



Final Report

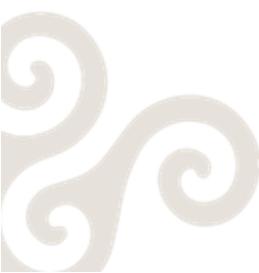
Supporting farmers to make the transition to regenerative agriculture

StateNRM grant - CSGL18102

July 2020



natural resource
management program



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Version control

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<p>Document is labelled as version X-01Z, where:</p> <ul style="list-style-type: none"> • X - D" Draft (internal), "E" Draft (external), "F" Final • 01 – the number of the major revision in the series • Z - Lower case alphabetical increments for minor revisions 					
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Acronyms

ABARE	Australian Bureau of Agricultural and Resource Economics
DPIRD	Department of Primary Industries and Regional Development
NACC	Northern Agricultural Catchments Council
NRM	Natural resource management
PHCC	Peel-Harvey Catchment Council
RA	Regenerative agriculture
SCNRM	South Coast Natural Resource Management
State NRM	State Natural Resource Management Program
SWCC	South West Catchments Council
WA	Western Australia

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Regenerative Agriculture Defined

Regenerative agriculture (RA) is a concept proposed nationally and internationally that defines the way modern agriculture can transition to becoming a truly sustainable industry. The practice regenerates and stabilises soils, increases biodiversity, captures carbon, improves the water cycle and provides ecosystem services. It involves the reduction or elimination of many conventional farming practices such as excessive ploughing and the widespread over-use of inorganic fertilisers and pesticides, as well as the introduction of new practices such as rotation grazing.

As a holistic concept the agriculture industry globally has struggled to define it:

*“The term ‘regenerative’ may first have been used in the context of farming by organic guru Bob Rodale in 1984. Yet even three decades later, no one can agree on its exact definition.”*¹

Farmers tend to refer to a set of five practices that unify the approach:

1. cover crops
2. crop diversification
3. reduced or no tillage
4. reduced chemical and fertiliser application
5. rotational livestock grazing

Regenerative agriculture leads to healthy soil, capable of producing high quality and nutrient dense food. As the return to a natural ecosystem occurs, this ultimately leads to productive and resilient farms and healthy communities and economies. The following provides some good insights into regenerative agriculture, taken from an article *“The five principles of soil health”*²:

A regenerative system takes many years to develop, during which time the benefits accumulate slowly but surely, in terms of improved soil health, water management and ecosystem services.

Soil health is defined as “the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans.” Achieving soil health requires a systems approach that combines five principles:

- *soil armour (plant residues left on the soil surface);*
- *minimal soil disturbance (e.g. no-till systems);*
- *plant diversity (mixing cool- and warm-season grasses and broadleaf plants);*
- *continuous living plants/roots (choosing crops that leave high carbon material on the ground); and*
- *livestock integration*

The regenerative agriculture definition, explored in depth interviews with stakeholders as part of the process informing this report, is:

“Regenerative agriculture is a conservation and rehabilitation approach to food and farming systems. It focuses on topsoil regeneration, increasing biodiversity, improving the water cycle, enhancing ecosystem services, supporting biosequestration, increasing resilience to climate change, and strengthening the health and vitality of farm soil.”

¹ <https://www.motherjones.com/environment/2020/07/indigo-agriculture-carbon-farming-sequestration-agriculture-climate-change-emissions-soil-health/>

² <https://www.grainews.ca/features/the-five-principles-of-soil-health/>

Executive Summary

This report was commissioned by the Government of Western Australia, funded through State NRM's "Community Stewardship Grants 2018 – Large" program. The project used social research techniques to determine the key drivers and benefits, as well as barriers and risks, of regenerative agriculture – so as to recommend to Government a roadmap to increase uptake of the practice in Western Australia (WA) and identify supporting future-research requirements.

There are some very significant hurdles to overcome to facilitate greater adoption of regenerative agriculture in WA. Firstly, there is confusion as to the definition of regenerative agriculture, particularly as to which practices it encompasses. The term is polarising and has even led to some antagonism between stakeholders. Some argue it is an unnecessary alternative term for best practice agriculture.

Farmers need to apply agricultural practices from which they can turn a profit, hence if regenerative agriculture can deliver incremental profit on conventional practices that would be its greatest driver. However, there are very mixed views within the industry as to the profitability of regenerative agriculture and most stakeholders cite a lack of available data on which to form an opinion. The industry does agree that there is no 'one-size fits all' and primary producers want evidence of the profitability of various regenerative practices to be relevant to their local level/own situation. This implies the need to trial and evidence results for an enormous range of scenarios.

Currently the main drivers of regenerative agriculture in WA (in no priority order) are:

- Younger farmers and 'new' primary producers entering the industry from various backgrounds and who are open to trialling new approaches
- Farmers facing financial challenges forced to look at alternative practices
- Farmers competing to be recognised for 'healthy and quality produce' (noting 'quality' and 'regenerative' are not always interchangeable)
- The shift in consumer demand toward more sustainable product

Farmers are also influenced by leaders who have successfully adopted or taken a positive approach to promoting regenerative agriculture. This is driving transition in WA and is a mechanism that could be leveraged to further increase uptake.

Notable by their absence from key drivers are concern for the environment and worries about the impact of climate change – which are neither key drivers nor key barriers in WA. There is, however, a niche audience of farmers for which the social and/or environmental drivers will be more important than the level of profit.

Farmers supportive of regenerative agriculture point to factors outside their control inhibiting the adoption of regenerative agriculture, and identify the vested interest of associated industries, such as financial services and agrochemical companies, in maintaining the status quo of the agricultural industry.

Barriers to the adoption of regenerative agriculture (including those outlined above for completeness) are:

- The definition of regenerative agriculture is problematic
- Farmers require evidence of profitability of RA practices at a local level
- Farmers overwhelmingly do not know how to implement RA practices
- The vested interest of some stakeholders to maintain the status quo
- Where farmers are doing well financially, they are not inclined to change

- Farmers are mostly conservative, stick to what they know and are conscious of peer-review if they try something different
- There is a perception among the farming community that those who transition to regenerative agriculture must be performing poorly financially
- Fear of reduced profit/potential losses in transition
- A lack of skilled advisors and apparent lack of commitment to education, particularly given the omission of regenerative agriculture from university courses
- Key advisors to agricultural businesses, in addition to lacking education (as above), not being enabled to support it e.g. agronomists unable to get indemnity insurance and bank lending models premised on conventional agriculture
- The existing financial paradigm whereby primary producers carry large loans on an annual cycle and can't afford to trial regenerative agriculture
- A lack of support by Government, and a lack of visibility of support, relative to that given to conventional practices

The Government has an opportunity to increase the adoption of regenerative agriculture through undertaking the following actions:

- Get industry consensus on the definition of regenerative agriculture, both as a concept and in terms of a range of practices
- Consider changing the regenerative agriculture label and/or determine how to communicate to shift negative perceptions
- Determine which regenerative agricultural practices are profitable where – farmers want evidence demonstrating the science and the economics at a local level
- Demonstrate to farmers how to implement regenerative agricultural practices
- Catalogue R&D/economic analysis and make it easily accessible to the industry
- Consider financial incentives – to support farmers through transition and/or for ecosystem services
- Educate advisors to farm businesses and enable them to support the transition to regenerative agriculture
- Demonstrate support for key industry organisations (grower groups, NRM Regions etc.) to develop a more co-ordinated approach to regenerative agriculture
- Encourage change in associated industries, such as agrochemicals and financial services, such that they are not constraining the uptake of RA
- Target young and 'new' primary producers and mixed farms to transition
- Amplify the voice of existing influencers/leaders in the field
- Encourage the inclusion of regenerative agriculture into relevant tertiary courses
- Encourage consumer-led demand for product from regenerative practices

Stakeholders contributing to this report recognise they are not fully aware of the range of topics already researched, but commonly suggested eight topics for research (see 'Recommendations'). The high-level topics suggested indicates the low level of understanding of regenerative agriculture within the industry. NRM Regions suggest research should seek to understand methods to demonstrate change to biological systems (this is as compared to agricultural research that considers elements in isolation). For example: understanding soil biology and its effect on nutrient availability and yield and, testing the validity of concepts such as bacterial:fungi ratios which are not accepted by the mainstream scientific community as having any relevance.

1. Scope of this Report

The Government of Western Australia funded this initiative through State NRM's "*Community Stewardship Grants 2018 – Large*" program. It has been run by South West Catchments Council (SWCC) with the collaboration of all other NRM Regions in WA.

The project aimed to identify key information gaps in the agricultural industry, particularly of farmers, pertaining to regenerative agriculture – with the intent to generate a list of priority research requirements to meet the needs of farmers transitioning to regenerative agriculture. The project proposed identifying these requirements by region and by key agricultural sectors.

In developing the project, it became apparent that the barriers to adoption of regenerative agriculture extend well beyond farmers understanding the science. This is due to a few key factors:

- Industry-wide confusion about the definition of regenerative agriculture, both as a concept and in terms of a range of practices
- Farmers are enabled or constrained by associated industries, many of which stand to benefit from the status quo hence inhibiting the growth of regenerative agriculture
- Farmers want local evidence that regenerative agriculture is profitable, at a more granular level than region or agricultural sector

There is also a perception among stakeholders that research is already available but a very low awareness of what that research covers and whether or how they can access it. For these reasons, this report provides a high-level list of scientific topics for research only as stakeholders were unable to articulate a detailed, extensive nor prioritised list.

Recognising these constraints, the project ensured it looked more broadly at the key motivations and barriers for farmers to transition to regenerative agriculture. Stakeholders consulted included primary producers, pastoralists, grower groups, agronomists, agronomic economists, agency staff, insurance companies and university researchers.

The revised scope enables this report to better meet the project's original strategic intent, to enable the State Government to facilitate an increased rate of adoption of regenerative agriculture.

It must be noted there are some organisations and individuals who are trailblazers of regenerative agriculture within the wider agricultural industry in Western Australia. In developing this report SWCC sought the views of supporters and detractors of regenerative agriculture and sought to understand widely held perceptions in the agricultural industry.

Also note, the scope of the project has not allowed for consideration of the drivers and barriers of regenerative agriculture reviewed in the context of current industry initiatives. These include the Commonwealth Government's Agriculture Stewardship Package and development of a common approach to Environmental-Economic Accounting by Commonwealth, State and Territory governments. Progress is also being made by innovative new organisations such as Wide Open Agriculture and their Dirty Clean Food brand.

SWCC suggests that State Government consider the insights and recommendations of this report in context of such initiatives, particularly where there may be opportunity to leverage pilot projects that may reward farmers for environmental-sustainability outcomes.

2. Key Findings

There is inconsistent understanding and definition of regenerative agriculture, as a concept and as an articulation of individual practices, within the West Australian agricultural industry. This is undoubtedly creating confusion and some antagonism.

Stakeholders think about the practice in different ways, ranging from a broad interpretation such as 'a sustainable way of farming' to referring to specific actions such as maximising ground cover. Consequently, some farmers consider themselves to be regenerative but are not actually adopting any regenerative agriculture practices. There are also farmers adopting the practices who steer away from labelling themselves as regenerative.

The term regenerative agriculture is polarising among the agricultural industry. This is primarily due to some of its supporters exhibiting disrespectful behaviour toward more conventional farmers, as well as several stakeholders seeing the term only as a marketing buzzword without substance.

Some believe the term to be unnecessary as they perceive regenerative agriculture to be current best practice agriculture.

Interestingly, concern for the environment and worries about the impact of climate change are neither key drivers nor key barriers to the uptake of regenerative agriculture. A significant number of farmers are climate sceptics and compounding this, where farmers are doing well financially, they are not inclined to change the way they farm.

This research suggests the core motivator on which to 'sell' regenerative agriculture to primary producers is financial benefit, rather than sustainability.

"All agriculture is regenerative. This is a warm and fuzzy term of recent times. Farmers will adopt new practices if they are demonstrated to be profitable."

Farmers are a predominately conservative community, highly conscious of peer-review. They typically 'stick with the crowd' and fear ridicule if they are the only one doing something different. However, this research identified that younger farmers and 'new' primary producers, entering the agricultural industry from a variety of backgrounds, are open to trialling new approaches and are drivers of the uptake in regenerative agriculture.

Additionally, slowing uptake is a perception among the farming community that those who transition to regenerative agriculture must be performing poorly financially. Facing financial challenges is indeed a key driver of transitioning to regenerative practices, but agricultural businesses understandably do not want to be labelled as struggling financially.

While these factors hold back adoption of regenerative agriculture, the importance of peer-recognition conversely drives uptake because farmers compete to be recognised as the best local farm for 'healthy and quality produce'. Farmers have the emotional driver of pride and rational driver of competitive advantage of quality outputs. Noting 'quality' and 'regenerative' produce are not always interchangeable, this does suggest an angle of opportunity for regenerative agriculture.

Some primary producers recognise the shift in consumer demand toward more sustainable product and this is a key driver for some farmers to transition to regenerative agriculture. The quantitative study contributing to this report indicates over half of respondents (skewed toward farmers already practicing regenerative agriculture) believe regenerative agriculture will deliver greater profit, however, 40% either think it will deliver similar or lower profits than conventional practices. About half believe farmers will require some sort of support to cover potential losses in transition.

Set-up costs aside, and recognising regenerative agriculture requires lower inputs, farmers understand the transition to regenerative agriculture requires an incremental approach and there is an expectation of reduced profit at least in the short to medium term.

“While carbon is being sequestered and soil biology is coming alive, there will be a loss of profit - farmers need a plan to transition.”

Determining and evidencing the commercial benefit of regenerative agriculture to the industry is paramount to increase adoption of the practice. Currently the industry-wide perception is that evidence is extremely limited, often anecdotal with the reason behind success stories unknown or undocumented. Farmers want to better understand the costs, benefits, risks and profitability of transitioning to regenerative agriculture.

“(There is a) lack of real and detailed information. Need less fluffy feel good stories and instead need trials and local case studies.”

Farmers also do not just want the ‘why’ they should adopt regenerative agriculture, as currently the vast majority lack the knowledge of ‘how’ to transition. 87% of respondents to the quantitative study contributing to this report ‘agreed’ or ‘strongly agreed’ that ‘farmers may not know how to transition to RA practices’.

Another key factor in influencing farmer-behaviour is peers as a trusted source of information. Leaders who have successfully adopted or taken a positive approach to promoting regenerative agriculture, are currently a key driver of farmers adopting the practice. This logically suggests evidence of the economic benefit of regenerative agriculture plus a ‘how to’ guide as messages amplified through peer-recommendation would be optimum to drive uptake.

A very significant challenge is that primary producers universally recognise there is no ‘one-size fits all’ and want evidence to be relevant to their local level/own situation. This implies the need to trial and evidence results for an enormous range of scenarios under different climatic conditions, soil types etc.

This also speaks to an opportunity raised by some stakeholders to learn from Aboriginal people about the relationship between ‘people’ and ‘place’ underpinning a sustainable model.

It is not just farmers who require evidence of the economic impact of transitioning to regenerative agriculture, but also the associated industry of financial and insurance services, and influential stakeholders such as agronomists – both of whom in the main currently won’t carry the largely unquantified risk of regenerative agriculture in their business models.

Some industry stakeholders highlight that the current agronomic model struggles to evolve due to two key factors. The first is the existing financial paradigm whereby agribusinesses carry large loans (particularly cropping businesses that invest heavily in machinery) and cannot afford to trial regenerative agriculture. The second is that a range of influential organisations have a vested interest in retaining the status quo, particularly from the industries of agrochemicals, farm machinery, financial services, and by exertion of their influence this extends to agronomists and tertiary institutions and researchers.

Even if farmers understand the ‘why’ and ‘how’ to adopt regenerative agriculture, its uptake will be impeded unless a benefit can also be identified for other industries heavily reliant on the agricultural industry status quo.

Regarding government’s support of regenerative agriculture, stakeholders interested in the practices speak not just of a lack of support by government being problematic but the lack of visibility of support

relative to that given to traditional methods. Primary producers do not currently see government as serious about making the agricultural industry regenerative.

“Most of the trial work/extension available from both Government and private enterprise has been based on industrial methods, chemicals, fertilisers to achieve maximum production with little regard for the environment.”

Stakeholders supportive of regenerative agriculture are also concerned about the lack of skilled advisors and apparent lack of commitment to training the next generation in regenerative agriculture, particularly given its absence from university courses.

“Unfortunately, most current people working in this industry were trained under the old system, that is, get big or get out and spray to address any inadequacy.”

While this report focusses on the most motivating factors and key barriers affecting farmer transition to regenerative agriculture for the industry overall, for a smaller number of farmers the social and/or environmental drivers will be more important e.g. reduction of exposure to sprays. Consequently their information requirements will differ to those of more profit-driven farmers. These farmers represent a niche audience for transitioning to regenerative agriculture, but arguably one that is more easily convinced once presented with the appropriate balance of information on economic, social and environmental factors.

There is an inescapable focus on the economic implications of regenerative agriculture for farmers in these key findings. Government may rightly wish to understand the wider social and environmental issues, such as food security (the volume and nutritional value of food that can be produced using this system), the community health implications of a reduction in the use of chemicals etc. The crux of the issue for most farmers though is whether by adopting regenerative practices they can make a profit.

3. Recommendations

3.1 Increase support

3.1.1 Research and development need to be comprehensive in terms of the science of regenerative agriculture, but it must also extend beyond agricultural science to the economic implications. Conduct trials and provide information on the profitability of regenerative agriculture practices

- relevant to WA conditions, particularly sandy soils;
- to a great degree of granularity, down to the local area/individual farm situation;
- providing comparison between the performance of regenerative and conventional agriculture, including addressing the 'zero input' issue; and
- including some trials on sites where regenerative agriculture has been practiced for some years.

