

COGGO

Council of Grain Grower Organisations Limited
ACN 091 122 039

Final Report

COGGO Research Fund 2013

A project completion report covering the project. The acceptance of a satisfactory report against the objectives of the project, and agreement on the sharing of any commercial returns and/or IP will trigger payment within 4 weeks, by COGGO for any outstanding payments.

This Final Report should be completed with reference to the Research and Intellectual Property Agreement (the Research Agreement) signed between the proponent and COGGO Pty Ltd.

1. Project information

| | |
|-------------------|---|
| Project title | Increasing Cropping Returns on Red loam Soils through Chemical Fallow |
| Commencement Date | January 2013 |
| Completion Date | January 2015 |

IMPORTANT: Only amend details in the rest of this section 1, i.e. any project information that has changed since the project was approved

| | |
|-----------------------|--|
| Name of Proponent | |
| ACN/Legal Name or ABN | |
| Mailing Address | |

| | |
|------------------------|--|
| Administrative Contact | |
| Position | |
| Telephone | |
| Fax | |
| Email | |

| | |
|---|--|
| Project Supervisor/Principal Researcher | |
| Position | |
| Telephone | |
| Fax | |
| Email | |

COGGO Use Only

| | |
|----------------|--|
| Project Number | |
| Date Received | |

| | |
|---------------------------|---|
| 2. Project results | This section provides a final report against the Project Aim and the Planned Outputs for the Project. |
|---------------------------|---|

| | |
|--|--|
| Achievement of the Project Aim | Brief statement of achievement in relation to the aim of the project |
| <p>This project began in January 2013 with the aim of investigating options to increase yield and quality of grain grown on red loam soil types in the Mingenew / Irwin region and testing the hypothesis that cropping returns on red loam soils increase through the use of chemical Fallow.</p> <p>Background:</p> <p>A large scale replicated trial was established in 2013 to test for an increase in yield and quality of grain grown on red loam soil following the implementation of chemical fallow. Two paddocks were used in this evaluation trial. The first went into chemical fallow in 2012 while the second was sown to wheat in 2012. Most growers on red loam soil types agree that fallow increases crop yield in the following year but have not measured the output. The trial was established to quantify if the increases in grain yield and quality are significant and justify the financial cost of leaving a paddock to fallow, with the grower essentially only receiving one crop in two years.</p> <p>Recent dry seasons have highlighted the importance of stored soil moisture in the early establishment of crops. Red loam soils have a high water holding capacity and the purpose of fallow is to increase the amount of soil water in the profile at seeding. Stored soil water in the profile is very important when only small rainfall events are received at seeding for crop establishment. MIG measured soil water during the season.</p> <p><i>'Does chemical fallow increase cropping returns significantly?'</i> In this trial the answer is no. Returns were actually higher in the paddock that did not have fallow in the rotation but seasonal effects have played a role in this result.</p> | |

| | | |
|------------------------|---|---|
| Project Outputs | | Please provide a report on the achievement, or otherwise, of the project outputs as per the planned outputs provided in the Project Proposal. |
| 1 | - | Output 1 (from Project proposal) Report quantifying results from the trial |
| | | Comment: Trial report attached |
| 2 | - | Output 2 (from Project proposal) Chemical fallow field walk to showcase the trial to growers |

| | | |
|---|---|---|
| | | Comment: Site included on MIG Field walk on Wednesday 6 th August with 15 attendees at the site |
| 3 | - | Output 3 (from Project proposal) Report on soil moisture profile of trial site |
| | | Comment: Included in the attached report |

| | |
|------------------------|---|
| Project results | Please provide brief statements on the results of the Project |
|------------------------|---|

This section should cover aspects identified in *Section 7.3* of the Research Agreement

- the results of the Project, including discoveries made and other achievements (including any Project IP and Project Confidential Information);
- the potential application of the outputs of the Project to the Western Australian grains industry and broader community;
- the actual or potential economic benefits flowing to the Western Australian grains industry and broader community from the Project;
- the difficulties encountered;
- the conclusions reached;
- the Researcher's recommendations for any further research;
- a list of scientific papers or publications resulting from the Project; and
- attach copies of any photos, diagrams or other artworks (including, if requested by COGGO, negatives, bromides or the like) which the Researcher has and which may be of assistance to COGGO in the dissemination of information concerning the Project to COGGO's stakeholders.

The results from the project did not reflect the expected outcome. Unfortunately in season 2013 and season 2014 dry periods over a number of weeks were experienced during critical stages of the growing season (june/july). The result was an exaggerated impact of the slightly heavier soil type in the fallow paddock on crop growth and yield in comparison to the wheat on wheat paddock.

In 2014, soil moisture readings taken in early July showed higher moisture levels at depth in the fallow paddock but soil properties and plant stress due to high temperatures did not allow the plant roots to access this moisture.

