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Understanding social attitudes related to the success of area-wide weed management

PRELIMINARY FINDINGS FROM SUNRAYSIA

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Introduction

Weeds are one of Australia's most persistent agricultural and environmental challenges. The mobility of weeds, biological controls and herbicide resistance, means that weed management is a landscape-scale problem that requires community-wide solutions.

The need for weed management to work effectively across property and institutional boundaries, means that an in-depth understanding of the attitudes, practices and relationships of various actors involved in weed management is needed.

In mid-2020, over 80 growers, agronomists, consultants, contractors, extension officers, biosecurity officers and public land managers were interviewed as part of this social research project.

The aim of the interviews was to:

- learn about the diverse attitudes towards area-wide management of weeds across three case study regions: Darling Downs, Queensland; Riverina, NSW; and Sunraysia, Victoria.
- identify factors that explain participation in individual and area-wide management of weeds
- identify social costs and benefits of area-wide management of weeds and related practices

This report provides a summary of the preliminary results from the Sunraysia interviews. For more information about the project please contact: sgraham@uow.edu.au

Method

Eighteen people from the Sunraysia region participated in phone interviews between August and November 2020.

Seven of the participants are in information provision (including agronomy, industry extension and research), five are growers, four work for local or state governments, and the other two represent contracting and Landcare.

The interviews involved open-ended questions about interviewees' experiences with and perceptions of: the most concerning weeds in the region; the key issues surrounding the management of weeds; perceptions regarding area-wide management of weeds; and the future of weed management.

This document presents the preliminary findings of the interviews. No detailed analysis of the data is presented nor conclusions drawn. That will be conducted in the next stage of the project.

Weeds of most concern

Interviewees were asked to identify the three weeds of most concern to them. In response to this question, interviewees identified 28 different weed species that they were concerned about.



The five weeds that were most commonly mentioned as being of concern (in order of the frequency with which they were mentioned) were: ryegrass (6), barley grass (4), brome grass (4), couch grass (3), and fleabane (3) (Figure 1).

