production on sandy soils in low and medium rainfall areas of the southern region
11. Managing micronutrient deficiencies in cropping systems in Eastern Australia
12. Application of Controlled Traffic Farming in the low rainfall zone, to minimize effects of soil compaction upon production
13. Deliver trials to assess regional suitability for industrial hemp production at Loxton and Kybybolite
14. Expand Predicta to include a greater capacity for early detection of biosecurity threats for grains industries
WINE

Key Actions

- Undertake research to manage pathogens of grapevines, while reducing the reliance on fungicides.
- Undertake research to assist in the management of the impact of a changing and variable climate for SA wine industry.
- Undertake research to understand the vineyard drivers which produce regional uniqueness (terroir).
HORTICULTURE

Key Actions

- Develop a male only sterile Queensland fruit fly to protect SA fruit and vegetable industries.
- Develop advanced production systems for almonds with improved water and soil management strategies.
- Provide grower guidelines on using recycled water sustainably on the North Adelaide Plains for annual crop and vegetable production.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting / Processing</th>
<th>Market Access</th>
<th>Extraction / Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>14, 16, 33, 34, 35, 38, 40, 41, 42, 43, 44, 106</td>
<td>36, 37, 41, 42, 43</td>
<td>18, 39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project No</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.</td>
<td>Integrated multi-level approach to assess new high intensity almond orchards and optimise water and nutrient uptake</td>
</tr>
<tr>
<td>34.</td>
<td>Information provided to almond industry on management of key climate risks</td>
</tr>
<tr>
<td>35.</td>
<td>Development of a novel orchard floor management including rapid method to assess almond root growth</td>
</tr>
<tr>
<td>36.</td>
<td>Development of a male only, temperature sensitive Queensland fruit fly for area wide fruit fly management</td>
</tr>
<tr>
<td>37.</td>
<td>Support the trial release program for sterile bi-sex Queensland fruit flies in 2018</td>
</tr>
<tr>
<td>38.</td>
<td>Assess how new water resources can sustainably expand irrigated horticulture on NAP</td>
</tr>
<tr>
<td>39.</td>
<td>Provide technical input to support new industry sectors (Manuka honey)</td>
</tr>
<tr>
<td>40.</td>
<td>Surveillance techniques which provide growers with precision irrigation scheduling recommendations</td>
</tr>
<tr>
<td>41.</td>
<td>Work with NAP vegetable industries to validate diagnostic tests for key soil borne pathogens</td>
</tr>
<tr>
<td>42.</td>
<td>Develop novel surveillance tools for plant industries</td>
</tr>
<tr>
<td>43.</td>
<td>Develop and deliver diagnostic technologies to enhance pest and disease identification</td>
</tr>
<tr>
<td>44.</td>
<td>Support Biosecurity SA with timely and accurate diagnosis of insect and pathogen threats</td>
</tr>
</tbody>
</table>
## FISHING AND AQUACULTURE

### Key Actions
- Inform sustainable management of aquatic resources through fisheries and ecosystem based monitoring and assessments.
- Advance aquaculture development through innovative approaches to selective breeding, nutrition, feeding and health.
- Lead the SafeFish seafood assessment program to support market access.

### Natural Resource Base
- Production
- Harvesting / Processing
- Market Access
- Extraction / Product Development
- Food Manufacturing

