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# PERCEPTIONS OF STRATEGIES TO STRENGTHEN BIODIVERSITY MANAGEMENT – PERSPECTIVES FROM THE COTTON INDUSTRY

NLP2103 COTTON LANDCARE TECH INNOVATIONS: BIODIVERSITY MANAGEMENT RESEARCH

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In partnership with the Cotton Research and Development Corporation





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# **Executive Summary**

# **APPROACH**

This research aimed to explore grower and industry perceptions about strategies to improve on-farm impacts related to biodiversity. In particular, this project collaborated with Australian cotton farmers and consultants to explore values and attitudes about biodiversity practices, and what factors might motivate or constrain adoption of new practices (or strengthening existing practices). We conducted online surveys and interactive workshops with cotton growers and other members of the cotton industry.

# **PERSPECTIVES ON BIODIVERSITY**

#### There was general support for initiatives to tackle biodiversity loss, but agreement was not universal

Overall, the majority of participants agree that biodiversity loss is a serious issue in Australia, that it is an important issue for the cotton industry to address. However, this perception is not universal, with some participants not agreeing with statements about this issue. Although most participants within the workshops expressed support for industry initiatives in this area, it is important to recognise that initiatives may be needed to broaden this support across the industry.

#### Clear goals and support are vital for moving forward

There were differences in understanding about what the term biodiversity referred to. Uncertainty about the term biodiversity and its relevance to farming practices could limit grower engagement in industry programs. Initiatives to tackle biodiversity need to have clear definition and goals. Most participants

described that growers 'want to do the right thing', but a range of strategies will need to be deployed to generate widespread adoption.

# **GENERAL STRATEGIES TO SUPPORT** ADOPTION

Discussions revealed a range of strategies that were perceived to support adoption of these practices.



# **PERSPECTIVES ON KEY PRACTICES**

Results did not reveal a 'favourite' practice to consider for prioritising in biodiversity management targets. Participants considered management of feral animals to have a strong advantage (relative to costs) and was considered highly compatible with farming practices. However, participants described a range of opportunities and challenges for each of the four practices. We provide a range of criteria to consider behavioural prioritisation.

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Revegetation	<ul> <li>Opportunities</li> <li>High opportunity for change</li> <li>Accepted benefits for biodiversity</li> <li>Potential benefits for productivity</li> <li>Opportunity to link with existing schemes (e.g. carbon markets)</li> </ul>	<ul> <li>Challenges</li> <li>Need to activate social norms</li> <li>Need to address longer term financial &amp; production impacts</li> <li>Need to provide support &amp; skills to ensure intended benefits are achieved</li> </ul>
Stock exclusion	<ul> <li>Accepted benefits for biodiversity and water quality</li> <li>Share positive stories of change - benefits of the practice are clearly observable</li> </ul>	<ul> <li>Only available to some growers</li> <li>Need to address costs associated with fencing, maintenance, and water access</li> </ul>
Weed management	<ul> <li>Compatible with farm practices</li> <li>Accepted benefits for production and biodiversity</li> </ul>	<ul> <li>Existing uptake could limit scale of change</li> <li>Consider area wide management &amp; financial support</li> </ul>
Feral animal control	<ul> <li>Compatible with farm practices</li> <li>Accepted benefits for production and biodiversity</li> <li>Visible problem generates strong problem agreement</li> </ul>	<ul> <li>Existing uptake could limit scale of change</li> <li>Consider area wide management</li> <li>Alignment with farm goals may weaken biodiversity focus</li> </ul>

# **Approach & Scope**

# **RATIONALE FOR THE PROJECT**

The Cotton Research and Development Corporation sought to better understand grower and industry perceptions about strategies to improve on-farm impacts related to biodiversity. In particular, this project collaborated with Australian cotton farmers and consultants to explore values and attitudes about biodiversity practices, and what factors might motivate or constrain adoption of new practices (or strengthening existing practices).

# **PRACTICES TARGETS FOR RESEARCH**

The Cotton Research and Development Corporation identified four practices for focusing social research. These were

- Strengthening targeted revegetation and regeneration
- Improving stock exclusion from rivers, streams and wetlands
- Strengthening control of environmental weeds
- Strengthening control of feral animals

This project recognised that many cotton growers have some existing engagement in these practices. Because the focus of the project was related to *change*—specifically, improving outcomes related to biodiversity—this project designed questions that related to *strengthening* these practices, rather than maintaining existing practices.



# METHODOLOGICAL APPROACH

This project had two components

- 1. A quantitative online survey was developed to explore existing engagement in biodiversity management practices, and factors that may influence adoption.
- 2. A series of small focus groups with growers and consultants enabled rich discussion about the opportunities and challenges growers face when considering biodiversity management practices.

These were both conducted between June and September 2021.

## **Online survey**

Twenty-seven individuals completed the online survey: 16 were cotton growers, and 7 were consultants. The remaining respondents had other roles such as farm managers or worked in the extension industry. A range of regions were represented by survey respondents: while most were from northern NSW (21 / 78%) other regions represented included central QLD, Darling Downs, and Macintyre / Balonne. Respondents were involved in diverse types of farms: the most frequent type was mixed cropping (74%), following by irrigated and dryland cropping (56%), grazing (56%), and irrigated cotton (44%).

## Focus group discussions and workshops

27 individuals participated in focus-group style workshop discussions. Regions represented included Emerald, Gwydir, Dalby, Macquarie, South NSW, Namoi and Goondiwindi. Twenty-one participants were cotton growers, four were consultants, and others were industry representatives.

# **THEORETICAL FRAMEWORK**

In addition to exploring perceptions of growers about individual practices, we also apply a framework to explore elements of practices that may influence adoption of innovations—which in this case are biodiversity management practices. Specifically, we apply a framework from Diffusion of Innovations theory. Within this framework, practices are more likely to be adopted if

- The advantages of practices are perceived to outweigh the disadvantages,
- The practice is compatible with existing on farm issues, lifestyle, and values
- The benefits of the practice are observable to growers and to others
- The practice is easy to understand and adopt
- The practice can be trialled in some way (e.g. for a period of time, or on a smaller parcel of land) prior to making a larger commitment

# **ETHICS CLEARANCE**

This project was conducted in accordance with the Australian *National Statement on Ethical Conduct in Human Research* (Ethical clearance #5025, Queensland University of Technology)

# **Findings from online survey**

# PERCEPTIONS ABOUT BIODIVERSITY AND BIODIVERSITY MANAGEMENT

#### **Issue agreement**

More than half of respondents to the online survey agreed that biodiversity loss was a serious issue in Australia (62.5% scoring more than 50 on a 1-100 scale, mean=64, Range 32-100). Similarly, just over two thirds agree that loss of biodiversity on cotton farms would have a strong impact on the Australian cotton industry (73.9% scoring over 50, mean=60, range 7-100). Most participants agreed (79%) that it was important for people in their position to do what they can to protect biodiversity.



# Alignment between protecting biodiversity and contribution to the industry

Respondents were asked to indicate to what extent strengthening action to protect biodiversity would contribute to aspects of the Australian cotton industry. Most respondents indicated that biodiversity management would support integrated pest management (87%), support a 'clean, green' image for the industry (83%), and support a community licence to operate (79%).



# Current understanding about threats to biodiversity and strategies to mitigate these threats

Most respondents in the online survey indicated at least *some understanding* of threats to biodiversity (70.8%), how their practices influence biodiversity (73.9%) and strategies to protect biodiversity (78.3%). However, only a minority of respondents (1-2 respondents, 4-8%) described a strong understanding of these issues.



# Other perceptions that could influence adoption

Because many cotton growers may already implement certain practices on farm to protect biodiversity, we examined whether this existing engagement may pose a barrier to strengthening these practices via new initiatives. Most respondents (79%) agreed with the statement that cotton growers are not being sufficient acknowledged for existing practices. This suggests that any new initiative would benefit from incorporating a component to communicate and share narratives of success with regard to strengthening existing practices or adoption of new practices.

Nonetheless, only one third (33%) indicated that they already do enough for biodiversity and don't need to do more, and only 12% indicated that that don't need to take action because it's the responsibility of others.



# **EXISTING ENGAGEMENT IN SPECIFIC PRACTICES**

Respondents were asked whether they already engaged in each of the four practices. The practice with the strongest existing uptake was feral management, with all respondents indicating that they had engaged in some form of management of feral animals. The other practice with strong rates of existing engagement was weed management, with only 5% of respondents indicating that they had not engaged in weed management practices. The practice with the lowest rate of existing uptake was revegetation and regeneration practices: 32% indicated existing engagement, 32% reported 'a little' engagement, while 37% reported no engagement in revegetation or regeneration practices.



#### Insights for practice change - 'go for gold'

The biggest opportunity for change sits with the practices that have the lowest rates of existing uptake.

Based on the online survey results, initiatives that focus on promoting revegetation could elicit greater impact than initiatives that promote feral management.

However, it is important to consider why this practice may have lower rates of uptake, and ensure initiatives are able to address barriers. Orange area represents opportunity for impact

Revegetation & regeneration

### **ADVANTAGES OF DIFFERENT PRACTICES AND COMPATIBILITY**

Participants were asked to rate how they perceived the relative advantage of each practice, and how compatible it was with farming practices. Feral animal control exhibited the highest relative advantage, and the highest compatibility with existing farm practices. In contrast, revegetation had the lowest scores for relative advantage and compatibility.



Participants were provided with the option to add additional information about the benefits and barriers to adopting each practice (full responses in Appendix A)

For revegetation practices, the described benefits related to direct enhancement of biodiversity across the farm through providing habitat and wildlife corridors, improving the social image of cotton farming, increasing productivity, and assisting with carbon capture.

Challenges related to financial cost, time and effort, availability of land, and ensuring revegetation is linked to corridors and sources appropriate plant species.





The benefits of stock exclusion from waterways and riparian areas involved both benefits to biodiversity generally, and a range of indicators of waterway health, such as reducing erosion, stablising riverbanks, and improving water quality.

Challenges related to the costs and labour involved in fencing and fence maintenance, the impact of flood damage, lack of access to water, and impact on pest species.

Benefits of strengthening weed management practices were diverse. Responses included increased productivity and positive impacts on cash crops, reduced weed seedbank, and return of native grasses.

Challenges of strengthening weed management practices the high financial cost of controlling some weeds, especially chemical costs, minimising negative impacts on non-weed species, access to certain areas, herbicide resistance, the availability of 'softer' options including non-chemical control, and lack of understanding about the economic benefits of effective weed control.





The benefits of strengthening control of feral animals included benefits for farm productivity and biodiversity. For example, cited farming benefits included reducing crop damage and negative impacts on crop yield, improved biosecurity, and productivity. Benefits to biodiversity included greater abundance of bird and mammal species,

Respondents highlighted the importance of everyone contributing to feral animal control. Challenges to strengthening feral animal control included limited effectiveness without area-wide management, finanical costs and labour, limited effective control methods for some species, managing public image, and safety.

These findings suggest that management of feral animals and weed management are perceived to have strong advantages, and compatible with other farming practices. However, based on the description of benefits, there is not a clear link to biodiversity benefits, especially compared to revegetation practices. This suggest that if these 'standard practices' are targeted/prioritised for biodiversity management, then

additional communication would need to emphasise that additional benefits for biodiversity of these practices. If delivering biodiversity benefits required some change in these practices, a dependence on status quo may create a barrier to change.

# **ATTRIBUTES OF PRACTICES THAT INFLUENCE ADOPTION**

Participants were provided with a series of statements and asked to rate them for each practice (see Figure below). Overall, respondents agreed with statements that these practices are positive things to do, are helpful for biodiversity, and that other farmers would approve of these practices. In addition, respondents largely agreed with statement about having the capacity to engage in each practice, and that the benefits are observable.

Overall, responses for each of the four practices were similar, with a few exceptions. While revegetation and stock exclusion practices had the strongest ratings of being helpful for biodiversity, these two practices had less positive responses for a number of items. Specifically, there was overall disagreement with the statement that 'cotton industry groups agree that cotton farmers should adopt this practice". This suggests that the current social norms for these practices are not positive. Any targeting of these practices for industry-wide adoption would need to be accompanied by communication content designed to strengthen social norms – for example, emphasising wide-spread industry support for these practices, and sharing positive stories about growers who have engaged in these practices.

In addition, responses indicated that revegetation and stock exclusion are viewed as more challenging for growers, and less aligned with other farm priorities. This suggests that any prioritisation of these practices would need to ensure synergies between biodiversity practices and other farm activities were identified and promoted, and that barriers to engaging in targeted practices were identified and addressed proactively.





# **Findings from workshops**

# HOW DOES THE TERM 'BIODIVERSITY' RESONATE WITH GROWERS

### The term 'biodiversity' is not immediately meaningful

A number of discussions revealed that the term 'biodiversity' is not immediately clear to many growers. For some, it was a general term encompassing all of the natural environment. For example, as stated by one grower, biodiversity reflects both landscape features such as rivers, wetlands and pasture, as well as grasses and trees:

[biodiversity is] all of the environment that you've got around you... [the] river, wetlands... pasture, native grasses, trees..."

For others, it reflected not just the abundance of plants and animals, but how they interacted with each other. Some respondents emphasised the need to consider not just the larger components (such as trees or larger wildlife), but also small species and insects.

Another issue that emerged within these discussions was whether biodiversity should only be considered in non-cropping areas (with native vegetation and wildlife), or whether diversity of invertebrates and soil microbes in cropping areas was also an important component of biodiversity. For example, one participant highlighted that when considering biodiversity, they view microorganisms in the soil that support healthy soils and healthy crops as part of on-farm biodiversity:

> "...for me, we most definitely have two separate areas [of biodiversity], we've got our natural veg biodiversity and we've got our farming country—productive economic biodiversity. We need both"

#### Clear definitions and goals are vital for moving forward

Most participants were interested in understanding how biodiversity linked to their farming practices, but the lack of clarity about the definition of biodiversity made this difficult. For many participants the 'vagueness' of the term meant it was difficult to really think about in a specific way. For example, one participant felt that it was jargon, or a 'buzzword' and wanted more detail on what the focus actually was:

"...[I see biodiversity as]a bit of a buzzword, like sustainability ... what biodiversity

The lack of clarity about the term biodiversity flowed over into uncertainty about how biodiversity and success of biodiversity initiatives would be measured and assessed. Most respondents indicated that they would not know how to assess biodiversity on their property. As said stated by one participant:

"If I went in and tried to map my biodiversity, I wouldn't know where to start"

Many participants felt that—for the CRDC to move forward on this issue—there needed to be clear definition that resonated with cotton growers. One participant highlighted that they felt the issue of biodiversity management was currently 'asleep' for the cotton industry, and that they needed a clear charter, and clear goals about what needed to be achieved. For example, one participant said:

"[I] think CRDC need to be pretty clear as to what biodiversity... encompasses"

Participants identified a need to know many parts of this issue, including whether the focus would be on native vegetation, wildlife, or smaller species, and whether it involved maintaining existing biodiversity, or supporting increasing biodiversity.

"...are CRDC looking to increase biodiversity on cotton farm? Or are they looking to promote the [areas] where it already is?"

#### There is strong support for industry leadership on biodiversity management

Overall, participants indicated strong support for the cotton industry taking a leadership role in the area of biodiversity management, and viewed biodiversity as an important opportunity to 'do the right thing' and build social licence for the industry. One participant described how building a social licence via activities such as biodiversity management would generate long term benefits for the industry:

"I agree, it's all about social licence. I think long term benefits will come from biodiversity enhancement."

One participant described how engaging in these types of issues could be vital for the future for the industry: "we ultimately have to do something about these things, or we may not survive..."

### Growers 'want to do the right thing' but need support

Many participants identified that farmers "*want to leave their land in better shape than what they found it*". As said by one participant:

"I think we all want to do the right thing and introduce biodiversity wherever we can."

However, some participants also recognised that in practice, not all farmers reach this goal, and that there is room for improvement. As said by one participant as part of this discussion: "*if I had a dollar for every time that I'd heard that we'd be doing a lot better than we're doing.*"

#### **Key finding**

Uncertainty about the meaning of the term biodiversity and its relevance to farming practices could limit grower engagement in industry programs

Overall, most respondents welcomed industry leadership on this issue. However, any industry-wide initiative about biodiversity should communicate a clear definition of biodiversity and specific ways that it will be relevant to cotton growers



# **PERCEPTIONS ABOUT REVEGETATION AND REGENERATION**

## **Motivating factors**

#### **Benefits for productivity**

Some participants shared their experiences with revegetation and that they had experienced benefits in productivity. For example, one participant stated that they experienced a substantial increase in productivity in a particular vegetated area: "We're pushing up to 400% increase in productivity underneath old coolabah trees across our landscape, that's phenomenal."

Many of the secondary benefits for revegetation on productivity that emerged during discussions related to integrated pest management. One participant indicated that having beneficial birds and insects in vegetated areas saves "\$50 per hectare sprays and insecticide, that adds up every day of the week". A number of participants indicated that it would be useful to have more information about the specific benefits of these services, and to be able to put a value on these:

"...a big thing [regarding] this insect, bird and bat spectrum [is] trying to analyse how much contribution they give to control of pest insects."

In addition to benefits of natural pest management, a number of participants talked about benefits of shelterbelts for reducing spray drift and costs associated with pesticide use. One participant shared experience of international practices, where shelterbelts could also contribute to reducing erosion, soil loss and spread of crop diseases.

Another benefit mentioned related to revegetation and insect populations was benefits to populations of bees and other pollinators. One participant mentioned that showcasing and marketing bee-friendly practices could be a way to promote good practices:

"...the whole world is aware of bees now, [if we could say] 'no bees are harmed', I think that would really resonate [with the community]".

#### Being able to see positive change

Many participants described enjoying and appreciating visible changes in the landscape or wildlife presence that occurred after revegetation activities. One participant described how a colleague who has been engaging in revegetation activities for some time, has started to see native grasses return that hadn't been seen on the property for decades. Other participants described enjoying birds and wildlife. As one stated: *"I've never seen so many Zebra finches... it's pretty exciting to see"*.

With regard to seeing the benefits of revegetation, one participant described how it can be difficult for people to conceptualise if they don't yet have anything on their farm: For some participants, being able to

see the difference between their farm and other areas provided important insights about the benefits of revegetation:

"...there was [another] farm with very little biodiversity around, that gave us an opportunity to see the difference"

# Challenges

#### Financial costs

A consistent theme arising in all workshop discussions related to the financial impacts of revegetation activities. The types of financial impacts discussed were diverse. For some, the upfront costs of labour and materials—posed a significant cost to growers. For example, one grower mentioned that a budget for 3.7 km of trees (both planting and maintenance) to ensure survival for 5 years was about \$50,000.

In addition to upfront costs, many practices confer an ongoing negative impact on financial returns. This was viewed as an especially important consideration for revegetation, which involves changing land use from production-related activities to non-production. One participant described how they would love to revegetate some areas of the farm, but the ongoing financial impacts of converting cropping areas to non-cropping areas for revegetation activities would be too great. Overall, participants indicated that farms were businesses and needed to be profitable. As described by one participant:

We want an economic return on what we do, we don't want it to be costing us money, every year

While funding programs (see later section) could compensate for some of these costs, some participants noted that funding programs did not necessarily cover all the costs of the required actions. One participant described applying for a grant for funding for biodiversity activities, and said "*it would cost more to do what they expect than the payment that you receive in return*".

In many cases, financial costs were viewed as a barrier to more widespread adoption and many participants perceived that growers would not adopt because of these costs. As described by one participant: *"if you actually asked them to go and plant those trees and pay for those trees they probably wouldn't do it"* 

Related to financial impacts, some participants raised concerns about allocating land to non-production areas and the negative impacts that this would have on productivity. One participant highlighted that productivity was always a priority for farming: "*from a farming point of view, productivity is going to be the number one.*"

#### Benefits accrue over long time periods

One of the challenges with revegetation is that benefits are typically accrued over long time periods. For example one participant indicated that if a revegetation program takes 10 years or more to deliver a benefit or return, then many people will be less likely to adopt the practice. Another participant described how their farm generates economic returns quicky, but 'feel good' projects (such as revegetation) do not generate rapid returns. This aligns with research that shows delayed rewards are less likely to motivate change than immediate rewards.

Some participants who did engage in revegetation activities described how they had a long-term vision, and that the benefits were for the longer term and future generations: "*it's not for us, it's for the kids in primary school now, to get the benefit… down the track*".

#### Compatibility with farm conditions

The capacity for a grower to engage in a practice, and their capacity to expect to generate benefits, was in many cases dependent on characteristics of the on-farm environment.

For example, the opportunity to engage in revegetation activities can be limited by drought, or insufficient water. As one participant said, farming in a dry landscape is a barrier to thinking about tree planting activities. Another participant described the challenges in ensuring newly planted trees survive and become established.

Participants described how farm size can impact opportunity and capacity to engage in certain practices. Specifically, many participants felt that larger farms had more capacity to consider biodiversity management practices than smaller farms. In some cases, this related to the size of the business, where larger businesses were perceived to have more capacity to consider new practices. In other cases, this related to physical opportunity to adopt new practices, where smaller farms were perceived to have fewer areas that could be used for biodiversity management:

# "... the larger the farm they might have more area that they can do that. It's probably a little bit harder for the smaller farm."

While a small farm was perceived to offer fewer physical opportunities to consider new practices, for some respondents, poor access to certain areas of the farm could also constrain opportunity to adopt a new practice. In some cases, the presence of irrigation and other farming infrastructure also impacted suitability of certain practices. As stated by one participant:

"...Revegetation, and that kind of thing is, is, to large extent impractical when you've got irrigation infrastructure around the place."

#### Revegetation is not simple - conceptually or practically

With regard to revegetation, a range of challenges were identified, related to accessing plant stock, and promoting effective growth in difficult conditions. A number of participants stated that it is difficult, or in some cases *"totally impossible"* to source and access plants that are suitable for revegetation. This resulted in some participants shifting to practices which involved direct seeding. As described by one participant:

"...[a challenge is] actually getting plants to plant, there's hardly any nurseries, you can't get the plants, so that's difficult..."

Many participants highlighted that keeping trees alive can be difficult, especially in drought conditions.

A number of discussions highlighted that revegetation is not just about trees. One participant highlighted that while "*planting trees looks fabulous*" that there may be greater benefits and survival of seeds. A number of participants highlighted the importance of soil health, not just in cropping areas, but across a range of farm systems. As stated by one participant: "*when you start seeing grasses then we start to see better fungal numbers, so we're really focused, I guess, on how we can regenerate some of our country through getting particularly fungi back into our soils.*"

#### Lack of information or knowledge

Some participants indicated that they feel their current knowledge about a practice is not sufficient to support adoption. For example, with regard to revegetation, one participant described that they needed to know where to find information, what types of species to plant, and the suitable density of planting. Similarly, another participant described wanting to know more about suitable species for their area, and what is typically required to ensure revegetation thrives.

"I need to know a lot more about what different species need. I don't know enough about what's there and what it needs to stay there, and what it needs to thrive." Participants in all the workshops described the complex relationships between biodiversity management practices and impacts on diverse parts of the farm. One participant describes uncertainty about the best approach given the possibility of an unintended negative impact:

"I think sometimes we don't know what to do, - we do something that can have a negative impact"

Discussions suggested that the potential for practices to have a negative or unpredictable impact on biodiversity results in hesitancy to embrace these practices and could act as a barrier to adoption.

#### Compatibility with farming systems and geography

Discussions revealed that many aspects of the farm itself could support revegetation activities or create a barrier to engaging in revegetation. For example, some respondents suggested that larger farms had greater opportunity—in terms of space—to engage in revegetation than smaller farms. Another participant described their farming setting: because they had limited areas for substantial revegetation projects, that they looked to introduce shrubbery in non-productive areas, such as under power lines.

Some participants described planning for revegetation can be constrained by the physical presence of farming infrastructure. As described by one participant:

#### "Revegetation, and that kind of thing is to large extent impractical when you've got irrigation infrastructure around the place"

The opportunity to engage in revegetation activities was also considered to be limited by drought or insufficient water. As one participant said, farming in a dry landscape is a barrier to thinking about tree planting activities. Another participant described the challenges in ensuring newly planted trees survive and become established.

"...water has been quite limited. We've got some wildlife corridors, and we've lost probably 50% of the trees within those areas. They're quite hard to get water to, with that low rainfall."

#### Benefits undermined by secondary impacts

Many participants described the complex relationships between revegetation practices and impacts on diverse parts of the farm. Some discussions revealed that revegetation practices can provide entry points for weed dispersal and undermine effective weed management approaches.

#### Growers are at diverse stages of the 'biodiversity journey'

One issue that emerged a number of times in discussions related the need for clear goals about biodiversity management strategies. In the context of revegetation, this related to clarifying whether protecting existing vegetation was considered and 'rewarded' in a similar way to revegetation activities. For example, one participant shared their experience of finding it challenging to acquire funding for biodiversity projects because they had established trees that required maintenance—as opposed to planning to plant new trees. Their experience suggested that "*people don't seem to value even trees that are say 30 years old*" compared to new tree planting. This ambiguity could create a barrier to engagement, especially in those with established trees seeking support for maintaining ecosystem quality.

