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Future Drought Fund

Vic Hub DROUGHT & INNOVATION

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North West Irrigated Horticulture Node

REGIONAL DROUGHT CONSULTATION SUMMARY REPORT

Part 1 | October 2023

VICTORIA DROUGHT RESILIENCE ADOPTION AND INNOVATION HUB

Vic Hub DROUGHT & INNOVATION

Mallee Regional Innovation Centre

North West Irrigated Horticulture Node

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The Mallee Regional Innovation Centre acknowledges the First Peoples of the Millewa-Mallee, the traditional custodians of the land on which we work, learn and live. We acknowledge the ancient connection they hold with their country and pay our respect to Elders past, present, and emerging.

The Mallee Regional Innovation Centre is the Lead for the North West Irrigated Horticulture Node of the Victoria Drought Resilience Adoption and Innovation Hub.

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The Victoria Drought Resilience Adoption and Innovation Hub acknowledges the importance and support from its partner organisations:

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1 Summary

The North West Irrigated Horticulture Node of the Victoria Drought Hub has begun a series of focused consultations on drought. This summary provides an overview of some of the high level findings from the first block of consultation activities.

The consultations thus far have demonstrated that drought should be considered a constant feature of farming in North West Victoria. Further consultations will help build up the institutional memory of how we have adapted to the changing face of drought. The next drought will be different, but we can prepare ourselves to be better placed to continue to adapt next time.

When drought comes it is felt first in the farming communities, in the transport sector, and in retail industries. The impacts on the wider community are delayed. The consultations have indicated that recovery takes a minimum of two years for dryland agriculture and four years for irrigated horticulture. Negative news stories in the press also affect tourism industries. And consecutive years of drought lead to exits from farming and the consolidation of farms into larger enterprises.

Continual improvement in drought management depends on preparation and planning for drought. Decision-support systems enable better adaptation. Predictive technologies can help to reduce uncertainty, and there is scope to improve farming systems through digital communications, innovation, and infrastructure upgrades.

Climate change will increase the imperative for adaptation. Drought provides a motivation for change; it drives innovation and the pursuit of sustainable farming practices. The consultations have revealed researchable and actionable projects for the Victoria Drought Hub to pursue and develop.

Business-management skills, and decision-making skills – both on farms and in the small businesses in agriculturally-dependent towns – are the most critical ingredients for drought management. Farmers and business managers need their various sources of advice to be connected. Farmers working jointly with their agronomists, their accountants, and their bankers will improve the synergy of their operations.

The people of North West Victoria are particularly concerned about the potential for better management of mental health before, during and after the next drought. Reducing uncertainty and supporting better decisions during the droughts are seen as key in this regard. There has been considerable improvement in the attention to, and management of, mental health, but more needs to be done. The community values the refuge offered by green spaces in managing mental health, and the amenity of towns needs to be protected in the next drought.

2 Introduction

This report provides the results from an interpretation of the consultations conducted between September and December 2021 to understand farmers' and other stakeholders' experiences of drought and their insights for enhancing drought resilience.

The aim of the consultations and the subsequent co-design process with stakeholders is:

1. To identify significant issues and implement actions for drought resilience innovation through co-designed projects with different communities across Victoria (and Australia).
2. To provide a foundation and legacy for ongoing collaboration between the Drought Hub partners and key stakeholders to enhance drought resilience with communities.

This report is the first in the series of reports that capture farmer and stakeholder perspectives to guide the ongoing activities of the Hub.

The drought cycle

The Drought Hub describes four stages in a typical long-term climate cycle.

To build resilience you need to be prepared and then act in a timely manner in each of the four stages.

The good period,

The good period, with consecutive average or above average growing conditions. We will still get these even with climate change. Decisions made here can have a big impact on how we cope with the other three stages of the cycle. We need to act in this period to invest in drought resilience.

The uncertain period

The uncertain period, with growing conditions well below average (total rainfall in decile 3 or below) [1] and the next expected positive event e.g., wet spring, autumn break, next wet season fails to materialise. People are 'hanging on' for a positive event to relieve a bit of anxiety, hoping things will come good. Possibly hanging on for too long where some different actions may help, if the drought period kicks-in.

Drought period

The drought period, where several expected positive events (average or above) don't occur. The uncertain period merges into a drought, with little or no rainfall. Decisions are really about what to spend money on, what to sell and when to cut your losses. The main aims are to extract the maximum value out of what is left and the resources available for recovery (finance, pastures, soil etc) are in the best possible condition later on.

[1] Rainfall less than or equal to the rainfall in the lowest 30 per cent of recorded rainfall totals.

This may mean not sowing at all, only hanging on to core breeding stock, confinement feeding, refinancing debt payments etc. This stage also has potential animal welfare and biosecurity issues.

Decisions about what is essential, and what is not, are difficult, and they are often even more so with other emotional stressors. Personal wellbeing and the need for various support structures, social events, counselling, fodder subsidies, short term loans/ interest subsidies etc become critical especially in prolonged drought with no clear end in sight.

The Recovery period

Recover is where there are 'green shoots' to signal things are on the way to a good period. People feel more optimistic, but money may be tight and recovery slow or significant changes needing to be made. Small, short term wins are needed and doing something different in the short term while progressing to the preferred long-term position. Identifying opportunities, which may not be common, don't always spring to mind when feeling the relief of a change in fortune, and having extra support to consider what would work can be helpful.

