

Following the finances of fallows with COGGO. Season 2013 and 2014 - Mt Madden, Cascade and Salmon Gums



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Background

This project was funded by COGGO to assess the agronomic and economic factors involved in the chemical fallowing of paddocks in the medium to low rain regions of the Esperance port zone.

Methodology

The project deployed 4 trial sites across the Esperance port zone using precision agriculture technologies. In paddocks which were sown to either peas or canola in 2013, selected strips of 36m widths were left as fallow treatments amongst the control breakcrop. The fallow strips locations were selected from previous years yield data as well as farmer soil type knowledge to ensure they were representative of the paddock. In the 2014 season, all paddocks were sown to wheat. The design of the fallow strips were then used as cut-outs from the 2014 yield data to define the yield effects of the fallow versus control break crop. The relative variable costs of each site were then assembled for comparison to the 2014 yield effects between the fallow and break crop treatments.

Yield effects of Fallow.

From each site the following yield data was recorded from the host farmer's yield monitor.

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2		Vermeersch - Cascade		Longmire - Salmon Gums	
	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013	Peas 2013	Fallow 2013	Canola 2013	Fallow 2013
2013 Break crop yield t/ha	1.15	0.00	1.90	0.00	0.80	0.00	1.00	0.00
2014 Wheat yield t/ha	2.88	3.17	3.56	3.61	3.478	3.241	1.98	1.98
Yield difference in fallow t/ha		0.29		0.05		-0.237		N/A
Yield difference in fallow (%)		10%		1%		-7%		N/A

At the Mt Madden canola site there was a clear yield advantage from the fallow treatment over the canola break crop of a 10% yield increase. This was also accompanied by the canola site reducing wheat protein by 1.9%. Unfortunately this was not able to be supported from the Salmon gums canola site as there was no yield data recorded.

For the 2 paddocks which had peas as the break crop, there was mixed results. At the Mt Madden location there was virtually nil yield variation between the pea crop and fallow treatments (1% variation in yield), while the pea crop treatment at Cascade had a yield increase of 7% (approximately 0.24 t/ha) from the pea crop treatment over the fallow.

Financial Analysis

From the host farmers the paddock records the 2013 season variable costs of the break crop and fallow treatments were tracked over the 2 year period. With the help of local agronomists and Farmanco consultants these have been assembled into a 2 year running gross margin which includes the subsequent wheat crop in 2014.

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2		Vermeersch - Cascade		Longmire - Salmon Gums	
2013 season treatment	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013	Peas 2013	Fallow 2013	Canola 2013	Fallow 2013
Total 2013 Season costs	\$251.03	\$69.55	\$224.63	\$64.68	\$198.24	\$49.69	\$200.54	\$67.65
Net Income from 2013 season	\$336.23	-\$69.55	\$407.61	-\$64.68	\$74.91	-\$49.69	\$318.58	-\$67.65
2014 Wheat crop costs	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00
Actual Wheat 2014 - Yield ton/ha	2.88	3.17	3.56	3.61	3.478	3.241	1.98*	1.98*
Net result from 2014 Season	\$529.26	\$668.11	\$777.37	\$791.38	\$784.59	\$716.13	\$311.87	\$351.47
2 year - Net margin (2013+14)	\$ 865	\$ 599	\$ 1,185	\$727	\$ 859	\$666	\$630	\$284

*Salmon gums site yield 2014 is based on the whole paddock

All sites in this project managed to generate a cash flow positive 2013 result. This coupled with a marginal increase of wheat yield at Cascade strengthened the case for breakcrops over fallow as a rotation choice. The canola treatment at Mt Madden did have a noticeable reduction on the subsequent wheat crop for yield and grain protein yet not enough to adversely affect the overall 2 year gross margin.

When might fallow be more profitable?

As this project deigned the trial of fallow treatments in paddocks which the host farmers thought might be profitable for either peas or canola, it is not surprising that fallow is less economically attractive than the breakcrop option. In low rainfall environments there are often soil types which will not achieve profitability in the farmers chosen breakcrop. The following is a data set from the Salmon Gums host farmer.