3.1.2 Knowledge about RA must be catalogued and must be made accessible to the agricultural industry

- both in terms of them knowing where and how to find information and in terms of conveying the insights in a simple, jargon-free manner; and
- for farmers, preferably through case studies that go beyond the narrative and evidence results, as well as on-farm trials and demonstrations.

3.1.3 Consider providing financial support/incentives to agricultural businesses

- through the transition period when most, if not all, will see a drop in revenue and profit; and
- particularly noting, farm businesses with a currently strong financial performance do not have the catalyst of financial pressure to seek change.

This requires investigation of the criteria for qualification, a methodology to administer and financial modelling of the potential quantum.

3.2 Shift perceptions

3.2.1 Rebrand regenerative agriculture or manage communications to mitigate the negative connotations of the existing label for a significant number of stakeholders in WA. Regenerative agriculture is a term used internationally, which requires consideration in any relabelling of RA practices in WA. As the term is used globally, there may be learnings from other countries on this issue.

3.2.2 Ensure a common understanding of regenerative agriculture (or alternative label if adopted). There may be benefit in a definition that focusses on the outcomes in terms of profit, people and landscape.

Note: It would be worth researching with industry the appeal of potential alternative definitions of, and names for, regenerative agriculture before attempting to introduce them.

3.2.3 Increase visibility of support amongst the farming community, to shift the perception that far greater support is given to conventional agriculture.

3.2.4 Encourage consumer-led demand – leverage consumer interest in food provenance, processes and nutritional value, with the intent to increase the premium consumers are prepared to pay for product from regenerative practices. Investigation is required into what nomenclature should be used to communicate with consumers and drive demand, particularly given the concept of regenerative agriculture is far more complex than, for example, 'organic' and bearing in mind the negative connotations of regenerative agriculture for some industry stakeholders in WA.

3.3 Educate key stakeholders

- 3.3.1 Encourage the financial and insurance services industry to respond to the needs of agricultural businesses transitioning to RA, which may require significant investment on their behalf to rework risk and lending models (which will likely require the same economic evidence farmers seek on the benefit of regenerative agriculture).
- 3.3.2 Upskill Agronomists, who are enormously influential on which practices farmers follow and who in their formal training likely didn't cover RA. Ensure they have the ability (and know they have the ability) to safely recommend RA e.g. ability to get liability insurance.
- 3.3.3 Ensure regenerative agriculture is incorporated into relevant university courses.

3.4 Lead and enable industry collaboration

- 3.4.1 There is no clear consensus from stakeholders on who should take overall responsibility for providing support and raising the profile of regenerative agriculture in WA, but both government and NRM organisations are seen to have a key role to play.
- 3.4.2 Government can support agricultural industry organisations (grower groups, NRM Regions, government agencies etc.) to develop a more co-ordinated approach to encouraging transition to regenerative agriculture.

3.5 Target marketing for the greatest impact

- 3.5.1 Amplify and distribute the message of existing influencers – individuals practicing and/or promoting regenerative agriculture who have gained a following.
- 3.5.2 Target younger farmers and those new to farming, who are more likely to transition to regenerative agriculture.
- 3.5.3 Target mixed farms, with crops and livestock, who stakeholders agree have an advantage in shifting to regenerative agriculture due to the ability of livestock to diversify the soil microbiome.
- 3.5.4 Use the agricultural industry's media channels of choice, being radio and social media, to educate them about regenerative agriculture.
- 3.5.5 Consider niche communications or smaller but arguably more easily converted groups, such as farmers who want to minimise their use of chemicals.

3.6 Act now – priority research requirements

- 3.6.1 The Australian Government’s Department of Agriculture Water and the Environment advise “Our climate has already changed, and further changes are likely as concentrations of greenhouse gases continue to increase.”³
- 3.6.2 Recognising the transition to regenerative agriculture is incremental, that it can be a lengthy process for farmers and that there is a need to mitigate the impact of climate change – there is an imperative for government to encourage an increased rate of adoption of regenerative agriculture.
- 3.6.3 Stakeholders contributing to this report recognised they are not fully aware of the range of topics already researched (see recommendation 2.2. above), but commonly suggested prioritising for research:
- Understanding the implications of regenerative agriculture in WA’s sandy soils
 - Clearly defining the differences by WA regions and soils and the implications for regenerative agriculture practices
 - Outlining the practices of carbon sequestration
 - Defining ways to build soil organic carbon and the benefits to the farm
 - Explaining how cover cropping works and the benefits to the farm
 - Understanding the improvements in biodiversity that regenerative agriculture brings
 - Examining key sprays and their repercussions
 - Discovering how regenerative agriculture reduces the negative impacts of industrial nitrogen.

See section ‘Scope of this Report’ for the reason research topics suggested are very high-level

A note from WA NRM Regions:

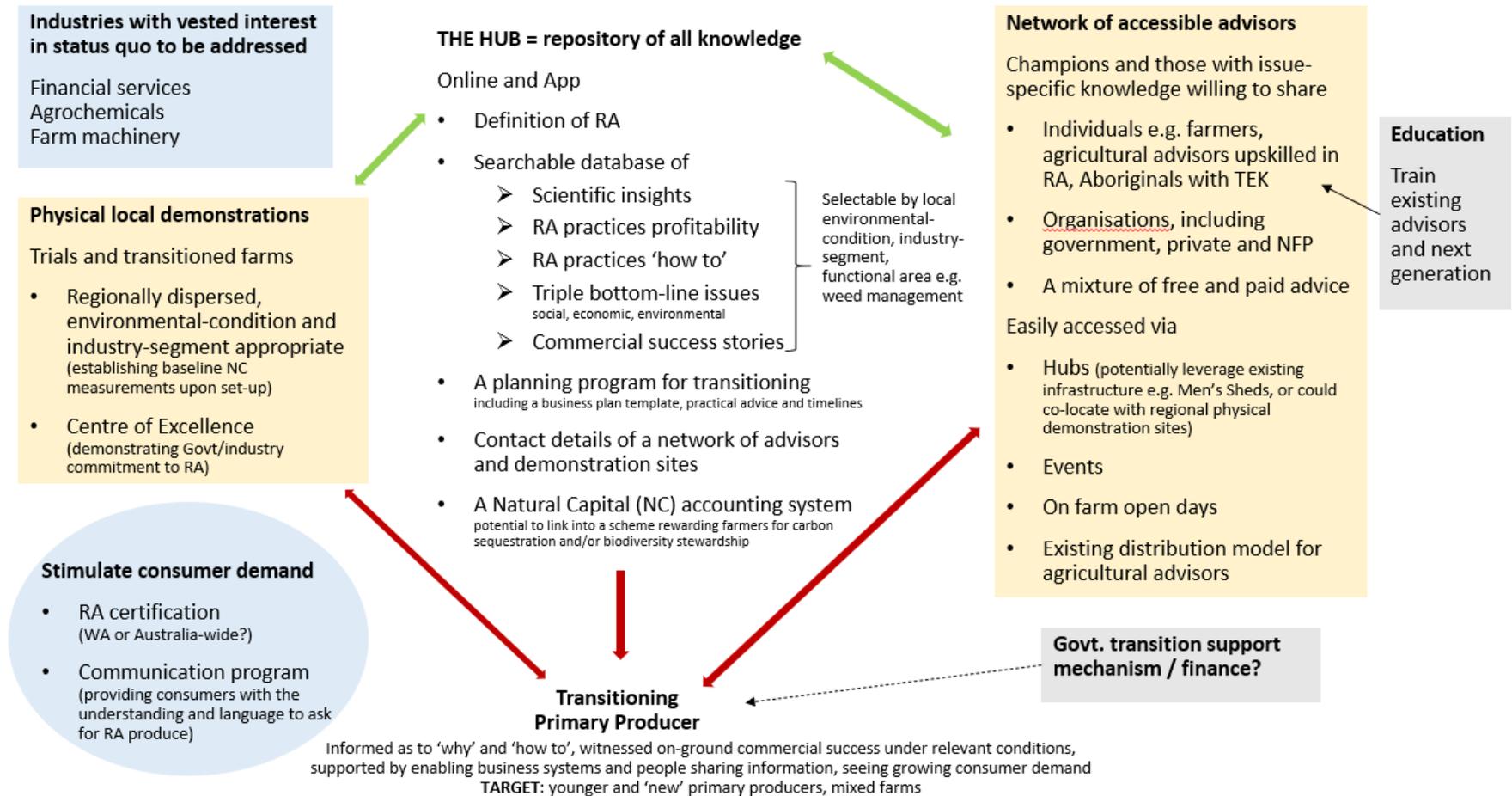
The high-level research topics suggested by participants indicates the low level of understanding of RA within the industry. NRM Regions suggest research should seek to understand methods to demonstrate change to biological systems. This is as compared to much agricultural research that considers elements in isolation as compared to as part of a system – recognising the enormous number of variables and difficulties this presents. The industry uses soil and plant testing, but these methods are not ideal if the goal is to increase infiltration and build soil structure. Showing growers this and how to set up a replicated trial is important.

Research could include such things as:

- Discovering how biological amendments and microbial stimulation can reduce the need for synthetic fertilizers and pesticides
- Understanding soil biology and its effect on nutrient availability and yield (demonstrating to growers how abundant and diverse is it in different situations, how is it measured and what are critical values, or how do you calibrate it to provide reliable agronomic advice)
- The benefits of maintaining more than a certain percentage of total ground cover and the best practice to achieve this
- The role of pH, which some argue does not matter
- How RA systems reduce nutrient leakage
- Test the validity of concepts such as bacterial:fungi ratios which are not accepted by the mainstream scientific community as having any relevance
- The phosphorus legacy – how long it lasts in different situations

³ <https://environment.gov.au/climate-change/climate-science-data/climate-science/climate-change-future>

Roadmap to develop Regenerative Agriculture (RA)



4. Project Description

4.1 Background

The State NRM's "Community Stewardship Grants 2018 – Large" program funded this initiative recognising the need to better understand the challenges that farmers face when making the transition from conventional to regenerative farming practices. The grant was for \$99,325. A project extension was requested to enable completion of phase 3 of the Project Activities (see below) and the project scheduled for final delivery by July 2020.

Despite the RA concept appearing to be appealing, delivering improved soil health and food quality with simultaneously reduced input costs, few West Australian farmers appear to have adopted the practices. Initial conversations with primary producers revealed their need for cost-benefit and risk analyses, as well as advice specific to their situation before risking alternative management practices.

This project was designed to gather input from a broad spectrum of stakeholders to identify key information gaps holding back transition to RA and provide strategic guidance on issues requiring attention and action to speed up adoption.

South West Catchments Council ran this project with the collaboration of all other NRM Regions in WA. The state's seven NRM Regions are:

- NACC NRM
- Peel-Harvey Catchment Council (PHCC)
- Perth NRM
- Rangelands NRM
- South Coast NRM
- South West Catchments Council (SWCC)
- Wheatbelt NRM

4.2 Project Activities

The following three-phased approach was taken to understand the complex issue of RA and ascertain the views of a wide range of stakeholders.

- 1) A quantitative study
Designed and executed collectively by WA's NRM Regions
Accessible online and via one-on-one contact with NRM Region representatives at events or over the phone
Commencing 1st September to 18th October 2019
226 responses were collected from across the State, with 75% being active farmers
- 2) A workshop attended by all NRM WA Regions to determine the collective wisdom of the groups on RA, analyse the results of the quantitative research and scope a qualitative study
- 3) A qualitative study
Scoped and briefed SWCC, supported by WA's NRM Regions
Designed and executed by Metrix Consulting
29 depth interviews with a range of stakeholders (see breakdown later in this report)
Commencing 11th May to 2nd June 2020

5. Qualitative Research Insights

There are a number of issues highlighted through the quantitative study forming part of this report (attached below) that are implicit in the qualitative research insights. They are worth mentioning here for consideration if at any time the qualitative component is extracted from this overall report for presentation.

- Farmers need to understand not just ‘why’ they should adopt regenerative agriculture, but need to learn ‘how’ to implement it.
- While the majority of farmers will need to see the profitability of regenerative agriculture before transitioning, for a smaller number of farmers the social and/or environmental drivers will be more important. NRM Regions particularly hear a desire of farmers to reduce exposure of themselves and their families to chemicals.
- The financial risks in transitioning to regenerative agriculture are not only the potential scale of loss if things go wrong, but also recognising there will be a lull in production while soil health builds.

Two insights from the quantitative study are not articulated in the qualitative report.

- That the current agronomic model struggles to evolve due to the existing financial paradigm (referring to farmers’ carrying significant loans, as opposed to the constraints of current lending models referred to in the qualitative report).
- That the current agronomic model struggles to evolve given the vested interest of influential organisations to retain the status quo, particularly from the industries of agrochemicals, farm machinery, financial services, and by exertion of their influence extends to agronomy and tertiary institutions and researchers.

This slight variation in findings is due to the different sample of each study – respondents to the quantitative study were largely farmers already interested in and/or practicing RA, while the qualitative study sought a view from both supporters and detractors of RA and a far wider range of stakeholders including amongst others representatives of financial services organisations, agronomists and university researchers.

Identifying Priority Actions & Research for Regenerative Agriculture in WA



Report | June 2020



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Scope of Engagement



Research Objectives

South West Catchments Council (NRM Regions) received a grant from State National Resource Management (NRM) to ascertain and provide strategic guidance on any priority areas for Regenerative Agriculture research in WA.

Metrix Consulting was engaged to conduct in-depth interviews with a diverse range of industry stakeholders to:

Understand and prioritise the actions and research opportunities to positively influence the adoption of Regenerative Agricultural (RA) practices among primary producers in Western Australia.

The specific informational objectives were to explore:

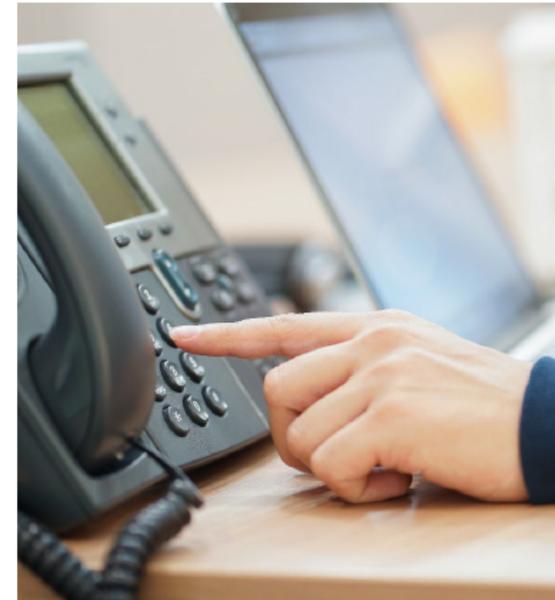
- Knowledge and understanding of RA;
- Key drivers and barriers of RA;
- Perceived benefits and risks of RA;
- RA topics for further exploration and research; and
- Any other opportunities to assist the adoption of RA practices.



Methodology

29 in-depth telephone interviews were conducted with a sample of stakeholders provided by WA NRM Regions (breakdown below). All interviews were completed by experienced moderators from the Metrix team. In-depth Interviews were held from the 11th of May to the 2nd of June 2020.

Stakeholder Group	Number of Interviews
Primary Producers	9 participants
Agronomists	9 participants
Agency Staff	3 participants
Industry Grower Groups	3 participants
Agronomic Economists	2 participants
University Researchers	1 participant
Insurance Companies	1 participant
Pastoralists	1 participant



*Please note:

- This is a qualitative study. Where insights are listed, these are not in any priority order.
- Metrix attempted to conduct interviews with the bank contacts provided by NRM Regions but they were not available to participate.
- This report also incorporates feedback from a workshop attended by all NRM WA regions in February 2020, which was used to inform the research.



Executive Summary



Key Insights

Knowledge and Understanding of Regenerative Agriculture

Regenerative Agriculture is not clearly defined. The way in which stakeholders think about RA ranges from very broad terms (sustainable farming, healthy soils etc.) to specific RA practices (cover cropping, stubble retention etc.).

As a result, while many see RA as very different to conventional and industrial farming, others see it as a buzzword for practices that farmers are already using and question the need for a RA 'label'.

Key Drivers of Regenerative Agriculture

In terms of what is currently driving the adoption of RA, there are a combination of financial and emotional factors at play:

- The influence of **industry leaders** who have either successfully adopted or taken a positive approach to promoting RA practices.
- A **strong sense of pride** that is common within the farming community, with farmers wanting to be recognised by others for running a 'healthy' farm.
- Farmers facing **financial challenges** that force them to consider a change in approach.
- **Market drivers** changing the demand for produce.
- **Younger and 'new' primary producers** who are open to trialling new approaches.

Key Insights

Key Barriers Towards Regenerative Agriculture

There are a number of identified barriers to adoption:

- A **lack of quantified local (WA) economic evidence** of the effectiveness of RA, given WA's unique climate and soil conditions.
- A **lack of catalyst for change** if farmers are performing well financially/maximising yield and don't see how RA can help them, particularly given that there are short term risks associated with implementing RA.
- **Negative connotations** with RA as a controversial approach by some supporters of RA suggesting conventional farmers are 'degenerative'.
- A **risk averse and conservative mindset** from farmers who don't want to be seen to be doing things differently to what is accepted practice.
- A **lack of support** (including funding for trials, research and development) compared to conventional and industrial practices.
- **Financial institutions and insurance companies** lacking the required knowledge and financial models to support the adoption of RA practices.

