Acknowledgments

This document is part of the Plan, Prepare, Prosper program that was developed under the Pilot of Drought Reform Measures ('the pilot'), a joint initiative between the Australian Government and the Western Australian Government. The program aims to support farmers and rural communities to prepare for drought, climate variability and other challenges.

Plan, Prepare, Prosper is a strategic planning process that will help farmers to assess their enterprise and determine the best course of action in response to known and projected challenges to business performance.

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GOVERNMENT OF WESTERN AUSTRALIA

Department of Primary Industries and Regional Development

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Introduction to Environmental Risk, Resource and Production

Aims

- To identify and plan for projected changes in weather patterns and in the physical resources that underpin the productivity of the farm enterprise.
- To develop initiatives to manage observed and likely threats from the environment to farm enterprises.
- To support the achievement of long-term economic viability of land under production.

Content and supporting materials include:

- overview of projected changes
- impact of climate phenomena on rainfall
- impact on plant growth and yields
- impact on livestock production
- long term planning
- key messages for industry
- direct and indirect impacts of climate variability on land management on enterprises
- causes of general patterns of weather and climate over Australia.

Today's content will help develop risk management strategies for agricultural production systems.

Tips for getting the most out of this workshop

Skip information that is not relevant to your geographical location.

Build your strategic plan in stages.

Be prepared for your facilitator to call 'time out' for you to work your plan throughout the day.

Workshop Manual

To make it easier for you to review your ideas and thoughts that you collate during this workshop we have included a number of exercises and places for note taking..

ENVIRONMENTAL RISK, RESOURCES AND PRODUCTION

1 WHAT'S CHANGING?

1.1. What have you seen?

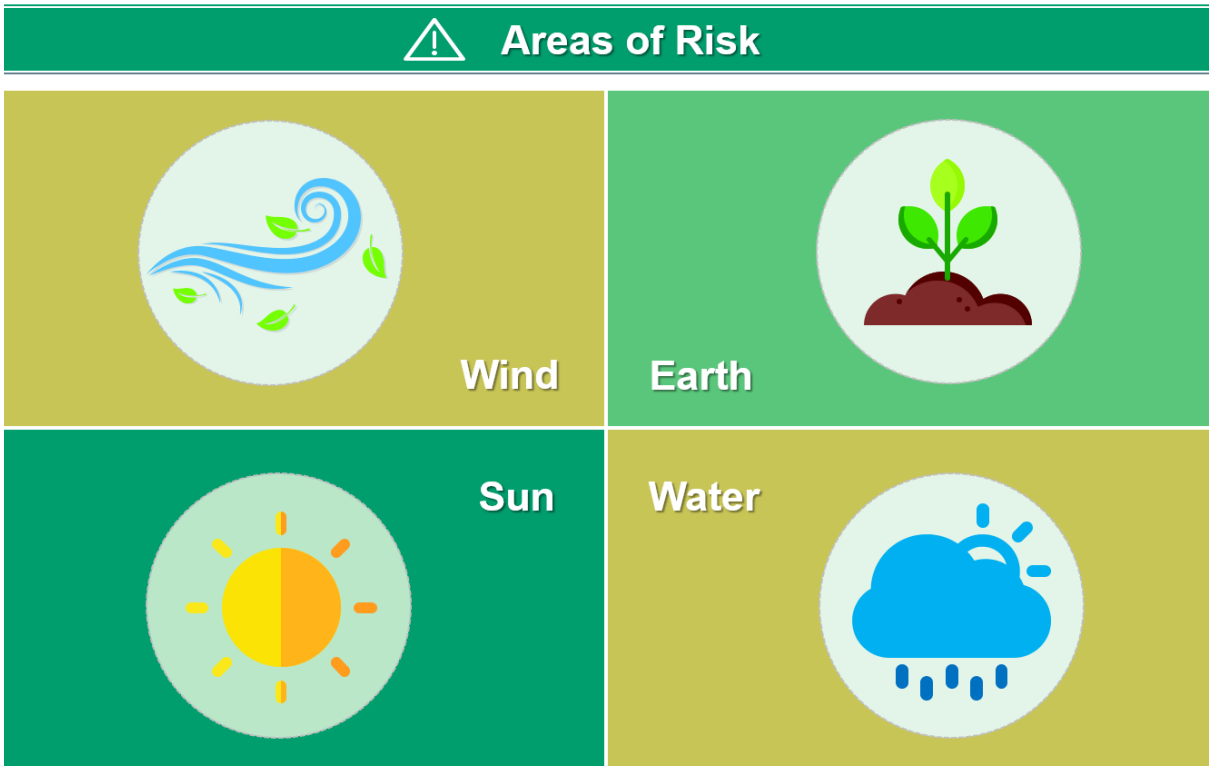

Figure 1 Areas of risk

1.2. Observed trends

Over the past 40 years, major weather patterns and rainfall distribution have changed over southern WA.

Rainfall

Seasonal rainfall has declined since the 1970s, most strongly along the lower west coast and also in agricultural districts. Rainfall decline has been strongest early in the growing season (May–July). Changes in in late season rainfall (August–October) have been relatively small.

What might be regarded as average seasonal rainfall has therefore changed, with averages derived for most recent decades being lower than for periods prior to the 1970s. Average rain for May to July is now about 20 per cent less than the long-term average. Notably, historically wet seasons have been less frequent, and this has had a particular impact on water resources.

There have been fewer ‘rain days’ in general, and the number of consecutive wet days has also declined. This means there tends to be larger gaps between rain events.

These rainfall changes occur at an agriculturally and hydrologically important time of the year, and are associated with increasing atmospheric pressure across southern Australia. This shift in pressure is part of changes in large-scale weather patterns in the Southern Hemisphere.

The frequency of cold fronts has decreased, and the incidence of high-pressure cells has increased during winter. The lower atmosphere has become drier as a consequence.

The atmosphere in the Australian region has become generally more stable, meaning that it is less likely to generate the winter storms that provide most of southern WA’s rainfall.