Salmon Gums - Light and heavy soil comparison

	Canola Light soils	Fallow Light soils	Canola Heavy Soils	Fallow Heavy soil
Total 1st Season costs	\$225.79	\$ 62.89	\$225.79	\$62.89
Long term Canola yield t/ha	0.68		0.3	
Net 1st year result	\$124.34	-\$ 62.89	-\$ 71.32	-\$ 62.89
Year 2 wheat costs	\$220.00	\$220.00	\$220.00	\$220.00
Year 2 wheat yield (10% yield reduction on canola stubble)	1.62	1.8	1.53	1.70
Year 2 net result (\$265/ton x yield less costs)	\$209.30	\$257.00	\$185.45	\$230.50
Net result over both years	\$ 333.64	\$ 194.11	\$ 114.13	\$ 167.61

This data set shows that in a heavy soils type the fallow treatment has a 2 year gross margin advantage of \$53.48/ha when compared to the canola breakcrop.

Summing up - key findings of the SEPWA fallow project.

- The chemical fallow generally required 4 spray applications which had an annual cost of between \$60 and \$70/ha including machinery costs (average cost was \$62.89/ha).
- From the actual yields recorded in 2013, all the break crops were cashflow positive and hence making them more financially attractive than fallow as a rotation option.
- In some soil types, the preferred breakcrop of canola does not yield sufficiently to ensure positive cash flow results, as a result fallow is more economical option for the overall crop rotation.
- The additional advantage of fallow as a rotation need to also be considered. These factors include: being able to use a maximum range of chemical options of weed control; lower overall financial outlay per hectare than a break crop and no harvest machinery pressure of fallow.

Overall growers in the Esperance port zone more than often have profitable break crops options of peas and canola as part of their rotation sequence. This is particularly so when growers can grow a cash flow positive break crop and make a contribution to their fixed costs incurred regardless of the land use rotation choice. In some soil types peas and canola will not generate yields sufficient to cover the costs of their crop and in this situation farmers would be better off to utilize the fallow option to control weeds in the cereal based cropping rotation.

This project was funded by COGGO.

Following the finances of fallows with COGGO.

**Season 2013 and 2014
Sites: Mt Madden, Cascade and Salmon Gums**



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Executive Summary

This project was funded by COGGO to assess the agronomic and economic factors involved in the chemical fallowing of paddocks in the medium to low rain fall regions of the Esperance port zone. This aim was to provide local grain growers information in helping them choose break crop and/or fallow options for their crop rotations

From implementing fallow treatments in four break crop paddocks across the Esperance port zone the overall economic and agronomic implications of fallow versus break crops were compared from the 2013 and 2014 cropping seasons. From analysis of the two year net margin off all paddocks fallow was shown as a less profitable option in the trial paddocks when compared to the peas or canola break crops. This was primarily due to the break crops all achieving cash flow positive results in their own season. At all sites four chemical applications were required during the 2013 season to ensure a bare fallow situation with an average cost of \$62.89/ha.

In one of the two paddocks sown to field peas in 2013 there was a noted yield increase of 230kg/ha of the pea area compared to the fallow treatment. This corresponds to the anecdotal evidence of pea growers in the Esperance region of some yield advantage in wheat crops when following a pea break crop. At the Mt Madden site there was noted to be a yield advantage of the fallow treatment over the canola area of 290 kg/ha. This 10% yield advantage of the 2014 wheat crop was more than likely was due to either more soil water stored from the 2013 season fallow or greater nitrogen availability when comparing the fallow areas to the canola. This was also supported by higher grain protein in the fallow area compared to the canola treatment.

The agronomic factors of only two seasons do not necessarily correspond to the long term sustainability of a farming system. From the crop diaries of the host farmers an excessive use of glyphosate was noted in regard to non-selective weed control. This is of concern to pending herbicide resistance issues across the WA wheat belt and the long term sustainability of the WA no till farming system. So despite fallow being shown as less profitable in this project, it may need to be occasionally considered as part of an overall integrated weed management approach.

The projects work did reveal that in some soil type's peas and canola will not generate yields sufficient to cover the costs of their cropping costs. In this situation farmers would be better off to utilize the fallow option to control weeds in the cereal based cropping rotation. For farmers to see if they have paddocks that fall into this category they may wish to assess their long term yield performance of their rotation using yield data collected from the harvester data card.

