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

PRELIMINARY FINDINGS FROM THE DARLING DOWNS

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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 Darling Downs interviews. For more information about the project please contact: sgraham@uow.edu.au

Method

Seventeen people from the Darling Downs region participated in phone interviews between August and November 2020.

Eight of the participants are growers, seven work in information provision (including agronomy, agricultural services and industry extension), one works for local government, and one for 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 13 different weed species that they were concerned about.

The four weeds that were most commonly mentioned as being of concern (in order of frequency) were: feathertop Rhodes grass (15), fleabane (11), milk thistle (6), and barnyard grass (4) (Figure 1).

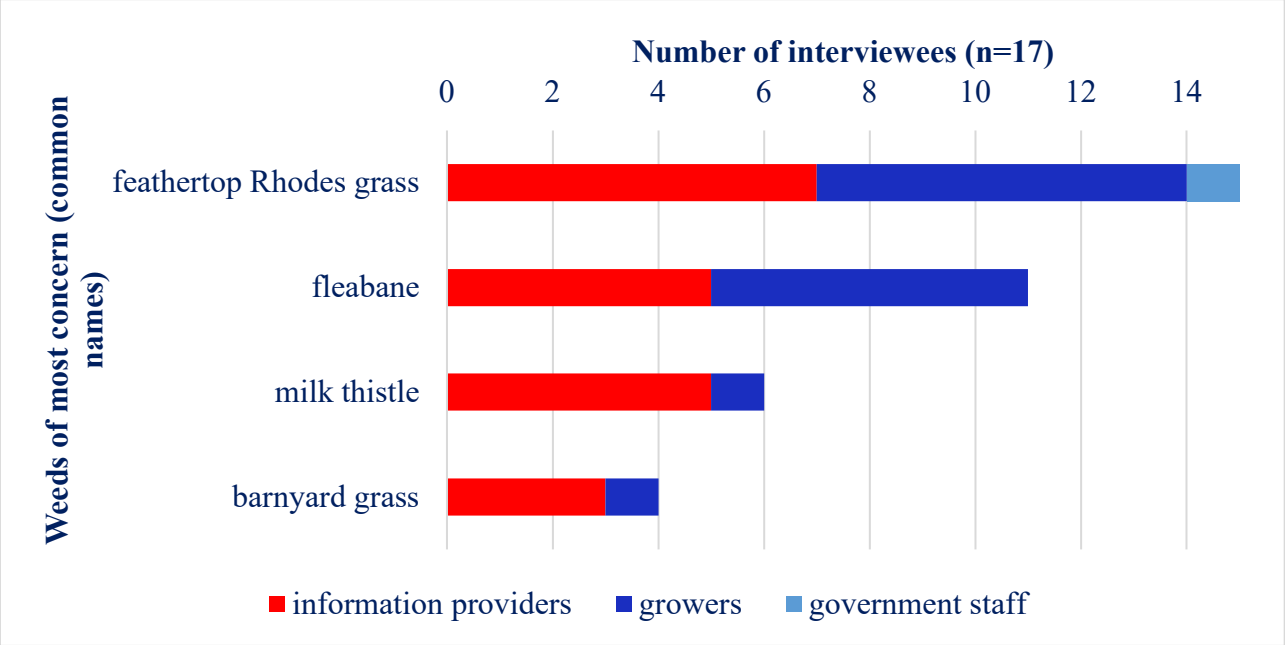

Figure 1. Number and occupation of interviewees who identified each weed as being in their top three weeds of most concern. Only weeds that were mentioned by at least four interviewees are included in this figure. The rest of the weeds were mentioned by one or two participants.

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

1. FEATHERTOP RHODES GRASS. Is often glyphosate resistant and is often found along roadsides. It is labor-intensive to remove and easily spreads.
2. FLEABANE. Is small-seeded and easily dispersed. Quickly becomes very difficult to control. Has some herbicide resistance.
3. MILK THISTLE. Dispersed primarily by wind and is a surface germinator. Has some herbicide resistance.
4. BARNYARD GRASS. Widespread and building resistance, “glyphosate won’t budge it once it gets past a certain stage.”

Nine 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	johnson grass	turbine
coolatai grass	lantana	urochloa
fire weed	**prickly pear/tree pear**	vines

In addition to the weeds mentioned above, interviewees identified a further 28 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.

bellvine	cat's claw creepers	privet	**tiger pear**
black oats	**Chilean needle grass**	**Queensland bluegrass**	turnip weed
bladder ketmia	**European bindweed**	rye grass	velvety tree pear
briar bush	**giant rat's tail grass**	**saffron thistle**	**volunteer cotton**
buckweed	marshmallow	shattercane	wild radish
caltrop	mother of millions	**tar vine**	**wild turnip**
castor oil	**nutgrass**	thistles	wire weed

The most significant weed management issues

There were 6 significant issues that interviewees believe affect the management of weeds. Herbicide resistance was the most frequently mentioned, being mentioned by 12/17 interviewees in the Darling Downs. The next most frequently mentioned were current practices not working (7 interviewees), competing priorities (7 interviewees), weather conditions (5 interviewees), other chemical concerns (4 interviewees) and weeds spreading from roadsides (2 interviewees).