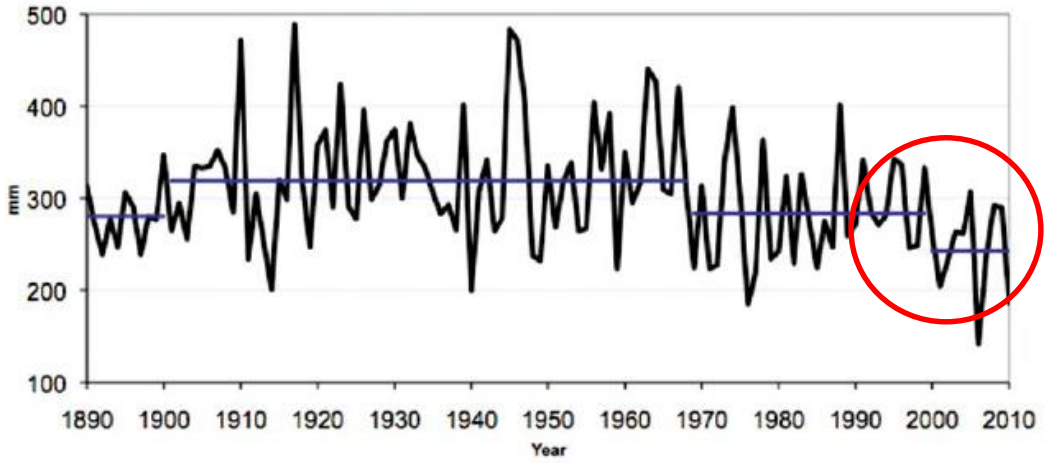

Figure 2 Average rainfall for May to July for far south-west WA (horizontal line the mean between each statistical break point)

Temperature

Daily maximum temperatures appear to be increasing more rapidly than daily minimum temperatures. The number of hot days (such as above 35 degrees C) are also increasing. In contrast, occurrence of frost events is persisting in the cropping areas. This is likely to be related to decreasing cloud cover during the growing season.

Accumulation of heat within season is also changing. This is often measured as time where temperatures are above or below specific thresholds. Horticultural crops are receiving reduced chilling during winter, affecting development of flowers and fruit quality. Conversely for field crops, increasing accumulation of heat within season is accelerating crop development in recent years.

However, within these trends, seasonal temperatures still exhibit notable variability from year to year.

A summary of trends observed

Broadly, climate zones appear to be shifting south.

The changes described above are related to changes in large-scale pressure patterns (such as the southern annular mode or SAM) over the Southern Hemisphere, so the WA drying trend is not a local phenomenon.

The run of dry years is unusual when compared with historical records, and also with 1000-year simulations of WA climate in computer models.

Changes in the atmospheric circulation of the Southern Hemisphere appear to be the result of a reduction in the difference between the temperatures of the tropics and the poles.

Future climate projections indicate the belt of high pressure at middle latitudes in the Southern Hemisphere will shift southwards, and rain-bearing westerly wind is likely to lessen over southern Australia.

Whether you believe in climate change or not doesn't matter as much as asking yourself — if the next 10 seasons continue in a similar pattern as the last 10 (i.e. a considerable number being below the 100-year average rainfall) then how will your farming business stand up to that sort of pressure and variable seasons. What can you change to lessen the financial losses? Keith Devenish, Area Manager, Department of Agriculture and Food, Western Australia 2012

1.3. Using the risk matrix

We examined the risk matrix in 'Introduction to strategic planning'; it is appropriate to consider again when managing environmental risk.

Choosing the events that you will influence

Risk is the possibility of adversity or loss, and refers to 'uncertainty that matters'. Consequently, risk management involves choosing among alternatives to reduce the effects of risk. It typically requires the evaluation of trade-offs between changes in risk, expected returns, entrepreneurial freedom, and other variables. Understanding risk is a starting point to help producers make good management choices in situations where adversity and loss are possibilities (Harwood et al 1999).

There are many different tools for identifying and determining degree of risk. In this program, we have chosen to use the risk matrix shown at Figure 2. Many variations exist but, whichever matrix you choose, it is important that you use the same version consistently.

Likelihood				
	Very likely	**Medium**	**High**	**Extreme**
	Likely	**Low**	**Medium**	**High**
	Unlikely	**Low**	**Low**	**Medium**
		Minor	Moderate	Major
		Impact		

Figure 3 Risk Matrix

Risk matrices like Figure 3 are practical and easy to use. Use this tool to encourage discussion and also to prioritise responses to threats and opportunities in a consistent way. The discussion about why something is high or low risk is probably more important than where you finally place that risk on the chart.

Areas of risk

Describe the risks or threats from the wind, sun, earth and water to your production systems on your farm.

Identifying and managing our risks

In workshop one, Introduction to Strategic Planning, you considered a number of significant and important risks that may affect your business.

Review what you identified in workshop one. Based on the information you currently have and our discussions today, are there any changes you would like to make to your risk identification and management planning? You may like to use the following blank templates to record your thoughts and ideas.

Record our updated risks in the following table.

Risk category	Description	Likelihood	Impact	Score

Risk planning template

To update or record new risk management plans use the following risk management template, use the risks identified in your previous table. In the first instance enter those risk events that achieved a score of 15 and above into the template below. Events that score below 12 may have an appropriate insurance response and not require more advanced risk planning.

Note, you may like to refresh your memory by referring back to your reference material from workshop one.

Risk category	Description		
Focus Area			
Risk 1	Likelihood	Impact	Score
Management response	By date	Name	
Who needs to know?	By?		
Risk 2	Likelihood	Impact	Score
Management response	By date	Name	
Who needs to know?	By?		
Focus Area			

Risk category	Description		
Focus Area			
Risk 1	Likelihood	Impact	Score
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Risk category	Description		
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Management response	By date	Name	
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Management response	By date	Name	
Who needs to know?	By?		
Risk 2	Likelihood	Impact	Score
Management response	By date	Name	
Who needs to know?	By?		