MIG is conducting further research into the impacts of fallow on cropping rotations at other sites as it is a research interest area to members. For improved net returns, grain growers need to identify all factors affecting crop performance and yield and they rely on research to support their in paddock conclusions. The results from this trial did not have the expected outcome but it is not enough research to state that this would be the case in every situation. Understanding soil moisture and the impact it has on establishing the crop and maintaining crop growth is an important area for growers to understand as they develop strategies that maximize on farm returns and profits. For this reason, MIG recommends that COGGO support further research into this topic.

| | |
|-----------------------------|---|
| 3. Project resources | This section describes use of the funding listed in the initial plan and any refunds due to COGGO |
|-----------------------------|---|

| Expenditure of funds requested from COGGO | \$ Total funds budgeted | \$ Total funds expended (actual) | \$ Total funds requested from COGGO* | \$ Total COGGO funds expended | \$ Refund due to COGGO of any unexpended COGGO funds |
|---|----------------------------|-------------------------------------|---|----------------------------------|---|
| Salary/Contractors | 5000 | 5000 | 5000 | 5000 | 0 |
| Operating costs | 5000 | 5000 | 5000 | 5000 | 0 |
| Capital | 5000 in kind by MIG | 5100 in kind by MIG | 0 | 0 | 0 |
| TOTAL | | | | | 0 |

*Funding provided by COGGO.

IMPORTANT: Return of unused funds to COGGO is required as per *Clause 3.3* of the Research Agreement.

| | |
|-----------------------------|--|
| 4. Commercialisation | <p>Insert details of the proposed commercialisation process, as applicable, with reference back to the planned commercialisation plan in the project proposal) for any outputs from the project.</p> <p>This should include recommendations for the commercialisation of the results of the project and the registration or other protection of Project IP and Project Confidential Information as per the Research Agreement.</p> |
|-----------------------------|--|

| | |
|----------------|--|
| Not applicable | |
|----------------|--|

It is understood that this may require further discussion and agreement with COGGO via its' agent GIWA, as per the undertakings given and terms agreed, in the project proposal. This can be the subject of an appended letter and attachments. In all cases such discussion and subsequent agreements need to be governed by *Section 8 Project IP, Improvements and Project Confidential information* of the Research Agreement.

| | |
|------------------------------------|---|
| 5. Communication/ Extension | <p>Insert details of how the communication and extension of the project outcomes has been achieved to date and recommendations for future activities to disseminate and promote adoption of the results of the Project.</p> |
|------------------------------------|---|

| | |
|--|--|
| A field walk held by MIG on Wednesday 6 th August visited the | |
|--|--|

trial site and the outcomes of the trial were discussed with a audience of 15 MIG members. Results were presented to a larger audience at the MIG trials review on Thursday 5th March and are published in the 2014 MIG Trial results manual. These events were advertised in the MIG links and on social media

Note: As per *Clause 7.3 (b) (ii)* of the Research Agreement COGGO may require the Researcher to produce an edition of the Final Report in a form suitable for general distribution. If so required by COGGO, the Researcher must produce a non-confidential version of the Final Report within 28 days of receiving a request to that effect from COGGO.

6. Certification

The Project Supervisor and the Research Organisation certify that all information contained in, and forming part of, this final project report is complete and accurate. The project supervisor and research organisation further warrant that the project complied with all the relevant guidelines affecting the conduct of research, for example in relation to ethics, bio-safety, environmental legislation, GMAC or National Health and Medical Research Council Codes.

Project Supervisor's signature _____

Name (in Capitals)

_____ Date:

Research Organisation signature _____

Name and title of authorised signatory (in Capitals)

_____ Date:

Completed Final Project reports

Email to coggoresearchfund@giwa.org.au or mail to
COGGO Research Fund, GIWA, PO Box 1081, Bentley DC, WA 6983

For any further enquiries please email questions to coggoresearchfund@giwa.org.au
Or phone (08) 6262 2128

COGGO representative

For the purpose of this Project agreement contract, COGGO will be represented by Grains Industry Association of Western Australia (GIWA), or such other representative that is nominated by COGGO as authorised to operate on behalf of COGGO.

80MIG14

Researcher: Debbie Gillam and Laura Dorman

Organisation: Mingenew-Irwin group

Supported by: COGGO



Grower: Bligh Lee Farms
Location: Mingenew-Morawa Rd, East Mingenew
Soil Type: Red Loam

Table 1. Soil Test results

| Paddock | Depth | N | P | K | S | pH (CaCl ₂) | OC % |
|--------------------|-------|-------|-------|--------|-------|-------------------------|-------|
| Wheat Stubble | 0-10 | 9.65 | 28.5 | 224.4 | 5 | 4.6 | 0.49 |
| | 10-20 | 7.9 | 44.5 | 186 | 22 | 4.35 | 0.425 |
| | 20-30 | 10.3 | 30.5 | 193 | 18.5 | 4.55 | 0.445 |
| Chemical Fallow | 0-10 | 30.83 | 38.5 | 450.75 | 12.25 | 5.6 | 0.767 |
| | 10-20 | 20.27 | 40.25 | 385.5 | 21 | 4.9 | 0.635 |
| | 20-30 | 19.1 | 27.5 | 329.75 | 35.25 | 4.65 | 0.492 |