# Strategies to strengthen revegetation and regeneration activities

#### Financial incentives and innovative ways to value biodiversity

In addition to traditional grants and incentives, much of the discussion about financial support for revegetation activities turned to innovative ways to value biodiversity, such as carbon farming or

biodiversity credits. Some participants expressed enthusiasm for the opportunities that these schemes provided, as shared by one participant:

#### "I think that carbon [farming] is the greatest opportunity that agriculture has ever seen, and I think it'll be the greatest opportunity that I'll see in my farming lifetime"

Within the context of discussions on initiatives such as carbon farming, some participants expressed concerns about the negative impacts on production. In turn, participants were concerned that reduced productivity would also generate negative social impacts, such as loss of jobs, and secondary effects such as downturn in local communities. One participant said that biodiversity management initiatives *"shouldn't have negative socio-economic impacts on the community."* 

#### Information, education and extension

Discussions reveals that many participants were uncertain about identifying optimal tree or plant species for certain areas. As such, much of the conversation about information provision focused on advice about selecting species for particular geographic areas. One participant also described a situation where farmers on a neighbouring property were asking to see how they planted trees and maintained them, highlighting the potential contribution of skills-based extension in the areas of revegetation. Some discussions also highlighted the importance of clear information and support in navigating information services.

A number of participants highlighted the importance of providing growers with measurement tools to both assess 'where they were at' as well as gauge success, and "*knowing if you get it right*". One grower discussed the importance of demonstration sites as a way of learning from others.

#### Create flexible and simple entry points to encourage people with diverse needs to engage

Feeling that an activity is achievable is an important part of building a sense of capacity. Aligned with this, many participants suggested that keeping it simple, or keeping it small to begin with would engage more growers than focusing only on large-scale projects. As described by one participant:

"... if people start having those small wins and then the benefit from just one thing. Not trying to do [everything] at once, or, you know, just to in manageable sizes that, yeah, that aren't overwhelming in amongst everything else that people have got going on in their life"

Some participants highlighted that, when considering revegetation projects, they would like the flexibility to choose where to locate things like wildlife corridors, rather than overarching rules about what was required.



# **PERCEPTIONS ABOUT STRENGTHENING STOCK EXCLUSION FROM RIPARIAN AREA**

# **Motivating factors**

#### Easy to see beneficial impacts

Being able to observe the impacts of a new management practices has the potential to reinforce adoption and support continuing engagement in these practices. Some participants discussed being able to see onground changes, such as plant growth, after excluding stock from riparian areas. One participant described how they were surprised at the types of changes observed over the longer term after stock exclusion practices and how seeing this reinforced the impact of stock and stock exclusion practices:

"... to see the impact ten years down the track is pretty eye opening, particularly with those native grasses, and how much they are impacted by, not just stock, but all animals."

In addition to being able to see the benefits over time, many participants also described being able to see clear benefits for de-stocking one area, compared to areas that have not been de-stocked. One participant described being able to see the differences between one area of their property and an adjoining property:

"You can see it. If one farms got riparian zone that are un-grazed and the neighbouring property has grazed area, the difference in the quality of the environment is very noticeable"

#### In some situations, de-stocking may be easier than stocking

For some participants, identifying riparian areas that were difficult to stock (or crop) provided an opportunity to take positive action for biodiversity. As they describe:

"...well, it was hard to stock, and you couldn't really crop it, so thought we'll do something good for the environment. Take it back to what it was."

Another participant described that protecting riverine areas didn't require as many 'active measures' as revegetation, and all that was required was fencing and taking stock off the area:

"...fencing off a riverine environment. If you did that, that'll help. You don't have to plant necessarily, you just let it come back, just take the stock off."

Despite this practice being seen as an 'easy win' by some participants, it is important to note that many growers have minimal or no grazing stock.

### Challenges to strengthening stock exclusion from riparian areas

#### Cost and effort involved in fencing

While some participants found stock exclusion a relatively easy practice (compared to some high intensity practices), many participants pointed out that the financial and labour costs of installing and maintaining fencing could be considerable, and a barrier to engaging in this practice. One participant described that when finances were tight, many growers would not bother:

"There's capital and ongoing costs to doing all of this, which means a lot of people just say, oh, I can't be bothered. ... water from the river is a lot cheaper than putting a pump from a trough."

One participant described how balancing the fluctuating and competing needs relating to time and money, and the windows of opportunities relating to water level, often meant that these activities were not prioritised. As they described:

"When the rivers are low enough for you to do something, then you've got no cash and then once you're busy, you're busy cropping and getting cash flow, and it is one of those things that does get pushed to the back burner ... when you've got the time, you haven't got the money. When you've got the money, you don't have the time."

#### Loss of water access points

Some discussions revealed that for some growers, riverine areas provided important water access points with no immediately available alternative. Some participants highlighted, even when stock had been excluded from riparian areas, these water access points became more important in times of drought, which could led to reintroduction of stock in these areas. As described in one discussion: "all the good intentions in the world can come undone when finances are tight or … animals are starving"

#### Limited access to some riparian areas

A number of participants identified that in some areas, physical access to riparian areas was challenging, due to certain geographical features, and that this would create a barrier to maintaining fencing in these areas. Floods impacts also made it difficult to maintain fencing.

#### Cost in managing unintended emergence of weed species and feral animal populations

Many participants raised the issue that excluding stock from riparian or riverine areas would rebound presence of invasive weed species, and this would require additional management. One participant described how managing the secondary impacts of destocking were quite substantial:

"Quite often when we have excluded or locked up areas, they also become secondary issues with bushfire, pests, noxious weeds. So a locked up area that's not managed has its own massive set of issues and challenges".

In some cases, the grazing pressure from feral animals such as goats, or pressure from other feral species were perceived to also undermine the benefits of stock exclusion.

#### Lack of clarity about whether all stocking or only high-density stocking needed to change

One of the challenges with many areas of practice change is determining whether all levels of a particular practice need to be changed, or only practices of a certain intensity. This had an influence on discussions about stock exclusion. Some participants suggested that low numbers of stock have a negligible impact, whereas other suggested that temporary cycles of destocking and restocking might be suitable.

As described by one participant: "I don't really think our stock impact our river so much... we're not big graziers or anything"

# Strategies that could support strengthening stock exclusion practices

#### Financial support

Many of the discussions raised the issue of how funding support could enhance uptake of this practice. The types of funding mechanisms mentioned were diverse. While some focused on incentives or schemes to cover the cost of fencing, many discussed opportunities for innovative funding mechanisms based on revegetation or regeneration of riparian areas. As discussed above in the context of vegetation management, some of these discussions drew from carbon farming initiatives. In response to a question about what would enable them to protect more riparian areas, one participant stated:

> "More funding and hopefully more awareness of how important carbon farming is and some value on carbon farming"

Nonetheless, some participants viewed that financial incentives would not lead to practice change for everyone. One participant described the importance of developing '*enduring mechanisms*' where farmers could benefit from biodiversity protection.

#### Concern about non-voluntary approaches

The discussion about whether financial incentives could motivate practice change then led into discussions about alternative strategies, including non-voluntary approaches such as regulations. Overall, most participants were wary of regulatory approaches and felt that they could undermine engagement. As put forward by one participant, regulatory approaches would need wide-spread industry and grower support to be suitable:

"...regulating what you can and can't do - maybe that is the way of the future. But there would have to be an awful lot of support to come with that kind of regulation to say, 'we're not to have any livestock in a riparian area'"



# **PERCEPTIONS ABOUT STRENGTHENING WEED MANAGEMENT**

## **Motivating factors**

#### Weed management is part of farming routine

All participants shared experiences and challenges related to weed management. Because the workshops were held across diverse farm types, and different geographic areas, the specific weed-type that was the focus for each participant varied.

# Challenges to strengthening weed management

#### Financial, time and labour costs

Most participants indicated that weeds posed an ongoing management challenge, and that one of the key challenges related to the cost of effective weed management. As stated by one participant about strengthening weed management practices: "we would love to able to do it. It's just not something that economically is viable for us" Many participants described that weed management often requires extensive manual labour (e.g. spraying from backpacks, accessing areas using quad bikes) which poses significant labour costs. These costs can be hard to justify when the practice doesn't generate a financial return. One participant described that "we can't justify [these intensive practices] for what we're getting out of the country".

While the online survey indicated that many respondents find it easy to do the specific practices on their farm, discussion in workshops revealed that many aspects of these practices were challenging. For example, many participants described the challenges of effective weed management, especially in riverine environments or where accessibility is limited by thick undergrowth. As stated by one participant:

"controlling the weeds in these riverine areas would be very difficult to do." "every time you have a flood, a brand new species of weed pops up that you didn't have before"

For some respondents, poor access to certain areas of the farm could also constrain opportunities to adopt new practices. Farming country that had major gullies or was heavily treed was considered harder to access for activities such as management of weeds or feral animals. In some cases, large woody weeds in thickets makes it difficult to access areas for weed control.

One participant described how in many other parts of life, new technologies make life easier, but that this doesn't apply to weed management:

"...it's difficult. Yeah, in the rest of our lives, things are becoming easier and easier, or more convenient. These particular things [related to weed management] are very hard."

#### Lack of coordination and area-wide management

Participants highlighted that the practices of others in the region was an important influence on adoption of weed management practices. It was considered very challenging to manage weeds on farm if neighbouring properties did not contribute to effective weed management, due to dispersal of weeds. One participant described their situation:

"we do our best to control boxthorn, and they [neighbouring property] don't really do anything to manage their weed situation, which makes our work twice as hard"

#### Concern about unintended negative impacts

A number of participants also described how certain approaches to weed management could have a negative impact on other vegetation. For example, one participant describes how widespread application of herbicides can harm vegetation areas: "*I'd love to go in there with a plane and hit that [weed species] but then you bugger up your trees*".

Another participant described the potential negative effects of weed removal on bird life:

"If we do go in and clear the buckthorn, and briars and things, we may well have a detrimental effect on our small bird life that's down there. So it is a real balancing thing"

#### Different problem orientation

While most people viewed strengthening weed management as a viable action, and aligned with farm needs, not every participant shared the same perspective about the problems of weed management.

One participant felt that existing practices were adequate, and that additional effort was not required: "*I* don't see a need to strengthen our weed management program too much more, or, we've got a pretty good handle on what we should be doing."

Another participant indicated that they were not worried about weeds: "I'm not worried about weeds. We can handle weeds—if you can grow weeds, you can grow crops."

A number of participants also discussed the challenge in interpreting what was a weed, and what was not. For example, some species were native, but operated as a weed in farming country. Conversely, some viewed weed species as part of biodiversity, and that chemical control could pose a stronger threat to biodiversity than the weed itself.

#### Strategies that could support strengthening weed management

A range of strategies were discussed that could strengthen weed management.

#### Coordination and area wide management

Most participants agreed that area-wide approaches were important for effective weed management. As said by one participant:

"If you're on a watercourse, especially, everyone's got to be on board, otherwise you're going to be constantly spending the money to other people's problems." However, there was recognition that coordinated approaches were not simple, and required organisational input. As stated by one participant: "*someone needs to run it. That's always the crux of these things*"

#### Provide financial support and extension

Participants discussed a range of types of support that would help them or other farmers strengthen weed management. Financial incentives were discussed as one option to offset the financial costs of weed management. One participant said: "*it's a dollar factor. Ultimately what gets people over the line with things is an incentive.*"

Other types of support discussed were education and extension, to provide knowledge about the benefits of weed management and the importance of '*getting everyone on the same page*'. One participant also highlighted that some would also benefit from support in engaging with coordinated approaches, to offset the time and transactional costs involved in reporting and applying for funding. For example:

there's quite often a bit of reporting that goes with it and trying to get even a 1pager filled out can be very difficult at times ... it requires quite a lot of detail to work within those programs. So, having someone that's helping farmers [would be] beneficial"

#### Share stories of what people are already doing

Discussions about diverse weed management practices revealed that most participants recognised that farmers varied in the degree to which they engaged in strong weed management practices. Importantly, the positive practices of some farmers were seen as an opportunity to encourage others to adopt those practices, and that social influence was an important way to inspire practice change. As said by one participant:

"it'll evolve with peer pressure. The more famers that jump in the boat and do these things, [then] the guys that aren't doing want to jump in and make sure there's a seat in the boat"

#### Trial planting of native grasses

One participant suggested that trial patches of native grasses might be an important way to test the potential for these grasses to spread and replace weeds, reducing the need for weed removal.



# **PERCEPTIONS ABOUT STRENGTHENING MANAGEMENT OF FERAL ANIMALS**

# **Motivating factors**

#### Management of feral animals is part of farming routine

Like weed management, management of feral animals was a common part of the farming routine. All participants shared experiences and challenges related to the management of feral animals. Because the workshops were held across diverse farm types, and different geographic areas, the specific feral species that were the focus for each participant varied. Nonetheless, participants described being able to witness many feral animal species.

# Challenges to strengthening management of feral animals

#### Financial, time and labour costs

Discussions revealed that many approaches to managing feral animals were expensive, especially related to the actual costs of purchasing baiting systems. One participant described that grants did not always cover the full costs involved.

#### Some control methods are challenging or inadequate

Some species, such as feral cats, were viewed as particularly difficult to bait or trap effectively. For example, one participant described the challenges of controlling feral cats:

"Because they like the live kill, they're also tricky to trap. [So] apart from people walking around with shotguns I don't know what else you can do"

Similar to the challenges of weed management, some country was difficult to access due to the physical geography, such as gullies or trees. This makes it difficult or expensive to deploy feral animal control methods in these areas.

#### Lack of coordination and area-wide management

Participants highlighted that the practices of others in the region was an important influence on adoption. As described by one participant, managing feral cats on one property is unlikely to generate meaningful benefits in the long term if neighbouring properties are not also managing feral cats effectively:

"I think that's the whole point of biodiversity. ... you can't just look after your own patch, it's a bigger picture —there's no point in me killing all our cats if they're just gonna breed up next door..." One participant described their frustration when, even after discussing feral dog problems with neighbours, a single neighbour acts without consultant or working collaboratively with neighbours. As they describe:

"...often when you're talking to a neighbour, we, end up talking about [feral] dogs — and then you'll find that one neighbour has gone and done a 1080 program. And they ring up to say, 'oh, we just put 1080 round ...keep your dogs locked up' and [I will think] 'What the hell - Why didn't we talk about this as a group?'"

#### Focusing on species that impact productivity rather than biodiversity

Many participants described that there was generally more support for management of feral animals than there was for weed control. This was perceived to be related to greater issue visibility and clear negative economic impacts associated with some feral species. As described by one participant in response to this discussion:

"[feral animals are] easier to manage and also like it's the same cost for everyone. So if everyone's involved, there's no inequity in the cost of managing it... in terms of animal control, they're a much easier thing to see and control, they're cheaper. It's easier to organize a group of people to do it. ... Pigs will come in and cause an economic impact far more than some of the invasive woody weeds. So people are more willing to spend money getting rid of them"

Species that had a less visible impact on crops and productivity could go under the radar:

"we're not so worried about the foxes and cats just because they're not obvious and they don't seem to be doing too much to the crops themselves ... they're not front of mind because they're not eating the sorghum"

While impacts on economic productivity was a strong motivator for participants to support feral animal control measures, discussions revealed that focusing on species with negative economic impacts could 'distract' from control of species that were more important for biodiversity. As described by two participants:

"we've got a lot of 'roo pressure here on our wheat ... even though they're not feral, I think they are [a pest]"

"I know we talk ferals but ... 300 brolgas are every bit as damaging [to crops]... When a population gets out of whack, then, anything is a pest"

### Strategies that could support strengthening management of feral animals

A range of strategies were discussed that could strengthen management of feral animals.

#### Coordination and area wide management

Similar to weed management, there was general support for coordinated or area-wide approaches to feral animal control. As stated by one participant:

"I think we need to get better at working with the neighbours, we're not great at that."

Another participant suggested that coordination and funding would make an important contribution to practice change: "co-ordination and funding are probably the two things that would get a bit of action around here."

As mentioned above, discussions revealed that many participants believed that coordinated approaches would be easier for feral control than weed management. This was strongly related to issue visibility and problem agreement. One participant stated:

"Yeah, the feral animals ...It seems to be much easier to get agreement between people that live close by to control them whilst they're mobile - they're almost not as mobile as weeds can be"

Some discussion about area-wide approaches focused on coordinating funding or motivating individuals in a particular area, while other participants suggested that having coordinated support for things like surveillance (*"having someone come in and doing surveillance on number of goats"*) would help individual growers and support area-wide management.

While there was a general perception of strong problem agreement about feral animal control, some participants suggested that there will always be "*people who don't want to be part of it… that's just human nature*"

#### Provision of information and support – but avoid information overload

Provision of information was suggested as a helpful strategy to support area-wide management. As described by one participant:

"if there was a bit more advertising around that area, [for example] 'now is the months to go after foxes'"

However, some participants highlighted that information is not usually enough to support change, and that some growers may experience information overload:

"I get the need for more education, but, how many of the information sheets that come in the mailbox or on e-mail, do you comprehensively read, before you put them in the bin? Sometimes I feel like that stuff is wasted effort"

#### Provide opportunities to learn from other growers

In the discussions about learning and information provision, many participants highlighted that learning from other growers, hearing about their experience and seeing it on their farm was an important part of practice change:

" Seeing it occur on someone's farm, and that peer-to-peer discussion seems to work when you gather a group of grower's together. And they're actually visually seeing the benefits"

While visiting other farms in local areas was deemed to be the easiest way to do this (from the perspective of time and travel costs), this participant suggested that there are also strong benefits to seeing what growers are doing in other regions.

# STRATEGIES TO PROMOTE UPTAKE OF PRACTICES

# **Develop industry targets**

#### Most participants support clear industry targets

Overall, most participants indicated support for industry-led programs with clear targets. One participant stated: "*I certainly think there's a significant place for the cotton industry to be involved*". Some participants emphasised the need for clear goals. As said by one participant: "*I'd really like to see some goals and objectives… that we're going to work towards as an industry… There needs to be solid standards.*"

Some participants suggested that industry-led programs would be more successful than alternative programs. For example, one stated: "*industry programs seem to get a lot more traction, than something that government puts [out].*" Another participant felt that specific directions and goals would also strengthen success: "*If I had some quite strong direction from industry, ... that will assist with this outcome.*"

#### Targets need to be achievable

Many participants highlighted the need for targets to be achievable, and applicable to diverse regions and farming contexts:

"What, I guess, what I'm hoping to get out of it, is, like, if we do have some targets, they need to be realistic and achievable, and applicable for our region."

"Start small and build up to it, rather than a ridiculous, unachievable target to start with, which would turn people away from the whole concept."

#### Consider achievable entry points

While not a dominant feature of the discussions, many participants mentioned that being able to begin at a smaller scale—and know the benefits of small changes—would help them to consider new practices: "*if we kept it basic … that would be a starting point.*" Sometimes this related to accessibility and logistics of new practices, whereas for other responses, this related to juggling demands of everyday life. For example, in a discussion about revegetation, one participant suggested that recommendations for large changes would be overwhelming, and that starting small would be more feasible: "Not trying to do [everything] at once, just to do manageable sizes that aren't overwhelming"

In some cases, it was thought that smaller-scale projects would also have better chances being integrated into farming practices and being successful. One participant described having seen others take on large projects, but ended up unsuccessful because they were not managed well. This participant highlighted the importance of being able to fit in with routines: "… *it has to be, something that you can do, as well as doing all the other tasks on your farm.*"

#### Recognise existing achievements and individual farm characteristics

A challenge highlighted by some participants stemmed from the fact that growers may be at different stages on the 'journey' of biodiversity management. Some participants described how many funding initiatives are targeted towards people beginning small scale contributions to initiatives, such as revegetation initiatives. While these programs were recognised as important, they were thought to be less suitable for individuals who had made some progress on biodiversity management, or who had existing vegetated areas on farm and were seeking support to manage these areas effectively for biodiversity outcomes. When initiatives focus on providing entry points to enable growers to begin adoption of practices, this may create challenges for those who have made a start and would like to consolidate and strengthen their existing practices. This frustration was expressed by one participant:

"it gets quite frustrating ... there is no real talk around how we can fund the people that have passed phase one?"

This related to the discussion about clarity of goals mentioned above, and the need to clarify whether industry-led initiatives are seeking to increase biodiversity on farm, or look after biodiversity that currently exists. As described by one participant: "*the challenge is - are we looking after existing biodiversity or are we trying to replant, build biodiversity?*"

#### Preference for voluntary approaches

While most participants were supportive of industry-led targets, there was concern about whether this would result in implementation of regulatory approaches that would mandate or restrict certain activities. Some indicated a role for mandated practices *"most people won't do it, unless they have to"*, and the importance of clarifying what practices were appropriate: *"I think that's a big thing that we need to work out, what people can and can't do."* However, most respondents indicated that most growers would prefer to apply targets in a more flexible way, and that overly restrictive approaches may not promote engagement. As described by one participant: *"Targets always make me nervous. It's just that people choose to pick up on the negative areas."* 

## Provide financial support and innovative ways to value biodiversity

#### Strong support for financial incentives

Aligned with the major discussion on financial impacts of biodiversity management practices (as discussed above), part of the solutions discussed that would enable more growers to participate in these practices involved initiatives that provided financial support. Incentive programs could potentially serve to *motivate* participation in new practices, and by at least partly covering costs, would increase *capacity* of many growers to adopt new practices. As described by one participant:

"...there needs to be incentives - because it's not primary business probably for anyone to do this"

One participant stated that if growers had to cover the cost of initiatives such as revegetation, then this would be a barrier to engaging in this practice: "...*if you actually asked them to go and plant those trees and pay for those trees, they probably wouldn't do it.*" While most participants indicated that financial support was an important part of any industry initiative, some participants also recognised that financial support alone would not motivate everyone, and that some growers are just likely to be less interested in these practices.

#### Consider how to value biodiversity in new ways

Participants recognised that traditional approaches to valuing farming land do not adequately recognise broader values, such as those related to biodiversity management. As described by one participant, the capacity for land to generate ecosystem services is not always recognised, and therefore not adequately valued:

"A valuer will tell you that country's only worth [a particular amount] ... But the science around [what] ecosystem services ... contribute to the cropping system is pretty well established...It's just that we're not conditioned to see it."

Discussions suggested that not being able to adequately value biodiversity and related ecosystem services would limit uptake of biodiversity management practices. A number of discussions revealed that specific approaches to valuing biodiversity on farm were complex. One participant described a conversation with a neighbour about the challenges of valuing things such as wildlife on farm: "…*he showed me a photo of a koala that he'd taken down the river on his farm and I said, I asked him how much he thought it [the koala] was worth, and… we had a chat about it, like, what is it worth?*. Another participant suggested that

older trees should be valued in a different way to new trees, suggesting that "surely a 200-year-old tree is worth more than a one-year-old tree."

Carbon farming initiatives provided a potential example of how environmental services could be financially valued and provide ongoing credits to farmers. One participant described the importance of market-based financial incentives: "We need a financial reward and the way you have financial reward is to have a trading platform that you can trade your biodiversity ..."

Some participants had positive experiences of carbon farming programs, and many others were interested in the potential benefits that a program could generate. The enthusiasm that some participants expressed about these initiatives was seen in one comment: "*that's the brilliant idea to talk about carbon farming*. ... *at the end of the day to have some sort of a payoff*.".

Many participants were curious about whether a 'biodiversity credits' system would be feasible for the cotton industry: "people are asking the questions - is there a way that we can offset the cost of doing this [biodiversity management] in country that's currently not productive?"

Some participants discussed that, while there may be some overlapping practices that supported both carbon credits and biodiversity credits, there may be points of divergence in goals. In particular, one participant describe how this might play out when planning revegetation initiatives: if carbon was the only focus, then this would support planting trees, but important ecosystem elements to support biodiversity could be overlooked, such as understory and ground covers.

"...if they're not on the biodiversity [pathway] early enough, people will go down the carbon route, simply revegetating with tree—not putting in the ground covers, and the lower story stuff, which is all really important to get a fully diverse ecosystem. So, they're going to have to be on the biodiversity **with** carbon bandwagon"

Another participant highlighted the importance of acting quickly to value the more complex elements of biodiversity management practices, suggesting that if the industry didn't act on the current opportunity, then the opportunity could be lost: "you already have a new industry out there, which is the carbon industry. ... I think if the biodiversity isn't part of that somehow, then I do feel like biodiversity will get lost."

#### Recognition that other financial influences may emerge

Some participants highlighted that banks and financial programs were beginning to consider the sustainability of agriculture as part of their financing approaches, and suggested that 'green financing' approaches would also have an influence on how the industry tackled challenges related to biodiversity. One participant stated: "*I notice banks and insurance are really looking closely at this side of agriculture*."

While this may not be something the cotton industry can directly influence, understanding the broader context of financing may provide opportunities to integrate industry-led initiatives with the broader culture of financial systems. In addition, some emerging discussion suggested that growers could benefit from support tools that enabled them to assess their status with regards to sustainability. For example, one participant was asked by their bank if their farm had a 'sustainability statement'. Because they didn't know what this looked like, this participant suggested that support for developing these tools would be useful:

"We were asked in our annual relationship meeting with our banker if we had a 'sustainability statement'. 'Actually, no we don't, what does that look like? Just send us an example and we'll develop our own.' ...I don't even know what that looks like. ... so creating some tools for growers around that would I think be a real opportunity for us" One participant highlighted that stronger performance on environmental indicators may also influence decisions about investing in farms, where farms with strong performance on environmental management may be more attractive to buyers.