Using insurance as a risk management tool

Insurance is one of the most regulated industries in Australia. Insurance providers have a duty of care to communicate clearly what is covered by their insurance and also the likely payouts to your business. As a purchaser you have a responsibility to disclose information that may affect the likelihood of a claim made for your business.

When considering any insurance policies it is useful to undertake a return on investment analysis for the policy. Frequency of the event and the impact of the event are critical in determining the benefit to your business.

Many of the events that may affect your business can be altered by changing your production management practices. It is important to take this is into account when considering insurance policies. Changing to a frost resistant wheat variety may be more cost effective than insuring against frost. Farm management deposits may be more cost effective than insuring against a drought.

Making the most of insurance for your business

When you listed your fixed and variable costs in the Financial Management Workshop how did you list insurance? As a fixed or variable cost?

We hope that the financial management workshop will have encouraged you to review your current insurance policies, asses their applicability to you and helped you find some savings. In the Work- Life Balance workshop we will have encouraged you to investigate income and lead man insurance.

However have you considered insuring against impacts on your yield or price?

‘Agricultural insurance is more appropriate for rare and extreme events. Claims made against insurance policies frequently add to the cost of insurance by increasing the costs of loss adjustment. The cost of insurance also needs to be considered against the cost of alternative risk management practices. In particular, less significant risks may be managed more economically through savings or borrowings.’ Options of insuring Australian agriculture (ABARES 2012).

Analysing the benefit of insurance

Consider the ABARES statement above. Do you agree? What yield limiting events have occurred on your farm? How frequently have they happened? What impact on your yield?

On the next page use the table to consider profit or yield limiting events that have affected your farm, record the occurrence and impact. Events that occur every year may be costly to insure and have smaller pay outs. What is the best management option for your business? You may decide that the Farm Management Deposit Scheme is an excellent insurance policy to prepare for drought periods.

Management options may include, insurance, Farm Management Deposits, variety selection.

Notes:

Event description	How many times has this occurred in the last twenty years?	Estimated impact on yield when it occurs % Volume impact or Quality / Price Impact	Estimated $ Cost of event	Cost / Benefit of available insurance	Cost / Benefit analysis of other options
Frost					
Bushfire					
Drought					
Flooding					
Rain at harvest					
Global Financial Crisis					
Low global prices for product					
Market closure					
Other:					

2 SOLVING PROBLEMS AND MAKING DECISIONS

As noted earlier WA is already showing signs of climate change and farmers (and the research organisations that support them) have begun to develop and test adaptation responses. Not all adaptations have been developed with climate change as a driver, although the result has been an adjustment that increases the farmer's ability to manage through long-term changes in climate.

In Appendix A Industry Information there is a case study of enterprise change responses for your industry.

Kris Cole recommends a seven step decision making process to increase the likelihood that all issues are considered on the way to making a decision.

Table 1 Seven step decision making process

Time invested	Decision making steps
70%	1. Identify the problem clearly 2. Establish the desired outcome 3. Analyse the problem to determine its cause 4. Generate alternative solutions 5. Evaluate alternatives
	6. Implement decision
	7. Follow up and evaluate results - Other outcomes - Other results - Benchmarking - Your analysis - (environment 1%) - Record keeping

Decision making and learning from our lessons and past experiences is vital to remaining a sustainable farming enterprise. The following images highlight some of the lessons learnt from the 2007 drought in Western Australia.