Total Annual Rainfall: 320mm

GSR (Apr-Oct): 285mm

Paddock History:

2013 – Wheat, Wheat

2012 – Wheat, Chemical Fallow

Plot Size: 200m x 18m

Trial Size: 200m x 144m

Seeding Date: 22/5/14

Seeding Rate: 80kg/ha

Seeding Machinery: 18m, John Deere Bar, knife points and press wheels

Variety: Wyalkatchem

Date of vigour ratings: 17/8/14

Paddock Inputs

Fertiliser

At seeding: 70kg/ha Agstar Extra

Total cost: \$43.40/ha

Chemical

Knockdown: 1.1L/ha Glyphosate

Pre-emergent: 1.5L/ha Sprayseed

Post emergent: 670ml/ha Velocity

Total cost: \$42.16/ha

Why do the Trial?

To demonstrate a technique that will increase the yield and quality of grain grown on red loam soil types in the Mingenew/Irwin region and test the hypothesis that cropping returns on red loam soils increase through the use of chemical fallow in the rotation

Key Messages:



- Testing at this site began in 2013. Four crop rotation options were applied on a chemical fallow and a standard wheat stubble. No significant differences were observed between treatments in 2013 or 2014.

Table 2.

| Paddock | Treatment | Yield t/ha | Vigour | Weight kg/ha | Protein % | Screenings % | Falling no. | Returns \$/ha |
|-----------------|---------------------|------------|--------|--------------|-----------|--------------|-------------|---------------|
| Wheat Stubble | Wheat/ Wheat | 1.52 | 8 | 82.1 | 14.1 | 2.96 | 260 | AUH2 \$474 |
| Wheat Stubble | Albus lupin / Wheat | 1.72 | 8 | 82.2 | 13.7 | 1.97 | 271 | AUH2 \$537 |
| Wheat Stubble | Chickpea / Wheat | 1.89 | 7 | 82.7 | 14.1 | 1.44 | 289 | AUH2 \$590 |
| Wheat Stubble | Canola / Wheat | 1.57 | 8 | 82.4 | 14.2 | 1.69 | 254 | AUH2 \$490 |
| Chemical Fallow | Wheat / Wheat | 0.65 | 5 | 81.7 | 14.8 | 4.48 | 237 | FED1 \$156 |
| Chemical Fallow | Albus lupin / Wheat | 0.57 | 5 | 81.2 | 15.8 | 6.41 | 249 | FED1 \$137 |
| Chemical Fallow | Chickpea / Wheat | 0.71 | 5 | 81.4 | 15.7 | 6.41 | 219 | FED1 \$170 |
| Chemical Fallow | Canola / Wheat | 0.67 | 5 | 82.0 | 16 | 6.41 | 238 | FED1 \$161 |
| P value (T1xT2) | | 0.253 | | | | | | |
| CV% | | 11.0 | | | | | | |
| LSD 5% | | NS | | | | | | |

Price Notes: All prices net delivered Geraldton and GST Exclusive
 Notes: Vigour, 1 = poor, 10 = Good Vigour
 2013 crop types: AL=Albus Lupin, CP = Chickpea, Can=Canola

Table 3. Moisture levels

| Paddock | Treatment | 5cm | 10cm | 15cm |
|-----------------|---------------------|------|------|------|
| Wheat Stubble | Wheat/ Wheat | 11.8 | 14.1 | 15.8 |
| Wheat Stubble | Albus lupin / Wheat | 9.7 | 13.7 | 12.2 |
| Wheat Stubble | Chickpea / Wheat | 9.4 | 11.8 | 13.4 |
| Wheat Stubble | Canola / Wheat | 10.2 | 12 | 13.8 |
| Chemical Fallow | Wheat / Wheat | 13.2 | 13.9 | 19.6 |
| Chemical Fallow | Albus lupin / Wheat | 15.1 | 15.9 | 19.5 |
| Chemical Fallow | Chickpea / Wheat | 13.8 | 17.0 | 18.0 |
| Chemical Fallow | Canola / Wheat | 12.9 | 15.7 | 19.9 |
| CV% | | 0.5 | 0.6 | 6.5 |
| LSD 5% | | 4.9 | 6.4 | 2.1 |

% moisture in the soil at depths of 5, 10 and 15cm, recorded 10th July 2014



Comments:

- The site location of the trial in the chemical fallow paddock was a slightly heavier soil type which did not perform well in the 2014 season conditions
- In July there was higher % of moisture at depth in the fallow paddock but this did not convert to yield.
- There was a significant difference in yield between the two paddocks that was not related to treatment
- In conclusion, this trial does not support the hypothesis that cropping returns on red loam soils increase through the use of chemical fallow in the rotation at this site but MIG does recommend further research to support this result.

Acknowledgements: Thanks to Darrin Lee at Bligh Lee farms for the trial site, assistance and time over the 2 year period of this trial. Many thanks to COGGO for funding this research.

