

FINAL REPORT

FGI00010

08.052014 - Grain and Graze 3 (Western Region)

PROJECT DETAILS

PROJECT CODE: FGI00010

PROJECT TITLE: 08.052014 - GRAIN AND GRAZE 3 (WESTERN REGION)

START DATE: 01.03.2014

END DATE: 03.01.2017

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Summary

Grain and Graze 3 (G&G3) was the third phase of a mixed farming investment by GRDC.

The themes were:

1. Enhanced grazing of cropped land.
2. Improvements to crop and pasture rotations.
3. Transition, integration and balance (enterprise mix) at the farm level.

Activities included on-farm trials, demonstrations, discussion groups, case studies, presentations, adviser training and whole-farming modelling. G&G3 worked closely with grower groups and advisers across Western Australia (WA).

Facilitated working groups - 28 (target 8).

Extension activities - 180 (target 80).

Small scale demonstrations - 62 (target 26).

Number of people involved - 5,077.

Facilitation tools - Pasture Decision Tool.

Whole-Farm Model for grazing crops.

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Conclusions

Managing both cropping and livestock within the same business, on the same land, requires many complex decisions and multiple skills to make it work. G&G3 worked with researchers, advisers and grower groups to improve these decision making skills, and to improve farm management skills in grazing on cropped land (grazing crops and stubbles) and pastures in the cropping rotation.

Activities were focused on three themes and separate conclusions can be drawn for each theme:

1. Enhanced grazing of cropped land.

G&G3 has demonstrated that crops should only be grazed lightly to avoid yield penalties. This recommendation differs from the start of Grain and Graze 2 (G&G2) where the industry was recommending hard grazing to the 'white line'. This recommendation caused yield losses in grain crops and caused many growers to not use the technique.

Trial activities in this theme closely followed the work currently being undertaken by the CSIRO Farming Systems team looking at different plant phenologies and flowering dates. This included demonstration sites that explored very early sowing (crops sown in December, grazed the following autumn and harvested the following summer), mixing early and late flowering varieties to combat frost, and different grazing regimes to manipulate plant growth habits.

Demonstration sites in this theme explored the nutritional benefits grazing crops had on livestock production, particularly twin bearing ewes (where nutritional requirements are very high towards late pregnancy). This work cooperated with a Meat Livestock Australia (MLA) Pasture demonstration project for the livestock component of the trial, and also followed the Australian Wool Innovation (AWI) Lifetime Ewe Management guidelines and research.

2. Improvements to crop and pasture rotations.

The discussion groups improved their skills in basic pasture production, improving both soil nitrogen (N) levels and the quantity of pasture produced. The ability to partner a researcher with a private adviser worked very well, with both learning from each other about pasture management in broadacre WA.

3. Transition, integration and balance (enterprise mix) at the farm level.

The 11 farm business discussion groups established across WA were the highlight of this theme. Each of these groups was facilitated by an experienced business adviser, and most were self-selecting (they formed their own groups). The feedback

from growers involved was positive, with most groups continuing privately now the project has finished (demonstrating that growers value the knowledge and experience of the group and are prepared to pay commercial advisory rates for them). There were at least three groups that did not start in 2014-2015 due to project constraints. The facilitators for these groups met annually in Perth for training and bi-monthly via the phone.

The 2015 National Farm Business Risk Forum had 50 participants and a variety of national speakers. In 2016, regional risk forums were held in Northam and Katanning and involved many of the members of the farm business discussion groups.

One of the key deliverables of G&G2 and G&G3 has been the development of a whole-farm business analysis using @Risk (a Monte Carlo simulation). This analysis puts a measure of 'likelihood' onto an expected outcome. Rather than using averages, farm businesses calculate how many years in 10 a certain financial outcome would be likely to occur. The project has trained more than 50 farm business advisers and government economists in the use of this tool.

Recommendations

- o Grazing crops can contribute to whole-farm profitability if managed correctly, and grazed using high value stock (e.g. twin bearing ewes).
- o Pastures continue to be a major part of the rotation for WA mixed farming.
- o There is an opportunity to partner researchers, advisers and grower groups to increase learning and confidence in the industry about pasture and fodder management.
- o The establishment of farm business discussion groups helped to improve decision making confidence, particularly about the strategic decisions that affect the farm business.
- o Growers are aware that the variability of returns across seasons is a key component to farm business risk. By managing this variability (usually caused by climate change) through production improvements and reduced costs, growers can better manage their overall farm business risk, and create a more resilient farm business.

Outcomes

Economic Outcomes

More than 70% of Australia's crop production occurs on mixed farms and a substantial proportion (approx. 30%) of livestock production. In WA, crop and livestock (sheep) production account for approx. \$6 billion.

The continued refinement of the management of grazing crops meant that grain yield reductions were reduced, giving mixed growers an alternative winter feed source (saving supplementary feeding) and providing extra tonnages of grain delivered at harvest (from the extra hectares sown).