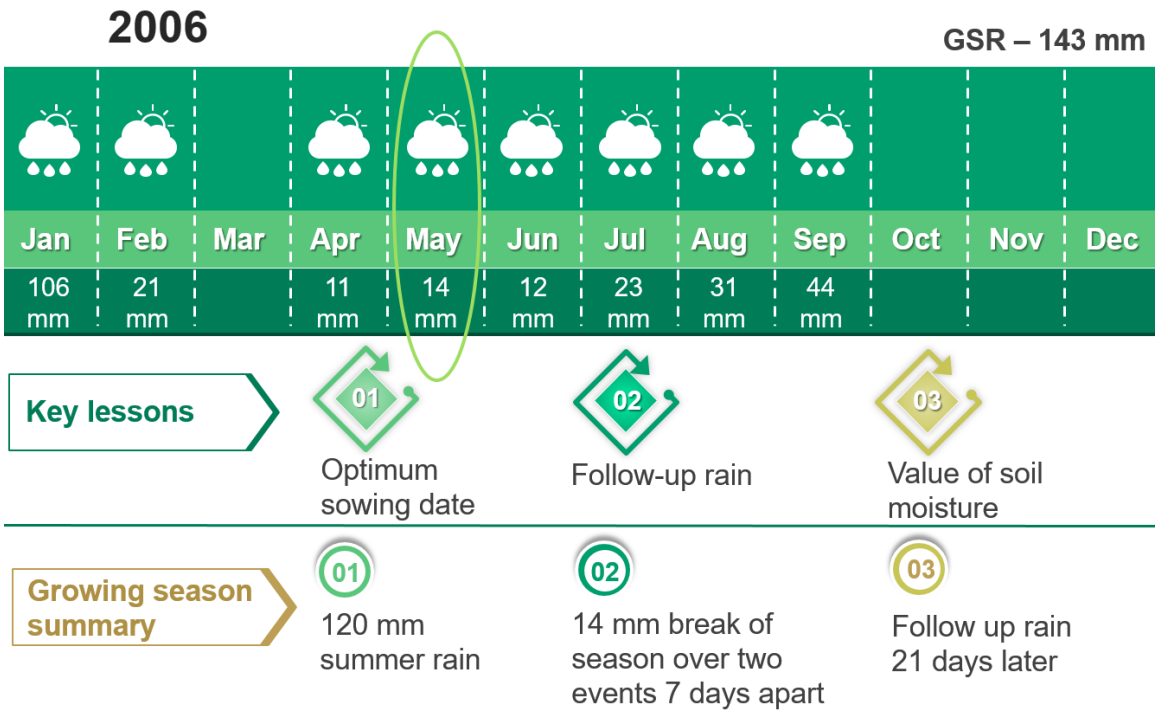


Figure 4 2006 Rainfall

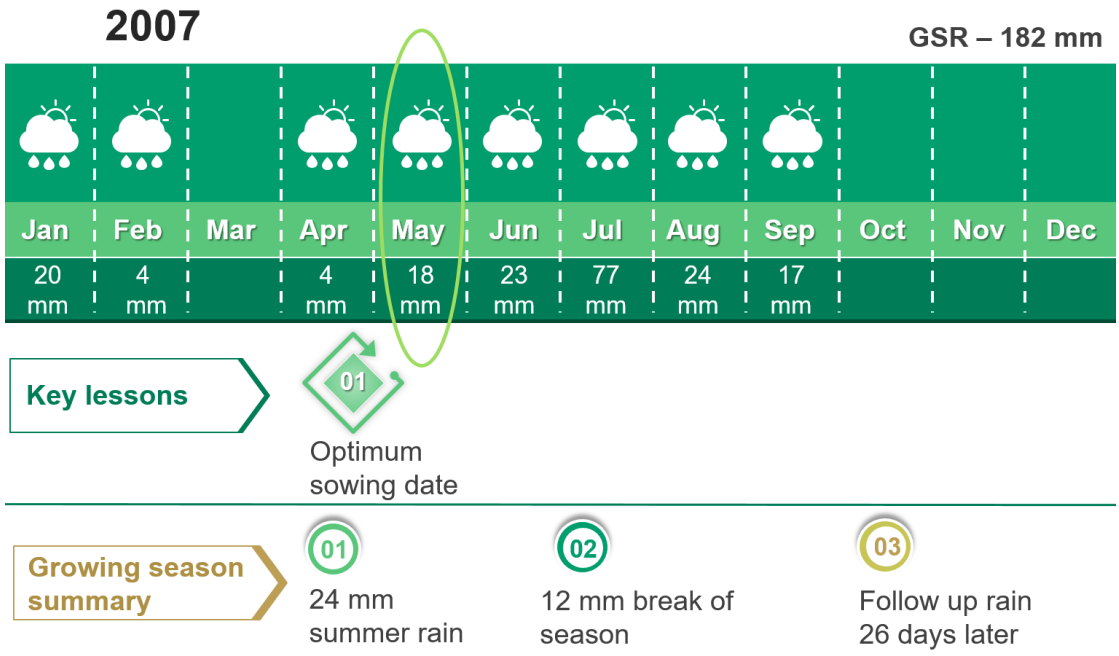


Figure 5 2007 Rainfall (Kari- Lee Falconer, Department of Primary Industries and Regional Development, Northern Agricultural Region)

Lessons learnt

Consider the decisions you made in recognised bad years. What if you could ‘do over’ a bad year? Like the 2010 drought year or the 2007 year? With reference to the Risk matrix and using the seven decision making steps — discuss and record what you might do differently.

My decision making rules / guidelines

Do you have on-farm decision-making rules or guidelines? Do you consider soil type, soil moisture, water budget or milestone production dates? What role does forecasting play in your decision making?

REMEMBER, CONSIDER THE FACTS FIRST! OR WHAT YOU KNOW FOR SURE.

My production rules are:

3 BUSINESS TOOLS

It is possible for enterprises to be strategic within a variable season. To achieve this it is necessary to have a plan for how you will respond to, poor, average and good seasons is a good way to ensure that you maximise your opportunities.

Cropping specialists have been developing 'rule of thumb' or seasonal triggers that will alter decision making at different dates depending on how the season is shaping up.

In Appendix A we have a range of guidelines for decision making within the season. To develop your rules of thumb there are a wide array of tools available to you.

Tools

Climate and weather forecasting — how reliable is it and how can you use it to improve management?

What are rainfall forecasts for the next four days and beyond?

Recent years have seen an explosion of weather services available on the web as computing systems, observations, models and software have improved. The primary source of short-term forecasts in Australia is the Bureau of Meteorology (BOM). The bureau's Water and The Land web pages (www.bom.gov.au/watl) have rainfall forecasts for the next four days, and the four days after that. The BOM uses several models and expresses the forecast as expected amounts and chances. Some private web providers repackage the BOM information in various ways.

Most weather forecasts will run only to about a week or 10 days ahead. This is because that is about the life span of most weather systems, and is as far ahead that individual systems can be tracked. Forecasts over monthly and three-monthly periods use probabilities, and describe the chances that rainfall (or temperatures) will exceed chosen thresholds (such as the median).

Statistical forecasting

DAFWA is using statistical models to produce timely forecasts of rainfall for the agricultural growing season in the south-west of WA.

Statistical forecasts are not exact amounts. They take the form of probability distributions that may represent a shift from climatological probabilities.

Forecast skill depends on the amount of lead time, the forecast months and the strength of relationships between the climate drivers and rainfall. Forecasts should therefore be carefully interpreted using the skill information. If the skill is poor (for example, if the per cent consistent skill score is less than 0.6 or correlation skill score is less than 0.22), then climatological probabilities may be a better guide than the forecast.

The predictive skill of weekly weather forecasts has been improving as observation and analysis systems improve. The skill of seasonal climate forecasts remains dependent on the influence of oceans, and is generally not as strong.

When using forecasting it is important that managers know which climate drivers or synoptic features are most important for the location. For more information about climate drivers, see Appendix C.

Using forecasting

Forecasting should not be used in isolation from factual information available to the farm manager. Cropping enterprises will pay attention to:

- optimal seeding dates
- amount of rain at break or soil moisture
- likelihood of follow-up rain (weather forecast (0–10 days)
- stored soil moisture
- climate outlook (1–12 months).

Greater weighting in the decision-making process is given to those criteria where there is a known fact.

The fact that will have the greatest importance for horticultural enterprises will be the water budget — both availability and likely demand.

Livestock enterprises using the pasture growth index will be interpreting projections using local knowledge of species, soil type, fertiliser history and aspect.