The consultations drew on the four stages in the drought cycle to explore the experiences in each stage, the support needed in each stage and the gaps in knowledge, products and services and opportunities for innovation in these areas in each stage. All consultation sessions included a presentation of the concepts outlined in Figure 1 to summarise the sorts of questions that would be asked about each stage in the drought cycle.

Figure 1: The four stages of drought

3 Methodology

The Victoria Drought Hub developed a detailed toolkit that the Nodes are using as a basis to undertake their consultations with stakeholders across their regions. The kit was developed in consultation with all Victoria Drought Hub partners. As well as taking into account the cycles of drought, the questions were designed using an ORID (objective, reflection, interpretive and decision) framework. The kit provides a set of questions for primary producers, farm services, statutory authorities, advocacy bodies, health services, water corporations, supply chains and another group named 'other'.

Six formal consultations took place in October 2021. A total of 28 individuals were consulted, from government, statutory authorities and banks. These individuals were representative of a wider proportion of the sector they were speaking to. Often having firsthand experience with their engagement with farmers, their community engagement or what they experienced themselves in drought in their business.

A draft of this report was circulated to everyone who participated in the consultations to seek feedback on how well the issues they raised, and the ideas they put forward, had been captured. This final report has benefitted from their feedback.

4 Responding to findings from the consultations

Following the consultations, several projects have been initiated and further planning is underway to address short, medium- and longer-term opportunities to improve drought resilience.

These are:

- Horticulture Skills Capacity Framework (completed)
- Think Tank – Farm Decisions (completed)
- Farm Management Deposits (in development)
- Blue Green Algae Management in Water Treatment Plants (water security & water supply) (current)
- Improving Water Allocation Forecasts (current)

Further to these, the following sections detail a high-level overview of some recorded outputs from the consultations.

4.1 Farming systems

- Improve drought tolerant varieties
- Improve/promote consideration of climate change, adaptation
- Develop holistic risk management strategies for farmers and communities
- Improve knowledge of water market mechanisms and water risk management
- Improved localisation of Bureau of Meteorology (BOM) data and information

4.2 Technology development

- Improve technological capacity and infrastructure
- Consider innovations from other regions, both within Australia and overseas
- Improve use of monitoring technology

4.3 Services innovation

- Develop community of practice in farm service banking
- Improve timeliness of access to supporting financial resources
- Improve understanding of financial support mechanisms (like review FMDs) and how to use them strategically

4.4 Mental health

- Promote recognition of mental health
- Improve mental health support

5 Consultations

The outcomes of consultations for the North West Irrigated Horticulture Node of the Victorian Drought Hub were initially organised into the various themes identified through focussed conversation technique called ORID. This technique helps focus interviews or conversations toward the outcome of 'what should the hub be working on?'. It is a purposeful, directed conversation and the questions help the participant come to a clear conclusion or decision about needed future actions. Questions were designed for different types of stakeholders (e.g., farmers, advisers, industry bodies, etc) and for each stage of the drought cycle.

A written record of the responses to questions from each consultation were entered into a data collection platform Qualtrics™. Using qualitative data analysis techniques, experiences in drought and ideas for enhancing drought resilience were coded and classified for each consultation and then grouped into common themes when compared with other responses within a node (to identify common themes at a node level-refer to individual node reports) and then across all nodes.

To collect information in a consistent way across all nodes, standardised questions, related to the different phases of the drought cycle, were developed to explore individual's and organisation's experiences of the stages of drought and their opinions on where effort needs to be targeted to improve preparedness or responses to drought. The consultations were also an opportunity for participants to identify the areas they wanted to be part of co-developing or investing in with the hub.

Once that process was complete, Tim Cummins, who facilitated each of the consultation session for the North West Irrigation Node, reaggregated the Qualtrics™ outputs in the form of a narrative structure suitable for further consultations in the local community. This report constitutes that narrative interpretation of the outcomes of the consultations.

That overarching narrative consists of three broad components, which are dealt with separately below. These are:

1. Dealing with drought on dryland farms
2. Dealing with drought on irrigated farms
3. Supporting drought-resilient communities

6 Outcomes of consultations about drought and dryland farms

What should the drought hub be working on?

A common view was that the drought hub should focus on giving farmers the tools they will need to support their decision-making during the **uncertain** period. By definition this work must be done during the **good period** and must be based on the lessons learned during **recovery**.

Ideally, farmers should have previously prepared drought plans to help guide their decision making during the drought. The nature of those drought plans is a researchable topic for the drought hub to be working on. The experience to date has been mixed, some participants were critical of the templates some banks were suggesting, but they all agreed that it was important to have a plan in place.

Often it is not clear whether there is a drought until halfway through a growing season. Crops should be chosen and inputs should be applied at levels consistent with knowledge of soil moisture levels and weather forecasts, but even so, it is common for the certainty of drought to arrive after those decisions have been made and the investments committed. The tough times will start well into that first season. Most participants saw it as important then to have gone into that season with two-years of stock feed in the shed.

It is vital for the drought plan to support decisions about the fate of failed crops. This is a critical decision point. The risk is that the grazing of failed crops, drying pastures, or residue stubble will reduce soil cover to levels too low to protect against wind erosion.