This project did achieve in its aim of exposing a simple PA style trial to many growers across the Esperance port zone region. It also upskilled some of the RAIN staff to further use PA type tools in their future project work. What was highlighted by the loss of the Salmon Gums yield data is that farmers still have long way to go in utilising their existing PA equipment for farm scale trial work. SEPWA has been funded by GRDC to address this issues via the DIY PA Project which started at the beginning of the 2014 season.

1.0 Methodology

This project deployed 4 trial sites across the Esperance port zone using precision agriculture technologies as a means to assess the agronomic and economic consequences of a fallow option versus a break crop option. In a paddock which was sown to a break crop of either peas or canola in 2013, selected strips of 36m widths were left as fallow treatments amongst the control of the pea/canola break crop. The fallow strips locations were selected from previous years yield data as well as farmer soil type knowledge to ensure they were representative of the paddock.

At the commencement of the 2013 season host sites were selected at Mt Madden, Cascade and Salmon Gums. With help from the RAIN group, the 2 sites at Mt Madden were at the Frosts' property with pea's and canola being the paddock break crops. At the Cascade site the host farmers Vermeersch sowed the paddock to peas while Longmire's at Salmon Gums used Canola as their break crop option.

A soil moisture probe was also installed at the Salmon Gums site at part of the local groups in season tracking information feedback mechanism. This information was hosted on the SEPWA website for farmer reference. This can be viewed at:

<http://www.sepwa.org.au/index.php/2011-11-15-05-40-21/soil-moisture-probes>

The trial sites were monitored during 2013 season for weed control and as well as mapping the precise location of the fallow strip amongst the break crop.

In the 2014 season, all hosts paddocks were sown to wheat. The design of the fallow strips were then used as cut-outs from the 2014 yield data to define the yield effects of the fallow versus control break crop. Of the 4 sites, only 3 were able to be assessed for yield results due to the Salmon Gums site having a contract harvester which did not understand their yield data recording mechanism and the data was lost for the host paddock. (They had not emptied their data card in 3 years).

The relative variable costs of each site were then assembled from the farmer actual applications for comparison to the 2014 yield effects between the fallow and break crop treatments.

3.0 Results – Yield and agronomy effects of Fallow.

From each site the following yield data was recorded from the host farmer's yield monitor.

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2		Vermeersch - Cascade		Longmire - Salmon Gums	
	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013	Peas 2013	Fallow 2013	Canola 2013	Fallow 2013
2013 Break crop yield t/ha	1.15	0.00	1.90	0.00	0.80	0.00	1.00	0.00
2014 Wheat yield t/ha	2.88	3.17	3.56	3.61	3.478	3.241	1.98	1.98
Yield difference in fallow rotation t/ha		0.29		0.05		-0.237		N/A
Yield difference in fallow (%)		10%		1%		-7%		N/A

At the canola site at Frosts Mt Madden there was a clear yield advantage from the fallow treatment over the canola break crop of a 10% yield increase. Unfortunately this was not able to be supported from the Salmon gums canola site as there was no yield data recorded by the contract harvester.

For the 2 paddocks which had peas as the break crop, there was mixed results. At the Mt Madden location there was virtually nil yield variation between the pea crop and fallow treatments (1% variation in yield), while the pea crop treatment at Cascade had a yield increase of 7% (approximately 0.24 t/ha) from the pea crop treatment over the fallow.

3.1 Grain quality effects

At the Mt Madden sites the host farmers (Sarah and Andy Frost) collected grain samples from the 2014 wheat crop which the project analysed for the main parameters of protein and grain size (screenings).

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2	
	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013
Protein	11.3%	13.2%	13.3%	13.9%
Screenings %	0.42%	1.09%	0.56%	0.81%
Screenings weight.	1.59	4.01	2.2	3.06
Half L weight.	381	369.34	390.47	379.25

These results indicate that the canola break crop more than likely has had more nitrogen draw down than the fallow or pea rotation options. This is evident by the lower grain protein from the canola treatment area (1.95% lower) when compared to the adjacent fallow treatment. When compared to the pea and fallow mean wheat protein (13.5%) the canola treatment on the Frosts paddocks overall was 2.17% less than the pea and fallow treatment means.