### Information, education, and advice

#### Provide clear information and advice

Many participants described a need for information and advice about which practices were recommended, and how to implement these in their particular circumstance. As said by one participant"

"We're engaged, we're keen - [But] what do we need to do? ... That's where we need some help"

Participants provided examples of areas where more support would be beneficial, related to all of the four practices. This related to both scale of the problem (e.g. "*what damage cats are doing to the system*") and information to make better decisions (e.g. "*if there was, it's a possibility of more weather stations to be put across the region. that would go a long way to helping [reduce chemical inputs]*."). With regard to revegetation, many participants described needing more information about many aspects of this practice, including the types of plants that were appropriate for their area, where to get plants or seed, how to minimise negative impacts, and how to maximise growth.

"I need access to education ... [such as information on] the sort of thing you should plant here and where to get that? Or, if I have to seed it myself, how do I do that? I still need more education on just how to do it well..."

In some cases, participants highlighted the importance of more active support, such as consultants, which could provide more tailored analysis of the whole farm and support an overarching management plan.

#### Provide opportunities to learn from others and directly experience new approaches

Much research describes how learning from others is a powerful way to support learning and promote adoption of new practices. Aligned with this, many participants described the value of learning from neighbours and other growers. As two participants stated:

"I think the successful thing is, neighbours talking to neighbours

"I think it'd be great to look a lot more into what guys are doing around the district"

Some participants highlighted the value of demonstration projects as a way to experience different approaches, while others described the importance of learning from researchers or overseas:

"we're starting to see some examples around the world, doing things very differently, and encouraged by that and we're starting to think about looking to do some of those things ourselves."

In addition to providing learning opportunities, participants also recognised that showcasing the practices of other growers can activate positive norms that motivate others:

"I think it'll evolve with peer pressure, the more famers the jump in the boat and do these things, the guys that aren't doing it they want to jump in."

One participant highlighted that demonstration projects may also be a means to strengthen community perceptions of the industry.

#### Provide tools to clearly gauge impact

The capacity to visualise a problem, or see the beneficial impact of a management practice, can influence adoption of a new management practice. However, discussions about the potential benefits of biodiversity management revealed that many participants described finding it difficult to gauge the benefits of diverse

management practices. A number of participants highlighted the potential for management practices to have a negative impact on biodiversity, and indicated that they would like feedback on whether they are 'doing the right thing'. For example,

"some of it, too, is about knowing if you get it right. What are we trying to do? Is it actually a positive or a negative impact?"

For some, being able to measure the positive impact was important for justifying decisions about biodiversity management practices, especially when there were trade-offs with production. For example, one participant described shifting pest management from insecticides to beneficial insects

"...trying to prove that decisions we're making around trying to trust beneficial insects to carry the load when most advice is to use insecticides, has been one of the more difficult things..."

#### **Recognise inter-connectedness of farm systems**

While a large part of the workshops involved asking participants about the four targeted practices, an important element to come out of these discussions is that participants don't view these practices in isolation, but see them as integrated.

It's a systems approach, we can't look at biodiversity just as the creek that's got a few trees around it and a bit of grassland or some weeds. It's that whole systems approach, we need to change the mindset - it's all these sorts of things, like how this riparian area or biodiversity area is actually contributing to the rest of the farm

For example, in discussions about revegetation, discussions included secondary impacts on weeds or feral animals, and the need to integrate, say, weed management, into revegetation initiatives. Similarly, in discussions about stock exclusion from riparian areas, discussions involved investing in revegetion activities in these areas and the need to manage weed dispersal via water flows.

# **Coordinated approaches**

#### Consider area-wide management

Participants described how many practices—especially those related to managing weeds or feral animals—are likely to be more effective is everyone within a region engages in the practice. For many participants, this results in a discussion about the importance of area-wide management approaches. As one participant described: "you can actively manage [problem weeds] and then next door can be doing nothing. And I think that's always been an issue … the group approach is the only way to do it"

In addition to strengthening the impact of weed and feral management strategies, discussions revealed that area-wide approaches could also motivate greater participation in practices; "*if you feel everyone is looking to do this, then you're more likely to get involved, than if you try and do it on your own… and that creates some motivation too.*" However, some participants highlighted that when neighbouring properties were not involved in farming, their motivation to participate in area-wide schemes may be limited.

#### Coordinated information and support services

Discussions about the different sources of information and support available to growers considering new practices revealed that many participants found it difficult to navigate the different organisations involved in this process. Some participants highlighted that the processes to support their engagement in sustainable practices were not clear. In some cases, this was confusion about which organisations were the most appropriate target for support. As stated by one participant: "*knowing where to go to get help ... is half the struggle*." For some participants, the diversity of organisation providing grants or funding opportunities created confusion. One participant described it as: "*because so many people operating in these spaces, it's really hard to get your head around it all*." This lack of clarity acted as a barrier for growers to apply for

funding. As stated by one participant: "*It's awfully hard as a grower to chase down grants and things*". In general, there was agreement that greater coordination of support and funding opportunities would be beneficial for growers considering strengthening biodiversity management practices.

#### Partnering with research institutions

A number of participants suggested that stronger partnerships with universities and research organisations would be beneficial for growers and the industry. One participant highlighted the importance of "making sure that we have the information coming through from researchers, and then practical examples in the paddock where that's working."

Another participant indicated that there is a disconnect between research and on-farm practices, and voiced their support for stronger alignment between these areas: "I *think the CRDC need to put a lot of effort into bringing that expertise to the table for us.*"

# **Synthesis & Recommendations**

# **GENERAL READINESS TO ENGAGE IN BIODIVERSITY PROTECTION**

Overall, workshop participants expressed interest and enthusiasm for the discussions about biodiversity management, and valued the opportunity to share their views and experiences. In general, the majority of participants in both workshops and the online survey shared their support for the cotton industry moving forward on the issue of biodiversity protection. Nonetheless, a small subset felt that biodiversity was not a major issue for cotton growers and that some were 'doing enough.' It is important to note that participants in these activities may represent a more engaged subset of growers and consultants, and that the level of support for industry action on biodiversity may be lower in the broader cotton industry. So while many supportive beliefs were shared, it is important to continue fostering a sense of importance and responsibility across all growers.

## **CONSIDERATIONS WHEN CHOOSING A PRACTICE TO PROMOTE**

Discussions in the workshops were wide-ranging and demonstrates that growers and other cotton professionals can identify benefits and barriers for all four of the practices discussed. These discussions did not reveal a 'favourite' practice to consider for prioritising in biodiversity management targets.

In order to facilitate decisions about practice prioritisation, we apply a behavioural science lens to both the online survey and workshop discussions, and provide a series of reflections to guide decision making.

# High opportunity for change

One factor to consider in prioritising practices is identifying which practice has the lowest existing rate of adoption. Such a practice has the potentially greatest capacity to elicit change. Quantitative survey results show that revegetation and regeneration practices have the lowest existing uptake. This means that potentially, any effective strategy to promote greater adoption of revegetation could create change in the greatest number of growers

The corollary of this is considering why this practice may have the lowest uptake: are there particular barriers that need to be overcome when promoting this.

# Compatibility with existing practices

Biodiversity management practices that are compatible with existing on-farm practices and production needs are more likely to be adopted. In this case, both online surveys and workshops indicated that management of feral animals and weed management have the strongest alignment with existing practices. There are a number of potential challenges working with 'high compatibility' practices. As mentioned above, high rates of existing uptake may limit the opportunity for change.
Importantly, many growers may have scope to intensify their current practices, which we recognise can be conducted on a spectrum of frequency or intensity. For example, existing engagement in feral management practices could reflect high-level feral management using the latest techniques, or more superficial engagement in basic feral management. The research methods used here tried to focus questions on 'intensification of practices', in the recognition that many growers may engage some management practices, but that many will not have reached the 'upper threshold' for feral management opportunities on farm.

However, there are a number of challenges for promoting practices where individuals have some existing engagement:

- (i) When faced with initiatives promoting the practices, individual recollection of existing activities could displace consideration of new practices, and reduce the perception that change is required.
- (ii) If these practices are strongly aligned with production outcomes (e.g. reducing animal impacts on crop damage), then any attempts to extend application of these practices for biodiversity outcomes could be weakened if growers retain a strong emphasis on production benefits.

If the industry does decide to prioritise these highly compatible 'spectrum' practices, we recommend that clear information and tools be provided to ensure that specific biodiversity targets are achieved, maintained, and celebrated.

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-	Opportunities	Challenges
Revegetation	<ul> <li>High opportunity for change</li> <li>Accepted benefits for biodiversity</li> <li>Potential benefits for productivity</li> <li>Opportunity to link with existing schemes (e.g. carbon markets)</li> </ul>	<ul> <li>Need to activate social norms</li> <li>Need to address longer term financial &amp; production impacts</li> <li>Need to provide support &amp; skills to ensure intended benefits are achieved</li> </ul>
Stock exclusion	<ul> <li>Accepted benefits for biodiversity and water quality</li> <li>Share positive stories of change - benefits of the practice are clearly observable</li> </ul>	<ul> <li>Only available to some growers</li> <li>Need to address costs associated with fencing, maintenance, and water access</li> </ul>
Weed management	<ul> <li>Compatible with farm practices</li> <li>Accepted benefits for production and biodiversity</li> </ul>	<ul> <li>Existing uptake could limit scale of change</li> <li>Consider area wide management &amp; financial support</li> </ul>
Feral animal control	<ul> <li>Compatible with farm practices</li> <li>Accepted benefits for production and biodiversity</li> <li>Visible problem generates strong problem agreement</li> </ul>	<ul> <li>Existing uptake could limit scale of change</li> <li>Consider area wide management</li> <li>Alignment with farm goals may weaken biodiversity focus</li> </ul>

## **GENERAL APPROACHES TO SUPPORT ADOPTION**

## Clearly define terminology and goals. Communicate these well

Many discussions about biodiversity indicated the potential to consider biodiversity on a number of levels – mainly, nature and wildlife occurring 'separate to' the farming system, or elements of the farming system such as soil microbiology. Such ambiguity is not only a barrier to effective communication, but also can be a barrier to change: where an individual is encouraged to engage with a vague or poorly defined practice, they may connect with elements of the practice that they are already doing, rather than seeing an opportunity for adopting new practices.

While many respondents raised concerns that many strategies to protect biodiversity are likely to have a negative impact on productivity, some discussions also highlighted that some practices may generate a production benefit. If a practice has the potential to generate a production benefit, this needs to be communicated clearly, and growers should be provided with tools to maximise this benefit.

## Provide specific methods or tools to measure goals and gauge success

A key driver of adoption of new practices is the perception that the practice is able to generate an expected benefit. In the context of practices to protect biodiversity, the lack of clarity about the exact nature of benefits, and subsequent uncertainty about how these benefits might be assessed is likely to constrain adoption. Being able to measure a benefit will also support continued engagement in new practices and reduce risk of dis-adoption.

When promoting new practices, it is important to provide specific examples of the types of benefits that they generate, and tools that enable growers to assess the degree of benefit occurring on farm.

## Promote observability and feedback

Many participants highlighted the importance of being able to visualise or monitor the benefits that specific practices have for biodiversity. Much research in behavioural science and adoption highlights the importance of feedback for enabling continuing performance of a practice. While feedback can take various forms, in this circumstance, if growers are able to see (directly or via monitoring reports) the specific benefits attributable to new practices, this would support continuing to engage in these practices.

Another opportunity to promote observability and feedback is via demonstration projects or peer-to-peer learning initiatives. Opportunities to see an initiative and its impact in real world settings that are meaningful to growers is an important part of gauging the advantage of new practices. Geographically, discussions indicated that these experiences do not need to be limited to the target region to be beneficial – but there are benefits to a region focus regarding local farming context and costs of travel.

## Consider the adoption targets and audience

For any scheme which intends to promote new practices (or strengthening existing practices), it is important to clarify whether a scheme requires only a small number of growers, or a large proportion of growers to engage in the practice to be successful. The type of strategy best suited to adoption will vary, depending on whether a scheme is targeting a small group of growers with strong existing motivation, or if a broader range of growers are targeted. If widespread adoption is the target, then it is important to recognise that this group will encompass growers with diverse levels of motivation, capacity and opportunity to adopt. As such, it is important to consider how to make support available to diverse types of growers. For example small vs larger farms, different farming systems, or those with strong existing biodiversity on farm vs those newly introducing biodiversity practices. If the perceived or actual equity in these processes is poor, this can limit program success.

## SPECIFIC TOOLS AND STRATEGIES TO PROMOTE ADOPTION

## Provide good information and extension as part of broader approach

The need for access to information and support is a key component of practice change, and the need for information and support applied to all the practices discussed. However, it is important to recognise that practice change research suggests that information may be a 'necessary but not sufficient' ingredient to support new practices. For those with existing motivation (as represented in many of our workshop participants), information can help overcome the threshold for change; for those without motivation or capacity, information alone is unlikely to elicit change. As such, information and extension services need to be part of a multi-faceted approach.

## Share stories of success

Learning from others is an important pathway for motivating change. Seeing how others have adopted practices, and sharing stories of what worked and didn't work, is an important part of peer-to-peer learning. Seeing what others have done can also strengthen social norms, which are an important influence on action. Both of these influences were recognised in these findings, and supported by growers. This highlights the importance of creating opportunities to share stories of those who have successfully adopted new practices.

## **Coordinate approaches**

Coordination can potentially occur on a range of levels. Area-wide management reflects coordination of on-ground activities within a particular region, whereas information and support services could also benefit from coordination at regional or national levels. Strategies such as area-wide coordination were viewed as especially important for weed management and feral animal control. In addition to strengthening effectiveness of weed or feral management strategies, area-wide management approaches could also strengthen social norms and social pressure to engage in these practices. When area-wide management approaches are initiated, it is important to communicate these well, as perceptions of trust and neighbours' action is an important part of the process.

While success of revegetation or vegetation management initiatives were less immediately dependent on the actions of one's neighbours, there may be benefits to link these programs within area wide approaches, as part of broader landscape connectivity (e.g. wildlife corridors), to strengthen social norms and to share practices and stories of success.

# Consider financial tools – especially when there are significant costs and impacts on production

Participants recognised that some practices can deliver a range of productivity benefits. Nonetheless, many of these practices have the potential to incur a high cost to growers. In addition, some practices— especially certain stock exclusion and revegetation programs—require significant upfront costs and have a negative impact on ongoing financial returns. There was wide-spread consensus that any initiative that

'actively encouraged' or 'required' growers to meet certain biodiversity targets, should consider not only the financial cost but ongoing impacts on returns.

## Make it easy to apply for financial support

Applying for grants and engagement in other schemes often comes with a high 'transactional cost' related to the time and effort to complete applications and gather necessary information. If funding schemes are developed or made available, ensure that these are designed to be do-able for most growers, and provide support to ensure a smooth and easy application process.

## Explore opportunities to create innovative financial tools – biodiversity credits

Much discussion centred around the potential for innovative financing mechanisms—similar to carbon credits and carbon farming schemes—to provide direct support for farmers engaged in biodiversity management practices. While it is beyond the scope of the current report to review biodiversity credit schemes, our findings suggest that there is interest from growers in exploring these options. Many growers are gaining experience with carbon credit schemes, and see these as a way of the future. A system of 'biodiversity credits' could strengthen both motivation and capacity for growers to dedicate time, effort or land to activities which would not normally contribute to production.

From a social perspective, experience with other funding mechanisms indicates that pursuing such a scheme for the cotton industry could consider a range of factors, such as transactional costs and equity of accessing such schemes, alignment with existing schemes and support systems, potential for negative social impacts, and ensuring goals and purposes are communicated effectively.

# Appendix A. Responses to open-ended questions in online survey

## **REVEGETATION AND REGENERATION**

## **Benefits**

Up diversity in neighbouring crops

Assists with carbon capture, helps biodiversity

Benefits for beneficial insects and animals, habitat increase, wind and soil erosion control

Biodiversity Sustainable production Social licence

Carbon offset? Increase beneficial insect

Habitat

Helping to improve biodiversity on-farm and helping to improve the social image.

Increase biodiversity (Simply for the sake of increasing biodiversity, with the additional benefit of decreasing reliance on chemicals hopefully).

Stabilise floodways.

Increased biodiversity, increased production,

Potential to increase arable or grazed land productivity.

Reducing erosion and creating nature corridors for native fauna

Rehydration, productivity of all farm resources and areas

to increase beneficial insects and wildlife

## Challenges

Confidence

Cost, loss of economic production area. Loss of arable area/ value

Cost and enthusiasm

Costs and availability of land

Costly for little short term benefit.

Cost

I only want to plant species that are already growing on the farm so I need to source the right tube stock or grow my own - more strategic section of the farm

I'd like to see other famers, governments implementing a much larger network of nature corridors to interconnect existing or planned vegetation.. I'd like to see farmers paid for existing veg or to re-veg areas in a structured/ centrally planned manner. Basically, one farm can't achieve much, esp when others continue to knock down tree lines etc. Some farmers could even clear more land for farming but just offset it with a tree line/ nature corridor in other Convincing some growers of the benefits and sometimes the cost involved can be a barrier.

Time, Time and money, Time and effort, Time consuming.

Weather for good establishment



## STOCK EXCLUSION FROM RIPARIAN AND RIVERINE AREAS

## Benefits

Bank protection, erosion protection Better river banks in water quality Biodiversity Erosion reduction, rehydration increased biodiversity healthier waterways Improved riparian zones and water quality Improving the stability of the river banks and improving the habitat for native species. increased biodiversity, stable banks (decreased erosion), connectivity maintaining a healthy river ecosystem Reducing erosion and trampling of ground soil erosion prevention, pest and disease management

## Challenges

Breeds pests Cost Cost, flood damage to fences and fence water crossings Costs, convincing some growers of the benefits and the difficulty of fencing some of these areas. Costs, fencing and floods! Costs, staff availability Flood damage to fences Floods, fence destruction Improved river health and habitat for bird life fish and frogs Not having access to feed along the water way. Time



## STRENGTHENING MANAGEMENT OF WEEDS

## **Benefits**

Cost and hygiene Enhancement of our IWM and IRMS Ensuring sustained longevity to current modes of action. If weeds are controlled hopefully more native grasses will grow Improved diversity of productive species of plant and productivity of farm In theory, if you get on top of weeds early then a lower seedbank should result in less future weeds with a lower cost to control. This should help with resistance Increase productivity Increase yields and reduce habitat for over wintering pests Less competition for cotton Limit downward pressures on productivity related to weed pressure Maintaining native species which help with encouraging beneficial insects and vertebrates. It also helps in reducing the spread of the weeds into the cultivation areas. Manage invasive weeds. Protect diverse natives. Stop spread of invasive weeds into economically productive country Pest and disease management Prevent crop competition with desired cash crops. reduced problematic weed seed set Reduces Weed seed bank Reduces pest population Reducing noxious weeds and very competitive weeds that out compete native species Smaller seed bank= less chemicals/spray operations = More money in pocket Weed control helps to prevent seed set of weeds and possibility of herbicide resistance

## Challenges

Application techniques

Area of weeds in some areas - very costly to control

Control that is not just chemical

Convincing growers of the benefits and growers having the time, staff and resources to carry out the control programs.

Cost

Cost of chemical is astronomical. The timing is critical but sometimes factors such as the weather makes conditions less ideal to control in a particular timeframe

Cost of effective control technology. Time associated.

cost/access/legislation

costs and availability of staff and soft chemical options

Group I,A and M resistant weeds. As well as finding the manpower to control weeds in hard to get to areas

Herbicide resistance

How to actually control harissa cactus, mimosa bush. Timeliness on grass sprays. Ability to use desired chemicals at certain stages of the year, or not hurting trees/ non target plants in the process of control.

Lack of consciousness among other farmers & understanding of economic return from weed control

Managing weeds economically without affecting beneficial species

Methods

New weeds

Time, Weather and climate - flood drought- wind.

Weeds in water delivery



## MANAGEMENT OF FERAL ANIMALS

## **Benefits**

decreasing pig numbers has direct effect on crop yield. decreasing cats/carp numbers has direct effect on biodiversity.

Everyone needs to do their part and contribute

Feral cats MUST be controlled at all costs

Have to keep numbers down or they will become very hard to control. If diseases such as foot and mouth broke out, the feral populations would make it hard to control. Keeping numbers low means less damage to crops

Increase in productivity of farming and grazing operations

Increase of birds and native mammals which benefit my IPM strategy

Increased production, improved biosecurity

less cats and foxes would give the small animals like dunnarts and birds a chance to build up numbers

Less crop damage

Less damage to crops

pest and disease management

Production

Reduces the risk of crop damage and damage to infrastructure. Helps reduce predation on Beneficial's by pest animals.

Reduction in crop damage.

Reduction of economic loss from direct feeding/living in.

stopping spread of disease and weeds

## Challenges

Area wide - neighbouring farms need to also do it

Convincing growers to participate in a "area wide" approach to pest control.

Cost and government regulations

Cost, things like aerial shoots aren't cheap.

Cost

Effectiveness

Cost

Time

costs and availability of control methods

Easily used technology

Expense, area wide management holes

Intelligent nature of some feral animals

My main challenge is that I have a neighbour that seems to breed feral cats that then disperse to other farms. Also I don't know how to control European carp in Billabongs.

Number of feral animals, cost

Pigs just needs number financial support to control, so ultimately not that difficult. Carp/ cats we/re fighting a losing battle need biological control.

Proactive participation from everyone

Public image. Time consuming.

Safe control measures

Time



## Appendix B. Themes and coding from workshops

Workshop discussions were reviewed for emerging topics and themes. Three main sections are provided:

- Overall perceptions about biodiversity and biodiversity management on cotton farms
- Perceptions about key biodiversity management practices
- Perceptions of industry approaches to promote biodiversity

For each of these themes, the following tables indicate the key topic that the theme emerged within, and how frequently this issue was raised.