Using forecasting

Do you know which climate drivers are most important on your property?

Which weather drivers will you monitor in the long term?

Weather drivers that I will monitor for my farm are:

4 THE TOP 25 FARMERS

In 2011 a report was commissioned to investigate precisely what is it that the 'Top 25' farmers where doing that could be linked to their profitability. Farmers were chosen from as many rainfall zones as possible and collectively demonstrated similar behaviours and characteristics that align with the principles of continuous improvement.

Summary of the behaviours and characteristics of the Top 25 Farmers

From interviews with the top farmers, seven managerial characteristics clearly emerged.

1. **Focused on profit** — The top farmers used rational decision-making to analyse whether a practice was possible and they stuck to budgets. They understood risks and consulted with multiple specialists before changing their business plan. They did not consider themselves early adopters, but took a 'wait and see' approach. As an example, they did not rush in to new varieties and often took two to three years to make a change.
2. **Planned** — The top farmers sowed 35 per cent of their crops dry; about 30 per cent higher than the average farmer. The ability to sow a significant portion of the farm dry was due to careful planning to ensure effective weed control.
3. **Prepared** — The top farmers made most decisions outside the high stress periods of sowing and harvest. They usually only changed about 20 per cent of their program in response to seasonal conditions. In general, rotations were kept in place to ensure weed control and income.
4. **Timely** — Timeliness was noted as one of the top practices needed to ensure production. This included the timeliness of spraying, fertiliser application and sowing. Importantly, sowing time was nominated as the key practice to maximise profit.
5. **Committed** — The top farmers were not distracted by other issues after a decision was been made. Few decisions were made that resulted in substantially negative effects on profit in the years that challenged the profitability of most other businesses.
6. **Positive** — The top farmers were positive about the future. This was shown in a desire to learn more and succeed; and their passion for agriculture.
7. **Connected** — To farmer groups, consultants and researchers. Approximately 69% of the top farmer group have a mentor or close friend they bounce their ideas off as part of their decision making process.

Source: McConnell G 2011*, 'Bridging the Yield Gap Survey of High Profit farmers',* Department of Agriculture and Food, Western Australia.

Top 25 of farmers

Consider the characteristics of the Top 25 Farmers. What are these farmers doing? Are you doing similar things? Undertake a SWOT of your enterprise. What are your gaps compared to the Top 25? What can you do to fill the gaps?

Strengths	Weaknesses
Opportunities	**Threats**

5 REVIEWING LONG-TERM DECISIONS FOR PRODUCTION SYSTEMS

If you want to know what your farming system is going to look like in 20 years, look 20–30 kilometres to the north-east.

Cameron Weekes, personal communication 2010

Reviewing soil management

Where is your 1% in soil management?

Identify the problem

Identifying major soil constraints can make a significant difference to both a farms productivity and sustainability. Issues like soil acidity, water repellence and wind erosion among others are all issues that can be identified and to some extent mitigated.

Identifying soil degradation issues in the paddock and deciding on what to do can be difficult. If the pasture growth or crop yields are poor and the agronomy and management is adequate then it is likely that there is an underlying soil degradation issue.

The document ‘Diagnosing and Ameliorating Problem Soils’ (reference provided today) provides an easy to follow key for identifying potential soil degradation issues with little more than a spade some basic soil test information and some visual assessments.

Some other very useful links include:

- The DAFWA soil identification webpage, https://www.agric.wa.gov.au/land-use-planning/identifying-soil-types

The Australian Government, Department of Agriculture and Water, managing soil health webpage, http://www.agriculture.gov.au/ag-farm-food/natural-resources/soilsThere are several soil degradation issues that impact on productivity, the link between soil acidity, soil fertility and productivity is especially strong. The following information deals specifically with these issues, their impacts and provides links to potential tools.

Soil acidity

Soil test and determine best value for money source and apply lime

Soil acidity or declining soil pH is an inevitable consequence of productive agriculture and if left untreated it impacts on productivity and profitability. In WA the major effect of soil acidity (low pH) occurs in the subsurface layers (10–20 and 20–30 cm layers in sandy textured soils). As the soil pH declines the concentration of Aluminium increases with toxic effects on root growth reducing the crop and pastures access to moisture and nutrients deeper in the soil profile (see Soil acidity: a guide for WA farmers and consultants. DAFWA Bulletin 4784).

Under conditions of reduced moisture it is important that such constraints are managed to afford the crop the best chance effectively using the resources available. There are many examples that demonstrate the profitability of liming to treat soil acidity.

There are a few essential steps that need to be followed for successful management of soil acidity, these are:

- Soil test — Identification of the soil pH profile to 30 cm in 10 cm increments so appropriate 10-year soil acidity management plan can be developed.
- Calculate the best value-for-money lime source. Use lime quality information from members of the Lime WA Inc. group of independent agricultural lime suppliers (Audit of WA agricultural lime quality 2011. DAFWA Bulletin 4830 and www.limewa.com.au) and lime comparison calculator (www.soilquality.org.au). Taking quality and transport costs into account can save substantial dollars).
- Continue to monitor the soil pH and aim to reach the recommended targets of pH_{Ca} 5.5 in the top 10 cm and 4.8 in the subsurface layers. The target of 5.5 in the topsoil will ensure that some lime will treat acidity deeper in the profile.
- The Lime association of WA has a website that has the quality data for a number of pits from across the state. This is a great way to compare different pits and make an informed decision. Go to the member details on the following website. www.limewa.com.au

Soil fertility

Soil test – phosphorous may be sufficient

Fertilisers contribute a large proportion of the cost of production for most enterprises. Improved understanding of farm nutrient requirements can drastically reduce the amount of fertiliser needed and increase pasture production.

Recent analysis of 109,000 soil samples from CSBP showed some amazing trends (Weaver and Wong, 2011). The soil test levels for phosphorus (P) were assessed according to the PBI (phosphorus buffering index) and % of maximum production. A dairy farm for instance might be running at 95% of maximum production while a beef property on the same soil might be running at 85%. Analysis against 85% of maximum production showed that 85% of properties were above the critical value, meaning they would get no response from applying P. Even at 95% of maximum production, 52% were above the critical value (Table 1).

