

## GRDC GROWER NETWORK

### Low Rainfall Zone – Opportunities and Constraints

Zone	Title	Description	Area	Freq- uency	Impact /cost
LRZ	Effective summer spraying- maintaining efficacy under changed spray conditions	Herbicide options and tips and tactics for summer weed control because restrictions on the use of important products has meant that spraying may not be able to occur under optimum conditions as the window for spraying has narrowed	3.8	3.8	3.6
LRZ	Public acceptance of farming practices may restrict future farming operations.	Potential for external societal influences to affect farmers ability to produce in an effective manner e.g. biased consumer attitudes	4.0	3.6	3.4
LRZ	Adaptation of high value pulses for low rainfall zone production	Improved pulse varieties to increase the profitability of farming systems in the low rainfall zone	3.8	3.8	3.3
LRZ	Alternative weed control measures for Glyphosate	The loss of glyphosate as a major tool through either regulation or resistant weed species would significantly impact on the profitability and sustainability of farming systems in low rainfall zone	3.7	3.5	3.3
LRZ	Impacts of global pesticide regulation on crop protection chemical availability	As the global trend for pesticide regulation based on hazard rather than risk continues, deregistration of affordable active ingredients will cause an increase in pesticide costs and erode profit margins	4.0	3.7	2.7
LRZ	Improved modelling for mid-long range early season forecasts	Increased model skill in seasonal forecasts provided from March to May and better forecast utilisation by growers and advisers presents an opportunity to improve decision- making management risk more effectively	4.0	3.6	2.6
LRZ	Identifying trends in climate change impacts on growing season for informing breeding and farming systems planning	Potential for climate change to become a significant constraint due to increasing spring heat, shorter growing seasons and possible increased frost incidence	4.0	3.3	2.9
LRZ	Farm business management skills are essential to improving long term profitability	Farm business management skills are essential to improving long term profitability	4.0	3.6	2.5
LRZ	Robotics provide opportunities to increase efficiencies and profitability of farm businesses	Robotics provide opportunities to increase efficiencies and profitability of farm businesses	3.5	3.6	2.7
LRZ	Alternative weed control measures to herbicides (novel methods)	New and novel methods of weed control e.g. microwaves	3.7	3.2	2.9
LRZ	Accumulation of herbicide residues in sandy soils	The risk (either perceived or real) of herbicide residues accumulating in sandy soils in low rainfall environments is reducing returns	3.3	3.7	2.8
LRZ	Hard to control weeds		3.8	3.3	2.3
LRZ	Capacity building in grower knowledge of pulse agronomi in new production zones	Limited knowledge, skills and experience of growers and advisers new to pulse growing increases production risk of pulses in the low rainfall zone	3.4	3.5	2.6

