Loxton Research Centre
A foundation for innovation

The Loxton Research Centre Redevelopment forms part of the South Australian River Murray Sustainability Program (SARMS), funded by the Australian Government and delivered by the Government of South Australia.
In 1960, the regional hub for the then State Department of Agriculture’s research, extension, and biosecurity services in the Riverland moved to Loxton. It started out as little more than sand and a tin shed (office) for manager Richard ‘Dick’ Hilder. The department had outgrown its original site, the Berri Experimental Orchard. Established in 1908, the orchard was the research base, where staff first worked to identify the opportunities and challenges in establishing fruit and vegetable production in the Upper Murray – now known as the Riverland.

At the time of the move, the Upper Murray irrigation districts were fast establishing themselves as significant horticultural production areas, particularly for citrus, dried and canned fruit, and wine.

However, for the region to really fulfil its potential, new solutions were needed to the problems holding it back. This included a need for high-quality planting material, clean propagation methods, better disease and pest control and efficient solutions to salinity and water-logging.

A 30-hectare site just out of Loxton was selected to create a dedicated research and development facility that would support planned experimental horticulture trials and watering programs.

The priority was to get crops into the ground and establish a comprehensive irrigation system; first grape vines, followed two years later by stonefruit and then citrus. New buildings followed as more researchers moved to Loxton.

The original office, a tin shed, later became the base for the Upper Murray’s first fruit fly monitoring program.

Things really took off in the 1970s, starting with the construction of a research centre comprising six offices, three laboratories, a library and a reception area.

The centre had become a genuine research hub, bringing together crop specialists in citrus, viticulture, stonefruit and vegetables as well as plant pathology, entomology, nematology, irrigation and soil management. Technical staff were also employed for this work and to assist with plant propagation and soil and plant nutrition.

As quality research started to come out of Loxton, international attention and relationships opened.
up, fostering technology exchanges with countries
grappling with similar research challenges.
For instance, in 1979 an information exchange
was initiated with the Israeli Ministry of Agriculture,
assisting with the development of the Australian
Irrigation Technology Centre (an equipment
evaluation service) in the Riverland and the Irrigated
Crop Management Service (ICMS) at Loxton.
The centre expanded further in the 1980s, with
the addition of nine new offices, new laboratory
facilities, a larger library and conference room, and
a new reception area.
The research program continued to grow, solving
problems and developing new technology for
Riverland and Australian horticulture. During the next
decade and beyond, the centre hosted renowned
international visitors from many disciplines through
sabbaticals, as part of collaborative projects, study
tours and the occasional international conference.
International collaboration continued throughout the
1990s, when partnerships between government
research and private sectors presented new
opportunities – including short-course training in
irrigation, agriculture practices, seed production
and farm management – at the centre and in the
respective countries, particularly in the Middle East
and North Africa.
In the 2000s, the Milennium Drought hit the region
hard and industry restructuring and water efficiency
programs were the focus of centre research,
estension and industry support programs.
In its role as a hub for the extension of important
technical knowledge, Loxton Research Centre has
and will continue to deliver innovative solutions to
the problems faced by growers across the state –
and beyond.
The technology developed by the centre’s
horticulture and agriculture staff has, over the years,
contributed significantly to the economic productivity
and sustainability of the region’s fruit-growing and
farming. Now a new chapter has begun.
In 2016 the original centre – including offices,
laboratories, kitchen, boardroom, meeting rooms
and reception – underwent a modern refurbishment.
In addition, a new conference facility was built
beside the original buildings, incorporating meeting
rooms, a demonstration kitchen and flexible
working spaces.
The $7.5 million redevelopment forms part of the
Australian Government-funded South Australian
River Murray Sustainability Program (SAPMS). It is
an investment in a continuing success story.
The vision is for the redeveloped Loxton Research
Centre to bring together industry, research,
education and government to drive sustainable
innovation for the benefit of regional, national and
global agricultural communities.
The expanded facility will become a key regional
location for national and international research and
events, attracting delegations, businesses and their
investment into the region.
Its mission is to cement its role in expanding
regional economic development by attracting
investment, improving productivity and enhancing
both the environment and the economy across
this important region, the state and the nation.
The centre is now home to a number of private
and government tenants, including Primary
Industries and Regions SA (PIRSA), the Almond
Board of Australia, Biological Services, Riverland
Wine, Growsmart Training, Wisdom Data and
Mapping, and Rural Directions.
In 2015, the Australian Almond Industry’s Almond
Centre of Excellence was opened at the Loxton
Research Centre, with an aim to champion
exciting new research for Australia’s fast growing
almond industry.
As we look forward to the future growth of the
centre, it is fitting to look back at some of the
highlights of the past 56 years and to thank all who
have been a part of the story to date.