The aim should be to have as much flexibility as possible for diversifying operations over possibly several years of drought. The drought plan should therefore include stock management plans that allow for the removal of stock from paddocks before critical ground-cover thresholds are reached. Properly constructed and managed, on-farm stock containment areas are a vital tool in this respect. The drought plan should also identify thresholds for selling or keeping stock.

Severe soil erosion is to be avoided. It has lasting impacts on farm productivity, and it is costly to remedy. Importantly, airborne dust poses major risks to road safety by curbing visibility. It is also a widespread threat to respiratory health. It burdens regional communities with repeated cleaning costs, and it acts as a disincentive for tourism.

Participants had mixed views about whether Farm Management Deposits were a good thing to have. The future role of Farm Management Deposits is a researchable topic.

The node should focus on:

- Exposing farmers to new ideas and networks – the aim should be to get the Research & Development on the ground as soon as possible.
- Making Bureau of Meteorology information more localised in ways that farmers can really use.
- Encouraging the adoption of soil moisture probes on farms and in paddocks so that drought plans can be based around using localised information to support decisions.
- Explaining the risks and probabilities of actions that could limit the potential for catastrophic effects.
- Developing case studies of those farms that came out of the last drought with their businesses intact and with minimal environmental impact.

- Facilitating the development of tools that quantify the economic impacts of farm management decisions that affect soil health. (Ideally farmers should be able to compare the costs and benefits of keeping stock grazing stubble against the timely removal of stock to maintain adequate groundcover and mitigate erosion risks.)

What worked best and what didn't have much impact?

Final decisions on crop types and varieties are heavily dependent on rainfall and soil moisture. Farming systems have changed radically in the Mallee in the past 40 years since the severe drought in 1982-83. In broad terms, farmers are generating higher yields with less rain than was previously imaginable. In below average rainfall years, they now have the capacity, with large precision equipment, to sow seed quickly over large areas at the start of the growing season and then make later decisions about their level of investment in other inputs, such as fertiliser, based on subsequent conditions and ongoing weather forecasts. More grain is able to be stored on-farm than in years past. This helps to sell when grain prices are optimum and it provides a store to draw on for stock feed in dry times.

There are limits to this approach however, and this became most apparent in the Millewa in severe drought years of 2018-19, 2019-20 and 2020-21. Depending on people's approaches to sowing and grazing in those critical drought years, large parts of the Millewa became subject to severe wind erosion for the first time since the 1980s. Those different exposures to erosion risks persisted right up until rainfall improved in 2021-22. Some participants were of the view that those differences revolved around whether or not stock had been contained or if they had been allowed to continue grazing large parts of the farm.

Some also believed that the equipment necessary to cater for undulating landscapes also made the problem worse. Their view was that minimum tillage equipment requires reasonably level landscapes to operate effectively. Typically, this is achieved by undertaking a light cultivation often referred to as 'chaining'. This removes residue stubble and summer weeds and smooths the paddocks ready for sowing. Chaining usually occurs during late summer and early autumn. The downside of the practice is that if crops fail to germinate, large areas are exposed with little or no protective groundcover.

What have you advised your clients in the most recent good period to prepare for the next drought?

Fortunately, 2021-22 was better, many of our clients couldn't afford another bad year. Those whose businesses collapsed in that time at least had some consolation in the fact that the capital value of their land actually increased during the course of the drought. This was very different to the lived experience of the Millennium Drought (1996–2010) when land prices fell.

Sheep and livestock prices were also at an all-time high. Those who managed to get through the drought with their breeding flocks intact were very happy with prices at the end of the drought. Those who had to restock faced high prices to get restarted. Those who had to sell up completely had some consolation from the high prices.

High meat and wool prices offer an opportunity for further adaptation and greater diversity of income streams. The lessons learned during the drought about stock containment areas, hay and grain reserves and saltbush grazing show that, regionally, the sustainable flock size is probably higher than the total numbers going into the drought. Mallee sheep enterprises are less about self-replacing flocks and more about bringing sheep in on a short term basis to make use of standing crop stubble and grain spill from the previous season.

Some participants expressed frustration that the lessons relearned about stock containment areas during the most recent drought had also been learned through the Millennium Drought and the drought before that. In that context, they felt there was a need to think about the institutional arrangements necessary to provide incentives for good farming practices and disincentives for poor practices.

Over the past 40 years, advances in livestock production on mixed wheat-sheep farms in the Mallee have to some extent lagged behind advances in crop production – up until recent years. Larger machinery, precision agriculture, conservation tillage and larger paddocks mean that one family can now crop a much bigger area than was the case 40 years ago.

By contrast the size of the sheep flock that one family can manage profitably has not grown by the same degree. The imperative to remove fences to accommodate large, efficient cropping paddocks also fed into the trend towards smaller flocks. There is potential for virtual fencing to provide opportunities to reintegrate wheat-sheep production in the future, but this is still being developed.

Moreover, lessons learned from the recent drought show that it is possible, with proper planning and adequate preparation, to maintain a flock through even the worst conditions. The current high prices for livestock are encouraging a rethink about the role of sheep in the Millewa. Real fences are also going back in on several farms.

Stock containment workshops held during the drought helped to make this untapped potential more obvious. The topics covered included: how to set up and run water infrastructure and how to calculate and meet livestock feed requirements.

What impacts did you note in the region?