LRZ	Effective integration of livestock into cropping systems - utilising new technology	Opportunities to improve the integration and management of livestock into the farming system with site specific grazing are impeded by technology cost and state regulation	3.8	3.8	2.1
LRZ	Manipulating crop phenology to avoid frost risk	Predicting flowering time and manipulating crop development to reduce exposure during high risk periods to mitigate impact of frost	3.1	3.0	3.3
LRZ	Integrated Weed Management (IWM) - sustainable use of herbicides and alternative weed control measures	The sustainable use of cost effective herbicides and the development of alternative management tools are critical for effective weed control and profitability of cropping systems	3.3	3.3	2.7
LRZ	Reduced public investment in RD&E capacity	R,D & E capacity in the low rainfall zone is diminished by retraction of public investment in infrastructure and human resources and the exit of experienced professionals	3.4	3.5	2.3
LRZ	Opportunities to improve profit are missed as new practices are not adopted due to a lack of grower trust in small plot results	Opportunities to improve profit are missed as new practices are not adopted due to a lack of grower trust in small plot results	3.8	3.3	2.1
LRZ	Highly leveraged, high input, high crop intensity farming systems threaten the economic viability of low rainfall farm businesses	The downside risk of highly leveraged, high input, high crop intensity farming systems threatens the economic viability of low rainfall farm businesses	3.6	3.3	2.2
LRZ	Effective extension methodologies	The strong preference growers demonstrate for peer to peer learning via digital communication (twitter) is an opportunity for effective extension to builds skills and capacity and practice change	3.8	3.2	2.0
LRZ	Economic thresholds for insect control in the low rainfall zone are poorly defined which causes the over-use of insecticides	Economic thresholds for insect control in the low rainfall zone are poorly defined which causes the over-use of insecticides	4.0	3.1	1.7
LRZ	Extracting greater 'value' from large data sources	The opportunity to use big data to improve grower profitability in the low rainfall zone	3.7	3.4	1.7
LRZ	Glyphosate resistance in weed species	Glyphosate resistant weed populations are developing on fence lines	3.6	3.1	2.0
LRZ	Understanding the impact of legume nitrogen contributions to following crops and N management decisions	Nitrogen management decisions – value of legume contribution and cost vs returns	3.7	2.5	2.5
LRZ	Managing insects - forecasts and alerts, new pests, thresholds, new insecticide groups and control of resistant populations	Managing insects -forecasts and alerts, new pests, thresholds, new insecticide groups and control of resistant	4.0	2.5	2.2
LRZ	Hard to control grass weeds	Barley grass and Brome grass control	3.1	3.1	2.5
LRZ	Phenoxy herbicides - alternatives	Phenoxy herbicides - alternatives	2.3	3.4	2.8
LRZ	Building capacity in objective data driven decision making	Easy to use decision support tools would enable better use of objective data and reduce grower financial and production risk	3.6	2.9	2.0
LRZ	Impacts of herbicide residues on legumes in sandy soils	Residual herbicides affecting legumes in sandy soils, how to assess risk	2.3	3.4	2.8
LRZ	Better adapted cereal and pulse varieties i.e. shorter season varieties with a longer flowering period	Better adapted cereal and pulse varieties i.e. shorter season varieties with a longer flowering period	3.1	3.0	2.3

LRZ	Improving profitability through better rotations for long term management of weeds diseases and soil fertility	Opportunity to improve profitability and long term management of weeds, diseases and soil fertility through better crop sequencing	3.3	3.3	1.8
LRZ	Tools and technology for improved (real-time) monitoring of and management of residual fertiliser/nutrition in soil.	Real time and rapid tools to measure residual fertiliser/nutrition (N, P and trace elements, particularly Zn), especially after pulses to enable fertiliser rates and timing to be adjusted	3.7	2.6	2.1
LRZ	Seed banks of problem grass weeds are increasing because harvest weed seed management is not being fully utilised	Seed banks of problem grass weeds are increasing because harvest weed seed management is not being fully utilised	3.2	3.3	1.9
LRZ	Local data for Russian Wheat Aphid risk factors (volunteer species, aphid flights) is scant	Local data for Russian Wheat Aphid risk factors (volunteer species, aphid flights) is scant	3.7	3.0	1.6
LRZ	Declining soil nitrogen from increased crop intensity	The soil nitrogen supply is declining as crop intensity increases	3.3	2.9	2.1
LRZ	The lack of low cost open pollinated canola varieties is contributing to the reduction in canola area in the low rainfall zone	The lack of low cost open pollinated canola varieties is contributing to the reduction in canola area in the low rainfall zone	3.1	3.2	2.0
LRZ	Widespread adoption of seed applied insecticide for Russian Wheat Aphid control may harm beneficial insects and soil microbes	Widespread adoption of seed applied insecticide for Russian Wheat Aphid control may harm beneficial insects and soil microbes	3.5	2.7	2.0
LRZ	Sandy soils - crop establishment and growth, cover crops and amelioration strategies	Sandy soils - crop establishment and growth, cover crops and amelioration strategies	2.2	3.2	2.8
LRZ	Head loss, pod loss, and shattering	Head loss and shattering in crops including lentils, canola and barley	3.5	2.2	2.3
LRZ	Extension of Nitrogen removal and cycling to improve N management	Increasing awareness of nitrogen (N) removal and cycling may improve N management, lower risk and increase profit in the low rainfall zone	3.3	2.9	1.8
LRZ	Seasonal labour shortages and capacity building to attract people to careers in agriculture	Lack of particularly seasonal farm and agribusiness labour-improving the image and promoting the opportunities to attract the next generation to a career farming and agriculture. Educating the wider community and particularly school aged children to appreciate the importance of agriculture and gain an understanding of issue is important for building the capacity of the industry	3.1	2.9	2.0
LRZ	Cost of WHS compliance to businesses	Cost of compliance to meet occupational, health and safety (OH&S) legal obligations could be reduced by making simples and practical safety guidelines and templates which could be adapted for an individual business or situation	3.3	3.2	1.4
LRZ	Understanding most profitable Precision Agriculture (PA) opportunities to mazximise profit	Better access to profit and production focused precision agriculture (PA) support would increase return on investment in PA	3.1	2.9	1.8
LRZ	Rhizoctonia – economics of fungicides (seed dressings and	Rhizoctonia – economics of fungicides (seed dressings and in furrow application)	2.8	2.7	2.3

