Medium Rainfall Zone – Opportunities and Constraints

Zone	Title	Description	Area	Freq-uency	Impact /cost
MRZ	Developing new food-based markets for pulses to help growers manage price volatility	Developing new food-based markets for pulses to help growers manage price volatility	3.7	4.0	3.7
MRZ	Tools and Technology to improve Nitrogen (N) decision making	Nitrogen (N) decision-making – technology to measure nitrogen in real-time and improved nitrogen budgeting tools, better rules of thumb for nitrogen (N) mineralisation, N budgeting and management, improve N use efficiency	4.0	3.8	3.3
MRZ	Herbicide tolerance traits for canola	Evaluation and pre-breeding of canola varieties for tolerance levels to dim herbicide chemistry could lead to improved annual ryegrass control and reduce the risk of crop damage resulting in increased profitability and increased area of canola production	3.3	4.0	3.7
MRZ	Public acceptance of farming practices may restrict future farming operations.	Social licence - perception (not evidence) and expectations of wider community which will impose restrictions or greater obligations which will ultimately increase cost of production for example, restricted access to agri-chemicals etc.	3.8	3.5	3.1
MRZ	Profit focused cost and productivity management can increase profit	Profit focused cost and productivity management can increase profit	3.7	3.6	3.0
MRZ	High value pulse and legume varieties for a wider range of soil types and rainfall zones	High value pulse and legume varieties (e.g. lentils and chickpeas) bred for a wider range of soil types and rainfall zones will improve farm profitability on a broader scale	3.5	3.6	2.9
MRZ	Effective integration of livestock into cropping systems	Long term no-till cropping farms may not have the infrastructure, tools or knowledge to effectively integrate livestock into the business	3.0	4.0	3.0
MRZ	Level of knowledge and skills of advisers, farmers and staff is critical to the profitability, risk management and/or compliance of farm businesses	Level of knowledge and skills of advisers, farmers and staff is critical to the profitability, risk management and/or compliance of farm businesses	4.0	3.5	2.5
MRZ	Glyphosate resistance in weed species	Efficacy of glyphosate is declining due to over-use and increased incidence of glyphosate resistant weeds including Fleabane, Wild Radish, Tares, Milk Thistle and Canary Grass in addition to Annual Ryegrass	3.5	3.2	3.1
MRZ	Impact of stubble retention on pest populations	Stubble retention has increased the risk of economic damage from pests including but not limited to insects e.g. lucerne flea, slugs, snails and mice	3.8	2.9	3.1
MRZ	Sprayer efficacy and training	Access to local spray application training for local operators including in the border areas of Victoria and New South Wales to increase spray efficiency and reduce off-target damage	4.0	3.5	2.3
MRZ	Using soil moisture information for tactical management to optimise use of plant available water	Using soil moisture information for tactical management to optimise use of plant available water	4.0	3.1	2.7

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MRZ	Canola seed variability and limited cultivars for diesase,and weed control	Variability in seed supply and limited choice of canola varieties, particularly high yielding, open pollinated varieties with durable disease resistance increases production risk, compromises weed control and herbicide residue management and reduces profitability	3.4	3.5	2.8
MRZ	Localised agronomy for pulse production	Updated variety specific agronomy packages (VSAPs) to ensure successful adoption and growing of pulse crops	3.6	3.3	2.7
MRZ	Non- chemical weed control	Cost-effective non-chemical weed control systems such as robotic weeders in broadacre crops will prolong the life of important herbicide chemistry such as glyphosate and minimise the economic impact of difficult to control weed species such as Fleabane	3.8	3.5	2.4
MRZ	The current processes for pesticide legislation and governance within APVMA restrict timely access to pesticides which negatively impacts crop production and profits	OUT OF SCOPE	4.0	2.7	2.5
MRZ	Cereal leaf diseases	Cereal leaf diseases - genetic solutions and integrated management strategies to manage Yellow Leaf Spot (YLS), Eyespot and Septoria tritici blotch (STB)	3.6	2.6	2.9