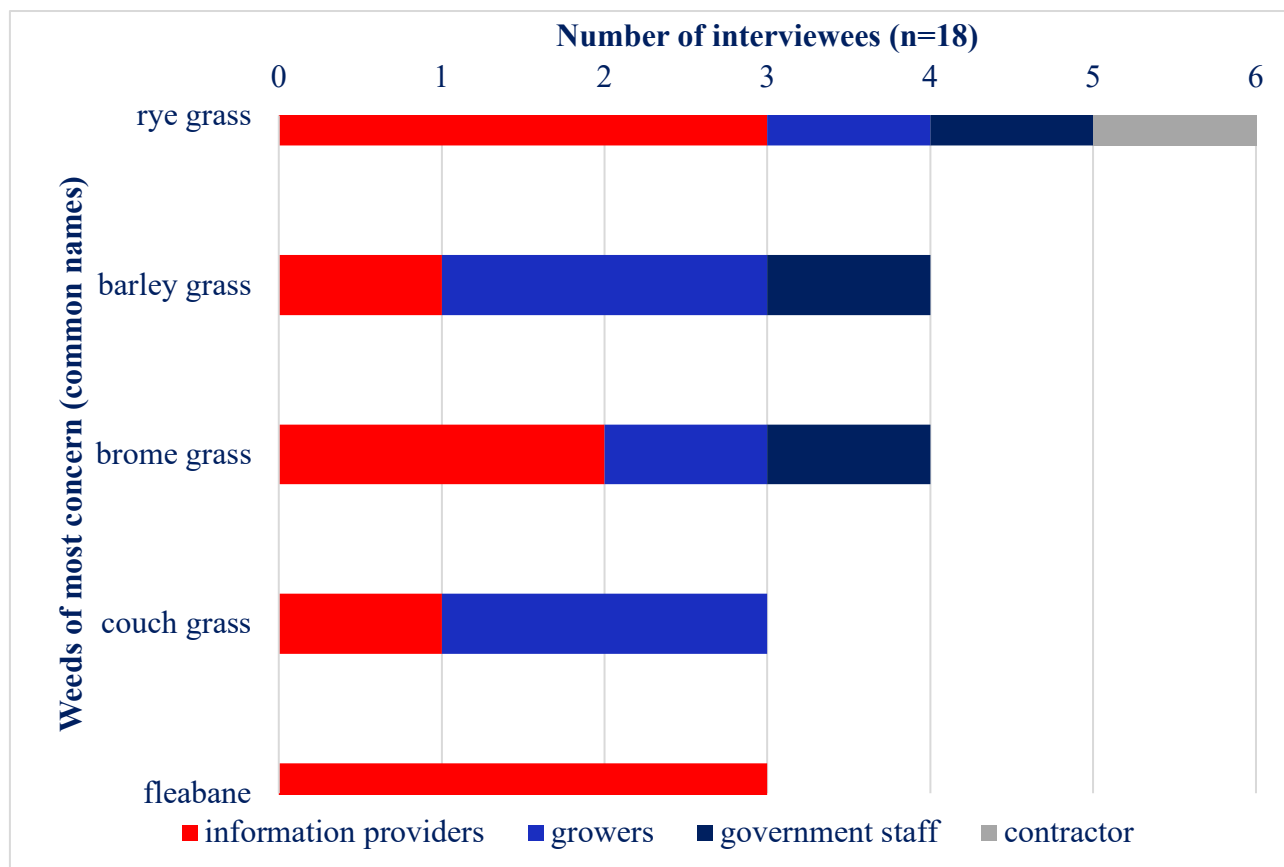


Figure 1. Number and occupation of interviewees who identified each weed as being in their top three weeds of most concern. Only weeds that were mentioned by at least three interviewees are included in this figure. The rest of the weeds were mentioned by one or two participants.

The reasons why the top five weeds were considered to be particularly concerning were:

1. RYE GRASS. Concerns were raised about glyphosate resistance in ryegrass as well as its unpredictability and the importance of timing control methods. Ryegrass is problematic for winter and summer crops.
2. BARLEY GRASS. Is hard to control and there are limitations on chemicals that can be used due to increasing resistance and regulations.
3. BROME GRASS. Particularly an issue for broadacre cropping, and it is also building herbicide resistance.
4. COUCH GRASS. Is a ground creeper that is hard to control, especially with limitations on glyphosate effectiveness and in organic farming where cultivating spreads it. Competes with trees for nutrients and water.

5. **FLEABANE.** The waxy leaf makes it hard to penetrate with herbicide and it spreads easily. It is building resistance to glyphosate

Twenty-three other weeds were mentioned by either one or two people as being in their top three weeds of most concern (Table 1).

Table 1. Common names of weeds of most concern to interviewees, which were mentioned by two (**bold**) or one interviewee.

African boxthorn	feathertop Rhodes grass	serrated tussock
alligator weed	Johnson grass	silverleaf nightshade
bridal creeper	khaki weed	sow thistle
buffel grass	Mexican feathergrass	spiny emex
cactus	mustard weed	vetch
caltrop	prickly pear/tree pear	water hyacinth
cobbler's pegs	red feather grass	wireweed
fat hen	scented night stock	

In addition to the weeds mentioned above, interviewees identified a further 26 weeds that are of concern to them (Table 2).

Table 2. Additional weeds mentioned by interviewees that were not among the list of those of most concern. Weeds that were mentioned as new or emerging are in bold.

African lovegrass	mesquite	skeleton weed
blackberry	moth vine	snail medic
camel thorn	mother of millions	soldier thistle
cat's claw creepers	Paterson's curse	spear thistle
dandelions	poverty weed	stemless thistle
gorse	prickly lettuce	stinging nettle
innocent weed	ragwort	wild oats
lantana	roly poly weed	wild radish
marshmallow	short-fruited turnip	

The most significant weed management issues

There were 14 significant issues that interviewees believe affect the management of weeds. Herbicide resistance and limited chemical options were the most frequently mentioned, being mentioned by 11/18 interviewees. The next most frequently mentioned was cost (4 interviewees), lack of coordination (4 interviewees), the timing of chemical applications (4 interviewees), and individual landowner responsibility (3 interviewees). The remaining issues were identified by one or two interviewees each.