LRZ	Fertiliser toxicity	Fertiliser toxicity	3.0	2.4	2.4
LRZ	Improving use of soil moisture probes for informing seasonal decisions	Poorly calibrated moisture probes provide incorrect estimations of Total Available Water (TAW) and Plant Available Water Capacity (PAWC)	3.0	3.1	1.5
LRZ	Soil biology - understand the value of beneficial microbes and the impacts of farming practices e.g. herbicides and insecticides on beneficial species	Soil biology - understand the value of beneficial microbes and the impacts of farming practices e.g. herbicides and insecticides on beneficial species	3.4	2.3	1.8
LRZ	Understanding sulphur dynamics and fertiliser needs in sandy soils of low rainfall environments	There is an opportunity to obtain higher return on investment from sulphur fertiliser by understanding of sulphur dynamics in sandy soils and low rainfall environments	2.9	2.7	2.0
LRZ	Effective integration of livestock into cropping systems	Improved integration of livestock - flexibility, economics and animal health	2.5	3.2	1.9
LRZ	Understanding seed zone environment - vertical furrows - need confirmation	Understanding seed zone environment - vertical furrows - need confirmation	2.9	3.2	1.4
LRZ	Crop establishment under marginal conditions - understanding effects of moisture, stubble, precision seeding, discs, chemicals	Crop establishment under marginal conditions - moisture, stubble, precision seeding, discs, chemicals	3.3	2.0	2.3
LRZ	The nitrogen supply of sandy soils is being over-estimated	The nitrogen supply of sandy soils is being over-estimated	2.5	3.0	1.9
LRZ	Understanding crop phenology and environments to enable growers to better target optimum flowering window and mitigate frost risk	Populating the Flower Power Decision support tool with varieties and locations relevant to the GRDC Southern Region will help mitigate frost risk	3.0	2.7	1.6
LRZ	Identification of key soil characteristics to define management zones in variable soil landscapes.	Access to regional soil descriptions would help define management zones in variable soil landscapes	2.8	2.8	1.7
LRZ	Farm efficiencies	Farm efficiencies	2.9	2.8	1.3
LRZ	Spot spraying	Spot spraying	3.0	2.5	1.5
LRZ	Control of grasses in cereal based pastures creates a feed deficit at certain time of the year	Control of grasses in cereal based pastures creates a feed deficit at certain time of the year	2.4	2.9	1.7
LRZ	Erosion risk on control traffic tramlines in sandy soils	Growers are concerned that the erosion risk of bare tramlines may outweigh the benefits of reducing compaction in sandy soils	2.5	3.1	1.4
LRZ	Crown rot is increasing with changed farming practices leaving stubble crowns intact and not susceptible to break down	Crown rot is increasing with changed farming practices leaving stubble crowns intact and not susceptible to break down	2.8	2.1	1.9
LRZ	Low productivity of shallow calcareous soils	Is there an opportunity to increase the productivity and profitability of shallow calcareous soils?	1.2	3.5	2.2
LRZ	There is limited choice of legume pasture species adapted to the low rainfall zone	There is limited choice of legume pasture species adapted to the low rainfall zone	1.8	2.9	2.0