The business discussion groups and the associated activities (such as the 2015 National Farm Business Risk Forum) have given the industry a greater understanding of farm business risk, and tools in which to manage this. This in time will lead to more 'enduring profits' on-farm (consistent income).

Environmental Outcomes

Mixed farming involves growing crops and managing livestock within a single enterprise. This is the main farm business structure for broadacre non-irrigated agriculture in WA. The current area under mixed farming is estimated at approx. 70 million hectares. Project activities led to better management of the pasture phase of the cropping rotation, thus leading to less water and wind erosion, and better use of rainfall 'where it falls'.

Social Outcomes

The discussion groups have provided an opportunity to encourage the industry to discuss the adoption, implementation, planning, management and economics of grazing crops and pastures in the cropping rotation. They brought the researchers, advisers and growers together, and allowed a greater understanding of the mix of science and practice in agriculture. They provided a key social opportunity for the industry to network and share information and stories.

The evaluation of the business discussion groups showed that both advisers and growers found value in the business discussion groups. There was evidence that changes in critical thinking and decision making had occurred. The growers learnt from each other about their colleagues' decision making processes, and the successes and failures that have occurred within their businesses.

The other (unintentional) benefits of the business discussion groups were: 1) Women participants had confidence in attending more 'production' field days after being involved in the business discussion groups, 2) Seeing that others are in the same financial position has many non-tangible advantages, such as improved mental health (e.g. "I'm not in this alone"), and 3) Advisers are learning as much about business management and decision making as the growers.

Achievement/Benefit

G&G3 was the third phase of a mixed farming investment by GRDC. The Western GRDC Region delivered activities in the low, medium and high rainfall zones. The topics addressed in the project were:

1. Enhanced grazing of cropped land.
2. Improvements to crop and pasture rotations.
3. Transition, integration and balance (enterprise mix) at the farm level.

During the 2014 season (March 2014-February 2015), G&G in the Western Region delivered:

- o Six trial sites at Kojonup, Esperance, Kellerberrin, Arthur River, Kendenup and Wickepin, looking at the detail of the integration of the pasture and grazing crops into a mixed farming system. The Arthur River and Kendenup sites explored pasture establishment in the medium and high rainfall zones, while the Kellerberrin, Kojonup, Wickepin and Esperance sites explored the use of grazing crops in the low, medium and high rainfall zones. The pasture measurements were conducted by the Department of Agriculture and Food WA (DAFWA) in cooperation with the host grower group at Arthur River and Kendenup. This allowed learnings to occur between growers, advisers and researchers, and vice versa. The same occurred at the Wickepin and Kellerberrin grazing crops trial site, which was hosted in cooperation with the Facey Group and the Kellerberrin Demonstration Group, respectively.
 - o Twelve on-farm demonstration sites were established at Esperance (2), Kojonup (2), Moora, Kellerberrin (2), Kendenup, Cranbrook, Lake King, Badgebup, and Wickepin. These sites continue to provide a chance for grower groups to manage either a pasture or grazing crop according to on-farm practice. It provided the group with the opportunity to answer specific questions about how these techniques can work in the farming system, and to push the system regarding their use.
 - o Nineteen discussion groups were hosted at Esperance (2), Kojonup (2), Moora, Kellerberrin (2), Mt Barker, Cranbrook, Lake King, Badgebup, Wickepin, Dandaragan, Merredin (2), Katanning, Boyup Brook, Esperance, and Ravensthorpe. These were mixed groups from all three themes. They provided an opportunity for grower-to-grower learning on each of these issues, with the support of an experienced adviser.
 - o Twenty seven field group walks were hosted between the trial and demonstration sites. More than 400 mixed growers, advisers and agribusiness attended these field days.
 - o There were 25 industry presentations delivered by key advisers on the results of the on-farm trials and demonstrations. These activities reached a total of 597 growers, researchers and advisers.
 - o Ten case studies covering topics from each of the key themes. These case studies can be found in the 2014 Trials Results Booklet, on the G&G website and Facebook page.
 - o Six Adviser Updates were delivered which included activities to up-skill project personnel, technical forums for industry, presentations to key stakeholders, steering committee support and a WA Crop Updates session.
- During 2014, the activities (listed above) involved a total of 1,050 growers, advisers and agribusiness representatives across WA.