DATINC

#### TOPIC

1	Increase understanding around the meaning of biodiversity	Α	Commonly shared or raised
2	Need for knowledge and skills, monitoring, assessments, non-financial resources Biodiversity occurs in whole farm context and at a	В	Somewhat shared or raised Not commonly shared or
3	landscape scale and management of impacts	С	different thinking
4	Economic cost and value of biodiversity	D	Above/beyond common practice or opinion
5	Recognition of good stewardship and practices	Ε	Question raised
6	Leadership opportunities for industry		

7 Climate variability poses long-term challengers

## What does biodiversity mean to you?

#### TOPIC RATING

Want to increase own understanding of biodiversity and how we can capitalise it and access funding to really have a good 1 A go at it

- 1 A Want to know what CRDC means by biodiversity this is the purpose of the session to gain grower understanding
- 1 A Would like greater awareness and understanding of what biodiversity is
- 3 A Having a look at all of the environment around you river, wetlands, pasture, native grasses, trees, riverine areas
- 3 A It is everything and the balance between all of that
- 3 A Abundance of plants and creatures, they are all playing in a symphony together
- 3 A Buzz word for sustainability, working within the environment, understanding whether it is natural biodiversity
- 3 A Understanding how it interacts on our farm, not just the big animals, but the little bugs and don't know what is there
- 3 A What do we need to do to keep biodiversity here Understand how natural biodiversity interacts with farming biodiversity to optimise farming and achieve coherent
- 3 A productive results
- 3 A Thinking diversity of flora and fauna, and diversity of microbiology Riparian and other projects focused on tyring to improve biodiversity in grazing enterprise, it is the first time we've every
- 3 A had a discussion about biodiversity in cotton
- 3 A Working with the landscape around your farms
- 3 A Includes flora and fauna and how you can fit in it for the best outcome for your farm
- 3 A Biodiversity is part of the natural environment **Biodiversity on cotton farms?**

- 1 A Some scepticism, not from a practical sense, but the measure of what biodiversity is and use of the word Definition of what is healthy or not, the condition rather than health, equate, some of the problem is condition and the
- 1 A quantum pressure of productivity or profitability than impacts biodiversity

It is the quality of biodiversity, either in the crop, land or water, remnant or regenerated vegetation, the condition or health

- $1 \quad B \quad \text{is a much more difficult thing to pin point and manage} \\$
- Like to know what is working well, and what isn't, what is thriving and how can we protect those species that are more
- 2 A threatened
- 2 B Can't improve what we don't measure, bury your undies, wetting and drying and can have positive impact
   We don't know what we don't know, getting handle on issues around soil health, wasn't aware of the impact we have had on
   2 B soils, the focus is on inputs with little focus on soil biology
- It is about measurement, can't do measurement on anyone else's farm, internally tree lines are maximum 2km from a
- 2 A centred area
- 2 B Funding for more weather stations to help with spray control
- Finding ways to make it more public knowledge and information more readily available to chemical users one way to
- 2 B improve on biodiversity affected by off target sprays
- 2 A Trying to get understanding and greener outcome in our practices
- 2 B Getting plants to put in are hard to get from nurseries
- 2 A Don't know a lot about it, where to get information to learn more about it and where do we go to look?
- 2 A Types of species, most appropriate and works with others in the environment
- Heavily timbered areas with big rain events hold water, areas we could be planting if we knew more about it and 2 B methodology
- 2 B Not a lot of native nurseries around, direct seeding needed
- 3 B Need to get away from a total monoculture and having a mixture of all sorts of things
- 3 A Don't really know, I get a picture of a natural theme, having a diverse range of flora and fauna and need to co-exist A level of activity, I am drawn to remnant vegetation because it has an increased level of environmental activity from a
- 3 A diverse and abundance of number of species
- 3 A You can be in a cotton field and still experience a level of activity in the soil and insect life
- 3 A General level of activity, total abundance or numbers
- 3 A Basic level, health of plants and levels, you can have plant and animals and not be a good indicator of biodiversity
- 3 B When asked to assess biodiversity, I wouldn't have thought about it in relation to the paddock
- One of things we need to do better is to see the bigger picture and where our farm fits within it, we are all interconnected 3 B and where we fit in it
- 3 A Value is beneficial insects, recruitment of insects to the monoculture, proximity to the crop is a big thing
- 3 B Water quality, distance of riparian between creek and paddock is critical value for maintaining water quality
  3 B We can destroy value, dilemmas we have are around destruction of condition
- During travels got to see how other countries are approaching biodiversity and are now under legislation, large bare fields are no longer possible, need to have shelter belts to slow movement of air and preventing erosion, benefits for biodiversity
- 3 C and disease control
- 3 A How does farming interact with biodiversity
- My understanding of biodiversity is everything, micro bacterial and fungi through to macro animals and what are the threats, such as low variety or diversity of soil micro organisms or farming system practices that gives you good diversity
- 3 A of species
- 3 B Soil ecology is really an area which is sadly lacking in the cotton industry and cropping industries in general Biodiversity management is around balance, the animals comfortable carrying a number of kangaroos in diversity with
- 3 B other animals to improve
- You've got your own farm and looking at how to manage landscape for pest management, not thinking more broadly past 3 A their own farm, landscape looking at pests but not for beneficials and where are they coming from
- Keen to be responsible for what happens on our farm and across our neighbours, and know more about development of 3 B chemicals and spray control
- 3 B Trees affected by defoliation, message all need to contribute to spray control
- 3 A Shelter belts
- 3 A Identified as sensitive areas, selectively grazed, weed control, planting, fencing off
- 3 B Intensive irrigation area harder to manage remnants that are left
- 3 B Companies have biodiversity blocks in the irrigation areas
- 4 B For some it may not mean anything because they don't have diverse areas on their farm
- 4 B Some areas are big blank canvas, having a creek we have a head start
- 4 A From a farming point of view, productivity is always going to be number one and will come before biodiversity A lot of pressure on the business of farming, rather than worrying about the condition of something that is seen as a
- 4 B liability instead of asset
- I see them separately, production vs biodiversity areas and waterways and corridors, think of these areas as an offset to
- 4 A production
- 4 B Paddocks are man made biodiversity, I don't know how to bring both together or if you want to The issue of flow between paddocks and natural areas, or lack of it, is something we are conditioned to. Valuation of property says vegetated areas only worth 5% of cleared areas, however the science supporting of the value of these areas of
- 4 C remnants and environment can contribute to the cropping and farm is established but we are not conditioned to see it
- 4 C How much is a koala worth? In one way they are priceless because they are the last representation of their species
- 4 B We understand there is an interaction between natural areas and production, but we use language like 'unproductive' land
- 4 A Farming unproductive land costs more to farm that area, we could use it for use to another purpose to benefit the farm

- 4 A Comes back to value of land, if you have a massive debt you need to do what you can to sustain it Its one thing for a person to recognise the benefits, needs to be wider benefits such as creeks and beneficials that everyone benefits, but you need to manage your own farm still and there is a level of independence that doesn't always align with
- 4 A biodiversity
- 4 A Carbon project, looking at where value lies in locking it up
- 4 A What is the value of biodiversity, is there a financial profit to the farm
- All funding to biodiversity go into places that need to happen now because its so bad, or areas that have already been doing 4 B it for a while
- Applied for grants, challenge that small projects are picked up but not the big projects that have large creek areas,
- 4 B disconnect between large biodiversity areas to acknowledge in the farm, compared to small area locked up or planting trees
- 4 C Biodiversity conservation trust application to lock up areas, but the area proposed was too big, but smaller projects got up
- 4 B The biodiversity challenge is do we protect what we have or create new biodiversity areas How do we do both? Important thing, as a farmer, there wouldn't be anyone who isn't looking for a financial incentive,
- 4 A can't lock it up for no return and that is the challenge
- 4 A Biodiversity will fall over unless there is a financial incentive To be paid for biodiversity offering - what does this look like? Proposed to maintain the area in its natural vegetative state, biodiversity officer to address weeds, pests, no wood gathering, fenced, plus small return based on locking out stock,
- 4 B preferred in perpetuity but put in 20 year plan,
- 4 B Hectare rate \$50, cost more than expected for payment
- 4 B Will re-stock if can't get financial incentive to maintain as natural area
- 4 C Biodiversity is asleep, we don't have a charter and don't know what everyone is doing
- 4 C Biodiversity outcomes driving production decisions and beneficials, trying to measure it to provide it has an outcome
- 4 A Remnant is very valuable and very expensive to manage
- 4 A Revegetation is expensive, needs to be well managed
- 5 A A fine balance between being conservative and letting nature do everything that it can before you step in and alter that
- 5 A Lots of timber strips, monitoring it and protecting it
- 5 B Have done flora and fauna surveys
- Have a block have locked up for 15 years with surveys done, no startling results but have seen improvements from taking 5 B grazing out
- 5 B Old irrigation land slowly regenerating
- Soil health, soil biology has been decimated from grazing or cropping practices in the past, involved in project looking to
- 5 B reintroduce and re-establish beneficial biology in the landscape
- 5 B Changing grazing practices seen improvements, looking at irrigation country to improve soil health
- 5 C Looking at examples from around the world to improve ecology
- 5 A Every farmer wants to leave the farm in a better way than they got it
- 5 B Want to introduce as much biodiversity as we can
  - Growing cover crops to protect the soil and erosion, which is helping with beneficial complex and soil microbial
- 5 B biodiversity and helps control verticillium
- 5 D Learning how to manage diseases with biology and fungi in the soil
- Working with IPM and using riparian areas and tree lines for beneficials for pest management, and release beneficials in 5 B vegetated areas
- 5 B Areas cleared of trees historically would have benefited from keeping tree lines
- Shelter breaks benefits are for drift management, break for wind to restrict movement, native vegetation for animals or 5 A refuge for insects and bats etc
- Larger farms will have increased demand for getting shelter belts and corridors through them, realise the benefits of them 5 B and how clearing has impacted wind and pesticide movement and prevent sand blasting impacts
- Biosecurity has been a big thing for the insects bird and bat spectrum to analyse how much contribution they give to 5 B control pest insects, been the focus nearly exclusively
- Starting to look at biodiversity above and in the soil and driving crop rotation and crop decisions and how it relates to flora 5 A surrounding the farm
- 5 A Adjoin the Council, weed managment not conducted making it hard to control and do the right thing

#### **Revegetation and regeneration**

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	RATING		
		Views and experiences	
2	А	Need to know what we have got and what we should be doing	
$\mathbf{r}$	۸	Crown d truth it first	

- 2 A Ground truth it first
- 2 B Wanting to clear out area on creek but told not the touch it
- 2 B Research between tree planting vs fencing areas to regenerate, exciting to see how quickly things can regenerate
- 2 B What species will get past 2 decade period for survival
- 2 B It has to be such a long term vision and you to commit to it for 50 years, it is not a 5 year project

- 2 C Trees in places where not naturally grown for carbon forests
- 2 А Carbon is the greatest opportunity for agriculture, how can we sequester carbon into soil and be rewarded, not into trees
- 2 Work done on soil carbon sequestration and want to see more in this area from the industry Α
- Burning helped to promote regeneration, more information about how to best management burning for areas and
- 2 В knowing besting conditions
- Nothing since the drought 3 А
- 3 Trees on creeks have died в
- 3 On the scheme, cleared and the tree scape is limited B
- 3 В Lost 50% trees from previous Landcare project years ago
- 3 А Dry years can really impact on best intentions
- 3 С The natural condition has been disrupted to the extent it is hard to find areas to work on
- 3 Focus on existing natural areas, revegetation is impractical with irrigation around the place в
- 3 The negative impact the extent of dry has had on native veg and amenity of the farm в
- Tree planting can be a lot of work but succumb to drought 3 А
- 3 В On a landscape that is very dry, tree planting is not part of our thinking, focus on regeneration
- 3 C Journals of Sturt and Mitchell, more trees now, previously open grasslands
- 3 Haven't done to much other than fencing and weed control А
- Revegetating to close to the river causes issues during flood, want to pick areas for a wildlife corridor rather than blanket 3 В tree planting
- Greater diversity, getting everything to live is the challenge and establish the species that will grow 3 А
- Mix around five species of trees and shrubs based on local seed and soil types, trees outgrew the shrubs, three lines of 3 В trees along the riverine corridors and split farm into units and connect farm with riverine areas
- People have planted trees, people concerned growing trees with defoliation and tree corridor impacts 3 в
- 3 В Reseeding for revegetation for regeneration of area, waiting for right conditions to take off
- 3 С Running surge water off through bushland, helped it take off
- 3 В
- Natural areas should be able to regeneration with out reseeding
- Redgum forest suckers taking over after wet years, about a balance and area wide management and regional view instead 3 В of doing it on own
- В We know there is a value on it, but it is a value on paper 4
- Managing for weeds and loss of productive area, set cost every year and loss of income such as cropping which adds up 4 А over years and significant financial impact
  - Desire to create a sustainable landscape, way to offset some of the cost is how we see it working going forward which is
  - А why we are interested in the carbon, we know there will be increased biodiversity but it is without financial return
- 4 В Carbon projects regular flow benefits, during drought when grazing
- 4 Fitting around revegetation with infrastructure, designing new developments to include tree lines and is a big cost А
- 5 Small area revegetated А

4

- 5 Effort is making sure they live А
- 5 В Motivation to plant, habitat is more sustainable if there are corridors
- 5 В I'm a bit of a greenie
- Never were trees on the creek, a few old ones, young ones coming back 5 С
- 5 А Have been planting some corridors and paths
- 5 А Looking at tree planting, but water is limited
- Pockets of vegetation left, used to be burned but now removed burning regime due to neighbours not burning and have a 5 В lush area
- Strips on farms for insects in Europe, strip of wildflowers for beneficial insects to thrive resulting in 2 less insecticide 5 С sprays
- 5 All farming, areas of grazing and dryland as well as irrigation. В
- 5 Farming can put back to grass, can see where that needs to happen В
- 5 В There is a good system of corridors
- 5 В Focus on areas where we take water from the river, and care to manage vegetation in areas to access the river Legacy of dryland cropping, have dropped out poor areas and return to grass in spectacular period of time in good
- 5 В conditions
- 5 В General rule with staff that only feral animals are shot/culled to not have a negative impact on native animals on the farm Spoken about with carbon farming, growers are asking the question can we do this in country that is not productive and
- 5 А offset the cost and ongoing cost of managing regen area
- Entire focus of grazing operation is regeneration, don't focus on animals, focus on grass and landscape health 5 В
- Previously involved in significant tree planting program, but big company had situation where they could water during 5 B drought

#### **Strengthen practices?**

- 2 B A lot of tools out there at the moment for grazing, about controlling numbers myGrazing
- 2 B Assessment done on old cotton country, very slow regeneration
- 2 B Barriers are legislation, what is it and what we can and can't do
- 2 B Can't get access to stock to plant
- 2 B Case studies on revegetation and nature strips and spray drift management

- 2 C Fast tracking tools to calibrate impacts on soil carbon and investment in technology to measure using desk top assessments
- 2 B Getting access to tools, better understanding impacts to soil carbon
- 2 A Having information about where to plant and small steps to take
- 2 A Knowing if you get it right, what do we do and positive and negative impact
- 2 A Knowing what can do, know limitation
- 2 B Not doing anything in case you have a negative impact
- 2 B Recipe or guide book and funding for fencing, willing to pay but costs over a long period of time
- 2 A Would do what is recommended, to encourage habitat through retention or regeneration
- 3 B Add vegetation spots on farm where can
- 3 B Brolgas can do a lot of damage on farm during the dry
- 3 B Council weed officers don't have many options for roadside control, slashing and chemical
- 3 B Don't see a lot of overlap with cotton and grazing business, new area of work to look at regenerative ag and cotton systems
- 3 B How can it be made better if we can't touch it
- 3 B Lots of micro bats on farm, trying to ensure they have access to water
- 3 B Planted native trees, big exercise and need to be interested in it to do it
- 3 B Revegetation by direct seeding, mixed results
- 3 B Slash roadways, have finches and have an area we don't slash to ensure they have cover
- 3 B Synergy between cotton and grazing would be through soil biology Farming practices working towards with all growers is improving in field biodiversity to foster a sustainable farming system and seeing a financial gain which is a significant driver, different biodiversity infield and other natural areas which
- 4 B is why people are investing in filed because the financial return is higher
- 4 B Fixing an environmental problem vs development limitation
- 4 B If don't have a vested interest in environment it is financial Natural vege and biodiversity and productive biodiversity, infield will see the economic reward much areas, just won't see
- 4 A economic return from natural areas
- 4 B Run cotton and other areas as two separate businesses
- 4 A Want an economic return, don't want it costing us money every year to manage it for public good
- 4 A Where is bang for buck, best planting to do
- 5 C Compost to improve soil biology and how to get into cotton areas
- 5 C Desilting hole back to original depth and natural state, work on being able to this
- 5 B Part of the biodiversity is farming practices, changing biodiversity in micro level in the soil to improve productivity areas Took some areas back to natural landscape, took a fortune to do it, hard for stock and couldn't crop it and in the future
- 5 B might be worth something as carbon
- 6 B Lack of input, management and control from LLS
- 6 A Regional view needs to be coordinated
- 3 B Some growers are happy to do the easy options such as plant trees
- 3 A Hard in flooded areas to plant trees
- 4 A Don't know how to put value on riparian areas such as beneficials and put a monetary value on it
- 4 A Dollar factor
- 4 A Incentive gets people over the line
- 4 B Incentive BCI BMP premium for biodiversity management
- 6 A Publicity and warm fuzzy feeling for the public, we just do it, but outside people think it is great Cotton as a clothing product, this is our point of different, cotton can make a positive contribution to the environment,
- 4 C jump on before it is green washed
- 4 C Trading house to capitalise on it
- 4 C Kangaroo and koala photos on products

#### Motivate to strengthen practices?

- 1 A More funding and awareness on carbon farming important to do more
- 1 B Haven't looked a biodiversity credits, but carbon because it is important for the future
- people more than happy to move back to natural state if it they are no longer able to make a return, financial incentive vs
- 1 B lack of return,
- 2 B Prove it works, beneficials living in shelter belts will reduce the number of sprays
- 2 A Learning process, such as birds and bats have an impact too
- $2 \ \ A \ \ Better \ understand \ when \ beneficials \ will \ work \ or \ wont \ work$
- Can't farm to the river, taking 40m off river bank wont change production area, using riverine areas and native recruitment 3 B and tree lines in the grazing areas
- 3 B Fits in mixed farm well, full irrigation lateral systems costs a lot to move or change for tree lines
- 4 B can't put a value on it and left it to grow back to natural scrub
- 4 B Don't want to lock it up because don't know what value it has in the future
- Market for cotton with no sprays and premium for it, potential cost is losing yield needs to be offset with sustainability 4 A return
- 4 B Hard to justify taking production land out of production to plant shade lines, prepared a little bit, but need to see a return
- 4 C In areas of the cattle industry, if you dedicate 10% to corridors it directly corresponds to 10% improved production
- 4 A It is not easy to analyse, but need the demonstration and measure of benefit and cost benefit

- 4 B Time, money, motivation not at top of priority list Help or Solutions?
- Assistance to demonstrate what can do and design, benefits of what to put where and define what the outcome is and trying 2 A to achieve against a vision
- 2 B Big on demonstration sites and case studies, people are doing things differently to high input agriculture using biology
- 2 B Challenges gets back to value in our current system, can't value these resources and their function properly
- 2 A Consultant to look at whole farm plan, management plan over 5 years best plan of attack and advise better on practices
- 2 A Getting a good look at alternative ways of doing things and demonstrating that
- 2 B Have a plan to measure, issues and how to address it with options
- 2 A how many bats does it take to control insects, we don't talk about these benefits in IPM
- 2 A How to measure biodiversity? Need to know it is being looked after.
- 2 A Kept it basic and recipe to encourage what to do would be a good starting point
- 2 A Need to know a lot more about what species need, what is there and what they need to thrive
- Really can't improve what we can't measure, done some testing and was expensive but didn't understand what was saying 2 B (soil)
- 2 C Salinity from cleared areas and water table rising, advice to manage it
- 3 A Doing things now, how to do it in an enduring way and will take a long time to fix
- 3 B Few of us are having saline issues, encouraged to put trees back, opening there that it could help cropping
- 3 C I was destroying the landscape, not improving it, and I didn't know that
- 3 C In France, look at IMP and whole region biodiversity and address disruption chemistry has done
- 3 B It has to be whole of, not piece by piece, takes a lot of cooperation
- 3 B Know it is not going to happen overnight or get results quickly
- 3 B Left black wattle because they have survived through the drought when eucalypts haven't

People see black wattle as a weed, but it is only a weed because it comes in after disturbance, it is a legume and fixes 3 B nitrogen for the next generation of vegetation

- 3 B Trees around during the drought is a bit of a mental boost
- 3 B Working with neighbours and what they have got
- 4 B All the focus is on tree planting, but how to we fund those that already have passed stage one and improve biodiversity Biodiversity funding really interesting, funding is about tree planting and regeneration, but interesting that old growth is
- 4 A not valued, will take a long time for tree planting to achieve the value that 20 year trees already have, agree with zoning
- 4 A Cost of maintenance over a five year period to establish, especially during drought where there was only 30% survival Credit points for cotton industry, there are answers, can control pest insects through IPM but what is the incentive to
- 4 B manage it
- Depending on the incentive, could be game changing if value is placed on the area and put a return from it, people are 4 A going to want to do it
- 4 A Doing a portion of our selves, assistance would speed it up
- 4 A Ecosystem services and wind protection value of native vegetation strips
- 4 B Gowers would welcome assistance and support to do things in the pipeline, not for every grower
- Happy to set aside areas that are not suitable for farming, cost is a big part of what needs to be done, if there is carbon 4 A credit scheme for ongoing management would help that to occur
- If the country is costing more, such as flooding and constantly doing soil works and not as productive for farming, if funded to turn it back to native vegetation and give financial incentive to manage it properly and offsetting the cost of 4 B management such as weeds etc
- 4 A Lock up land, depends on returns, sometime unpractical to put boundaries on what can and cant' do Looking at the big picture of climate change, look at different ways, it is treated as a crop for ongoing benefit, not just the cost of planting but has to be something ongoing so there is a return on the land we have as a bigger picture for all farmers
- 4 B monetary incentive instead of just losses Management fees to improve the country or maintain it at the same level, expert classes land based on diversity and putting
- 4 B value on country, if they are improving the class of country they need to be incentivise Monetary incentive to offset cost to managing area, so you are no longer losing money as it is costing money of low
- 4 A productive area to manage
- 4 A Need to be looking at things differently, old trees and been there a long time should be valued different than tree planting
- 4 A Primary producers have to carry the farm for the community, wearing the cost but sharing the benefits
- 4 A Program cost, time, resources maybe 50% costs Public good on riverine area planting, controlling weeds, water quality, fish breeding and public funding comes into play to
- 4 B offset costs for beneficial outcomes
- 4 A Question is about how to help with the cost
- The ground that makes money vs ground for natural areas, shift in income may increase value and area for tree corridors 4 A etc
- 4 B Threatened species are hanging on in the older areas and areas not cleared and left, those areas are the most valuable Time and money, interest if know other neighbours would meet consultant to get advice and target to make improvement
- 4 A and have unified approach Two fold biodiversity - as land assets doesn't add value, it is devalued, it is a drag on the balance sheet, if we are to improve it we gain an income but we are funded to clear and keep it to an level, at the moment it is not generating an
- 4 B income and valued

- 4 A Wary of funding the new stuff without acknowledging or rewarding the old stuff
  - your time and employees worth something, every minute costs something, what is the cost, budget and payoff basic
- 4 A principles
- 5 C 400% increase under coolabah trees in production
- 5 C Change in view around trees, decimation of trees attitude, now see most productive areas are under trees
- 5 B don't know, what you don't know, didn't previously appreciate the value of trees
- 5 B Feel that some of the rare species are only just hanging on, there is a responsibility to look after them
- It can be overwhelming, we need to see the benefit from small wins and doing one thing and manage within day to day
- 5 A lives
- 5 C No introduced species, trying to encourage natives grasses and legumes to regenerate Revegetation is already done, it is happening naturally and there isn't anything more we can do, it is not about revegetation, it is about increasing biodiversity in the areas that are already there. We can do this in our farming country with practices,
- 5 B but don't know in natural areas. A
- 5 A Time. Talking about intergenerational stuff.
- 6 B A lot of opportunity that the cotton is struggling to focus on, microbes back in landscapes first steps to reduce nutrients
- 6 A Carbon positive cotton farms, end goal better environment with offshoot of measuring carbon
- Central body to coordinate and partially fund it, and get other stakeholders on board such a council, roads, rail and provides 6 A value for money
- 6 B Like a recipe, encouraged how we managed SLW as a good example
- 6 A More coordination
  - Strategic approach, more likely if others are getting involved, program to have access to materials and seed, and
- 6 A encourages motivation

#### **Stock exclusion from riparian areas**

#### TOPIC RATING

#### Views and experiences

- 3 A Grazed during droughts
- 3 B Gas neighbours on creek who are not concerned and could be managed better
- 3 A Weeds in creek area
- 3 B Not achieving nrm benefits due to goats and difficult to access to muster goats
- 3 A River frontage very hard to control with weeds, hard challenge with floods
- 3 B Fire risk
- 4 B Limited by rain, it is a profitability thing or access to water
- Can do all the right things and fence off, but during drought it is the only area left, can have all the good intentions and
- 4 B may not be sustainable, but need to do it
- 4 A Comes back to value, how do you benefit from the value of these areas.
- Interesting that we can be regulated in relation to pesticide and insecticide use, whatever the drivers are, such as reef  $4 \, C \, condition$
- Floodways linked through the farms, lot of unproductive area if we can generate income from it, but it is going backward 4 B in its current state
  - Large stretch of creek, it is absolutely beautiful, would be nice if we revegetate old billabongs and bring back some
- 4 B wheat country, but need to make money
- 4 A When borrowing money to buy farms, they need to be profitable, but also recognise that we need to manage biodiversity
- 4 B Its not farming vs environment
- 5 A Fenced creek
- 5 A Stock excluded
- 5 A Control weeds
- 5 A Riparian vegetation and fragile due to history of over grazing
- 5 B Creek hasn't been grazed for 20 years
- 5 A Don't have stock, but have a view on it, see the extreme impact that stock have had on riparian zone from overgrazing
- 5 A Quality of the environment is very noticeable where areas are overgrazed
- 5 A A lot of cotton growing people is they have lightly stocked or de-stocked
- 5 A Enduring support for agriculture to manage riparian areas, extra recognition for what you carry on behalf of society
- 5 D Pilot on natural asset lead, reward cycle
- 5 B 20 years time, the next generation will want to know what you are doing, so recruitment benefits might be there
- 5 A Destocked
- 5 A Managing ferals and weeds
- 5 B Have an endangered species on farm, in cotton fields, recognise need to look after these areas and balance Fencing off riverine areas, seen a big improvement in plant species and good evidence that marine species are improving
- 5 A and that they respond when the grass is down to the river bank

To see impact of fencing off is very eye opening, how much native grass species are impacted by stock, drought lost

- 5 A species but they came back
- 5 A Seen positive changes and wanting to do on more river areas, stock has managed access
- 5 A When rivers are flowing and healthy can allow grasses to regenerate
- Fenced a lot of riparian country, limited success, manage grazing on water points, goats have been the biggest issue 5 B impacting ground cover
- 5 C Focused on how to regenerate country by getting fungi back into soils
- 5 A Clusters of trees and nature strips, encourage biodiversity in natural strips, chose not to clear but not active management
- 5 A Fenced off and crash graze to knock down weeds and promote groundcover, managed in conjunction with neighbour
- 5 A Tyring to establish trees through riverine area to manage erosion
- 5 B Long term experience improving riverine areas and planting trees
- 5 A Our stock don't impact the river, sections river fenced, don't see it as a big issue and only lightly stocked for fuel control Wetter seasons, have a big flock of pelicans on the dam and noticing more bird life, pretty positive and wildlife
- 5 B advantage of what doing as part of irrigation system
- 5 B Diversity of birdlife in irrigation areas and water birds
- 6 B Cotton footprint, what can we do that could be a key part of the outcome for river health

#### Strengthen practices?

- 2 B Doing a biodiversity survey already, tree and weed species
- 2 C Desilted a watercourse to keep more water in it and turn into a bird habitat safe from cats and foxes
- 2 A Hard to access and manage areas, how to get rid of weed species, pigs and roos
- 3 B Don't want to be told what to do
- 3 B Feral pigs negate any effort to create positive environment
- Maintenance on riverine fencing takes a lot, in hindsight should have moved fences out further away from river to
- 3 B alleviate maintenance issues with access
- 3 A Could enhance remnant with understory, but weeds come down in flood
- 3 B Creek has no stock, just weed control, did direct seeding but not yet successful
- 4 A Doing anything is a cost where there is no income from that area
- 4 A Funding for fencing
- 4 A Funding for weed control
- To push wheat country back to extend riparian area would need a budget and look at the ongoing cost of not farming that 4 B country
- 4 B Already excluded domestic animals, spend more time trying to remove goats to take consistent grazing pressure away Motivate to strengthen practices?
- 3 C Want to spend money on a bore to pump into the creek to keep it topped up in the dry season for habitat
- 3 A Weed control