Table 2 Percentage exceeding critical Colwell P value dependent on PBI class and production target

PBI range	Production target (% of maximum)			
	80	85	90	95
0– 5	87.5	81.4	73.8	56.2
5– 10	90.4	81.2	74.9	47.9
10– 15	89.4	82.4	73.0	45.0
15– 35	91.9	87.4	75.2	55.6
35– 70	90.6	86.1	75.1	53.2
70–140	86.5	79.8	68.9	45.3
140–280	84.3	74.8	64.6	43.5
280–840	74.3	65.7	51.5	33.3
Overall	**90.1**	**84.5**	**73.6**	**51.7**

This clearly indicates that for many, careful consideration must be given to how fertilisers are managed.

Both the Fertiliser Partnership (FP) and the CSBP data indicate that soils with high P status (those above the critical value) show other problems such as low potassium and sulphur, and problems with soil acidity. Fifty percent of all soil samples used for pastures in the CSBP and FP data had high soil P status and low pH (< 5.5). For these soils, current farm input costs directed to P based fertilisers could be redirected to lime or other nutrients.

Soil management

Do you need a goal, initiative or action for soil management on your farm?

Do you need to consider how you manage your soil into the future?

What cost will there be?

6 REVIEWING WATER RESOURCE MANAGEMENT

Where is your 1% in water resource management?

Using rainfall where it falls

For broadacre farming systems, preserving soil moisture and maximising benefits of rainfall where it falls will be the objective. For affected soils management strategies that limit the water repellence will be important. Subsoil constraints like soil acidity will limit root penetration of cropping and pasture plants and also water use and must also be managed.

Contour paddock systems represent an opportunity to capture and use rainfall where it falls. Unfortunately these systems may also represent an opportunity cost to systems that employ large scale equipment to sow crops rapidly.

Minimum till and ground stubbles retention will also be used to limit soil water losses through evaporation.

Improve water collection

The decline in rainfall, affecting run-off into dams, can be partially offset by the use of roaded catchments. These can increase the volume of run-off into dams during periods of lighter rainfall. However, in preparation for periods of greater rainfall, dams will need to have overflows of greater capacity to handle increased catchment run-off.

To alleviate the effects of both wetter and drier periods, the enlargement of dams should be considered. Dams with greater capacity that can be filled during wetter periods would help to offset reduced run-off during drier periods. The use of dams with smaller surface areas and greater depth will help reduce evaporation, which is particularly important during drier periods.

Gully dams in the south-west will be greatly affected by rainfall decline, as all rely on streamflows to fill. During drier periods, there will be a decline in the frequency of streamflow and hence the volume of flow. Gully dams are by default shallow and have large surface areas, leading to high volumes of water loss through evaporation.

The most practical solution is to transfer water captured in gully dams to deep regular-shaped dams ‘off stream’. Again, in preparation for periods of greater rainfall, gully dams will need to have overflows of greater capacity to handle increased catchment run-off. Bypass arrangement for flows not required to fill off-stream storages would be an advantage for the health of streams and rivers.

Understand and monitor your aquifer

Understanding the aquifer you're pumping from is essential. If the bores aren't pumping continuously, keep records of groundwater levels to monitor depletion and recovery. Smaller aquifers may be at greater risk from over-pumping with reduced recharge. Salinity and acidity levels should also be monitored quarterly to provide confidence that quality has not fallen below useful levels.

Improve livestock watering systems

Movable watering points

Movable watering points have been shown to reduce erosion impacts of grazing animals as well as helping animals to maximise the potential food on offer value within paddocks.

Shading water supplies will reduce losses to evaporation and improve productivity of animals.

When shifting to supplementary feeding in dry conditions, good quality water supplies are important in helping animals to utilise high protein supplementary feed.

Irrigation systems

Improve water distribution

For enterprises using irrigation systems, the key is maximising water use efficiencies. Many are already implementing night-time irrigation to reduce water loss through evaporation. Others have made significant productivity gains and reductions in inputs by using detailed assessments of their irrigation equipment and programs.

These assessments subsequently lead to changes in design of systems and equipment choices.

Tradable water rights may also create flexibility in enterprise management, both over time and within a variable season.

Refer Appendix A for more messages on water resources for your industry.

Water resource management

Do you need a goal, initiative or action for water resource management on your farm?

Do you need to consider how you manage your water resource into the future?

What cost will there be?

7 REVIEWING MANAGEMENT OF SEASONAL VARIABILITY

Maximising the yield and minimising loss

The challenge is getting the crop out of the ground, not into the ground.
— Rob Grima, DAFWA 2011

Changes to break-of-season and sowing opportunities

Sowing rules of thumb will be guided by the amount of rainfall or soil moisture available to get a crop out of the ground. Observed drying trends and greater variability in the April–May period means that there are, on average, fewer wet sowing days available at the time of sowing. Management decisions need to take this into account to prevent either crop germination failure or delayed emergence. Table 2 shows average days available for sowing at Mullewa for the periods 1889–2009, 1975–2009 and 1999–2009.

Table 3 Fewer days available for sowing[(a)]

Period	Month				
	April	May	June	July	Total
All years	2	9	16	8	**35**
1975–2009	3	9	13	7	**32**
1999–2009	2	6	8	6	**22**

(a) As a rule, sowing can occur after the crop area has received 10 mm of rainfall over the previous 15 days between 20 April and 15 July (Source: Crop updates 2011, Mike Robertson CSIRO, pers. comm. Rob Grima).

Options to help overcome shorter sowing seasons include:

- increase areas of dry sowing
- increase sowing capacity
- increase fallow areas.

Dry sowing

In the Northern Agricultural region, crop failures have tended to occur in the wet years rather than in the dry years. By ensuring that crop establishment is on time, enterprises have been able to make better-than-expected returns in dry years.