Strategies to Drive the Adoption of RA

Leadership



The lack of a coordinated approach to driving the adoption of RA needs to be addressed. The NRM regions, if adequately resourced, can work in partnership with government and other relevant industry stakeholders (e.g. agronomists, financial institutions, researchers etc) to inform decisions about R&D and facilitate information sharing in a consistent and constructive way, which is currently lacking.

Definition and name of RA



In order to gain wider acceptance and interest, there is a need for an outcome focussed definition of RA practices (wellbeing of people, land and profit). Invest in developing awareness and understanding of a consistent definition. There may be benefit in developing an alternative name for RA, as the label currently has some negative connotations acting as a barrier to adoption.

Coordinated approach to R&D



Awareness of different research projects (past and present) varied considerably among the stakeholders interviewed, however most acknowledged there was likely to be a lot more happening than they were aware of.

Key priorities should be research projects that:

- Evidence the economic benefits of Regenerative Agriculture (i.e. case studies of trials that demonstrate step change analysis).
- Are directly relevant to local (WA) conditions. In particular, how RA applies to WA's unique soil and climate conditions.

Strategies to Drive the Adoption of RA cont'd

Utilise relevant channels to inform and educate



With radio and social media (Facebook groups and Twitter) widely used by farmers to share information and ideas, there is an opportunity to leverage these channels to inform and educate the industry about RA.

Field days and workshops are also relevant ways to engage with the key target audiences, by showcasing relevant local examples of RA trials and success stories.

Invest in case studies



Relevant, local case studies were almost universally suggested by the stakeholders interviewed as a way to positively influence consideration and adoption of RA. Not only can they demonstrate the positive outcomes of RA but also help to manage expectations of the challenges in the early stages of transition. Consider a mix of case studies (trials and proven success stories) that encompass a range of farm types, sizes, climates and landscapes in order to be applicable to a broad cross section of Western Australian farmers and evidences the economic benefits.

Partner with relevant influencers



Build and maintain relationships with key enablers such as agronomists, financial institutions and insurance companies, who may not have updated their knowledge and financial models to support RA.

Consider partnering with farmers who are considered industry leaders within particular regions to champion specific practices where the evidence has been proven.

Seek to influence younger farmers by getting RA on the agenda in university courses. If the topics are covered as part of their studies they are more likely to bring the idea of RA back to the farm.

Strategies to Drive the Adoption of RA cont'd

Consumer-led demand



As the consumer mindset is evolving to value the process in which their produce is created, consider strategies that stimulate consumer demand for RA produce (e.g. a consumer and retailer education campaign).

Explore different funding options



Given that there wasn't a clear preference identified among interviewees for the type of funding which should be available, there is scope to consider a mix of:

- 'Support' in the way of funding for trials, research and development, or funding for consultants to provide farmers with advice on how to apply RA practices in their specific situation – either from government or private investors.
- Financial incentives to encourage farmers to adopt RA practices.

Targeted approach to communications



Consider a targeted approach to communications and engagement with different audiences based on needs and motivation.

For example:

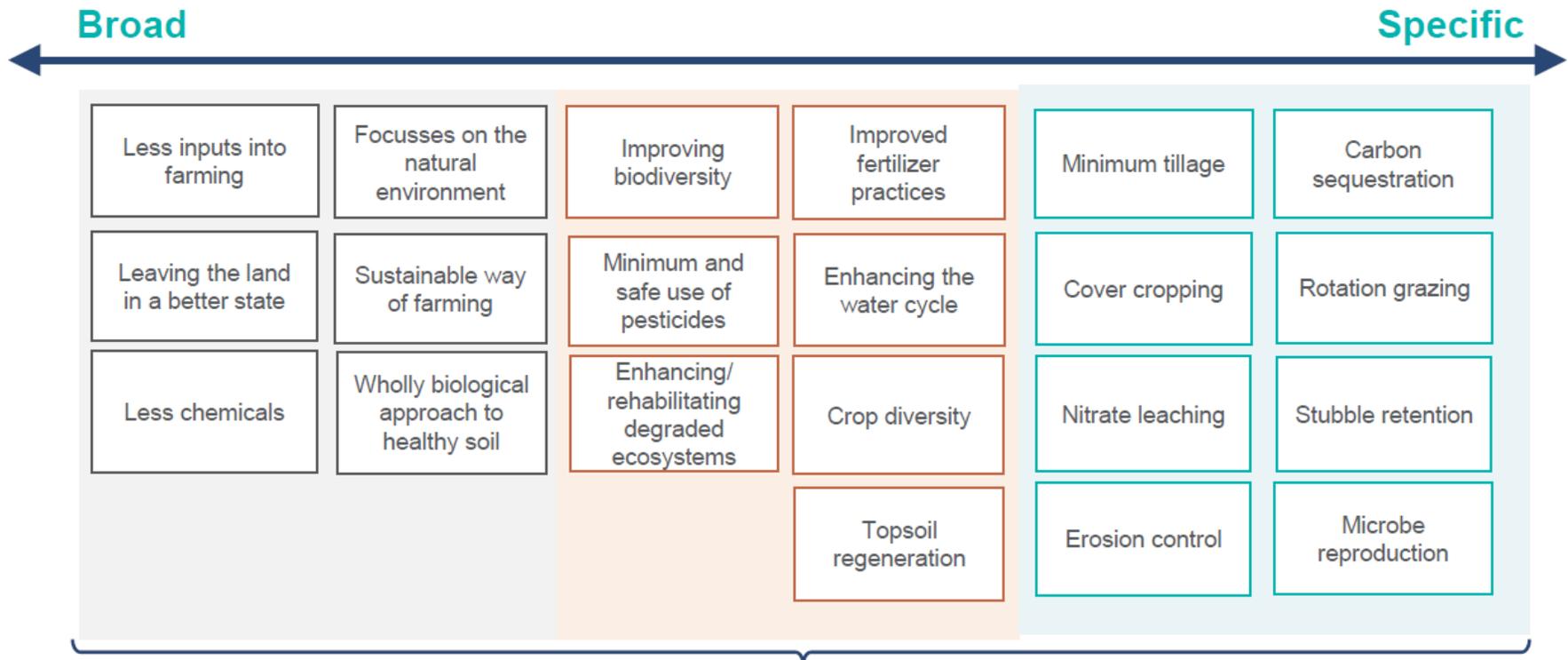
- Tailoring the message to the specific challenge being faced (yields, profit, market drivers) and how RA can help to address this.
- Adapting the message for primary producers vs agronomists vs other target audiences.
- There may be better times of year to communicate with certain farmers depending on workloads.

Knowledge and Understanding of Regenerative Agriculture



Regenerative Agriculture lacks a universally accepted definition

Stakeholders think about Regenerative Agriculture in different ways, with definitions ranging from broad principles to specific Regenerative Agriculture practices.



As a result, there is a view that:

- There are farmers adopting RA practices without referring to it as RA.
- There are farmers who think they are adopting RA because they are being 'regenerative' but are not necessarily adopting the specific practices.

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The view of RA as described by stakeholders

Broad View

Those with a broader view of Regenerative Agriculture are typically less informed about RA, either by choice or because there is a lack of easily accessible information.

When prompted with a definition of RA, they are likely to be aware of and even using specific practices, but without referring to the term Regenerative Agriculture. They are likely to be more focussed on the bigger picture of sustainable outcomes.

Specific View

Those with a specific and more informed understanding of RA are more likely to have researched the topic or be aware of others who have trialled or adopted RA as a way of farming.

“ There are some farms that are nature based and low input, but for the most part everyone is regenerative.
[Primary Producer] ”

“ We have to get in touch with the natural capital of things - not relying on bagged fertiliser, we have to use the soil as a medium and not call it dirt.
[Primary Producer] ”

“ I have looked at some of the things around RA specifically, and it's basically good farm practices that everyone does – good rotations, using legumes etc.
[Agronomist] ”

“ My absolute vision would be having corridors across the landscape for carbon planting and have some sort of configuration.
[Primary Producer] ”



Stakeholders commonly described it as a buzzword/marketing term

The term Regenerative Agriculture follows in the footsteps of words like 'organic' and 'biodynamic' which have received significant investment over time. Although recognised as different to either of these concepts, some believe Regenerative Agriculture to be a transient buzzword used by marketers, fuelled by the rising conversations around climate change and by environmentally conscious stakeholders.

However, supporters of RA believe that if marketed effectively using research and development to provide evidence, this can drive greater traction in the long-term.



“ A lot of these practices are things that farmers are already doing. Labelling it as RA just makes it sound bigger and more radical than it actually is.
[Primary Producer] ”

“ I've had hundreds of conversations on both sides – in those conversations I've learnt there will be some who find a reason to disagree or pick holes. Regenerative Agriculture is one of them.
[Primary Producer/Wholesale/Retailer] ”

“ Regenerative Agriculture has become a bit of a buzzword. When you look around it's still a slow burn and hasn't gotten the momentum some people have been hoping for.
[Primary Producer] ”

“ Are you suggesting I'm destroying the capability of my farm? Labels like this puts people off. It feels like you're having a go at others who have modern techniques in place.
[Agronomist] ”

The Regenerative Agriculture movement is described as ‘polarising’

While most could see the rationale for specific RA practices in response to specific issues and many are likely to be implementing regenerative practices, the way in which RA has been promoted is described as polarising because it has directly criticised industrial practices and conventional methods. This has created what many consider to be an unnecessary divide.

As a result, some questioned the need for a RA ‘label’.

“ On the spectrum of RA, there are not a lot of practicing RA farmers. The bulk of farmers are conventional but I suspect lots are looking over the fence with more than a general interest, just not letting their mates know. It is very polarising.
[Agency Staff] ”

“ The Regenerative Agriculture movement is polarising, with calls that industrial agriculture is poisoning us.
[Grower Group] ”

“ Some of the people pushing Regenerative Agriculture have been in the media and you don’t want to associate yourself.
[Primary Producer] ”

The definition tested focusses on RA practices but fails to articulate the outcomes

Definition*:

Regenerative Agriculture is a conservation and rehabilitation approach to food and farming systems. It focusses on topsoil regeneration, increasing biodiversity, improving the water cycle, enhancing ecosystem services, supporting bio-sequestration, increasing resilience to climate change and strengthening the health and vitality of farm soil.



The main issues with the definition provided is that it:

- Focusses too much on the processes rather than the outcomes.
- Lacks a reference to the economic benefits of RA.
- Uses too much jargon.

One stakeholder suggested the **Graeme Hand** (owner of holistic land management consultancy *Handfortheland*) definition of RA, focussing on profit, people and landscape:

- Profit – the financial benefits.
- Landscape – improving the function of the land, providing healthier foods and better soil.
- People – farmers who enjoy what they are doing and advocate this to others.

“ There’s too many words - I guarantee farmers wouldn’t be able to understand this. It needs to be simplified and focussed on improving their farming system and the reasons ‘why’.
[Agronomist] ”

“ The definition needs to be economically focussed otherwise people won’t practice.
[University Researcher] ”

Stakeholders are forming their opinions about RA based on information from a wide range of sources

The **biggest challenge** is that it is not coordinated or consistent, and there is not enough evidence relevant to WA conditions (explained further in the key barriers section).



Agronomists / Consultants: “A lot of people listen to what agronomists have to say and do a lot of planning with them – though there aren’t enough agronomists out there that are convinced.” **Primary Produce + Wholesale Retailer**



Peers: “You learn a lot from the people around you – lots of peer to peer – seeing what others are doing with agronomists and how they’re applying it to their situation.” **Primary Producer**



Field Days: “I’ve learnt a lot from on farm demonstrations and field days – it helps more than just reading.” **Primary Producer**



Regional Subcommittees / Landcare Groups: “There are quite a few regional subcommittees and landcare groups that have 1 or 2 people that are very active in this space and have lots to share.” **Primary Producer**



Internet: “The essence of Regenerative Agriculture is it’s a community asset, it’s not owned by the corporations and the internet is providing the opportunity for information to be exchanged.” **Primary Producer**



Twitter: “I follow some leading farmers on twitter who share information relating to their knowledge and experience. Farmers like Brad Jones.” **Agronomist**



Facebook groups: “Young farmers in particular are often part of online farm groups and will share ideas through these groups.” **Grower Group**



Literature: “Everyone must buy ‘For the Love of Soil’ by Nicole Masters, I got most of my knowledge from this book.” **Primary Producer**

The are some common overarching views about the implementation of RA



No one-size fits all

There are various factors that impact the implementation of RA practices – location, climate, crops, livestock and financial position of the farm. No two farms are exactly the same and a case by case approach is required.



Mixed farms have an advantage in the transition to RA

Farms with a mix of crops and livestock help to diversify the soil microbiome. This increases carbon within the soil to build new soil, which is critical to the success of Regenerative Agriculture.



An incremental approach is best

While there may be exceptions, most stakeholders considered an incremental approach to adopting RA as less confrontational than applying a ‘whole farm’ approach in the first instance. Farmers can better manage the short term risks by tracking what is working and making adjustments accordingly.



Return to a natural ecosystem

The implementation of RA can help to minimise issues with pests and diseases, allowing crops to defend themselves and ecosystems to function naturally.

“ I don't believe there is a one size fits all. Everyone's circumstance is different. That's the beauty of it as well, it's a very organic approach and farmers themselves are already independent and individuals in their thinking – you can make it work for you which is great! You can be very creative.
[Primary Producer]

”

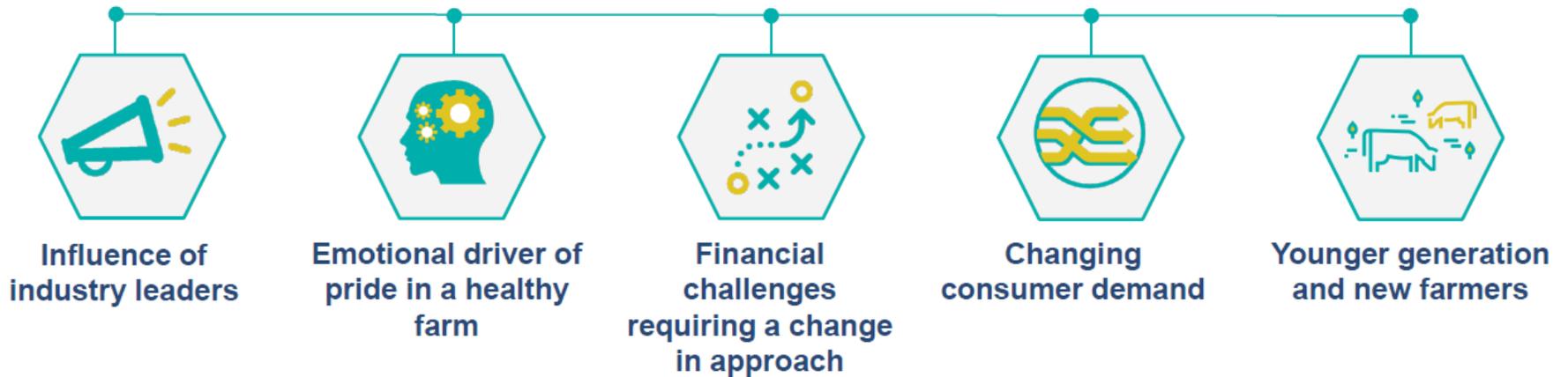
Key Drivers and Benefits of Regenerative Agriculture





There is a strong case for Regenerative Agriculture practices, with many stakeholders aware of the benefits and positive impacts they can have on **soil health** and **future sustainability**.

What is driving farmers to adopt RA practices?



The influence of industry leaders recognised for supporting and driving Regenerative Agriculture in Western Australia



Many draw inspiration from leading people and organisations within their community and on a broader scale, giving them confidence and drive to learn more about agricultural practices and follow in their footsteps.

These leaders can play a key role in the uptake of regenerative practices as it allows for a model to be made which farmers can draw on for guidance and experience.

Individual names called out by interviewees include people who are primary producers, an MP, agency staff, NRM organisations and agronomists. For example:

- The Haggerty family
- Nick Kelly
- Alannah MacTiernan



“ I started to get involved in the South West Catchments Council – the field days really helped. They’re all about getting people involved.
[Primary Producer] ”

“ Very grateful for Alannah MacTiernan. She has been a powerful minister. She’s had to put up to manage huge resistance from high-level people, which is very inspirational.
[Primary Producer] ”

Farmers wanting to be recognised by their local community for a healthy and profitable farm



Pride is important within the farming community. Farmers want to be well regarded by their neighbours and peers for a healthy farm that produces the best quality outputs. This can also give them a commercial advantage.

If there are primary producers in the same catchment producing the same outputs, often one will be seen to have 'better produce' and relied upon for their supply.

As competition is fierce, primary producers regularly look for ways to progress their farm, changing and adapting their practices to stay on top of their game. For example, RA practices that reduce the use of chemicals can be one point of difference.



“ People want to be the biggest and the best – happier and more profitable.
[Primary Producer] ”



Specific challenges that require a change in approach and force farmers to reassess their practices



Primary producers faced with financial difficulty will often be forced to look for new ways to adapt. For example, some may be faced with rising input costs and/or increasing debt levels practicing under the conventional system. Economic evidence is considered a driver if farmers are able to relate to relevant case studies that demonstrate the financial opportunity of regenerative agriculture.

Some are also seeing a plateau in yields (quality and quantity), recognising their soil and ecosystems aren't as healthy as they once were. This can be driven by issues such as pests and salinity.

As a result, primary producers may be looking at new ways to adapt in order to restore the health and finances of their farm.