<table>
<thead>
<tr>
<th>Project No</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>45.</td>
<td>Investigate the use of alternative fishing gears to improve the efficiency of the Southern Rock Lobster Fishery</td>
</tr>
<tr>
<td>46.</td>
<td>Deliver an operational now-cast/forecast ocean prediction system (eSA-Marine) for southern Australia</td>
</tr>
<tr>
<td>47.</td>
<td>Post-harvest uses for macroalgal and microalgal components to make high value ingredients</td>
</tr>
<tr>
<td>48.</td>
<td>Bacteriophage assessment as an indicator of risks due to sewage spills for management of oyster growing areas</td>
</tr>
<tr>
<td>49.</td>
<td>Validation and implementation of paralytic shellfish toxin rapid test kit for bivalves</td>
</tr>
<tr>
<td>50.</td>
<td>Development of a rapid sensor for norovirus in oysters</td>
</tr>
<tr>
<td>51.</td>
<td>Easy-open oyster machine for commercial scale splitting and resealing of oysters</td>
</tr>
<tr>
<td>52.</td>
<td>Investigate Yellowtail Kingfish nutrition, feeding strategies and health</td>
</tr>
<tr>
<td>53.</td>
<td>Produce 20 million oyster spat for industry grow out</td>
</tr>
<tr>
<td>54.</td>
<td>Selectively breed Pacific Oyster Mortality Syndrome (POMS) resistant Pacific Oysters</td>
</tr>
<tr>
<td>55.</td>
<td>Undertake fishery stock assessments, monitoring and harvest strategy development</td>
</tr>
<tr>
<td>56.</td>
<td>Support and inform the restructure of South Australia’s Marine Scalefish Fishery</td>
</tr>
<tr>
<td>57.</td>
<td>Regional and zone scale aquaculture environmental monitoring program for Southern Bluefin Tuna and Yellowtail Kingfish</td>
</tr>
<tr>
<td>58.</td>
<td>Provide the SafeFish seafood assessment program</td>
</tr>
<tr>
<td>59.</td>
<td>Test ports for marine pests to support domestic ballast water arrangements</td>
</tr>
<tr>
<td>60.</td>
<td>Complete the Great Australian Bight Research Program and deliver key results and outcomes to stakeholders.</td>
</tr>
<tr>
<td>61.</td>
<td>Conduct an integrated assessment of the ecosystems, industries and communities of Spencer Gulf</td>
</tr>
<tr>
<td>62.</td>
<td>Investigate the use of alternative fishing gears to manage seal-fisher interactions in the Lakes and Coorong Fishery</td>
</tr>
<tr>
<td>63.</td>
<td>Identify key King George Whiting spawning areas to support management arrangements for the fishery</td>
</tr>
<tr>
<td>64.</td>
<td>Investigate the population dynamics, natal origin and movement of native freshwater to inform management</td>
</tr>
<tr>
<td>65.</td>
<td>Deliver the long-term intervention monitoring in the Lower Murray River</td>
</tr>
<tr>
<td>66.</td>
<td>Provide science input and conduct research to inform the National Carp Control Plan</td>
</tr>
</tbody>
</table>
### LIVESTOCK (INCLUDING WOOL)

**Key Actions**
- Develop advanced sheep management practices on farm to improve pregnancy, lambing and weaning rates.
- Improve rates of genetic gain, food and fibre phenotypes and production value through advanced livestock reproductive techniques.
- Improve production and market access and manage production performance through whole-of-chain tracking through high-tech assessment of meat yield and quality.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting / Processing</th>
<th>Market Access</th>
<th>Extraction/ Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 5, 7, 8, 9, 10, 15, 89</td>
<td>3, 5, 7, 8, 9, 10, 15, 79, 80, 81, 82, 83, 85, 88</td>
<td>80, 86, 87, 88</td>
<td>80, 84, 86, 87</td>
<td>80, 84, 86, 87</td>
<td>80, 84, 86, 87</td>
</tr>
</tbody>
</table>

- Continue to develop advanced reproductive technologies for sheep/cattle/pigs
- Enhanced supply chain profitability through reporting and utilisation of peri-mortem information by livestock producers
- Managing metabolic disorders in pregnant ewes to improve ewe and lamb survival
- New approaches for increasing weaning rate of the national sheep flock
- Improving the success of artificial insemination programs in meat breed rams to overcome seasonal infertility
- Estimating carcass values based on lean meat yield and eating quality
- Use of Juvenile In Vitro Embryo Transfer (JIVET; sheep) and Ovum Pick-Up (OPU; cattle) for accelerated genetic gain
- Process Control Monitoring in abattoirs to develop an improved system for reduced food contamination
- Process Control Data and Analysis for Market Access in the red meat industry
- Improvement in welfare of flock sheep - Sheep wellbeing and productivity
- Reducing sheep methane emissions through improved forage quality on mixed farms
POULTRY

Key Actions

- Improve wellbeing and production of free range chicken meat and laying hen farms through resilient forage and shelter plants.
- Increase the feed efficiency and production of poultry meat.
- Optimise commercial scale feed formulations for chicken meat production through advanced metabolisable energy measurement technologies.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting / Processing</th>
<th>Market Access</th>
<th>Extraction / Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>90, 92, 105</td>
<td>91</td>
<td>91, 92</td>
<td></td>
<td>105</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project No</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.</td>
<td>Investigate critical amino acids to improve gut health of chickens fed reduced protein diets</td>
</tr>
<tr>
<td>91.</td>
<td>Campylobacter profiling for novel in-factory analysis of this pathogen in the poultry industry</td>
</tr>
<tr>
<td>92.</td>
<td>Resilient plants for free range chicken meat farms and laying hens</td>
</tr>
</tbody>
</table>