In regards to grain size all of the treatments had relatively low levels of screenings. As a result it is difficult to determine any precise effects of grain size from the treatments as all treatments appeared to fill wheat grains adequately to limit screenings % levels well below the 2%.

4.0 Financial Analysis

From the host farmers the paddock records the 2013 season variable costs of the break crop and fallow treatments were tracked over the 2 year period. With the help of local agronomists and Farmanco consultants these actual applications have been assembled into a 2 year running gross margin which includes the subsequent wheat crop in 2014.

Financial actuals from the host sites.

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2		Vermeersch - Cascade		Longmire - Salmon Gums	
2013 season Costs	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013	Peas 2013	Fallow 2013	Canola 2013	Fallow 2013
Summer spray 1	\$18.95	\$18.95	\$18.95	\$18.95			\$18.06	\$18.06
Summer spray 2	\$17.08		\$17.08		\$19.44	\$19.44	\$18.06	\$18.06
Pre-EM KD	\$15.98	\$15.98	\$14.67	\$14.67				
Double Knock	\$21.25	\$21.25	\$17.69	\$17.69		\$19.3	\$16	\$16
Seed cost	\$2.48		\$36		\$36			
Seeding Fertilizer	\$55.97		\$22.93		\$0		\$40	
Seeding Machinery	\$35		\$35		\$35		\$35	
Top up N/ Post Em spray/Selective	\$25.95				\$34.6		\$17.02	
Crop top spraying	\$13.37	\$13.37	\$7.31	\$13.37	\$18.2	\$10.95	\$11.4	\$15.53
Harvesting costs	\$45		\$55		\$55		\$45	
Total 2013 Season costs	\$251.03	\$69.55	\$224.63	\$64.68	\$198.24	\$49.69	\$200.54	\$67.65
2013 Income								
Yield ton/ha - 2013	1.15	0	1.9	0	0.8	0	1	0
2013 grain price- AVG ESP port	\$546		\$365		\$365		\$546	
Grain receivable charge - crop specific	\$16.7		\$13.6		\$13.6		\$16.7	
Road freight	\$18.64		\$18.64		\$9.96		\$10.18	
Net local Bin grain price	\$510.66		\$332.76		\$341.44		\$519.12	
Local Crop revenue/ha	\$587.26	\$ -	\$632.24	\$ -	\$273.15	\$ -	\$519.12	
Net result from 2013 season	\$336.23	-\$69.55	\$407.61	-\$64.68	\$74.91	-\$49.69	\$318.58	-\$67.65
2014 Wheat crop								
2014 Wheat crop costs	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00
Wheat 2014 - Yield ton/ha	2.88	3.17	3.56	3.61	3.478	3.241	1.98	1.98
2014 APW wheat- (H1 +\$20))	\$289	\$309	\$309	\$309	\$309	\$309	\$289	\$309
Grain rec. charge - wheat	\$10.2	\$10.2	\$10.2	\$10.2	\$10.2	\$10.2	\$10.2	\$10.2
Road freight	\$18.64	\$18.64	\$18.64	\$18.64	\$9.96	\$9.96	\$10.18	\$10.18
Net local Bin wheat price	\$260.16	\$280.16	\$280.16	\$280.16	\$288.84	\$288.84	\$268.62	\$288.62
Gross revenue from 2014	\$749.26	\$888.11	\$997.37	\$1,011.38	\$1,004.59	\$936.13	\$531.87	\$571.47
Net result from 2014 Season	\$529.26	\$668.11	\$777.37	\$791.38	\$784.59	\$716.13	\$311.87	\$351.47
2 year - Net margin (2013+14)	\$ 865	\$ 599	\$ 1,185	\$ 727	\$ 859	\$ 666	\$ 630	\$ 284
Yield effect from fallow - t/ha		0.29		0.05		-0.24		
Yield effect from fallow - %		10.1%		1.4%		-7%		
Fallow effect 2014 revenue		\$81.25		\$14.01		-\$68.46		\$-

After consultation with Farmanco some standardised costs for machinery were applied across all sites. These were as follows:

- Each boom spray pass of the paddock is based on the actual chemical cost from the host farmer plus a \$6 boom spray machinery application cost.
- Seeding pass costs have been standardised to \$35/ha.
- Top up nitrogen fertiliser costs have had an application cost of \$6/ha added to the actual nitrogen amounts
- Harvest costs have been standardised at; Peas \$55/ha; Canola \$45/ha and cereals \$45/ha.