Mental health issues were a chronic concern in the Millewa during the most recent drought. Although it covers 260,000 hectares of farmland, the Millewa is a very small community. Going into the drought there were in the order of 50 to 60 farming families in the Millewa, and of those, twelve or so families accounted for the majority of the farming land. Unfortunately, some families found themselves badly exposed to wind erosion, while others didn't. This was seen as being a result of different circumstances or different practices during those first eventful sowing operations in what would turn out to be the first year of the drought. It was also seen to be a result of different approaches to livestock management or containment.

There wasn't much respite off the farm either. People travelling into Mildura to watch or play netball or football during a dust storm would sometimes be greeted with comments like: "have you come in to collect your farm?"

Many examples like this were given, including the concern expressed that during the heigh of the drought, that there were impacts of drought severely felt by service industries that engaged with farmers. They themselves needed tools and support in how best to support their clients year on year in a drought environment.

Various state agencies worked with local government, the Victorian Farmers Federation, and the Commonwealth to organise an open day at Lake Cullulleraine to discuss various support programs. Mental health professionals were on hand, in a low-key way, to provide support. There was an air of pessimism and a sense that a generation's worth of work on good soil conservation outcomes had been partly undone in just a few short years.

Farming families were fatigued, and some found it difficult to make decisions about what to do next. The coordination provided by local community groups was critical in helping to overcome this.

Within the broader community, particularly in Mildura, many businesses were also severely restricted. To have to clean dust from businesses and workplaces every day was expensive and very frustrating. Car yards were on a daily car cleaning rotation. Packing sheds and wineries and other businesses that were trying to sell fresh fruit to export markets felt that they were wearing the cost of poor farming practices.

Tourism was seen as a significant loser in the drought. National news coverage of daily dust storms was hardly conducive for alfresco dining or nature-based recreation. The media's focus on promoting bad news took its toll on tourism.

The off-farm work programs provided by various agencies supplied supplementary incomes. More importantly, they provided camaraderie, skills training, and breathing space to think about what to do during the drought recovery phase. Importantly they also provided an opportunity to talk out loud with a group of peers about the challenges and opportunities associated with the recovery. Those work programs also provided insights into the richness of the Mallee environment, the importance of natural resource management, and the roles of the government agencies they were working with.

For example, during the most recent drought, the Mallee CMA ran a Drought Employment Program that was available to people who had resided or farmed in the Millewa-Carwarp region since April 2019, who had suffered financial hardship as a result of the recent dry conditions, and who were prepared to work and travel as a member of a work crew.

The Drought Employment Program assisted struggling farmers and farm workers in the midst of significant dry and drought conditions by providing employment opportunities for environmental and community benefit. Not only did the program provide financial support for participants, it also provided the benefits of increased social interactions as part of a team and a sense of pride in completing important works.

The participants completed a total of 20,313 hours of environmental and community work. They completed 699 hours of training to improve their skills and broaden their employment prospects. And they partnered with 15 different organisations, including nine community groups, to complete much needed environmental and community work that may not otherwise have been funded.

The program provided otherwise isolated workers with a social environment where they could work with others experiencing similar difficulties to develop a sense of pride and achievement in the completion of important environmental projects that were valued by the communities they worked with. Socially, this enabled them to relieve their financial stresses, improve their wellbeing, and increase their morale.

What were the main banking products or advice your clients were seeking?

Leading into the drought is the really tricky phase. How do you identify 'leading into drought'? How do you know you're in this period. The reality is that you don't know until you're well into the first year of the drought. There is much uncertainty in this period.

It is at that stage that the farming family should ideally have a joint discussion with their agronomist, their accountant, and their bank about their options and how they might be able to absorb the different risks associated with different options. That is what should happen, but in practice it does not happen often.

One of the main reasons this does not happen often is that accounting resources are often focussed on tax minimisation. By definition, minimising tax involves channelling the profitability of the farm enterprise into other arrangements that attract less tax. From a banker's perspective this can make it harder to justify loans to the farm enterprise *per se* because its profitability is not as transparent as it might otherwise have been.

The farming family should start these discussions with an agronomist who is familiar with all aspects of their farming business; talking with an agronomist who is only familiar with the input side of their business is insufficient. The aim of this discussion should be to identify a range of options; it should not focus on designing one narrow path through the drought.

The agronomic opportunities and challenges vary with each drought. For example, during the Millennium Drought (1996–2010), when irrigators were affected more severely than they were during the most recent drought, dryland farmers were able to make money by converting failed crops to hay to be sold to irrigated dairy farmers. In the most recent drought the available stores of hay, grain and failed crops were best directed internally towards the livestock side of the farm enterprise.

These agronomic options should then be discussed with the accountant to determine the impact of each on cashflow, on the balance sheet, as well as on the profit and loss statement. A budget should then be prepared for the preferred options, and this should then be discussed with the bank.

Bankers work with many different clients in the same regions and in the same industries, they use their understandings of what other farmers are doing to talk through a proposed budget and to test ways in which it might be tweaked. The closer to the start of the leading into drought period these discussions start the better.

An early part of these discussions starts with reviewing what happened during the last drought and thinking about what has changed since then. Some of the changes will be internal. For example, comparing the family's age and stage this time around with that at the last. Other changes will be external in terms of commodity prices, industry trends and the nature of the drought.

The conversations are different with families facing their first drought. Debt levels at this stage are likely to be high and the family will not have as much experience to draw on.