“ I am constantly changing and implementing change as I learn. Always looking for ways to improve.
[Primary Producer] ”

“ Each farm is different. Each farm is unique and constantly changing, so they need to constantly be adapting.
[Agronomic Economist] ”

“ Using sprays and pesticides is a fundamentally flawed system – they start killing the good pests and removing all nutrients from the plants. RA helps the ecosystem go back to normal.
[Primary Producer] ”

Market drivers changing the demand for produce



Large retailers have previously been the gatekeeper to consumers, controlling the information they receive about their produce, processes and origin. Times are changing and consumers are taking ownership of their foods as purchase decisions become more aligned with personal values.

As the world becomes increasingly connected and consumers are exposed to a range of views and issues, this has the potential to drive change in demand. Consumers are beginning to critically analyse where their food is sourced and whether the source is a 'responsible corporate citizen'¹. This has the potential to influence buying decisions, with certain countries implementing regulations surrounding no chemicals and pesticides on their imported produce.

A number of stakeholders felt there is current demand for primary producers to produce sustainable foods, especially in unprecedented times (e.g. COVID-19).



“ People want to choose food low in nitrates and high in nutrients. Nutrient-dense food and full of flavour.
[Primary Producer] ”

“ As a company, we've identified for the consumer what they're interested in and what matters to them – quality and health of the food.
[Primary Producer] ”

“ COVID-19 has been fantastic in some way, it has made consumers realise the importance of agriculture as throughout this period we have been producing crops to feed the world.
[Industry Grower Group] ”

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[1] Nielsen, 2020. Key Consumer Behavior Thresholds Identified As The Coronavirus Outbreak Evolves. [online] Available at: <https://www.nielsen.com/us/en/insights/article/2020/key-consumer-behavior-thresholds-identified-as-the-coronavirus-outbreak-evolves/>



Younger farmers and ‘new’ primary producers open to different approaches



Society is experiencing greater diversity in thought, attitudes and values, reshaping the way younger generations are farming. These primary producers are driven by a changing climate and are motivated to create the most suitable outcomes.

- They're connected to a vast array of resources (e.g. Facebook groups, online research) with greater exposure to information and evolving practices than their predecessors.
- Many are also university educated and bringing new ideas back to the farm. Some stakeholders therefore felt that a lack of focus on RA in formal courses was considered a missed opportunity to engage with this audience.
- Younger generations are relying on consultants for advice to assist in shaping the future direction of their farm. These stakeholders are a source of information for primary producers and a target audience for assisting the adoption of Regenerative Agriculture moving forward.



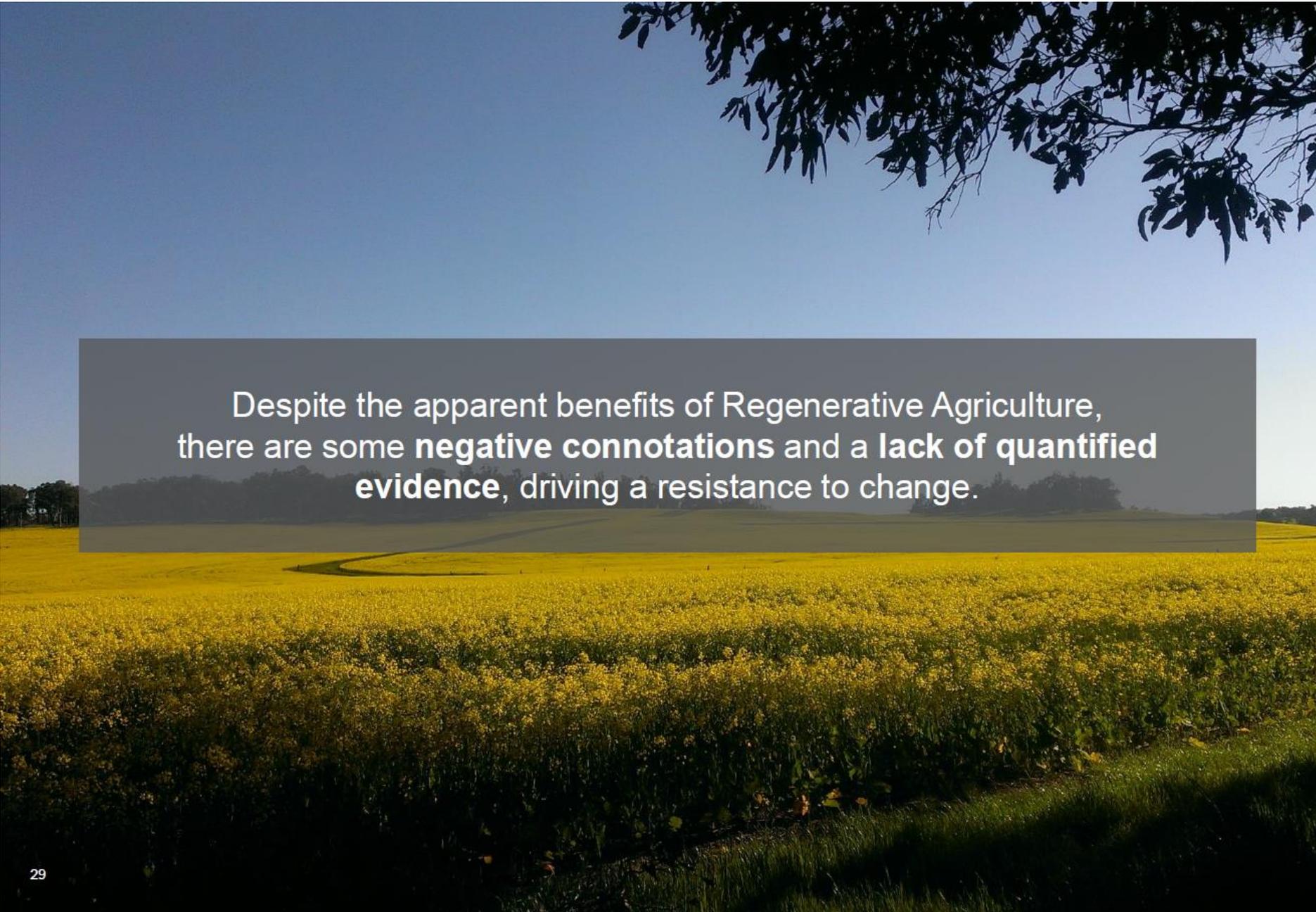
“ I have been to many conventions about RA, and I was blown away by the number of women and younger farmers. They are creating a movement away from industrialised agriculture. They want to see a change.
[Issues Researcher] ”

“ The whole educational system needs to be overhauled. These young farmers need to learn about this.
[Primary Producer] ”



Key Barriers and Risks of Regenerative Agriculture





Despite the apparent benefits of Regenerative Agriculture, there are some **negative connotations** and a **lack of quantified evidence**, driving a resistance to change.

What are the key barriers to farmers adopting RA practices?



A lack of local evidence causing uncertainty around the effectiveness of Regenerative Agriculture practices



Most of the information and research available stems from overseas (US, UK, Europe), with limited relevance to its application on Western Australian soils.

Primary producers face the challenge and risks of adopting RA techniques that accommodate Western Australia's diverse landscape and varying weather conditions. There is no 'one size fits all' and a test and learn approach is required to determine what works best for their farm.

Evidence of regenerative agriculture thriving in Western Australia is scarce, therefore many are reluctant to trial and adopt.



“ Resources and research should go into RA in Western Australia, to make it strong so farmers can be supported.
[Primary Producer] ”

“ Australian soils and climates are not suited to the full-blown industrial agriculture approach. Part of this is because we've enforced part of the European practices into our climate, which won't work.
[Agency Staff] ”

Social stigma of being associated with Regenerative Agriculture



Negative connotations with RA stem from:

- A controversial approach from some individuals promoting RA suggesting conventional farmers are 'degenerative' in their approach. Some are also being associated with uncooperative behaviour and disrespecting the opinions of others within their local communities.
- The belief that practicing Regenerative Agriculture suggests a farm isn't performing financially, causing embarrassment for those producers adopting RA within their community.

Some fear this evolving stigma will deter new adopters from converting to Regenerative Agriculture practices.



“ Social norm, if you live in a small country town, it is not very nice to be the only one doing something different because it makes everyone question you. It's important to be a part of a network and not feel like you're doing it on your own. ”
[Primary Producer + Wholesale/Retailer]

“ What farmers don't like is that people who practice and preach Regenerative Agriculture suggest that other farmers and their practices are degenerative. ”
[Agronomist]

Financially strong farms that see no reason to change their practices



There is no catalyst for change if farmers are performing well financially and maximising yield.

While some may be motivated to reduce their impacts on the environment, unless there is greater consumer demand and willingness to pay more for their produce, these farmers will continue to be defined by yields.

Agronomists often have KPIs centred around increasing farm yield and profit, so if a farming system doesn't support this they will be less inclined to recommend this way of practicing.



“ If a farmer's current practices are working, and they're still being profitable, there is no pressure to consider change.
[Primary Producer]

”

“ A lot of farmers have a cynical view if they don't see the monetary side of things.
[Primary Producer]

”

Lack of funding compared to conventional practices



Conventional farming systems have been supported by government funding and investment over the years.

Without the same support for Regenerative Agriculture, this has the potential to be viewed as a lack of encouragement from influential parties assisting the trial and adoption of these practices.

There were mixed views on the type of funding which should be available:

- While some see a role for financial incentives to encourage farmers to adopt RA practices, others felt that this would be difficult to audit and administer.
- Others saw more of a role for 'support' in the way of funding for trials, research and development – either from government or private investors.



“ Conventional farmers have had a lot of support to get to where it is today.
[University Researcher] ”

“ If they can get government and funding support for Regenerative Agriculture, like conventional farming systems, people would feel significantly more confident.
[Agency Staff] ”



There are short term risks – RA requires a long-term commitment



Regenerative Agriculture is both an emotional and functional shift for primary producers – from maximising yield and efficiencies in the short-term, to a focus on control and quality of outputs in the long-term.

The scale and pace at which this transition occurs requires commitment and planning. The transition period is considered a high risk period, with the potential for significant financial loss if things go wrong. This raises:

- The importance of farmers having realistic expectations in the pre-planning stage, otherwise they will give up and will be unlikely to consider RA again.
- The benefits of an incremental approach to introducing RA practices.



“ Those committed today will be reaping the benefits in 10 years.
[Agronomist] ”

“ The fact is, you need to be committed. It's a long term gain to see results and that's what people need to understand.
[Agronomist] ”

“ Buying acidic fertiliser is a lot cheaper than the good stuff. For pastoralists its similar, its not about fertiliser, it's about lowering stocking rates to improve the land. However, as a result they think they're going to lose money in the short term which is a turn off.
[Agronomist] ”

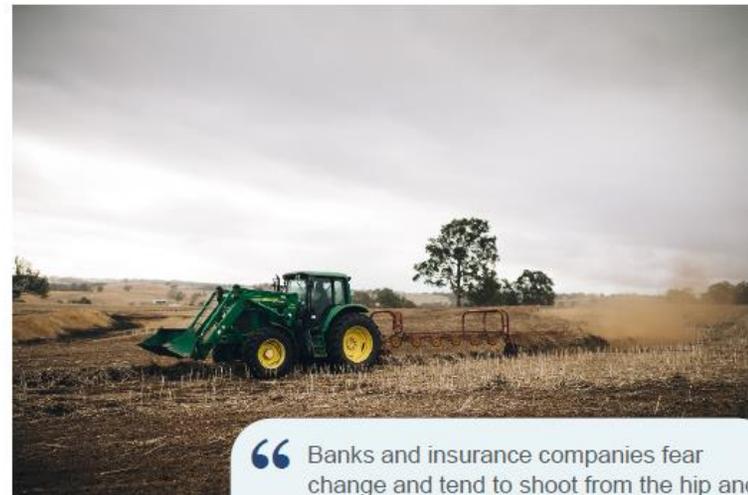
“ Set expectations about what could happen, some of the problems as well. You need to be realistic about the journey otherwise you will lose farmers first time.
[Grower Group] ”

Financial institutions and insurance companies failing to recognise RA as a profitable way to improve natural capital resources



The relationship between primary producers and financial institutions has been grounded in intensive farming methods over the years and not all financial institutions have updated their financial models to support the adoption of RA practices. Banks also require proof that the farm is profitable. As a result, a number of primary producers felt they were convinced to go back to conventional farming.

There is also a view that there are few insurance companies with sophisticated Regenerative Agriculture models in place, which can also act as a barrier to adoption. **Insurance Group Australia*** consider themselves to be a leader in the insurance space, having invested time and money partnering with a digital company (Digital Agriculture Services) to better predict and manage agriculture investment and commerce. Using remote sensors from space, they can visualise and understand changes to the built and natural landscape, supporting the progression of regenerative farming.



“ I had a bank manager come out who didn't believe me – our profitability increased. It took us three years to get through the quarantine part of the program. It then ramped up exponentially. **[Primary Producer]** ”

“ Banks like seeing agronomy reports and seeing words like 'pesticide' and 'fertiliser' look good. They will deter you with costs and if they don't think it's part of the money making business plan they probably won't give you cash flow. **[Primary Producer + Wholesale/Retailer]** ”

“ Banks and insurance companies fear change and tend to shoot from the hip and knock it back. It's very important they're engaged in the process which involves stepping away from what they think they know. **[Primary Producer]** ”

36 *Specific information provided by Insurance Group Australia because they were an interviewee of this report.



The risk averse nature of some farmers can mean they are sceptical of RA



The risk averse nature of many farmers who don't want to be seen to be doing things differently to what is accepted practice, was also widely viewed as a barrier to adoption of RA practices.

For example, many are likely to:

- Have a 'growth in gross profit' oriented mindset.
- Believe that conventional practices centred around technology offer greater advantages for sustainability, and without it there's a risk of going backwards.



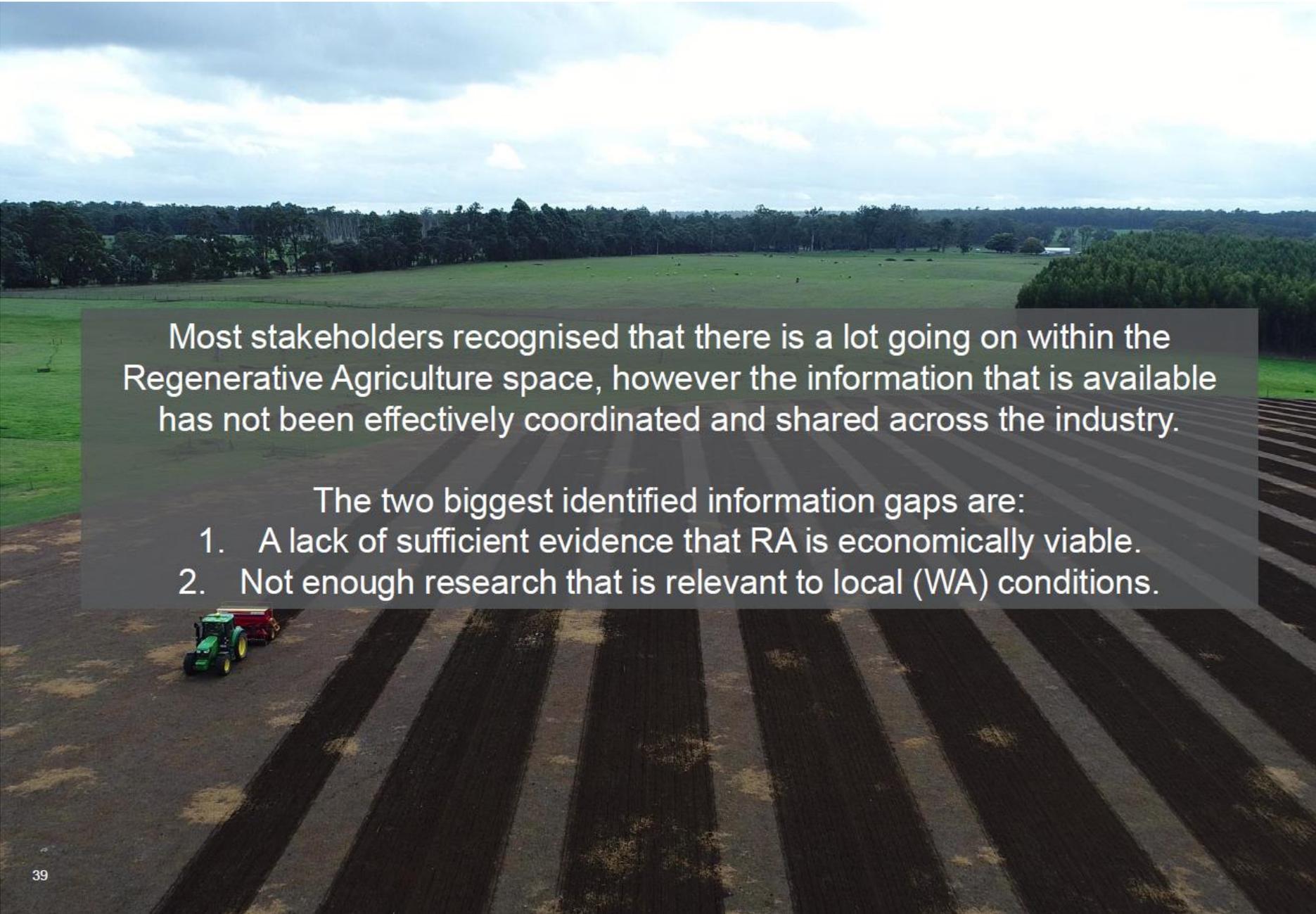
“ To adopt RA, one must change the way they do things, which means giving up on old practices with known certainty, for new ones that you're unsure about. Farmers don't like that.
[Agronomist] ”

“ Some farmers are reluctant to change, stepping outside of the norm. Farmers are pretty conservative, and want to fit in.
[Agency Staff] ”

“ Farming is a very emotive thing for farmers and land holders, there are a lot of potential emotions, languages and imagery involved in it. For that reason, farmers are slow to change
[Agronomist] ”

Topics for Further Exploration and Research



An aerial photograph of a farm. In the foreground, a green tractor is pulling a red trailer through a field with dark, tilled soil in rows. The middle ground shows a large, flat green field. In the background, there is a dense line of trees under a cloudy sky. A semi-transparent grey box with white text is overlaid on the center of the image.