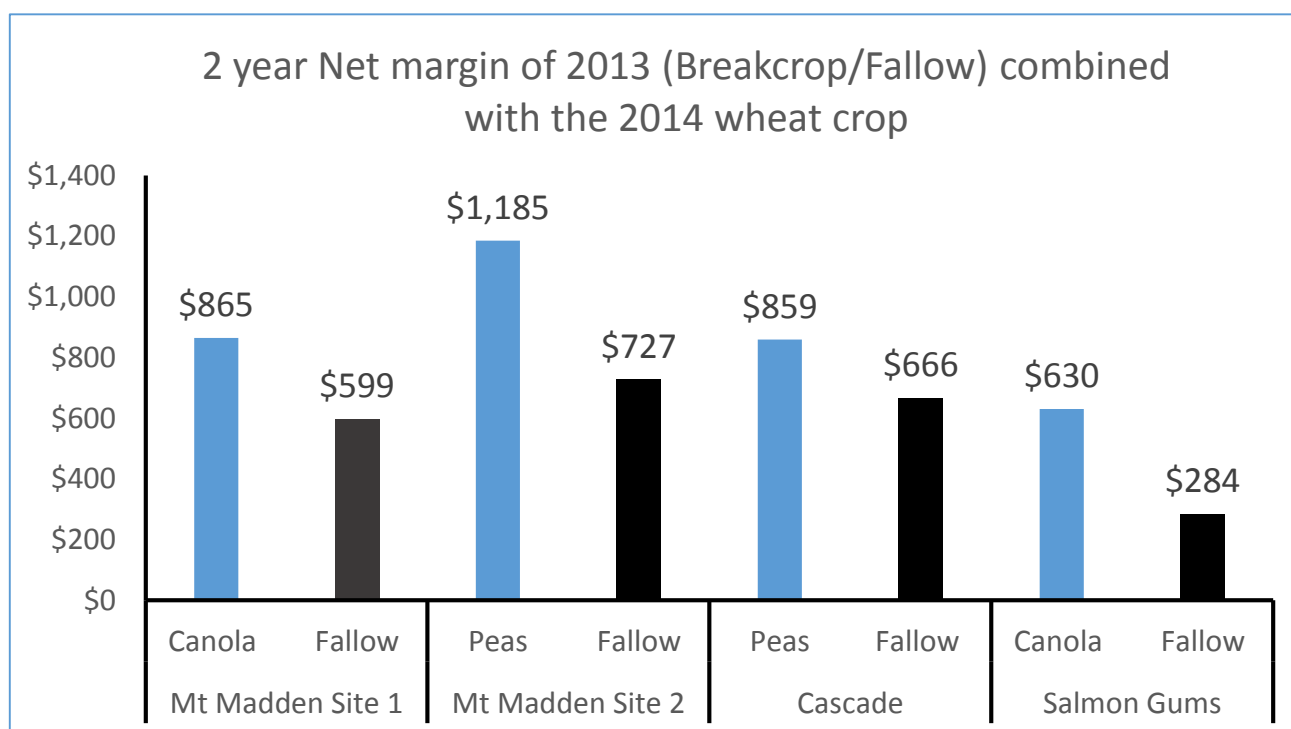
These costs were standardised in an effort to allow some level of comparison between sites and host farmers.

Key findings from this data set are:

- The chemical fallow required 4 spray applications which had a total annual cost of between \$60 and \$70/ha including machinery costs (average cost was \$62.89/ha).
- The average variable cost for a canola break crop was \$225.78/ha while peas was \$211.43/ha.
- From the actual yields recorded in 2013, all of the break crop treatments had a cash flow positive position in their gross margin.
- Canola break crop gross margins ranged from \$336.23/ha (1.15t/ha) to \$318.58/ha (1.0 t/ha) with an average of \$327.40/ha.
- Pea break crop gross margins ranged from \$407.61/ha to \$74.91/ha. This wide variation was primarily driven by yield variation from 1.9t/ha to 0.8t/ha.