PIGS

Key Actions

- Continue to improve pig welfare by identifying novel biomarkers and bioassays of animal welfare states.
- Investigate neuroendocrine techniques for year-round production stability in pigs.
- Create genetically superior boars which produce all female litters.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting / Processing</th>
<th>Market Access</th>
<th>Extraction / Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>94, 95, 96, 97, 98, 99, 100</td>
<td>101</td>
<td>93, 97, 98, 99, 100, 101</td>
<td></td>
<td>101</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project No</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>93.</td>
<td>Validation of a rapid test for boar taint detection by bio-sensing for improved pork eating quality</td>
</tr>
<tr>
<td>94.</td>
<td>Oxytocin utilisation to improve gilt behaviour during the peri-partum period and increase the weaning weight of piglets</td>
</tr>
<tr>
<td>95.</td>
<td>Investigation of control of seasonal pig infertility by the KNDY neurons</td>
</tr>
<tr>
<td>96.</td>
<td>Generation of boars that produce all-female litters using novel sex selection techniques</td>
</tr>
<tr>
<td>97.</td>
<td>Weaner piglet enrichment substrates and devices for lifetime welfare and production benefits</td>
</tr>
<tr>
<td>98.</td>
<td>Developing ways to measure and increase sow contentment</td>
</tr>
<tr>
<td>99.</td>
<td>Reducing sow stress around farrowing</td>
</tr>
<tr>
<td>100.</td>
<td>Novel biomarkers of animal welfare in pigs: microRNA, immunobiology and on farm application</td>
</tr>
<tr>
<td>101.</td>
<td>Process Control for pork processing</td>
</tr>
</tbody>
</table>
**FOOD**

**Key Actions**

- Lead the development and submission of a $160+ million industry-focused Fight Food Waste & Fraud Cooperative Research Centre bid.
- Provide food safety science to the seafood industry and for livestock Abattoir Process Control in South Australia and nationally.
- Work with over 50 South Australian food companies each year to accelerate food innovation in the state.

<table>
<thead>
<tr>
<th>Natural Resource Base</th>
<th>Production</th>
<th>Harvesting</th>
<th>Market Access</th>
<th>Extraction / Product Development</th>
<th>Food Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>103, 104, 106</td>
<td>102</td>
<td>103, 104</td>
<td>47, 102, 103, 104, 106, 108</td>
<td>103, 104, 105, 106</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project No</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>102.</td>
<td>Novel applications for freeze drying of food (e.g. fruit, vegetables and honey)</td>
</tr>
<tr>
<td>103.</td>
<td>Develop quality assurance systems for SMEs</td>
</tr>
<tr>
<td>104.</td>
<td>Advanced Food Manufacturing Hub and Research Connections grants to assist business opportunities for SMEs</td>
</tr>
<tr>
<td>105.</td>
<td>Development of Vitamin D-enriched eggs</td>
</tr>
<tr>
<td>106.</td>
<td>Provide a sensory assessment service</td>
</tr>
<tr>
<td>107.</td>
<td>Food waste minimisation – transforming Riverland food loss and industry waste into profit</td>
</tr>
<tr>
<td>108.</td>
<td>Post-harvest uses for industrial hemp ingredients such as oil, milk and seeds</td>
</tr>
</tbody>
</table>
Over 25 years, SARDI has evolved to become an integral part of a complex ecosystem consisting of South Australian based research organisations and strategic state initiatives, a national and international research network, including funders, and industry priorities.

Sustaining and developing relationships across these groups will be as essential in the future as it has been in the past. However, there are also opportunities for SARDI and other members of the state network to improve coordination around the development of strategic opportunities, capability development, resource sharing, international linkages and collective action.

SARDI also needs to continuously strengthen its relationships with industry bodies and individual businesses across the value chain to attract new funding to accelerate industry development.

Change of this scale in a public research organisation will take both time and investment. But the economic benefits will be well worth it to underpin the ongoing success of the state’s $21 billion agricultural sector.

There will be greater focus on the value and potential of new technology platforms such as robotics, drones, machine learning, digitisation and the analysis of big data. Linked to this is how we can leverage public data and knowledge banks into industry opportunities.

There will be a greater investment in research to support the development and marketability of differentiated food products (be they functional foods, luxury foods or native foods) rather than simply just the raw materials.

Areas of emerging interest for industry are markers for product differentiation and better ways to trace and authenticate food products, including animal welfare certification.

**SARDI’s commitment to traditional sectors remains as strong as ever.**

As does our commitment to delivering outstanding applied science and the research and development framework to transform knowledge and technology into new opportunities for our thriving agriculture sector.