Most stakeholders recognised that there is a lot going on within the Regenerative Agriculture space, however the information that is available has not been effectively coordinated and shared across the industry.

The two biggest identified information gaps are:

1. A lack of sufficient evidence that RA is economically viable.
2. Not enough research that is relevant to local (WA) conditions.

Evidencing the economic benefits of Regenerative Agriculture is considered a key priority

The type of information that is needed to determine economic viability at the pre-planning stage includes:

Weighing up the initial start-up costs:

Understanding the initial outlay of costs needed to start the process of transitioning into RA practices.

Outlining the short and long term benefits/risks:

Unpacking the various benefits and risks (from practicing regenerative farmers) for key stakeholders to learn from and make informed decisions of their own. This includes the short and long term benefits/risks, and what changes the land will undertake in this transition.

Evaluating the minimising of input costs:

Understanding the changes in costs when minimising the use of inputs within the farm.

Assessing the practical changes that need to be made:

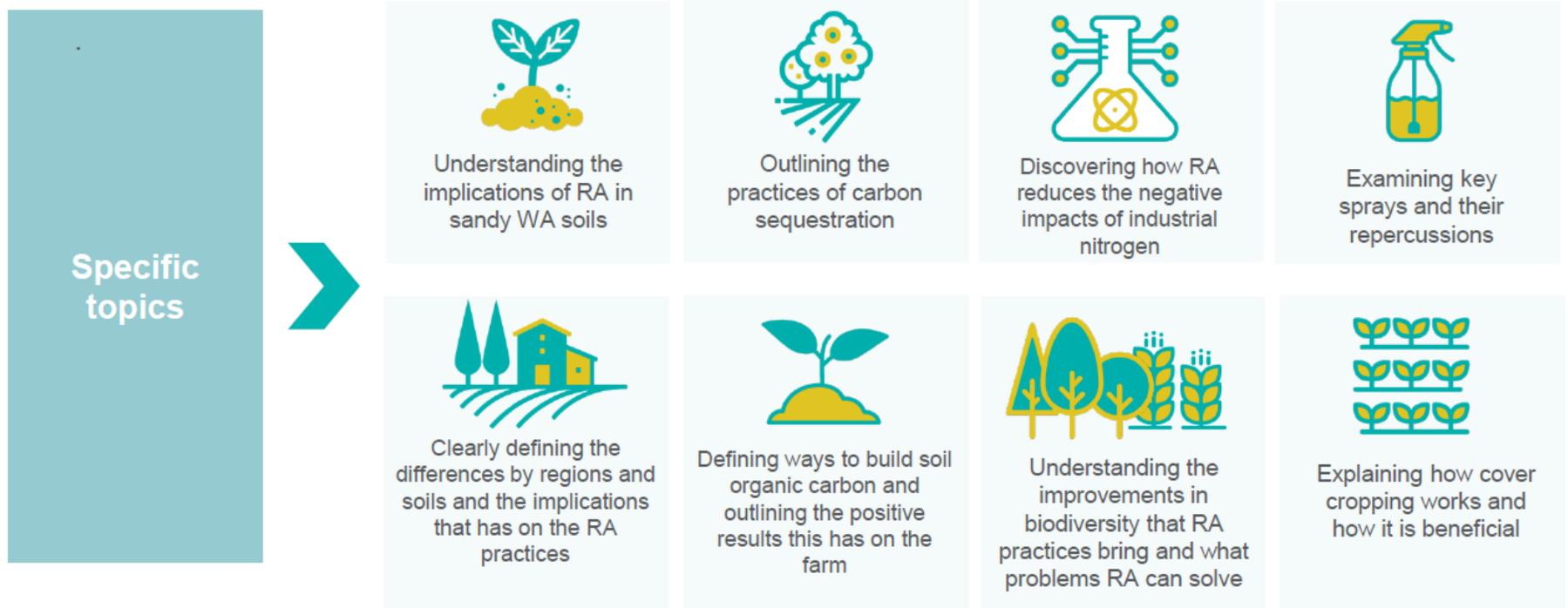
Outlining the changes to their practices and equipment that need to be implemented for primary producers to begin practicing Regenerative Agriculture.

Most would like to see this presented in case study format (locally relevant examples)

It is important to set realistic expectations and for farmers to be aware of the potential short term risks/challenges they may face as part of the transition. Otherwise this can result in misinformed opinions, views and implementation of Regenerative Agriculture practices.

Stakeholders most commonly suggested the following research topics

The key priority is ensuring that any research undertaken is **relevant to local (WA) conditions**, which are distinctly different to other parts of Australia and the world. This can clearly show what problems RA can solve – both how and where.



Stakeholders recognised that some of these topics have already been or are currently being researched so it is important not to repeat what is already available. For example DPIRD is currently working on case studies, Bioscience has conducted soil research for SWCC and Southern Dirt has a Federal grant to look at farming practices to determine if they are regenerative.

Other Considerations in the Adoption of Regenerative Agriculture



The need for a coordinated approach to sharing information about RA



While there wasn't a clear view on who should take overall responsibility, Government and NRMs are both seen to have a key role to play

Farmers are commonly sceptical about climate change

The agriculture sector is considered one of the biggest emitters of CO₂, however there is a widely held view that farmers are sceptical about climate change. Some claim these issues have been around for years and that the evolution of a climate crisis is a fraud.

With that being said, those that support Regenerative Agriculture believe that the outcomes of RA – putting carbon back in the soil, improving the resilience of a farm to harsher conditions - can help farmers withstand climate related challenges.

These attitudes towards climate change suggest that communicating a direct connection between RA and climate change may not be a relevant motivator for farmers to adopt RA practices.



“ The same questions around climate change and whether it exists still get asked from 100 years ago – it’s the same conversation.
[Primary Producer] ”

“ Whether you’re a sceptic or disciple, we have a changing climate. COVID-19 overshadowed climate change. Our attention has been drawn to this but still looming in the background is climate change. Agriculture at the end of the day is still one of the biggest emitters of carbon dioxide.
[Primary Producer] ”



Knowledge can be gained from traditional owners of the land

Some stakeholders talked about the opportunity to learn from Aboriginal people and the connection between their culture and land. Their food harvesting practices are driven by adapting to local environments that work alongside natural processes. Known as the 'true stewards' of the land, their relationships between 'people' and 'place' is what drives a sustainable model to be learned from.

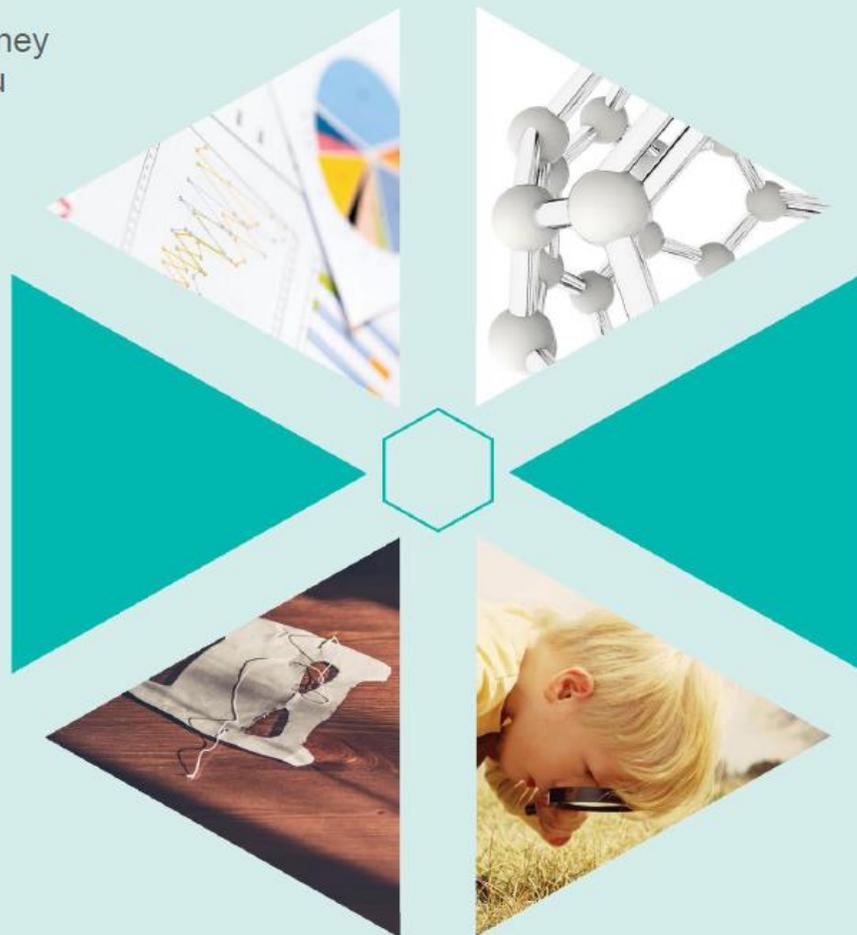
The Aboriginal culture demonstrates the benefits of embracing place-specific practices that align to the land and climate.



“ I like the Indigenous approach – 6 or 7 seasons – it's intuitive. We need to be in touch with our seasons, intuition that fits with each soil and climate.
[Agency Staff] ”

“ There are some great opportunities to work with the Indigenous in this sense. It would assist in a really good practical context.
[University Researcher] ”

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6. Quantitative Research Insights

6.1 Survey methodology

The survey questions were developed by the project proponent, the South West Catchments Council, and reviewed by the other six NRM regions in WA. The full questions are provided in Appendix 1.

Survey Monkey (<https://www.surveymonkey.com/>) was used for this survey and all seven NRM regions publicised the survey through their mailing lists with >2000 recipients, and through their websites, Facebook and Twitter accounts. Staff were also asked to use hard copies of the survey when they attended meetings and events with stakeholders in order to collect responses.

In total, 226 responses were received for the seven NRM regions in Western Australia (WA). This represents a 2.6% response rate based on the number of all primary producers in WA, i.e. there are around 8700 farmers and pastoralists in WA (<http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/wa#agricultural-sector>).

NRM region	# Responses
Rangelands NRM	29
Northern Agricultural Catchments Council	15
Wheatbelt NRM	14
Perth NRM	12
Peel-Harvey Catchment Council	35
South West Catchments Council	65
South Coast Natural Resource Management	39
Region not-specified	17

The confidence level (<https://www.checkmarket.com/sample-size-calculator/>) for this response rate is 6.4% with a 95% level of confidence. For example, this would mean that there is a 95% chance that between 69.6% and 81.4% of farmers with some understanding of RA would have the same viewpoint as the respondents, if 75% of respondents said they had a particular viewpoint.

6.3 Key findings

The results of this survey should be interpreted with an awareness that the responses indicate more respondents were farmers predisposed towards regenerative agriculture than the NRM Regions' regular engagement with the farming community suggests. This is indicated by the fact that:

- A majority of respondents (80%) practice some form of regenerative agriculture on their properties; and
- An overwhelming majority (89%) of respondents believe that regenerative farming should be a priority for support and research by the Commonwealth and State government.

If this is accepted, then for those who are motivated and interested in regenerative agricultural practices, most believe that adoption is limited by a lack of knowledge, lack of evidence from on-ground trials (particularly findings relevant to WA conditions) and by insufficient data on costs, benefits, risks and profitability. Farmers also do not just want the 'why' but currently the vast majority lack the knowledge of 'how' to transition to regenerative agriculture. Many respondents also believe farmers will need financial assistance to transition.

Somewhat incongruously, respondents believe regenerative practices are not inherently risky. Yet 30% are 'neutral' and 10% 'disagree' or 'strongly disagree' regenerative agriculture increases profitability and 55% 'agree' or 'strongly agree' that regenerative agriculture implementation costs for farmers are too high.

Insights	% of respondents 'agree' or 'strongly agree'	% of respondents 'neutral'	Research Statement about regenerative agriculture
Respondents believe RA provides multiple benefits *	82%	11%	Will improve future sustainability
	75%	19%	Provides greater marketing opportunities
	71%	20%	Makes farm less susceptible to climate change
	65%	28%	Reduces costs of production
Don't just want the 'why', need the 'how' to implement	87%	6%	Farmers may not know how to transition to RA practices
Overwhelmingly want more local evidence	91%	3%	Farmers need more information on RA practices
	90%	5%	Local trails and demonstrations are needed
	86%	6%	Farmers need more proof that these practices perform
A relatively high number may be unsure about profitability	60%	30%	Increases profitability
	55%	26%	Implementation costs are too high for farmers
Many believe farmers will need financial assistance to transition	50%	28%	Farmers require some form of support to cover potential losses in transition
	41%	33%	Farmers require financial support to transition

** Caution: an administrative oversight in developing the survey saw the inclusion of an introductory paragraph suggesting the benefits of regenerative agriculture before asking questions of respondents.*

6.5 Analysis of verbatim comments

In total, 271 verbatim comments were received from respondents and these have been provided, grouped into broad categories within Appendix 3.

Verbatim comments supported the other research findings in identifying the most important barrier to transition to RA to be the lack of knowledge and farmers' very limited understanding of the costs, risks and benefits of transitioning. The reluctance of farmers to change the way they farm was also identified as a significant barrier.

The most valuable insights provided by verbatim comments pertain to:

- The lack of definition or inconsistent understanding of the term regenerative agriculture
- That many believe RA is not a distinct genre but is in fact best practice agriculture
- That the current agronomic model struggles to evolve due to the existing financial paradigm
- That the current agronomic model struggles to evolve given the vested interest of influential organisations to retain the status quo, particularly from the industries of agrochemicals, farm machinery, financial services, and by exertion of their influence extends to agronomy and tertiary institutions and researchers.

Interestingly, where the first three insights above are supported by findings of the qualitative study within this report, the issue of companies with vested interest supporting the status quo did not come up in that research. A notable difference in sample is that these verbatim comments are largely from farmers already interested in and/or practicing RA, while the qualitative study sought a view from both supporters and detractors of RA and a far wider range of stakeholders including amongst others representatives of financial services organisations, agronomists and university researchers.

Example verbatim comments relating to each insight are given below.

Regenerative agriculture lacks definition / a shared understanding

“(The issue is) knowing what regenerative farming is. Is it a defined set of practices or just the latest in a long line of trendy synonyms? I suspect you could ask 20 people to list regenerative farming practices and you won't get 2 lists the same.”

“There is no Definition of Regenerative Ag, one person's perspective is different to another person's perspective. For example, controlled traffic, liming, deep ripping, ploza ploughing are all helping the soil, should this be under the regenerative banner vs the cover crop, compost fert, worm juice etc. There are some ok operations, but there are some terrible regenerative operations who say it is regenerative, but really, they are just farming badly. So, a definition would be good and all-inclusive of good farming practices.”

“The problem with "regenerative" or "sustainable" titles is that they unintentionally belittle those that don't "embrace the philosophy" even if they practise it themselves.”

Regenerative agriculture is best practice agriculture – we’re doing it already

“Farmers have access (to) and experience (of) large amounts of data, and most have trialled many options. I attended ANU's launch of sustainable ag in Melbourne and there was a large detach from reality and the desire to build another sector. This is one of the most damaging initiatives attempted to be launched, it is with the best intentions but needs a reality check.”

“I'm not a "regenerative" farmer, but my management ethos is one of constant improvement, strengthening resilience to tough conditions, flexibility in management decisions and land use, all done with an eye on the environment that I farm in.”

“Conventional farmers in WA pioneered and adopted min and no-till which is a global benchmark now.”

Current agronomic model – financial paradigm

“Many farmers are locked in with heavy repayments for machinery and therefore the need to grow lots ... in the safest way they know how.”

“(Farmers) are also stuck in a cycle of high inputs where they cannot change practices for fear of a failed season. Also, the massive financial gains of good seasons with high input systems may prevent landholders thinking of the future benefits of regenerative practices.”

“Farmers who are indebted to conventional supply chains.”

Current agronomic model – organisations seeking to retain status quo

“Current interests want to maintain the current systems - Agrochemical Industry as well as established farmer groups, banks, universities. DPIRD and so on ... And of course, the current system returns a hefty profit to the agrochemical industry as well as farm machinery manufacturers, importers and retailers ... Current farming culture works by adhering to what has worked in the past, influenced by marketing of large corporations.”

“The mindset within agriculture created by the corporate businesses that control the current input in agriculture. An information bubble has been created around farmers, research and education institutions.”

“Brainwashing by chemical companies making farmers believe that they need herbicides and heavy use of fertilisers in order to be profitable.”

“Mainly the fact that (farmers) are constantly bombarded with very skilled marketing by companies selling products that are counterproductive. These guys are very good at bypassing farmers discernment by presenting their products as best practice, when often it is the opposite ... there is many times more information put in publications etc from vested commercial interests

and this swamps farmers with what is essentially anti-regenerative farming propaganda.”