It should be noted that these costs have not included the fixed costs of farming operation which are often around \$80 per hectare.

The overall financial findings are summarised in the following graph:



4.1 Long term yield results incorporated

Given that all sites had a cash flow positive break crop in 2013, with only 1 site having a significant yield gain of fallow over the break crop option, it is difficult to make financial case for fallow in the circumstances from these host farmers data. This data should however be context against 2013 being one of the better seasons in the northern part of the Esperance port zone. As a result the break crops of the host farmers yielded sufficiently to provide a cash flow positive result. With this in mind, the concept of fallow as a rotation option needs to be reconsidered against the long term seasonal averages of the host farmers.

The following is a reworking of the financial 2 year gross margins from the host farmers using their actual long term average yields. Note the 10% yield increase of fallow over canola has been applied to the long term average at Mt Madden as well as a 0.2t/ha yield advantage of the peas noted at Cascade.

Long term average comparison gross margin:

	Frost - Mt Madden - Site 1		Frost - Mt Madden Site 2		Vermeersch - Cascade		Longmire – Salmon Gums	
	Canola 2013	Fallow 2013	Peas 2013	Fallow 2013	Peas 2013	Fallow 2013	Canola 2013	Fallow 2013
Year 1 season Costs	\$251.03	\$69.55	\$224.63	\$64.68	\$198.24	\$49.69	\$200.54	\$67.65
Long term AVG Yield ton/ha	0.9	0	1.3	0	0.9	0	0.68	0
Net local Bin grain price	\$510.66		\$332.76		\$341.44		\$519.12	
Local Bin crop revenue/ha	\$459.59	\$ -	\$432.59	\$ -	\$307.30	\$ -	\$353.00	\$ -
Net result with AVG Yields Year1	\$208.56	-\$69.55	\$207.96	-\$64.68	\$109.06	-\$49.69	\$152.46	-\$67.65
Year 2 wheat crop costs	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00	\$220.00
Wheat long term AVG - Yield ton/ha	2	2.2	2	2	2.4	2.2	1.8	1.8
Net local Bin wheat price	\$260.16	\$280.16	\$280.16	\$280.16	\$288.84	\$288.84	\$268.62	\$288.62
Gross revenue from AVG yields	\$520.32	\$616.35	\$560.32	\$560.32	\$693.22	\$635.45	\$483.52	\$519.52
Net result from AVG Yields Year 2	\$300.32	\$396.35	\$340.32	\$340.32	\$473.22	\$415.45	\$263.52	\$299.52
Net margin over 2 seasons	\$ 509	\$ 327	\$ 548	\$ 276	\$ 582	\$ 366	\$ 416	\$ 232

Using these long term average figures in the gross margin still shows the break crop options as having a better return than a fallow in the crop rotation. This shows that these particular farms in the Esperance region have reasonably robust profitability of their break crop options over fallow.

4.2 When might fallow be more profitable?

Given the analysis so far of this report, fallow has been shown to be a less profitable option when compared to peas or canola break crops.

There are however some circumstances when break crops are not able to generate sufficient revenue to cover their variable costs. In this case fallow may be a more profitable option than canola or pea break crops. One such circumstance is that of growing canola on heavy soils in the Salmon Gums area. Using actual yield results from the Salmon Gums host farmer the project was able to rework the financial data gathered from the 4 trial sites.