4

2

- 3 A When we have excluded or locked up areas, there are secondary issues such as fire or weed
- 3 A Managed exclusion zone definitely needs to be considered
- Use of language of 'exclusion' speculating what you need to do, needs to be a lot of support to say that is what is the right B thing, locking out stock may not be the best thing
- 3 B Don't know how to change perceptions, some don't get the concept of managing the riverbank
- 4 B Answer isn't cash, you are either interested or not
- Green financing, improving financing on farm, insurance or banks to prioritise biodiversity funding on farms and driver 4 B for farmers
- Message has been out there, funding for fencing and off stream water points to take stock off, people need to have a 4 B vision for it

Cost for off stream can be expensive, water infrastructure, fencing, impact of flooding, and cost can be prohibitive for A those working on low cost model

4 B Some think one year to the next, way they manage cropping system and vegetation and not for the long term vision

Structured financially, some have struggled through the drought and hard to put funding into a program that won't give 4 B any benefit for 10 years

- 4 B Majority need arm twisted to do anything, have cleared area but know that need to go an regenerate it
- 5 B Always exceptions to the rule, some doing it really well, others are not
- Not all farms have grazing, range of people those at the top and other extreme and everything in between with a range of 5 B values and what people are tyring to achieve
- 5 B Bigger farms more likely to do anything, maybe because they have the area to do it
- 5 B Think most people have an interest in doing something

#### Help or Solutions?

- 2 A Good to know what is actually there flora and fauna survey
- 2 B Help with people to do surveillance on goat numbers in riparian areas
- 2 B Lack of knowledge, surprised had a planting meeting/field day had never seen how trees were planted
  - A How do you get a tree to live running workshops and getting the timing right, target the right way and keep it smaller
- 2 A People are willing to try something small scale to give it a go, more education would help this
- 2 B Self assessment template do own assessment with a rating,
- 2 A farmers do have an interest, not easy to get it done, time, getting it on the agenda, and information

- 2 A Knowledge more trees would help with beneficials
- 2 A Workshops on designing farm long term, to incorporate tree planting help some think a bit further
- 2 A Taking knowledge and applying to situation, one-on-one advice
- Self assessment to see where they fit and a driver to do more, and having enough information and see what others are 2 A doing
- 2 A Case studies help and read about what other farms are doing
- Storages during the drought amazing how many farmers commented about birds on storages, part of the landscape and 3 B biodiversity
- 4 A Time, having the people to address some of the issues
  - Huge fluctuation in difference in core opportunities, with water growing crops, run into dry time and reduce people,
- 4 B trying to get consistency in business
- 4 A Would like to spend more time on issues, but can't get to it
- 4 A Decisions always doing cost benefit analysis, unfortunately some things around biodiversity are not high
- 4 B ecosystem services to cash in on and measure, accurate credit for works done to address issues
- 4 B When dry and can do something don't have resources to do it
- 4 B Have time but no money, or money and no time
- 4 B Very difficult to get people back after they leave the industry or district
- 4 B Access to funding, opportunities have dried up, or no labour to deliver projects
- 4 B Don't have access to itinerant workforce with backpackers
- 6 A Define the goal for biodiversity

#### **Strengthening weed management**

#### TOPIC

3

#### **RATING** Views and experiences

- 3 A Roundup resistant weeds
- 3 A Using well-advertised strategies
- 3 B Viewing weeds as part of biodiversity
- 3 B Managing weeds doesn't change what we do for biodiversity
- 3 B Spot sprays and cutting down amount of chemical
- 3 B Not worried about weeds, if you can grow weeds, you can grow crops
- 3 A Crop areas not a worry, weeds are a concern in riparian areas and is difficult to manage
- 3 B Look at them not as weeds and encompass them as part of the system, such as ground cover
- 3 A Riparian areas are needed as its where a lot of beneficials come from
- 3 B Non cropped areas 2 key weeds
- large stands of harissa can be confronting in riparian areas due to the way they invade waterways, detrimental to 3 B condition and function
- Buffle is one of those great success stories but does have an impact to small marsupials due to irreversible change since 3 B settlement
- 3 A Anything can be a weed, what is good for one person may not be good for another
- 3 B Everyone has to manage their own system, but are part of a bigger system
- 3 B Cotton on sides of roads makes cotton a weed
  - In heavily wooded grazing areas getting in to manage weeds is time intensive and difficult, different management and A multiple passes, cutting
- 3 A Along river after drought weeds came up,
- 3 B left area that had been cropped but weeds came up
- 3 B Trying to keep natives where treating weeds
- 3 B Biodiversity is species and number of species
- When taking out larger woody weeds taking out habitat on small critters, comes back to definition do we support
- 3 B biodiversity that is there or take it back to natural environment
- 3 B Weed management is an evolving thing, the weeds we used to see years ago and not the same ones we have now
- 3 B Soil biology is determining what plants become weeds
- 3 C Floods kill fungi populations, grasses are not growing back
- 3 B Cropping country heavily reliant on chemicals, tyring to reduce usage through IPM
- 3 A Weeds in nature strips and riparian areas, previously sprayed and cleaned up, but grows back so rapidly
- 3 B Have zero tolerance weeds we don't drive past
- 3 A Resistant weeds are a problem
- 3 B Different weeds in different seasons, areas along rivers have noxious weeds if not managed
- 3 A Roadways see a lot of resistant weeds
- 3 B Cropping sacrificial crops to manage weeds, direct drilling with minimum till
- 3 A Noxious weeds are a problem

- 3 A Weeds getting into tree lots and can't control them
- 4 A Cattle area costs a fortune to keep on top of weeds, cost of control and accessibility

#### Strengthen practices?

- 2 B Trial patches to see how to get access, plant patches of natural grasses to spread naturally
- 2 B Research would show that area wide would work
- Getting reporting done during coordination needs reportable outcomes and help to farmers meet these requirements is
- 2 B needed
- 2 B Robotic laser weed control, interested to look at that
- 2 A If there is more information from a biodiversity perspective then would like to be part of it
- 2 B Strategies within cotton system can use, whole farm approach, sending weeds off for resistant testing
- 2 B Waiting for microwave technology
- 2 B Always looking for new technology or strategies
- 3 B Patches are more accessible to spray
- 3 B Live with the weeds
- 3 B Buffer zones management for riparian areas spraying on label
- 3 A Greatest weed issue is resistance weed
- 3 A Timing is the biggest issue
- 3 B Examples have offered are all hard work. Don't have a good response as to what would strengthen management.
- 3 B Notice weeds all the time, but they become part of the furniture
- 3 B Don't notice them if not looking for them
- 3 A On a downward spiral, taking more chemical to treat weeds, weed resistance is an every increasing problem
- 3 A Concerned about amount of chemistry going out and impact on soils
- 3 A Only just starting to understand the impacts of glyphosate
- 3 A Heavily reliant on chemical systems, but doing what we can to slow it through chipping and rotations
- 3 B Weeds are not the biggest issue, it is soil health
- 3 A Battles don't even know where to start in riparian areas that is heavily timbered
- 3 A Riparian areas constant battle with new weeds and access
- 3 A Crash grazing, slashing, along the river some may think it is not their problem
- 3 B If they weren't managed would end up with some bad outcomes
- 3 A Strategic grazing has improved creek environment out of sight
- 3 A Cell grazing management system with high intensity grazing has some success concerned move towards zero till farming increase spraying and tough weeds develop around cropping system and
- 3 B spreading through the farm
- 3 B Not worried with grazing systems as it can be managed, but concern with resistance in cropping
- 3 A Other methods other than spraying chemicals, disc ploughing, management techniques around the district
- 3 B Don't see a need to strengthen more, have a good handle it
- 3 B Strategic tillage for weed control
- 3 B For shelter belts do a controlled burn for access to control weeds, and manage fuel
- 3 A Group approach, issue when neighbours aren't contributing, LLS needs to step more
- Reportability and accountability with large number of staff, hard to get message across to staff and is hard and gets put to 4 B the side
- + D uie side 4 D Einspaisl support

6

- 4 B Financial support for perennial weeds in non-cropped areas, for biocontrol, use of drones for selective destruction etc
- 4 A Weed control biggest costs
  - Area wide, one thing for one person to have it under control, but really hard if someone else upstream doesn't control it, A hard to get that collaboration
- 6 A If you want it to be a catchment approach, everyone needs to be involved and needs to be done as one
- 6 A About other landholders, adjoining old rail and isn't being managed, has to be a group approach and LLS policing more
- 6 A Resources and products are available, fighting a battle until can control bigger picture to stop it spreading
- 6 A Someone needs to run it, but on the whole people are keen to do it, it is just about working it in

#### 6 A Area wide management strategy

#### Motivate to strengthen practices?

- 2 B Hard to change mindset for a long term approach
- People want to be good neighbours, using best advantage for area wide approach, bring in researchers to show there can 2 A be a positive impact
- 3 B If don't do anything, or biodiversity is too hard, graze it hard and do far more damage in the long run
- 3 B Keep the modes of actions, able to implement what you can and information available
- Support to take on active control program, cost relating to control, exceptionally expensive for large woody weeds in vast 4 A area and difficulty access and flooding, ongoing maintenance control
- Economically not viable to manage weeds, among 200 year old trees, but can't get funds to improve what is already there, 4 B funding is for new areas
- 4 B Factor in cost of staff to manage the area
- Because of long term plans, if spend money to clean up creek and then flood comes they get disillusioned, not easy for
- 4 B small farms to do it
- 4 B Can waste money if they don't have a passion for it

#### 4 A Awareness and held accountable, more incentives, not farming business to manage weeds so need to see outcomes Help or Solutions?

- 2 A Need to understand the outcome to plan what to do
- 2 B Working out what is a weed in grazing scenario, but for biodiversity it might be ground cover
- Handy agronomists, another arm to agronomy, have there resources to manage these areas rather than brinGing in new 2 B people who are already advisors
- Watercourse, everyone needs to be on board, driver managing own country moving into farming area, if can get everyone 3 A on watercourse involved won't keep moving in every time you control it
- If ignore what's coming down the river, it will keep coming, chose to think we can do something and reduce the numbers 3 B of what's coming down
- 4 A Clarity around definition of what is a weed, and base funding around that natives out of control, or impact of control
- Able to assist growers, another thing for agronomists to do, but they also need to be compensated, have the skillset so it is 4 B about the appetite
- Last five years there has been appetite for valley management, people are trying to come together, need to have clear 6 B roles and responsibilities and implications for the system
- Purpose is to get everyone involved, positive mindset whole biodiversity wont work if everyone doesn't get involved, part
- 6 A of the charter need to agree change needs to happen and part of the process is working out how

#### **Strengthening control of feral animals**

#### TOPIC

#### RATING Views and experiences

- 2 A Interested to know what the impact of cats are
- 3 A Area wide management approach in river country, coordinate helicopter privately
- 3 A Bait for foxes
- 3 A Bait for foxes and dogs
- 3 B Catch cats
- 3 A Cats and foxes two biggest pests
- 3 B Cockatoos
- 3 B Crows in transformers, nesting in transformers and blowing them up
- 3 A Damaging a lot of the trees too, cockatoos
- 3 A Dogs
- 3 B Don't do any strategies in the field to mitigate impact of pigs
- 3 A Explosion of cats
- 3 A Explosion of pigs due to corn and sorghum
- 3 B Feral dogs ok context of controlling pigs
- 3 C Fisherman kill carp
- 3 A Foxes
- 3 A Goats
- 3 A Good results and numbers drop after each helicopter shoot pigs
- 3 A Increase in foxes
- 3 C Indian minors, showed up a few years ago and now a problem, don't know how to get information to management them
- 3 A Join with neighbours and bait pigs
- 3 A Mice
- 3 B New bait stations would be an easy way to control pigs
- 3 A Pig hunting in riverine areas
- 3 A Pigs
- 3 A Pigs helicopter shoot
- 3 B Rabbits supressed by other ferals
- 3 C Remove carp in billabong every time if floods
- 3 B Things have an element of balance and with seasonal change, foxes, rabbits, cats
- 3 B Traps for cats
- 3 B Unseen damage with feral cats
- 4 B A lot of pressure on wheat from kangaroos
- 4 B Cats and foxes not controlled because they don't impact crops
- 4 A Cotton business pigs are a big pest, habitat pigs breed up
- 4 C Exclusion fencing on orchards
- 4 A Feral cats go under the radar because they don't have an economic impact
- Much easier to get agreement with people to work together, easier to manage and same cost and equity to be involved 4 B and different scenario than weeds
- 4 A Natives can be a problem as well, brolgas and birds, kangaroos, not just crops but equipment and machinery

- 4 A Pigs controlled because they are hunted, shot, trapped because they eat crops
- 4 B Value and perception of pests

#### Strengthen practices?

- 2 B Education benefits is a better approach
- 2 B How many of info sheets come and actually comprehensively read? They are thrown in the bin
- 2 A Seeing it occur on someone's farm, getting group together to see economic benefits or losses
- 2 A See it in person and discussion about cost of control
- 2 A Value in see what others are doing in other regions, but cost to that
- 2 B Don't reinvent the wheel, Grains BMP, Grazing BMP, MyBMP, don't create anything new, they are already around
- 2 B Know more about the best time to target species
- 2 B Greater awareness of what damage the cats are doing, virus
- 3 B Virus for cats, but won't distinguish with domestic cats
- 3 B Needs work, but not sure what
- 3 A Not unlike the weeds, Harnessing area wide management
- 3 A Keep it simple and doable so people are more likely to get on board
- 3 B Opportunity to spray has been very narrow due to weather and water shortage
- 3 A Seasonal conditions, can be good opportunities to get on top of things too
- 3 A Use seasons to your advantage
- 3 B LSR managing ferals because its easier to get people to do it than weeds, people more willing to be part of it pigs, foxes
- 3 B Need to get better at working with neighbours
- 3 A Well communicated combination of regions that work together that have a unified plan of action
- 3 B Happy to manage cats if they are having an impact to native species
- 3 B Access to cat traps for farmers from LLS to help them out, would be easier
- 3 B In good seasons, populations can escalate and ongoing issue
- 3 B Control plague kangaroo populations
- 4 B Bounty for feral cats
- 4 A Coordination of funding would get action
- 4 B Challenges to participate are what is happening on that day on the farm, weather, some just don't want to be part of it Carrot coordination and information, stick notices to comply, thoughts? Don't find LGA proactive locally and
- 4 B domestically focused, wouldn't imagine them driving it
- 4 B Stick approach wouldn't work, leave a bad taste if leaves not option
- 4 B Isolating people further by bringing in stick isolates them from future activities as well
- 4 B Bounty for feral cats

Key thing in relation to coordination, over time experiencing more wild dogs problems, when talking to people one neighbour would bait but not let people know in advance to coordinate it together, we talk about the problem, but do

- 6 A individual things on our farm
- 6 A Need to work together, the outcome is much greater with coordination
- 6 A There isn't any other way to achieve as much, coordination only way to get result
- 6 A One or two is fighting a losing battle, need body to coordinate area wide management program
- 6 A Fox baiting can be pointless, one or two doing it, better if a large area baiting program
- 6 A LLS needs to step up more, not really present, pay rates and not feeling the returns or value in the service

#### Motivate to strengthen practices?

- 2 B GRDC doing some research into mice
- 2 B Baits not working as well as should be for mice, need to focus on this as they are always around, need options
- 2 C Virus for carp, need to come up with something
  - Places where there is native vegetation there are more feral species, if there aren't areas with natural veg they don't have
- 3 B the same issue, and CRDC need to be aware increase vegetation will increase ferals
- 3 B Inherent neighbour problems if don't work together
- 4 B NSW have a grant for the bait for mice
- 4 B QLD second year constantly baiting for mice, subsidy for bait, can't use anything else
- 4 C market for roo meat to help keep things in balance and make money
- 4 B Market for wild pigs, people want to participate in the market and maximise the opportunity
- 4 B Seen it with goats, better controlled because the market is strong
- 4 B Good to see subsides
- 4 B Spent a lot of money controlling mice, aerial baiting

#### Help or Solutions?

- 4 B It has value, struggling to understand the meaning and value of biodiversity
- 4 A Financial incentive to warrant the effort, we are keen but need support
  - What drives us is what impacts our viability, farmers will take that into their own hands such as mice, government is
- 4 A slow but good with information
- 4 B Chillers were big with the pigs, but not so much now
- People on farms chasing pigs can cause a lot of problems with people on farms, compared to dealing with it yourself with
- 4 B helicopter shoot

#### **Role of industry biodiversity**

#### TOPIC

#### RATING

- Uphill battle, one step forward two back when making progress e.g. teachers in schools misinformation about cotton,
- 2 A despite teach the teacher
- 2 A Constant battle to educate people and the historic view
- 2 A Tell people what we are currently doing, industry doesn't get the kudos what it is doing
- 2 B Love blurbs from Cotton Australia, but only getting to people who are following them
- 2 B People are getting information from old sources
- 2 B Reading what customers want and tell
- Industry development programs get more traction than government initiatives, industry developed programs with growers 2 B will be far more beneficial
- 2 B Not a fan of the stick, need to address concerns now before they are legislated in the future
- 2 B Don't know where the cotton industry fits in respect to the biodiversity impact
- 3 A All irrigators on some sort of waterway
- 3 B Think riverine areas as separate to the farm
- 3 A Need to think of the whole farm and interaction of systems
- 3 B Farms that don't have vegetation areas, sill have biodiversity in cropping areas, want biodiversity in soil
- 3 B Limited impact for cotton growers that don't have natural areas
- 3 A Irrigation farm within the property boundary don't have a lot to contribute to biodiversity
- 3 B Dams on properties have birds, nature strips for habitats, do offset cotton environment
- 4 A Public licence to keep operating
- When it affects the market however when it is greater than personal opinion, then need to aim higher for social licence,
- 4 B but such a big goal may not achieve it, niche market will pay a premium for educated market who values the biodiversity
- 4 B In Queensland we are seeing more activity in NSW and funding, don't know what is happening in Queensland
- 4 A Offsets is an area to look at, cotton growers could invest in offsets for biodiversity if they don't have any
- There are some farms that don't have biodiversity, but there are many that do have a lot to contribute but what are the A incentives to support that
- If all cropping and inside a fence, still want to do the right thing, if we are straight croppers what do we do without
- 4 B buying a dedicated farm for biodiversity
- 5 C The whole world aware of bees now, part of this is reducing pesticide use and set ambitious targets for 0 harm to bees
- 5 C Coal mining industry, clearly they don't need a social licence but they just do it anyway
- 5 C Don't care what people think, leave people with their uneducated opinion
- 5 B Work on corporates more, looking for things to do in the community more
- 5 B Country Road paired with Landcare in NSW
- 5 B Good for everyone
- 6 B Could have a big advantage doing this right
- 6 A Have a great need to make it look good and do it right
- 6 B What people see with pesticides and water use and need happy stories to counteract that
- 6 B We need to build trust
- 6 B Biodiversity is an easy space to educate and get a good story on, it is feel good and easy to understand
- 6 B Everyone has dealt with environment and biodiversity, so it is easy to understand
- 6 B Won't win over anyone with a few Facebook posts
- Councils have a role, they look after the roadways, all work together would be part of managing the environment and 6 B looking after their patch
- See opportunities for collaboration across boundaries, that's the point with biodiversity can't just look after your own 6 A patch
- Down the track need to include the tourists somehow, let them view projects to see what is happening, educate one
- 6 B person and feeds back to 100, could have a tourist route through
- 6 B Cotton industry lead in this area, we do well in other areas
- 6 B Cost sharing, diverse regions and collaborative with other groups and industries, partnerships
- 6 B Industry innovation to drive the way forward to take it up, instead of government
- 6 B Leadership issue
  - Others have developed BMP on the shoulders of cotton, recognition that cotton ultimately has to do something about it to
- 6 B survive, comes from a challenging place, but gives an opportunity to lead
- 6 A Clear a path and incentives
- Image thing for cotton in Australia, image is not justified so the more proactive the industry can be around what it is 6 A doing around biodiversity would help
- 6 A Social licence, long term benefits will come from biodiversity enhancements
- Benefits from beneficials for crops and highlighted a bit more, handy way to contribute to the situation and how good 6 A impacts can be done
- 6 A Has a role, targets make me nervous, people are already doing things but industry not good at projecting that well
- 6 B Have targets only negative thing I find is minority do the heavy lifting for the industry

- 6 B CRDC central body for funding
- 6 B Be careful of the overlap between departments, need someone to be coordinating it
- 6 B Overriding coordinating body
- 6 B A+A12:C55 lot of overlap between groups, hard as a grower to chase down grants to do reveg Setting Targets

#### Setting Targets

- 2 B End of the day it is still warm and fuzzy and hard to put a number on it, but need to keep pushing it
- 2 B BMP has boxes to tick around biodiversity, how is it being measured and what impact is it having
- Not an expert in biodiversity, conscious in being environmentally friendly and look after biodiversity, if we learn more 2 B there could be more we can do
- 2 B Consultants have a role to support information
- 2 B Consultants are not considering soil health enough as a solution
- 2 B Can't find support to look at other ways of doing things, so still doing things traditionally but want to change
- 2 A It is so complex, not that it can't be done, but where to start and draw baselines from
- 2 B Interested to see how to integrate improvements to soil ecology into cotton business
- 2 B See research, review of practices globally innovative ways of addressing soil health
- 2 A nature strips for beneficials, not measuring beneficials to know if they are having an impact
- What is soil health? No clear statement about what we are tyring to address and determines what is good soil health,
- 2 B biology, sequester carbon
- 3 B Sustainability outcome to protect the environment
- 3 C Emphasis in change of system to reinvigorate soil biology, don't see this attitude at the moment in industry Soil health for us is huge and have been focusing looking at different products, university, deep manure placement,
- 3 B seeing earth worms return
- 3 B Some of us are prioritising soil health
- 4 B Like to think we are past the point of sustainability, should be about premium and promotion
- 4 B Mantra yield is king, looking at alternative ways of doing things and think soil health is the greatest opportunity
- 4 B Finding balance of return and better manage for the future, achieved through IPM
- 4 B Low insecticide input in system now, still getting good yields
- 4 A If there are targets in place, needs to be rewards for reaching them
- 4 A Monetary return, BMP, long term biodiversity reward on farm for doing the hard yards
- 4 B Water limitations makes it difficult to put any continuity into it
- 4 B Flora and fauna targets for my irrigation business doesn't float my boat Best crops both yield and gross margin are on healthier soils, want to maintain and improve those soils and encourage
- 4 B biological activity
- 5 B One person starts in the district and others follow
- 5 B Not a great deal else I would be doing to satisfy industry
- 5 B don't know if industry targets would change management on property, as hope that what already doing is enough Focused on regeneration in grazing, have targets working towards, find difficult to get motivated with cotton to give it
- 5 C attention in this area
- 5 B Most people wont do it unless they have to
- 6 A Strong direction from industry and knowledge and awareness about outcomes would be a strong motivator
- 6 B Have targets for other issues and profitability drivers, this area is struggling due to lack of recognition of value Lead with industry target, but if don't have way to measure this on the farm, will keep raising questions about the real
- 6 A values
- 6 B Best things we can do is create the leadership value
- 6 A If we do have some targets, they need to be realistic and achievable, and applicable for our region
- 6 A Like to see a clearer path to implementing changes by industry
- 6 A Setting targets is complex because every system is different, every farm and every situation is different
- 6 A Set realistic target, get people motivated to commit to it, set bar low to get people involved and start from there 6 A Start easy
- 6 A Start easy
- 6 B Industry targets, impacts on business because of the time needed to get practices in place to be achieved
- E B What are you trying to achieve? Has the industry got targets in place?
- E B Who is going to measure?

