

2015-16 ANNUAL REPORT



GRDC[™]
REGIONAL CROPPING
SOLUTIONS NETWORK

WESTERN REGION

REGIONAL CROPPING SOLUTIONS NETWORK

grdc.com.au

2015-16 Annual Report: Regional Cropping Solutions Network – Western Region

This report outlines some of the local research, development and extension priorities identified by the grain grower, adviser and researcher members of the GRDC Regional Cropping Solutions Networks (RCSNs) that operate across the western grain-growing region of Australia.

Authors:

- Julianne Hill
Coordinator, Regional Cropping Solutions Network,
GRDC Western Region
- Melissa Williams
Senior Consultant, Cox Inall Communications

Acknowledgements:

Grateful acknowledgement is made for the ideas and time committed to this initiative by the facilitators, growers, advisers and researchers who are part of the GRDC's Western Regional Cropping Solutions Network; as well as Roger States (GRDC Regional Manager, Regional Grower Services – West); and Julia Easton (GRDC Manager, Regional Grower Services).

Note:

The information presented in this document was current and correct as at January 2017. However, as time progresses, information about each of the issues discussed will change as the issue progresses through the research, development and extension process. This report aims to provide an indicative view of research, development and extension priorities in the western grain-growing region, rather than absolute information.

Title: 2015-16 Annual Report: Regional Cropping Solutions Network – western region

Cover photo: Seeding at Collin and Sandy Penny's property, Lake King (Photo by Russell Ahmat)

Back cover: Seeding at Newmans' property, Cuballing (Photo by Roger Newman)

ISSN: 2205-7749 (Print) **ISSN:** 2205-7757 (online)

Published: January 2017

Copyright © Grains Research and Development Corporation January 2017

This book is copyright. Except as permitted under the Australian Copyright Act 1968 (Commonwealth) and subsequent amendments, no part of this publication may be reproduced, stored or transmitted in any form or by any means, electronic or otherwise, without the specific written permission of the copyright owner.

GRDC contact:

Ms Maureen Cribb, GRDC Publishing Manager

T: 02 6166 4500

E: maureen.cribb@grdc.com.au

W: <https://grdc.com.au/About-Us/Our-Grains-Industry/Region-Cropping-Solutions-Networks>

Editor: Julianne Hill

Design and production: Coretext, www.coretext.com.au

DISCLAIMER: This publication has been prepared in good faith by the contributors on the basis of information available at the date of publication without any independent verification. The Grains Research and Development Corporation does not guarantee or warrant the accuracy, reliability, completeness of currency of the information in this publication nor its usefulness in achieving any purpose. Readers are responsible for assessing the relevance and accuracy of the content of this publication. The Grains Research and Development Corporation will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information in this publication. Products may be identified by proprietary or trade names to help readers identify particular types of products but this is not, and is not intended to be, an endorsement or recommendation of any product or manufacturer referred to. Other products may perform as well or better than those specifically referred to.

CAUTION: RESEARCH ON UNREGISTERED AGRICULTURAL CHEMICAL USE. Any research with unregistered agricultural chemicals or of unregistered products reported in this document does not constitute a recommendation for that particular use by the authors or the authors' organisations. All pesticide applications must accord with the currently registered label for that particular pesticide, crop, pest and region.

Foreword

In presenting the 2015-16 final annual report for the western Regional Cropping Solutions Network (RCSN), I would like to highlight the major successes of this valuable initiative for the GRDC.

During the past three years of the RCSN project, the five western region port zone groups have facilitated GRDC spending of \$1.2 million in 36 projects of one to three-year duration across the Western Australian grainbelt. In 2015-16, the GRDC invested an extra \$888,000 into 22 RCSN projects in the western region and will fund the initiative for at least another four years.

The role of the RCSN is to capture major RD&E (RD&E) issues, ideas and priorities for grain growers in the Geraldton, Kwinana East, Kwinana West, Albany and Esperance port zones and feed this information into the investment planning cycle of the GRDC's western region.

Each of the RCSN groups comprise a mix of grain growers, advisers, consultants and other industry stakeholders and at the start of 2016, new members were appointed as each group underwent a partial transition of representatives through an open process of applications and advertising. A GRDC western panel member is assigned to each RCSN as a conduit of information between the group and the panel. Contact details for local RCSN members are available at: www.rcsn.net.au and through the new western region GRDC Facebook page GRDCWest.

RCSN groups each met twice during 2015-16 to review previously funded projects, discuss proposals for new projects and update and rank priority regional grains issues for their zones. This process involved undertaking a full evaluation analysis.

For the first time this financial year, the GRDC also piloted a series of 'open' RCSN meetings for all western region grain growers. This was an opportunity for growers to provide insight into the major challenges directly affecting them and receive feedback about GRDC's strategic RD&E investments. These meetings were also designed to improve understanding of levy-based investments in grains RD&E and how these investments translate to lifting on-farm productivity and profitability. The 2015 RCSN open meetings were highly successful and are being rolled-out again in all western region port zones during late July and August 2016.

Starting in June 2015, the GRDC revised its investment structure and portfolio hierarchy and classification. Investments have been re-classified by the 'time to delivery', based on the time it takes for a project to deliver useful information to a grower or adviser. These are:

- One to three-year duration (typically validation and extension).
- Three to eight-year duration (typically applied research and development).
- Eight or more year duration (typically strategic research).

This classification system is designed to ensure projects are balanced and that project time horizons are clear for growers. It clearly states to all recipients of GRDC funding that investments must have a return to growers.

The new structure also means RCSN groups have a better understanding of the areas that Regional Grower Services invest in, based on the identified priorities of the RCSN groups in:

- Validation – regional or local testing of State or national R&D outcomes in local conditions, soil types and farming systems.
- Extension – active, face-to-face communication of RD&E through updates, workshops and grower meetings.
- Grower and adviser communications – communication of RD&E outcomes through media releases, emails, GRDC GroundCover™, GrowNotes™, other less active formats and in capacity building, such as grower and adviser professional development opportunities.

This 2015-16 annual report provides a summary of RCSN projects and activities, as well as presenting the priority issues identified by the RCSN groups for each port zone for the next investment cycle and the actions taken by GRDC in response to each priority issue.

It contains an overview of the GRDC's investment planning process for grains RD&E and outlines how grain growers and the RCSN groups contribute to that process. This report also provides a summary of the activities of the RCSN groups over the life of the current contract and how RCSN members are participating in GRDC's major RD&E initiatives in the western region.

My thanks go to Julianne Hill for facilitating and coordinating the western region RCSN. Without her efforts, this project would not have been the success that it has been to date. I also offer my sincere appreciation to past and present RCSN members who have invested their time in this project and have provided the insight and knowledge necessary to make the RCSN initiative a valuable and respected resource in the WA grains industry.

You may notice some transformation at the GRDC's western regional office this year as GRDC continues to expand its WA-based team. This is part of a core national strategy to improve responsiveness and engagement with grain growers, grower groups, advisers and researchers in each grain-growing region. The new-look western regional network will have more say in GRDC's investment decisions, with a particular focus on one-to-three year and three-to-eight-year projects that address western region priority issues relating to farming systems, agronomy, soils, nutrition, weeds, pests and diseases.

If you have any queries about the RCSN project or any other aspect of GRDC business in the western region, please feel free to contact me or the Chairman of the Western Regional Panel, Peter Roberts (kpeterroberts@gmail.com; 0428 389 060).

Kind regards



Roger States,
Regional Grower Services Manager – West
Roger.States@grdc.com.au
0427 565 780

Table of Contents

Foreword	4
1. EXECUTIVE SUMMARY	8
<hr/>	
2. GROWER-DRIVEN, LOCALLY FOCUSED DECISION-MAKING	10
<hr/>	
Production-based zones	10
Local representatives	10
Coordination and facilitation of the RCSNs	10
RCSN operations	11
Albany Port Zone RCSN	14
Esperance Port Zone RCSN	16
Geraldton Port Zone RCSN	18
Kwinana East Port Zone RCSN	20
Kwinana West Port Zone RCSN	22
3. PRIORITY ISSUES FOR THE WESTERN REGION	24
<hr/>	
The top priority issues identified by the RCSNs for western region in 2015-16.	24
Summary of key issues and actions to address them	26
Issue – Water use efficiency and moisture utilisation	26
Issue – Abiotic stress (heat-cold) and crop nutrition in early moisture stress	26
Issue – Rotations	27
Issue – pH and acidity	27
Issue – Root lesion nematodes	28
Issue – Herbicide resistance	28
Issue – Pests, pesticides & fungicide resistance	28
Issue – Non-wetting soils	28
Issue – Early seeding opportunities	29
Issue – Compaction	29
Issue – Soil biology	30
Issue – Risk management (inputs)	30
Issue – Canopy management	31
Issue – Machinery management	31
Issue – Oats	31

APPENDICES	32
Appendix 1: Managing grains R&D	32
Local networks	32
GRDC western and southern regions	32
Regional panels	33
Research themes	34
Discovery	34
Applied	34
Delivery	34
Investment pathways	34
Pathway 1 – 1–3 year investment	34
Pathway 2 – 3-8 year investment	34
Pathway 3 – 8+ year investment	34
Appendix 2: Issues Identified	34
Albany Port Zone – 2015-16 Prioritised issues and areas of interest	35
Esperance Port Zone – 2015-16 Prioritised issues and areas of interest	38
Geraldton Port Zone – 2015-16 Prioritised issues and areas of interest	41
Kwinana East Port Zone – 2015-16 Prioritised issues and areas of interest	44
Kwinana West Port Zone – 2015-16 Prioritised issues and areas of interest	48
Appendix 3: 1–3 year projects	51
Albany Port Zone Project Details: summary of new projects 2016-17	51
Albany Port Zone Project Details: summary of 2015-16 projects	51
Esperance Port Zone Project Details: summary of new projects for 2016-17	52
Esperance Port Zone Project Details: summary of 2015-16 projects	52
Geraldton Port Zone: summary of new projects for 2016-17	53
Geraldton Port Zone: summary of 2015-16 projects	54
Kwinana East Port Zone: summary of new projects for 2016-17	54
Kwinana East Port Zone: summary of 2015-16 projects	55
Kwinana West Port Zone: summary of new projects for 2016-17	56
Kwinana West Port Zone Project Details: Summary of 2015-16 Projects	57
Albany RCSN – summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014	58
Esperance Port Zone RCSN – summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014	60
Geraldton Port Zone RCSN – summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014	62
Kwinana East Port Zone RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014	63
Kwinana West Port Zone RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014	65

Appendix 4: RCSN Meetings	67
Albany	67
Esperance	67
Geraldton	67
Kwinana East	68
Kwinana West	69
Appendix 5: Creating capacity in the next generation – case study	70
Appendix 6: GRDC initiatives	71
1. The National Frost Initiative	71
2. Soils Constraints – West	71
3. National Variety Trials Advisory Committee	72

Executive summary

There has been significant growth in the WA grains industry in recent years. The Department of Agriculture and Food, Western Australia (DAFWA) estimates grains exports from a total cropped area of about 98.45 million hectares are worth more than \$4 billion annually to the State's economy. This includes cereals (worth \$3.3 billion), oilseeds (worth \$0.7 billion) and legumes (worth \$0.15 billion). According to DAFWA, grain production is now the fourth biggest industry in WA after petroleum, iron ore and gold.

The GRDC estimates the average wheat yield in the western region is 1.65 tonnes per hectare and the State's top performing growers are achieving an average of almost three tonnes per hectare, with a focus on optimising yield for the level of inputs applied. The GRDC is working with CSIRO, DAFWA, universities and other industry partners and stakeholders in WA to gain a better understanding of the pathways leading to higher grains productivity and profitability, the technology drivers underpinning improvements and how resources can be most efficiently allocated to RD&E in the region.

At a State and national level, the grains sector is undergoing some transformation. State departments of agriculture and other traditional research partners are reducing their role in RD&E due to declining budgets. The private sector is now playing an increasingly important role in grains innovation. Grains research is also becoming progressively global and the GRDC is growing in significance and influence.

As a major investor in RD&E in the Australian grains industry, the GRDC is expected to play a more prominent leadership role in the future in the national and international global grains sector.

To assist the GRDC to maintain strong connections with growers on the ground and identify locally-specific RD&E issues and priorities, RCSNs were established in the grain-growing areas of the western region in October 2011.

There are five RCSNs in the GRDC western region, representing the grain receipt port zones of Albany, Esperance, Geraldton, Kwinana East and Kwinana West. Each network comprises growers, advisers, consultants and other grains industry stakeholders. RCSN members are appointed through an open process and at the start of 2016 there was a partial transition of representatives for each group. The RCSNs are coordinated by Julianne Hill and supported by the GRDC's Western Regional Panel and the GRDC Regional Grower Services team in the west, led by Roger States.

The groups meet at least twice a year to identify the priority issues facing growers in the western grain growing region and provide GRDC with detailed information about these issues. This information helps the GRDC identify and

plan its annual RD&E investments to achieve maximum effectiveness of RD&E levies at a local, regional and national scale. With hundreds of issues identified annually, the RCSNs play a critical first step in the prioritisation of these issues.

The GRDC has also initiated a series of 'open' RCSN meetings that provide consultation opportunities for the western region's wider grain growing community. These open meetings were piloted for the first time in 2015-16 and allowed growers to provide insight into the major challenges directly affecting them and receive feedback about the GRDC's strategic RD&E investments. The meetings have also been designed to improve understanding about levy-based investments in grains RD&E and how these investments translate to lifting on-farm productivity and profitability.

"The RCSN groups have made the GRDC more visible and relevant because they provide both a local face and some locally-relevant research results,"

– anonymous RCSN survey respondent 2016.

Many of the ideas and issues identified by the RCSNs and through the open RCSN meetings have been investigated through the GRDC's one-to-three-year project investment pathway. These projects are designed to give the industry an opportunity to be responsive to local, seasonal and tactical issues – which are often best addressed with timely, small-scale and often small-budget projects. These projects are generally in-season, delivered within a short timeframe (up to three years) and are set up where the speed of response is critical to meeting industry needs.

Since their establishment, the RCSNs have instigated and overseen completion of 83 projects with a one to three year duration (excluding projects which commenced in 2016), which have successfully delivered results in a timely, highly accessible and cost-effective manner. The close involvement of RCSN members in project design and approval ensures a credible approach to local RD&E. While the RCSNs recognise that not all issues can be met by a one-to-three-year project, many issues have been effectively addressed through this process.

As the value of these projects is realised and the process has matured, the level of investment by GRDC has increased to approximately 20 per cent through Regional Grower Services, under which the RCSN initiative sits.

Of the issues put forward by the RCSNs for the 2015-16 investment cycle, several have been included in new investments commencing in 2016-17 and others have been addressed through broader or ongoing GRDC investments.

The summary below lists the top ranked issues impacting on western grain grower profitability, as identified across all five western region RCSNs at meetings held in August 2015 and February 2016.

- Weeds, including herbicide resistance (all five zones August and February)
- Compaction (three zones August and four zones February)
- Acidity (four zones August and February)
- Profitable break crops and sequences (five zones August and four zones February)
- Non-wetting/water repellence (four zones August and three zones February)
- Frost (three zones August and February)
- Early sowing opportunities (three zones February)
- Nitrogen, phosphorus and potassium management (four zones August and three zones February)
- Managing seasonal variability (two zones August and February)
- Abiotic stresses (heat, cold, drought) (two zones February)
- Plant and root diseases (three zones August (cereal disease) and two zones February)
- Matching inputs investment to yield (four zones August and two zones February)
- Oats research, specific to port zone (two zones February)
- Farm business management, finance and information technology (two zones August and February)
- Farming with less rainfall (two zones August)
- Better varieties to match local conditions/crop breeding (one zone August and February)
- Sclerotinia and other canola diseases (one zone August and February)
- Water use efficiency (one zone August and February)
- Machinery management (one zone August and February)
- National Variety Trials (NVT) for agricultural zone four/precision technologies (one zone August and February)
- Slugs and snails/pests (one zone August and February)
- Soil health (one zone August and February)
- Sodic soils (one zone August)
- Waterlogging (one zone August)
- Grain marketing (one zone August)
- Communications (one zone August)
- GM technology (one zone August)
- Barley disease (one zone February)
- Controlled Traffic Farming (CTF) adoption and economics (one zone February)
- Grass control in oats (one zone February)
- Redlegged earth mites (RLEM) pesticide resistance (one zone February)
- Mechanical stubble residue management (one zone February).

In comparison, the top five issues identified across the RCSN groups in 2014-15 as having the biggest impact on grain grower profitability in the western region were:

- Profitable rotations in the farming system (four zones)
- Subsoil constraints (four zones)
- Acidity, both topsoil and subsoil, including availability of quality lime products and cost effective lime incorporation methods (four zones)
- Herbicide resistance with glyphosate resistance of particular concern (four zones)
- Nematodes and soil borne diseases in cereal dominant rotations (two zones)

To discuss any content in this report or to receive final reports of one to three year time to delivery projects, please contact:

Julianne Hill
GRDC's Regional Cropping Solutions Coordinator
E: regionalcroppingsolutions@gmail.com
T: 0447 261 607

Grower-driven, locally focused decision-making

The five RCSN groups were established in the western region in October 2011 to help guide the GRDC investment planning process by providing an on-ground and local perspective of grower issues. The members of the RCSNs contribute to the RD&E investment planning process by working together to:

- Identify and track regional issues facing growers in the western region – issues identification can be through the networks, group meetings, feedback, observation or experience.
- Provide on-the-ground insights into priority issues requiring industry R&D attention and how these might be addressed.
- Liaise with industry partners and other growers to provide direction and ideas about addressing regional priorities.
- Gather intelligence about regional grain production constraints and opportunities.
- Provide support and advice to the GRDC’s Western Regional Panel about regional issues and delivery of desired outcomes to local growers.
- Drive, with the GRDC Western Regional Panel, the one-three year projects that are aimed at improving grain growers’ productivity, profitability and sustainability.
- Represent the RCSNs at industry events and stakeholder meetings to collect information about issues impacting on growers and share information about RD&E priorities and investments.

Production-based zones

The RCSNs were formed to bring together growers, advisers and other industry professionals working in similar production environments. In the western region, Co-operative Bulk Handling (CBH) receival port zones have been used as the distinction between production environments for each of the RCSNs. The RCSN port zones are shown in Figure 4.

Local representatives

The members of the five western RCSN groups are growers, advisers, researchers, financiers and industry professionals. They represent a strong cross-section of interests across the WA grainbelt. The distribution of network members across the RCSN port zones is also shown in Figure 4 and the membership of each group is listed in this report.

The members of each RCSN are selected through an open process and a wide range of skills and regional knowledge are captured for the successful operation of the network and to provide geographic coverage of the zone. The networks, along with the GRDC Western Panel, play a critical role in the planning and management of investments in grains RD&E.

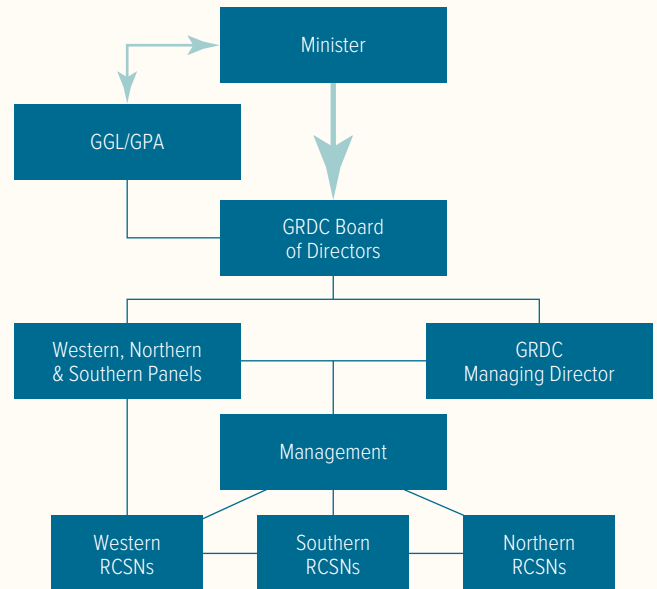


Figure 1: GRDC 2016 structure and the fit for the RCSNs.

Coordination and facilitation of the RCSNs

The Albany, Esperance, Kwinana East, Kwinana West and Geraldton port zone RCSN groups are coordinated and facilitated by Julianne Hill, with support from Gilly Johnson.



Figure 2: Julianne Hill



Figure 3: Gilly Johnson

1. Julianne Hill, RCSN coordinator/facilitator
KJ Heenan and JR Hill
PO Box 89, Brunswick, WA, 6224
08 9726 1307
0447 261 607
regionalcroppingsolutions@gmail.com
2. Gilly Johnson, RCSN support
Mentoring Resources Hub
Australian Mentor Centre
gilly@australianmentorcentre.com.au

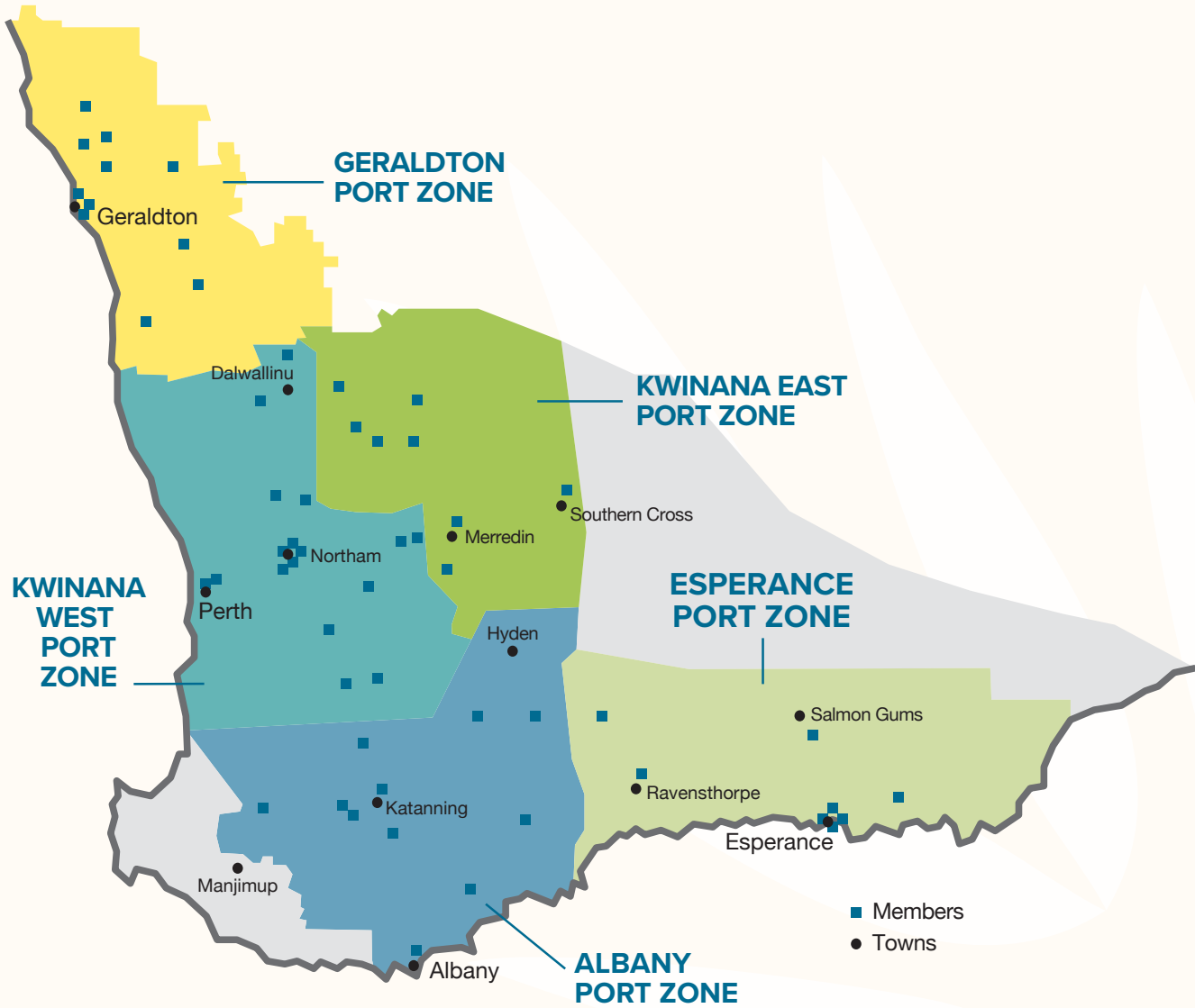


Figure 4: Regional Cropping Solutions Network (RCSN) port zones for the western region and the distribution of RCSN group members as at April 2016. SOURCE: GRDC

RCSN operations

NETWORK MEETINGS

Each of the RCSN groups meet face-to-face twice a year in their port zone. The meetings are scheduled according to the GRDC investment planning process and when convenient to its RCSN members. The purpose is to enable the RCSNs to provide timely and relevant information to the GRDC as it considers RD&E investments for the coming year.