LRZ	Understanding micronutrient needs of intensive cropping systems	Do more intensive cropping systems require greater micro-nutrient inputs?	2.3	2.9	1.6
LRZ	Re-visit old chemistries (efficacy, crop safety and maximum residue limits) for control of weeds in vetch hay and fodder crops	Re-visit old chemistries (efficacy, crop safety and maximum residue limits) for control of weeds in vetch hay and fodder crops	2.4	2.8	1.6
LRZ	Highly alkaline and saline sub-soil constraints are impacting rooting depth and access to plant available water.	Over-coming highly alkaline and saline sub-soil constraints would increase rooting depth and access to plant available water	1.4	3.1	2.2
LRZ	The risk of wind erosion due to inadequate ground cover constrains the use of legumes in low rainfall environments	The risk of wind erosion due to inadequate ground cover constrains the use of legumes in low rainfall environments	2.1	2.5	2.0
LRZ	Impacts of in-furrow fungicides on soil microbiology	Is regular use of in-furrow fungicides changing soil microbiology and increasing <i>Pratylenchus neglectus</i> populations	2.6	2.5	1.5
LRZ	Limited nutrient availability and low productivity of highly calcareous soils	There is limited data on the nutrient use efficiency of calcareous soils	1.3	3.2	2.2
LRZ	Mice – improved options that provide effective and long term control of populations	Mice – improved options that provide effective and long term control of populations	3.2	1.4	2.1
LRZ	White snail control strategies	Growers are unaware of recently developed techniques to improve common white snail control and off-label product use is occurring	2.3	2.3	1.8
LRZ	Sodic soils are not profitable in low rainfall environments	Sodic soils are not profitable in low rainfall environments	1.3	3.2	1.8
LRZ	Agronomic management strategies for irrigated crops	Variety specific agronomy for irrigated crops	1.6	2.9	1.6
LRZ	Soil acidity is an emerging and under-recognised issue which is limiting the productivity of legumes and even precluding the growing of legumes	Soil acidity is an emerging and under-recognised issue which is limiting the productivity of legumes and even precluding the growing of legumes	1.8	2.3	2.0
LRZ	Assessment of value of increased stubble retention from stripper front harvest, disc seeding systems	The potential for improved profitability from retaining more stubble by investing in stripper front disc seeder technology needs to be quantified	2.1	2.4	1.3
LRZ	Quantify impacts of regenerative agricultural systems, specifically cover crops in low rainfall environments	Evidence of impacts of regenerative agricultural systems, specifically cover crops in low rainfall environments	2.3	2.1	1.3
LRZ	Management of soaks and seeps	Management of soaks and seeps	1.2	2.6	2.0
LRZ	Powdery mildew is reducing medic production	Powdery mildew is reducing medic production	1.8	2.3	1.5
LRZ	Milling oats	Milling oats	2.2	1.9	1.3

LRZ	Alternative crop potential in low rainfall zone (safflower)	Is there potential to use alternative crops such as safflower as a viable rotation option for the low rainfall zone	2.3	1.7	1.2
LRZ	Irrigated high value crops could improve profitability of low rainfall zone growers who have access to water for irrigation	Irrigated high value crops could improve profitability of low rainfall zone growers who have access to water for irrigation	1.1	2.3	1.3