MRZ	Climate variability impacts on cultivar selection	Increased seasonal climate variability creates extremely contrasting growing seasons which requires adaptive, agile and flexible management options to optimise yield and maximise profit, including but not limited to a "menu" of crop species and cultivars	3.8	2.5	2.8
MRZ	Predictability of pest and disease incursion for planning.	Growers cannot easily predict the likelihood of pest and disease incursions which is important for planning and management	3.6	3.0	2.5
MRZ	Continual breakdown of genetic resistance to Blackleg in canola	The continual breakdown of genetic resistance to Blackleg in canola impacts on yield and profit of growing canola	2.9	3.0	3.1
MRZ	Spatial mapping, data and sensors for improved monitoring and management of crop nutrition, weed pest and disease control.	Spatial monitoring of farms using sensor technology and digital platforms may improve crop scouting efficiencies and enable site specific management including crop nutrition, weed and pest control	3.6	3.5	1.8
MRZ	Optimal crop rotations for economic sustainability	Which is the more economically sustainable option in high land price areas - a crop rotation dominated by high value crops or a more balanced rotation with a mix of cereals, pulses and other land use options?	3.3	3.2	2.5
MRZ	Nitrogen requirements to maximise profitability of wheat and canola in a long term no-till system	Nitrogen requirements to maximise profitability of wheat and canola in a long term no-till system are not well understood	3.5	3.1	2.4
MRZ	Reduction in herbicide, insecticide and fungicide efficacy	Over-reliance on chemicals i.e. herbicides, insecticides and fungicides has reduced sensitivity and increased resistance which limits cost-effective management options	3.8	2.5	2.5
MRZ	Summer weed spraying in inversions and/or with inappropriate spray quality (droplet size) creates a high risk of drift and off-target damage	Summer weed spraying in conditions conducive to inversions and/or with inappropriate spray quality (droplet size) creates a high risk of drift and off-target damage	2.6	3.3	2.8
MRZ	Localised agronomy for canola production	Canola variety specific agronomy packages (VSAP) to optimise yield potential and maximise profit	3.4	3.1	2.2
MRZ	Limited influence on barley variety development which may lead to a lack of varietal choice	Limited influence on barley variety development which may lead to a lack of varietal choice	3.5	3.2	2.0

MRZ	Off-target impacts of soil herbicide residues on fencelines	Soil residual herbicide used to control weeds on fencelines and "voids" can damage vegetation if they move through the soil from the target area	3.5	3.5	1.6
MRZ	Harester fire risks	Increased incidences of fires when harvesting pulses, particularly lentils and/or when harvesters have an in- built seed destruction could have consequences for insurance e.g. exclusions and higher premiums	2.0	4.0	2.6
MRZ	Sub-soil constraints and economics of amelioration and management	Sub-soil constraints — understanding how acidity, sodicity, nutrients and structure limit yield, quantifying the economic impact of amelioration techniques, management of sub-surface and sub-soil acidity, genetic advancements, soil amelioration and drainage strategies to reduce the impact of waterlogging	2.6	3.0	2.8
MRZ	Frost risks - mitigation, monitoring, ID and management	Opportunity to improve the mitigation of frost risk via pre- sowing risk assessment, new monitoring tools, better frost identification skills and shared learning	3.0	2.7	2.8
MRZ	Soil compaction and management	Compaction – What is the impact, which soil types are impacted and which soils will be responsive to tillage?	2.8	3.4	2.3
MRZ	Harvester set-up to increase efficiency and effectiveness to reduce losses	Harvester set-up to increase efficiency and effectiveness to reduce losses	3.2	3.1	2.1
MRZ	Precision Agriculture (PA) to mazximise profit	What are the practical strategies that can make best use of precision agriculture (PA) data and technology to maximise profit by reducing or re-allocating costs and/or increasing yields	3.6	2.9	1.8
MRZ	Impact of stubble retention on pre-emergent herbicide efficacy	Pre-emergent herbicides do not work effectively in heavy stubbles	3.6	2.2	2.5
MRZ	Registration of imidazolinon herbicides in lentils	Registration of short residual imi-herbicides to control problem weeds in lentils reduces the risk of herbicide residue damage in cereals and the off-label use of other short residual Group B herbicides in lentils	2.5	3.4	2.5