The role of the RCSN members is to prioritise and develop ideas brought forward through open RCSN meetings and from consultation with other growers; and to provide some oversight into the outcomes and outputs around potential project(s) that arise from those ideas.

These potential project ideas are then taken up by the RCSN coordinator, who scopes up the proposed project after determining if the work has not been conducted previously, and ensures that any project(s) that arise from RCSN ideas reflect the intent of the RCSN members for the individual port zone.

These project scopes are then sent to GRDC's one-to-three year time to delivery regional manager who ensures that the correct process is undertaken.

GRDC's role is to ensure that the ideas and any project(s) that arise from RCSN ideas:



Figure 5: At the February 2016 meeting of the RCSN Kwinana East group were RCSN coordinator Julianne Hill, left, RCSN members Cathy Cooke, of Koorda, Ty Kirby, of Beacon, and Darren Kilminster, of Bruce Rock with GRDC Horizon scholar Elicia Lim and GRDC Western Panel member Gemma Walker.

PHOTO: COX INALL COMMUNICATIONS

- align with the investment strategy;
- do not repeat existing or prior projects;
- build on prior and current GRDC investment where possible;
- are designed in such a way to deliver the outputs required;
- represent value for money;
- aim to improve profitability on-farm; and
- are contracted in accordance with the Federal Government's Procurement Guidelines.

OPEN MEETINGS

In 2015, the GRDC coordinated a series of pilot 'open' meetings, hosted by each RCSN port zone group, offering all western region grain growers an opportunity to have their voices heard on production issues affecting their profitability.

This initiative provided a forum for growers to have input into the GRDC about its RD&E priorities, improve their understanding of GRDC investments in grains RD&E and learn about how these investments translate into lifting productivity and profitability on-farm.



Figure 6: Grain growers gathered in Frankland for one of the highly successful RCSN open meetings in 2015. These are being expanded in 2016.

PHOTO: JULIANNE HILL, RCSN

Participants at each meeting were able to network, discuss the key issues and challenges in their cropping systems and learn about local GRDC-supported research and trials.

The open meetings were also a valuable opportunity for RCSN group members, GRDC Western Panel members and GRDC staff to meet and consult with growers in each region face-to-face. 160 growers and industry attended at least one of the five open meetings during 2015.

Due to the success of the pilot RCSN open meetings in 2015 they will be repeated and expanded into 2016-17, with 13 open meetings held during the 2016 winter period.

NETWORK APPOINTMENTS

July 2015 marked the start of the current round of the RCSN initiative in the western region. There have been some changes in the methods for maintaining and appointing new group members, with some groups changing in size and the implementation of a requirement for regular turnover of members.

Any vacancies on the RCSN groups are extensively advertised and promoted and applications are sought from all areas of the grains industry. Appointments are made on the basis of knowledge and skills (first order consideration) and geographic representation (second order consideration). Appointments are made by the chairman of the GRDC Western Regional Panel (on behalf of the panel) and the GRDC Manager Regional Grower Services – West. Current members may be entitled to re-apply for a position on their network group.

NETWORK PRIORITIES

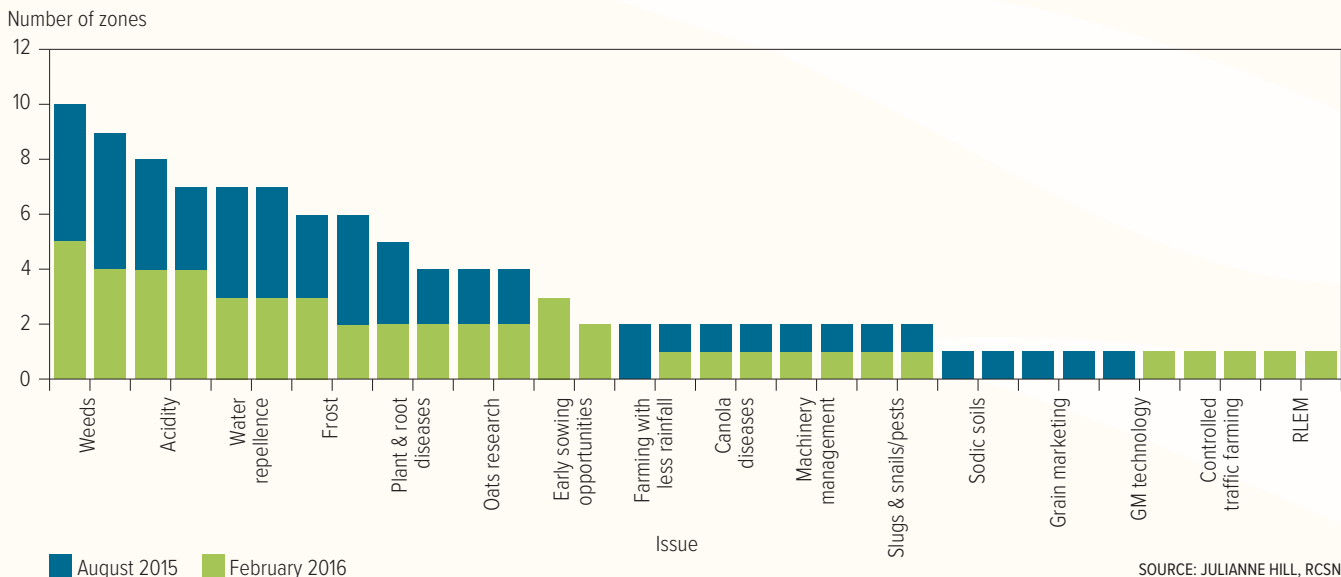
Priorities identified by RCSN group during meetings in 2015-16 are outlined below.



Figure 7: ‘Open’ RCSN meetings were initiated during the 2015-16 year to give growers the opportunity to have their say.

PHOTO: JULIANNE HILL, RCSN

FIGURE 8 Top issues identified by the western region RCSN groups at meetings in August 2015 and February 2016.



SOURCE: JULIANNE HILL, RCSN

Albany Port Zone RCSN

The top five, high-level issues identified by the Albany port zone RCSN (in February 2016) as impacting on grain grower profitability in this zone were:

- barley disease;
- pH/Soil acidity;
- herbicide resistance;
- non-wetting/water repellent soils; and
- frost.

Issues and specific priorities and ideas included the following.

- Barley disease – spot type net blotch in Oxford (and other varieties) – and head loss in barley.
- Subsoil acidity and pH – lime sources, lime cost and quality, incorporation methods for getting lime to depth. Also, more economic analysis of the cost/benefits of soil acidity options across a range of soil types (this was also a major priority issue identified by the RCSN Albany group in 2015).
- Herbicide resistance – glyphosate resistance in annual ryegrass (*Lolium rigidum*) and wild radish (*Raphanus raphanistrum*) and non-herbicide options to manage this. Integrated weed management options using effective combinations of herbicide strategies and harvest weed seed control. RCSN members also identified effective knockdowns as a particular issue following harvest weed seed control; and grass control in oats.
- Water repellent/non-wetting soils – finding the most effective solutions for water repellency, especially in seasons when May is dry (some growers are having difficulties achieving good crop germination on sandy gravel/forest gravel soils). Also, further validation of soil wetting agents and options for boosting water holding capacity.
- Frost – again identified as a priority issue in this zone, as was the case in 2015.
- Nematodes – these, especially root lesion nematodes (RLN), continue to be an issue for many growers in this zone (this was also the case in 2014 and 2015). RCSN members believe that test results are highly variable and barley crops, in particular, are being significantly affected.
- Controlled traffic farming (CTF) – economics of adoption and use. Adoption in this zone is difficult due to highly variable paddock sizes and shapes.
- Early sowing trials – how to best take advantage of early sowing opportunities.
- Nutrition – especially nitrogen (N), phosphorus (P) and potassium (K) management.
- Pests and diseases – slugs and snails (contamination issues and cost effective control measures), redlegged earth mites (resistance to insecticides, especially organophosphates and alternative control strategies) and sclerotinia in canola (control and costs).



Figure 9: Albany port zone RCSN members in Esperance for their February 2016 meeting. (Absent: Ben Creek, Kent Stone, Mark Sullivan and Mae Connelly).

PHOTO: JULIANNE HILL, RCSN

TABLE 1: Members of the Albany port zone Regional Cropping Solutions Network (at March 2016)

Member	Location	Occupation
Mark Pearce	Lake Grace	Farmer
Jeremy Lemon	Albany	DAFWA
Ben Ball	Wagin	Farmer
<i>Ben Creek</i>	<i>Boyup Brook</i>	<i>Farmer/agronomist</i>
Trent Parsons	Jerramungup	Farmer
Scott Smith	Kojaneerup	Farmer
<i>Mark Lawrence</i>	<i>Kojonup</i>	<i>Consultant</i>
Stuart Witham	Tambellup	Farmer/agronomist
Daniel McDougall	Katanning	Farmer
<i>Mark Sullivan</i>	<i>Katanning</i>	<i>Farmer</i>
Kent Stone	Kojonup	Farmer/Agronomist
<i>Mae Connelly</i>	<i>Lake Grace</i>	<i>Agronomist</i>

* GRDC Western Regional Panel member – Andy Duncan
 New 2015-16 RCSN members are identified in italics



Figure 10: South Kukerin grain grower Barry Gray is using narrow windrow burning as a harvest weed seed control (HWSC) measure to combat increasing herbicide resistant weed issues.

PHOTO: COX INALL COMMUNICATIONS

Harvest systems crush resistant weed seed problems

Managing herbicide resistant weeds is an ongoing challenge for grain growers in the Albany port zone and has been a key priority for the Albany RCSN group.

It has recommended GRDC investments into integrated weed management strategies, including harvest weed-seed control (HWSC) tactics.

Barry Gray, of Kukerin, is one of many growers in this zone to adopt narrow windrow burning to get on top of problem weeds. He says destroying weed seeds at harvest using narrow windrows that are burned the next autumn is a logical and necessary step to reducing long term weed burdens.

“It is fortunate our main problem weed species retain a high proportion of seed on upright stems and tillers at crop maturity,” he says. “By cutting the weeds off low with the harvester, their seeds are collected, processed, deposited in narrow windrows in chaff and then destroyed with burning. Windrow burning and crop rotations are now our main weed control weapons and give us flexibility with pre and post-emergent herbicides.”

Barry has modified his conventional harvester – a New Holland CX8080 – to place the weed seeds at the top of the windrow and says he can get higher levels of weed seed control when the windrow is then burned or baled.

The spinners on the harvester have been reversed and these direct chaff towards heavy-duty PVC tubes (300mm in diameter) fitted to the area adjacent to the spinners. A flap hangs behind the sieves and guides all material into the spinners.

“The chaff is blown down the tubes, hits a piece of carpet between the tube outlets and is deposited on top of the straw window – which is about one metre wide,” Barry says.

“This creates a defined separation of chaff and straw, which is vital because the weed seed-bearing chaff is then in the hottest part of the fire when we burn the stubble rows in autumn.

“Windrows burn well – even after rain – because they are sitting above the cut stubble and there is plenty of air movement and fuel to achieve a hot burn and seed kill.”

To view a video of Barry outlining his system, go to: www.grdc.com.au/GC113V-WeedSeedKukerin

More local examples of HWSC tactics are outlined in the Albany RCSN publication ‘The effectiveness of on-farm methods of weed seed collection at harvest time’. It is available at: www.grdc.com.au/Resources/Publications/2013/10/The-effectiveness-of-onfarm-methods-of-weed-seed-collection-at-harvest-time

Esperance Port Zone RCSN

The top five, high-level issues identified by the Esperance port zone RCSN (in February 2016) as impacting on grain grower profitability in the Esperance zone were:

- weeds;
- profitable break crops;
- efficient fertiliser application;
- early sowing opportunities; and
- soil compaction.

Specific priorities and ideas about these issues included the following.

- Herbicide resistance and management - summer rainfall and weed management, crop topping options, microwave technologies, alternatives to glyphosate, sticide (*Limonium sinuatum*) management, WeedSeeker® efficiency, in-crop herbicide applications, windrow burning and control of prostrate weeds and marshmallow (*Althaea officinalis*).
- Profitable break crops – potential of field peas, sacrificial break crop options and cereal rotations.
- Efficient fertiliser application – optimum management for nitrogen (N), phosphorus (P) and potassium (K).
- Early sowing opportunities.
- Compaction.
- Mechanical stubble residue management – impact of stubble management tools on soil and weeds.
- Oats research.
- Frost and heat stress.
- Soil health - biology, organic carbon and managing salinity.
- Technology and precision agriculture (PA) – quality of information generated and its use, better collation of data and access to simple information sources.
- Drainage – in management of salinity, especially knowledge gaps about depth of drains and drain design.
- Seed placement accuracy.
- Pests and diseases – crown rot and RLN.
- Multi-peril grower risk management strategies.



Figure 10: The Esperance port zone RCSN members at their Esperance meeting in February 2016. (Absent: Andrew Fowler and Anna-Lisa Newman).

PHOTO: JULIANNE HILL, RCSN

TABLE 2: Members of the Esperance port zone Regional Cropping Solutions Network (at March 2016)

Member	Occupation	Location
<i>Ryan Meldrum</i>	<i>Bank manager</i>	<i>Esperance</i>
<i>Bevan Tuckett</i>	<i>Farmer</i>	<i>Ravensthorpe</i>
<i>Colin Penny</i>	<i>Farmer</i>	<i>Lake King</i>
Quenten Knight	Consultant	Esperance
Holly Meiklejohn	Farmer	Esperance
<i>Peter Daw</i>	<i>Farmer</i>	<i>Ravensthorpe</i>
<i>Phil Smyth</i>	<i>Consultant</i>	<i>Esperance</i>
Ben Hyde	Farmer	Newdegate
Leon Bowman	Farmer	Grass Patch
<i>Andrew Fowler</i>	<i>Farmer</i>	<i>Esperance</i>
Craig Brown	Consultant	Perth
<i>Kirk Jeitz</i>	<i>Farmer</i>	<i>Coomalbidgup</i>

* GRDC Western Regional Panel member – Bill Ryan
 New 2015-16 RCSN members are identified in italics



Figure 11: Esperance growers Megan McDowall and Ashley Reichstein are using a TopDown® plough to help overcome acidity, compaction and water repellent soils across their Esperance farm.

PHOTO: COX INALL COMMUNICATIONS

Turning around south coast soils

Soil health has consistently been a priority for the Esperance port zone RCSN group. The strong interest in soils in this region resulted in the RCSN coordinating a Soils Forum in February 2016 to delve into issues surrounding biology, organic carbon and compaction.

One of the Soils Forum presenters was local grower Ashley Reichstein, who is having success with a TopDown® cultivator on his 4800-hectare cropping and sheep property.

“The aim of this technology is to mix-up and incorporate the high levels of surface organic matter we have from no-till and stubble retention; pull-up subsoil clay to the surface; and make ourselves a deeper, much higher quality topsoil,” he says.

“With subsoil compaction and other constraints of acidity and water repellence affecting 80-90 per cent of our sandy gravel and sandy loam over clay soil types, we currently only have a rooting depth topsoil of about 15 centimetres”.

“We want to double that to 30cm to really improve crop germination – especially if there is marginal moisture at the start of the season – and lift our crop yields.”

Ashley estimates the TopDown® cultivation system costs about \$60/ha, which he says is great value for a single-pass operation that is required maybe only once in every eight to 10 years and ‘re-sets’ the soil profile. He says he is moving towards implementing full controlled-traffic farming to prolong and protect the benefits of this amelioration system. His machinery/implements are matched to 12m, 18m and 36m operating widths.

To view a video of Ashley outlining how the TopDown® system works go to: www.grdc.com.au/GC122-CombatCompaction

Presentations from the Esperance RCSN Soils Forum are available at: www.rcsn.net.au/past-events.html

Geraldton Port Zone RCSN

The top five, high-level issues identified by the Geraldton port zone RCSN (in February 2016) as impacting on grain grower profitability in this zone were:

- Managing seasonal variability
- Matching input investments to yield
- Compaction
- Acidity
- Farm business management, finance and IT.

Specific priorities and ideas about these issues included:

- Managing seasonal variability – preparing the paddock in terms of linking diagnostics of soil and production constraints to ‘best’ treatments, increasing the soil’s water-holding capacity, using real-time data capture devices to quantify changes, profiling soil types and finding simple methods to identify water holding capacity. Also, the development of models that take into account heat stress and nutrition (N, P and K strategies, such as timing and N use efficiency).
- Managing risk with seasonal variability – risk management, generating stronger and more profitable businesses and the ability to use every available resource to maximise yield for the least amount of investment – in a sustainable manner. Also, the importance of management and education (also identified as a priority at the group’s July 2015 meeting).
- Canopy management – wide row spacing (whether this can be effective in the northern agricultural region).
- Seasonal flexibility in sequences – options for a range of planting and management scenarios given a range of seasonal opportunities. This would include when not to grow a particular variety and systems to generate more data about decision times, cut-off dates, changing varieties for seasonal variability and fallow options.
- Variety tolerance – information about heat, frost and moisture (abiotic) stresses.
- Very early sowing (early April) on the back of summer rain (continued research from 2015 projects).
- Development of simple water use efficiency models and tools – taking into account heat stress.



Figure 13: Geraldton port zone RCSN group members met in the Swan Valley in February 2016.

PHOTO: COX INALL COMMUNICATIONS

TABLE 3: Members of the Geraldton port zone Regional Cropping Solutions Network (at March 2016)

Member	Occupation	Location
Karl Suckling	Farmer	Northampton
<i>Chad Eva</i>	<i>Farmer</i>	<i>Three Springs</i>
<i>Jason Stokes</i>	<i>Farmer</i>	<i>Mt Erin</i>
<i>Kathryn Fleay</i>	<i>Farmer</i>	<i>Morawa</i>
<i>Rohan Ford</i>	<i>Farmer</i>	<i>Binnu</i>
John Flannagan	Farmer	Mullewa
Greg Creasy	Farmer	Nolba
<i>Andrew Sandison</i>	<i>Consultant/farmer</i>	<i>Geraldton</i>
Dale Pearse	Agribusiness Manager (finance)	Geraldton
Tony Rosser	Agronomist/ Merchandise Principal	Geraldton
Craig Topham	Agronomist	Geraldton
<i>Geoff Fosbery</i>	<i>Agronomist</i>	<i>Northam</i>

* GRDC Western Regional Panel member – Mike Ewing
 New 2015-16 RCSN members are identified in italics

Responding to opportunities – very early seeding trials

A very high priority issue for the Geraldton RCSN in the past two years has been management of seasonal variability and risk. This is particularly relevant in the northern and eastern low rainfall parts of the region, where the opportunity to sow crops in the ideal late April to early May sowing window is more challenging than ever due to lack of rain at this time.

In 2015, there was good summer and autumn rain in these parts (often more than 300 millimetres) and growers were faced with the question 'do we sow now' or 'do we wait until later in April-May thus running the risk that we don't get more rain until it's too late'?

The Geraldton RCSN group recognised this as an opportunity to test 'very early seeding' and GRDC contracted DAFWA to carry out time of sowing trials at Yuna and Pindar.

At Yuna, six wheat varieties were compared at sowing times of 9 April, 23 April and 12 May on a red sandy loam site.

The slow maturing variety Forrest had the highest yields of 4 to 4.2 tonnes per hectare at the earliest sowing time of 9 April and its yield fell to about 3t/ha when sown on 12 May.

Mace, Westonia and Magenta had the highest yields – of about 4 to 4.6t/ha – when sown on May 12.

When Mace, Westonia and Magenta were sown early (on April 9), yields were about 0.7-2.4t/ha lower on average (depending on seeding rate).

At Pindar, the commonly used canola varieties ATR-Bonito and ATR-Stingray were pitted against non-traditional, longer season, triazine-tolerant (TT) lines Pacific Seeds Hyola® 450TT, Pacific Seeds Hyola® 559TT and Pacific Seeds Hyola® 650TT.

Preliminary yield results from the Pindar canola trial are available on the DAFWA website at: <https://agric.wa.gov.au/n/5040>.

- As expected, the shorter season varieties were not able to capitalise on the 9 April sowing as well as the longer season varieties.
- Grain yield declined with delayed sowing for longer season canola varieties.
- Growers may not see a flat yield response for early sowings as an issue. Rather, the early sowing window allows them to get crop out of the ground and reduces the risk of dry spells leading to a lack of future sowing opportunities.



Figure 14: DAFWA wheat agronomy project manager Christine Zaicou-Kunesch, with Richard Quinlan, of Planfarm, right, and Woongoondy grower Gerard Rowe (left) inspecting GRDC-funded Geraldton port zone RCSN early sowing wheat trials in 2015. PHOTO: DAFWA



Figure 15: Kwinana East Port Zone RCSN members met in the Swan Valley in February 2016.

PHOTO: COX INALL COMMUNICATIONS

Kwinana East Port Zone RCSN

The top five, high-level issues identified by the Kwinana East port zone RCSN (in February 2016) as impacting on grain grower profitability in this zone were:

- water use efficiency;
- rainfall variability and climate;
- business management, staffing and succession and machinery cost management;
- rotations; and
- crop abiotic stresses (heat, cold).