#### Help

- Definition and clear picture of what biodiversity is. CRDC needs to be very clear, is it n the economic areas and
- 1 B vegetation areas, clear about the objectives.
- 2 B Visit from Stacey, if already available then we can say assistance is available
- 2 B Others may take it up if they knew it was available, 20%-50% neighbours would be interested and adopted
- 2 A Session at a field day, information session would be well attended
- 2 A People like to observe what is around them and how it all interacts
- Getting an assessment done for the industry is important, people don't know where to start and give them ideas what they 2 A can do and be surprised about who might do something
- 2 B Know what you have and what you are lacking, need to change system to increase soil microbe biodiversity
- Systems approach, need a change in the mindset, its where beneficials are breeding, how are these areas contributing to  $2 \quad A$  the rest of the farm
  - the rest of the farm

One learning base and same information and strong on that information, reduces chance of deviation of what trying to accomplish with biodiversity system

- 2 В Smaller farms means getting more information across to people, needs to be valley relevant, including relevance and
- 2 В location of research
- Tools for growers, can't manage what we don't measure and don't have much to go by 2 Α
- Measures are easy, people can see results and only need a small win to see results and want to do more 2 А
- Photos are a simple way to monitor and visual to see the wins 2 В
- See the results before moving on to the next stage 2 В
- There is a validation step in everything we do, industry target, get industry and national outcome, but need to get local
- 2 Α person out to tell us what the right plant to put in is 2
- Validation that what we are doing is worth while А
- 2 Lack of knowledge Α
- Have things that have a secondary impact, working aside ecologists, plant seeds instead of root stock, go back to basics 2 Α about what will work in the local ecosystem
- 2 В Lost that engagement for years with ecologists
- Everyone is doing the best they can, fields of cottons don't grow trees, doing a great job that we are doing a lot already 2 В and managing creeks and vegetation, looking for more information about what to do to improve what we have
- Disconnect between research and farms, wealth of knowledge universities and researchers but not breaking it down for farms and need to bring the expertise to the table to work together, farmers don't have the answers and need to bring 2 В practicality to the farms
- In terms of support, need numbers and research, good understanding of what is driving the ecosystems and management 2 В practices, solid numbers to manage and improve
- Had scientists on farm looking at endangered species, were great, they had survived this long doing what you are doing 2 В so don't change anything
- 2 в Case studies on cotton farms for carbon farming have been done
- How does proper IPM fit in to the biodiversity on the farm. If using this philosophy then stuffing the IPM if not 3 В addressing biodiversity
- Pretty lucking in area can check how IPM is working as neighbours are in a bubble and check the area. If neighbours are 3 В working differently don't have that advantage
- Area wide management hasn't really worked as there as so many fingers in the pie, isn't just a grower issue, everyone 3 В providing advice impacts what happens on farm
- Talking about major insects, talking about vegetation areas to manage as whole farm system, look as whole farm
- 3 В management, putting past farm gate not sure
- 3 В Problems change, such as floods bringing in weeds Biodiversity thinking about riparian and weeds etc, need to bring biodiversity into the general farm to start talking dollars, such as soil microbes and insects and show they all spread from riparian areas and assess to know what we have
- В 4 and what to push
- В Asked by bank - do you have a sustainability plan for your farm? 4
- People don't just own farms, they lease them, what is the benefit for someone leasing for 5 years, what are the incentive 4 В to improve the value of the farm in the short term
- 4 В Dollar value attached to rotations in other countries, paid for fallow and have production benefits in the following year
- 80% US share farms, looked at long term management 4 в
- Comes back to manageability, some plant 1000 and have over half die, better to have 10 and establish them properly 4 в
- Management has to be within everything else going on the farm 4 в
- Cost is minimal for the tree, and outlay isn't a lot and people can do and therefore not money focused 4 R
- Don't want to spend money on something that doesn't work, but want to do something that wont cost a lot 4 А
- Not looking for recognition, looking to increase value and return, if not getting a return, increase sustainability number 4 В one and increase bottom line number two
- Consultants perspective, appetite is there, incentive economically in there to increase biodiversity, information coming В from researchers to get it on the farm and invest in new technology 4
- Incentives, marketing advantage such as carbon farming, social with sustainability, way to market Australian cotton,
- 4 А financial incentives then feasible for consultants to spend time on
- 4 Е Soil carbon is a hot topic, is it perceived as biodiversity?
- Don't want to lock up areas just for biodiversity, needs to be actively managed to produce an income 4 В
- If not doing it with carbon farming early, then will go ahead with carbon credits because that is where the dollars are, and 4 В miss opportunity to include biodiversity
- Could attract bids due to carbon and attract client base to the product, tyring to understand where it fits as part of the 4 В system
- Clear market for carbon credits, not clear for biodiversity credits, so that's why people would go to carbon market first 4 в Same as decisions wheat or barley, it is an economic decision, if biodiversity isn't part of the economic decision they will
- 4 А go for carbon
- Biodiversity should be first and carbon is the by product, perplexing given biodiversity is most important 4 В
- Need a trading platform, financial reward is to have a trading platform to trade biodiversity and put it to the market, fair 4 В and transparent market
- В Biodiversity zones and levels of zones to measure and trade it, on a global scale 4

Can see the economic side of it, need financial support, can see the value in it, but want information to know how to do it

- 4 A well but can see the big argument Economic basis, biodiversity should be valued more highly than carbon credits, farmers need to do the right thing by their
- 4 A land but need to get economic return for it
- 4 B Banks and insurance really looking at this, asked for the first time
- 4 A Access to funding, so many people operating in this area and hard to understand what is relevant, and what projects to do 4 A Got to be financial positive to the business, targets financially negative to the business is going backwards
- Talk about carbon farming, what does this mean for farm, develop new parts of the business around it, may not get
- A benefit for 10 years but will eventually get a return, but in the mean time there are environmental benefits being achieved
  5 B Smaller farms are doing the heavy lifting
- 6 A Package it as an area wide thing, if could line up with a group and help uptake where some are not keen
- 6 A If not a priority people won't go out of their way to do it, need to show it is a priority
- 6 A A stronger component in BMP, an easy path and already doing BMP you are capable of uptake
- 6 B What makes it a priority? It is a personal preference and will vary. If in BMP forces it to be a priority
- 6 B Peer pressure is great sometimes, one neighbour will do it and others may try it
- If it is a concern, rather than a priority, might be interested, growers have enough to be worrying about, not sure how to 6 B get biodiversity up the food chain
- 6 B Can't have the same biodiversity target for every region
- 6 B Every cotton grower plants one tree, every year as a start
- Tend to be insular as an industry, strength for agronomy, but potentially weakness when comes to NRM, by accident can 6 B find someone with a lot of experience in DPI and didn't know that had the expertise because we don't have the connect
- Have dropped the ball, see lead projects and what might make it easy, also need to not lose sight of those who left areas 6 B uncleared and the corridors and tap back into what we are doing it for
- Whether is it about biodiversity in farming areas, dollar per hectare, increasing perception in the community through
  B revegetation, or protect what is there and enhance it should be trying to do all of it
- Started mapping carbon process, but wouldn't know how to map biodiversity footprint, biodiversity needs to learn from 6 B carbon market
- Not sure what CRDC will do with the project, how to use the targets, needs to be solid standards about what growers are working towards, and for consultants to support them
- Objectives putting forward a united front, influenced by external factors, making sure everyone is on board, better
- 6 B understanding as an industry what are we trying to achieve instead of doing it individually
- Talk about scenarios and hope don't go the other way that limits people o what they can do on their farm, more 6 B transparency
- 6 B Voluntary vs not voluntary, come more transparent, most people doing their best, but then under greater scrutiny
- Risk we say we have these great areas of biodiversity and government puts restrictions on it or tell you what to do, such 6 B as water
- 6 B Really strong body to understand the risk and what farmers trying to achieve and have voice
- 6 B Careful don't create a social licence to farm, don't have the right to farm you have to earn it
- Help develop the carbon farming industry to achieve the benefits and realistic approach to get a pay off for the 6 A implementation of a program
- Need a lot more information on carbon farming, central body, accessible information on how, what, opportunity for 6 A business development

# **Appendix C. Quotes from workshops**

The following sections highlight key quotes from the workshops that correspond to the results sections above.

Perceptions about the term biodiversity			
Biodiversity is 'the natural environment'			
It's really just having a look at all of the environment that you've got around you. So whether it's river , wetlands, whether it's pasture, native grasses, trees it's looking at the whole environment that you've got around you and working with it.			
biodiversity is just part of the natural environment.			
Biodiversity is not just all the plants and animals, it's the little things too, and how they interact			
I'd say an abundance of plants and creatures and you know, that're all playing in a symphony together.			
for me it's more understanding what's out there and how it interacts with each other, and how it works on our farms Especially the little things like the bugs and the small things. We don't know what's there - so, learning about what's here and what you need to do to, to keep what's here here			
Some participants viewed soil microorganisms and parts of cropping systems as part of biodiversity by some, but not all participants came to the discussions with this view.			
Those microorganisms that are in there, the fungus bacteria - they will help us grow better crops if we've got healthier soil. And so that is to me, part of the biodiversity of our farming practices, changing the biodiversity in our soils on a very micro level. So for me, we most definitely have two separate areas - We've got our natural veg biodiversity and we've got our farming country, productive economic biodiversity. We need both			
I would have just thought if you were asking me to assess biodiversity in a farm we've been in a farm we've been in now, I wouldn't have thought about it in relation to what the paddock, I would have thought about it in relation to the other areas of the farm so I saw them separately, which is probably needs to be a shift in thinking, really.			
Then yeah, you're working on yeah, your paddocks where you're farming is, I guess it's biodiversity, isn't it, but it's a, it's a man-made biodiversity, it's a different system altogether			
The vagueness of the term biodiversity, and the different ways it could be interpreted was a barrier to engaging with the topic. In particular, some people found it a bit 'jargony'			
a bit of a buzzword, like sustainability what biodiversity [do] you really want? I'd like to increase my understanding of biodiversity and how we can capitalize on it within our farming system.			
I'm probably at a basic level as well you can have plants and animals, and that not be a good indicator of biodiversityI guess to be honest [I have] some scepticism around biodiversity			

If I went in and tried to map my biodiversity, I wouldn't know where to start, or wouldn't know who to ask.

Participants felt that if the cotton industry was going to more involved in biodiversity management, then they need to develop clear definitions and clear goals with regard to what they were trying to achieve.

I think biodiversity's asleep. I don't think there's a real charter, as to what we're all trying to achieve. Because none of us really understand the true meaning of it or will have a different meaning. And I guess that's why I wonder where CRDC are going with the biodiversity...Whether they are looking for big native vegetation stuff, or whether they're looking for the more small scale in field, diversity of small species

I think the biodiversity challenge is - Are we looking after existing biodiversity or are we trying to replant, Build biodiversity? And I think that that's the challenge. And for us, are CRDC looking to increase biodiversity on cotton farm? Or are they looking to promote the ones where it already is?

To have a clear vision, definition, picture of what they are promoting as biodiversity, because, obviously, even from this call, there are varied opinions on what that is. So, I would think CRDC need to be pretty clear as to what biodiversity... encompasses

And, so, there is this kind of way that we can contribute to shaping things for the sector. There is recognition that we have to, you know, we ultimately have to do something about these things, or we may not survive. ...what the things that we're talking about mind, you know, they're challenging, but they also may very opportunities for the future, So, we have this opportunity to lead again

I agree, it's all about social licence. I Think long term benefits will come from biodiversity enhancement.

Yeah, that's where we've got to get to, and I think our, one of the best, yeah, the most focused things we could do is, it's crack that leadership opportunity.

...if it [biodiversity protection] is not something that's a priority, we do have that risk that the industry does come under fire, because it's not something that we're addressing enough... Yeah, I do think I see it as something really beneficial for our industry

#### Motivations to do the 'right thing'

every farmer wants to leave their land in better shape than what they found it and, you know, if I had a dollar for every time that I'd heard that we'd be doing a lot better than we're doing.

I know that every farmer I've talked to wants to leave the land in a better way than they found it. There is, that approach on a family farm might be different to leasing country so that's a thing to consider but, yeah, in general, I think we all want to do, do the right thing and introduce biodiversity wherever we can.

I would like to do something for smaller birds, some sort of different species of trees, or whatever to encourage them

... what he was saying earlier, you know, people need to have a vision for it

Some inherent value for biodiversity: we've got a problem on our farm at the moment - Well, it's not a problem. It's, it's, it's actually really interesting, but it's an old billabong area that was hooked up through the cotton channel, into our farm. And it's got a endangered species living in it that no one can find it anywhere else at the moment. So we're working with the DPI on that. But it's, it's a little bit yes, it's in our cotton fields, its this little snail, and, and we have to look after him. So, yeah, you know, we sort of recognize that. You know, we have to look after these areas as well. Yeah, so it's just a balance

#### Revegetation

Motivating factors -benefits for productivity

Trees supporting productivity

We're pushing up to 400% increase in productivity underneath old coolabah trees across our landscape, that's phenomenal.

One thing, I would like add is the change in my view around trees. I would go out to people's farms ... and the only good tree was one that was that was burnt in the corner of the paddock. Since we've changed our grazing practices here, what we've started to see is our most productive land is under our trees, so that's, that's a pretty significant change.

You know there's does research in the cattle industry up on the tablelands, where if you put 10% of the land down to tree lines you actually gain that exactly the same amount of productivity back and the cattle are warmer, grow better and there's less liquid in the plants. So there's actual data and studies around that. We're yet to have that in our arena here. So it's identifying how you get a return out of it.

#### Habitat supporting beneficial insects and natural pest management

[re promoting insects] It was really common throughout Europe to have..., to do a strip of wild flowers were attractive to beneficial insects, and they were doing that along each field to try and promote benefits of moving into that particular area, that wasn't touched throughout the season. [Did they see results from that?] Yes. There was less insecticide sprays in those fields.

I think that the language around the benefits of what things like your birds, bats = are doing on farm, you know, eating their own weight in insects, if we can provide that habitat and then sort of, I guess how many bats does it take to control this many insects, providing through extension some of the. The tangible outcomes of these, these wildlife on your farm, would be certainly be helpful at the moment.

Having this bank of beneficial insects and birds living in that tree line over there that saves me putting on \$50 per hectare sprays and insecticide, that adds up every day of the week

#### Motivating factors - Seeing the benefits

the further we get into it, the more species we start to see returning, things that, you know, we have mate of ours who's been doing this longer than us, you know they're seeing species their mother hadn't seen for decades, and suddenly they start to see grasses, returning that, this lady, hadn't seen since she was a kid or something, you know, that's, that's really encouraging

There's a strip - I've currently got a whole heap of Zebra finches. I'm just, I've got quite a long strip that we're not slashing so that they've got somewhere to hide – they're in the chickpeas, they're just everywhere, I've never seen so many Zebra finches before in my life, so it's pretty exciting to see. So I'm just sort of trying to be aware of the areas that we do slash and make sure that they've got some cover around.

Yeah, we've got pockets that we've just left. they used to be burnt semi regularly and we've now taken the burning program out of that particular area cause one of our neighbours has an area that's never been burnt and it's, it's really quite lush, and it's, you know, come back really well.

I do think that most farmers have got a bit of interest in native vegetation trees in general around here

To some it actually means nothing to them, because they don't have anything on farm to really be worried about, like, the only trees they've got are around the house, the only lawn that they've got or any sort of pasture might be around the sheds or the back of the sheds.

...there was [another] farm with very little biodiversity around, that gave us an opportunity to see the difference between that farm and the other farm and there was some difference.

#### **Challenges - financial costs**

*just an example, a budget for 3.7 kms of trees on the, and get them through for five years to keep them alive and growing, is about \$50 000* 

So there's just the budget for doing that. It's not necessarily a cheap exercise, especially, it's not just plant a tree, you gotta keep alive, water them, spray around them, all of that stuff. So, it's, it's not a cheap project

every minute of the day, your time's worth something, and all your employees, you're paying them – they don't go home saying oh, don't pay me only for the second half, because we've been planting trees You know, that, every minute of every day, for every machine, and every

unit of labour it costs money - That's as a business owner. That's the first thing across my mind. Anytime we look at anything, that's, what's it gonna cost?

... I would be losing income... it's no longer productive on your farm and landscape and just costing you money to manage ... there has to be something ongoing, I think, so, a return on that land that we have.

we've got a large stretch of the creek... it's absolutely beautiful... I'd love to bring the river back a bit, you know, reclaim some of this wheat country. But every time it comes back to dollars, and at the end of the day, it's a farm, and it needs to make money, Yeah, his quick answer is, 'when is the government going to pay us to grow trees, the same sort of money as we can out of wheat.' So, I think, at the end of the day, we have these beautiful areas of land but they are also farms, and when you're borrowing money to buy farms and things, they have to be profitable

the area is good cropping area. So, a major cash incentive I guess [to not use for biodiversity]

We want an economic return on what we do, we don't want it to be costing us money, every year to be doing it just to make somebody feel better about it

And they're quite happy to plant trees and do the easy options because it's funded for them but if you actually asked them I would confidently say that if you actually asked them to go and plant those trees and pay for those trees they probably wouldn't do it.

Because, you're asking people to spend money. Which, obviously, we know that there's gains for an increase in biodiversity on farms and sort of stuff. But, you're asking an outlay of costs with no dollar return, which ultimately is a business like anything else. That ends up being the driver for a lot of growers

[on funding and labour force] I feel like those opportunities of sort of dried up bit, unless I'm just not looking in the right spots. It seemed like Lls and landcare have invested more in people we'd be happy to do tree planting and things like that but to me, it seems like by the time you find a grant they are only open for 5 or 6 weeks and we'll miss a deadline and then, um, once again, if you don't have the labour to do the planting and things like that, it would be great to see some collaboration with the people who are looking for work

it's very hard to, you know, put 50 or \$60,000 into a program. Um, so, uh, Like some guys, just because they're not in a financial situation, they probably not in a position to do it.

We are actually planning to put in tree lines but you can imagine there's some big costs...

So there's just the budget for doing that. It's not necessarily a cheap exercise, especially, it's not just plant a tree, you gotta keep alive, water them, spray around them, all of that stuff. So, it's, it's not a cheap project

#### **Challenge** – impacts on productivity

You can, you know, put country back to grass, and you can see where that needs to happen. But, again, it comes down to, back to productivity.,

from a farming point of view, productivity is going to be the number one....Productivity is going to come before biodiversity still I don't know if that's the right thing, but I think that's probably the normal thing for most, most farmers.

#### Challenge – Benefits accrue over long time periods

A lot of it's how they're structured financially as well, guys that probably have just struggled through the drought, so it's very hard to, you know, put 50 or \$60,000 into a program that's going not to don't give you any return for at least 10 years or see any benefit for probably 10 years or more. Like some guys, just because they're not in a financial situation, they probably not in a position to do it.

in field, we're going to see the rewards economically much faster. We're not necessarily going see that in our feel-good areas. Oh, we love them— but we're not getting an economic return from them

What did I actually try to achieve in the first place, and to know that it's not going to happen overnight You're not going to get results quickly, But I imagine that through the drought, you know, like, I know you'd like to have trees around, it probably gives a bit of a mental boost when you've got trees around. It's really hard, it's got to be a long-term vision. You've really got to commit to it for 50 years, you know, like, it's, it's not a five-year project.

acacia takes probably 20 to 30 years to go through that cycle. So we are locking up a bit of land to recreate a remnant. And black wattle takes over and everyone, in the business goes look what you've done – you've just created all this weed but it's not for us, It's for the kids in primary school now, to get the benefit of, one day down the track.

to implement that's going not to don't give you any return for at least 10 years or see any benefit for probably 10 years or more.

and to know that it's not going to happen overnight You're not going to get results quickly

#### Challenge- revegetation is not simple, conceptually or in practice

#### Difficulty accessing plant stock

actually getting plants to plant, there's hardly any nurseries, you can't get the plants and things like that - so that's difficult ...

I agree... there's not a lot of native, um, plant nurseries around it seems to have gone more into direct seeding

And, as I said before, you might want to but you can't, find access to - I'm trying to find some salt bushes at the moment, it's totally impossible.

#### Establishing trees is difficult

The trick is getting everything to live, especially when you've got a hostile environment of no trees there already, sometimes you've just got to establish the species that will run. The second thing is, it's really hard to go back and replant or thicken or increase the diversity of a tree plot that's there because a lot of the moisture gets taken by the crops that are there. If you have a tree die it's actually quite hard to get another one to live in that spot. because all of the surrounding trees take all of the moisture and there's a lot of competition for light and everything

#### Encouraging tree growth was not always a straightforward process:

... that's really promoted that natural bush to come along throughout the farming operation. and helps with the wildlife. But it struggles to take off unless you burn some of it. The new trees can't regenerate because of the ground cover. We've had the odd lightning strike, but it's just understanding the time when to burn or how to manage that undergrowth to promote that natural revegetation

#### Revegetation is more complex than just trees

and things that look really good – like planting trees looks fabulous. But if we were to plant seeds, it's actually more beneficial. And we're more likely to have survivorship through planting seeds, than to plant saplings

I'm really convinced that when we look at plants that germinate following events, it's very much to do with, you know, the dominance of either fungi or bacteria in our soils and, unfortunately, we haven't got too much of either.... you know when you start seeing grasses then we start to see better fungal numbers, so we're really focused, I guess, on how we can regenerate some our country through getting particularly fungi back into our soils

That's, that's, it's, it's a whole new, it's a whole new area of work at the moment in looking at regenerative ag and cotton systems. But, you know, it's about, I guess it's about healthy biology.

I guess one of the things that, back on the soil health stuff.. we feel that soil biology's basically been decimated, whether it's through grazing practices or through our farming practices in the past, we feel that we've got very small quantities of soil biology and poor soil ecology ... We've changed our grazing practices over the years to go from traditional set stock grazing to time control grazing, so rest and recovery, is a big part of our program. So now we know we spent a lot of return of perennial grasses, shrubs back into the landscape.

Yeah, that's the entire focus of our grazing operation is around regeneration. You know, we know that the capacity of a landscape today is nowhere near what it was once and you know, man made it what it is today and we're making the assumption that man can turn that around and so, you know, yeah, our focus is around you know, we no longer focus on animals. we

focus on grass and when make all our decisions based on the grass or the landscape health, as opposed to animals.

#### Challenge – lack of information or knowledge

I need to know a lot more about what different species need. I don't know enough about what's there and what it needs to stay there, and what it needs to thrive.

I think sometimes we don't know what to do, - we do something that can have a negative

impact

Challenges - Alignment to farm systems and geography

#### Finding opportunity and space for revegetation projects

Yeah, I think probably the bigger the farmers are the more likely they are to do something, rather than the smaller farmer. ... the larger the farm they might have more area that they can do that. It's probably a little bit harder for the smaller farm.

I've been trying to increase the amount of shrubbery underneath power lines that are quite low, ...there's not a lot of space to plant trees—that would take out really high, productive sort of parts of the farm. So I'm looking at spots where I can add some vegetation and not sort of impact negatively on the field...

#### Hard to access certain areas

it's hard to get access and hard to manage those areas and, and to even know where to start with, sort of, I guess, getting rid of some species and encouraging others.

...Revegetation, and that kind of thing is, is, to large extent impractical when you've got irrigation infrastructure around the place,

*Um, it's predominantly now availability, fitting it around the farming infrastructure that's there...* 

#### Drought and water scarcity

we're on a landscape that is very dry and so, tree planting is not something that's been part of our thinking. [So] our regeneration is all around controlling our grazing pressure.

The trick is getting everything to live ...sometimes the you've just to establish the species that will run. If you have a tree die it's actually quite hard to get another one to live in that spot. because all of the surrounding trees take all of the moisture

And we've been trying to be involved with some biodiversity projects for the last five years. And water has been quite limited...we've got some wildlife corridors. And we've lost probably 50% of the trees within those areas. They're quite hard to get water to, just with that low rainfall. So I'm trying to work out how to work with [our local NRM group] and sort of look at what trees are actually suitable for the region that will get past that two decade period and cope in those really hot, extended dry periods

#### Flood

it's really hard to manage those river areas particularly with revegetating too close to the river because of flood coming through

#### Challenges - Benefits undermined by secondary impacts on weeds, pests, or feral animals

Yeah, the only thing you'd do is enhance the remnant with the understory. but what happens now when the water recedes, we'll have all the weeds from everywhere to contend with and that's an issue river country is known for

I don't know that there's a great deal more that we could do apart from linking up those waterholes which would have been in a corridor for small creatures and whatnot. But there's sort of not much point to doing that if we've got a feral pig problem, that's, you know, that sort of negating anything positive in terms of making it a nice environment or making a habitable environment for smaller critters.

if we leave country uncultivated, especially near the river, but generally speaking the pioneering species will, will, um, colonize immediately and often they're weeds. So, we described him as a weeds.

sometimes we do things that do have that secondary impact, and because someone's trying to solve a solution, I witnessed just the multi species cover cropping. And it was a regulated thing ... and they had a list of 20 species that are allowed to put in there, and they're actually bridging pest insects into their next following crop.

#### Challenge – supporting revegetation vs protecting existing vegetation

This is where we've found biodiversity funding, really interesting and all the projects that come out about regeneration and tree planting, which is fabulous, I have no issues with that, but I find it really interesting that people don't seem to value even trees that are say 30 years old don't get the value. But I would just be a bit wary about always funding the new stuff, and not rewarding or acknowledging the old stuff as well

#### **Strategies - Financial mechanisms**

... the other underlying one is funding, isn't it? If we want to go fence all these areas off or if we to go and plant trees, it's who's paying for that and we're willing to pay but it's just if we're paying it's over a longer period of time.

I guess it's something that's been spoken about quite heavily as the whole carbon farming Initiative has sort of taken off in the last few years. So growers are asking the question, is there a way that we can offset the cost of doing this in country that's currently not productive ... It's definitely a desire to create sustainable landscape, but I think finding a way in which we can offset some of the cost

I think that carbon is the greatest opportunity that agriculture has ever seen, and I think it'll be the greatest opportunity that I'll see in my farming lifetime To me, it just, it just, it all sets up and it's about how can we sequester carbon back into our soils how can we be rewarded for that? So I don't see sequestering carbon in trees as being the future, it's, it's about how we can sequester carbon in soils, and I've been really disappointed that I'm not sort of seeing more energy from the cotton industry in how we can sequester carbon in soils because there was some work done by Rocky, that sort of gave some pretty encouraging indications that we can sequester carbon in cotton soils.

BUT certain schemes (such as carbon farming) could have negative social impacts:

it shouldn't have negative socio economic impacts on the community

I guess that's my point, so we don't want biodiversity to head that way ... locking up country purely for the grant or reward.