The costs associated with dry sowing include an increase in your financial risk through higher variable costs, seed, fuel, equipment depreciation and possibly also fertiliser and herbicide.

Dry sowing also increases the risk of soil erosion events. This risk can be managed — but not eliminated — by retention of stubbles, inter-row sowing between the previous year's stubbles and the elimination of sheep from those paddocks.

Scrupulous long-term weed control is essential to limit the likelihood of excessive weed burden in dry sowing years. The cost of this weed control over time must be taken into account when considering dry sowing as a long-term strategy.

Increasing sowing capacity

Increasing sowing capacity may mean increasing the number of machines you employ to sow the crop or purchasing larger equipment that covers more ground in less time. This will carry a very high financial burden that needs to be budgeted for every year that you have that machine. Managers should account for interest on borrowings and also depreciation of any new equipment purchased for this purpose. Leasing equipment might reduce the risk but remains an increased cost to production. There are many ways to increase sowing efficiencies that reduce the required time to get the crop in the ground including GPS technologies, soil mapping technologies, etc.

Fallowing

Fallowing paddocks is an opportunity to store water in the soil profile for the next growing season. The opportunity associated with fallowing is reducing the risk of input expenses that are unlikely to yield a return. Fallowing can be employed when the window of opportunity for sowing has been missed or when soil types less likely to be productive in a dry season are excluded from production.

Some enterprises use fallowing as a strategic tool in much the same way that lupins are used in the wheat–lupin crop rotation on sandplain. The likely opportunity costs and returns must be assessed against the budget over time before fallowing is used in this way.

Fallowing allows managers to control weed burden for those subsequent years when wetter conditions or dry sowing is less likely to result in crop failure.

Go to Appendix A for messages on seasonal decision making for your enterprise.

The costs of adapting production systems

A message from our finance team

Any adjustments to an enterprises production system should be assessed carefully against a range of criteria, most importantly cost of the adaption and the likely return to your enterprise.

You have to be sure that by implementing the change, you will obtain the financial benefits intended. Having decided that a change to your system is necessary, examine the risks that the proposed adaptations will expose you to.

For example diversifying production can reduce the risks of seasonal variability; however as a manager you are likely to have higher labour costs or shifts in peak labour demand to manage the additional aspects of your enterprise.

Diversifying production may also increase existing infrastructure requirements.

Investing into variable rate technology can be costly (can you service the debt?) and you will need extensive knowledge of the production history in your paddock (GPS yields, nutrient status, etc.).

Investing into different types of machinery (larger, faster, more efficient) can expose the business to debt that may cost more than the expected returns.

Choosing to lease equipment, contract labour, etc. may bring other risks (unavailability, import weeds, diseases).

What tools will you use from the Financial Management workshop to asses a proposed change to your enterprise?

What can you do to test the costs and benefits of potential adaptations?

Consider undertaking the following analyses on your proposals:

- Gross margin on enterprises
- Cash flow analysis
- Partial budget
- Return on investment.

Don’t forget to factor in potential variations in cost of inputs and value of product sold.

Seasonal variability management

What strategic actions can you take to manage seasonal variability within your production system?

What cost will there be?

8 OPPORTUNITIES IN BIODIVERSITY, REMNANT VEGETATION AND LANDCARE

You may not naturally think of protecting remnant vegetation and preserving biodiversity when developing your strategic business plan. But there are number of reasons why you might consider identifying remnant vegetation as a resource or an opportunity for your business.

Enterprise consolidation

Excluding areas of poor productivity from production allows you to maximise the benefits of costly inputs. Revegetation on poor areas can be a low-cost management option that reduces the need for ongoing weed control.

Revegetation or native species crops may also create opportunities for enterprise diversification or access to government grants. DAFWA is also investigating how poor agricultural land might be subdivided from the farm and sold to interest groups to manage. Some shires may allow realignment of ‘title lots’ to allow this to happen.

Windbreak benefits

Evaporation and water loss is reduced downwind of the stand by more than 20 times the final height of the stand.

Pest management

Remnant vegetation can provide a home for pest animals. However, it can also provide a home for beneficial insect populations.

Market assurance

Increasingly, consumers are demanding products that have been produced in an environmentally friendly way. Remnant vegetation and biodiversity could be used as part of your marketing strategy.

Carbon farming

Research is ongoing to determine how farmers can obtain a return for ‘carbon farming’. Existing remnant vegetation may form part of a carbon farming income stream available to farmers.

Family health and welfare

Extensive research shows that changes in the natural environment can impact on the mental health of farm families. The loss or decline of remnant vegetation may negatively affect families associated with the farm’s welfare.