“Most agronomists push /recommend high usage of chemicals fertilisers...Good marketing by large chemical and fertilizer companies also inhibits farmers having the confidence to be brave and look at alternative farming practises.”

“Opposition and misinformation from vested interests and key influencers (e.g. agronomists working for fertilizer/chemical companies).”

The verbatim comments also provided good additional suggestions for trial development, including:

1. Trials need to not just provide data on regenerative practices, but must compare the performance to conventional agriculture:
“Comparisons between production systems (including the science and the economics) is required and the terminology needs to be inclusive.”
2. They must address the zero input issue:
“Differing ideas of what is regen (some believe it is about zero inputs - which is not sustainable for production).”
3. Some trials must be done on sites where regenerative agriculture has been practiced for some time:
“We have set up a trial on a site that has been regenerative ag for 60 years, preliminary results are showing just how far reg ag had degraded the soils productive capacity.”

The verbatim results were also analysed for the number of times key words occurred that could be linked to identified barriers. The results are provided below.

Barrier / Issue	Number of times identified	Combined Weighting	% of responses identifying the barrier
Lack of <u>knowledge</u>	49	145	54%
Lack of <u>understanding</u>	18		
Lack of <u>information</u>	17		
How to <u>implement?</u>	16		
What are the <u>benefits?</u>	15		
Effect on <u>income?</u>	7		
Effect on <u>production?</u>	24		
Fear of <u>change</u>	53	90	33%
<u>New / different / unknown</u>	37	77	28%
<u>Cost</u> is prohibitive	44		
Is it <u>profitable?</u>	22		
<u>Financial</u> risk	11	50	18%
Need for <u>trials / demonstrations</u>	24		
Lack of <u>proof / evidence / science</u>	26	38	14%
<u>Conventional</u> agriculture is the norm	30		
Reliance on <u>chemicals</u>	8	19	7%
Need for <u>support</u>	19	19	7%
Lack of <u>time</u>	16	16	6%

Interestingly, in verbatim comments the need for support and for trials and demonstrations did not come through as strongly as earlier in the study, where 90% of respondents ‘agree’ or ‘strongly agree’ local trials and demonstration are needed. It should also be noted that the lack of knowledge/understanding identified as a barrier implies that there is a need for reliable information that is based on solid scientific trials, demonstrations and training.

6.7 Profession of respondents

In total, 75% of the 226 respondents identified themselves as being farmers (Fig.1), with only 25 being either Landcare professionals or government agency staff (31 did not provide this information). This is a good representation of the key stakeholder group that was being targeted, i.e. farmers.

The identity of respondents broken down by region is shown in Appendix 2 and reflects the demographics of each region, i.e. mixed farming in the Northern Agricultural and Wheatbelt regions, pastoralists in the Rangelands, smallholders in Perth and mixed farming in all other regions (Peel-Harvey, the South West and South Coast).

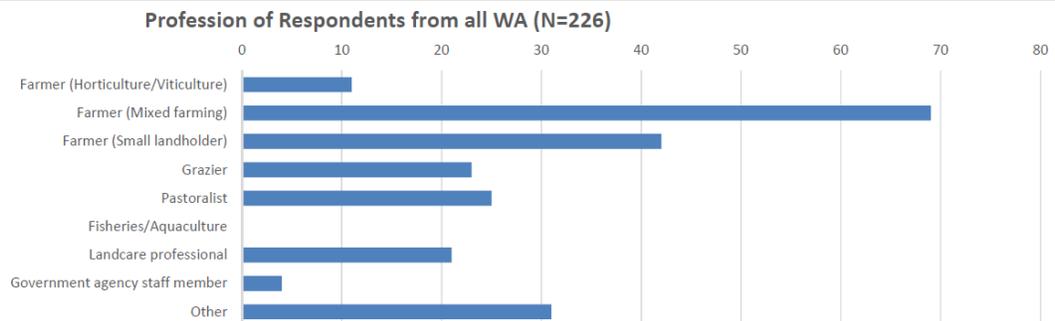


Figure 1 – Identity of Respondents

6.8 Numbers practising regenerative agriculture

Q: “As a land manager, do you implement sustainable farming / regenerative farming practices?”

Responses 220

Around 80% already use regenerative farming practices some, or all, of the time (Fig.2), which shows that the majority of respondents already embrace the concept and have begun to implement some of the practices. The responses to the following questions should therefore be understood as insights from people who are currently interested in, or are exploring the potential of RA.

Q: As a land manager, do you implement sustainable farming / regenerative farming practices?

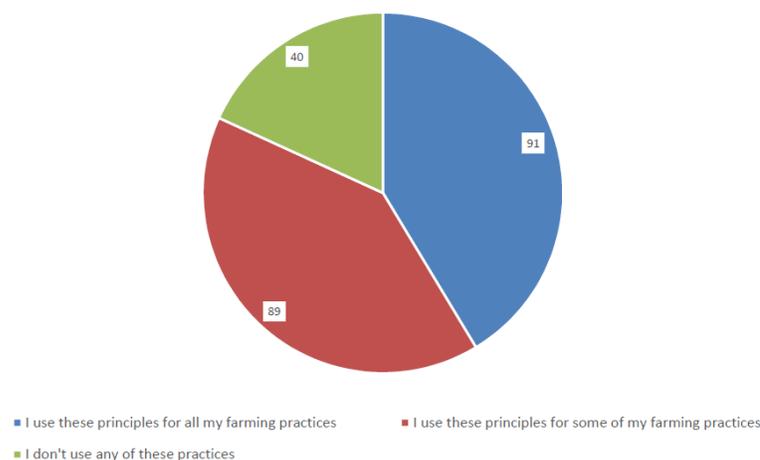


Figure 2 – Farming practices utilised by respondents

6.9 Is regenerative agriculture considered a priority

Q: "As a land manager, should regenerative farming be a priority for support and research?"

Responses 221

Around 54% considered regenerative farming should be the most important priority for support, with another 36% considering it to be a priority (Fig.3).

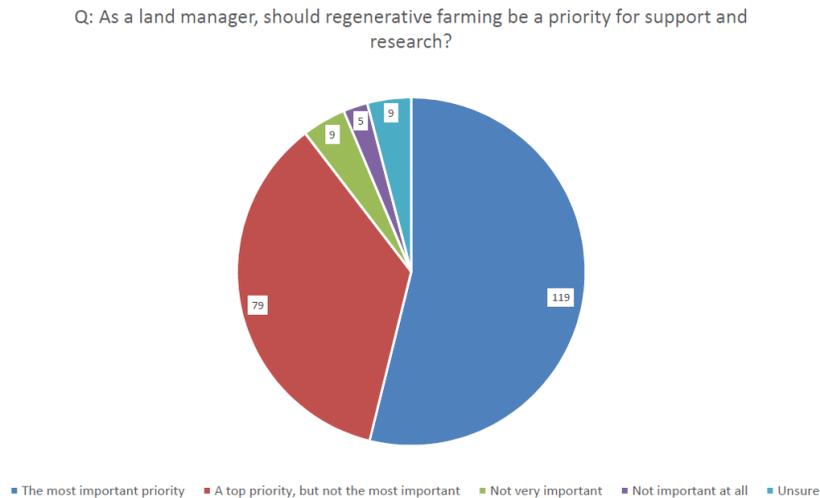


Figure 3 – Support and research priorities

6.10 Quality or Quantity – which is a priority

Q: "As a land manager, I believe that a farm should prioritise the production of?"

Responses 220

Around 68% considered that farmers should produce both a high-quality product but also maximise production, while another 29% believe that producing as high a quality product as possible should be a priority (Fig.4). Very few (3%) believed that producing as much as possible should be the priority for farmers.

Q: As a land manager, I believe that a farm should prioritise the production of?

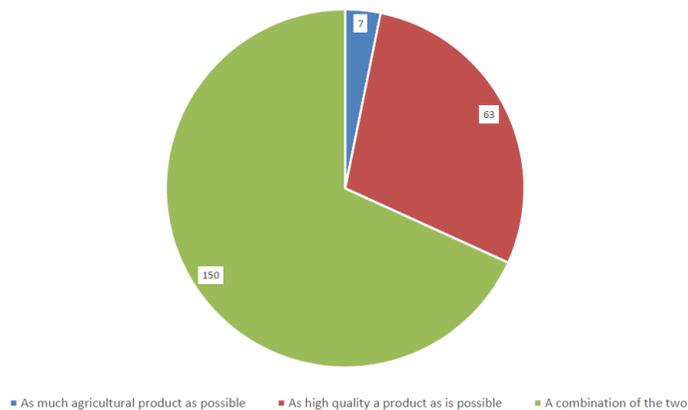


Figure 4 – Production priorities

6.11 Understanding of the concept

Q: “Do you know what regenerative agriculture is?”

Responses 222

Almost 86% indicating they did. (190 respondents; Fig.5). This is in strong contrast to views collected by the co-author when talking with farmers across the South West NRM region, where it became very clear that most farmers do not fully understand what regenerative farming is. This contrast further highlights that the survey results are most appropriately interpreted as views of producers who are currently interested in regenerative agriculture but who may lack the necessary information to implement particular practices more fully.

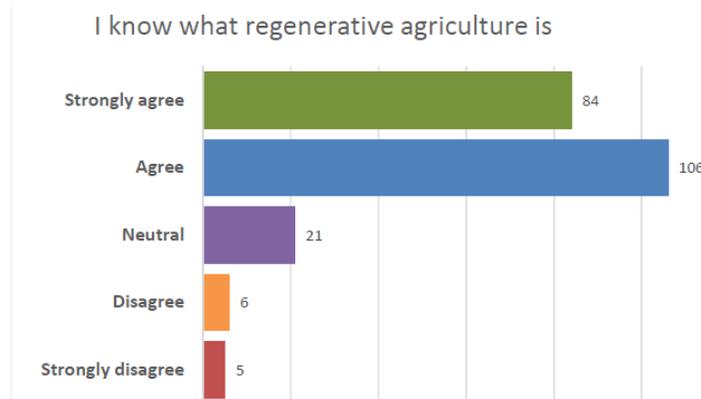


Figure 5 – Understanding of the concept

6.12 Embracing the concept

Q: “Do you like the concept of regenerative agriculture?”

Responses 224

Almost 88% indicated they did (197 respondents; Fig.6). This again indicates that the survey results reflect the views of those who are already supporting or actively engaged in regenerative farming practices.

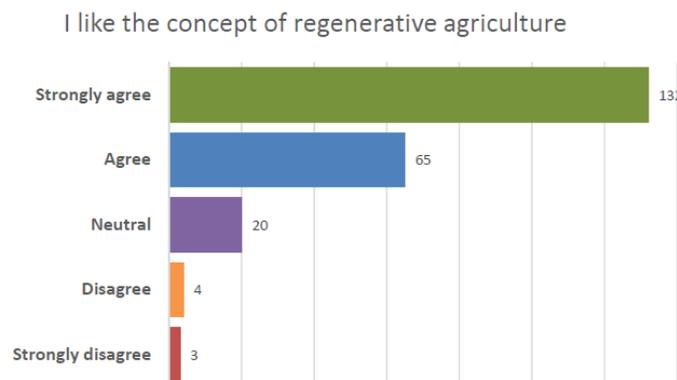


Figure 6 – Support for the concept

6.13 Perceived benefits of regenerative agriculture

Questions asked:

- 1) whether they believed that regenerative agriculture practices improve sustainability,
- 2) whether the practices would offer marketing benefits,
- 3) if the practices would reduce costs of production, and
- 4) whether implementing these practices would improve plant and soil health.

Responses 223

Respondents overwhelmingly believed that regenerative farming practices brought a range of benefits to practitioners.

Almost 82% indicated that the practices would improve the future sustainability of farming (182 respondents; Fig.7) while 75% thought that the practices would provide marketing benefits to practitioners (167 respondents; Fig.8).

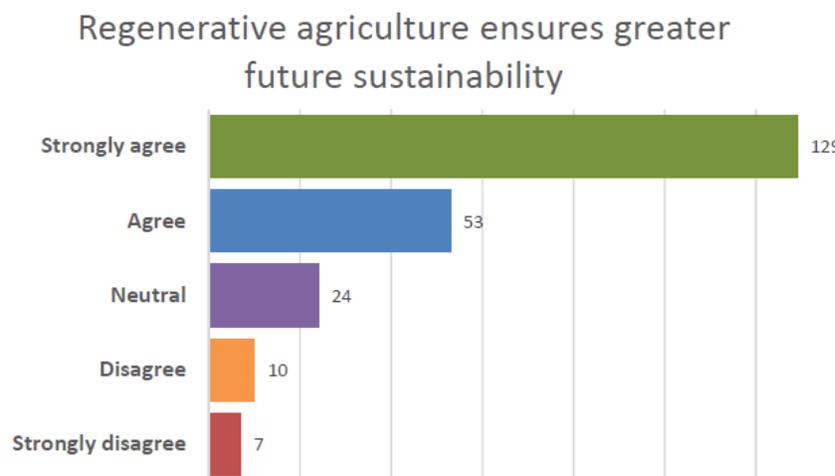


Figure 7 – RegenAg and sustainability

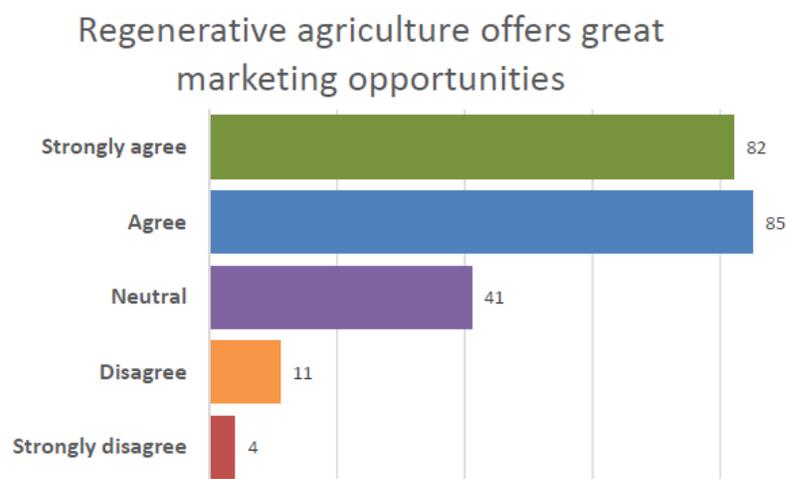


Figure 8 – RegenAg and marketing

Two-thirds of respondents also believed the practices would reduce costs (65% or 145 respondents; Fig.9) while almost 91% believed the practices would increase plant and soil health (202 respondents; Fig.10).

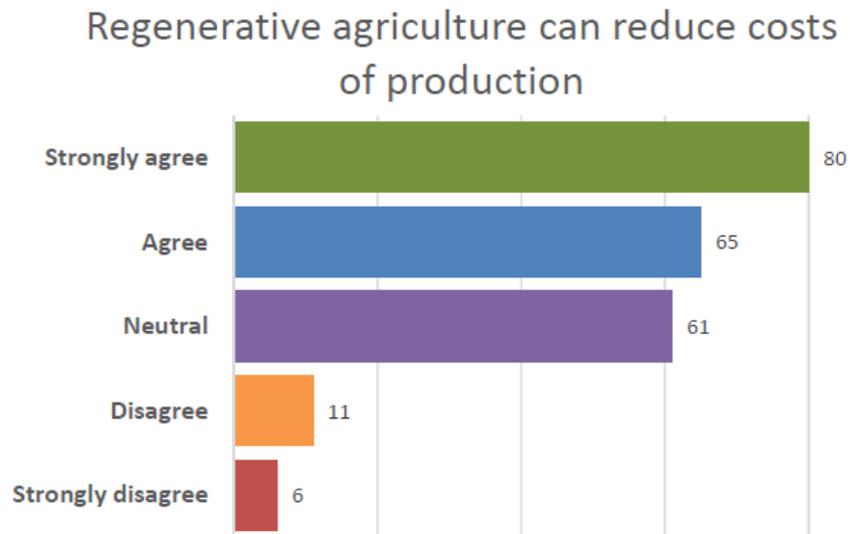


Figure 9 – RegenAg and costs of farming

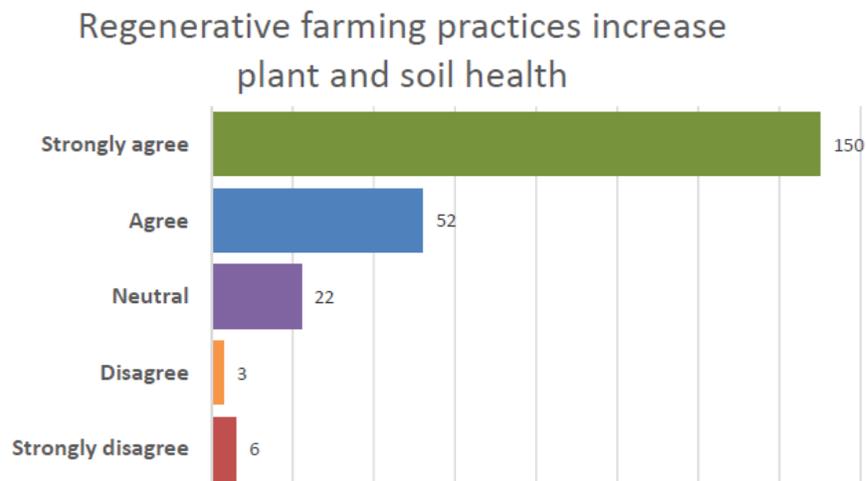


Figure 10 – RegenAg and plant/soil health

Just over half of the respondents believed the practices would increase profitability (60% or 132 respondents; Fig.11), although 30% were 'neutral'. Almost 71% believed the practices would make farming less susceptible to climate change risks (159 respondents; Fig.12).