- *Herbicide (glyphosate) resistance* – is problematic for a number of reasons, including the need to change to alternative, often more expensive, herbicides and other weed control options, and the timing of activities. It is also something that can be spread easily. As one interviewee explained:

Well, on-farm, obviously resistance is something that we're always sort of conscious of, and so we sort of, when it comes to chemical use, anyway, resistance, whether it be from our use or obviously a neighbour's use, that resistant seeds get across the fence line, so that's obviously one thing that we always keep in mind.

- *Limited chemical options* – there was some concern over regulation preventing use of certain chemicals. This included less timing options for spraying due to risk of spray drift, not knowing what to replace Roundup with, and the lack of options for different herbicide chemistries in Australia.
- *Costs* – both monetary and time costs were discussed. The increasing cost of chemicals was a concern, as was the time it takes to do effective weed control, and balancing costs and benefits of different weed management techniques. As one interviewee explained:

Like, you might spend \$1,000 a hectare per year on weed control but do you make \$1,000 additional profit by doing that? ...Because if you do nothing or very little, you could be actually getting a greater benefit overall, net benefit. You're not spending money, and potentially you're getting better nutrient cycling in the soil, you're not using herbicides, you're not burning diesel. Because even organics isn't sustainable.

- *Timing of chemical application* – waiting too long to apply herbicides can give weeds an opportunity to become established. In addition, there are challenges with timing chemical applications around key growth and sensitivity windows for specific crops. When the weather is unpredictable it makes planning herbicide control harder.
- *Lack of coordination* – among adjoining councils, between various government departments, among researchers, and with private land managers with respect to preventing the spread of weeds and managing weeds across boundaries. A government staffer made this observation regarding volunteer concerns:

I think it's almost a stereotype, that unless you've got some quite active and enthusiastic and engaged landholders, it's really down to the retirees and those type of people who have the time to assist. And we've got a really good example up in the Mallee region, up around in that I would say Manangatang, Swan Hill across to Ouyen area. They're really engaged and they're sort of active farmers, so sort of in that 35 years to 55-year-old group that were really engaged. But they were just getting hindered by the amount of red tape that they had to do to go through and get funding and then undertake works. And then manage their own farm. And essentially, to assist on roadsides and all, you know, to assist with that. And they were just, they burnt themselves out and tended to get federal awareness of it, state government awareness. But it just went by the wayside because, yeah, and now it's just fallen back to nobody's responsibility. Because we can't come in as a government if we don't have that community led support. So it's catch 22. If the support's not there and people aren't engaged, it does fall down to the too few, if that makes sense.

- *Individual landowner responsibility* – government staff expressed the difficulty of engaging diverse landholders in coordinated responses to weeds, particularly larger corporate farms.

The next 3 issues were mentioned by 2 interviewees each:

- *Constant stream of new weeds* – there always seems to be a new weed and it requires constant work and adaptation.

- *Drought and changing weather patterns* – weeds and weed management change significantly depending on the weather, and droughts and wet summers both make this difficult to predict and control.
- *Spray drift* – was particularly a concern among horticulture and organic growers.

There were also 5 issues mentioned by one interviewee each which included:

- *Importance of communication*
- *Concern about danger of chemicals*
- *Footprint of heavy machinery*
- *Lack of government understanding*
- *Very difficult to kill weeds*

Area-wide management of weeds

There was little consensus about what area-wide management of weeds is, the size of the area it would cover and the activities it would include. One interviewee mentioned he was struggling to understand the term and another was not sure it was an “attainable possibility”. There was more consensus around which weeds would be best suited to an area-wide approach and a handful of examples were provided of weed management programs that could be considered to be area-wide.

Overall, when interviewees were asked what the term “area-wide weed management” means to them, responses often included mention of a geographic area, who should participate and what sort of action is involved.

- **GEOGRAPHIC AREA** – the following terms were used to describe the area over which interviewees believed an “area-wide” approach would cover.
 - Landscape/catchment level
 - The whole community in blocks of 100,000 hectares
 - Roadsides and neighbouring industries
 - Group of farms
 - Across one particular industry
 - Wide area
 - Whole area
 - Broader base

Some interviewees referred to an industry-wide or cross-industry approach, rather than focusing on a particular geographic area. In doing so, interviewees recognised that a weed would need to be a significant problem across different industries.