Remnant vegetation

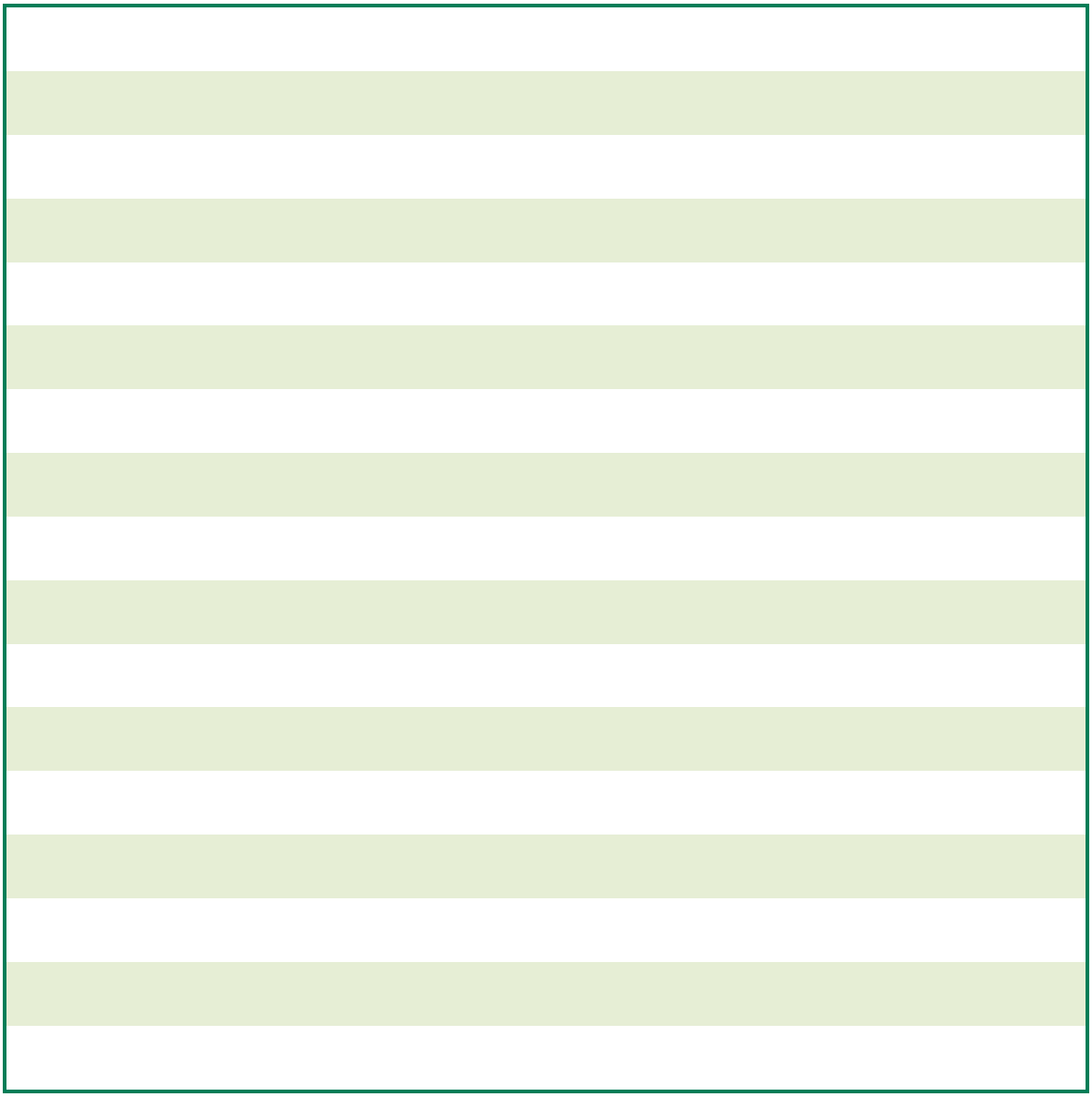
Are you using remnant vegetation on your farm as an asset?

If yes how?

If not, how can you use it as an asset?

Do you need more information?

How will you work out how much it will cost?



The costs of adaptating production systems

How will you prioritise your initiatives and actions identified to adapt your production systems?

How will you work out how much it will cost?

9 HOW WILL WE GET THERE – OUR GOALS?

As discussed in workshop one, a goal is a broad, long-term aim that will accomplish your vision. Its purpose is to inform your strategies and actions. Your goals should be **SMARTT**.

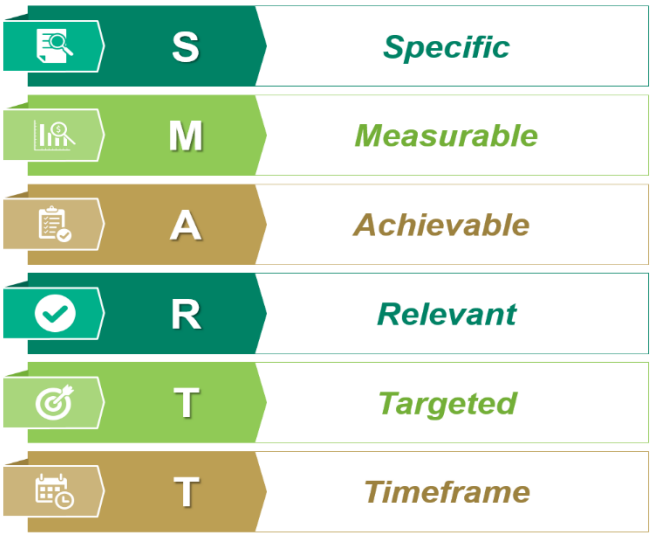


Figure 6 SMARTT Definitions

When developing your goals think about what you must achieve to make your strategy and ultimately your vision a reality. Ensure your goals measure results not activity.

Step one: Brainstorm the key focus areas that you believe are crucial to achieving your strategy.

Step two: For each of these key focus areas draft one or several SMARTT goals. The following templates may be helpful.

Focus Area	
Specific	
Measurable	
Attainable	
Relevant	
Target	
Time-line	
Written goal:	

Focus Area	
Specific	
Measurable	
Attainable	
Relevant	
Target	
Time-line	
Written goal:	

Focus Area	
Specific	
Measurable	
Attainable	
Relevant	
Target	
Time-line	
Written goal:	

Focus Area	
Specific	
Measurable	
Attainable	
Relevant	
Target	
Time-line	
Written goal:	

Developing goals, key initiatives and actions

As discussed in workshop one, key initiatives and actions are the details of your goal. A key initiative outlines the pathway or route you will take to achieve the goal and actions are the steps or tasks undertaken *in order* to achieve the goal.

To draft your key initiatives, you can use your large strategic planning template that has been provided by your facilitator. At this stage, it's important to review your goals and check whether they are defiantly the most appropriate goals.

References

Cole, K 2005, 'Management theory and practice', Pearson Education Australia.

Department of Agriculture, Fisheries and Forestry (ABARES), Australian Government 2012, 'Options for insuring Australian agriculture', ABARES Canberra ACT.

Harwood, J, Heifner, R, Coble, K, Perry, J & Somwaru, A 1999, 'Managing risk in farming: concepts, research and analysis', *Agricultural Economic Report* no. 774, US Department of Agriculture.

McConnell, G 2011, 'Bridging the Yield Gap Survey of High Profit farmers', Department of Agriculture and Food, Western Australia.