Specific priorities and ideas about these issues included the following

- Water use efficiency (WUE) and dealing with rainfall variability – profiling soil types, developing quick methods and models to measure water holding capacity and use of real-time data to quantify changes. Also, paddock preparation and tactics to increase the soil’s water holding capacity, the cost of achieving WUE, and profitable options for boosting WUE.
- Abiotic crop stresses (such as frost and spring droughts/heat) – better data about the effects of frost, heat and/or winter rainfall stresses on some soil types. Also, foliar-applied products (in the case of a dry period after seeding to improve nutrient mobility in the soil), the impacts of time of sowing, when to apply N and K (and when not to apply – especially when sowing very early) and development of risk profiles for frost and heat stress potential when there is a dry spring (including how to refine and manage those risks and variety effects).
- Rotations – a range of short and long term sequencing options, economics and impacts of diversity in farming systems, access to all NVT data for Ag Zone 4 (including canola, triticale and oats and the type of seeding system used) and more information about profitable canola varieties (such as triazine tolerant, Roundup® Ready and

TABLE 4: Members of the Kwinana East port zone Regional Cropping Solutions Network (at March 2016)

Member	Occupation	Location
Bob Nixon	Farmer	Kalannie
Caroline Peek	DAFWA	Merredin
Clint Della Bosca	Farmer	Southern Cross
Matt Steber	Farmer	Doodlakine
Darren Kilminster	Farmer	Bruce Rock
Dave Stead	Consultant	Brookton
Nick Gillett	Farmer	Bencubbin
Ty Henning	Consultant	Badgerin Rock
Ty Kirby	Farmer	Beacon
Scott Dixon	Farmer	Kellerberrin
<i>Cathy Cooke</i>	<i>Farmer</i>	<i>Koorda</i>
<i>Glen Brayshaw</i>	<i>Consultant</i>	<i>Northam</i>

* GRDC Western Regional Panel member – Gemma Walker
 New 2015-16 RCSN members are identified in italics

imidazoline-tolerant options). Also, very early sowing issues including managing the opportunity, summer rainfall, when not to grow certain varieties, cut-off dates and use of fallow.

- Business and risk management – staffing, succession planning and sustainable machinery investments.
- Acidity and sodicity – more information about options and the use of variable rate technology (VRT).



Figure 16: Wyalkatchem grower Campbell Jones, left, discusses the Kwinana East RCSN fallow trial before the 2015 harvest with local trial coordinator and agronomist Bernie Quade, of Quade AgriServices Landmark.

PHOTO: COX INALL COMMUNICATIONS

Exploring fallow options for the low rainfall zone

Water use efficiency (WUE), dealing with seasonal variability and using profitable sequencing options that might include a strategic fallow are priorities identified by the Kwinana East RCSN group for this port zone.

The group supported GRDC investment into a 2015 trial at Campbell Jones' Wyalkatchem property to investigate residual herbicide options and new crop technologies to improve the profitability of a spray fallow. Trials were also set up at Mingenew and Morawa – supported by the Geraldton port zone RCSN group.

A range of residual herbicides was assessed, along with new crop technologies, including 2-gene Clearfield® wheat; imidazolinone (IMI) tolerant barley; and Clearfield® dual-tolerant triazine tolerant/Roundup Ready® canola).

Project leader Grant Thompson, of Crop Circle Consulting, says a clean spray fallow can be costly to set up in a low rainfall environment.

He says the goal is to develop management packages for residual herbicides that can be applied before the start of the winter fallow period to control winter weeds and continue to be effective on summer weeds.

“We anticipate these treatments will then persist into the next (second) winter cropping season, when a tolerant crop type would be planted into the treated area,” he says.

“This winter crop would have access to almost 12 months of stored soil moisture and mineralised nutrients, it should be less labour intensive to spray and there should be less reliance on current herbicides – having a positive spin-off in reducing herbicide resistance risks.”

Grant says if such crop and herbicide options prove successful, yield advantages could be as high as 0.5 to 1 tonne per hectare for wheat and 0.5t/ha for canola. He says herbicide savings could be about \$15-50/ha (depending on rainfall distribution and soil type).

“In low rainfall years, this could be the difference between two consecutive loss-making crops or one very profitable crop after a low-cost fallow spray,” he says.

To see an interview with Campbell Jones and Bernie Quade about this trial at Wyalkatchem, go to: www.grdc.com.au/FallowSprayTechniques



Figure 17: Kwinana West Port Zone RCSN members met in Greenhills in February 2016.

PHOTO: COX INALL COMMUNICATIONS

Kwinana West Port Zone RCSN

The top five, high-level issues identified by the Kwinana West port zone RCSN (in February 2016) as impacting on grain grower profitability in this zone were:

- moisture utilisation;
- non wetting/water repellent soil management;
- oats;
- profitable rotations; and
- nutrition.

Specific priorities and ideas about these issues included the following.

- Moisture utilisation – time of sowing (earlier crops performed better in 2015 and other years) and the value of fallow systems and biomass production (crops germinating when there is moisture available).
- Non-wetting/water repellence – management of water repellent gravel and deep sands, best points and tynes (mechanical) design.
- Oats – seasonal variation issues and herbicide options (particularly in-crop).
- Profitable rotations.
- Nutrition – monitoring fertiliser rates over time, P and K levels, tissue testing and other data/soil layers (such as depth of K and in-season N management).
- Machinery management – use of harvest weed seed control, life of machinery and a guide to effective asset replacement.
- Weeds – herbicide resistance, control options for short and long-term and late-season (pre-harvest) control strategies.

TABLE 5: Members of the Kwinana West port zone Regional Cropping Solutions Network (at March 2016)

Member	Occupation	Location
Tony White	Farmer	Miling
Jemma Sadler	Farmer	Goomalling
Ben Wilson	Farmer	Quairading
Graeme McConnell	Consultant	Northam
Trevor Syme	Farmer	Bolgart
Gary Lang	Farmer	Wickepin
Roger Newman	Farmer	Cuballing
Rob Dempster	Farmer	Northam
Ty Fulwood	Farmer	Northam
<i>Bill Moore</i>	<i>Consultant</i>	<i>Belmont</i>
<i>Blayn Carlshausen</i>	<i>Farmer</i>	<i>Wubin</i>
<i>David Sermon</i>	<i>Consultant</i>	<i>Perth</i>

* GRDC Western Regional Panel member – Chris Wilkins
 New 2015-16 RCSN members are identified in italics

- Frost.
- Soil compaction – options for all soil types.
- pH and subsoil acidity – liming, deep ripping and other soil amelioration options.
- Financial decision making – end-of-season finance and access to capital to maximise potential.

New GRDC Soil Constraints Initiative tackles big issues on the ground

Addressing soil constraints, particularly managing water repellent soils, are a big priority for the Kwinana West RCSN.

It is estimated more than 10 million hectares of WA's agricultural land is affected by water repellency and four of the five RCSN groups have identified this as a major issue impacting on cropping productivity and profits in their local region.

Sandy-textured soils with less than 5 per cent clay are most at risk of exhibiting water repellence because the soil particles have a relatively smaller surface area than the particles of soil with higher clay content and, as a result, become coated with water-repellent compounds more quickly.

Adoption of no-till farming has intensified the severity of water repellency in some areas because it leads to an accumulation of soil organic matter and the waxy compounds responsible for water repellency at the soil surface.

GRDC-funded research in WA is investigating soil water repellence across a range of soil types and cropping systems and aims to provide information about effective management options.

This is part of Soil Constraints – West (2014-19), which is a component of GRDC's national Soil Constraints Initiative that started in 2015.

Some of the WA trials underway in the northern and central grainbelt are explained by RCSN Kwinana West group member Ty Fulwood, DAFWA soil researcher Craig Scanlan and past GRDC manager farming systems and agronomy Matthew Appelbee in a Ground Cover TV feature that can be seen at: <https://grdc.com.au/GCTV19>

They are discussing GRDC-funded projects investigating the effectiveness of a range of ploughing implements for mixing and redistributing soil – and the cumulative benefits.

This research aims to help growers make informed decisions about investments into ameliorating soil constraints to significantly improve their crop yields and profits.



Figure 18: Kwinana West RCSN group member Ty Fulwood talks about research into managing soil constraints on Ground Cover TV.

PHOTO: COX INALL COMMUNICATIONS

Priority issues for the Western Region

A key role of the western region RCSN groups is to 'identify the critical needs to ensure prosperity of the grains industry in your port zone'. Identification of these needs is typically drawn from member's networks, feedback, observation and/or experience.

As outlined, each RCSN has identified, discussed and ranked the top priority issues for its particular zone during two face-to-face meetings in 2015-16. The outcomes are summarised below.

The top priority issues identified by the RCSNs for western region in 2015-16.

TABLE 6: Issues as at February 2016

Issue	Albany	Esperance	Geraldton	Kwinana East	Kwinana West	TOTAL
Weeds including herbicide resistance	✓	✓	✓	✓	✓	5
Compaction		✓	✓	✓	✓	4
Acidity	✓		✓	✓	✓	4
Profitable break crops and sequences		✓	✓	✓	✓	4
Non-wetting	✓		✓		✓	3
Frost	✓	✓			✓	3
Early seeding opportunities	✓	✓			✓	3
N, P and K management	✓	✓			✓	3
Managing seasonal variability			✓	✓		2
Abiotic stress (heat etc)		✓		✓		2
Plant and root diseases	✓		✓			2
Matching inputs investment to yield			✓	✓		2
Oats research specific to port zone		✓			✓	2
Farm business management, finance and IT			✓	✓		2
Better varieties to match local conditions			✓			1
Barley Disease	✓					1
CTF – adoption and economics	✓					1
Grass control in oats	✓					1
Slugs/snails	✓					1
Sclerotinia	✓					1
RLEM Pesticide resistance	✓					1
Mechanical stubble residue management		✓				1
Soil health		✓				1
Water use efficiency				✓		1
NVT Ag Zone 4				✓		1
Machinery management					✓	1

Issues marked in orange (✓) were further explored and defined – and several activities identified.

TABLE 7: Issues as at August 2015

Issue	Albany	Esperance	Geraldton	Kwinana East	Kwinana West	TOTAL
Herbicide resistance, weed management and pesticide resistance	✓	✓	✓	✓	✓	5
Rotations, and profitable break crops	✓	✓	✓	✓	✓	5
Non wetting	✓	✓	✓		✓	4
Soil acidity	✓		✓	✓	✓	4
N and P management, matching inputs to seasonal expectations, input costs	✓	✓	✓	✓		4
Frost	✓	✓		✓		3
Cereal disease	✓	✓			✓	3
Compaction	✓			✓	✓	3
Business management (HR, staffing, succession etc)			✓	✓		2
Farming with less rainfall		✓			✓	2
Seasonal variability			✓	✓		2
GM technology					✓	1
Soil biology and health (including soil acidity, compaction, soil nutrition etc)		✓	✓			2
Canola yield limitations – Sclerotinia, and other disease	✓					1
Sodic soils				✓		1
Grain marketing			✓			1
Communications					✓	1
Machinery purchase options, management					✓	1
Water logging	✓					1
Pests		✓				1
Precision agronomy adoption		✓				1
Crop breeding			✓			1
Water use efficiency				✓		1
Snails and slugs	✓					1

Issues marked in orange (✓) were further explored and defined – and several activities identified.

Summary of key issues and actions to address them

Below is a summary of the key issues that were highly ranked by the RCSNs in each port zone as well as projects that are being carried out currently in the GRDC RD&E project portfolio to address these top issues. Please note that there are many more projects on the ground, however those listed below address the top issues as identified by the RCSNs.

Included in the list are the RCSN initiated 1–3 year time to delivery projects; the Western Panel initiated 3–8 year time to delivery projects; and the GRDC initiated 8+ year time to delivery projects.

Projects listed below are new this year. The ranking of each issue was determined by the RCSN members at their February 2016 meeting.

NB: The projects listed in **BLUE** are RCSN-initiated projects (one-to-three years time to delivery)

ISSUE – WATER USE EFFICIENCY AND MOISTURE UTILISATION

Kwinana East (ranked 1st); Kwinana West (ranked 1st); Geraldton (ranked 1st)

The Geraldton port zone RCSN at their February 2016 meeting noted that “preparing the paddock” was the biggest impacting issue for growers in the Geraldton port zone, and identified that they wanted to see “linking diagnostics of constraint to ‘best’ treatment; knowledge on all causes of restricted plant available water (PAW); more work done on soil amendments and/or deep ripping”. They wanted to see “clear thresholds linking diagnosis to profitable investment”.

Kwinana East port zone RCSN ranked water use efficiency as their number one issue at their February 2016 meeting, and wanted to see a “standard measurement or system to enable growers to better understand the potential of different soil types in the Kwinana East port zone”

- DAW00254 Furrow formation and Inter-row Compaction (FFIC) for Improved Wheat Production in Water-limited Environments of the Wheatbelt of WA (DAFWA – G Reithmuller) + RCSN
- PRE0004 Yield Prophet® modelling and reporting for Esperance port zone (Precision Agronomics Australia – F D’Emden) + RCSN
- DAW00250 Evaluation and report on the effectiveness of yield predicting tools (DAFWA – C Peek) + RCSN
- CRC0004 Improving spray fallow techniques for better moisture conservation, better winter and summer weed control and more profitable grain crops (Crop Circle Consulting – G Thompson) + RCSN
- MIG00016-A Deep ripping ‘deeper’ deep ripping & water use efficiency (Mingenew Irwin Group – D Gillam) + RCSN
- AAM00005-A Deep ripping ‘deeper’ deep ripping & water use efficiency (Agrarian Management – C Topham) + RCSN

- CIC00033-A Case studies of growers using novel techniques to utilise available moisture in the Kwinana East port zone (Cox Inall – M Williams) + RCSN
- CSA00056 Developing farming systems for the LRZ of Western Australia (CSIRO – A Fletcher)
- UWA00174 A long-term study to increase water use efficiency, grain yield and the profit of growers in the Western Region in a no-till system: WANTFA long-term trial (UWA – D Minkey)
- WAN00021 Dry Seeding in Western Australia (WANTFA – D Minkey)
- CSP00177 Water balance of conservation farming systems 4 (CSIRO – P Ward) +
- CSP00179 Raising water productivity: Trait assessment for Australian rainfed wheat (CSIRO – G Rebetzke)*
- CSP00156 Engagement of the national MEF in validation and delivery of key physiological traits for improved wheat performance under drought (CSIRO – G Rebetzke)*

+ Project ended 30 June 2016

*8+ year TTD

ISSUE – ABIOTIC STRESS (HEAT-COLD) AND CROP NUTRITION IN EARLY MOISTURE STRESS

Ranked 2nd by Kwinana East and 3rd by Geraldton Port Zones

The Geraldton port zone identified managing their soils as one of their top issues at their February 2016 meeting. They further identified that they wanted growers to have increased use of in-season monitoring for management decisions: water, heat, frost, soil amelioration, which would help to “adjust phenology, N and varieties/phenology to suit seasonal conditions”. They also identified that they wanted “growers better at managing N and K while not increasing risk”.

The Kwinana East port zone RCSN identified abiotic stress (heat-cold) and crop nutrition in early moisture stress as their 2nd top issue. They want to see growers in the Eastern Wheatbelt have “improved knowledge, awareness and tools for measurement of this issue” to improve the “resilience of their farming systems”.

- MIG00015 - Improving the Understanding of Nitrogen Use Efficiency and Soil Water Interactions (MIG – D Gillam)+ RCSN
- SEP00016 - Case studies of growers managing inputs using VRT (SEPWA – N Curtis) RCSN
- TAR0004 - Pre-seeding frost workshops (ConsultAg – G Knell) RCSN
- DAW00251 - Evaluation of the effectiveness of tools to better understand and manage soil moisture (DAFWA – C Peek)
- CIC00027 - Case studies frost and farm business management (Cox Inall – M Williams)
- CSA00056 - Developing farming systems for the LRZ of Western Australia (CSIRO – A Fletcher)

- DAW00234 - Determining yield under frost - one degree at a time (DAFWA – B Biddulph)
- DAW00241 - Farming systems to improve crop tolerance to frost (DAFWA – B Biddulph)
- ANU00020 - The generation of wheat cultivars with improved drought tolerance (ANU – B Podgson)*
- US00080 - Introgression of heat-tolerant genes to broaden genetic variation in current wheat breeding populations (Uni Sydney – R Trethowan)*
- US00081 - A national approach to improving heat tolerance in wheat through more efficient carbon allocation (Uni Sydney - H Bramley)*
- CSP00156 - Engagement of the national MEF in validation and delivery of key physiological traits for improved wheat performance under drought (CSIRO – G Rebetzke)*
- ICA00013 - Improving heat tolerance of wheat (ICARDA - W Tadesse)*
- ULA00009 - The effects of heat stress on programmed cell death and floret sterility in wheat (La Trobe Uni – R Parish)*
- CSP00199 - Validation trials for dwarfing genes, vigour x management interactions, and preliminary assessment of rate of grain-filling (CSIRO – G Rebetzke)

+Project ended 30 June 2016

*8+ year TTD

ISSUE – ROTATIONS

Ranked 3rd by Kwinana East, 2nd by Esperance and 4th by Kwinana West Port Zones.

Esperance port zone at their RCSN meeting in February 2016 identified break crops and rotations as their 2nd highest issue. The RCSN members wanted “farmers to have access to profitable legume crops and sustainable rotations” and noted that there needed to be “increased industry understanding of sustainability/financial position of break crops”.

The Kwinana East port zone RCSN agreed that a profitable rotation was an issue for their port zone, and identified that they wanted to see “growers have the confidence to implement a viable rotation”. However, they noted that they want to “farm for the long term but need to survive the short term”.

The Kwinana West port zone noted at their February 2016 meeting that rotations were an issue in their port zone, and want to see “growers have rotations that manage weeds, disease and nutrition” and would like to see an easy-to-use “rotation decision tool”.

- FMO00003-A WA Crop Sequence Calculator workshops: Review and demonstration of different rotations and break crops for Western Australian growers (Farmanco – B Curtis)
- FFC00010 2015 Canola early sowing management systems: grazing canola (ConsultAg – G Fosbery)
- CMP00001-A Case study of different rotations and break crops for Western Australian growers (Cussons Media – B Cussons)

- ELF00001-A Investigating double break (or stacked rotation) options report (AgInnovate - D England)
- WMG00003-A Investigating double break (or stacked rotation) options (West Midlands Group – C Wilkins)
- DAW00227 Tactical break crop agronomy in Western Australia (DAFWA – M Seymour)
- CSA00029 National integration of crop sequence strategies and tactics (CSIRO – R Lawes)+
- BWD00025 National paddock survey (Birchip Cropping Group – H van Rees)

+Project ended 30 June 2016

ISSUE – PH AND ACIDITY

Albany port zone (ranked 1st)

Albany port zone RCSN members identified “cost effectiveness of tackling soil acidity” as their top issue at their February 2016 meeting; and wanted to see “growers receiving an increased rate of return after lime application” and believed one of the key factors in this knowledge is that there is “poor economic analysis of the benefits of liming”.

- LIE00010-A Best bet management of ameliorated non-wetting soils for the Geraldton port zones (Liebe Group – L Martin)
- GIA00005-A Bus Tour to northern wheatbelt growers to investigate options for herbicide resistance management and lime incorporation methods (GIWA – I Longson)
- WMG00003-B - Compilation of lime trial results and grower case studies (WMG – B Bowden)
- DAW00236 Soil Acidity is limiting grain yield (DAFWA – C Gazey)
- DAW00252 Innovative approaches to managing subsoil acidity in the Western Region (DAFWA – C Gazey)
- DAW00242 Subsoil constraints - understanding and management (DAFWA –D Hall)
- DAW00259 Management of Sodic and Magnesian Soils - Western Region (DAFWA – E Barrett-Lennard)
- LIE00008 Working together to deliver multiple benefit messages to growers through a whole systems approach to soil management (Liebe Group – L Martin)

ISSUE – ROOT LESION NEMATODES

Albany (ranked 2nd)

The Albany port zone RCSN at their February 2016 meeting identified Root Lesion Nematodes as a growing issue for the Albany port zone. They identified that they wanted “growers to have the knowledge and the access to RLN control options”.

- USQ00019 Genetic control of nematode species affecting major crops - Germplasm enhancement for nematode control in cereals and pulses (University of Southern QLD – J Thompson)*
- USQ00021-DAV National nematode epidemiology and management program (University of Southern QLD – G Hollaway)*

*8+ year TTD

ISSUE – HERBICIDE RESISTANCE

Albany (ranked 3rd)

Albany port zone RCSN at their February 2016 meeting identified herbicide resistance and weed control as their third top issue, with a practice change of “growers have a better knowledge of resistance status on their properties”. They would like to see that “growers have effective integrated weed management strategies in place tailored to individual farms”.

- [PLN00013-B Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers \(Planfarm – C Weeks\)](#)
- [Shed session on harvest weed seed control, including iHSD \(J Hill\)](#)
- [TAR00005 Is Triazine resistant silvergrass a looming threat for the mixed cropping belt? \(ConsultAg – G Knell\)](#)
- [NYA00001 Herbicide resistance survey \(Nyabing Farm Improvement Group – F Hobbly\)](#)
- [GIA00005 Bus Tour to northern wheatbelt growers to investigate options for herbicide resistance management and lime incorporation methods \(GIWA – I Longson\)](#)
- [PLN00012 Threshold and cost of hand weeding radish \(Planfarm – P Newman\)](#)
- [UWA00172 WeedSmart - Stage Three \(UWA – L Mayer\)](#)
- [USC00024 Surveillance of herbicide resistant weeds in Australian grain cropping \(Charles Sturt University – J Broster\)](#)
- [UWA00171 Australian Herbicide Resistance Initiative 5 \(UWA – S Powles\)*](#)
- [CSP00182 Genetically improving wheat's ability to outcompete weeds \(CSIRO – G Rebetzke\)*](#)
- [Herbicide Innovation Partnership \(Bayer\)*](#)

*8+ year TTD

ISSUE – PESTS, PESTICIDES & FUNGICIDE RESISTANCE

Albany (ranked 5th)

The Albany port zone RCSN at their February 2016 meeting identified Pesticide and pests as the 5th top issue for the Albany port zone. They identified that they wanted “growers with access to a suite of RLEM control options prior season, in crop and seed dressing – where and when they need it” and were interested in exploring crop sequences in relation to pest numbers.

- [TAR0006 Best practice netblotch management in Scope barley and interactions with pre-harvest head loss \(ConsultAg – G Knell\)](#)
- [DAW00230 PestFax Map II National \(DAWFA – A Diggie\)](#)
- [DAQ00201 National Pest Information Service \(NPIS\) \(Queensland Department of Agriculture and Fisheries – M Miles\)](#)
- [Centre for crop and disease management \(Curtin University – M Gibberd\)*](#)

*8+ year TTD

ISSUE – NON-WETTING SOILS

Albany (ranked 4th); Kwinana West (ranked 3rd)

Albany port zone RCSN at their February 2016 meeting identified that non-wetting soils were their 4th highest ranking issue impacting on profitability in the Albany port zone. The RCSN members identified that they wanted to see that “growers are able to seed on time with confidence”. The RCSN members wanted to see “specific solutions for specific soil types and rainfall, machinery and farming systems”.

Kwinana West have identified non-wetting soils as an issue since inception of the RCSNs in 2011. At their February 2016 meeting, they identified that they wanted “farmers can improve germination on non-wetting soils through combining different effective techniques” and identified further soil types that need work “other soils where non-wetting is an issue including tamar soils and Ironstone gravels”.