Salmon Gums – Canola /Fallow - Light and heavy soil comparison

	Light soil Pdk Canola	Light soil Pdk Fallow	Heavy Soil Pdk Canola	Heavy soil Pdk Fallow
Total 1st Season costs	\$225.79	\$ 62.89	\$225.79	\$62.89
Net local Bin grain price	\$514.89		\$514.89	
Long term Canola yield t/ha	0.68		0.3	
Net 1st year result	\$124.34	-\$ 62.89	-\$ 71.32	-\$ 62.89
Year 2 wheat costs	\$220.00	\$220.00	\$220.00	\$220.00
Year 2 wheat yield (10% yield reduction on canola stubble)	1.62	1.8	1.53	1.70
Year 2 net result (\$265/ton x yield less costs)	\$209.30	\$257.00	\$185.45	\$230.50
Net result over both years	\$ 333.64	\$ 194.11	\$ 114.13	\$ 167.61

In this scenario the heavy soil paddock is not able to generate sufficient yield to cover the canola break crop variable costs. At a 300kg/ha canola yield the financial loss is \$71.32 per hectare which is greater than the fallow cost of \$62.98/ha. This combined with a potential yield advantage of fallow providing greater stored soil moisture and nitrogen levels for the next season wheat crop makes fallow a clear financial winner over the canola break crop by \$53.48 per hectare.

It is likely these economic circumstances would be representative of the marginal regions of the WA wheat belt where season risk can cause great fluctuations of canola yields.

It should also be remembered that fallow offers the greatest variety and cost effective weed control options than any rotation choice. Having a full spectrum of low cost control options in paddock which may have pending weed issues may in the short term pay less financial reward than a break crop, however ensure the long term profitability of the cropping system by preventing weed seed numbers and chemical resistance build up.

Fallow, although still requires around \$65/ha of investment to be maintained, does actually represent less of a financial outlay than a break crop. In a farm business when seasonal capital available for crop finance is limited, fallow can offer a lower \$/ha option which would enable the businesses to grow more wheat hectares overall. As the wheat crop is the primary economic driver of the business, fallow economic loss may actually open up greater wheat profitability and scale on a year in year out basis. The fallow option also requires less capital risked per year overall which would be a key consideration in marginal cropping areas of WA where complete crop failure can occur.

5.0 Additional project outputs

5.1 Demonstration of PA technology

In this projects implementation SEPWA was able to demonstrate precision agriculture technology and its use for trial work at 4 sites across the port zone. This will hopefully entice to conduct similar simple trials at a farm scale which can be simply monitored via the harvesters yield monitor. As part of this the project provided dedicated training and software support to the RAIN group as part of their Mt Madden sites.

The fact that the yield data was lost from the Salmon Gums site does show that there is still some way to go in increasing farmer's knowledge of their yield mapping and precision agriculture equipment. GRDC has funded SEPWA currently for the ongoing training of farmers across WA and we are improving this situation.

5.2 Glyphosate resistance – the inevitable is coming.

During this projects work the actual chemical applications were recorded as part of the 2 year gross margin tracking of the hosts paddocks. Of some 32 non-selective chemical applications noted from the host paddocks only a single paraquat (or similar) application was recorded. All other a knock down herbicide applications were glyphosate based.

This brings into focus the pending problem of glyphosate resistance which seriously threatens the WA no till farming system. If the use of glyphosate is not rotated in a paddocks herbicide application, fallow, possibly even by mechanical means may be the only rotation option to manage glyphosate resistant weeds.

5.3 Salmon Gums Soil probe.

The soil probe installed at the Salmon Gums site has been hosted on the SEPWA website for just under 2 full growing seasons. The data generated from this probe has been used for soil moisture seasonal management discussions at each of the 2013 and 2014 spring field days of the North Mallee top crop group. As with all soil probes, it takes a period time for the probe to settle in after its installation, and then further time for the soil moisture to be recognised as a calibration of stored plant available water. Going forward it is expected that this soil moisture probe will be a useful indicator of stored soil moisture for the Salmon Gums region.

The probes information is hosted on the SEPWA web site at:

<http://www.sepwa.org.au/index.php/2011-11-15-05-40-21/soil-moisture-probes>

6.0 Recommendations and implications

Overall growers in the Esperance port zone more than often have profitable break crop options of peas and canola as part of their rotation sequence. This is particularly so when growers can grow a cash flow positive break crop and make a contribution to their fixed costs incurred regardless of the land use rotation choice.

In this limited projects scope there was some yield and grain protein advantage of the fallow and pea break crop over the canola break crop option. This observation aligns with the theory of canola being better at soil water extraction than peas as well as it having a greater nitrogen draw down on the soil reserves. This then does broker the question of longer term gross margin analysis that the traditional single year. DAFWA has to some degree started this process with its GRDC break crop agronomy project across WA.