RESEARCH HIGHLIGHTS
Irrigation change and technology
The Loxton Research Centre was created in
part to support and drive new irrigation development
across the Riverland. The initial design incorporated
10 hectares of furrow irrigation and 11 hectares
of sprinkler system, with plans for a further nine
hectares of sprinkler-watered plantings.
This helped facilitate and support the region’s move
from furrow to pressurised and eventually to full
pipeline delivery of water, in conjunction with the
industry push for greater efficiencies and a more
sustainable water approach.
From the introduction of improved sprinkler
designs and performance measures, to computer-
aided techniques linking water use to soil type, the
centre has helped revolutionise the management of
the precious River Murray resource.
As the national significance of these changes
grew, the new technology gradually moved ‘up
river’. Many of the innovations being rolled out
on farms and fruit blocks along the length of the
Murray, from pump automation to new drought
tolerant varieties, trace their origins to research
undertaken in Loxton.

Selected projects
An early trial tested the relative merits of under-
tree and overhead watering, with the results
prompting a change to under-tree watering for the
centre’s plantings and leading to further trials of
new and more efficient sprinkler systems and soil
management practices.
Irrigation research in the 1970s provided growers
with better information to measure and improve
sprinkler distribution and uniformity and determine
life expectancy of different systems. This led to the
creation of an equipment evaluation service in the
late 1970s, which later became the commercial
Australian Irrigation Technology Centre.
In the early 1980s the centre was selected to
run a number of projects as part of the Australian
Government-funded River Murray Soil and Irrigation
Program (RMSIP). This included a project to help
field-test complete irrigation systems and pump
performance, and provide advice on all aspects of
irrigation system design and operation.
Later, an irrigation scheduling project helped assess

Left to right: Citrus fruit from a Riverland orchard being picked (circa 1960s). Andrew Chapple undertaking irrigation research (1968).
water requirements matched to specific crops.

The centre’s researchers were also among the first in the region to use neutron moisture probes to measure available water in the soil. This helped determine irrigation schedules for growers, at a time when improved distribution systems were introduced across the region. It again led to a new commercial service in the region.

Today, PIRSA’s regional support officers are based at the centre supporting the delivery of some 200 projects, which will receive around $200 million in funding under SARMS. This program, and the projects it funds, are continuing to lead the way in water efficiency and sustainable horticulture production.

Crop production and expansion

Many potential new crops have been trialled at the centre to assess suitability in the region. These have included pistachio nuts, pecan nuts, walnuts, avocado, kiwi fruit, persimmons, nashi fruit, feijoas and vegetables, among them peppers, pumpkins, squash, rockmelon, watermelon and garlic.

The region’s currently most successful crop – and part of early trials at the centre – is almonds. The Riverland now produces more than 85% of South Australia’s almond crop (14,000 tonnes), which is our most valuable horticulture export, worth $146 million in 2015-16.

Research at the centre has also supported new crop varieties; production methods; disease, drought and salinity tolerant rootstocks; planting methods; windbreak trials; trellising trials; and rootstock propagation for a number of horticulture and viticulture crop types.

Selected projects

Almond, apricot, peach, nectarine and plum variety evaluation trials were set up in the 1960s to screen introduced varieties and local selections. Several of these were then planted in small plots in Loxton to provide a source of budwood for growers.

A peach rootstock trial in the 1960s tested rootstock and scion varieties to better match ripening dates to the various rootstock and scion combinations.

Another major project at the centre involved the introduction of seeds (genetic material) of apricots from Turkey and the cross-breeding of sweeter, high quality varieties now being used commercially in producing apricots for the dried fruit and fresh fruit markets.