- [LIE00010-A Best bet management of ameliorated non-wetting soils for the Geraldton port zones \(Liebe Group – L Martin\)](#)
- [DAW00244 Delivering enhanced agronomic strategies for improved crop performance on water repellent soils in Western Australia \(DAFWA – S Davies\)](#)
- [DAW00242 Subsoil constraints - understanding and management \(DAFWA – D Hall\)](#)

ISSUE – EARLY SEEDING OPPORTUNITIES

Esperance (ranked 1st); Kwinana West (ranked equal 1st)

Esperance at their February 2016 meeting identified early seeding opportunities to be their number one issue for that time. They defined the practice change as “Growers have the ability to sow in April and increase yields by longer crop duration”.

Kwinana West port zone at their February 2016 meeting noted that Moisture utilisation was an issue in their port zone, and wanted growers to be able “to sow earlier with greater knowledge of risks”. They want to see further work occur around “building the knowledge and management packages for different sowing times”.

- DAW00253 Early seeding – a climate change adaptation method in the NE Ag Region of WA (DAFWA – C Zaicou)+
- SYN00008 Early seeding - a knowledge gap strategy for very early season starts (Synergy Consulting – C Brown)+
- FFC00010 2015 Canola early sowing management systems: Grazing canola to modify maturity and water use (Farm Focus Consulting – G Fosbery)+
- SYN00010-A Early seeding options in the Kwinana East and Esperance port zone (Synergy Consulting – C Brown)
- FFC00011-A Regionally specific agronomy projects (RSAP): Early seeding trials for the Kwinana West port zone (Farm Focus Consulting – G Fosbery)+
- WAN00021 Dry Seeding in Western Australia (WANTFA – D Minkey)
- CSP00187 Increasing yield and reducing risk through early sowing in the Southern Grains Region (J Kirkegard)

+Project ended 30 June 2016

ISSUE – COMPACTION

Kwinana West (ranked 2nd); Esperance (ranked 3rd)

Esperance port zone RCSN identified compaction as an issue for their port zone, and wanted to see a “Cost effective remediation of compaction”. The RCSN wants growers to be “able to use ‘correct’ machines and ‘correct’ techniques for managing a specific soil type”.

Kwinana West port zone RCSN identified at the February 2016 meeting that compaction was still an issue for their port zone. They wanted to see that “growers can use a range of treatments to manage compaction by soil type in Kwinana Zone” and wanted to see “best bang for buck for management and equipment”

- WMG00002 Development of a self-testing, diagnostic protocols for compaction (West Midlands Group Incorporated – B Bowden)+
- AVP00003-A Compaction Mitigation options for growers in the Albany and Kwinana West port zones (Ag Vivo – D Revell)
- MIG00016-A Deep ripping ‘deeper’ deep ripping & water use efficiency (Mingenew Irwin Group – D Gillam)
- AAM00005-A Deep ripping ‘deeper’ deep ripping & water use efficiency (AgMan Pty Ltd – C Topham)
- DAW00243 Minimising the impact of soil compaction on crop yield (DAFWA – P Blackwell)
- DAW00242 Subsoil constraints - understanding and management (DAFWA – D Hall)
- DAW00259 Management of Sodic and Magnesic Soils - Western Region (DAFWA – E Barrett-Lennard)

ISSUE – SOIL BIOLOGY

Esperance (ranked 5th)

At their RCSN meeting in February 2016, Esperance port zone RCSN identified soil biology as an issue for their port zone. They wanted to enable growers to be able to put in place “management practices to increase microbial release of phosphorus; and managing soils to enhance biological breakdown of herbicide residue”.

- Soil Forum Esperance 11 February 2016 (J Hill)
- SOK00001 Increasing crop-uptake of fertiliser by improving soil health with granular humate and prilled liming agents (Kent Landcare – P Leonie)
- CSO00044 - Understanding biological farming inputs (CSIRO – M Farrell)*
- CSO00045 - Soil Spectroscopy Capability (CSIRO – M McLaughlin)*
- DAV00102 - Monitoring soil biology with high resolution genomic technologies (DEPI Vic – C Bath)*
- DAV00105 - Suppressive soils: Can we find a microbial finger-print using “omics” technology? (DEPI Vic – H Hayden)*

ISSUE – RISK MANAGEMENT (INPUTS)

Geraldton (ranked 5th)

Geraldton port zone at the February 2016 meeting noted that risk and business management around input decisions was often lacking in the Geraldton port zone. They noted that they would like to see growers “to gain a better understanding of the key drivers to help make input decisions” to create “stronger, more profitable businesses”.

- SEP00014 Investigations of available technology tools for in season management decisions - Esperance port zone (SEPWA – N Metz)+
- AAM00003 Increasing Profitability Through the Utilization of Combined Technologies to Target Input Strategies To Productive Capacity Of Soils (Agrarian – C Topham)
- SYN00007 Zoning the farm – A case study report of 2 farm pilots (Synergy – D Pfeiffer)
- FUT00001 A case study approach to review different methods for defining within-paddock management zones (Precision Agriculture – B Isbister)
- KDI00026 Understanding map layers for VRT II (Kwinana Extension) (Kondinin Group – B White)
- SEP00016-A Case studies of growers managing inputs using VRT (SEPWA – N Curtis)
- PLN00013-A Assessment of Business training options for WA farm business managers (PlanFarm – C Weeks)
- RDP00013 The integration of technical data and profit drivers for more informed decisions (Rural Directions – D Heinjus)
- ORM00017 GRDC Farm Business Updates Western Region (ORM – M McCarthy)

ISSUE – CANOPY MANAGEMENT

Geraldton (ranked 5th)

Geraldton port zone RCSN ranked canopy management of crops in the northern wheatbelt highly at their February 2016 meeting. They noted that they wanted “Growers are managing crop canopy to suit their environment in the northern agricultural region (NAR)” and identified one of the biggest hurdles to managing crop canopies as being “time and confidence to manage the canopy in the variable – low rainfall and short growing season”.

- CSP00156 Engagement of the national MEF in validation and delivery of key physiological traits for improved wheat performance under drought (CSIRO – G Rebetzke)*
- CSP00182 Genetically improving wheat’s ability to outcompete weeds (CSIRO – Rebetzke)*

*8+ year TTD

ISSUE – MACHINERY MANAGEMENT

Kwinana West (Ranked 5th)

Kwinana West once again at their February 2016 meeting, noted that machinery replacement decisions were an issue for their port zone. They want to “extend reliable use of the lifetime of farm machinery” as many in the zone are “Increasing the hours of farm machinery”.

- [KIS00003-A Machinery replacement options for growers in the Kwinana West port zone \(Kondinin Group – B White\)](#)

ISSUE – OATS

Esperance (Ranked 4th)

Esperance port zone RCSN identified oats as an issue for their port zone at the February 2016 meeting, and wanted to see “more growers adopting oats into the rotation”. They wanted to see a “local rotation trial (with grain and hay) – how good are oats as a break crop?”. This project has yet to be scoped up.

Appendices

Appendix 1: Managing Grains R&D

The Grains Research and Development Corporation (GRDC) was established under an Act of Parliament in 1990. Its charter is to plan, facilitate and oversee the investment of funds in research, development and extension (RD&E) to improve the production, sustainability and, ultimately, the profitability of the Australian grains industry. The GRDC manages more than \$197 million, which is the combined research investment of grain growers and the Australian Government.

The investment of funds into grains RD&E is a complex process that is driven by the needs of grain growers and the regional communities in which they live and work. At the ground level, the grower can contribute to the development of grains RD&E by:

- participating in and contributing to discussions at GRDC grower events and grower updates;
- discussing issues and making suggestions and comments directly to representatives on the GRDC Regional Cropping Solutions Network – Western and Southern Regions (RCSNs) and Grower Solutions Groups – Northern Region (GSGs);
- discussing issues and making suggestions and comments directly to farmer representatives on the GRDC regional panels;
- making comments and suggestions about RD&E on the GRDC website (www.grdc.com.au/About-Us/Contribute); and
- making comments and suggestions about RD&E through social media by following the GRDC on Facebook and Twitter.

At the decision-making level, grain growers have the opportunity to represent their industry as members of RCSNs, GSGs or as appointed members of regional panels on the board of GRDC.

The GRDC has a rigorous investment planning process designed to ensure that the GRDC levy is managed so it can be the best investment a grower can make to improve their business. Additionally, the GRDC must ensure accountability for monies invested, which are essentially public funds.

LOCAL NETWORKS

The GRDC engages extensively with the grains industry and uses a wide variety of information sources to guide its investment in RD&E. Grower groups or networks have been established in each of the three GRDC regions: northern, southern and western (Figure 1).

These groups or networks play a critical role in supporting GRDC regional panels to help set priorities for RD&E (Figure 8). The groups or networks also have access to funds to address immediate local research priorities in the short term.

The format of each group or network differs between regions, based on historical RD&E, industry structures and grower needs.

GRDC WESTERN AND SOUTHERN REGIONS

There are nine GRDC RCSNs across the western and southern grain-growing regions of Australia. Each network comprises up to 16 members representing growers, agronomists, agribusiness representatives, researchers and a representative from the relevant GRDC regional panel, and is coordinated by an independent facilitator. The RCSNs were established in the western region in 2011 and the southern region in 2012.

The RCSN initiative was developed to provide a vital role in the GRDC's effort to understand and address priority issues in the western and southern regions. The initiative was also seen as a way for the GRDC to work with growers to help reduce the time it takes for new varieties, practices and technologies to be adopted. Creating a forum to involve growers and their advisers in the GRDC investment process is also an important role of the RCSNs.

The RCSNs/GSGs initiative grew out of feedback from major stakeholders of the GRDC, indicating that:

- growers want more effective delivery of RD&E that drives growth in their productivity, profitability and sustainability;
- growers continue to face a broad spectrum of demands on their time and resources;
- the grains industry operates in the context of increasing consolidation of public sector resources, most critically in development and extension services;
- Australia's competitiveness in global grain markets will increase if the time between development, field testing and ultimate adoption is accelerated; and
- the GRDC's delivery of development and extension must continue to adapt to changing physical and operational environments to meet the priorities of stakeholders.

The development of the RCSN/GSG initiative was aligned closely with the vision of the Primary Industries Ministerial Council. This vision included a national restructuring of RD&E resources, which aimed to foster greater cooperation

between the Commonwealth and the states, avoiding unnecessary duplication, and maximising benefits from the investment in RD&E.

The objectives of the RCSN initiative are to:

- create and manage knowledge;
- build regional development and extension capacity among growers and advisers;
- proactively respond to regional industry issues in a timely manner; and
- provide enduring links between growers, advisers and the GRDC.

The primary goal of the southern and western RCSNs is to provide feedback to the GRDC regional panels on local issues affecting growers, which are specific to production zones, to assist the panels in prioritising issues for investment in RD&E. The RCSNs enable the GRDC to develop a detailed understanding of what is important to growers and determine where there are gaps in current RD&E, with a specific focus on issues affecting grower profitability. The local knowledge of the RCSNs helps build essential on-ground linkages between growers, farming systems groups, agribusiness representatives and researchers.

As well as influencing investment at a regional and national scale, the RCSNs have the ability to determine and initiate fast track projects, where significant local issues can be addressed in a short timeframe with a relatively small budget.

The RCSN initiative complements the National Grains Industry Research, Development and Extension Strategy (2011). The strategy is focused on coordination and collaboration to improve the continuity of investment and improvement of the efficacy and efficiency of investment in RD&E. The RCSNs play a role in ensuring greater industry engagement in setting priorities for RD&E and ensuring that outputs from national research programs are adapted and delivered into the regions with local development and extension activities of greatest benefit to growers.

REGIONAL PANELS

Recognising the variations in environment, conditions and issues across the nation, the GRDC was established in 1999. It implemented three advisory panels based on the grain-growing regions of northern, southern and Western Australia (Figure 1). The regional panels ensure that different market and production realities are considered and reflected in the RD&E investment program. Each region has distinctive features that warrant focused planning and research management in plant breeding, farming systems, soil, grain storage and handling, product development, market opportunities and technology marketing.

The regional panels are composed of grain growers, agribusiness representatives, researchers and the GRDC's executive managers.

Each panel:

- identifies and monitors regional and national grains industry issues that are relevant to the region;
- interacts with grower groups, research advisory committees and other interested parties in the region to exchange information;
- identifies and develops priorities for RD&E investment and recommends these to the GRDC National Panel;
- keeps growers and advisers in the region informed about the GRDC's strategic direction, investment portfolio and research projects; and
- assists staff in monitoring the effectiveness of the investment portfolio.

The GSGs and RCSNs provide information on priority issues to the GRDC's regional panels. The regional panels also consider information provided by less formal structures than the networks, such as direct communication with grower groups, government research and extension agencies, private research and extension organisations, and industry organisations.

The regional panels work with the GRDC National Panel, to ensure that GRDC investments are directed towards the interests of all grain industry stakeholders and to deliver relevant products and services in each grain-growing region.

The GRDC National Panel is made up of the chairs of the three regional panels, the managing director of GRDC and the GRDC's executive managers.

The GRDC National Panel:

- addresses national RD&E priorities across the GRDC's investment portfolio and makes recommendations to the Board; and
- assists the Board of GRDC to maintain links with grain growers, the Australian Government, state and territory governments and research partners.

Research themes

The GRDC has evolved over the past 12 months. Where last year the GRDC identified areas for investment through research themes (Meeting market requirements; Improving crop yield; Protecting your crop; Advancing profitable farming systems; Improving your farm resource base; Building skills and capacity), the GRDC now defines its investment into three main areas.

DISCOVERY

National investment areas, and includes investments such as:

- new varieties;
- new traits;
- new actives; and
- new technology.

APPLIED

Regional investment areas, and includes investments such as:

- agronomy;
- farming systems;
- nutrition;
- soils;
- weeds;
- pests/entomology; and
- pathology.

DELIVERY

Local investment areas, and includes investments such as:

- local validation of research findings;
- extension and communication;
- NVT;
- RCSNs; and
- others;

Investment pathways

GRDC's investment of funds in grains RD&E involves a rigorous planning process to ensure the best possible use of grower levies and government funds. This process involves formal and informal analysis of each issue, as well as analysis of trends, current activities (including internationally), opportunities and threats around priority issues to help the GRDC make fully informed judgments about where to invest RD&E funds.

There are three main investment processes or 'pathways' used by the GRDC, which recognises that issues raised by growers will vary in many ways and one pathway alone may not suit all issues. Following the principle that 'one size does not fit all', the RCSNs and regional panels play a central role in determining which pathway will be most effective to address individual issues.

PATHWAY 1 – 1–3 YEAR INVESTMENT

In the GRDC's southern and western regions, the one to three-year investment pathway provides a way for in-season, small-scale projects to be carried out at a local level, where the speed of response is critical to meeting industry needs. These projects are delivered in a short time frame (one to three years) and are best suited to issues that would benefit from immediate investigation, development and/or extension, such as addressing the impact or management of a crop disease.

Budgets for one to three-year projects are generally smaller and require generally less administration. Opportunities for developing these projects are identified and developed by RCSNs.

This one to three-year project concept has proved successful in delivering results in a timely, highly accessible and cost-effective manner. The transparent nature and collective approach to approval ensures it is also a credible way of instigating some types of R,D&E. The one to three-year process provides a new pathway of investment that enables particular issues to be addressed effectively with significant return for a relatively small investment, however this process is not appropriate for all issues.

PATHWAY 2 – 3–8 YEAR INVESTMENT

This investment pathway is the main process by which most RD&E investments are made to address priority issues. A decision to award funding is made after identifying and assessing issues nationwide and, after consideration of all issues, deciding which best serve the ongoing profitability and sustainability of the grains industry.

PATHWAY 3 – 8+ YEAR INVESTMENT

An intensive process of assessment may also be undertaken to determine the nature of investment required to address an issue. This process entails a thorough investment analysis, which may span more than one investment cycle. While not required for every issue, the eight year (plus) process may best suit issues where complex RD&E investments are needed to address an issue, or a range of related issues. It is generally used for longer-term investments, where people outside GRDC may have the insight, tools and/or capabilities to add to the rigour of the investment analysis, or, where the final project is complex, or the planned response is more important than the speed of the response.

Appendix 2: Issues identified

RCSN members prioritise issues and ideas using a group voting process. Members vote based on their view as to 'what are the critical needs of the region for a prosperous grains industry?'

These issues are then ranked according to:

- Can this issue be further developed into a project that will deliver value to growers within the one to three-year RCSN/ GSG time frame?
- Will it address a need that will improve profitability within a port zone or a given area?

In other words, SMART thinking is used to determine if an issue sits within and can be influenced by the RCSN process.

- **Specific** – target a specific area for improvement or investment.
- **Measurable** – quantify or at least suggest an indicator of progress.
- **Assignable, achievable** – specify who will do it (this is not always considered at this early stage)
- **Realistic** – state what results can realistically be achieved, given available resources.

- **Time-related** – specify when the result(s) can be achieved.

Some of the issues and ideas are then further analysed to identify key RD&E activities. Below is a table for each port zone that highlights the top issues from the winter and summer rounds of the RCSN meetings and the actions occurred against each RCSN proposed activity.

NOTE (j): Information in this section is a work in progress and aims to provide an indicative view rather than absolute information.

ALBANY PORT ZONE – 2015-16 PRIORITISED ISSUES AND AREAS OF INTEREST

TABLE 8 Albany Port Zone – Prioritised issues and areas of interest

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
Aug 2015 Frankland					
Non-wetting soils		1	ALB1	Literature review of which current approach is best on a range of soil types (most cost effective). Road show for discussion and economic analysis of alternatives	Project scope submitted: Best bet management of ameliorated non-wetting soils for the Albany and Geraldton port zones. Project pending
			ALB2	Analysis and economics of weed control, and plant establishment using a range of current techniques. Discussion on why non wetting area is increasing across diversely managed soils ... extension of current knowledge ... no till? Species?	Project scope submitted: Best bet management of ameliorated non-wetting soils for the Albany and Geraldton port zones. Project pending
			ALB3	3 sites - Trials to compare yield (not demo) – Protracker vs in furrow wetter vs soil mixing (grizzly etc.). How close to furrow; Soil type influence; Root disease impacts	Linkages with Steve Davies non-wetting project. Project scope submitted: Best bet management of ameliorated non-wetting soils for the Albany and Geraldton port zones. Project pending
			ALB4	Follow-up participants from the 2014 tour and see what adoption there was of different options; produce booklet/e-booklet	Project scope submitted: Best bet management of ameliorated non-wetting soils for the Albany and Geraldton port zones. Project pending
Snails and slugs		2	ALB5	Trial to assess/compare the effect of different commercial snail baits on small conical snails: economic analysis/ profitability; which bait to use; product x rates (½, full, double); product – cheap, expensive, nicta, metax, iron based, rainfast versus non rainfast; rates – to assess recommended rates. Don't want to burn. How to simulate seasonal effect in a lab setting? Timing of baiting/first rain (how much)	Project scope submitted: Effective baiting options for the control of conical snails in the Albany port zone. Accepted
			ALB6	Survey bait distribution and density – encourage effective baiting; Baiting efficacy – rolling, bait placement in furrow vs spread	Project scope submitted: Effective baiting options for the control of conical snails in the Albany port zone. Accepted
			ALB7	Designed trial to compare bare earth insecticide treatments and effect on snail/ slug movement/activity – Talstar @ 1x, 2x, 5x, 10x label rate; Chlorpirifos@ 1x, 2x, 5x, 10x rates	Linkage with Svet Micic. Further work indicated from July 2016 meetings

TABLE 8 Albany Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
Aug 2015 Frankland					
N & P management		3	ALB8	Design field trial to evaluate what increases P uptake and results in a yield increase. Site characteristics: increased PBI, increased AI, reasonable pH, site to be barley on canola stubble. Treatments: 4 P rates (0, ½, 1, 2, 3). Plus/minus Calcipril. Plus/minus MgCO3 +/-	Project scope submitted: The effect of input and management practices on P levels and yields on high PBI soils in the Albany port zone. Not accepted but will be included in the forest gravels GRDC project
			ALB9	Physical and Economic evaluation of different N products, including slow release N products. UAN – pre versus post, streamer nozzles versus fans, target applications versus canopy versus roots uptake or lower canopy (tillering application)	No project scope submitted
			ALB10	Economic analysis on trial cultivation types on gravel soils using current and past work – rock crusher for P (unlocking P and breaking down reactive iron) using some of the systems from the Northern port zone	Project scope submitted: The effect of input and management practices on P levels and yields on high PBI soils in the Albany port zone. Not accepted but will be included in the forest gravels GRDC project
Canola yield limitations including sclerotinia		4	ALB11. *Combine with GER18	Fungicide trial for sclerotinia – effectiveness of different available and internationally available fungicides and biological agents – multi sites – south Stirlings, Kojonup, Gnowangerup	Project scope submitted: Using different rotations, and fungicides to manage Sclerotinia incidence in canola. Project pending
			ALB12	Revisit nutrition package (increase inputs) – pH, N, P, K, S, trace elements (matrix) – productivity vs profitability – include legumes vs bag N	No project scope submitted at this stage.
			ALB13	Rotation length and disease interactions (sclero levels and incidence after different breaks). Also looking at different season length varieties (include new genetics, and early seeding trials)	Project scope submitted: Using different rotations, and fungicides to manage Sclerotinia incidence in canola. Project pending
			ALB14	Retention of OP varieties for LR areas and breeding – Discussion of end point royalties versus seed costs by seed company representatives	Not in the 1–3 year RCSN scope of interest
Compaction		5	ALB15	What is the yield loss from compaction; Whole farm profitability increase; Demonstration of problem – ID yield penalty of issue – set local trial – include wet clay/chaser bin; Step by step guide to moving to CTF	Discussion with others in this field indicate this work is already being undertaken
			ALB16. *Combine with KW8 & GER9	Demonstrating amelioration of compaction across soil types – how to do it, economics	Project scope submitted: Compaction Mitigation options for growers in the Albany and Kwinana West port zones. Accepted
			ALB17	Bus trip – Esperance – visit growers at different stages of CTF; and include some case studies of Alb zone farmers who are using CTF	Project scope submitted: Compaction Mitigation options for growers in the Albany and Kwinana West port zones. Accepted