In all situations, bankers will want to make sure that the budget does not overcommit the family. They will not want to take their clients to the limit at the start of the drought, whey will want to ensure that there is some buffer, some ability to provide funds later if they are really needed. They will want to impress on the family the reality of dealing with uncertainty. Just because something worked during the last drought does not mean it will work for the current drought.

The most important thing is to have a plan. The second most important thing is to be willing to change the plan if it is not working. The worst thing is to have no plan. Without a plan it is hard to make any decisions, and it is harder still to make consistent decisions.

In an ideal world the farming family would workshop their options jointly with their agronomist, their accountant, and their banker. Working closely together, working better, they will each find room for improvement in the plan and the budget. Together they will be better able to deal with the uncertainty of how the drought will play out and the uncertainty of how long it will persist.

Working together they can also decide early on whether the best course of action is to seek the support of a rural financial counsellor. The counsellor may help them to access government support programs to get them back on track, or, if necessary, help them to prepare an exit strategy. It is better to seek advice from a rural financial counsellor sooner rather than later.

What were the first things you advised your clients in the recovery from drought period?

In the recovery from drought period, the immediate need is likely to be access to working capital to support the recovery of the livestock enterprise through purchases, breeding, or both. The most recent

drought was unique in that regard because property values kept appreciating despite the drought. This gave farming families increased equity to borrow against.

When it starts raining, it does not start raining money – the family will still be 12 months away from getting money. For those who had successfully been able to hold on to livestock this time, it turned out to have been a good decision; they did not have to compete in buying stock later.

Another thing to consider in recovery the is the replacement schedule for farm machinery. It is tempting to pull them out of the schedule to help with cash flow. But if they do pull out, there are risks associated with trying to play catch up for replacement machinery in a shorter period.

What have you advised your clients in the most recent good period to prepare for the next drought?

From a banker's perspective, it is important to keep looking at the fundamentals and the financials during all the drought periods. It is important for the farming family to do this with their accountant. The focus should be on financing to put the farm enterprise in a better position rather than minimising tax. It is unlikely the farm enterprise will go broke paying tax, but it is possible it will go broke trying to repay unnecessary debt.

The good period is the best time to think about preparing for the next drought. The farming family will have time to think about the next drought, and they be better placed to make critical decisions without the stresses and strains of uncertainty and hardship.

This is the time to build up reserves. Cash reserves, including farm management deposits, as well as grain and fodder reserves sufficient to weather at least two years of drought. It is also a good time to think about the optimum levels of farm debt necessary to fuel growth and prosperity.

7 Outcomes of consultations about drought and irrigated farms

A common theme in the consultations was that ideally irrigators should have thought through their water market strategy before they find themselves in the **uncertain period**. Similarly, they need to have thought through their approach to irrigation management in the event that they are unable to secure 100 per cent of their irrigation water requirements before they find themselves in the **uncertain period**.

Put differently, irrigators should prepare a drought plan during the **good** period based on the lessons learned during the **recovery**. And the consensus seemed to be that the main thing learned from the last recovery is that going into a period of low water allocations on an irrigation farm is not a time for half measures.

With the benefit of hindsight, irrigators now say that during the Millennium Drought they would have been better off making hard and fast decisions about which patches to dry off completely and which patches to irrigate to 100 per cent of their irrigation requirements.

Efforts last time to mothball some plantings, practise Regulated Deficit Irrigation on other patches, and reduce canopy size on other patches were generally judged to have done lasting damage to the vines or trees. Many people reported their plantings as taking up to four years or more to recover from those decisions.

The other main lesson irrigators took coming out of the Millennium Drought was that it is not necessarily best to try to secure 100 per cent of your seasonal water needs at the start of the season. Irrigators are now more likely to continuously purchase their water needs during the course of the season. While the price of allocations peaked above $1,000 per megalitre in October 2007, the first year of worryingly low allocations during the Millennium Drought, the median price for allocations that year was in the order of $325. The median price for the following 2008-09 season was similar but there was not such a spike at the start of the season.

Ideally irrigators should go into a low allocation season with an individual drought plan tailored to their situation. The drought hub could help irrigators' build up their 'water literacy' so that they can make informed decisions about their:

- Annual water budget – the total volumes of water required to produce an economically optimal crop for each crop and each variety
- Optimum carryover levels to ensure a start in even the worst seasons – in the expectation that there will be some increase in allocations as the season progresses
- Optimum water entitlement holdings – which would need to balance capital efficiency against drought risk mitigation
- Optimum portfolio of held entitlements, leased entitlements, and purchased allocations to complete an average season
- Threshold allocation announcements – fortnightly allocation percentages and climate outlooks – at which they would make a decision to dry off more land
- Seasonal water allocation purchasing strategy – outlining the timing of purchase decisions and the threshold allocation prices that would require a decision about whether or not to dry-off more land

To complement this water strategy, irrigators' drought plans should include a detailed understanding of the patches that could either be irrigated or dried-off separately. Their plans should also outline what scope there might be, if necessary, to install valves to to reduce the size of these patches to allow for more granular decisions about which patches to dry off.

Based on this understanding, and depending on commodity prices, each of these patches should be triaged to determine the order in which they could be dried off if necessary. The drought hub could help develop decision support systems for the triage operation.

What happened in drought last time and what were the main products or advice your clients were seeking?