Production and maturity trials for the citrus industry evaluated new varieties, including the
periods of drought. Their orchards and minimise losses through future information will assist growers better manage levels and durations of water reductions. This horticulture plantings take to recover from various information for growers on how long permanent plantings (grapes, citrus and almonds).

The data collected from the five-year trial provided data associated with the drought event and, eventually, recovery of permanent horticulture plantings (grapes, citrus and almonds).

The data collected from the five-year trial provided information for growers on how long permanent horticulture plantings take to recover from various levels and durations of water reductions. This information will assist growers better manage their orchards and minimise losses through future periods of drought.

As part of the trial the Irrigation Recording and Evaluation System (IRES), developed by the Irrigated Crop Management Service at Loxton Research Centre, was employed as a platform for collecting and analysing data from drought monitoring sites. The program integrated data entry, storage, analysis and summarising into one platform, and provided robust outputs for the project.

Pest and disease management

Many significant discoveries in pest and disease management have been made at the centre, particularly for viticulture and citrus crops.

This research has helped boost production, while significantly reducing the amount of chemical used to control diseases and pests at lower costs for growers. This laid the building blocks for the state’s world-class reputation for premium, clean and green food and wine production.

Selected projects

Research at the centre led to the introduction of nematode-resistant rootstocks, saving the wine grape industry many millions of dollars by increasing productivity in nematode-infested soils and reducing the need for dangerous and expensive nematicides. In addition, the identification of optimum propagation methods for disease and pest-resistant rootstocks best suited to Riverland soils and climate has enabled the region to significantly increase production, while using non-chemical means of protecting its certified phylloxera-free status (a potentially devastating pest).

An insectary established in the early 1960s provided the foundation for a large body of research on horticulture pests, including world-leading biological control of red scale on citrus and the development and introduction of revolutionary integrated pest management systems.

The region’s citrus industry was the first to trial a biocontrol agent (a tiny wasp) that led to the successful management of red scale. This major pest had previously required many costly and toxic chemical sprays per season, and is now under stable biological control without the need for spraying.

Pioneering research into spray technology helped facilitate the redesign and development of highly efficient spray machinery, which led to international adoption of specially-designed fans that apply minimum quantities of chemicals to achieve efficient and effective pest control.

Research into downy and powdery mildew has led to more efficient spray programs for cleaner, greener control of this disease. A computer-based disease simulator for downy mildew, built with international collaboration, now processes local weather data to determine the risk of disease events.

This work led to a commercial disease advisory service, now called GrowCare, which provides online disease control advice to growers in South Australia and interstate.

Soil management and classification

In 1980, projects undertaken as part of RMSIP facilitated significant research outcomes in the field of soil management, soil characteristics and water balance across vineyards and orchards in the Riverland. Results from these projects underpinned important advances in water and soil management across the region and elsewhere along the Murray-Darling water catchment.

The results from some of these projects led to the formation of the ICMS, established in 1985 to deliver a service to irrigators, government and industry bodies across South Australia and nationally.

A key component of the service was the development of soil mapping methodologies to assist irrigators to understand key soil properties and to apply appropriate management, affecting crop selection, soil improvement and irrigation.
design and scheduling. Many of these soil classification and mapping methodologies have been adopted industry-wide.

Selected projects

The centre was the base for the Woodlots for Salinity Mitigation project, an Australian Government-funded program (1990-1996) that established experimental plantings to determine the survival, growth and water use of a range of tree species irrigated with saline drainage water.

Numerous soil surveys have been undertaken to help identify land suitable for irrigated horticulture. As part of this work, important advances and trials of new soil mapping technology have been made, including the development of AutoCAD computer software.

In the early 1990s, the Analytical Crop Management Laboratory (ACML) was established at the centre to provide a South Australian-based analytical laboratory for horticulture and broadacre farmers to monitor crop nutrition and manage soil salinity.

The ACML also provided a niche service to the state’s vegetable industry offering soil and plant nutrition analysis. In the 2000s, it was involved with soil salinity and nutrient analysis during the large expansion of grapevine plantings across Australia.

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References

1 PIRSA Food Scorecard 2015-2016.
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