This key finding highlights the importance of future work to quantify impacts on profitability as a lack of data, or a lack of awareness of data, on profitability may be a significant constraint to wider adoption of regenerative agriculture. This is discussed in more detail later.

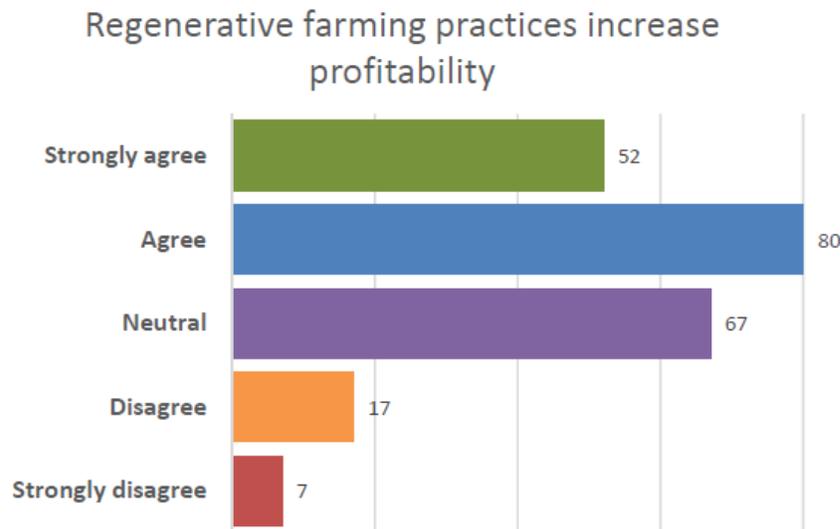


Figure 11 – RegenAg and profitability of farming

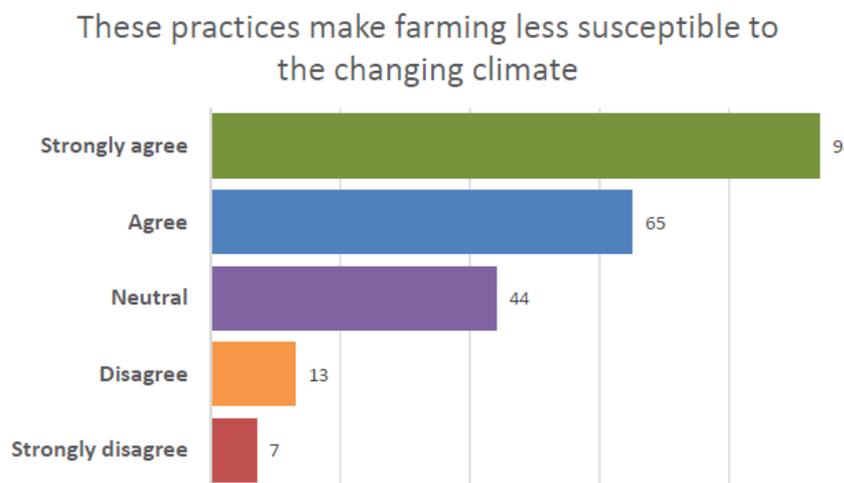


Figure 12 – RegenAg and plant/soil health

6.14 Perceived negative sides to regenerative agriculture

Respondents were asked:

- 1) if they 'see regenerative farming practices as being unacceptably risky for farmers';
- 2) whether adopting such practices will change farming systems too much;
- 3) if adopting such practices will make farming less profitable;
- 4) whether implementing these practices is feasible under real farming conditions;
- 5) if regenerative farming is too complex and risky for farmers;
- 6) if the costs of switching practices would be too high;
- 7) whether they thought the practices were economically viable; and
- 8) if it would cost too much to implement.

Responses 221

Respondents generally believed that regenerative farming practices would not have significant negative impacts on practitioners.

Almost 67% indicated that the practices were not unacceptably risky (148 respondents; Fig.13), 22% 'neutral'. 68% thought that the practices would require significant changes to farming systems (151 respondents; Fig.14), 25% 'neutral'.

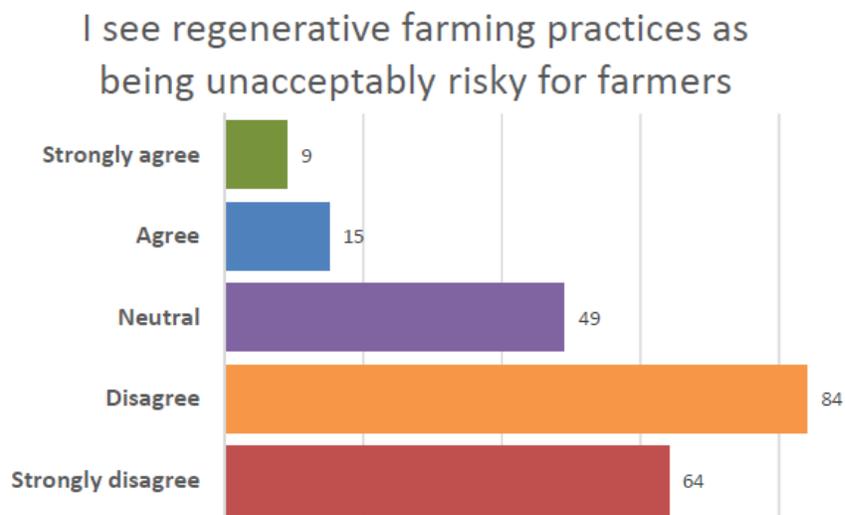


Figure 13 – RegenAg and risk

Adopting such practices will change farming systems too much

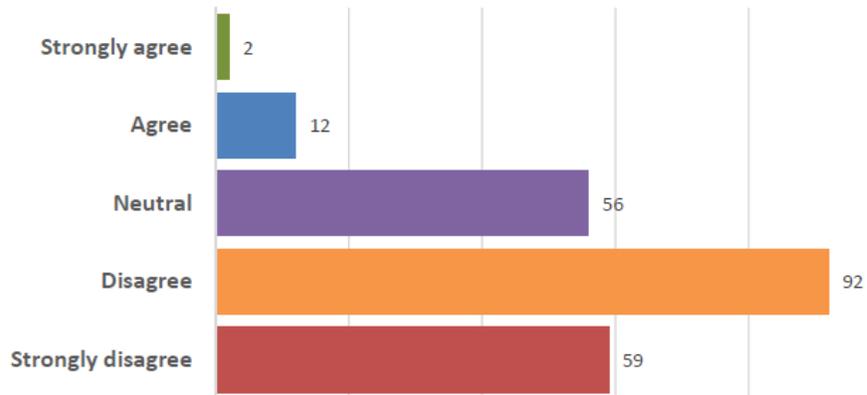


Figure 14 – RegenAg and farming systems stability

Respondents also believed the practices would not reduce farm profitability (62% or 137 respondents; Fig.15), 25% 'neutral', while 70% believed the practices were feasible under real-life conditions (156 respondents; Fig.16).

Adopting such practices will make farming less profitable

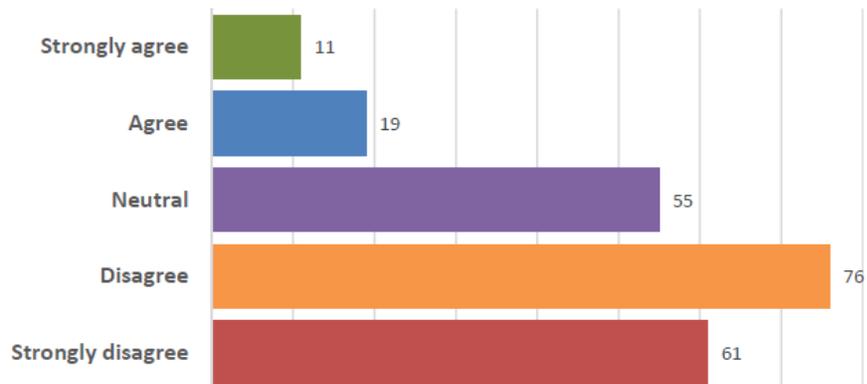


Figure 15 – RegenAg and profitability of farming

Regenerative farming practices are not feasible under real farming conditions

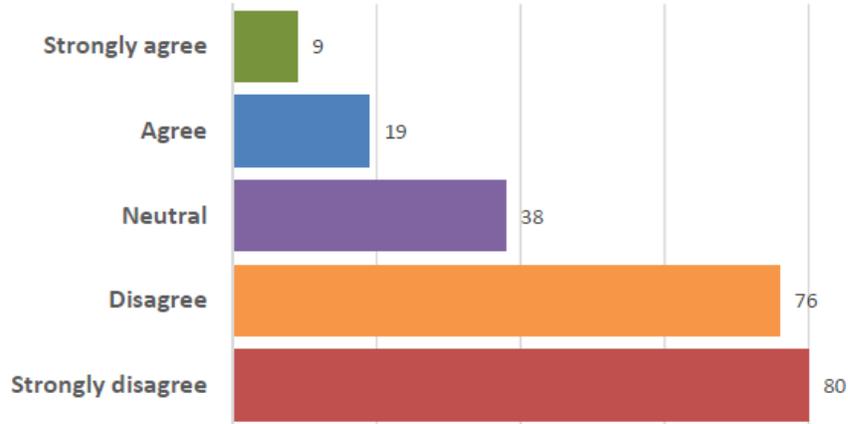


Figure 16 – RegenAg and feasibility

Respondents felt that adopting the practices was neither too complex nor too risky for farmers to adopt (75% or 166 respondents; Fig.17) and around half believed that the cost of implementing the practices would not be too high for farmers (54% or 121 respondents; Fig.18), 26% 'neutral'.

Regenerative farming is too complex and risky for farmers

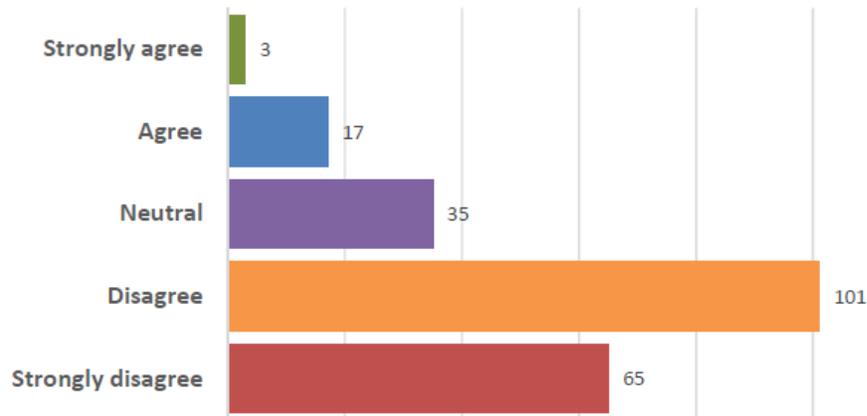


Figure 17 – RegenAg and risk

The cost of implementing such practice changes will be too high for farmers

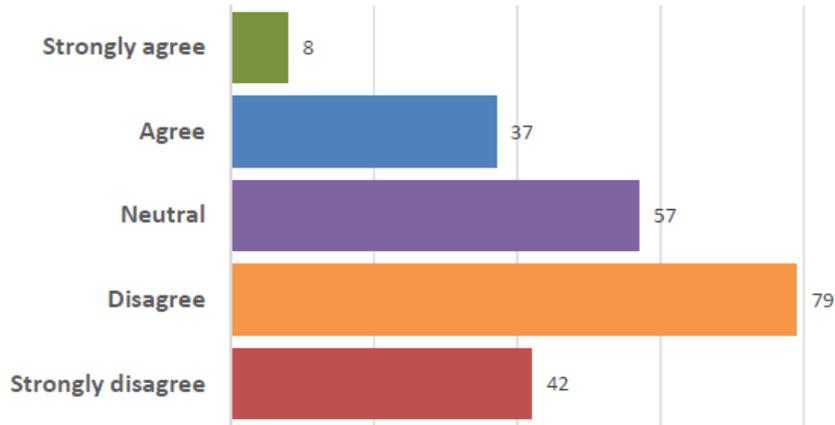


Figure 18 – RegenAg and implementation costs

Around half of respondents felt that the economics of adopting the practices did stack up (51% or 114 respondents; Fig.19) while slightly more believed that the cost of implementing the practices would not be too high for farmers (55% or 121 respondents; Fig.20).

Uncertainty on the effect on profitability is apparent, with a significant proportion of respondents reporting neutral or negative views on the economic feasibility of regenerative agricultural practices.

The economics of the new practices don't stack up

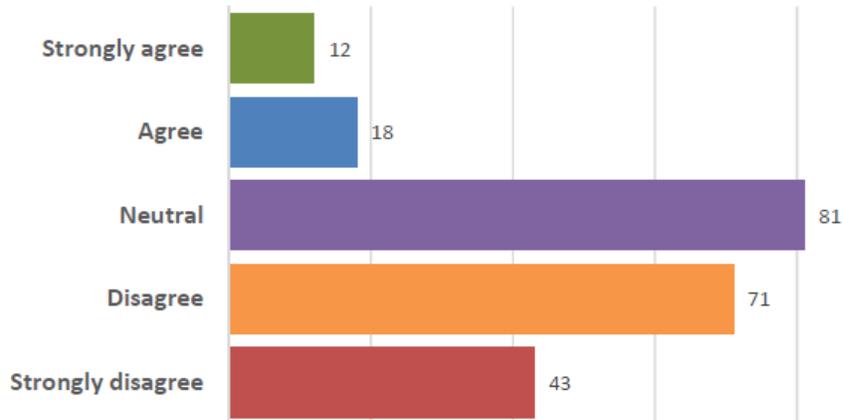


Figure 19 – Economics of the practices

It will cost a farmer too much to implement

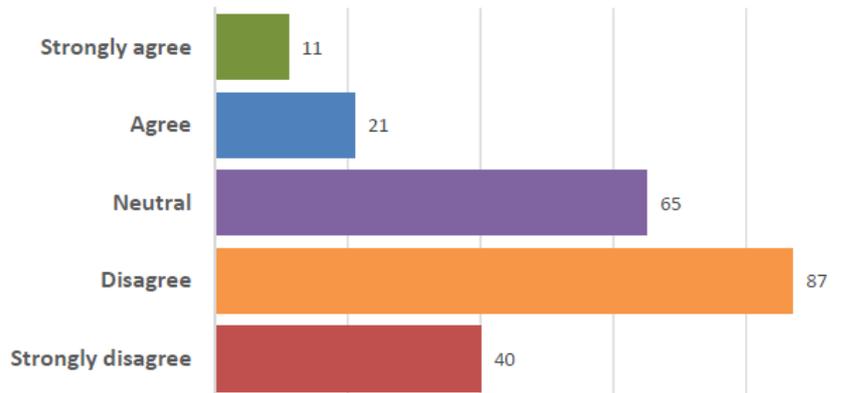


Figure 20 – Costs of implementation

6.15 What is required to support adoption

Respondents were asked whether:

- 1) farmers would need more information on practices;
- 2) farmers need more proof that these practices perform;
- 3) local trials and demonstrations are needed;
- 4) farmers know how to make the transition to these new practices;
- 5) farmers need to know what practices are associated with regenerative agriculture;
- 6) farmers need to know what works;
- 7) do farmers require financial support to transition; and
- 8) is support required to cover potential losses while transitioning?

Responses 221

Respondents generally believed that a lack of knowledge about regenerative farming practices was a key hurdle. Firstly, 91% indicated that farmers needed more information (202 respondents; Fig.21) while 86% thought farmers needed proof that the practices perform (191 respondents; Fig.22).

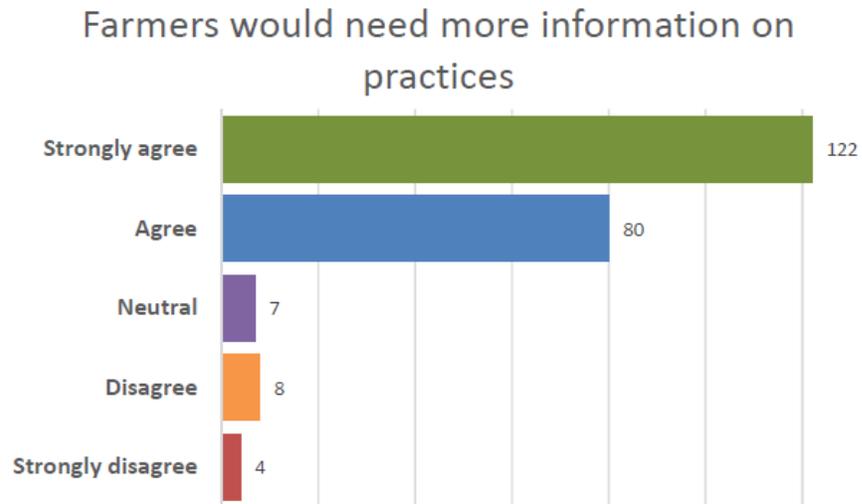


Figure 21 – Information requirements



Figure 22 – Show me it works

A clear majority of respondents also believed that local trials and demonstrations of the practices are required (90% or 200 respondents; Fig.23) while 87% believed farmers do not know how to make the transition to using these practices (194 respondents; Fig.24).