Those irrigators who had spent $800–$1,000 per megalitre at the start of the season found themselves with serious cash flow issues coming into harvest. Many of them were severely stressed and finding it hard to make decisions. Bankers encouraged them to draw on their Farm Management Deposits. Often though the banks discovered that the irrigators' accountants had advised them to structure their Farm Management Deposits for tax advantages, and this made them less useful for drought management. Even where they could use their Farm Management Deposits easily they discovered that the cap on Farm Management Deposits no longer meets contemporary needs. Whether or not the cap should be higher, and the future roles of FMDs, are researchable topics.

It was easier to give advice to those who had a water strategy. Cash flow was also easier to manage for those irrigators who had secured part of their water using long-term leases rather than relying on the allocation market.

Things were worse for NSW irrigators in the first bad year. The NSW Government had announced full allocations against high security entitlements[2], but they then realised that their estimates for water availability had been too optimistic, and they put an embargo on, which limited NSW high security entitlement holders to using only half of their allocations. This was particularly hard on those NSW irrigators who had already sold some of their water allocations before the embargo was announced. The NSW allocation process was better in the second year; they didn't make the same mistake again.

What have you advised your clients in the most recent good period to prepare for the next drought?

Banks encourage irrigators to have a water strategy, but they stress the need for each irrigator to come up with their own strategy because every business is different. Generally, they say their larger clients will have a water strategy, but often their smaller customers do not.

If irrigators were using out of date irrigation techniques, banks encouraged them to upgrade irrigation infrastructure and pumps; they also encouraged them to adopt drip irrigation. Irrigators can make quicker and finer irrigation decisions with the latest technologies. Once irrigators set their individual parameters, such as, aim for soil moisture at this per cent, turn the pumps on for X hours, that sort of thing – they usually found water savings, but they also sometimes identified underwatering. The move to modern irrigation practices definitely saved them a lot of time and they were able to reinvest that time into critical decision making.

Bankers say that generally, their clients do not fully prepare for droughts, but if they've got sufficient equity, they will get through one or two years of hard times with the banks' support. Banks look at loan

[2] It is this class of 'high security' entitlements that traditionally supported irrigated horticulture in NSW. By contrast the less reliable 'general security' entitlements have typically supported rice-based annual cropping enterprises.

to valuation ratio and total business equity. In any given year though banks will also look at likely returns; the better the return on investment, the more they can afford to lend. Lending has been reasonably safe the last four or five years compared to say 2011 and 2012. Exchange rates then had the Australian dollar at parity with the US dollar or above. Australian exported fruit then was too expensive, and the domestic market was over supplied. There are cycles involved, and different industries cycle over different timespans.

The security necessary for borrowing against vine crops is less than that for orchards. Almonds are thought to be more sensitive to water shortages than citrus, while it is thought harder still to do damage to vines.

During the good period banks encourage irrigators to get their Farm Management Deposits set up to help cash flow when needed. Also, they encourage irrigators to think about leasing some water and not relying solely on the temporary market. The banks aim is to get some surety into the irrigators' cash-flow budgets. Banks want irrigators to think about what they should budget for water.

In recovery, what were the first things you advised your clients?

The main lesson people seemed to take away from the recovery was that sub-optimal watering strategies during the drought were counterproductive. Anything that had not been watered fully took several years to recover. CSIRO and others are said to have studied this, and the advice now seems to be to concentrate water on fully irrigating as much of the orchard or vineyard as possible and leaving the rest unwatered.

There are some variations between commodities all the same. For example, with table grapes there is no middle ground growers simply must not produce soft fruit. By contrast some red wine grape varieties respond well to Regulated Deficit Irrigation, but for those commodities that should be their normal strategy, not their drought strategy.

One of the main priorities in recovery was to start getting debt levels back down in a timely fashion so as to start building resilience for the next downturn.

What questions or advice do you remember your clients asking for, or you giving, in leading into drought?

People find it stressful looking ahead – trying to guess what the next season and water season will look like. The psychological impacts are significant, but it all comes back to having a water strategy. Irrigators need to know in advance what their threshold allocation percentages and prices are; they need to have thought through what their decision-making trigger points are.

The uncertain period is necessarily speculative. People look at Bureau of Meteorology forecasts, they look at storage levels they look at carryover levels, and they look at commodity prices. Even if they have a preprepared water strategy they need to adapt it to the circumstances they find themselves in. Water brokers have held forums where irrigators can hear about the information the brokers have been gathering and about how the brokers are interpreting things. Agriculture Departments on both sides of the river have also provided a lot of information.

There is potential for the Northern Victorian Water Resource Manager to make more accurate predictions about likely allocation outlooks using Bureau of Meteorology streamflow forecasts. This would reduce uncertainty and therefore reduce stress. This potential for improvement has achieved proof of concept and should now be developed into standard operating procedures.

In the recent 2019-20 dry period, horticultural irrigators were starting to wonder about where the water was going to come from. In the Millennium Drought the water necessary to keep horticultural crops

growing came from the dairy industry, but a lot of water has gone out of the dairy industry in recent years. A lot of water went out of dairying under the Basin Plan and a lot of it went out to support the continued significant expansion of horticulture in the Lower Murray-Darling region since then. One of the hidden factors is that a lot of horticulturalists also sold water under the Murray-Darling Basin Plan, but they have kept using the same amount of water. People are not as confident that their existing assumptions about being able to get through drought on allocation purchases will still hold true for the next drought.

Those irrigators who still hold their original entitlements, a lot of dried fruit growers for example, feel more comfortable about drought than those who are highly dependent on allocation purchases.