- **WHO AND WHAT** – “all” or “cross” industry, “farmers and landowners”, and “community” were the most commonly used to describe who should be involved in area-wide weed



management and what it involves. The terms “everybody”, “everyone”, “all” and “across boundaries” were also used. Other key terms included “integration”, “responsibility” and “partnership”.

- **A diverse group of actors** – some interviewees gave lists of different actors who they believe should be involved in area-wide management of weeds. These actors included: farmers, landholders, volunteer groups, council, roads and transport authorities, state government, state water, etc.
- The following weed management activities were specifically mentioned by interviewees as potentially being part of area-wide weed management activities.
 - **Greater awareness and understanding** of how ones’ practices affect others. As one interviewee said: it’s “not so much farmers working together to control a particular weed but farmers understanding how their mode of practice might affect other industries and how that might have a detrimental effect. And then what they can actually do to improve their practices”.
 - **Collaborative partnerships** across boundaries (geographical, industry and otherwise)
 - **Integrated approaches** to pest, plant and animal control across farms
 - **Developing relationships** and understanding the system as **holistic**
 - **Explaining** and **demonstrating** benefits
 - Best (weed) management practice
 - Using all the weed control options available, not just herbicides
 - Maintaining groundcover
 - Cultivation
 - Preventing weeds from going onto neighbouring properties and thinking about spray drift
 - Keeping difficult cross-industry weed populations down, e.g. “the more noxious or insidious weeds that are really detrimental to all industries”.
- **WHEN** – timing was a big issue with 13 interviewees mentioning a temporal component to weed management. One mentioned that until there is “an area-wide strategy that acknowledges the impact on environment and economy” the broadacre industry will continue to “spend far too much time and herbicide spraying out troublesome weeds”. Another mentioned without coordination people lose momentum doing the same thing “year after year”. One interviewee mentioned the need for area-wide management to be a multi-year program.
- **WHICH WEEDS** –interviewees were asked if there were any specific weeds that they thought would be well-suited to an area-wide weed management program. The following weeds were mentioned. Numbers in brackets indicate how many interviewees suggested each weed.
 - Fleabane (4) – it comes and goes, is mobile, and “so hard to control”

- Feathertop Rhodes grass (3) – mobile and building resistance
- Ryegrass (2) – it is “a constant problem that everyone’s got” and “you let it go for a year or two and all of a sudden you’re overrun with it again”.
- Patterson’s curse (2) – it is starting to show up on roadsides and creeping onto land but can easily be controlled.
- Barley grass (1)
- Barnyard grass (1)
- Blackberry (1)
- African boxthorn (1)
- Caltrop (1)
- Short-fruited turnip (1)
- Onion weed (1)
- Roly poly weed (1)
- Spear thistles (1)
- Serrated tussock (1)

BENEFITS

When interviewees were asked what they perceive to be the benefits of area-wide management, or what would encourage people to participate in an area-wide program, the following enabling factors and benefits were identified.

- Reduced impact between industries leading to financial benefits and reduced conflict between industries
- Less confusion over who controls what and a more streamlined approach to weed management on public lands
- Greater capacity to send “real people” out to farms to provide advice and create “personal connection”
- Weed control will be more effective/rigorous
 - the costs will go down
 - it will take up less time
 - leaves funds for investing in other areas
 - it will help reduce resistance

COSTS

Many of the costs involved in area-wide management are similar to the costs that are often identified for weed management more generally. For example, a lack of money and time were the most commonly mentioned challenges associated with area-wide weed management.



- MONEY – five interviewees mentioned the financial cost associated with undertaking weed control, including the cost of chemicals, and the impact of such costs on gross margins. Mention was also made of the need to demonstrate benefits across industries.
- TIME – three interviewees mentioned time as one of the social costs involved in area-wide weed management. This included the time required to attend meetings and undertake the weed control, which was placed in the context of existing commitments and workloads. Mention was also made that area-wide weed management would require a long-term commitment.

CHALLENGES

Beyond the costs and benefits of engaging in area-wide weed management, interviewees identified the following range of challenges that may undermine area-wide efforts.