TABLE 8 Albany Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
February 2016 Esperance					
Soil acidity	Growers receiving an increased rate of return after lime application	1st	ALB18 & ALB20	Quantify losses in my environment – benefits of lime investment; Trials for non-acidity benefits of lime – eg. weed control, N increase, non-wetting, nodulation	Proposed project scope: Establish 4 sites within Alb port zone. Include incorporation methods (look at depth to acidity)
			ALB19	Independent lime pit quality surveys – repeat	<i>Limesand and limestone resources of southern Western Australia</i> (record 2015/7), Dept of Mines. Doc sent to all Albany port zone RCSN members for their perusal. Consider holding off on this project until after feedback from RCSN
Herbicide resistance and weed control	Better knowledge of resistance status	1st in July 2015	ALB21	HSD overview – need clarification on capability; extension of progress of interactive HSD	Project scope submitted: Shed sessions on harvest weed seed control including iHSD – Tambellup
Non wetting soils	Growers are able to seed on time with confidence	2nd in July 2015	ALB22	Continue side-by-side trials – economics and extension – clay / wetters / mould board / spader / zero till etc.	Project scope submitted: Demonstration of various techniques for managing non-wetting, including case study booklet and roadshow
Root lesion nematodes (RLN)	Growers have the knowledge and access to RLN control options.	2nd	ALB23		No project scope submitted, however, Sarah Collins confirmed to talk to RCSN group to better define the issue
			ALB24	More varietal screening	Outside the scope of the RCSN
			ALB25	Nematode species vs rotation trial	No project scope submitted however Sarah Collins confirmed to talk to RCSN group to better define the issue
Pesticide and pests	RLEM control options prior season, in crop and seed dressing	5th	ALB26	Can certain crop sequences put downward pressure on populations?	No project scope submitted, though look at project UWA168 and confirm it includes sequencing. If not, add it
			ALB27	Explore differences between hybrids and OPs – tolerance and ability to withstand RLEM	No project scope submitted: Update from Svet Micic
			ALB28	How widespread are OP resistance pockets? Are they expanding? Area?	No project scope submitted: Update from Svet Micic

ESPERANCE PORT ZONE – 2015-16 PRIORITISED ISSUES AND AREAS OF INTEREST

TABLE 9: Esperance Port Zone – Prioritised issues and areas of interest

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
Lake King June 2015					
Soil biology and health/soil acidity	What are the effects of herbicides, fungicides and insecticides on our soil health?	1	ESP1	Chemical effects on soil biology – non chemical alternatives/cultural practices, using trials to measure effects long term. Education on biological processes etc and knowledge. Start with a literature review	Soil health forum undertaken at Esperance in February 2016
			ESP2	pH is low and not really getting better. Issues are long-term lime access, price of lime and quality. Project to look at lime strategies for the Esperance zone and bring in guest speakers to the Esperance RCSN to discuss the issue	Soil health forum undertaken at Esperance in February 2016
Matching inputs to seasonal expectations – inc. VRT/PA	How can we best use available resources to maximise production not just biomass?	2	ESP3. *NB Combine with GER8	Continue to develop and compare current yield prediction models for input decisions – down to the zone levels, including a canola model shoot out – N decision and yield forecasting – yield prophets, Mic Fel’s model and other	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Pending
			ESP4	VRT trials across ESP to determine what to do where – replicated small plot NPK on key soil types (N, P, K, NP, NK, PK, NPK) – 5 trials – east to west	Project scope submitted: Case studies of growers managing inputs using VRT. Accepted
			ESP5. *NB combine with KW5 & KE4	Create database of all probes in EPZ – Get access to other soil moisture probes (privately or company owned) in a format that is user friendly. East of zone – promote usage and compare to Yield Prophet® to increase transferability of a probe to the next farm	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Pending
Herbicide resistance and weed management	What are the best ways of managing herbicide resistance and what options are the most effective?	3	ESP6	Assess current methods of IWM – looking at weed numbers and viable seed. Chaff carts; chaff lining; windrow burning etc.	Project scope submitted: Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers. Accepted
			ESP7	Non-chemical weed management options – row spacing, orientation, allelopathic varieties and vigour, canopy management. Literature review; identify any gaps in these areas, and look at putting trial/s in around these gap areas	Included in above
			ESP8	Best way to manage a high weed burden using crop sequencing. Demo sites in Esperance zone with different rotations, eg. barley, canola, wheat, lupins, barley; or canola, field peas, wheat, barley ... Low, medium and high-rainfall zones (Lake King, Esperance, Grass Patch or Ravy)	Project scope submitted: Review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops. Accepted
Profitable break crops	We need a good break crop including looking at oats again	4	ESP9	Oat SEPWA style trials – hay and grain	No project scope submitted at this time

TABLE 9: Esperance Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
Lake King June 2015					
			ESP10	Rotation demos of new varieties of pulse species followed by cereal – include Canola (particularly open pollinated) as well, with particular interest in heavy soil trial work. Collate 3–5 year rotations \$1/ha info from this rotation work	Project scope submitted: Review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops. Accepted
Esperance February 2016					
Early sowing opportunities	Ability to sow in April – increase yields by longer crop duration	1	ESP11	Time of sowing trials x varieties x crop types x regionally specific (need flowering biomass/H1)	Project scope submitted: Early seeding – a knowledge gap strategy for very early season starts. Accepted
			ESP12	Test variety mixtures – longer flowering – frost, heat and moisture	Included in above
			ESP13	Variety suitability for range of sowing times - included in variety guides or 'Guide to early sowing'	Included in above
Break crops/pastures	Farmers have access to profitable legume crops and sustainable rotations	2	ESP14 & ESP16	Sacrificial crop vs legume crop vs oilseed – rotation experiment (Evaluate higher value legume – lentils)	No scope submitted at this stage. Ron Yates DAW00221 has undertaken much of this work looking at residual N
			ESP15	Economic evaluation of break crops / rotations	Project scope submitted: Report investigating double break (or stacked rotation) options for growers in the Kwinana East and Kwinana West port zones. Accepted
			ESP17	Independent sclerotinia fungicide product – timing at Munglinup	Project scope submitted: Using different rotations, and fungicides to manage Sclerotinia incidence in canola. Not accepted. To be considered through CCDM
Compaction	Cost effective mediation of compaction	2	ESP18	Trials on shallow, sandy gravels over gravel and economic analysis thereof on CTF	Update from David Hall in the Subsoils constraints project
			ESP19	Soil compaction field day – in August – research, grower experience – in field	Organise soil constraints field trip for July/ August – this was conducted by the soils group
			ESP20	Machine comparisons on different soil types including economics of remediation	
			ESP21	Trial the tillage radish (and others) that overcome compaction	No project scope submitted
			ESP22	Checklist of other management option to include when ripping – trace elements, lime, inclusion plates, weed control, soil borne pathogens	Project scope submitted: Compaction Mitigation options for growers. Accepted
			ESP23	Rip strips – neighbour based machine/ option trials, need economic analysis of each, soil type specific	Included in above

TABLE 9: Esperance Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
Esperance February 2016					
Oats research	More growers adopting oats into the rotation	2	ESP24	Local rotation trial (with grain and hay) – how good are oats as a break crop? Rotations trial with wheat, wheat, oats; wheat, canola, oats; wheat, barley, oats etc	No project scope submitted at this stage. Update from Roger Lawes (modelling) on LUSO
			ESP25	Very early sowing trial – 25/3 by rainfall zone	Included in above TOS work
			ESP26	Local export opportunity (container facility) CBH	AEGIC issue not GRDC. Mick Daw (CBH) invited to speak at Scaddan RCSN meeting
			ESP27	Herbicide tolerance screening	This project work is already happening though not finished and does not fit in the RCSN scope of business
			ESP28	Case studies (booklet) of long term oat growers	Discussion with Mark Seymour and Georgie Troup. Case study booklet as an output
Soil biology	Management practices to increase microbial release of phosphorus and enhance biological breakdown of herbicide residue	5	ESP29	Explore crops or varieties which can be used in rotation that can release organic acids and mobile organic phosphorous	This work has been largely done in SB1 & SB2.
			ESP30	Evaluate Predicta® B – disease outcome (crown rot, take all), correlate to soil types x grid sampling	Update from Alan McKay SARDI. No project scope submitted at this time

GERALDTON PORT ZONE – 2015-16 PRIORITISED ISSUES AND AREAS OF INTEREST
TABLE 10: Geraldton Port Zone – Prioritised issues and areas of interest

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
August 2015 Mingenev					
Seasonal variability	Growers having access to varieties that can handle heat stress and short seasons	1	GER1	Heat stress accumulated heat units effect on crop phenology, yield, WU, variety selection eg. Mace vs Corack and research and extension	This was deemed to be outside the scope of the 1–3 year RCSN project area but has been forwarded to Western Panel via Roger States
			GER2	Breeding to allow deeper seeding (coleoptile seed size) – ability to chase moisture	This was deemed to be outside the scope of the 1–3 year RCSN project area but has been forwarded to Western Panel via Roger States
			GER3 *Combine with ESP3	Extension of available weather info – moisture probes, doppler radar details – list interpretation of different models	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Project pending
			GER4. *Combine with KE3 & KW6	Continue early seeding trial of 2015 – wheat/canola/sand/loam – (calendar seeding – 29 March TOS). This time, include co-ordinated large scale demos of very early seeding. 3-4 growers/grower groups seed proportion of one paddock in week of 29 March	Project scope submitted: Regionally-specific agronomy projects: early seeding trials for the northern part of the Geraldton port zone. Project accepted
Input costs (chem, fert etc)	In a world of diminishing returns we need to be careful with our expenditure on inputs	2	GER5	Re-look at rates on N mineralisation in Northern/Eastern parts of the region now that temperatures have increased	Project scope submitted: Testing Nitrogen Calculators including re-looking at Organic N assumptions. Pending. Combined with GER6
			GER6	Nitrogen management systems. Rethinking strategy N model – later N trials. New guidelines given changing climate	Project scope submitted: Testing nitrogen calculators including re-looking at organic N assumptions. Pending. Combined with GER6
			GER7	Improve farmer uptake of VRT through more extension by: Review and extension of long term practitioners of VRT (case studies). Is VRT relevant on all farms? Are there bigger fish to fry?	Project scope submitted: Case studies of growers managing inputs using VRT. Accepted
			GER8	Further evaluation of yield prediction tools to better manage N decision making.	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. See GER3. Project pending
Soil health (including compaction, soil nutrition etc)	De-compaction length of benefit? What nutrition do we need?	3	GER9 *Combine with KW8 & ALB16	Identification of change in WUE/PAW in compacted/CTF/ameliorated soils? Change in PAW by ripping depth; Length of time between ripping and +/- CTF; Compaction – how long do you get out of ripping on different soils – how deep?	Project scope submitted: Deep ripping, 'deeper' deep ripping & water use efficiency. Accepted
			GER10	Potassium project (see Richard Quinlan for this one). Key nutrient requires revisiting. K timing in June spread vs April spread MOP vs banded; K cycling (lupins vs canola vs cereals); Subsoil K with regards to K soil thresholds	No project scope submitted

TABLE 10: Geraldton Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
August 2015 Mingenev					
			GER11	What is the best way to apply nutrients on non-wetting soils? Lit review – small plot work including: granular, banded, spread; liquid – banded, applied foliar; timings – across multiple crops/years	Project scope submitted: Best bet management of ameliorated non-wetting soils for the Geraldton port zones. Accepted
Farm business management, finance & IT	What business model best suits our farm? And what ratios should we be aiming for?	4	GER12	Case studies of farm management structures – good and bad.	No scope submitted: GRDC has funded a project being conducted by ORM currently looking at alternative farm business models. Cam Weeks is on project team
			GER13	Up-skilling in business knowledge – where do you go? 101 – Business Updates; 201 – 12 week business challenge; 301 – 12month course. 1 day/month over 12 months – eg. Curtin course, build it, run it, extend it. Short intensive program for young people – wide area, connections. Initial project to be a scoping project on feasibility	Project scope submitted: Assessment of Business training options for WA farm business managers. Accepted
Profitable break crops	How do we grow lupins better? Derisking canola.	5	GER14	Weed management techniques revisit particularly narrow leaf lupins. Lupins – what are the best chemical options when triazine resistance is confirmed?	No project scope submitted: The paddock monitoring with AHRI could be reworked
			GER15	Undertake a lit review of the cost benefit analysis to compare fallow vs pasture vs lupins, vs canola etc. Follow this up with case studies, searching out real farmer data and experiences and document	Project scope submitted: Case study of different rotations and break crops for Western Australian growers. Accepted
			GER16	What is holding back lupin yield? Establishment, non-wetting, nutrient uptake, heat tolerance, sowing time. Effect of heat stress on flower abortion and yield? Specific paddock monitoring project – RLN etc.	This was deemed to be outside the scope of the 1–3 year RCSN project area but has been forwarded to Western Panel via Roger States
			GER17	De-risking GM canola in the lower rainfall zone – reducing upfront costs. Compare low seeding/fert/chem rates vs medium vs high over 3 years.	No project scope submitted for GER. Project scope for KE 2015 Canola early sowing management systems: Grazing canola to modify maturity and water use
			GER18. *Combine with ALB11	Beet Western Yellow virus in canola – exploring timing of aphid control and chem product options. Sclerotinia in canola – fungicide x timing trials	Project scope submitted: Using different rotations, and fungicides to manage Sclerotinia incidence in canola. Pending
February 2016 Vines					
Profiling soil types	Increased use of in-season monitoring for management decisions: water, heat, frost, soil amelioration	Equal 1st	GER24	Comparison of iPaddock App, Yield Prophet®, N Broadacre App	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Project pending
			GER25	Facilitated climate workshop	Invitation to Neil Bennett to attend next meeting. Confirmed

TABLE 10: Geraldton Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
February 2016 Vines					
Preparing the paddock	Growers are able to link diagnostics of constraint to 'best' treatment	1	GER26	Trials of soils amendment/deep ripping interaction	Invitation to Bindi Isbister to attend next meeting. Confirmed
			GER27	Deeper ripping demos around region	Two scopes are currently in the pipeline from the previous round but happy to add further outputs if you have them
			GER28	*Best return for lime input (rapid)	Invitation to Bindi Isbister to attend next meeting. Confirmed
			GER29	*Fine tuning Inclusion plates	Invitation to Bindi Isbister to attend next meeting. Confirmed
			GER30	Bindi's work (more of) – compaction/CTF	Invitation to Bindi Isbister to attend next meeting. Confirmed
Nutrition	Growers managing N and K while not increasing risk	3	GER31	Better understanding of soil rest results and crop nutrition requirements including Colwell P	Draft scope pending: On-line crop nutrition tutorials
			GER32	Review international model – plant based decision tools	Draft scope pending: On-line crop nutrition tutorials
			GER33	Nutrition on Canola	Draft scope pending: On-line crop nutrition tutorials
			GER34	Case studies – plant tissue testing, soil testing	Draft scope pending: On-line crop nutrition tutorials
			GER35	Fuel gauge site – summer fert (green seeker) NVDI	Draft scope pending: On-line crop nutrition tutorials
Risk management	Use every available resource to maximise yield for the least amount of money.	3	GER36	Workshop on key drivers for input decisions	Draft scope pending: On-line crop nutrition tutorials
			GER37	*Early seeding and nutrition in region – soil type specific trials	Project scope submitted: Regionally specific agronomy projects (RSAP): Early seeding trials for the northern part of the Geraldton port zone. Project accepted. See GER4
			GER38	Advisor development – scenario planning workshops	Draft scope pending: Online crop nutrition tutorials
Canopy management	Growers are managing crop canopy to suit their environment in the northern agricultural region (NAR)	3	GER19	Canopy management on seed set	No project scopesubmitted for GER. Further work
			GER20	Crop grazing to manage biomass	No project scope submitted for GER. Further work
			GER21	*High biomass to suppress weeds	No project scope submitted for GER. Further work
			GER22	Study/review of what is possible in NAR	No project scope submitted for GER. Further work
			GER23	Find out what is known	No project scope submitted for GER. Further work
Business management	Stronger, more profitable businesses	6	GER39	Feasibility into Curtin type idea as well as online course opportunities	Project scope submitted: Assessment of Business training options for WA farm business managers. Accepted

KWINANA EAST PORT ZONE – 2015-16 PRIORITISED ISSUES AND AREAS OF INTEREST

TABLE 11: Kwinana East Port Zone – Prioritised issues and areas of interest					
Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
July 2015 Bruce Rock					
Rainfall variability & climate	What systems are growers using to make the most of short seasons, and frost/heat shock at the end of the season?	1	KE1	Case studies looking at farmers who are doing the following: making the most of moisture when it's around – Feb/Mar/Apr sowing – trials – pitfalls – frost, heat, bulking up, harvest issues. Cut hay, regrow and harvest, spring fallow, graze	Project scope submitted: Case studies of growers using novel techniques to utilise available moisture in the Kwinana East port zone. Accepted
			KE2	Data on variety tolerance to heat shock such as a hot frost, flowering timings	To go to WP, however will get an update on this from the relevant researchers
Water use efficiency	We often get an early break and then a dry spell. But how often does early seeding pan out?	2	KE3. *NB combine with KW6 & GER4	Very early sowing opportunities: variety and crop type, warm season crops, costing out the risks vs rewards	Project scope submitted: Canola early sowing management systems: Grazing canola to modify maturity and water use. Accepted
			KE4. *Combine with KW5 & KE4	Link moisture probes, iPaddock, Yield Prophet® tools etc apps	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Pending
			KE5	Polymer CRC – commercial options? How long until it's ready to be used broadacre; how long does it last in paddock? Demos and trial work to test	Keith Bristow CSIRO was invited to talk with the Kwinana East RCSN at their June 2016 meeting. Keith gave an update on this work; consensus that it is still a little way off commercial use therefore outside the scope of the RCSN at this time
			KE6	Stubble orientation/height in relation to water harvestability and moisture retention. Stubble or no stubble in dry conditions due to the wicking effect. Burn or reduce existing stubble levels. Inter-row spacing vs smashing stubble. Desktop assessment? Old data?	No scope submitted. Some work in the past done on this
Inputs	Lime is one of our bigger expenses and we know that we should be using it, but in a low input environment is it worth it?	3	KE7	Bus tour investigations of incorporation methods of lime, and sodic soil	Project scope submitted: Bus tour to northern wheatbelt growers to investigate options for herbicide resistance management and lime incorporation methods. Accepted. Bus tour planned for 12 to 14 September 2016
			KE8	Managing N decisions (rate, application, VRT, timing); P and lime input decisions – synergies in the system. Trial investigating more efficient fertiliser usage. Liquid vs granular (full cost analysis); granular spatial distribution; ground truth minimum requirements.	No scope submitted. Some work in the past done on this but further work can be done for Kwinana East
			KE9	Evaluation of mass pH measurement (Veris) to produce VRT lime spreading maps. Demo on farm in KE	Link into Geraldton/Quinlan work
Weeds	We want to learn from our northern growers and put in place good herbicide management strategies to lessen chances of herbicide resistance and keep our chemicals working for us	4	K10	Long term trial Matricaria control including seed bank – different chemical groups, actives and timing	Linkages with AHRI and national weeds initiative

TABLE 11: Kwinana East Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
July 2015 Bruce Rock					
			KE11	Northern areas resistance updates, case studies and trip. Evaluation to help further east adapt	Linkage to AHRI. Project scope submitted: Bus tour to northern wheatbelt growers to investigate options for herbicide resistance management and lime incorporation methods. Accepted. Bus tour planned for 12 to 14 September 2016
			KE12	Investigation of harvest weed management techniques in dry eastern wheatbelt with smaller crop residues	Project scope submitted: Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers. Accepted
Rotations	A good break crop has not been found for the eastern wheatbelt even though modelling suggests there could be one	4	KE13	Analysis (financial and risk) of all rotational trials for last 15 years for central and eastern wheatbelt. Apply current costings to yield data to determine the most profitable, lowest risk, most sustainable, and what soil type. Economic analysis – bugger the agronomist	Two project scopes submitted: Review and demonstration of different rotations and break crops for Western Australian growers & Case study of different rotations and break crops for Western Australian growers. Accepted
			KE14	Desktop study – Full economic analysis of role of fallow – use data from Doug Abrecht and Michael Robertson (and others)	Included in above
			KE15	Long term rotation trial to ground truth Roger Lawes work – double break economics. (Bob Nixon has one set up)	Included in above
February 2016 Vines					
Inputs	Standard measurement or system to enable growers to better understand the potential of different soil types in the Kwinana East port zone	1	KE16	Field days to show best tools for soil moisture measurement	Possible variation to current KE WUE contract to include further field days and sites
			KE17	Identify true, absolute yield potential of varieties on generic soil type	Addressing the yield gap in rainfed crops: a review (Anderson et al). Also review http://www.yieldgapaustralia.com.au
			KE18	Demo water harvesting techniques	Project scope submitted: Furrow formation and inter-row compaction (FFIC) for improved wheat production in water-limited environments of the wheatbelt of WA. Accepted
			KE19	Find the optimum level of organic matter (stubble) before it becomes inhibiting in small rainfall events	WANTFA Effect of rainfall, rotations and residue on wheat performance (Flower et al). CSP00177 WANTFA long term rotation trial: When comparing the effect of residue retention versus burning in treatment 1, once again there is no consistent effect of the residue treatment on soil water storage

TABLE 11: Kwinana East Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
February 2016 Vines					
Abiotic stress (heat-cold) and crop nutrition in early moisture stress	Improve knowledge awareness & tools for measurement	2	KE20	Mapping yield etc from satellites and using the information - imaging project (Simon Wallwork)	Further work required on this project before submission
			KE21	Assess low spec foliar fertilisers for effects on crop growth/nutrition (N, TE, Ca, Zn, Mg, Mn, Cu, B, S, K) in early moisture stress scenarios	Ross Brennan DAFWA has conducted some of this work though possible further work for Kwinana East. No scope submitted yet
			KE22	Look at existing data – probability of frost vs heat stress – decision making tool from stats of TOS/frost/heat stress	Greg Rebetzke and Keith Bristow (CSIRO) attended the Kwinana East RCSN meeting in June 2016 to further define the issue
			KE23	Assess nutrition management under intermittent stress (soil type specific)	Dr Ian Fillery CSIRO (ian.fillery@csiro.au) Economic assessment of nutrient use efficiency of the Australian grains industry – though further gap of stressed crops. Greg Rebetzke to address at RCSN meeting to further define gaps
			KE24	Social media use	Not a project on its own and will be rolled into all other projects
Rotations	Confidence to implement a viable rotation	3	KE25. Included on KE15 scope	Ground truth Roger Lawes double break – Doug Abrecht data	Project scope submitted – report be developed that translates the research that has been conducted on double breaks
			KE26	Rehash the existing data – fresh look and statistical analysis	ELF00001-A: A report translating the research that has been conducted on double breaks has been initiated from August 2015 meetings – KE15
			KE27	Survey of growers rotations for previous 5 to 10 years	Build on previous work from Farmanco (Farmanco Facts Agribusiness 2015 pg 2-5 Rotations and Profit
			KE28	Simple information on benefits of break	ELF00001-A A report translating the research that has been conducted on double breaks has been initiated from August 2015 meetings
			KE29 & KE30	Cereal cyst nematode work with Triticale. Look at sub zones eg. Southern Cross vs Morawa etc	Review of past work. Not progressed yet
National Variety Trial Ag Zone 4	Quicker adoption of more appropriate crop type and varieties and packages	4	KE31	Canola NVT Agzone 4	Update from Bill Ryan, GRDC NVT appointee
			KE32 & KE33	Harvest and publish all trials regardless of yield	Bill Ryan GRDC Western Panel, Geoff Moore and Neale Sutton (ACAS) contacted about these areas of interest 25/5/16. Those with a site mean yield below 0.3 t/ha are not released and those with a CV above 15% are not released. History has proven the trials with a CV above 15% usually have issues for one reason or another