8 Outcomes of consultations about the role of government in the four phases of drought

What should the drought hub be working on?

The most important thing that both irrigation and dryland farmers can do to improve their drought resilience is to prepare a drought plan during **the good period**. A good drought plan will help them navigate their way through the **uncertain period** with more confidence. A good drought plan will also help them adapt, with greater alacrity, to the differences between the drought they planned for and the drought they actually confront.

Service providers, from both the private sector and the public sector, have a role to play in helping to facilitate the development of farmers' individual drought plans. The role of government is to provide services that the private sector either cannot yet provide at all – or cannot yet provide to all.

Drought resilience planning by support agencies during **the good period** is also important. One of the key lessons learned during the 2018-20 drought was the need for a well-coordinated approach by support agencies. Agriculture Victoria was instrumental in pulling together, on a regular basis, all relevant regional agencies concerned with service delivery, for planning meetings with representatives of drought-affected communities. This approach supported a highly coordinated approach to engagement, and it resulted in support activities that were timely, relevant, and targeted to community needs. It also avoided the unnecessary duplication of engagement activities, which would otherwise have been counterproductive.

While service providers may provide support, farmers, and farming families, must ultimately craft their own plans if they are going to have the confidence to adapt them in the face of changing circumstances.

For dryland farmers, some of the key things to be covered in a drought plan include:

- Optimum levels of stored grain and fodder reserves to build up in the **good period** to maintain stock numbers at optimum levels during the **drought period**.
- Stock containment plans for feeding those reserves to livestock in ways that minimise wind erosion during the **drought period**.
- Plans to match crop inputs (fertilisers and other agricultural chemicals) to soil moisture levels, in different parts of the farm, during the **uncertain period**.
- Decision-making thresholds for deciding whether to graze failed crops, or to harvest them for fodder, during the transition from the **uncertain period** to the **drought period**.

- Decision-making thresholds (stock prices, weather outlooks, and financial positions) for guiding either stock sales or feed purchases during the **drought period**.
- Decision-making thresholds (stock prices, weather outlooks, and financial positions) for guiding stock purchases during **recovery**.

For irrigation farmers, some of the key things to be covered in a drought plan include:

- Continuous improvement in understanding and applying the right amount of water at the right time during the **good period** so as to have the requisite skills during the **drought period**.
- Monitoring and mapping soil moisture, plant health, irrigation effectiveness, and plant age throughout the orchard, or vineyard, during the **good period** so as to be able to make informed decisions about which patches should be dried off in the **drought period**.
- Developing 'water-market literacy' in the **good period** for those irrigators who only participate in the water market during the **drought period**.
- Optimum levels of 'carryover' water to build up in the **uncertain period**.
- Decision-making thresholds (commodity prices, carryover levels, water allocation outlooks, allocation prices, crop performance histories, and financial positions) to guide early and informed decisions about which patches to dry off at the start of the **drought period**.
- Decision-making thresholds (commodity prices, crop performance histories, and financial positions) for guiding the renewal of irrigation systems and replanting crops during **recovery**.

Drought Hub projects that support the development and continuous improvement of individual drought management plans would make a significant difference to the region's future experiences of drought. Ideally individual farmers should develop their drought plans jointly with their agronomists, accountants, and bankers. Incentives for encouraging such joint efforts are also worthy of drought hub investigations. Incentives are especially important given that inertia during **the good period** naturally weighs against the production of drought plans.

The Drought Hub should also investigate the continued fitness-for-purpose of the Farm Management Deposit Scheme. There are two main issues to be better understood. The first is whether the cap on deposits is still suitable for the contemporary scale of Australian farm businesses. The other is to investigate the validity of repeated comments that many Farm Management Deposits are being used to minimise tax rather than manage drought risks as originally intended.

Tax benefits are intended to be the key incentive of the Farm Management Deposit scheme. It was designed to encourage farmers to invest liquid funds in Farm Management Deposits to avoid high marginal tax rates, with a view to withdrawing funds during low-income years so as to increase farm resilience.

However, the extent to which Farm Management Deposits are actually used to manage through drought, is unclear. Bankers see only limited relationships between drought and the withdrawal of Farm Management Deposit funds. They see the scheme as being primarily used for tax management and income smoothing, and they see scope for the scheme to be improved. This scope is worthy of further investigation.

It is also clear that farmers are using Farm Management Deposits in a variety of ways. Researching this diversity, and exploring the different ways that Farm Management Deposits could be used in individual drought management plans, could also help to optimise the use of the existing scheme while also identifying opportunities for improvement. Similarly, the scheme's interactions with other income averaging arrangements are not clearly understood.

What new ideas or innovation would help?

The University of Melbourne and Goulburn-Murray Water have tested the potential to use Bureau of Meteorology Stream Flow Forecasts to improve water allocation predictions. The current predictions are based on historical records of streamflows for only four scenarios (very dry, dry, average, and wet). The existing method is conservative, and it involves high levels of uncertainty; it assumes there will be very little rainfall, so normally the end of season determinations are higher than predicted at the start of the season. Using actual streamflow forecasts would reduce uncertainty and produce better predictions. This holds the single most potential to make better use of the water available in the season. With proof of concept already achieved, further developing this process should be a priority.