Strategies – information, education, extension

#### Information about what species to plant and where, and how to maintain them

in the first instance, gaining information about where to look and how to learn more about it. I'm not sure -Is it as simple as, do you guys have comprehensive information on your websites? ... If we learnt more about what would be the most appropriate types of things, to be planting, or to the population per hectare. what sort of rates? What sort of methodology? Yeah. To be able to learn more about that, would be an advantage

For me, I, I think I need to know a lot more about what different species need, to start with. I just don't know enough about what's there and what it needs to stay there, and what it needs to thrive

First of all, as I said before, we really need to know what we've got there and what, what we should be doing to make that better, or sustain it, or whatever. So we probably need to ground truth first I reckon

And really where we're the bang for buck is going to be, I'd love to plant these trees but I want them to be the right ones that are going to really make more of an impact.

[advice] Well, I guess it would be based on what is actually recommended, what is the best biodiversity and nature strips to have or revegetation, like, what are we encouraged to plant? And, and we'd look to go and do that or strengthen the existing strips

I actually think there is a bit of a lack of knowledge...I was surprised, we had a drone tree planting field day, did everything and two neighbours, they tell us they've never seen how we plant a tree, which I thought was a pretty common thing, with the land care around the district. So there's potentially a lack of knowledge to make a start out there. It really surprised me, you know we've had lots of discussions about insects and tree lines and everything over the years but the question they asked me was, well how do you get a tree to live? And so that surprised me a bit, so there's potentially a lack of knowledge there

#### Information about benefits

I think that'd probably drive a few them. If they saw that they saw that you know I've got less than 2% of trees on my farms and there's a bit of knowledge around that more trees will help with beneficial insects and everything. Certainly I think there'd be some interest there.

You know, there's just a big gap of information about the soil health, and how can we manage it going forward? What are the best things to do, like the information if it's there, it's not getting to the growers.

#### Information about getting started and navigating systems

I reckon that idea of a bit of a recipe or a guide book would be, would be great

I think if you, it's not going to happen overnight, but if we kept it basic and there was a recipe almost to encourage us what to do that would be a starting point

But I think it's more, knowing what people can do, knowing their limitations, and knowing where to go to get help, because I think that is half the struggle, that's half the issue, we just don't know what we can do, what we're able to do, that sort of thing.

I think some of the barriers is probably legislation, so not really knowing what the legislation is, and what's allowed to happen and I suppose, the restrictions of those legislations, so I think that's a big thing that we need to work out, what people can and can't do.

#### Measurement tools & support

Some of it, too, is about knowing if you get it right. What are we trying to do? Is it actually a positive or a negative impact

Maybe you can get a self assessment template, or document where a grower can go and do your own self assessment. Then, you know, whether you do a ranking or rating I don't know.

I suppose if you could get yourself a self assessment and see exactly where you are that might drive a few of them

#### **Demonstrates sites / learn from others**

I guess, I'm big on demonstration, we need case studies. There are people that are starting to do things very differently to traditional high input agriculture and just really encouraging stuff, You know, there's guys in New Mexico in in the US that, you know, are growing high yielding cotton crops on predominantly biology. And, so, you know, we need to be able to demonstrate it because, you know, I felt I was always doing the right thing, you know, we're trying to leave our landscape in better shape to the next generation well you know it's pretty bloody clear to me that I've been destroying the landscape, not improving it.

#### Provide flexible entry points

People basically want to try things within their sphere. I wouldn't discount just running some more simplified workshops.

... that takes a lot of commitment and co-operation. Sometimes, I think we try to put, put it across as ... It just becomes overwhelming, because it's too much, like, whether we can bring it back to just a bit at a time, you know, things that are manageable, and, and have those if people start having those small wins and then the benefit from just one thing. Not trying to do [everything] at once, or, you know, just to in manageable sizes that, yeah, that aren't overwhelming in amongst everything else that people have got going on in their life

we would like to pick some areas where we would have a like a wildlife corridor or something like that and promote that that rather than sort of blanket tree planting or shrubs or anything like that.

#### Stock exclusion from riparian and riverine areas

Motivating factors: seeing the benefits

I guess looking at landscapes and looking at the improvements that we've made, some really encouraging responses to what he was, what he was identifying and seeing improvements in

some of those perennial plants, even through the drought. We feel we're making some real headway just by changing our grazing practices,

on one of [our properties], we did fence off 14 or 15 km of river there, but to see the impact of that sort of 10 years down the track, it is pretty eye opening, just particularly with those grasses, native grasses, and how much they are impacted by, not just stock, but all animals.

But I've certainly seen the extreme damage that stock on riparian areas can have to the bank, and the structure around, you know, the roots of the trees that are along that bank line, especially if it's overgrazed riparian areas. And, you can see it if one farms got riparian zone that un-grazed and the neighbouring property has grazed area the difference in.. I guess the, the quality of the environment is very much noticeable.

But then It's amazing to see how quickly it all comes back... it's amazing to see, it's been fenced off from grazing for 15 years and the stark fence line differences there.

It's just chalk and cheese when you go to our boundary with our beautiful grass and trees and big riverbanks into maximum eroded banks that are moving probably a meter a year every time we get a big flood or big flow events in the river.

*I think we've seen the positive changes in that and we're looking to do it on our, on our other river country as well.* 

Motivation - in some circumstances, de-stocking is less effort than stocking

Well, it was hard to stock, and you couldn't really crop it, so thought we'll do some thing good for the environment. Take it back to what it was. And in the future, it may be worth something as carbon.

... fencing off a riverine environment. Even if you did that that'll help you don't have to plant necessarily, you just let it come back, just take the stock off

#### BUT not everyone has stock

Not everyone has stock: a lot of feedback from cotton growing people is that they are either lightly stocked

#### **Challenges – cost and effort**

Maintenance on fencing is, I guess, it's just been difficult to address those issues once again, it requires people, labour, time.

It's just been a matter of cost, you know, with the drought and things like that, that's probably the barrier.

Sometimes it's a profitability, thing, really.

there's capital and ongoing costs to doing all of this [fencing riparian areas], which means a lot of people just say, oh, I can't be bothered. I've got neighbours that say they're graziers and they've got eroding riverbanks. But they work on a low-cost model and water from the river is a lot cheaper than putting a pump from a trough.

We took some areas back to the natural landscape but not a great deal ... as we said, the government doesn't support you to do it.

We've fenced a lot of country, you know, we've probably done close to 30 kms of riparian fencing

it's all about just having the people to be able to address some of these issues

*The other thing is the, you know, the, the maintenance on riverine fencing ...requires a lot of work,* 

originally, we put these fences in over 10 years ago now and, I guess, we tried to leave as much country outside of the area that we fenced on the riverine areas to maximize our grazing opportunities. But in hindsight what we should have done is it's probably moved our fences back out into some more hospitable fencing country I guess, rather than sort of running down gullies and stuff, probably taken away a little bit further from the river and that would've alleviated some of the maintenance issues that we've come across.

it's almost like when you're dry and the rivers lower enough for you to do something, then you've got no cash and then yeah, once you're busy, you're busy cropping and getting cash flow, and it is one of those things that does get pushed to the back burner if it's not, you know, within your whole farm system. Yeah, you're trying to make next repayment on a new header or whatever you thought of those things get pushed to the back burner. But when you've got the time, you haven't got the money. When you've got the money, you don't have the time.

#### **Challenges – loss of water access points**

You can do all the right things and fence off your creek and riparian areas, [and then you have] a raging drought and... we'll just let the cows go in there....Now that's all we've got left.

...all the good intentions in the world can come undone when finances are tight or ... Animals are starving

#### Challenges – physical access to certain geographical areas

we find it difficult to [do that] at times, just due to the fact that riverine country is just so difficult to get around in because of gullies and trees.

we also have other areas on farm with naturally-vegetated floodway. And other riparian areas that we didn't put in [to a grant application], because it was just too difficult, we couldn't maintain roads, We couldn't maintain flood banks. It wasn't going to be, practical, on a cotton farm to be able to do that, [to] put that into that conservation trust

#### **Challenges – secondary negative impacts**

quite often when we have excluded or locked up areas, that they also become secondary issues with bushfire, pests, noxious weeds, So A locked up area that's not managed has its own, You know, massive set of issues and challenges that go with it.

Probably the biggest challenge there is just controlling the weeds and the pests that that creek will harbour.

The tree lines are fenced off from the cattle. But there are some circumstances on the creek where we do crash graze the banks trying to knock down weed species and trying to establish the native grass species on the banks to stabilize the banks and that's been highly successful... But as a rule the tree lines are fenced off from stock unless we have a particular model like that.

I don't know that there's a great deal more that we could do apart from linking up those waterholes which would have been in a corridor for small creatures and whatnot. But there's not much point to doing that if we've got a feral pig problem, that's, you know, that sort of negating anything positive

So we've excluded domestic animals from there, I guess, what we need to do more is, we need to clean that country out to try and get rid of those goats on a much more frequent basis to try to take that consistent grazing pressure away.

Like, you know, the biggest thing is the weeds. You know, you can have it all beautiful native grasses and whatnot, but the cost of actually controlling the weeds and you've got this continual flood waters that are coming over, the cost to the individual landholder is just astronomical... and you're lying low because you don't want someone to come in and say, look, you've got to control those weeds in that area because 400 acres when you don't actually getting an income off it, it's a lot to be controlling these weeds.

#### Challenge – lack of clarity about stocking density requirements

Ok, Well, I don't really think our stock impact our river so much So it's not a It's not a big thing. I don't see it as a bigger issue as what it might be in other areas anyway. And it's not for us because we have cattle and the most that would have on that river is like 20 cows and calves sort of thing. So, it's not, like thousands of head on it, or anything, you know. We're not big graziers or anything

And locking livestock out might not be the right scenario in some situations. It might be that you have to, only have them in for two months of the year, or 50% capacity

#### Strategies to strengthen adoption

#### Funding mechanisms

[What would it take to put more areas back?]More funding and hopefully more awareness of how important carbon farming is and some value on carbon farming

it would be good to come up with a more enduring mechanism to support that across all of agriculture, not just cropping systems. There are a lot of different mechanisms that could be used. You know, deductibility is another one ...A deduction rather than a payment, so that when you do make a profit, you have this extra recognition for what you've carried on behalf of society. And I think there's a pilot program now within the Federal Department of DAF, too, to look at rewarding natural asset protection development... grabbing those opportunities and promulgating them across the industry so that you get this sort of lead/reward cycle, happening where people are piloted into ... programs. That become an example for the rest of the community.

#### BUT

#### Funding is not always the answer

I don't think the answer really, is probably cash, I think it's something that you're either interested in, or you're not, you know, that's, um, yeah, that'd probably, probably wouldn't be a major motivator for, for a lot of, a lot of farmers.

#### Its 'complicated'

I don't know how you do that,. ... how do you [generate] any benefit from that value? Is it just that managed assets [are] worth more, or are you getting a payment for not using it? ... How do you get the value from locking it up?

#### Concern about non-voluntary approaches

Oh, I don't want to be told to do anything with it. That's sort why I've kept my head down on this, because I don't really want someone coming legislating that I've got to do this or I've got to do that.

I think the big stick is just going to terrify people. And I didn't even consider that that would be a part of it, but now hearing about it, I think, yes, that is a problem. You know, you sort of reluctant to put your head above the parapet in that situation.

That's regulating what you can and can't do. And maybe that is the way of the future. But there would have to be an awful lot of support come with that kind of regulation to say, 'we're not to have any livestock in a riparian area'

#### **Strengthening management of weeds**

#### Challenges - time and cost

the biggest thing is the weeds... You know, you can have it all beautiful native grasses and whatnot, but the cost of actually controlling the weeds and you've got this continual flood waters that are coming over, the cost to the individual landholder is just astronomical

So it is because of the way, because of the country that it is down there... It's a very difficult area to access. And so it's not just the initial going in and removing [weeds, its] getting rid of all of the suckers and the seedlings that come up afterwards - all the re growth.... - we would love to able to do it. It's just not something that economically is viable for us

...We [applied for funding for a] biodiversity officer... employed on managing that country, to get rid of the feral species, weeds, pests.... It had to be locked up, there could be no wood gathering, there could be no bikes, there could only be horses to retrieve other stock, it had to be fenced. And we had to provide a budget to do that, and so we, went and budgeted, all of those things... [but] it would cost more to do what they expect than the payment that you receive in return

they sort of, start spending a few dollars and start cleaning up the weeds ... and then all of a sudden, they get a flood and they seem to have gone backwards. Some farmers seem to get disillusioned in that process and they seem to have gone backwards

we're quite capable of saying 'yes it's great for the beneficials, it's an ecosystem for them to build up', but there's no actual figure on how many beneficials come out of those weed areas ... if you could actually put monetary figures on it, you might get more of a shift, but if there's no monetary figure on it I don't know how you actually convince people that management of those areas is probably a huge benefit for them in our grazing country, Which is heavily wooded areas, so it's quads & backpack sprays pretty well, which we can't justify for what we're getting out of the country even on grazing let alone leaving it to natural vegetation....

We've got a farm that we do actually graze and the cattle country there costs an absolute fortune to keep the roly poly and keep the grass growing instead of sapling trees and roly poly at least, and briars. Think last year for about 600 acres it was about \$90K

It would be exceptionally expensive for us to take that [weed management] program on ourselves, because of the area that we have down there. It's not somebody else's 10 hectares remnant vegetation along the fence line - it is a vast area. It's \$70 a hectare to be an able to do it.

And you're looking for ways, always looking for ways to sort of minimize inputs and the costs around that.

#### Challenging practices

the controlling of the weeds in these riverine areas that you just it's, it's very it would be very difficult to do.

*Boxthorns are very difficult to try and control, especially in every heavily timbered areas. Similar with the fleabane - very difficult to control... yeah, it just spreads everywhere* 

One other tool that I'd like looked into is actually, with the natural boxland and the shelterbelts - is to actually to do a controlled burn through them to actually help manage some of the undergrowth and allow access to get into for to control some of the weeds, because some of it, it's virtually impenetrable

trying to control some of the weeds in these areas, but not hit the native things that are popping up as well. Yeah, trying to because there's lots of small native things that you want to keep. So, really, it comes down the backpacks [a time-consuming technique] and it's just impossible

it [the challenge] is being able to get in there and do it, and it is - a lot of that is inaccessible, A lot of it is very wet a lot of the time. And it is a person with a backpack or the it is just very labor intensive to be doing it

I think, definitely accessibility - in those areas, getting in and being able to manage the weeds, its extremely time consuming, labor intensive. And also, there's a higher chance of missing areas, or not doing the job that's needed to fully control the different weeds

Our problem is feathertop rhodes - when you see them, try and pull them out - Quite hard to get out during the dry weather

There's another side to this because it's difficult. Yeah, in the rest of our lives, or in a lot of other areas of our lives, things are becoming easier and easier, or more convenient, These particular things, are very hard. That's going to have to be something that one's about...smart solutions, like biological control, or maybe selective use of drones and that kind of thing, selective destruction, purpose, introduce., that kind of thing. There is no easy answer to that question about strengthening weed control.

It's more the weeds the controlling of the weeds in these riverine areas that you just it's, it's very it would be very difficult to do.

#### Challenges - compatibility with on farm conditions

But the trouble with river flood country, every time you have a flood, a brand new species of weed pops up that you didn't have before

its impossible the accessibility ... probably 80% of it is pretty hopeless ...

But the trouble with river flood country, every time you have a flood, a brand new species of weed pops up that you didn't have before then that changes sizes that population, like now we've got ]a new weed] that we didn't have before, and then how do we manage that going forward?

We had a really quick turnaround, from no allocation to deciding to plant a winter crop and the, the period of time to be able to spray this year has been extremely narrow to get on top of weeds, and then juggle what's happening around the area as well in terms of chemical choice,
and crop emergence. That, you know, it's been quite a challenging year for weeds this year even though it's been excessively dry.

Seasonal conditions...while they make it tricky, they also provide really good opportunities to get on top of things as well. You know, we've had a run of dry summers, which has been really good for getting some things under control

So it is because of the way, because of the country that it is down there and the flooding and the way it floods and cuts across the landscape. It's a very difficult area to access.

# Challenges - lack of coordination and area-wide management

we do our best to control boxthorn, and they [non-farming neighbours on one side] don't really do anything to manage their weed situation, which makes our work twice as hard. ... they're not managing their noxious weeds as everyone should, so it sort of impacts on growers doing things right, and leads to more cost to eradicate the problem, to start with.

if we just ignore what's coming down the river and say its too hard We're just gonna get reinfested, we wouldn't do anything... So, either we say, OK, we've got to do what we can do, or we just say, we're not doing anything, because it'll just keep coming. And we would choose to think, we can do something in the hope that eventually other people will, and it'll start to reduce numbers of what's coming down.

# Challenges - concern about unintended negative impacts

It's in the riverine area [that't challenging]. I'd love to go in there with a plane and hit that [weed species] but then you bugger up your trees you know.

Because the way they [weeds] invade, waterways and develop very heavy stands in the right conditions, you know, usually, after medium to high flows floods. Yeah, so that can be quite damaging to the level of condition

interestingly, on that riverine environment— speaking to some of these scientist guys, that we talk to about it when they came down, to do the ...vegetation, flora and fauna surveys - If we do go in and clear the buckthorn, and briars and things, we may well have a detrimental effect on our small bird life that's down there. So it is a real balancing thing

the boxthorn some of the boxthorn are quite big, and the briars are quite big. So when we do take those out, we then find that we can have a negative impact on some of the other biodiversity - The small insects and the small birds that are using those areas as protected areas from the bigger birds, and the predators. So, by removing that weed species, the invasive species, we can be having a negative impact on some of the other biodiversity in there. So it's a really tricky sort of thing.

# **Challenges – different problem orientation**

I don't see a need to strengthen our weed management program too much more, or, we've got a pretty good handle on what we should be doing

I'm not worried about weeds. We can, we can handle weeds, if you can grow weeds, you can grow crops.

So we've got to look at, um, how these other weeds are managed and whether we look at the weeds and I know this is a bit of a left, left sided approach but whether we actually look at them as not weeds but we encompass them into the actual the whole system. And we look at trying to control them in a form of whether it's slashing or whatever before they seed. So, they're actually looked as ground cover and keeping soil together rather than as a negative effect of being termed weeds, if you know what I mean.

some farmers just think it is probably not their issue, not their problem

it seems like we're saying Roly Poly is a weed. But Roly Poly is actually a native So it's,- what, what are we looking for? And, yeah. So to have a definition around that. And then to have the funding based on that would be great

Because it [particular species] is considered a weed in a grazing management scenario. And actually in a biodiversity scenario, maybe it's not a weed. Maybe it is one of those ground cover, low story, essential species?

The one thing that I've noticed, I now see weeds all the time - they become part of a furniture almost. and if I point them out, you know, if you drive past the same plant 100 times, it's sort

of almost becomes oblivious... and that's, that's definitely a risk with all farmers, that what you see all the time can quite often just be..., not something that they notice, if they're not looking for it

But I like their idea of not thinking of them as weeds in riverine areas, thinking of them as ground cover and try to no let them set seed because the other way from a biodiversity perspective is that, yes, that's where some of our pests come from, but that's also where a lot of our beneficials have the ability to build up, because obviously, if we don't have any crops there's no way for them to live so the weeds in riverine areas and the sides of roads and those sorts of spots are where they're going to come from.

I think weeds are part of biodiversity and how we're trying to do that is by doing everything basically with spot sprays and cutting down the amount of chemical we're putting into that, in the environment

# Factors that would support strengthening weed management

# **Coordinated approaches**

If you're on a watercourse, especially, everyone's got to be on board, otherwise you're going to be constantly spending the money to other people's problems. And I guess that's also a big driver for people wanting to manage their own country as well, is like those weeds are moving out into farming areas who are having to manage them. So if we can manage them as a whole, we're still going to be better off in our own farming systems but if you can get everyone on your watercourse involved, you're not going to have that weed spreading every time we get a Flood event. It just moving straight back in again, and youre, starting from scratch, again.

need to look at that area wide-systems as well - so it's, it's one thing for person to have it under control, but, two places upstream, but they don't do anything. So, that stuff's really hard and I don't know how you implement that, that level of co-operation

I mean, everyone has to manage their own system, but it's gotta be part of a bigger system

# However, coordinated approaches were not simple:

[but] someone needs to run it. That's the always the crux of these things [re area wide management].

# Other types of support

# **Financial incentives**

, it's a dollar factor. Ultimately what gets people over the line with things is an incentive.

# Education

So it's I think education is probably the biggest one is to say, well, look, you know, these are the benefits, if you if you do it, do it long term

So, you know, our charter is to engage everyone, not individuals, in a positive mindset... we've gotta get everyone on the page and you know, Change takes time, but results speak for themselves So, I think that's part of the charter. is to come in saying, we all agree that it needs to change

#### Support with engagement with systems

I think another thing with those programs—theres quite often a bit of reporting that goes with it and trying to get even a 1 pager filled out cam be very difficult at times. And if you've got to sit down and work out which areas need control and the problem areas, the weeds, How are you going to control it? That's, it requires quite a lot of detail to work within those programs so that they've got recordable outcomes as well. So, definitely have someone that's helping farmers along with that particular requirements is beneficial

# Shifting norms

I think it's, sometimes it can, it'll evolve with peer pressure, the more famers the jump in the boat and do these things, the guys that aren't doing it they want to jump in and make sure there's a seat in the boat

You want to try to use the top 10% or 20% are your target, those growers, they're usually the early adopters, and I think once you target those and it becomes a success the other guys follow.

**Trial new approaches** 

But I mean if we shouldn't be doing some sort of trial patches to see what we can do with it? I mean, if you put patches of, planted patches of kangaroo grass or blue grass or whatever it maybe it'd spread out eventually, maybe that's what you gotta do, start sort, of nurseries along the length of the creek to let it naturally spread because there's no way you're going to get with a tractor or spray rate or whatever.

# **Strengthening management of feral animals**

# Challenges – cost

The new sodium nitrate baiting system that developed originally researched by the invasive animal CRC....so that could essentially lead to very effective wild pig management across the nation, let alone you know.in our section of the river or whatever, ...but the bait Box itself, which is part of the label for the baiting Program, is 600 something dollars

And then the program of placebo baits is another like 200 than the actual baits is three or \$400. So its over \$1000 for one program. You get to keep the box and use it again, but still.

...We [applied for funding for a] biodiversity officer... employed on managing that country, to get rid of the feral species, weeds, pests.... It had to be locked up, there could be no wood gathering, there could be no bikes, there could only be horses to retrieve other stock, it had to be fenced. And we had to provide a budget to do that, and so we, went and budgeted, all of those things... [but] it would cost more to do what they expect than the payment that you receive in return

# **Challenges – difficulty**

[on controlling feral cats] Because they like the live kill and they're also tricky to trap that apart from people walking around with shotguns and being a very good shot, but really I don't know what else you can do widespread to control it

But in achieving the NRM goals that we had originally intended, we've found it difficult to do that, and we find it difficult to even get the goats at times, just due to the fact that riverine country is just so difficult to get around in because of gullies and trees. We're now using gyros to, to get the goats out of there, which is much more effective.

The barrier is, a couple of the areas that we could look at excluding is known as the jungle, like, it's hard to get access and hard to manage those areas and, and to even know where to start with, sort of, I guess, getting rid of some species and encouraging others.

Challenges - lack of coordination and area-wide management

...often when you're talking to a neighbour, we, end up talking about [feral] dogs — and then you'll find that one neighbour has gone and done a 1080 program. And they rings up to say, oh, we just put 1080 round ..., so keep your dog's locked up and what the hell - Why didn't we talk about this as a group? We talked about dogs all the time and then one person goes and does something.

it's lack of a focal focus point around co-ordination that, that sort of causes that. We talk about the problem in the community kinda way, but we actually go and do individual things about it on our farm and somehow we need ... there is this opportunity there for better co-ordination, where are we, where we can coalesce that motivation everyone has, but not necessarily to do it in a coordinated and more effective manner

Probably, one of the main issues with it is that we don't really have any neighbours on that creek who would share, you know Queensland gas and coal mine are on the other side so they're not desperately concerned about a pig's population or mother of millions problem down there

[on pigs] We basically have an area wide management approach on that because of working with neighbours on that with the country. There's no point in chasing them off yours with a chopper onto someone else's.

Area wide management easier with ferals than weeds: Yeah the feral animals ...It seems to be much easier to get a agreement between people that live together close by to control them whilst they're mobile - they're almost not as mobile in water as weeds can be. They don't travel as far. Probably as weeds can travel through the whole valley, in the in floodwaters.

Like, the biggest issue for us is goats. We have a little of difficulty controlling goats on the river and, know, we spend a lot of time trying to increase ground cover, when it's dry and the river is not flowing, goats can basically can just walk across the river from other country and graze those areas that we've been trying to protect.