MRZ	Vetch cultivar improvement and grain market development	Vetch variety improvement and grain market development would enhance the profitability of farms with soil types which are not suitable for growing lentils	2.4	3.3	2.5
MRZ	Management for early sown cereals	Profit from cereals sown on early autumn rainfall events could be enhanced by clearly defined management packages which include variety selection, canopy management and crop protection strategies	2.7	2.9	2.5
MRZ	Soil constraints and economics of amelioration and management	Soil amelioration techniques for specific situations to improve crop establishment, nutrition and production on non-wetting sands resources for growers for soil amelioration – extension and resources for growers	2.0	3.5	2.7
MRZ	Rhizoctonia patches limiting yield production	Rhizoctonia patches limiting yield production	2.9	3.0	2.3
MRZ	Impacts of stubble removal on the farming system	Influence of stubble removal on the farming system – pros and cons	3.5	2.9	1.8
MRZ	Timing of NVT data availability	Growers and advisers cannot make informed decisions about adopting a new variety as non-biased National Variety Trials (NVT) data is not available or accessible until after a variety is released	3.4	3.0	1.6
MRZ	Alternative pasture options to optimise feed availability in the farming system	Identify and test alternative pasture options, including annual, perennial and hard seeded varieties (compared to vetch) to provide a range of options which will produce feed throughout the whole year across variable environments	2.2	3.1	2.7

MRZ	Capacity building for growers and the grains RD&E landscape	Succession planning for R,D&E expertise and capacity plus building the skills of growers	3.5	2.3	2.1
MRZ	Commercial structure of plant breeding reducing varietal choice	The commercial structure of plant breeding in Australia is leading to monopolies and reducing customer choice in varieties	3.8	2.2	1.9
MRZ	Dual purpose crops for risk management	Opportunity to expand dual purpose crops (grain, graze or silage/hay options)	2.8	2.8	2.3
MRZ	On-farm storage for segregation, risk management and price optimisation	On-farm storage to maintain the quality of product to optimise price	3.3	2.7	1.8
MRZ	Precision seeding to improve crop establishment, yield and profitability	Precision seeding to improve crop establishment, yield and profitability	2.9	2.8	2.1
MRZ	Influences on organic matter and soil biology and their impact on crop production	Soil health – increasing organic matter to address declining levels and consequences by understanding the impact of inputs on soil biology and soil health plus understanding the impact of practices such as controlled traffic farming (CTF) and growing cover crops	2.8	2.5	2.5
MRZ	Capacity building in grain marketing or improving access to marketing advice	Growers can optimise price received by improving their grain marketing knowledge and skills and/or accessing quality grain marketing advice	2.9	3.0	1.8
MRZ	Poor understanding of soil water use in pulses leads to poor yield predictions	Poor understanding of soil water use in pulses leads to poor yield predictions	2.8	2.8	2.1
MRZ	Effective extension methodologies	More effective extension of valuable research and development findings to enable adoption and practice change	3.1	2.5	2.1
MRZ	Pod loss (drop) in lentils	Pod loss (drop) in lentils	2.1	2.2	3.4
MRZ	Management of cereal, canola and pulse diseases in medium to high rainfall seasons	Management of (cereal, canola and pulse) diseases e.g. Septoria tritici blotch, aerial blackleg and sclerotinia, ascochyta and grey mould in pulses in medium to high rainfall seasons	2.6	2.8	2.3
MRZ	Herbicide residues in soil	The accumulation of herbicide residues in soils, especially low organic carbon sands over several seasons may be impacting crop health and yield and restricting crop options	3.1	2.1	2.5
MRZ	Understand constraints limiting lupin yields	Identify and understand the constraints which limit the yields and profitability of lupins, including Black Pod Syndrome and Phomopsis Blight	1.8	3.2	2.6
MRZ	Soil acidity and insufficient liming	Soil acidity is increasing as liming programs and rates are not keeping up with rates of acidification	1.7	3.3	2.6
MRZ	Increasing insecticide resistance and need ot reduce prophylactic use of insecticides	Insecticide resistance especially in aphid species and the need to reduce prophylactic use of insecticides particularly neonicotinoids	2.9	2.6	2.0