- *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 issue of timing spray activities. It also affects all land managers, including those who use integrated weed management practices and have "good rotations". As one interviewee explained:

  > you've got to rotate, don't allow survivors, rotate your chemistry. Don't just be using chemistry but go back to using, you know, perhaps some cold hard steel. I know chipping has kind of, has gone out of fashion. Some growers are starting to use that again, but it's quite labour and time intensive and costly

- *Current practices not working* – this often went hand-in-hand with concerns over increasing resistance and included discussion on difficult to kill weeds, the costs of more complex chemistry and needing better technology like camera-operated chippers. One interviewee said we need "to think outside the square with weeds" and numerous interviewees discussed the need for more variety in weed management practices with a combination of chemistries, tilling, ploughing (although there was still hesitation about these practices due to lack of soil moisture during drought combined with flash flooding), livestock, groundcover and new technologies.

- *Competing priorities* – this included competing priorities and views between industries – what is a priority for one person is not necessarily a priority for their neighbour. It also included priorities in time and cost at the individual farm level. The time it takes to do effective weed control has to be balanced against other priorities, and the costs and benefits carefully considered.

- *Weather conditions* – Drought, combined with flash flooding and wind were mentioned as significant issues in weed management. The acknowledgement of tilling being a non-chemical option for weed control was often seen as not viable due to these extreme conditions.

- *Other chemical concerns* – this included increasing costs of more complex chemistry, the dangers of chemicals on soil biology, and concerns over chemical companies not understanding the Australian conditions.

- *Roadsides and waterways* – are seen to be problematic because they represent common areas where weeds establish and then move onto neighbouring properties.

Area-wide management of weeds

There was some consensus about what area-wide management of weeds is, the size of the area it would cover and the activities it would include. Many interviewees mentioned the need for greater public land management to stop weeds spreading into cropping areas, and a greater awareness and collaboration around waterway control due to flash flooding. Some interviewees mentioned needing to undertake programs on a smaller scale across the Downs, while one thought the bigger the better. 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. Two interviewees said they had "never heard of it" but thought there was value in working across an area to manage a weed problem.

- GEOGRAPHIC AREA – the following terms were used to describe the area over which interviewees believed than an "area-wide" approach would cover.
    - Specific smaller regions like Western Downs, Central Downs, Southern Downs
    - The whole community in a 15-20 kilometre radius
    - A group of landholders
    - Group of farms
    - An area with a particular weed problem
    - Neighbours
    - Smaller shire or Landcare group area
    - An area
    - A contiguous area of land with a particular species
    - Non-farmed areas that are not well-controlled

Some interviewees mentioned the need to focus on public lands like roadsides, and other council or government managed areas to effectively manage weeds spreading into cropping systems. One interviewee made an argument for smaller regions being more effective than a larger area:

> "So it might be, you know, merely a shire or a Landcare group area or something like that where you're going to have more people who've got some buy-in and skin in the game and try to get this sort of approach up and going on a reasonably small area-wide scale. You know, I think we'd be ridiculous to go, oh, let's get this going across the whole of the Darling Downs, whereas, and I think this is what's happening, you know, it might be let's target that area around Millmerran and Pittsworth or somewhere like that, and it might even only be where there's 20 or 30 different landholders, and that way they can be targeted individually and probably there is a little bit more likelihood of guilt on a local level by not doing something, than if they're part of some huge area-wide state type programme."

WHO AND WHAT – the terms "everyone", "everybody", and "working together" were the most commonly used to describe who should be involved in area-wide weed management. Other key terms included "coordination" and "cooperation". The terms "responsibility" and "involvement" were also used regularly.

- **A diverse group of actors** – Most interviewees gave lists of different actors who they believe should be involved in area-wide management of weeds. These actors included: neighbouring landholders, farmers and their agronomists, smaller growers, and public land managers such as Landcare, roads and railway managers, National Parks, and government at every level. One interviewee commented "any area weed management process would have to include governments in a big time, you know, to get serious about their responsibilities".

- The following weed management activities were specifically mentioned by interviewees as potentially being part of area-wide weed management activities.
  - **Greater shared awareness and understanding** of weed spread and responsibility. As one interviewee said:

    > "To me, I guess, it's more about the local farmers in a particular area or right across the area depending on the size of it, discussing the options and their issues and identifying issues early in the piece and implementing tactics that will mitigate that risk of spread or increased resistance and things like that. And keeping that to, I guess, keeping those weeds under control that it doesn't impinge on their production."