TABLE 11: Kwinana East Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
February 2016 Vines					
			KE34	Larger NVT sites comprising variety vs variety, crop type vs crop type, species vs species, cereal vs cereal, barley/wheat/triticale, legume vs brassica, L vs L vs pulse	One option is to investigate presenting the VSAP and other GRDC trials via the NVT website and database to give growers easier access to the results, even if they are operated as specific VSAP trials
			KE35	Cull non performing varieties to grown varieties (NVT committee) – replace with earlier promising varieties	This is always a priority for NVT and ACAS are working on many levels to optimise this
			KE36	Variety and agronomy packages with local input levels	NVT aim to show maximum potential of varieties in the NVT program. Nutrition applications should match as close to district practice as possible while not limiting the productivity of individual lines

KWINANA WEST PORT ZONE – 2015-16 PRIORITISED ISSUES AND AREAS OF INTEREST

TABLE 12: Kwinana West Port Zone – Prioritised issues and areas of interest

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
July 2015 Dowerin					
Rotations	More information needed on stacked rotations	1	KW1. *Combine first part with GER15	Lit review on double/stacked rotations for the Kwinana West port zone (and in WA)	Project scopes submitted: Case study of different rotations and break crops for Western Australian growers and review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops *Combine first part with GER15
			KW2	Demo sites to complement the above literature review – use rotations as per the literature suggests. Assess the economics at the end of project and extend information	Included in above
Machinery	Machinery is our biggest cost. How can we better utilise it?	2	KW3	Strategies for machinery replacement. To include: Changeover of gear during hard times; cost of running machinery over a longer period of years; Having 2 similar pieces of equipment; Opportunity cost of capital (also linked to different ownership models and considerations of two units vs one); Machinery systems – size, getting gear to talk to each other	Project scope submitted: Machinery replacement options for growers in the Kwinana West port zone. Accepted
			KW4	Case studies looking at different ownership models (eg leasing vs owning). Look at Messinas, Newmans. Extend results	Include with KW3
Utilising rainfall	How early is too early and how often does it work for us?	3	KW5. *Combine with ESP5 & KE4	Increase network of Yield Profit sites and other decision support tools and make publicly available (get more people using the ones that exist). Review and understand start to 2015 season – rain, soil moisture and temperature.	Project scope submitted: A collaborative approach to linking moisture probes, Yield Prophet® sites, iPaddock, and other decision support tools to create one easy-to-read platform. Pending
			KW6. *Combine with KW7 & GER4	Early seeding trials to capitalise on early sowing opportunities – early oats late March/early April – varieties that can be sown to different depths to access moisture. Revisit time of sowing for wheat and barley. Why wait to sow to mitigate frost when long term seeding early may be better – 3 varieties x 4 time of sowing x 3–5 years	Project scope submitted: Regionally specific agronomy projects (RSAP): Early seeding trials for the Kwinana West port zone. Accepted
			KW7	Precision seeding – trial of vacuum seeder for canola – more even placement for better water use	No project scope submitted at this stage. Brad Jones, Tammin has purchased seed singulation bar
Compaction	Compaction issues are increasing in our port zone	4	KW8. *Combine with GER9 & ALB16	Longevity of compaction mitigation techniques – soil type vs techniques vs time. Trial paddock soil type variation (red dirt to sand), mouldboard vs ripper vs spreader. Measure compaction, nutrient profile, disease, pH over 5 and years to 5	Project scope submitted: Compaction Mitigation options for growers in the Albany and Kwinana West port zones, Accepted. *Combine with GER9 & ALB16

TABLE 12: Kwinana West Port Zone – Prioritised issues and areas of interest

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
July 2015 Dowerin					
			KW9	Ideal depth and tyne spacing for deep ripping – monitor affects over a number of years. 14.8m bar, 2.8m track width on tractor, 0.75m track/tyne width, 1.5m in each 15mm in wheel track	Included in above
Soil pH	What is the best way to get lime down?	5	KW10	Lime incorporation + ripping? Crop type after incorporation – what gives the best return?	Included in above
			KW11	A booklet compiling and collating all lime trials – including snake oil trial (alternative) results – extension of lime incorporation methods (eg Craig Scanlan work); and including results and current key issues – how, when, where – farmer experiences in lime incorporation.	Project scope submitted: Compilation of lime trial results and grower case studies. Accepted
Weeds	What is our herbicide resistance status over the zone?	6	KW12	Late season weed control – swath vs crop top vs nothing – effect on seed bank over 5 years.	Project scope submitted: Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers
			KW13	Assessment of new headers and front types with reference to weed seed collection in chaff carts – must also take into account header setup and settings, new machinery vs older machinery comparison.	Included in above
			KW14	Subsidised weed resistance testing (consider 75% subsidy).	No scope submitted at this stage.
February 2016 Greenhills					
Moisture utilisation	To sow earlier with greater knowledge of risks	1	KW15	Building the knowledge and management packages for sowing time (April TOS across rainfall zones and soil types) to better understand the risks. Need to get seasons under the belt to understand the risks – need to collate and extend the current knowledge	Andrew Fletcher CSIRO invited to RCSN meeting 11/8/16 at Wickepin to further define issue. Scope sent in 24/5/16 - Includes Geoff Fosbery sites at Kellerberrin and Coorow
			KW16	Choosing cultivars to suit season	This work has been done with James Hunt, but to include with KW17
			KW17	Oat agronomy – frost avoidance – early sowing – increase moisture utilisation. Time of sowing x seeding rate x weeds	Garren Knell and Andrew Fletcher invited to RCSN meeting 11/8/16 at Wickepin to further define issue
Soil Compaction	Growers can use a range of treatments to manage compaction by soil type in Kwinana Zone	2	KW18	Testing and evaluating treatment of compaction (not ripping and CTF) over variable soil types within a paddock/farm with the assistance of soils west resources – locally based DO	Project scope submitted in July round: Compaction mitigation options for growers in the Albany and Kwinana West port zones, Accepted. *Combine with GER9 & ALB16
			KW19	On-farm trial across variable soil types of ripping and innovative methods for other constraints with DO/RO to take measurements and manage field days	To include with KW18

TABLE 12: Kwinana West Port Zone – Prioritised issues and areas of interest (continued)

Issue	Area of interest	RCSN rank	Act no.	Activities	Comments
February 2016 Greenhills					
			KW20	Developing a group champion group on soil compaction in the west central wheat belt	No project scope submitted
			KW21	Investigate what is being done in horticulture and overseas to manage compaction in heavy soils	No project scope submitted
Non-wetting	Farmers can improve germination on non-wetting soils through combining different effective techniques	3	KW22 & KW23	Reverse' case studies - how farmers 'created' it. RO person in S of KW (Northam?)	Steve Davies DAFWA attended RCSN meeting 11/8/16 at Wickepin to further define issue
			KW24	Trials in 'new' areas – soil types and demonstrations	Discussion with Steve Davies – any soil type gaps? Steve Davies attending RCSN meeting 11/8/16 at Wickepin to further define issue
Profitable rotations	Grower have rotations that manage weeds, disease and nutrition	4	KW25	Rotation – benchmarked and biology	Project scopes submitted after July round: Case study of different rotations and break crops for Western Australian growers and review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops *Combine first part with GER15
			KW26 & KW29	Double stack rotations for weeds and possibly nematodes and phase farming vs canola/wheat/lupin/wheat (WWWPPPP)	Project scopes submitted after July round: Case study of different rotations and break crops for Western Australian growers and review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops *Combine first part with GER15
			KW27	Low-cost break crop options	Included in above
			KW28	Fallows in medium/high rainfall	Possibly include above with Activity KW27
Machinery management	Extend reliable use on farm lifetime of machinery	5	KW30	Benchmark machinery (life, maintenance costs, fail points, hours, issues, reliability) and compare to other industries (mining)	Project scope submitted after July round: Machinery replacement options for growers in the Kwinana West port zone. Accepted
			KW31	Case study on machinery purchase: new vs old; owned vs hire purchase and risk on business enterprise	Included in above
			KW32	Set up an issues register and resolution options	Possible discussion with Bindi Isbister – online portal?
			KW33	Contractors vs self-owned case study	Included in above

Appendix 3: 1–3 year projects

Each year, for the five years that the RCSNs have been in operation, funds have been available to address short term, high priority projects in each port zone. These one to three-year projects have been well received locally and many have delivered state-wide benefits.

A significant success factor of the one to three-year projects has been the ownership and ‘buy-in’ from local growers and professionals. This has led to great leverage (ie substantial in-kind contributions from those involved) plus genuine interest in the findings.

These projects have been funded by the GRDC to address local high priority issues that each RCSN has identified. Until now, projects have been required to be completed within 12 months; have typically involved local agronomists, researchers and growers; and been focused on extension activities.

To date, all one to three-year projects proposed by the RCSN, are assessed by the GRDC’s Western Panel and/or GRDC Manager Regional Grower Services – west (Roger States) and other members of GRDC staff. Tenders are awarded one of three ways:

- In the first instance, through the Preferred Suppliers list
- If there are no successful tenderers, then either a limited tender or
- A direct negotiation process can be undertaken

The tables below outline the RCSN projects funded to date.

ALBANY PORT ZONE PROJECT DETAILS: SUMMARY OF NEW PROJECTS 2016-17

TABLE 13: Albany summary of new projects for 2016-17

Project number	Project title	Leader(s)	Length
SCF00004-A	Effective baiting options for the control of conical snails in the Albany port zone.	Christine Kershaw, Stirlings to Coast	31/5/16 – 1/6/17
Issue number addressed: ALB5 & ALB6			
Key outputs: This project will see a survey of bait distribution and density of snails; and comparison of the full range of baits available with three product trials throughout the Albany port zone			
AVP00003-A	Compaction mitigation options for growers in the Albany and Kwinana West port zones	John Duff, Agvivo	2/08/2016 – 28/2/19
Issue number addressed: ALB16, ALB 17, KW8 & KW9			
Key outputs: 10 demonstration sites will be established (or built upon) in the Albany and Kwinana West port zones, looking at a range of different ripping techniques that can be used to manage compaction. It is expected that there will be some clear messages on ripping methods (including depth, cost and length of effectiveness) to mitigate compaction on a range of soil types available for distribution and extension (via a bus trip and case study booklet) to growers			



Figure 19: Peter Newman (AHRI), Peter Hills (HillsAg) and Stuart Witham (Albany RCSN member and Tambellup grower) at the Weed Seed Shed Session near Tambellup.

PHOTO JULIANNE HILL

ALBANY PORT ZONE PROJECT DETAILS: SUMMARY OF 2015-16 PROJECTS

TABLE 14: Albany summary of projects for 2015-16

Project number	Project title	Leader(s)	Length
NYA00001	Herbicide resistance survey	Fiona Hobley, NFIG	1/7/15 – 30/6/16
Project update: Project completed			
DAWA00251	Investigate and extend effective and reasonably priced monitoring and control methods for snails and slugs in the Albany and Esperance Port Zones.	Svetlana Micic, DAFWA	1/3/15 – 30/6/16
Project update: Project summary provided			
TAR00004	GRDC Pre-Seeding Frost Workshops	Garren Knell, ConsultAg	1/1/15 – 30/11/15
Project update: Project completed			
SOK00001	Increasing crop-uptake of fertiliser by improving soil health with granular humate and prilled liming agents	Paul Leonie, Kent Landcare	30/5/15 – 31/12/16
Project update: Project completed			
TAR00005	Is Triazine resistant silver grass a looming threat for the mixed cropping belt in central and southern WA?	Garren Knell, ConsultAg	1/8/15 – 30/6/16
Project update: Project partially complete, but waiting for some further results			

**ESPERANCE PORT ZONE PROJECT DETAILS:
 SUMMARY OF NEW PROJECTS FOR 2016-17**

TABLE 15: Esperance summary of new projects for 2016-17			
Project number	Project title	Leader(s)	Final report due
SEP00016-A	Case studies of growers managing inputs using VRT	Niki Curtis, SEPWA	28/2/2017
Issue number addressed: GER7 & ESP4 Key outputs: This project will look at a number of growers who are at different stages of their VRT journey, with a case study booklet and YouTube video being produced			
PLN00013-B	Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers	Cameron Weeks, Planfarm	30/6/18
Issue number addressed: KW13,ESP6,KE12 Key outputs: At the end of the project, it is expected that there will be some clear messages on best fit options for harvest weed seed control (including chaff-lining) for growers in the Esperance port zone			
FMO00003-A	Review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops	Ben Curtis, Farmanco	28/2/17
Issue number addressed: GER15,KE13, KE14, ESP8, ESP10 Key outputs: WA Crop Sequence Calculator workshops			

**ESPERANCE PORT ZONE PROJECT DETAILS:
 SUMMARY OF 2015-16 PROJECTS**

TABLE 16 : Esperance summary of new projects for 2015-16			
Project number	Project title	Leader(s)	Final report due
SEP00014	Investigate available technology tools for farmers to make in-season management decisions for grain farming in the Esperance port zone	Alice Butler, SEPWA	1/7/16
Project update: Project completed			
DAW00251	Investigate and extend effective and reasonably priced monitoring and control methods for snails and slugs in the Albany and Esperance Port Zones.	Svetlana Micic, DAFWA	30/6/16
Project update: Project summary received			
SYN00008	Early seeding – a knowledge gap strategy for very early season starts	Craig Brown, Synergy	31/3/16
Project update: Project completed			
RAI00005	Management practices for reduction of Rhizoctonia	Elisa Spengler, RAIN	30/6/16
Project update: Project completed			
PRE00004	Yield Prophet® modelling and reporting for the Esperance port zone	Frank D'Emden, PAA	31/3/16
Project update: Project completed			

GERALDTON PORT ZONE: SUMMARY OF NEW PROJECTS FOR 2016-17

TABLE 17: Geraldton summary of new projects for 2016-17

Project number	Project title	Leader(s)	Final report due
SEP00016-A	Case studies of growers managing inputs using VRT	Niki Curtis, SEPWA	28/2/2017
Issue number addressed: GER7 & ESP4			
Key outputs: This project will look at a number of growers who are at different stages of their VRT journey, with a Case study booklet and YouTube being produced			
LIE00010-A	Best bet management of ameliorated non-wetting soils for the Geraldton port zones	Clare Johnston, Liebe Group	28/2/18
Issue number addressed: GER11			
Key outputs: A literature review on current and past work on nutrient application/timings/rates to ameliorated non-wetting soils in the Geraldton port zone. This will be followed up by small plot work with treatments including: Granular fertilisers - banded, or spread; and Liquid fertilisers – banded, or applied foliar			
FMO00003-A	Review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops	Ben Curtis, Farmanco	28/2/17
Issue number addressed: GER15, KE13, KE14, ESP8, ESP10			
Key outputs: WA Crop Sequence Calculator workshops			
CMP00001-A	Case studies of different rotations and break crops for Western Australian growers	Kelly Cussons, Cussons Media	28/2/17
Issue number addressed: GER15, KE13, KE14			
Key outputs: Case study booklet (~20 growers from KE and GER)			
PLN00013-A	Business training for WA farm business managers	Cam Weeks, Planfarm	31/12/16
Issue number addressed: GER13			
Key outputs: A feasibility study to 'on-line' learn at your own speed program that owners/managers can undertake without having to leave the farm			



Figure 20: Geraldton port zone RCSN identified fallow management as an issue for their port zone, and initiated the project "Improving spray fallow techniques for better moisture conservation, better winter and summer weed control and more profitable grain crops", led by Grant Thompson, Crop Circle Consulting.

PHOTO GRANT THOMPSON

TABLE 17: Geraldton summary of new projects for 2016-17 (continued)

Project number	Project title	Leader(s)	Final report due
MIG00016-A	Deep ripping, 'deeper' deep ripping & water use efficiency	Sheila Charlesworth, MIG	28/2/19
Issue number addressed: GER9			
Key outputs: Growers and advisers will have a better understanding of the benefits of deep ripping and in particular depth of deep ripping required to optimise crop yield & profit; as well as if the cost is worthwhile (rainfall zones, soil types) and very importantly how long the benefit lasts for in a CTF system			
PFS74-2015-GER06	Regionally specific agronomy projects (RSAP): Early seeding trials for the northern part of the Geraldton port zone	Karl Suckling, NAG	1/4/17
Issue number addressed: GER37			
Key outputs: 1 intensive trial site near Binu looking at 2 TOS on a number of different wheat varieties			
FFC00011-A	Regionally specific agronomy projects: Early seeding trials for Kwinana West & southern part of the Geraldton port zones.	Geof Fosbery, ConsultAg	1/4/17
Issue number addressed: GER37 & KW7			
Key outputs: 2x farmer size trial sites at Coorow, and at Kellerberrin with 3 TOS on wheat, barley and oats			

GERALDTON PORT ZONE: SUMMARY OF 2015-16 PROJECTS

TABLE 18: Geraldton summary of projects for 2015-16

Project number	Project title	Leader(s)	Final report due
DAW00253	Early seeding – a climate change adaptation method in the NE Ag Region of WA	Christine Zaicou, DAFWA	31/3/16
Project update: Project completed			
ENG00001	Transitioning family farm businesses	Danielle England, AgInnovate	31/8/15
Project update: Project completed			
WES00001	Quantification of soil testing versus EM38 and γ-ray spectrometry data for the Geraldton port zone	Wes Lefroy, Precision SoilTech	30/6/16
Project update: Not available on 28/6/16 – will arrive 15 July			
AAM00003	Increasing profitability through the utilisation of combined technologies to target input strategies to productive capacity of soils – 2015 expansion	Craig Topham, Agrarian	31/1/16
Project update: Project completed			
CRC00004	Improving spray fallow techniques for better moisture conservation, better winter and summer weed control and more profitable grain crops	Grant Thompson, Crop Circle Consulting	31/12/16
Project update: Project update supplied			
MIG00015	Improving the understanding of nitrogen use efficiency and soil water interactions	Deb Gillam, MIG	31/3/16
Project update: Project completed			
PLN00012	Threshold and cost of hand weeding low density wild radish	Peter Newman, Planfarm	30/11/15
Project update: Project completed			
KDI00026	Understanding map layers for VRT II (Kwinana Extension)	Ben White, Kondinin Group	1/2/16
Project update: Project completed			

KWINANA EAST PORT ZONE: SUMMARY OF NEW PROJECTS FOR 2016-17

TABLE 19: Kwinana East summary of new projects for 2016-17

Project number	Project title	Leader(s)	Final report due
PLN00013-B	Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers	Cameron Weeks, Planfarm	30/6/18
Issue number addressed: KW13, ESP6, KE12 Key outputs: At the end of the project, it is expected that there will be some clear messages on best fit options for harvest weed seed control (including chaff-lining) for growers in the Esperance port zone			
FMO00003-A	Review and demonstration of different rotations and break crops for Western Australian growers – WA Crop Sequence Calculator Workshops	Ben Curtis, Farmanco	28/2/17
Issue number addressed: GER15, KE13, KE14, ESP8, ESP10 Key outputs: WA Crop Sequence Calculator workshops			
CMP00001-A	Case studies of different rotations and break crops for Western Australian growers	Kelly Cussons, Cussons Media	28/2/17
Issue number addressed: GER15, KE13, KE14 Key outputs: Case Study booklet (~20 growers from KE and GER)			
PLN00013-A	Business training for WA farm business managers	Cam Weeks, Planfarm	31/12/16
Issue number addressed: GER13 Key outputs: A feasibility study to 'on-line' learn at your own speed program that owners/managers can undertake without having to leave the farm			

KWINANA EAST PORT ZONE: SUMMARY OF 2015-16 PROJECTS

TABLE 19: Kwinana East summary of new projects for 2016-17 (continued)

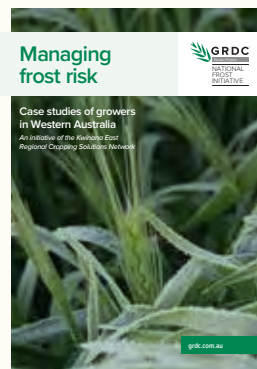
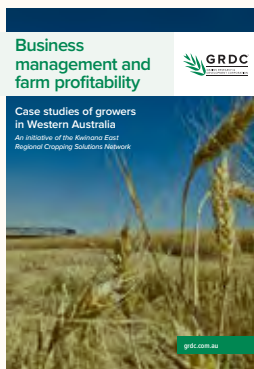
Project number	Project title	Leader(s)	Final report due
CIC00033-A	Case studies of growers using novel techniques to utilise available moisture in the Kwinana East port zone	Mel Williams, Cox Inall	28/2/17
Issue number addressed: KE1 Key outputs: At the end of the project, it is expected that growers in the Kwinana East port zone will be able to assess if different options to conserve moisture or better utilise available soil moisture are an option for their farming systems. They will also have access to go-to growers that they can ask advice from. 10 case studies will be undertaken			
WMG00003-A	Investigating double break (or stacked rotation) options	Anne Wilkins, WMG	31/5/16 – 28/02/19
Issue number addressed: KE15, KW1, KW2 Key outputs: Three sites in Kwinana West RCSN port zone quantifying the rotational benefits of broadleaf crops or pastures for cereals and to identify whether profitable broadleaf cropping sequence are available as alternatives to continuous cereals for low, medium and high rainfall zones; and provide guidelines for grain-growers and their advisers when and where to include a double break crop to achieve the best outcome			
ELF00001-A	Report: Investigating double break (or stacked rotation) options in Kwinana West port zones	Dani England, Sandy Lane	31/5/16 – 30/11/16
Issue number addressed: KE15 & KW1 Key outputs: A report translating the research that has been conducted on double breaks into clear and concise messages for growers to be able to put in place on their property			
GIA00005-A	Bus tour to northern wheatbelt growers to investigate options for herbicide resistance management and lime incorporation methods	Ian Longson, GIWA	1/5/16-28/2/17
Issue number addressed: KE7 & KE11 Key outputs: A bus tour to visit growers in the Geraldton port zone who have been using options to manage acidity and herbicide resistance over different lengths of time, with particular emphasis on best management practice			

TABLE 20: Kwinana East summary of projects for 2015-16

Project number	Project title	Leader(s)	Final report due
DAW00254	Furrow formation and inter-row compaction (FFIC) for improved wheat production in water-limited environments of the wheatbelt of WA	Glen Riethmuller & Callum Wesley	31/03/16
Project update: Project completed			
TAR00004	GRDC Pre-Seeding Frost Workshops	Garren Knell	30/11/2015
Project update: Project completed			
DAW00251	Evaluation of the effectiveness of tools in assisting growers in the Kwinana East Zone (KEZ) to better understand and managed stored soil moisture focusing on Yield Prophet® and soil moisture probes	Caroline Peek	29/04/2016
Project update: Project completed			
MDF00001	Reducing variety selection risk through understanding varietal performance with different management packages	Andrew Crook & Vanessa Stewart	30/04/2016
Project update: Project completed			
CRC00004	Improving spray fallow techniques for better moisture conservation, better winter and summer weed control and more profitable grain crops	Grant Thompson	31/12/2016
Project update: Project update supplied			
CIC00027	Case studies frost and farm business management	Mel Williams	30/06/2016
Project update: Project completed			

TABLE 20: Kwinana East summary of projects for 2015-16 (continued)