MRZ	Cover crops, green and brown manuring crops to increase systems diversity and sustainability	Cover crops, green and brown manuring crops are options to increase inclusion of legumes and other broadleaf species which provides the opportunity to increase the diversity and sustainability of farming systems	2.5	2.5	2.5
MRZ	Foliar diseases and poor agronomy of oats reduce hay yields and quality	Foliar diseases and poor agronomy of oats reduce hay yields and quality	2.2	3.4	2.0
MRZ	Grazing withholding periods unknown for many crop protection chemicals.	There is a paucity of grazing with-holding periods for chemicals which are commonly used on cereals	2.6	3.5	1.4
MRZ	Lack of grass control options in pulses (faba beans and others)	Lack of grass control options in pulses (faba beans and others)	2.2	3.3	2.0

MRZ	Lack of vegetative frost tolerance in oat varieties	Lack of vegetative frost tolerance in oat varieties	1.9	2.4	3.2
MRZ	Nutrition responses for pulses, canola and cereals	Quantify nutrition (N, P, K, S, Cu, Zn and Mn) responses for a range of crop types including pulses, canola and cereals for a range of diverse environments across the medium rainfall zone	3.4	2.3	1.7
MRZ	Conical snails reduce harvest efficiency, contaminate grain and reduce marketability	Conical snails reduce harvest efficiency, contaminate grain and reduce marketability	2.2	3.2	2.0
MRZ	Stem frost is limiting yield	Stem frost caused by regular or extended periods of frost or cold temperatures limits yields and profitability	2.5	1.5	3.4
MRZ	Pulse options and management for sandy soils under pH stress (acidic or alkaline)	Profitable pulse or grain legume crop options and agronomy packages for sandy soils with a pH < 6 or > 8	1.8	3.0	2.5
MRZ	Faba bean cultivar evaluation and management to maximise profitability	Faba beans - evaluation of varieties and agronomy to maximise the value which faba beans provide to farming systems and businesses in the lower rainfall districts (of the medium rainfall zone)	1.1	3.4	2.6
MRZ	Impacts of stubble removal on the farming system	Long term consequences of not retaining stubbles i.e. declining organic carbon levels given the benefits are out-weighed by the significant challenges of heavy stubble loads and the increased risk of frost with increased stubble load	2.4	2.5	2.2
MRZ	Integrated disease management and rapid identification tests	The development of integrated strategies which includes bio-control options for the management of Sclerotinia in pulses and canola plus a quick test to accurately distinguish sclerotes from Sclerotinia from ryegrass ergot to avoid product being unnecessarily downgraded are required	2.3	2.2	2.6
MRZ	Efficacy of zinc phosphide wheat bait on mice - effective control strategies required	The efficacy of zinc phosphide wheat bait on mice at registered rates is not providing adequate control and late season control strategies are unclear	3.3	1.5	2.2
MRZ	Crop yields are declining on non-wetting sands after a number of years of no-till cropping	Crop yields are declining on non-wetting sands after a number of years of no-till cropping	1.5	3.2	2.3
MRZ	Manipulating crop phenology to overcome risks of non-optimal emergence date and target optimum flowering window	Enabling flexible phenology in cereals through chemical application or breeding to match flowering date to emergence date and seasonal conditions would mitigate the risks associated with of dry sowing e.g. heat stress or frost	2.9	2.2	1.9
MRZ	Marketing options for frosted pulses and legumes	Identify alternative options for frosted pulses and legumes	2.5	1.8	2.5
MRZ	Eyespot inoculum breakdown uncertainty leads to prophylactic fungicide use	Uncertainty in the rotational break time required for Eyespot inoculum breakdown in stubble, reduces confidence and leads to prophylactic fungicide applications in cereals	2.1	2.7	2.1
MRZ	Localised agronomy for durum cultivars	Updated variety specific agronomy packages (VSAPs) to increase durum yields	2.0	2.7	2.1
MRZ	Information overload reduces effectiveness of communications & extension	Too much information prevents the message from being received	3.0	2.1	1.6
MRZ	Managing risk (minimising downside/maximising up-side)	Managing risk (minimising downside/maximising up-side)	3.0	1.8	1.9