# Focusing on species that impact productivity vs species that impact biodiversity

The capacity to visualise a problem, or see the beneficial impact of a management practice, can influence adoption of a new management practice. With regard to conceptualising the 'problem'—issues that are easily visualised generated strong problem recognition in participants. For example, certain feral animals are visible to growers,

[Why do you think it's easier to get people to work together on ferals and not weeds?] Yeah, easier to manage and it's the same cost for everyone. So if everyone's involved, there's no inequity in the cost of managing it, and then you also get funding from LLS and that sort of thing....in terms of animal control than weed control, really, they're a much easier a thing to see and control, they're cheaper. It's easier to organize a group of people to do it. So, they get on pig baiting or on their pig shooting. Everyone gets on board, and Almost far easier. To get people to do it, pigs will come in and cause an economic impact far more than some of the invasive woody weeds will in farming areas. So people are more willing to spend money getting rid of them

We've certainly seeing quite a lot of cats getting around. When I say, quite a lot on one block of 2000ha there would have to be a family of 20 odd cats getting around, see them at night while irrigating ... I've noticed them a lot more than ever before. That cats are getting pretty out of control I think.

There are a few wild dogs there that I'm sure, you know, maybe they've got 10% dingo in them, but there's they're mostly just feral dogs. I think they probably put a fairly good dent in the pigs, Um, you know just making their own sort of balance. I suppose that I don't, it's not a very popular sort of opinion, but I don't mind a dog or two in context to controlling a pig or ten.

But we're not so worried about the foxes and cats just because they're not obvious and they don't seem to be doing too much to the crops themselves people just don't worry about them so much, or they're not front of mind because they're not eating the sorghum or they're not eating the corn or they're not eating the cotton, so that's probably why they're not in front of mind. But it'd be nice for them, to be able to do something with them so that they're not taking out the native species ... when the mice disappear they're going to eat something else, so I just don't know how you keep on top of the cats because it's a bit sneaky.

One potential challenge with high visibility and high compatibility issues, such as those related to feral animals, is that the focus of discussions veered towards focusing on goals related to farm productivity, which may not necessarily overlap with biodiversity-related goals.

Main problems are pigs and dogs which affect productivity - the smaller [feral] animals [such as cats and rabbits] ... they're not necessarily economically important. You know, what they are they do go under the radar a bit... like you'd talk to Control Officers in the Council about rabbits and they can be quite dismissive that rabbits aren't really a problem, they just call them homestead pest, just around houses and that kind of thing

we've got a lot of 'roo pressure here at the moment ... We've got a lot of pressure on our wheat at the moment ... even though they're not feral, I think they are [a pest]

one of the downfalls of having larger wildlife is brolgas ... they certainly can do a lot of damage in wheatfield in in a day. So as much as I love having the wildlife on the farm, I did spend a lot of time driving around the fields, just shooing them [away]

If it's a bit tricky to when, I know we talk Ferals but, but, you plant a crop or something... 300 brolgas are every bit as damaging... or Wallabies, Kangaroos anything... When the population gets out of whack, then, anything is the problem - a pest I suppose

# Things that would support strengthening

# Area wide management

I think we need to get better at working with the neighbour's - we're not great at that.

So lot of these things that you really would like to be concentrating or spending more time on it's just really difficult to do that. So, you know, have could we address that?

I think it's not unlike the weeds question, in a way... harnessing area wide motivation to act, you know, so co-ordination and funding are probably the two things that would get a bit of action around here.

I think that's the whole point of biodiversity. You know, you can't really, you can't just look after your own patch, it's gotta be, it's a bigger picture there's no point in me killing all our cats if they're just gonna breed up next door...

I can't even imagine them [my local council] doing the programs that you're talking about. I imagine [such programs] will led by councils like Scenic Rim and Lockyer Valley and places where there's high numbers of landholders. Their drivers are around their natural landscape and visitor and tourism, so that council has a benefit ... [whereas] this council... in our region... we don't even hit their radar I don't think

Maybe we could have, you know, someone coming in and doing surveillance work on numbers of goats we've got it riparian areas. You know, trying to help us to sort of because it's difficult to understand just how many you've got in there.

# Information & education

, if there was a bit more advertising around that area, know, nows the months to go after foxes or now's the time to go after the pigs or whatever

More information isn't always the solution

I get the need for more education, but, I mean, how many, how many of the information sheets that come in the newspaper, or the magazine, or in the mailbox or on the e-mail, do you comprehensively read now, before you put them in the bin? Sometimes I feel like that stuff is wasted effort

# Peer support

I think seeing it occur on someone's farm, and that peer-to-peer discussion seems to, you know, work when you gather a group of grower's together, or a group of farmers together. And they're actually visually seeing the benefits and the or the economic losses happen.

I definitely think there's value in going to other regions to see what they're doing. But it also, there's a time cost to that. And expenses, in getting away, and leaving the farm to see what's happening elsewhere, but there's certainly some massive benefits to doing it, as well.

# Other comments about feral management

# General experiences suggest strong problem recognition

Certainly some aerial shooting in some area groups I think that's been a bit of a success with pigs.

I'm not sure whether you guys have too many cat problems, but it's unfortunately with cats. I think it's not so much that you can see them digging up the crop, it's just that you see them, you know, crossing the road at night and there's just a lot of unseen damage, I believe, with them with feral cats. That would probably be, you know, the number one thing I'd love to solve right now

Pigs in a practical way straightaway, but, um, I think cats are probably a big one that knock around bird life

Certainly a bounty on feral cats, I think that'd be great, it'd also bring in a few, I'm sure people would enjoy it, that's probably one thing.

We're kind of fortunate, our farming land borders the town, so we don't tend to see too many pigs. We just are involved with the aerial shooting, I've think I've done three times in the last 12 months and then just baiting for the pigs.

But there's always going to be challenges. And I guess it could be people that don't want to be a part of it as well. There be some people that, And that, and that's just, it's human nature.

Strategies – industry targets Support for industry targets industry programs seem to get a lot more traction, than something that government puts [out], so if we can be proactive in addressing some of our issues that are going to meet sustainability goals and it's implemented with the input of growers... I certainly think there's a significant place for the cotton industry to be involved

If I had, like, some quite strong direction from industry, like, you know, plant X amount of trees in this location, then, that will assist with this outcome.

I'd really like to see some goals and objectives bought out of it [this CRDC project]. That we're going to work towards as an industry, and then some steps of strategies to improve whether that's on farm or as an industry and where that puts us... But I think going on, from that, there needs to be solid standards.

as an industry, where [are] we going and what [is] the end goal so that we can get everyone on board. And then in work towards a common goal.

# Targets need to be achievable

Many participants highlighted the need for targets to achievable, and applicable to diverse regions and farming contexts:

What, I guess, what I'm hoping to get out of it, is, like, if we do have some targets, they need to be realistic and achievable, um, and I guess, applicable for our region.

A fairly obvious [starting point] would be set a very realistic target in the first instance, ... you're trying to get people to get motivated to commit to it.. start the bar quite low to get people involved and progress from there .... Yeah, to get those targets achieved, but yeah Start small and build up to it, rather than a ridiculous, unachievable target to start with would turn people away from the whole concept.

# Consider achievable entry points

if we kept it basic ... that would be a starting point

if people start having those small wins and then the benefit from just one thing. Not trying to do [everything] at once, or, you know, just to in manageable sizes that aren't overwhelming

Just to start with, maybe we can pick patches that are a bit more accessible

it comes back to manageability - I've seen other people take on these large tree planting projects - But then I had more than half of them die because they weren't able to manage them. Whereas, if you start with maybe 10 trees that you have the capacity to manage until they're past that establishment phase and then work up ... it has to be, something that you can do, as well as doing all the other tasks on your farm

People basically want to try things within their sphere. I wouldn't discount maybe just running some more simplified workshops.

# **Recognise existing achievements**

I guess for us, ... we don't really have anywhere that we need to replant trees. It's happened. It's done... So for us it's probably not about revegetation, it's about increasing the biodiversity in the vegetated areas that are already there. How we do that, I'm not really sure? And it gets quite frustrating for us ... there is no real talk around how we can fund the people that have passed phase one, they have the trees, they have the macro, how do we increase the other things like [small threatened species].

you put in a [funding] submission [to protect existing vegetation] ... ours came back, as 'no, it's too big an area', It's not financial'... no disrespect to the smaller projects, but I think the biodiversity challenge is - are we looking after existing biodiversity or are we trying to replant, build biodiversity? Are CRDC looking to increase biodiversity on cotton farm? Or are they looking to promote the ones that where it already is?

# Preference for voluntary approaches

Targets always make me nervous. It's just that people choose to pick up on the negative areas. The only other things, too, I find when you have targets and things like that. the only negative thing I find is it's often the same people who do the heavy lifting for the majority of the industry and that can be a bit tiring after a while everyone has their own ideas on what's the best way to work this piece of land... it's really tricky –you can't be prescriptive in how things are done farm to farm, there's a level of independence there that doesn't necessarily. work with you [re] biodiversity

I don't want to be told to do anything with it. That's sort why I've kept my head down on this, because I don't really want someone coming legislating that I've got to do this, or I've got to do that

I think the big stick is just going to terrify people

at the moment, we're talking about things that are voluntary and that sort of thing. Yeah, I guess if we become more transparent about the biodiversity on farms and, you know, in most scenarios I think people are doing everything in their power to manage and to the best of their ability, um, but, you know, whether, we become more transparent. And they start looking at things a little bit closer and then yeah some things become mandated that potentially weren't in before. I think there's obviously the risk of that, as you, as you start to publicize these sorts of things, you open up to greater scrutiny on what we are doing. ... I would agree with what she said about - there is a real risk that we do get out there and say, we have these great areas of biodiversity. And the government then puts serious restrictions on what we can do in those areas.

# **Strategies – Provide financial support and innovative ways to value biodiversity** Strong support for financial incentives

...if you actually asked them to go and plant those trees and pay for those trees they probably wouldn't do it.

incentives, there needs to be incentives. Because it is, you know, it's not primary business probably for anyone to do this

the revegetation stuff, its quite expensive, it needs to be fairly well managed and dedicated... could be some form of subsidy for revegetation

# But financial incentives wont change everyone

I think it's something that you're either interested in, or you're not, you know, , that probably [cash] wouldn't be a major motivator for a lot of farmers.

# Consider how to value biodiversity in new ways

If you get a valuation, the valuer will tell you that, that country's only worth, you know, 5% or something of your developed area...But the, the science around, over the ecosystem services and what the what those areas of remnant environment can contribute to the cropping system and to the rest of the farm is pretty well established...It's just that we're not conditioned to see

it.

...he showed me on his phone, a photo of a Koala that he'd taken down the river on his farm and I said, I asked him how much he thought it [the koala] was worth, and... we had a chat about it, like, what is it worth? In central Queensland? What is a nail-tailed wallaby worth?

# How to value existing, older trees?

... it's got old trees in it, and that it's been there for a long time - it should probably be valued differently to just someone going out there and planting a few new trees like, surely, know, a 200 year old tree is worth more than a one year old tree. ... Because to me, that the old stuff that's been there forever surely is more valuable [than] regenerating, replanting new areas

# Consider innovating financing mechanisms, learn from carbon farming initiatives

that's the brilliant idea to talk about carbon farming. ... to get a benefit out of it for 10 years, but if they've got a 10-year plan in place. ...they'll get a financial benefit from it, but on the way they've made an improvement to the sustainability of the environment ...bird life has improved, weeds have been able to be controlled, but at the end of the day... o have some sort of a payoff At the end of the program.

We need a financial reward and the way you have financial reward is to have a trading platform that you can trade your biodiversity ... the only way to work out the value of biodiversity and for that matter carbon, is to put it to the open market.

# This led to many participants questioning whether a 'biodiversity credits' system would be feasible for consideration?

the whole carbon farming Initiative has sort of taken off in the last few years. So I guess people are asking the questions, is there a way that we can offset the cost of doing this [biodiversity management] in country that's currently not productive ... It's definitely a, a desire to create sustainable landscape, but I think finding a way in which we can, I guess, offset some of the cost. ... which is why there's been an interest in the carbon farming side of things.

# Beware divergence in goals

you already have a new industry out there, which is the carbon industry. ...you need to look hard at how carbon to doing it... going forward if it becomes 'carbon is tradeable biodiversity is tradable,' it's the same as growing wheat or barley. People will end up going for whichever one is going to be the most economic benefit for them. ... I think if the biodiversity isn't part of that somehow, then I do feel like biodiversity will get lost. Because when it comes to carbon... it's far more established already than the biodiversity is. And it's a crazy system because the biodiversity should be first. Carbon is a by-product. So, I find it really confusing, perplexing that biodiversity is this hard to get off the ground

So, if they're not on the biodiversity early enough, people will go down the carbon wrote all simply read vegetating with trees, not putting in the ground covers, and the lower story stuff, which is all really important to get a fully diverse ecosystem out there. So, they're going to have to be, I think, on the biodiversity **with** carbon bandwagon or people are going to pick up carbon, because economically, that's where they're going to see a return.

# Recognition that other financial influences may emerge

...the other thing here, too, is I notice, banks and insurance are really looking closely at this side of agriculture

The green financing is probably where a lot of the drivers for prioritizing biodiversity on farm will, the push, will come. Whether it's insurance companies or banks that want those particular areas managed, well managed, and prioritized on farm and, you know, as a result, a reduction in, say, say fees or, lending, you know, lending interest fees.

We were asked in our annual relationship meeting with our banker if we had a 'sustainability statement'. 'Actually, no we don't, what does that look like? Just send us an example and we'll develop our own.' If you can give us a bit of an idea of what you think the template looks like for a farming business, then we'll be happy to do it'. But right now, I don't even know what that looks like. ..., so creating some tools for growers around that would I think be a real opportunity for us

One participant highlighted that stronger performance on environmental indicators may also influence decisions about investing in farms:

the thing about the carbon path ... it could be a traceability [issue], one where preference in time is to buy from a carbon neutral farm that is measured. So, you could attract the first bid... we could see, a more attractive client base to our product.

# Strategies - Information, education, and advice

Provide clear information and advice

we think that it's got value - we're engaged We 're keen . What do we need to do? How do we need to get there? - That's where we need some help

in terms of support, I guess it's a good understanding of —usually people need numbers and research and that sort of thing. So, having a really good understanding of what what's driving these ecosystems and what we can do, like what influence we can actually have based on different management strategies.

I need access to education - I don't want to plant anything on the farm that's not already here, ... this is the sort of thing you should plant here and where to get that or, you know, if I have to grow myself and seed it myself, how do I do that? I still need more education on just how to do it well. ...How do we plant well, and regenerate well, and do it properly - not just throwing anything in there and spraying weeds, knocking out something else that's important A lot of our native species tend to like a fire to get them activated in the seed pods and things. But yeah, I'd like to see a lot more information about how to best manage things like that, to actually promote them

if it was based on [a carbon farming approach], I mean, we need more info... What grants are available? You know, what sort of population is of trees do you need to plant per square meter or square hectare. What are the rules and regs, and what, what are the impacts? What are the benefits along the way?

# Importance of more active support, such as consultants:

what would probably best suit our needs is, like a consultant, they could sit down and look at the whole farm plan, and areas, and do a management plan, a 4 or 5 year plan. What's the best plan of attack to do all the tasks at hand?

# Make positive outcomes measurable

Being able to observe the impacts of biodiversity management practices has the potential to reinforce adoption and support continuing engagement in these practices:

And, you know, the further we get into it, the more species we start to see returning, ...suddenly they start to see grasses, returning that [they] hadn't seen since [being] a kid, you know, that's, that's really encouraging

Many benefits of biodiversity management are not immediately visible. This highlights the importance of being able to measure impacts as a way of feedback on practices:

some of it, too, is about knowing if you get it right. What are we trying to do? Is it actually a positive or a negative impact?

How would you measure biodiversity? How would you how actually measure it? Yeah, I can see acres and whatever, but you need to know in those acres [that] you're doing the right thing and things are thriving and it's being looked after as well - so to me that's a little bit tricky.

...trying to prove that decisions we're making around trying to trust beneficial insects to carry the load when most advice is to use insecticides, has been one of the more difficult things in terms of production decisions. First of all I need to identify what biodiversity outcomes can we firstly achieve and then secondly, can we measure? to try to measure, and prove it does is [important].

I'd like to know what is working well here and what isn't - like, what, what things are thriving and what's working well, and what things need help, sort of thing. Just to know, how we can help different species ...You know, how can we protect those, those things that are more threatened

I guess if we knew a little bit more about the actual benefits of those beneficial insects and animals that are in our crop systems ... If that was maybe highlighted a bit, it might give, quite a few people a handy way to justify contributing to the situation, across the industry as well If it was well known how that how the good impacts can be done.

# Provide opportunities to learn from others and directly experience new approaches

I think the successful thing is, neighbours talking to neighbours

I think it'd be great to look a lot more into what guys are doing around the district

# **Demonstration projects**

I'm big on demonstration, we need case studies. There are people that are starting to do things very differently to traditional high input agriculture and just really encouraging stuff, ... we need to be able to demonstrate it

during my travels, I've got to see how other countries are broaching biodiversity, and it's now under regulation in many countries, and the large, expansive fields, with no trees, no, vegetation is not something that they practice any longer ...we have the potential to catch up.

we're starting to see some examples around the world, doing things very differently, and encouraged by that and we're starting to think about looking to do some of those things ourselves.

Showcasing the practices of other growers can activate positive norms that motivate others:

I think it's, sometimes it can, it'll evolve with peer pressure, the more famers the jump in the boat and do these things, the guys that aren't doing it they want to jump in.

You want to try to use the top 10% or 20% are your target, those growers, they're usually the early adopters, and I think once you target those and it becomes a success the other guys follow.

# Demonstration projects can strengthen community perceptions of the industry:

... To let them view 1 or 2 or 3 projects, that can actually see what has happened, what's happening, and then, that's a big thing everyone driving around these days. Um, then, if you educate one person like that, it probably feeds back to hundred others eventually

# **Emphasise diverse benefits**

### Highlight integration with biodiversity and other parts of the farm system

Things happen so slowly out here so regeneration is not quick but to be honest, you know, we've almost run these things totally separate. I don't see a lot of overlap between what we're doing in our grazing operation and what we're doing in our cotton business but you know we're keen to change that.

# **Integrated pest management**

Having this bank of beneficial insects and birds living in that tree line over there that saves me putting on \$50 per hectare sprays and insecticide, that adds up every day of the week

I think that the language around the benefits of what things like your birds, bats- are doing on farm, you know, eating their own weight in insects, if we can provide that habitat and then sort of, I guess how many bats does it take to control this many insects, providing through extension some of the. The tangible outcomes of these, these wildlife on your farm, would certainly be helpful at the moment.

Biodiversity for me - has been a big thing in this insect, bird and bat spectrum for us trying to analyse how much contribution they give to control of pests insects.

I suppose, as an agronomist, we're sort of trying to work in that regard with IPM, so using any of those native vegetation areas or tree lines through beneficial management, for pest and beneficial management

Well, I guess I'm, um, the really obvious one in terms of cropping system, is beneficial insects. So, yeah, the recruitment of all those insects into a monoculture basically in the productive area, like the cropping area, They have to come from somewhere. [if] they're further away, and it's going to take longer time....Proximity to, to the crop is a big thing.

# **Reduced chemical use**

Spray Drift is a big part of management, getting better understanding on. We run, shelterbelts, a few shelterbelts to try and protect most, to try to find a better option and practices in farming,

# Pollination

I think, particularly in relation to, you know, the whole world is aware of bees now, know, and that's probably something that, you know, that we need to also get on board with. And if part of that is, you know, reducing our pesticide use to get to literally one spray, or, I think, I think it'd be great if we could set some really ambitious targets too, you know, to just have zero collateral.Yeah, I don't know how you could do that but I think that'd be a pretty admirable goal really, and I think that would probably resonate a lot with a customer more so than trees planted etc if it's, you know, no bees are harmed in this, in fact, they are important pollinators for us, et cetera, et cetera, I think that'd be, that would really resonate.

So, doing shelterbelts between very large fields. And it's, you know, so reasons like not only just wildlife corridors, but it's also to slow the movement of wind where they have a lot of the extended drought periods. They [are] really moving away from that that large expensive prairies to slow that management of the air across large fields. Which then is preventing erosion as well.... It's also being used for biosecurity purposes. You know, to prevent that wind-spread of diseases, as well. ... it's something that we're probably a long way behind,

# **Experiencing wildlife**

I might be very amazed at how much effect those cats are having. All those small lizards and things things you spoke of. You know, there was a real benefit to some of those animals in the whole ecosystem, and cats are taking part of that away, well,

On a positive note, I can sort of remark on what we've experienced in the last year or two with, particularly the moment with wetter seasons. I reckon this year, for the first time in our lives, ... we've got a big, big flock of pelicans on our storage dam at the moment. it just takes water. we've definitely noticed a lot more bird life...Pretty positive... ... you know, it shouldn't be environment versus farming, when you're farming, you're providing that irrigation environment. Yeah. We get brolgas and all sorts of beautiful birds

The other thing that I've been really excited to see, we have a lot of straw-necked ibis and lots of microbats around at the moment.

...he showed me on his phone, a photo of a Koala that he'd taken down the river on his farm and I said, I asked him how much he thought it [the koala] was worth, and... we had a chat about it, like, what is it worth? In central Queensland? What is a nail-tailed wallaby worth?

I've currently got a whole heap of Zebra finches. I've got quite a long strip that we're not slashing so that they've got somewhere to hide – they're in the chickpeas, they're just everywhere, I've never seen so many Zebra finches before in my life, so it's pretty exciting to see. So I'm just sort of trying to be aware of the areas that we do slash and make sure that they've got some cover around.

# **Ecosystem services**

... we see great opportunities arising out of this project. You know, we're looking at what other revenue opportunities might be around? You know, we're obviously looking at soil carbon and that's, that's one of the focuses of the project but we're also looking at being able to, what other ecosystem services can we cash in on? You know, and, you know, I guess biodiversity is one of those that we're looking to measure through this project.

# **Strategies** – Coordinated approaches

# Consider area-wide management

I think it's that group approach, because you can actively managing and then next door can be doing nothing. And I think that's always been an issue ... It's got to be, the group approach is the only way to do it

... Totally agree, it needs to be an area wide management strategy.

I think there's, you know, in most cases people want to be good neighbours and using that to the best advantage in the area wide management setting

I think a strategic approach, like a, you know, an area - if you feel everyone is looking to do this, then you're more likely to get involved, than if you try and do it on your own ... And that creates some motivation too

# Not all farmers are motivated to participate in area-wide schemes

one of the main issues with it is that we don't really have any neighbours on that creek... [large, non-farming industries] are on the other side so they're not desperately concerned about pig populations or mother of millions problem

# Need to coordinate support services

it's more, knowing what people can do, knowing their limitations, and knowing where to go to get help, because I think that is half the struggle,

And also sort of access to funding and things that could help us to improve that if it's there, it's a minefield that there's so many people operating in these spaces, - it's really hard to get your head around it all

we need someone central to co-ordinate this type of thing, but is the LLS [Local Land Services] already supposed to be doing that?

It's managed by lots of different groups, rather than being managed as a whole distributed through the groups. I think that might be a bit of an issue with the funding. It's awfully hard as a grower to chase down grants and things [on funding and labour force] I feel like those opportunities of sort of dried up bit, unless I'm just not looking in the right spots. It seemed like Lls and landcare have invested more in people we'd be happy to do tree planting and things like that but to me, it seems like by the time you find a grant they are only open for 5 or 6 weeks and we'll miss a deadline and then, um, once again, if you don't have the labour to do the planting and things like that, it would be great to see some collaboration with the people who are looking for work

if it was based on [a carbon farming approach], I mean, we need more info... What grants are available? You know, what sort of population is of trees do you need to plant per square meter or square hectare. What are the rules and regs, and what, what are the impacts? What are the benefits along the way? There's a hell of a lot to it, - so someone to co-ordinate what all that means, and make it [information] pretty accessible, that'd be great start. I reckon that would give the program some real legs.

We've just been noting all the way through the conversation of area wide management. An overview, from, from a regional point of view, from someone who's a central body, That can control the whole picture, instead of, you know, people trying to do it on their own, and people individually, you know, putting their hand in their pocket to do these sorts of things... I mean, little areas within regions vary according to that surrounding attributes, but a regional view on it probably needs to be co-ordinated to be better than is has been.

# Partnering with research institutions

From a consultancy perspective, and from a grower perspective, it's just, I guess, making sure that we have the information coming through from researchers. And then practical examples in the paddock where that's working and then pushing that out to the rest of the industry.

there's a real disconnect between, uh, the universities, and on farm - that needs to be brought together. I think CRDC need to break that wall down, and to break that disconnect ... I think the CRDC need to put a lot of effort into bringing that expertise to the bring that to the table for us to, to sort of all work together. And if you, if you can, put like minds together, it's amazing what you can do.

# Appendix D. Example of guide to behaviour change

# **GENERAL APPROACHES TO BEHAVIOUR CHANGE**

To provide some context about the general approaches to behaviour change, we provide a link to other resources about principles of behaviour change.

# "Guide to Promoting Water Sensitive Behaviours" prepared for the CRC for Water Sensitive Cities.

# https://watersensitivecities.org.au/content/guide-to-promoting-water-sensitive-behaviours/

We note that this document focuses on water-saving behaviours in the home, rather than agricultural practices. There are some important differences between simple behaviours in the home and agricultural practices that add complexity to the task of practice change. For example, water-saving behaviours are simple actions typically performed multiple times daily that are automatic. In contrast, most agricultural practices are more complex 'sets of behaviours' that are performed less frequently. Rather than being automatic, these are often planned actions that may be strongly linked to livelihood success and cultural identity.

Despite these differences, this document is included to provide an overview of behavioural science and approaches to behaviour change.