Project number	Project title	Leader(s)	Final report due
FFC00010	2015 Canola early sowing management systems: Grazing Canola to modify maturity and water usage.	Geoff Fosbery	31 March 2016
Project update: Project completed			
TEK00002	Wodjil Workout – Rise of the pH	Ty Henning	15 December 2017
Project update: Project completed			


Figure 21: Two publications have recently been released to address questions raised through the Kwinana East port zone RCSN around business profitability; and frost

KWINANA WEST PORT ZONE: SUMMARY OF NEW PROJECTS FOR 2016-17
TABLE 21: Kwinana West summary of new projects for 2016-17

Project number	Project title	Leader(s)	Final report due
PLN00013-B	Assessment of some harvest weed seed management options for Kwinana West, Kwinana East and Esperance port zone growers	Cameron Weeks, Planfarm	30/5/16 - 30/6/18
Issue number addressed: KW13, ESP6, KE12 Key outputs: At the end of the project, it is expected that there will be some clear messages on best fit options for harvest weed seed control (including chaff-lining) for growers in the Kwinana West port zone			
WMG00003-A	Investigating double break (or stacked rotation) options	Anne Wilkins, WMG	31/5/16 – 28/02/19
Issue number addressed: KE15, KW1, KW2 Key outputs: 3 sites in Kwinana West RCSN port zone quantifying the rotational benefits of broadleaf crops or pastures for cereals and to identify whether profitable broadleaf cropping sequence are available as alternatives to continuous cereals for low, medium and high rainfall zones; and provide guidelines for grain-growers and their advisers when and where to include a double break crop to achieve the best outcome			
ELF00001-A	Report: Investigating double break (or stacked rotation) options for growers in the Kwinana West port zones	Dani England, Sandy Lane	31/5/16 – 30/11/16
Issue number addressed: KE15 & KW1 Key outputs: A report translating the research that has been conducted on double breaks into clear and concise messages for growers to be able to put in place on their property			
KIS00003-A	Machinery replacement options for growers in the Kwinana West port zone	Ben White, Kondinin Group	30/5/16 – 28/2/17
Issue number addressed: KW3 & KW4 Key outputs: Case studies of options of growers who have developed good strategies for replacement of machinery including different ownership models (eg leasing vs owning); running machinery over a longer period; and running two or more pieces of similar equipment & 3x small group workshops			
WMG00003-B	Compilation of lime alternative product trial results and grower case studies	Anne Wilkins, WMG	31/5/16 – 31/5/17
Issue number addressed: KW11 Key outputs: The project revolves around the compilation of a booklet collating alternative lime source and lime incorporation trials and a number of case studies in the Kwinana West port zone of Western Australia			

**KWINANA WEST PORT ZONE PROJECT
 DETAILS: SUMMARY OF 2015-16 PROJECTS**
TABLE 21: Kwinana West summary of new projects for 2016-17 (continued)

Project number	Project title	Leader(s)	Final report due
AVP00003-A	Compaction mitigation options for growers in the Albany and Kwinana West port zones	John Duff, Agvivo	31/5/16 – 28/2/19
Issue number addressed: ALB16, ALB 17, KW8 & KW9 Key outputs: Five demonstration sites will be established (or built upon) in the Albany and Kwinana West port zones, looking at a range of different ripping techniques that can be used to manage compaction. Messages on ripping methods (including depth, cost and length of effectiveness) to mitigate compaction on a range of soil types will be available for distribution and extension (via a bus trip and case study booklet) to growers within the Kwinana West and Albany port zones			
FFC00011-A	Regionally specific agronomy projects (RSAP): Early seeding trials for Kwinana West & southern part of the Geraldton port zones	Geof Fosbery, ConsultAg	1/4/16 - 1/4/17
Issue number addressed: GER37 & KW7 Key outputs: 2 x farmer size trial sites at Coorow, and at Kellerberrin with 3 TOS on wheat, barley and oats			



Figure 22: Compaction has been raised as one of the top issues in the Albany and Kwinana West port zones during 2015-16.

SOURCE: JEREMY LEMON

TABLE 22: Kwinana West summary of projects for 2015-16

Project number	Project title	Leader(s)	Final report due
SYN00007	Zoning the farm – A case study report of 2 farm pilots	David Pfeiffer, Synergy	1/3/17
Project update: Project update received			
AAM00003	Increasing profitability through the utilization of combined technologies to target input strategies to productive capacity of soils – 2015 expansion	Craig Topham, Agrarian	31/1/16
Project update: Project completed			
TAR00004	GRDC Pre-Seeding Frost Workshops	Garren Knell	30/11/15
Project update: Project completed			
FUT00001	A case study approach to review different methods for defining within-paddock management zones	Bindi Isbister, FarmPos	31/3/16
Project update: Project completed			
TAR00006	Best practice netblotch management in Scope barley and interactions with pre-harvest head loss.	Garren Knell, ConsultAg	28/2/16
Project update: Project completed			
KDI00026	Understanding map layers for VRT II (Kwinana Extension)	Ben White, Kondinin Group	1/2/16
Project update: Project update received			
TAR00005	Is triazine resistant silver grass a looming threat for the mixed cropping belt in central and southern WA	Garren Knell, ConsultAg	30/6/16
Project update: Not available on 28/6/16			
WMG00002	A diagnostic approach for growers to test their own paddocks for compaction	Anne Wilkins, WMG	31/12/15
Project update: Project completed			

ALBANY PORT ZONE RCSN – SUMMARY OF 1–3 YEAR TIME TO DELIVERY PROJECTS COMPLETED FOR 2012, 2013 AND 2014

TABLE 23: Albany RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014

Year	Project	Issue addressed	Contractor	Key findings
2012/13	Understanding soil and water relationships for optimising crop management in variable seasons	Farmers find it difficult to access/digest/ value information to make informed in-season tactical decisions	Jeremy Lemon, DAFWA	Careful sampling and soil selection from the web interface is required for Yield Prophet® to generate useful information for decision-making. For this set of sites, PYCAL using stored soil water – deducting 33% of growing season rainfall has given the most reliable reflection of yield. Yield Prophet® and other decision support tools need continuing demonstration, promotion and support to gain wider acceptance by both growers and advisers
2012/13	Management of grazing crops to reduce the incidence of frost	Frost	ConsultAg	Grazing wheat is a viable option to delay flowering to reduce frost risk for early sown crops. Useful rules of thumb have been developed
2012/13	The effectiveness of on-farm methods of weed seed collection at harvest time	Weed management is highly reliant on chemical control	Alex Douglas, DAFWA; and Southern Dirt	Use of chaff carts and stubble windrow burning for harvest weed seed management can be as effective in the Albany Zone as they are in the northern regions of WA. The combination of effective herbicide use, plus harvest weed seed control techniques has been shown to reduce and maintain weed populations at very low densities
2012/13	Wheat variety research and extension focusing on wheat sprouting (PHS) tolerance for wheats grown in the Albany Zone	Sprouted grain impacts on grain quality and price	Daryl Mares, South Australia; Kevin Young, DAFWA	The relationship between falling numbers and rain treatment was found to be consistent with the field results from agronomy and SEPWA trials. It confirmed the susceptibility of the new lines Cobra and Emu Rock, the variability of Corack and the tolerance of Mace, Envoy and Scout
2013/14	Plant available water (PAW) information and tools for better crop management decisions for Albany and Esperance RCSN Zone consultants and farmers	Farmers find it difficult to access/digest/ value information to make informed in-season tactical decisions	Precision Agronomics Australia (PAA)	Two cored sites with paired probes were established and data is being loaded onto the PAA and SEPWA websites for all to view: http://www.precisionag.com.au/probes_and_prophets.php Combined with Esperance RCSN
2013/14	Extension of amelioration methods to address non-wetting soils in the Albany and Kwinana West port zones of WA	Non-wetting soils are limiting yield and increasing in extent and/or severity	SEPWA; Southern Dirt; and David Hall, DAFWA	Case study booklet produced by SEPWA (available June 2014), and two bus tours conducted. Combined with Kwinana West RCSN
2013/14	Stubble management to reduce the impact of frost to crops in the Albany and Kwinana West Zone of WA (on-farm trial to compare treatments of standing stubble, removed stubble and additional stubble load)	Frost limits yield – either through lost yield if there is a frost event or opportunity cost of not sowing earlier if there isn't	Living Farm; and Dr Ben Biddulph, DAFWA	Findings were that additional stubble treatment increased the severity of the frost and consistently recorded the lowest minimum temperature. Removed stubble averaged 1.8t/ha compared to standing stubble with 1t/ha compared to additional stubble with 0.6t/ha. Combined with Kwinana West RCSN
2014/15	Plant Available Water (PAW) Information and Tools for better crop management decisions for Esperance and Albany RCSN Zone consultants and growers	Farmers find it difficult to access/digest/ value information to make informed in-season tactical decisions	Precision Agronomics Australia (PAA)	Despite the influence of residual soil moisture from the probe installation (a slurry is used to ensure reliable soil/sensor contact) the project and Yield Prophet® soil moisture estimates were highly correlated at most sites. Sites with low correlation coefficients tended to be those with saline subsoils or high clay content. Further investigation into more accurate moisture probe calibrations is recommended. The soil moisture data and Yield Prophet® reports were frequently accessed by growers and consultants throughout the season, with over 1000 logins from at least 300 different users. Combined with Esperance RCSN

TABLE 23: Albany RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013 and 2014 (continued)

Year	Project	Issue addressed	Contractor	Key findings
2014/15	Rotation renewal: profitable legume phase options	Lack of legume options to include as part of a profitable rotation	Stirlings to Coast, with supervisor Jeremy Lemon, DAFWA	This project was extended for a further 12 months, and aims to demonstrate the viability of legume phase options in cropping rotations with appropriate agronomic management packages
2014/15	GRDC pre-seeding frost workshops	Frost limits yield – either through lost yield if there is a frost event or opportunity cost of not sowing earlier if there isn't	ConsultAg with supervisor Garren Knell	Two (per Zone) half-day, pre-seeding frost workshops for growers in the central and southern wheatbelt to update growers on latest frost research and best bet management tools. 148 growers and 17 industry representatives attended the events. Combined with Esperance, Kwinana West, Kwinana East and Albany RCSNs

ESPERANCE PORT ZONE RCSN – SUMMARY OF 1–3 YEAR TIME TO DELIVERY PROJECTS COMPLETED FOR 2012, 2013 AND 2014

TABLE 24: Esperance RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014

Year	Project	Issue addressed	Contractor	Key findings
2012/13	Nitrogen management of hybrid and open-pollinated canola in the WA low rainfall mallee	Lack of data (especially economics) exists on longer term profitability/ sustainability consequences of crop rotations	Mark Seymour, DAFWA	The trial highlighted the importance of assessing the nitrogen status and ensuring canola is not over fertilised with nitrogen in low rainfall areas. The reduction of oil with increasing N could lead to large discounts. There may be opportunities to delay making nitrogen decisions for canola in low rainfall conditions
2012/13	Information days for farmers and agribusiness to understand Yield Prophet® and other soil-water tools	WUE is not being achieved due to soil type variation	Kira Tracey, DAFWA; Tim McClelland Birchip	Use of soil probes in conjunction with Yield Prophet® would be an excellent use of both tools. This information allows growers to make decisions on things such as summer weeds spraying, nitrogen management, and marketing
2012/13	Learning events to actively manage business risk and uncertainty	Risk management is important particularly as many farm businesses are stressed	Danielle England, Planfarm	One benefit of the Optimising Risk workshop was the realisation of the risks that are actually manageable and how important the cropping mix is to risk (ie wheat vs barley or canola)
2012/13	Variable Rate Technology (VRT) and its application in the Esperance Port Zone – one day workshop	Farmers are not using PA and/or VRT to its full potential	N Metz, SEPWA; T Dawe, Farmanco	VRT is not a replacement for key agronomy factors such as weed control and timely sowing. VRT is regarded however to have economic benefits, particularly in soil amelioration
2013/14	Plant available water (PAW) Information and Tools for better crop management decisions for Albany and Esperance RCSN Zone consultants and farmers	WUE is not being achieved due to soil type variation	Precision Agronomics Australia (PAA)	Eight cored sites with paired probes were established and data is being loaded onto the PAA and SEPWA websites for all to view: http://www.precisionag.com.au/probes_and_prophets.php Combined with Albany RCSN
2014/15	GRDC pre-seeding Frost Workshops	Frost limits yield – either through lost yield if there is a frost event or opportunity cost of not sowing earlier if there isn't.	ConsultAg with supervisor Garren Knell	Two (per zone) half day pre-seeding frost workshops for growers in the Central and Southern Wheatbelt to update growers on latest frost research and best bet management tools. Combined with Esperance, Kwinana West, Kwinana East and Albany RCSNs
2014/15	Plant available water (PAW) Information and Tools for better crop management decisions for Esperance and Albany RCSN Zone consultants and growers	WUE is not being achieved due to soil type variation	Precision Agronomics Australia (PAA)	Four soil moisture probe and Yield Prophet® sites were established across the EPZ and Albany Port Zone in 2014 at Howick, Ravensthorpe, Jerramungup and Lake Grace. Another nine moisture probe sites were established across the Kwinana East (KE) and Kwinana West (KW) Port Zones at Beacon, Bonnie Rock, Merredin, Southern Cross, Warradarge, Coomberdale, Bindi Bindi, Yealering and Dowerin in mid-April 2014
2014/15	Soil moisture monitoring – an evaluation of current techniques and technologies and their application to current yield models	Information that could be useful for making decisions is often fragmented, hard to access and/or interpret	Ben White, Kondinin Group	A comparison of the range of soil moisture monitoring techniques were evaluated for their application, factors affecting accuracy and constraints in a yield modelling context. A special research report was produced by Kondinin Group on the techniques available. There are around thirty methods of measuring soil moisture content. Some are better suited to broadacre cropping scenarios than others because of the required installation method or the ability for permanent installation. Capacitance probes tend to be used predominantly by broadacre farmers that have recently installed soil moisture monitoring equipment

TABLE 24: Esperance RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014 (continued)

Year	Project	Issue addressed	Contractor	Key findings
2014/15	Soil constraints and management options are poorly understood	Farmers use cropping techniques and practices that maintain/improve soil structure and increase the profitability of cropping previously difficult soils	Elisa Spengler, RAIN	This project aims to document ‘farmer’ trials and machinery innovations and examine the responses and results of the various amelioration/disturbance methods used. Due June 2015
2014/15	CTF benefits – what are the nitrogen dynamics?	Farmers are not using PA and/or VRT to its full potential	Nigel Metz, SEPWA	This project included some strip trials of trafficked, and non-trafficked areas. The project clearly demonstrated the potential yield and nitrogen efficiency advantage of having no historical compaction on a variety of soils. All sites had significant yield increases from not only the simulated trafficked zone, but also the paddock area assessments immediately adjacent. This clearly indicates that sub soil compaction and subsequent loss in crop yield is a real factor of modern mechanised grain farming across multiple soil types and rainfall zones
2014/15	EDRS Field Day – Spatial Agronomy	Farmers are not using PA and/or VRT to its full potential	Nigel Metz, SEPWA	Primary focus to introduce the PA concept as a wider agronomy and paddock management concept. 170 people attended the day and it was considered a great success
2014/15	Short and medium term analysis of macro nutrient dollar substitution into lime	Soil sodicity and acidity limit nutrient availability	Craig Brown, Synergy	To continue assessing the short and medium term implications of substituting macro element dollars, namely N and P, which are often at luxurious levels in soils, into more lime, our biggest limiter. This project was extended, but initial results from 2013 showed some excellent results

GERALDTON PORT ZONE RCSN – SUMMARY OF 1–3 YEAR TIME TO DELIVERY PROJECTS COMPLETED FOR 2012, 2013 AND 2014

TABLE 25: Geraldton RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014

Year	Project	Issue addressed	Contractor	Key findings
2012/13	Herbicide sequencing for better and more sustainable wild radish control.	Weed management and herbicide resistance	DAFWA & Planfarm	There is no need for two applications of Velocity on hard to kill radish
2012/13	Understanding sclerotinia in canola	Canola area is increasing and disease management	Planfarm & DAFWA	Even in a dry year (2012) the disease was apparent at significant levels on four monitored sites. This confirms concern that in wet years the disease will be a major challenge
2013/14	Development of BMP for wild radish management in cereals.	Weed management and herbicide resistance	Crop Circle Consulting.	BMPs for wild radish management are now available for growers and advisers. Trials carried out confirmed findings of 2011/12 work
2014/15	Variable rate technology – how best to develop zone maps?	Management of seasonal & soil variability Soil acidity	Kondinin Group	In many instances effective zone maps can be developed using simple and cheap data layers such as satellite imagery, biomass maps, yield maps. A lack of historical yield maps and/or paddocks where soil type variation is not so visual are the obvious instances where the cost of adding EM38 & Radiometrics data layers can be worthwhile
2014/15	Increasing profitability through the utilisation of combined technologies to target input strategies to productive capacity of soils.	Management of seasonal & soil variability	Agrarian Management	Growers can use yield forecasting tools such as Yield Prophet® in combination with soil moisture probes, soil testing and nitrogen models to make better and more targeted crop input decisions. Better targeted crop inputs lead to greater profits
2014/15	Soil probes for cheap and accurate pH testing.	Soil acidity	Planfarm	Soil probes have been proven in this project to be an effective way of measuring top soil pH. The correlation to the standard 1:5 CaCl ₂ measure is very good provided the soil is wet and the probe is left in the soil for long enough. The challenge now is to develop a way to use a probe to test the subsoil. Use of soil probes to test pH will allow for far more cost effective development of paddock pH maps

KWINANA EAST PORT ZONE RCSN – SUMMARY OF 1–3 YEAR TIME TO DELIVERY PROJECTS COMPLETED FOR 2012, 2013 AND 2014

TABLE 26: Kwinana East RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014

Year	Project	Issue addressed	Contractor	Key findings
2012/13	Understanding soil and water relationships for optimising crop management in variable seasons – Kwinana East RCSN area	Understand and manage stored soil moisture	Caroline Peek, DAFWA	Nine Yield Prophet® sites were installed on sandy duplex country. Growers involved made cost-saving decisions of reducing or cancelling top-up nitrogen applications. Further refinement of the Western Australian soil types to make soil classification easier and more accurate
2013/14	Weed mapping and ecology in the Central and Eastern Wheatbelt of WA	Herbicide resistance/weed management	Pippa Michael, Curtin University of Technology	Correlations between weed presence and soil type made for five top weeds, providing farmers with additional management information. Combined with Kwinana West RCSN
2013/14	Break crop economics for the Kwinana East (low rainfall) Zone of WA	Profitable rotation/sequence	Graeme McConnell, Planfarm	This study suggested a canola, wheat, and barley rotation was the most profitable, with pasture, wheat, canola, wheat rotation a close second.
2013/14	The economics of summer weed spraying and effects on soil water and soil N, for the Kwinana East RCSN Zone	Understand and manage stored soil moisture	Aidan Sinnott, Precision Agronomics Australia (PAA)	Benefits of controlling early summer weeds demonstrated, particularly on certain soil types. Grain yield differences ranged from -0.1t/ha at Beacon North to 1.6t/ha at Nungarin.
2014/15	Farm business updates	Understand profitability constraints	ORM	One-day event held in Merredin with capacity attendance of 180 growers and consultants.
2014/15	GRDC pre seeding frost workshops	Frost limits yield – either through lost yield if there is a frost event or opportunity cost of not sowing earlier if there isn't	ConsultAg with supervisor Garren Knell	Two (per zone) half day pre-seeding frost workshops for growers in the Central and Southern Wheatbelt to update growers on latest frost research the best bet management tools. Combined with Esperance, Kwinana West, Kwinana East and Albany RCSNs.
2014/15	Determining economic rates and incorporation methods for lime in the Eastern Wheatbelt of WA	Active management of pH and sodicity of soil	Ty Henning, TekAg	This work looked at varying rates of lime, and different methods of incorporation on Wodjil soils in the Eastern Central Wheatbelt. Due to a very dry year, results were inconclusive. Due to the high cost associated with purchasing, transport and applying lime, the expensive tillage treatments rule themselves out of consideration economically. The use of a single or twin disk machine looks to be more effective at lime incorporation than tined implements and are a lot more productive and economic to use than a mouldboard or spader
2014/15	Developing and testing innovative, practical and reliable methods for incorporating lime into acidic sandplain top and subsoils in the Eastern Wheatbelt	Active management of pH and sodicity of soil	Travis Hollins, Caldo Holdings	This farmer scale demonstration site at Nungarin on a Wodjil soil type investigated cheap, cost-effective methodology to effectively incorporate lime to depth. One way plough and Grizzly Offset discs appear to be the most efficient, practical, and most cost-effective method of incorporating lime into the topsoil in the eastern wheatbelt wodjil soils. With lime costing \$50 per hectare, Lime \$8.50/tonne, Freight \$32/t and spreading \$9.50 there are many ploughs still owned by farmers and Grizzly Offset discs can be hired at \$8.50/ha
2014/15	Measuring the impact of different timings of summer weed control in the Kwinana East Port Zone	Understand and manage stored soil moisture	Aidan Sinnott, Precision Agronomics Australia (PAA)	The objective is to determine the most cost-effective time of summer spraying for the farmers of the Eastern Wheatbelt and the impact of summer germinating grasses on the subsequent crop in relation to soil moisture, yield and nitrogen effects. Due to no summer rain during 2014, this project was extended for a further 12 months

TABLE 26: Kwinana East RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014 (continued)

Year	Project	Issue addressed	Contractor	Key findings
2014/15	Understanding and managing spatial variation in stored soil moisture for better crop management decisions	Understand and manage stored soil moisture	Frank D'Emden, Precision Agronomics Australia (PAA)	Four soil moisture probe and Yield Prophet® sites were established across the EPZ and Albany Port Zone in 2014 at Howick, Ravensthorpe, Jerramungup and Lake Grace. Another nine moisture probe sites were established across the Kwinana East (KE) and Kwinana West (KW) Port Zones at Beacon, Bonnie Rock, Merredin, Southern Cross, Warradarge, Coomberdale, Bindi Bindi, Yealering and Dowerin in mid-April 2014. Combined with Albany and Kwinana West RCSN

KWINANA WEST PORT ZONE RCSN – SUMMARY OF 1–3 YEAR TIME TO DELIVERY PROJECTS COMPLETED FOR 2012, 2013 AND 2014

TABLE 27: Kwinana West RCSN – Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014

Year	Project	Issue addressed	Contractor	Key findings
2012/13	Farmer knowledge on methods to address non-wetting soils	Non-wetting soils and sands are increasing in severity and spread	Corrigin Farm Improvement Group; WA No-Till Farming Association; West Midlands Group; Darkan Landcare Group	Mould-boarding has potential to alleviate non-wetting soils and reset the weed seed bank to very low levels. The highest yielding treatments were also the most expensive to apply. Both the offset discs and spader gave significant yield benefits compared to nil incorporation. Banded wetting agent can improve crop establishment and grain yield but responses can be highly variable
2013/14	Stubble management to reduce the impact of frost to crops in the Albany and Kwinana West Zone of WA (trial comparison of standing stubble, removed stubble, additional stubble load)	Frost has a major impact on production and profitability	Living Farm; Dr Ben Biddulph, DAFWA	Findings that additional stubble treatment increased the severity of the frost and consistently recorded the lowest minimum temperature. Removed stubble averaged 1.8t/ha compared to standing stubble with 1t/ha compared to additional stubble with 0.6t/ha. Combined with Albany RCSN
2013/14	Extension of amelioration methods to address non-wetting soils in the Albany and Kwinana West Port Zones of WA	Non-wetting soils and sands are increasing in severity and spread	SEPWA; Southern Dirt; David Hall, DAFWA	Case study booklet produced by SEPWA (available June 2014) and two bus tours conducted. Combined with Albany RCSN
2013/14	Weed mapping and ecology in the Central and Eastern Wheatbelt of WA	Weed management	Pippa Michael, Curtin University of Technology	This project aimed to find out why weeds grow where they do, and linkages between soil types and certain weeds were explored. This knowledge will help farm managers make better decisions on how to manage (and perhaps treat) and zone particular weedy areas according to soil types. Combined with Kwinana East RCSN
2014/15	Variable rate technology – how best to develop zone maps	Matching inputs to soil types	Ben White, Kondinin Group	This project was placed on the ground near Dowerin, and also in the Geraldton port zone. After a destructive weather (hail) event on 18 October, crops on the VRT trial site at Dowerin were destroyed. This site has had a further extension for 2015. The sites at Coorow were untouched by the weather event and data from that trial has been analysed. While two sets of zone maps were developed for the site and strip-trials were run, no yield data was salvageable from the Dowerin trial with the paddock deemed to have incurred 100% losses due to hail and strong winds. However, in many instances effective zone maps can be developed using simple and cheap data layers such as satellite imagery, biomass maps, yield maps. A lack of historical yield maps and/or paddocks where soil type variation is not so visual are the obvious instances where the cost of adding EM38 & Radiometrics data layers can be worthwhile. Combined with Geraldton RCSN
2014/15	GRDC pre seeding frost workshops	Frost limits yield – either through lost yield if there is a frost event or opportunity cost of not sowing earlier if there isn't	ConsultAg with supervisor Garren Knell	Two (per zone) half day pre-seeding frost workshops for growers in the Central and Southern Wheatbelt to update growers on latest frost research the best bet management tools. Combined with Esperance, Kwinana West, Kwinana East and Albany RCSNs

TABLE 27: Kwinana West RCSN– Summary of 1–3 year time to delivery projects completed for 2012, 2013, 2014 (continued)

Year	Project	Issue addressed	Contractor	Key findings
2014/15	Understanding and managing spatial variation in stored soil moisture for better crop management decisions	Understand and manage stored soil moisture	Frank D'Emden, Precision Agronomics Australia (PAA)	Four soil moisture probe and Yield Prophet® sites were established across the EPZ and Albany Port Zone in 2014 at Howick, Ravensthorpe, Jerramungup and Lake Grace. Another nine moisture probe sites were established across the Kwinana East (KE) and Kwinana West (KW) port zones at Beacon, Bonnie Rock, Merredin, Southern Cross, Warradarge, Coomberdale, Bindi Bindi, Yealering and Dowerin in mid-April 2014. Combined with Albany, Kwinana West and Kwinana East RCSN

Appendix 4: RCSN Meetings

ALBANY

The Albany port zone RCSN met twice during 2015-16 - at Frankland in July 2015 and in Esperance in February 2016.