  - **Developing relationships and understanding the system as holistic** particularly pertaining to waterways and water-spread weeds.
  - **Combined/integrated approaches** to pest, plant and animal control across farms
  - **Education** on how herbicides affect soil profiles, the most impactful weeds and how they spread, "everyone trying to keep control of those weeds that we know are damaging the production [because] you're as good as your weakest denominator in this area".
  - Minimising seed set from **non-cropping areas**

- A **coordinated program** with clear weed targets
- Best (weed) management practice
  - Using all the weed control options available, not just herbicides
    - Maintaining groundcover
    - Utilising new technologies
    - Crop rotation
- **Pooling funds** across farms to purchase machinery and chemicals for weed management.

- WHEN – some interviewees mentioned a temporal component to weed management, particularly in relation to weather conditions including drought and flood. One mentioned the lack of good spraying conditions hindering effective weed management, while others discussed the difficulties in timing activities across different winter and summer crops.

- 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.

  - Feathertop Rhodes grass (14) – highly mobile, building resistance, spreads from public lands, and affects many landholders
  - Milk thistle (3) – small seeds that blow in the wind "for miles" and are "difficult to control"
  - Cactuses (2) – brought in from public lands and spread easily
  - Boxthorns (1)
  - Fleabane (1)
  - Fireweed (1)
  - Lantana (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.

- Mitigate risk of spread and resistance – particularly from roadsides and other public lands.
- Better return on investment in weed control
  - Pooling resources means spending less on weed control over the long-term
- Less impact from floods if water-spread weeds are managed at an area-wide scale
- Greater awareness of weed issues before they become a serious problem

- Acknowledge people for doing the right thing not just punitive measures
- Would lead to easier weed management overall

A number of interviewees said there would be benefits but did not specify what they were, e.g. phrases like "it would definitely be better", "it would be good", and it would be "ideal" were used more than once.

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 time was the most commonly mentioned challenge associated with area-wide weed management.

- TIME – Eight 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. As one interviewee said:

  "I think largely it's people's time. So what you want to do is trim down the amount of time that they have to spend thinking about doing something and just get them the wherewithal to do it with somebody there to go this is what you have to do, you have to do it now. I'm providing X amount to assist you with that, you'll have to provide this other amount. Because there's always this question about private and public benefit".

- MONEY – Six interviewees mentioned the financial cost associated with undertaking weed control, including the cost of chemicals, and technology, and the impact of such costs on gross margins, as well as the need to pay a coordinator of anything area-wide.

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.

- ENGAGING PEOPLE TO ACT – It was recognised that it is challenging to put education into action. As one interviewee said: "it's a bit tricky, I suppose. Like, you know, there's a lot of information out there on the weeds and stuff like that and workshops…but if people aren't engaging in that, it doesn't work, does it?' This was also evidenced in the large amount of interviewees who said they liked to just "do their own thing" and focus on their own farms.

- COMPETING PRIORITIES – in the heterogenous landscape of the Darling Downs, different weeds are issues for different stakeholders, as one interviewee stated, "what's bad for one is seen as a positive for somebody else. So you've got those competing priorities".

- GETTING PEOPLE TO WORK TOGETHER – There was some skepticism as to getting people to participate in an area-wide approach to weeds with mention of "different mindsets", and a belief that people do not like being told what to do. There was also the belief that people are already doing enough working on their own, as this interviewee demonstrates:

  "I think these days with so many people with their own ideas and their own ways of doing things and respect for others, to go to your neighbour and say, look, we need to work together to control this, then he might think, well,

> I've got it under control, I don't think I need to do anything, so off you go, do it on your own. I guess if you can control your own patch you are contributing to the area-wide programme. So in a way if there was an area-wide management, I would like to think I'm already doing it."

Other challenges identified included who would take leadership, the difficulty of getting public land managers and farmers to work together, as well as small and large farms, and the idea that you would need 100% uptake for an AWM plan to work and that that would be "almost impossible".

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.

- Field days on chemical registrations
- Landcare woody weed control
- Farmers groups
- Tiger Pear in New England
- Hudson pear in Lightning Ridge
- WEED-IT technology
- Toowoomba Regional Council targeted management areas
- CRDC guidelines on when to spray to manage resistance
- Satellite maps for cotton spray drift

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

- Heliothis caterpillar management in cotton
- Landcare pig project
- DAF armyworm program
- Areawide pest control – consultant driven

Concluding remarks

These preliminary findings reveal that there are a wide range of weeds that are of concern to land managers across the Darling Downs. The weeds that are perceived to be most problematic are those that display herbicide resistance, which makes them challenging to control, particularly feathertop Rhodes grass, and those that are spread by wind and water.

While Darling Downs 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. There were three key challenges— engaging people enough to act, getting people to work together, and competing priorities—that would need to

be addressed in the design of future area-wide weed management programs. Specific benefits would also need to be identified.

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