MRZ	Management of seeps and soaks	Strategies to stop and manage the increasing area affected by seeps and soaks i.e. dryland salinity and waterlogging	1.3	2.8	2.5

MRZ	Irrigation water decisions - decision support tools to understand the economics ($/ML) of irrigating crops	Irrigation water decisions - decision support tools to understand the economics ($/ML) of irrigating crops	1.4	2.3	2.8
MRZ	Impact of liquid systems on efficacy of crop inputs	Effectiveness of liquid systems to deliver crop inputs, including granular versus liquid fertiliser delivery	2.6	2.1	1.7
MRZ	Best practice management of late germinating grass weeds	Annual Ryegrass and later germinating Brome Grass limit crop choice, hay quality and grain yield and therefore price and returns – require locally relevant data to quantify impacts and demonstrate and support adoption of best management practices	1.8	2.5	2.2
MRZ	High pH sub-soils and compaction limits the yield potential of canola crops	High pH sub-soils and compaction limits the yield potential of canola crops	1.6	2.6	2.0
MRZ	Waterlogging mitigation and management	Solutions including drainage to reduce the impact of waterlogging on trafficability, management and profitability of crops	1.6	1.2	3.4
MRZ	Weather damage on oaten hay	Understand the impact of weather damage on oaten hay varieties – independent evidence for a range of varieties over number of years is required to assist growers to select varieties	2.2	1.7	2.3
MRZ	Integrated weeds, pests, disease management approaches for lentil production	The risk of growing lentils close in an intensive rotation could be reduced with specific and targeted weed, disease and pest management guidelines to address the key risks	1.6	2.3	2.2
MRZ	Estimating plant available water (PAW) & wate use efficiency (WUE) on calcareous soils and limestone rubble subsoils	It is difficult to estimate plant available water (PAW) and yield potential of calcareous soils and limestone of rubble sub-soils	1.6	2.8	1.5
MRZ	Limitations on practical application of subsoil amendements	Practical engineering solutions are required to cost- effectively to inject animal waste, lime and gypsum at depth to ameliorate sub-soils	2.1	2.4	1.5
MRZ	Development of alternative uses for frosted crops (beyond hay)	Strong demand means hay is a profitable option but alternative uses for frosted crops is required because cutting frosted crops for has is not without risks and the area or amount of hay that can be made is limited by the narrow window, machinery and logistics required to make hay	2.5	1.4	2.1
MRZ	Optimising profit of dual purpose crops, biomass, yield and quality factors.	Biomass is critical for dual purpose wheat varieties and awnless varieties may provide a more productive option compared to the currently available cultivars and the cultivars that are being tested	2.1	2.1	1.7
MRZ	Accuracy and consistency of virus testing in pulse seed	Accuracy and consistency of virus testing in pulse seed	2.4	1.5	1.6
MRZ	Perceived interaction between frost damage and wind farms	Quantify “unusual frost” damage in grain growing areas near wind farms	1.0	2.0	2.5
MRZ	Lack of independent product evaluation	Lack of independent product evaluation	2.5	1.4	1.4
MRZ	Highly frequency of frost events limit break crop options esp canola, particularly where pulses are not adapted.	Risk and impact of frost on canola and limited uses and market for canola hay has caused growers to reduce the area planted to canola or to not grow canola which has limited the break crop options and diversity in rotations which has consequences particularly where pulses are not adapted which means there are no suitable break crops	1.5	1.5	2.2
MRZ	Summer weed control options for blanket weed (Toadflax)	Growers have difficulty controlling Blanket Weed (Toadflax) after wet years with standard summer weed control herbicide mixes	1.7	1.8	1.7
MRZ	Multi-peril crop insurance	Multi-peril crop insurance - is it peril or a pearl?	2.4	1.4	1.4

MRZ	Irrigated cropping management to maximise return on investment in water and infrastructure	Irrigated cropping, including maize requires a different set of crop and/or cultivar selection and specialised management to maximise the profitability and return on investment in irrigation water and infrastructure	1.1	1.7	1.7
MRZ	Perennial grain crop opportunities in farming systems	Perennial crops - is there a place for these crops e.g. perennial wheat in broadacre dryland cropping systems?	1.5	1.1	1.2