During the meetings, the group prioritised its zone issues and heard presentations from researchers and other industry stakeholders about the high priority issues affecting growers in the zone.

The Albany port zone RCSN comprises eight growers, two advisers, one grain marketer and a researcher.

Members are located in an area from Boyup Brook in the western part of the port zone to Tarin Rock in the north and Jerramungup in the east.

The Albany port zone RCSN group is facilitated by Julianne Hill and supported by Gilly Johnson.

Since 2014-15, several members have joined this group, including: Ben Ball (Wagin grower); Ben Creek (Boyup Brook grower and agronomist); Mark Lawrence (Kojonup adviser); Mark Sullivan (Katanning grower); and Mae Connolly (Lake Grace grower and grain marketer).

Members who have stepped down include: Steve Curtin; Brent Pritchard; Simon Hill; and James Eyres.

Guest speakers to address the Albany RCSN group during the past 12 months include:

- Paul Leoni, of Kent Landcare, regarding an RCSN-supported trial that he is managing looking at alternative lime sources;
- Dr Bev Gogel and Dr Simon Diffey, of the Statistics for the Australian Grains Industry (SAGI), regarding developing and designing rigorous trials;
- Roger States and Julia Easton, of GRDC, regarding the new iteration of the RCSN groups going forward;
- Stuart Kearns, GRDC Executive Manager, Regional Grower Services, regarding a GRDC update;
- Wayne Pluske, of EQUIL, part-owner of Back Paddock and GRDC Soil Constraints – West chairman, regarding the Soil Constraints Initiative project;
- Margaret Roper, of CSIRO, regarding research into water repellence and management options for growers. She outlined CSIRO projects into development of bio-control agents, crown rot and on-row seeding and whether there are risks attached; and
- Sally Peltzer, of DAFWA, and Andrew Storrie, of Agronomo, regarding herbicide resistance and research/knowledge gaps in the Albany port zone.

ESPERANCE

The Esperance port zone RCSN met twice during 2015-16 – at Lake King in June 2015 and in Esperance in February 2016.

At these meetings, the group prioritised issues in the zone and heard presentations from researchers and other industry stakeholders about the high priority issues for that zone.

The Esperance port zone RCSN comprises eight growers, three advisers and one financier.

Its members are located in an area from West River in the western part of the port zone to Holt Rock in the north and Wittenoom Hills in the east.

The Esperance port zone RCSN is facilitated by Julianne Hill and supported by Gilly Johnson.

Since 2014-15, new members to join the group include: Ryan Meldrum (financier); Bevan Tuckett (North Ravensthorpe grower); Collin Penny (Lake King grower); Holly Meiklejohn (Esperance and West River grower); Andrew Fowler (Condungup grower); Peter Daw (Ravensthorpe grower); Phil Smyth (Esperance agronomist) and Kirk Jeitz (Coomalbidgup grower).

Members who have stepped down are: Eric Nankivell; Andy Duncan (now on GRDC's Western Panel); Ben Curtis; Jenny Chambers; Andrew Heinrich; David Campbell; Mic Fels; Anna-Lisa Newman; Steve Baker; and Chris Reichstein.

Guest speakers to address the Esperance RCSN group during the past 12 months have included:

- Mark Seymour, of DAFWA, regarding break crop trial work being undertaken by DAFWA;
- Roger Lawes, of CSIRO, regarding break crop and rotation modelling;
- Stuart Kearns, GRDC Executive Manager, Regional Grower Services, regarding a GRDC update;
- Gavan McGrath, an engineer in soil physics, water flow and remote sensing techniques, regarding his works with two students on water repellence and mapping of repellent soils. In the past, he had a contract with Snowy Mountains Hydro predicting water levels in dams and using sea surface temperatures to develop a tool to take forecasting to five to 10 years. He also has an interest in how chemicals move down the soil profile and integrating this with rainfall data;
- Andreas Neuhaus, of CSBP, regarding work into soil and plant nutrition, including fertiliser recommendation programs, trial design and remote sensing tools;
- Margaret Roper, of CSIRO, regarding water repellence and management options for growers. CSIRO is researching bio-control agents, crown rot and the potential for on-row seeding and whether there are any risks attached;
- Mark Seymour, of DAFWA and project manager for GRDCs tactical break crop agronomy project, regarding use of fungicides and pushing sowing time on field peas (and new generation fungicides). Chickpeas and herbicide work is also being looked at in the Esperance port zone and this work will also extend towards Kojonup; and
- Wayne Pluske, of EQUIL, part-owner of Back Paddock and chairman of the Soil Constraints – West, regarding this GRDC project.

GERALDTON

The Geraldton port zone RCSN met twice during 2015-16 – at Mingenew in August 2015 and in Perth in February 2016.

At these meetings, the group members prioritised zone issues and heard presentations from researchers and industry stakeholders about high priority issues for that zone.

The Geraldton port zone RCSN comprises eight growers, three advisers and one financier. Members are located in an area from Three Springs in the southern part of the port zone to Binnu in the north and Morawa in the east.

The Geraldton port zone RCSN is facilitated by Julianne Hill and supported by Cameron Weeks and Gilly Johnson.

Since 2014-15, the group has been joined by: Andrew Sandison (Geraldton grower); Chad Eva (Three Springs grower); Jason Stokes (Mount Erin grower); Kathryn Fleay (Mingenew/Morawa farm manager); Rohan Ford (Binnu grower); Greg Creasy (Nolba grower) and Geoff Fosbery (ConsultAg adviser). Those who have stepped down are: Richard Quinlan; Chris Pinkney; Peter Norris; Luigi Moreschi; Anne Wilkins; Rob Grima; Glen Thomas; John Koric; Michael O'Callaghan; and Mark Appleyard.

Guest speakers to address the group during the past 12 months have included:

- Danielle England, of AgInnovate, regarding family farming boards;
- Michelle Chafin and Phil Doyle, of Curtin University, regarding an overview of a leadership program called The Growth Owner Program. This program provides an opportunity for business owners to develop their leadership, management and business capacity;
- Dion Nichol, of DAFWA, regarding research with DAFWA's Christine Zaicou-Kunesch into heat stress and research with DAFWA's Ben Biddulph into frost;
- Ben Biddulph, of DAFWA, regarding background information into frost and heat research funded by the GRDC; and
- Andrew Fletcher, of CSIRO, regarding a general introduction and overview of his role in researching water use efficiency and early seeding options.

KWINANA EAST

The Kwinana East port zone RCSN met twice during 2015-16 – at Bruce Rock in July 2015 and in Perth in February 2016.

At these meetings, the members prioritised zone issues and heard presentations from researchers and industry stakeholders about the high priority issues for that zone.

The Kwinana East port zone RCSN comprises eight growers, three advisers and one researcher.

Members are located in an area from Bruce Rock in the southern part of the port zone to Kalannie and Beacon in the north and Southern Cross in the east.

The Kwinana East port zone RCSN is facilitated by Julianne Hill and supported by Gilly Johnson.

Since 2014-15, members that have joined the group include: Cathy Cooke (Koorda grower); and Glen Brayshaw (Planfarm adviser).

Those who have stepped down are: Damen Maddock; David Watson; Ian Maddock; Mick Caughey; Ryan Forsyth; Ryan Meldrum; and Stuart Yandle.

Guest speakers to address the Kwinana East RCSN group during the past 12 months included:

- Michael Foss, Bruce Rock grower and past Nuffield scholar, regarding corporate agriculture structures;
- Greg Shea, of DAFWA, regarding an update on the GRDC-DAFWA focus paddock project;
- Natalie Lee, of Cox Inall Communications, regarding an update on the RCSN frost and business case studies project;
- Caroline Peek, of DAFWA, regarding the RCSN Moisture probes project;
- Ty Henning, of TekAg, regarding the RCSN lime incorporation trial;
- Dion Nichol, of DAFWA, regarding research with DAFWA's Christine Zaicou-Kunesch into heat stress and DAFWA's Ben Biddulph on frost research;
- Ben Biddulph, of DAFWA, regarding GRDC-funded research into frost and heat; and
- Andrew Fletcher, of CSIRO, regarding his role in water use efficiency and early seeding options research.

KWINANA WEST

The Kwinana West port zone RCSN met twice during 2015-16 – at Dowerin in July 2015 and at Greenhills in February 2016.

At these meetings, group members prioritised important zone issues and heard presentations from researchers and industry stakeholders about the high priority issues for that zone.

The Kwinana West port zone RCSN comprises nine growers, and three advisers, who are located in an area from Wickepin in the southern part of the port zone to Miling and Wubin in the north.

The Kwinana West port zone RCSN is facilitated by Julianne Hill and supported by Gilly Johnson.

Since 2014-15, members to join the group have included: Bill Moore (Elders adviser); Blayn Carlshausen (Wubin grower); and David Sermon (ConsultAg adviser).

Those who have stepped down are: Brad Milstead; Ben Whisson; Helen Lethlean; Felicity Taylor; Jason Haywood; Andrew Todd; and Kari-Lee Falconer.

Guest speakers to address the group about its priority issues during the past 12 months have included:

- Shaun Moriarty, of Muresk, regarding an update on the progress and options available at Muresk;
- Greg Shea, of DAFWA, regarding an update on the GRDC-DAFWA focus paddock project;
- Peter Roberts, GRDC Western Panel chairman, regarding GRDC issues;
- Mark Seymour, of DAFWA, regarding the GRDCs tactical break crop agronomy project that he manages. Mark spoke about some of the research being done on lupins, lentils, canola, oats, field peas and other break crops. He also spoke about other projects around water logging and drainage;
- Wayne Parker, of DAFWA, regarding his work with DAFWA's Paul Blackwell looking at inversion plates. He also spoke about investigating a more productive way of seeding, ensuring that there is optimal machinery usage, and finding the most cost effective methods for managing issues such as soil compaction; and
- Bindi Isbister, of DAFWA, regarding some of the RCSN project work into defining and managing soil zones.

Appendix 5: Creating capacity in the next generation – case study

BRIGHT HORIZONS FOR FUTURE GENERATIONS

Elicia Jitming Lim, GRDC Horizons Scholarship winner 2015-16



Figure 23: RCSN coordinator Julianne Hill with RIRDC Horizon Scholarship 2015 winner Elicia Jitming Lim, sponsored by the GRDC.

Elicia was born and bred in Beverly Hills, a suburb 10 minutes from Sydney International Airport and 15 minutes from the Sydney CBD. She says she can run to the bus in thirty seconds, catch her train in less than two minutes and had seriously believed she could get through life without needing a driver's license. But things suddenly changed in Year 11 after she read a careers handbook and discovered that agriculture could be studied at university. At the time, Elicia was president of the Enviro Executive Committee and ran the Gardening Club, but believed she would not be able to pursue an interest in plants, sustainability and food production once graduating from high school. Aside from watching ABC's *Landline* program on television every week, agriculture was completely unfamiliar territory and she wondered how her family would react. Her dad has a Masters in Building from the UNSW, her mum a degree in Economics from the London School of Economics and Political Science and her brother is working towards a combined Commerce and Law degree.

"Fortunately, they were extremely supportive of my decision and I am pleased to say that I am now about to enter my second year of studying a Bachelor of Food and Agribusiness at the University of Sydney," she says. "As a Horizon Scholar, I have had the opportunity to meet a bunch of young, passionate agricultural students from around the country. Most recently, the industry placement with my sponsor, the GRDC, has cemented my decision that agriculture is definitely the industry for me."

Elicia says the scholarship not only provides financial support

for the duration of her degree and annual workshops, but more importantly, gives students a chance to network with industry leaders which would have been extremely difficult for someone with her background.

Elicia's work placement was arranged by RCSN coordinator Julianne Hill and she attended several RCSN meetings. "At those meetings, I ended up having to create a dictionary for agricultural jargon," she says. "Concepts like 'compaction', 'non-wetting', 'break crops' and 'stubble management' were new to me and I realise now that there is so much more to learn beyond my university degree. "It was my first time doing nearly everything – from working with the local Brunswick vet and watching him pregnancy test 130 cows, to waking up at 5:30am and learning from Kim Fry, a dairy farmer, as he milked his beloved cows, and watching bull sales for Black Simmentals which broke an Australian record. Elicia says she has learned that agriculture is not simply an industry, but a lifestyle that has supported generations of families and shaped the identity of many Australians. She says it is important not to overlook the potential of agriculture and to work to redefine the somewhat negative stereotype that enshrouds it.

NOTE: Applicants for the Horizon Scholarship program are selected on their commitment to a career in agriculture, as well as their leadership potential and high school academic record. Further information can be found on the website: www.rirdc.gov.au/researchprograms/ruralpeopleissues/horizon-scholarship.

Appendix 6: GRDC initiatives

1. THE NATIONAL FROST INITIATIVE

Frost damage to cereal crops is a significant annual production constraint for the Australian grains industry, estimated to cost the nation's growers about \$360 million in direct and indirect yield losses every year.

The GRDC has long acknowledged the severe impacts of frost on crop production and in 2014 funded a multi-disciplinary approach to the issue through its National Frost Initiative (NFI).

This five-year initiative is designed to tackle frost from several angles and deliver growers a combination of genetic and management solutions with tools and information to better predict frost events.

Its aim is to deliver targeted RD&E solutions to help growers develop comprehensive frost management strategies that incorporate tactics for pre-season, in-season and post-frost event periods to reduce the risks and impacts of frost and minimise seasonal profit variability.

The initiative has a three-pronged approach that centres on:

1. Genetics – developing more frost-tolerant wheat and barley germplasm and ranking current wheat varieties for frost susceptibility;
2. Management – developing best practise crop canopy, stubble, nutrition and agronomic management strategies to minimise the effects of frost, and search for innovative products that may minimise the impact of frost; and
3. Environment – predict the occurrence, severity and impact of frost events on crop yields and frost events at the farm scale to enable better risk management.

The NFI is managed by a committee comprising:

- | | |
|-------------------------------|------------------|
| 1. GRDC Manager | Dr Juan Juttner |
| 2. Co-ordinator | Dr Bob Belford |
| 3. Knowledge Manager | Dr Sue Knights |
| 4. Genetics Program Leader | Dr Ben Trevaskis |
| 5. Management Program Leader | Dr Ben Biddulph |
| 6. Environment Program Leader | Dr Peter Hayman |

RCSN members with a particular interest in frost sit on a 13-member national Steering Committee for the NFI. This group is chaired by GRDC Western Panel chairman Peter Roberts and meets twice a year, with the following RCSN members contributing to the initiative.

- Gary Lang, Kwinana West port zone RCSN member
- Craig Brown, Esperance port zone RCSN member.

Recent RCSN projects that have linked into the NFI include:

- pre-seeding frost workshops (six workshops delivered in the Kwinana East, Kwinana West and Albany port zones during early 2015);
- case-studies investigating the strategies used by six growers to manage frost risk in the eastern wheatbelt of

WA (Kwinana East RCSN initiative, 2015-16); and

- the mapping of frost areas after a frost event using either satellite imagery or new technology such as drones.

2. SOILS CONSTRAINTS – WEST

Soil constraints, such as water repellence, acidity, sodicity and compaction, cost Australian grain growers millions of dollars in lost productivity each year.

To address this problem, the GRDC has invested in a national Soil Constraints Initiative, which started during 2015 and has a western region component called Soils Constraints – West.

This is a collaborative regional initiative that spans the WA grainbelt and involves RD&E efforts by the Department of Agriculture and Food, WA (DAFWA), Murdoch University, CSIRO, and grower and industry groups.

The initiative aims to:

- further investigate soil water repellence across soil types and WA cropping systems, with the aim of delivering the best management options for a wide range of water repellent soils that occur on WA farms;
- coordinate an across-industry effort to effect a step change in the management of soil acidity in the western and southern GRDC regions (the project will revisit the major barriers to adoption of liming by growers and propose solutions to overcome these – as well as refining calculators to aid liming decisions);
- develop methods for growers to confidently predict the severity and extent of subsoil constraints, such as nutrient deficiencies/toxicities, acidity, sodicity, waterlogging and compaction; and
- develop profitable options to better manage subsoil compaction, while providing continued support to evaluate the financial and environmental benefits of controlled-traffic farming (CTF).

The five-year Soils Constraints – West investment represents more than \$33 million worth of new research aimed at addressing these significant issues. Its development included consultation with WA grain growers, through the GRDC Western Regional Panel and the RCSN groups, and adds to the GRDC's already substantial western region investment in other areas of soil research, including soil nutrition, soil carbon and soil 'health'.

As well as conducting new research and extending results to growers, Soil Constraints – West has a strong focus on training the next generation of researchers. The research being carried out through Soils Constraints – West is taking place mostly in WA, but the findings are feeding into the National Soil Constraints initiative and are expected to be relevant to other southern Australian cropping areas.

The Soil Constraints – West has a Steering Committee, chaired by Wayne Pluske, and encourages interaction between research agencies and growers. It is responsible for reviewing progress and providing advice to the GRDC about future research directions and investment strategies to deliver sustainable soil management to agricultural industries.

The Steering Committee includes a representative from each agency involved in the research and a member from each of the RCSN port zones:

- Tony White, Kwinana West port zone RCSN member
- Bob Nixon, Kwinana East port zone RCSN member
- Mark Pearce, Albany port zone RCSN member
- Craig Topham, Geraldton port zone RCSN member
- Quenten Knight, Esperance port zone RCSN member.

The Esperance RCSN group coordinated a Soils Forum in February 2016, where presentations focused on latest information and innovations to address the major soil constraints experienced in the region.

Participants heard from local growers and leading scientists from organisations including the GRDC, CSIRO, DAFWA, The University of Western Australia and CSBP.

Topics included:

- Possible impacts of on-row seeding on root and crown diseases.
- Compaction.
- Soil biology tests.
- The impacts of chemicals on soil biology.
- Validation of soil health work.
- Farming systems used by local growers.

Esperance grower Ashley Reichstein, pictured above, spoke at the Soils Forum about a new TopDown® deep ploughing system that he is trialling in an attempt to 're-set' soils affected by compaction, acidity and water repellence.

As the name suggests, this can – in one pass – break-up soil to a depth of 30 to 40cm, bring subsoil clay closer to the surface and mix topsoil organic matter down into the profile.

Ashley's story is featured in the western extension pages of the GRDC's May-June 2016 *GroundCover*™ magazine and a video explaining how the TopDown® machine works can be seen at: www.grdc.com.au/GC122-CombatCompaction

3. NATIONAL VARIETY TRIALS ADVISORY COMMITTEE

Two members from each RCSN port zone are elected by the RCSNs to sit on the National Variety Trials (NVT) advisory committee. This committee meets annually to discuss site selection of NVT and other management issues relating to NVT.

Members include:

- Ben Hyde, grower and Esperance Port Zone RCSN member
- Phil Smyth, industry and Esperance Port Zone RCSN member
- Stuart Witham, agronomist/grower and Albany Port Zone RCSN member
- Trent Parsons, grower and Albany Port Zone RCSN

member

- Nick Gillett, grower and Kwinana East Port Zone RCSN member
- Dave Stead, industry and Kwinana East Port Zone RCSN member
- Rohan Ford, grower and Geraldton Port Zone RCSN member
- Craig Topham, industry and Geraldton Port Zone RCSN member
- Tony White, grower and Kwinana West Port Zone RCSN member
- Bill Moore, industry and Kwinana West Port Zone RCSN member
- Blakely Paynter, DAFWA barley
- Julianne Hill WA support
- Barrett Sinclair, WA service provider
- Richard Devlin, WA service provider
- Tom Giles, GRDC
- William Ryan, GRDC WA
- Neale Sutton, ACAS general manager

Notes

Western Regional Cropping Solutions Network

CONTACT DETAILS

Julianne Hill
RCSN Coordinator/Facilitator
PO Box 89, Brunswick, WA, 6224
08 9726 1307
0447 261 607
regionalcroppingsolutions@gmail.com

Peter Roberts
Chair GRDC Western Regional Panel
0428 389 060
kpeterroberts@gmail.com

Roger States
GRDC Manager Regional Grower Services – West
0427 565 780
roger.states@grdc.com.au