During the 2015 season (March 2015-February 2016), G&G3 in the Western Region delivered:

- o Six trial sites at Esperance, Kellerberrin, Dandaragan, Kendenup, Merredin and Cuballing, looking at detail at the integration of pasture and grazing crops into a mixed farming system. The Kendenup and Dandaragan sites explored pasture establishment in the medium and high rainfall zones, while the Kellerberrin, Merredin, Wickepin and Esperance sites explored the use of grazing crops in the low, medium and high rainfall zones. The pasture measurements were conducted by DAFWA in cooperation with advisers and the host grower group at Kendenup and with the West Midlands Group at Dandaragan. The Wickepin, Merredin and Kellerberrin grazing crops' trial sites were hosted in cooperation with the Facey Group, Merredin and District Farm Improvement Group (MADFIG) and the Kellerberrin Demonstration Group, respectively.
- o There were 16 on-farm demonstration sites established at Miling, Walebing, Arthur River (3), Wellstead, Esperance, Darkan, Nyabing, Borden and Badgebup. These sites continue to provide a chance for grower groups to manage either a pasture or grazing crop according to on-farm practice.
- o Eleven business discussion groups were hosted at Esperance, Merredin (2), Wagin, Badgebup, Boyup Brook, Broome Hill, Lake King, Tenderden, Beverly and Jennacabine.
- o Ten discussion groups worked alongside the on-farm demonstration sites. These were at Moora, Kellerberrin, Merredin,

Boren, Nyabing, Darkan, Wickiepin, Esperance (2) and Ravensthorpe. They provided an opportunity for grower-to-grower learning on each of these issues, with the support of an experienced adviser.

- o Twenty eight field group walks were hosted between the trial and demonstration sites. More than 730 growers, advisers and agribusiness attended these field days.
- o There were 20 industry presentations delivered by key advisers on the results of the on-farm trials and demonstrations. These activities reached a total of 1,100 growers, researchers and advisers.
- o Twelve case studies covering topics from each of the key themes. These case studies can be found in the 2015 Trials Results Booklet, on the G&G website and Facebook page.
- o Eight Adviser Updates were delivered which included activities to up-skill project personnel, technical forums for industry, presentations to key stakeholders and steering committee support. This included the National Farm Business Risk forum with more than 50 attendees.

During 2015, these activities involved a total of 2,300 growers, advisers and agribusiness representatives across WA.

During the 2016 season (March 2016-February 2017), G&G3 in the Western Region delivered:

- o Eleven trial sites at Kojonup (x2), Mt Barker, Moora, Dandaragan, Wickiepin, Esperance (x3), Broomehill and Kojonup. Sites at Mt Barker, Kojonup, Dandaragan and Esperance, all studied the role of pastures in the mixed farming system, while the Esperance, Moora, Wickiepin and Kojonup sites explored the use of grazing crops in the low, medium and high rainfall zones.
 - o There were three on-farm demonstration sites established at Miling, Arthur River and Kojonup. These sites continue to provide a chance for grower groups to manage either a pasture or grazing crop according to on-farm practice.
 - o Ten business discussion groups were hosted at Esperance, Merredin (2), Wagin, Boyup Brook, Broome Hill, Lake King, Tenderden, Beverly and Jennacabine.
 - o Eleven field group walks were hosted between the trial and demonstration sites.
 - o There were 10 industry presentations delivered by key advisers on the results of the on-farm trials and demonstrations.
 - o Eighteen case studies covering topics from each of the key themes. These case studies can be found in the 2016 Trials Results Booklet, on the G&G website and Facebook page.
 - o Two Adviser Updates were delivered which included activities to up-skill project personnel, technical forums for industry, presentations to key stakeholders and steering committee support.
- During 2016, these activities involved a total of 1,388 growers, advisers and agribusiness representatives across WA.

Other Research

- o A project that continues to support the establishment of business discussion groups is developed to encourage enduring profits and resilient farm businesses within the WA grains industry.
- o Research and development (R&D) work continue into the ability to use crop phenology to provide more diverse options for crop management. For example, changing and optimising sowing time, flowering time, grazing length, and harvest management.
- o A project exploring the role of specialist fodder crops (cover crops) is developed to provide agronomic support to new and existing varieties.
- o Grazing withholding periods for the common broadacre herbicides and pesticides are clarified through research.
- o A sensitivity analysis be undertaken to determine the economic point where major enterprise changes are likely to occur within a mixed farming business (e.g. meat price, grain price, wheat price, climate change).
- o Development of a project exploring the residue of weed seed numbers from chaff dumps which have been grazed prior to burning (seed survival through livestock digestion systems.)
- o A 'TOPCROP' type pasture extension activity is developed to improve the pasture management skills of WA mixed growers (and advisers).

Intellectual Property Summary

The G&G3 website has been upgraded to include all information from G&G1, G&G2 and G&G3. This repository of mixed farming information will need to be maintained in the medium term.

No additional strategies are required to facilitate the protection and/or commercialisation of the project's realised outputs.

Additional Information

Publications

Crop Updates 2016 - technical papers

'The impacts of early sowing and crop grazing on the grain yield and quality range of winter and spring cereal varieties'. Phil Barrett-Lennard, agVivo; Sheree Blechynden, Facey Group; Joe Young, Southern DIRT; Greg Warren and Michelle Handley, Farm & General Esperance.

Crop Updates 2017 - technical papers

'Findings from 7-years of crop grazing research in Western Australia'. Phil Barrett-Lennard, agVivo.

'Making the hard decisions easier - 6-years of decision making on-farm'. Danielle England, AgInnovate.

Attachment

2016 Activity Record Sheet G&G3.