- LEADERSHIP – who would lead and coordinate an area-wide weed management program? Some suggested that an organisation is required that goes beyond industry, such as Landcare, council, or a local government department that doesn't “change its name every three years” and is across all the weed issues. It was recognised that a central authority would save time, as one interviewee noted:

where we're doing weeds, we don't have a system in place that is unique for all of us to put our information into...we were going to start a project, this project we're on now, when we went and we started, we realised someone had been there before. And it actually was the council that had been there before, so it was just like, 'ugh, you know, this is a bit time-consuming,' a day was lost working out who was there, where do we start.

- BRINGING PEOPLE TOGETHER – It was recognised that it is challenging to get everyone in a room to talk about weeds, as is evidenced by the challenge of getting everyone together for other common issues, such as water. There was recognition that some people don't want to be involved in area-wide programs because of the cost involved, or differences in industry restrictions and timings, or because they want to do their own thing. For example, one interviewee commented “I suppose every industry is the same, we're more worried about our own”, and as another pointed out, there's a myriad of different “personalities”, “goals” and desired “outcomes” across the different farms and industries in Sunraysia.
- DEMONSTRATING BENEFITS – aside from the long time it takes to demonstrate the benefits of an area-wide approach to managing weeds, interviewees identified that it is challenging to show individual benefits of participating. To overcome such a challenge would require formal monitoring and reporting back as well as education and awareness raising of the issues that can be mitigated with an area-wide approach.

Other challenges identified included the different timings for different crops making stream-lining on an area-wide basis difficult, communication among agencies and interagencies, unequal resources available to contribute to weed control among participants especially in different industries, getting a common understanding of what needs to be prioritised, what the options are, and what the best approach is.



EXAMPLES OF AREA-WIDE MANAGEMENT

Interviewees identified the following list of past and existing programs that they consider to be examples of area-wide weed management.

- Victorian Farmers Federation programs
- Skeleton weed program
- Fruit fly program (deemed unsuccessful by interviewee)
- Silverleaf nightshade program (15 years ago)
- Mallee CMA funding for protecting conservation areas from rabbits and weeds
- Mildura Rural City Council Roadside Invasive Plants and Animals Working Group
- Boxthorns – Landcare doing a lot around roadsides
- Cactus control
- Isolated gorse project
- Interagency weed mapping program
- Boneseed program
- Native saltbush trial

A couple of interviewees mentioned programs in other areas.

- The Mesonet Project in South Australia – a weather station project to help with best spraying conditions
- Queensland fruit fly program

One interviewee provided the following rich description of the isolated gorse program, an area-wide program that had been across a local government area. When asked what made the program successful, they clearly laid out the benefits of participation and how the program was organised.

So key stakeholder engagement, and early key stakeholder engagement. So engaging with the right stakeholders. I would have to say one of the key drivers is the enthusiasm and the direction of the project leader. Knowing, to know the area, to know the networks of who to engage, that's a really key one. I'm not saying that has to be a local, just someone that knows the area over a certain amount of time and can engage with the right people. Yeah, that's a key one.

And then it's about selling the message to the community. Yeah, it's about really informing the community of what can be done and showing them. And we use the carrot-stick mentality quite a bit, but it's about showing them what can be done and showing them that the use of their land, how much benefit you can have by 12, 18 months, two years of control, with said species. And explaining that...

So the stakeholders, the enthusiasm of the project leader and the clear direction. And the ability of the [Catchment Land Protection] Act...So we might be not happy with the Act completely, but it does have some really good processes. And this is one arm that has assisted us with said species.

Beyond weeds, interviewees identified the following as area-wide programs operating in and around Sunraysia.

- Rabbit control



- Goat control
- Nurseries for cochineal pest

Concluding remarks

These preliminary findings reveal that there are a wide range of weeds that are of concern to land managers across Sunraysia. The weeds that are perceived to be most problematic are those that display herbicide resistance, which makes them challenging to control.

While Sunraysia participants had a broad understanding of what an area-wide weed management program might involve, there was little consensus about the scale of the region it could cover, and the types of activities it could involve. The large variety of industries in the area was often the biggest concern. There were three key challenges—leadership, bringing people together, and demonstrating benefits—that would need to be addressed in the design of future area-wide weed management programs.

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