With the benefit of hindsight, it is now seen as a mistake to have dried-off public greenspaces during the Millennium Drought. People needed havens from the drought. Healthy green sporting fields, public parks, public gardens, and town entrances are now acknowledged as being particularly important to the sense of community wellbeing. Young farmers missed the opportunity to exercise their bodies and minds when sporting clubs were closed down during the Millennium Drought. These were missed opportunities for them to have some respite from the drought. They were also missed opportunities for farmers and affected townspeople to build camaraderie, and they were missed opportunities for their friends to offer comfort and support.

Integrated Water Cycle Management projects, which make use of non-rainfall-dependent water sources, such as recycled water, stormwater harvesting, and sewer-mining, are seen as opportunities for maintaining these community assets. Sporting clubs in other regions have also organised car washing days, where community members were encouraged to wash their cars while parked on the sporting field. Urban water corporations on the Murray system were also able to enter the water market to secure supplies to water these public spaces. Some water holders also donated water to be used on public spaces like sportsgrounds.

The increased prevalence of blue-green algae in the river, and in drinking water supplies, during drought periods is a common concern in the region. The incidence of algal blooms in the river is something that must be managed at the Basin scale. For example, under the Murray-Darling Basin Plan, river operators and environmental water managers are legally obliged to *'have regard to'* the potential for their actions to increase the risks to water quality.[3] Catchment management authorities and agriculture departments also strive to improve drainage management and on-farm nutrient management. The fertiliser industry is also working with farmers to improve nutrient management. Nonetheless, the nutrients already stored in riverine soils mean that blooms will still continue to occur when river flows are low, and temperatures are high.

At the regional scale there is scope to improve the design and management of water treatment plants to minimise the off-river impacts of algal blooms. One issue here is that individual urban water corporations see themselves as being too small to invest in the research and development of improved treatment processes on their own. The Drought Hub could play a role in coordinating joint action by

[3] https://www.mdba.gov.au/sites/default/files/pubs/flow-management-guideline.pdf (accessed 14 Nov 2022)

several urban water corporations in order to achieve the critical mass necessary to support such research.

What opportunities are there to improve policy?

There is a general consensus that more needs to be done to protect people's mental health, on farms and in drought affected towns, during drought. More ideas about the policy settings necessary to support that aim will be developed in further planned consultations with health professionals. Some of the key things here are coordination and collaboration between support agencies while working with existing community connections and networks.

More thought needs to be given to how best to support businesses in those towns where a high percentage of the workforce is occupied in agriculture, agricultural support services, and agricultural processing. It is good that the Rural Financial Counselling Service are now able to assist such businesses during the **drought period**, but it would be better if those businesses were able to prepare drought plans during the **good period**. This would help them to better identify the **uncertain period** when transport and retail businesses first start to decline, and the warning signs start to become apparent.

Plans need to be prepared during the good times regarding the risk management seminars and the education programs needed to support the community. They need to be on the shelf and ready to be rolled out during the **uncertain period** rather than part way through the **drought period**. Ideally those plans should also help identify when the circumstances are such that it is time to think about exit strategies.

How long does recovery take?

For irrigated areas, **recovery** takes at least three years to redevelop vineyards to close to previous yields, other crops take longer. For dryland farms it depends on livestock prices during the drought and to what extent the farm has been able to maintain livestock numbers. Recovery also depends on livestock prices at the end of the drought, the ability to finance restocking, and the quality of the grain harvest in subsequent years. It is also contingent on the availability of working capital to undertake the next seasons cropping program and the size of that program. The rule of thumb is that recovery takes three to five years.

Unfortunately, the **'recovery'** is all too often accompanied by a loss of resilience. The structures that work well in drought disappear with the first rainfall. Unlike other emergencies there is no automatic debrief after drought, so things get forgotten until the next drought. A regional drought management strategy needs to be put in place, and it needs to be exercised once a year.

9 Conclusions

The consultations to date have demonstrated that drought is a constant feature of farming in north west Victoria. Further consultations will help to build up the institutional memory of how we have adapted to the changing face of drought. The next drought will be different, but we can prepare ourselves and be better placed to continue to adapt next time.

When drought comes it is felt first in the farming communities, in the transport sector and in retail industries. The impacts on other communities are delayed. Recovery takes a minimum of two years for dryland agriculture and four years for irrigated horticulture. Bad news stories in the press also affect tourism industries. And consecutive years of drought lead to exits from farming

Continual improvement in drought management depends on preparation and planning for drought. Decision-support systems enable better adaptation. Predictive technologies can help to reduce uncertainty, and there is scope to improve farming systems through digital communications, innovation, and infrastructure upgrades.

Climate change will increase the imperative for adaptation. Drought provides a motivation for change, it drives innovation and the pursuit of sustainable farming practices. Consultations have revealed several researchable and actionable projects for the Drought Hub to research and develop.

Business-management skills, and decision-making skills – both on farms and in the small businesses in agriculturally-dependent towns – are the most critical ingredients for drought management. Farmers and business managers need their various sources of advice to be connected. Farmers working jointly with their agronomists, their accountants, and their bankers will improve the synergy of their operations.

The people of north west Victoria are particularly concerned about the potential for better management of mental health before, during and after the next drought. Reducing uncertainty, and supporting better decisions during the drought, are seen as key in this regard. There have been considerable improvements in the attention to, and management of, mental health, but more needs to be done. The community values the refuge offered by green spaces in managing mental health, and the amenity of towns needs to be protected in the next drought.

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