This projects work has highlighted the continual use of glyphosate herbicide and more work needs to be done to get farmers to take more seriously the issues of glyphosate resistance which threatens the WA no till farming system.

In some soil types peas and canola will not generate yields sufficient to cover the costs of their crop and in this situation farmers would be better off to utilize the fallow option to control weeds in the cereal based cropping rotation. For farmers to see if they have paddocks that fall into this category they may wish to assess their long term yield performance of their rotation using yield data collected from the harvester data card.

This project did achieve in its aim of exposing a simple PA style trial to many growers across the Esperance port zone region. PA technology is in place on most grain farms across WA currently, however it is underutilised for its ability to test and improve agronomy and farming systems. SEPWA has been slowly training growers across WA via the GRDC funded DIY PA courses which has started to remediate this situation, however there is still quite some ground to cover on this topic in training of not only farmers but also industry professionals.

COGGO

Council of Grain Grower Organisations Limited
ACN 091 122 039

Final Report

COGGO Research Fund for 2013 projects

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	Following the finances of fallows with COGGO
Commencement Date	March 2013
Completion Date	March 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	SEPWA
ACN/Legal Name or ABN	79262796876
Mailing Address	SEPWA PO Box 152 Esperance WA 6450

Administrative Contact	Nigel Metz
Position	Projects Officer
Telephone	0447 63 1115
Fax	08 90 83 1100
Email	nigel@sepwa.org.au

Project Supervisor/Principal Researcher	Nigel Metz
Position	Projects Officer
Telephone	0447 63 1115
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Email	nigel@sepwa.org.au

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.
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Achievement of the Project Aim	Brief statement of achievement in relation to the aim of the project
<p>From implementing fallow treatments in four break crop paddocks across the Esperance port zone the overall economic and agronomic implications of fallow versus break crops were compared from the 2013 and 2014 cropping seasons. From analysis of the two year net margin off all paddocks fallow was shown as a less profitable option in the trial paddocks when compared to the peas or canola break crops. This was primarily due to the break crops all achieving cash flow positive results in their own season. At all sites four chemical applications were required during the 2013 season to ensure a bare fallow situation with an average cost of \$62.89/ha.</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	-	<p>Output 1 (from Project proposal)</p> <p>A quantification of the relative agronomic values of fallow and peas as crop rotation elements in the low the medium rainfall regions of the Esperance port zone.</p>
		<p>Comment:</p> <p>This project has provided agronomic and economic analysis of 4 break crops versus fallow paddocks across the Esperance port zone.</p>
2	-	<p>Output 2 (from Project proposal)</p> <p>An economic analysis over 2 years of the chemical fallow versus pea rotation option.</p>
		<p>Comment:</p> <p>A full economic gross margin analysis has been compiled from this projects work.</p>
3	-	<p>Output 3 (from Project proposal)</p> <p>A demonstration of the value of simple PA style trails utilizing yield mapping technology</p>
		<p>Comment:</p> <p>Four PA style trials were demonstrated across the Esperance region as part of this projects work..</p>
4	-	<p>Output 4 (from Project proposal)</p>
		<p>Comment:</p>

Project results	<p>Please provide brief statements on the results of the Project .</p> <p>A full report of the projects findings have been compiled into the attached report.</p>
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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.

3. Project resources	This section describes use of the funding listed in the initial plan and any refunds due to COGGO
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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	9800	10216.73	9800	9800	-416.73
Operating costs	8300	6350.05	8300	8300	1949.95
Capital	2500	4091.55	2500	2500	1591.55
TOTAL	20600	20658.33	20600	20600	-58.33

*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>
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All IP in this project has been freely circulated to WA grain growers and industry.

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	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.
Over the duration of this project the project has used its activities for the following communication with grain growers and industry:	<ul style="list-style-type: none">• Spring Field walk 2013 – Salmon Gums and Cascade• SEPWA and RAIN NL articles x 4• SEPWA, RAIN and Lake King Grower Updates March 2015• SEPWA has also promoted the projects activities on the SEPWA website.

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.