**Implementation of the strategy**

Implementation of the strategy will be undertaken within the framework of the PIRSA Annual Corporate Plan and SARDI’s annual business planning. Through this approach delivery timelines and accountabilities will be formalised and project plans will be developed and implemented. Progress of delivery will be reported quarterly. Biannual reviews of deliverables will be incorporated as part of the PIRSA and SARDI planning and review processes.
Government
Agriculture Victoria
Bureau of Meteorology
Commonwealth Department of Agriculture and Water Resources
Commonwealth Department of Environment and Energy
Commonwealth Scientific and Industrial Research Organisation
Department of Agriculture, Fisheries and Forestry
Department of Economic Development, Jobs, Transport and Resources
Department of Environment, Water and Natural Resources
Environment Protection Authority
Fisheries Research and Development Corporation
Integrated Marine Observing System
Murray-Darling Basin Authority
National Landcare Program Phase Two (LandCare 2)
NSW Department of Primary Industries
Queensland Department of Primary Industries
Rural Solutions SA
SA Water
WA Department of Primary Industries and Regional Development

Industry Groups and Associations
Abalone Council Australia
Abalone Industry Association of South Australia
AgExcellence Alliance
Almond Board of Australia
Australian Abalone Growers Association
Australian Fisheries Management Authority
Australian Pork Limited
Australian Southern Bluefin Tuna Industry Association
AUSVEG SA
Central Zone Abalone Industry
Eyre Peninsula Agricultural Research Foundation
Grain Producers SA
Gulf St Vincent Prawn Boat Owners Association
Livestock SA
Lower Eyre Peninsula Agriculture Development Association
Marine Fishers Association
McKillop Farm Management Group
Meat and Livestock Australia
Northern Zone Rock Lobster Fishermens Association
Oysters Australia
Potatoes SA
RecFishSA
SA Sardine Industry Association
Sheepmeat Council of Australia
South Australian Blue Crab Pot Fishers Association
South Australian Food Innovation Centre
South Australian Grain Industry Trust
South Australian Oyster Growers Association
South Australian Pig Industry Advisory Group
South Australian Rock Lobster Advisory Council Incorporated
South Australian Sheep Advisory Group
South East Professional Fishermens Association
Southern Australia Meat Research Council
Southern Fisherman’s Association
Southern Rock Lobster Ltd
Southern Zone Abalone Management
Spencer Gulf and West Coast Prawn Fishermen’s Association
Surveyed Charter Boat Owners & Operators Association of SA
Wildcatch Fisheries SA
Wine Grape Growers Association

Private Sector
AEXCO
Agriculture Victoria Services
AUNir
Australian Eggs
Australian Grain & Forage Seeds
Australian Wool Innovation
Clean Seas Seafood Limited
Flinders Partners
Heritage Seeds
HiChick Breeding Company
Horticulture Innovation Australia
JBS Australia
MacKillop Farm Management Group
Mooide Agronomy
Pasture Genetics
PGG Wrightson Seeds
Pig Improvement Company Australia
Ridley Agriproducts
Rivalea Australia
Seed Net
SunPork Farms
Swickers Abattoirs
Teys Australia
Thomas Foods
Uncle Toby’s
Valley Seeds
Zoetis Australia

International Collaborators
Brain Research New Zealand
Cambridge University, United Kingdom
Cure Huntington’s Disease Initiative Foundation Inc., United States of America
Harvard University, United States of America
National Institute for Agricultural Research (INRA), France
University of Auckland, New Zealand
University of Sassari, Italy
West Virginia University, United States of America

Research and Development Centres
AgriFutures Australia
Animal Welfare Science Centre
Arthur Rylah Institute for Environmental Research, Victoria
Australasian Pork Research Institute Limited
Australian Centre for International Agricultural Research
Australian Wine Research Institute
Centre for Nanoscale Biophotonics
CRC High Performance Soils
CRC Plant Biosafety
Davies Research Centre
Goyder Institute for Water Research
Grains Research and Development Corporation
High Performance Soils CRC
MDC Strategic Partnership for Animal Welfare RD&A
Murray-Darling Freshwater Research Centre
National Livestock Genetics Consortium
Pork CRC
Pork SA
Poultry CRC
Poultry Hub Australia
Queensland Alliance for Agriculture and Food Innovation
Rural Research and Development for Profit Program
Sheep CRC
Wine Australia

Universities
Charles Sturt University
Curtin University
Flinders University
Murdoch University
Tasmanian Institute of Agriculture
University of Adelaide
University of Melbourne
University of New England
University of Queensland
University of South Australia
University of Sydney
University of Western Australia