Local trials and demonstrations are needed

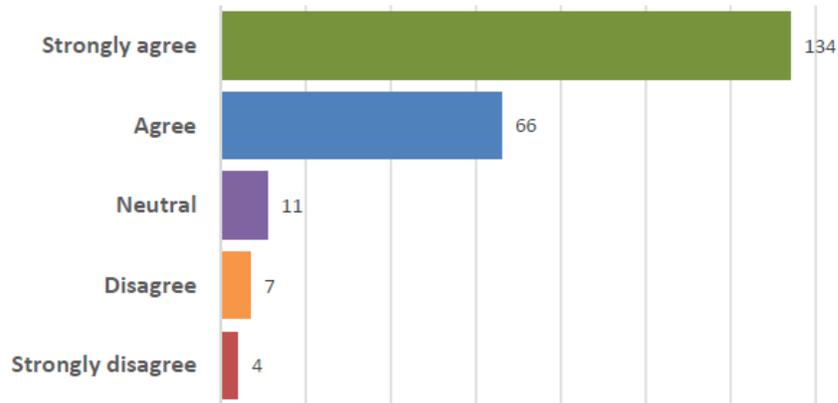


Figure 23 – Need for trials and demonstrations

Many farmers may not know how to make the transition to these new practices

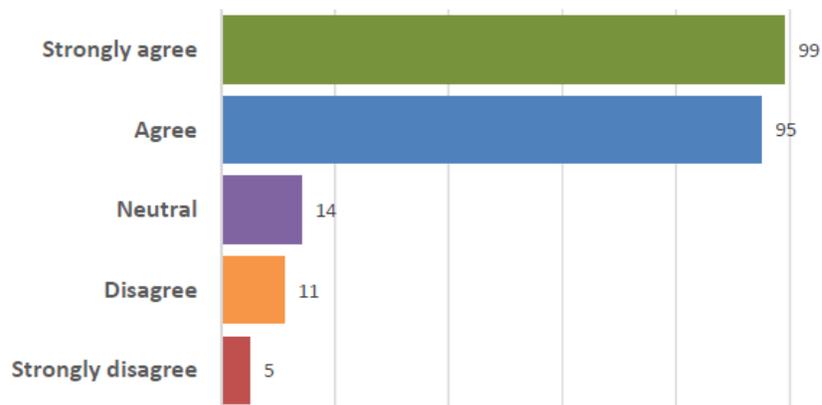


Figure 24 – Making the transition

Similarly, a clear majority of respondents felt that the practices associated with regenerative farming are not well known (94% or 209 respondents; Fig.25) while about two-thirds believed that farmers need to know more about what works (71% or 159 respondents; Fig.26).

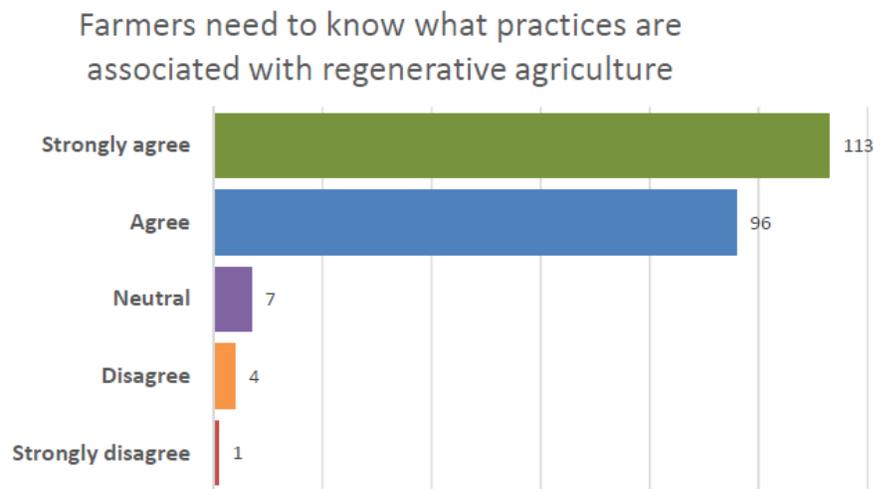


Figure 25 – Practices need to be identified

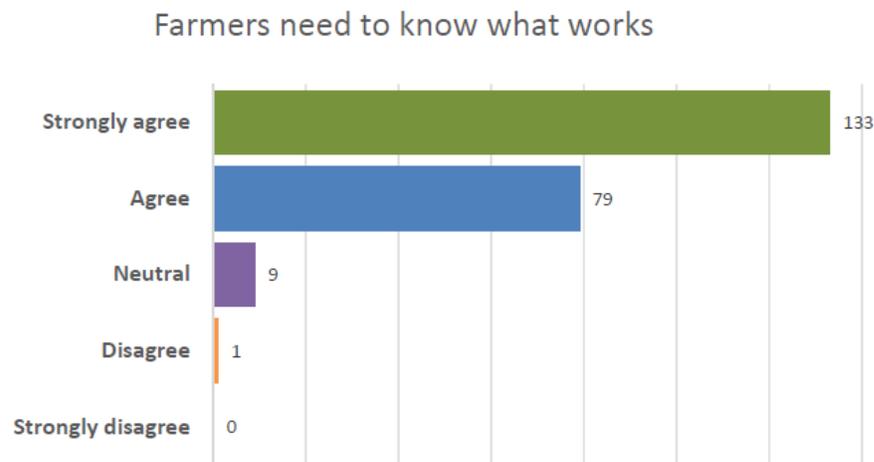


Figure 26 – Need to know what works

A divided response was provided to the questions about the requirements for support, with 41% believing that farmers would require financial support to transition (92 respondents; Fig.27) but a third 'neutral'. 50% believe that some form of support to cover potential production losses would be required (111 respondents; Fig.28), 28% 'neutral'.

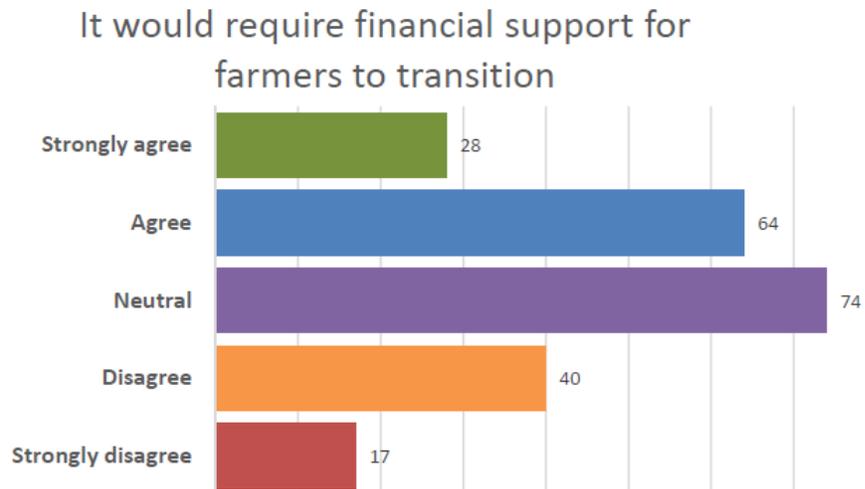


Figure 27 – Need for financial support to implement

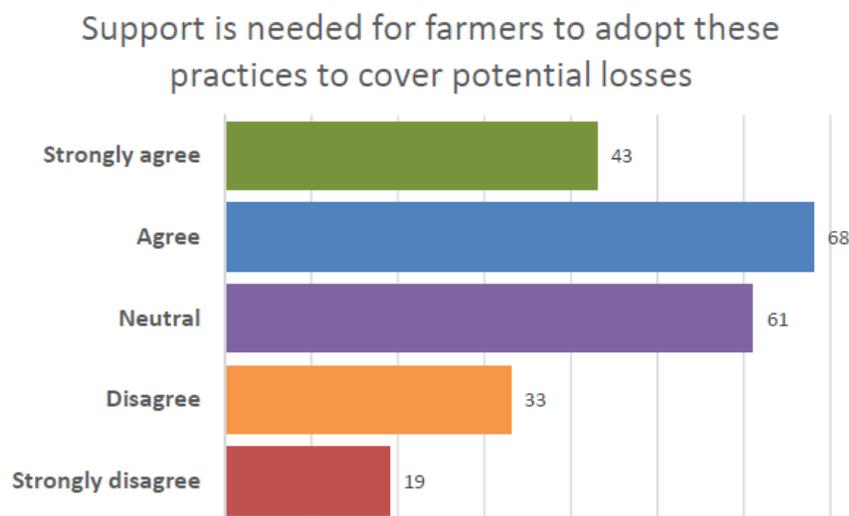


Figure 28 – Need for financial support to cover losses

6.17 Soil carbon

Respondents clearly believed that they had a good understanding of soil carbon and its benefits (85%; 189 respondents; Fig.29), while almost half believed that farmers generally did not know whether or not their own soil carbon was declining (103 respondents; Fig.30) – likely reflecting the skew in respondents to farmers already practicing regenerative agriculture.

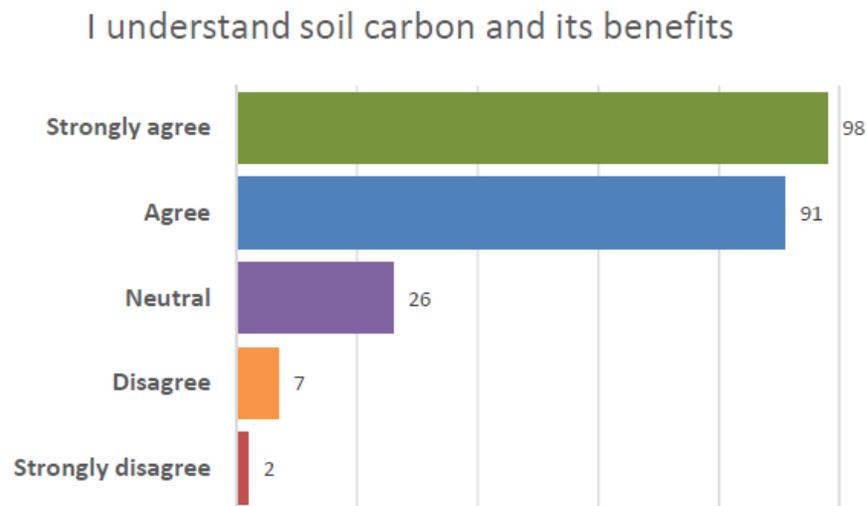


Figure 29 – Respondent’s understanding of soil carbon

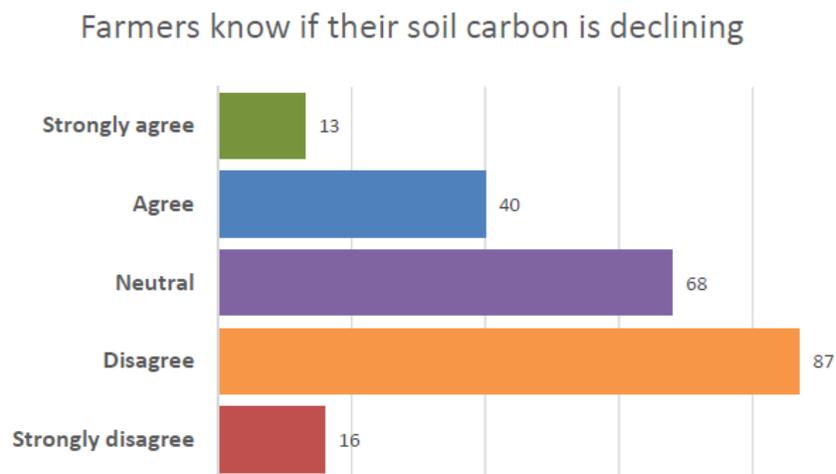


Figure 30 – Farmer’s understanding of soil carbon

7. Supplementary information

7.1 The feasibility of getting farmers to adopt new practices – a mini-desktop review

“Innovations are more likely to be adopted when they have a high ‘relative advantage’ (perceived superiority to the idea or practice that it supersedes), and when they are readily trialled (easy to test and learn about before adoption)” and

“Non-adoption or low adoption of a number of conservation practices is readily explicable in terms of their failure to provide a relative advantage (particularly in economic terms) or a range of difficulties that landholders may have in trialling them.” Pannell et al (2006) ⁴.

This is very pertinent to the discussion here, particularly given the difficulties experienced getting farmers to adopt better fertiliser management decisions based on over 50 years of in-depth research (Gourley et al (2007) ⁵, highlighted by the generally low uptake from “the time to lime”, a long-lasting campaign, and the fact that many farmers don’t understand the importance of inoculating legumes while expecting that the system should produce enough nitrogen without, and then add fertiliser N because it doesn’t (exacerbated by seed suppliers not suggesting and explaining inoculation). So, it appears that while the information is there, it is not taken up as it should be. This supports the notion that it is difficult to extend new practices, even more so when there is a clear lack of scientific evidence and confidence, with resultant risks for agencies, consultants and the farmers when providing advice based on an almost non-existent long-term evidence base ⁶.

⁴ Pannell, DJ, GR Marshall, N Barr, A Curtis, F Vanclay and R Wilkinson (2006) Understanding and promoting adoption of conservation practices by rural landholders. Australian Journal of Experimental Agriculture 46(11) 1407-1424 www.publish.csiro.au/an/ea05037

⁵ Gourley, CJP, AR Melland, RA Waller, IM Awty, AP Smith, KI Peverill and MC Hannah (2007) Making Better Fertiliser Decisions for Grazed Pastures in Australia. Department of Primary Industries, The State of Victoria. www.ccmaknowledgebase.vic.gov.au/soilhealth/soils_resource_details.php?resource_id=3297.

⁶ **Feedback from an agronomist reviewer:** Also interesting is that when there are field days, seminars etc on “alternative” points of view many of the same people seem to attend. New blood appears to be limited, although that may be changing a little now. Unless something concrete, demonstrable and doable is spelled out, many go away somewhat disheartened, and then you start to lose them. I’ve often heard, over many years, that “the theory is fine, but no one tells us how to get started, what to do/how to achieve it”. When demonstrable and doable is showcased, there seems to be little follow up of attendees. Did they or did they not use the information, and if not, why not? I have worked with farmers for over a decade who are now considered “progressive”, and although many practices have changed and are considered regen, some significant hurdles still remain in reducing chemical use. It’s always a fall back crutch – even if it’s not really required, its perceived as something that works, and this is something that’s been drummed into them over decades. Reducing fertiliser inputs is a lot easier! These farmers are few and far between. It’s a bit like David and Goliath, with the farming institution being Goliath, at the moment we (David) may have the sling, but not the stone. The stone is the “how to do it”. I believe that until we have some of these practices and principles written in stone from real successes, we won’t make any progress. Even so, as you say, practices like FUE hasn’t gained the traction that it should have, even with the huge amount of work done. The first thing many farmers do is still reach for more N. The overuse of N is massive, read somewhere lately that 2% of the world’s energy will be attributed to N production by 2050. This isn’t helped by incorrect advice given by some “agronomists”, the majority of whom are ag sales agents. Noted a few cases of consultant bias in the answers. Interestingly, trust is a huge factor in promoting change, but that doesn’t come without proven results, making small changes and measuring success is so important. A lot of farmers guess or think they see differences when there are none. Contra to that, if farmers are sceptical, they often choose not to own the good results and make excuses for the

One clear message that comes out of the work above is that the difficulties of supporting farmers to adopt new practices should not be underestimated.

Identifying the personal drivers that motivate any individual farmer will be critical in the success of any ongoing program. For example, as one farmer has told a SWCC staff member, *“We are just sick of using chemicals”*. In this situation, an intrinsic motivation to reduce chemical use could be the main driver, so whole-farm economics could be less important than providing practical alternatives to the use of chemicals. Recognising the emotional or social elements is essential, as ‘economic data if provided in isolation will miss the mark for some individuals. This report suggests such individuals comprise a minority group, but undoubtedly they exist.

Similar conclusions have been reported in studies examining farmer participation in ecosystem service payments: *“farmers' willingness to participate in voluntary conservation programmes is influenced by psychological, financial and social factors and these need to be assessed on a case-by-case basis.”*⁷. The following were identified as important to farmer participation:

- non-financial motivations that affect farmer attitudes and values;
- lack of awareness; and
- unavailability of adequate information.

In other studies⁸ into the adoption of ‘best management practices’ that have a strong environmental component, adoption has been linked to conservation and lifestyle motivation that translate into intrinsic motivation, although for financially motivated farmers, an absence of external incentives limits adoption. Clearly *“farmers' willingness to participate ... is influenced by psychological, financial and social factors and these need to be assessed on a case-by-case basis”*.

7.2 Further thoughts from our Agronomist Reviewers

- In most farming enterprises, farming practices generally follow a timeline of predicted activities, e.g. broadacre might include soil preparation, seed dressing (fungicides), seeding, fertilisation, spraying, harvest. This is often prescriptive and “new” information may come from supply agronomists and this regime has been going on for decades with updated guidelines to follow for crop type, etc. A lot of information exists on the suitability of seed varieties, nitrogen applications, chemical use, expected yield/quality and so on, but little is available on RA.

Innovative farmers experiment with inputs (seed/fertiliser/chemicals/biologicals etc) and machinery, but generally business is as usual, although some groups such as the Duli group have been “biologically’ innovative for well over 15 years (farmer driven group that has made good inroads in the Cadoux area).

Moving from the almost regimented type of farming into observation and adjustment farming takes away many, but not all, of the “knowns” and the “hows” and herein lies part of the fear. The instructions for RA in any particular area are neither written on a label, nor are they currently readily available in any other prescriptive form. The answers to the questions

results occurrence. Generally, they are appalling at conducting useful trials. As you have said, this is a very difficult task, and little steps will likely result in more positive change.

⁷ Page G, B Bellotti (2015) Farmers value on-farm ecosystem services as important, but what are the impediment to participation in PES schemes? *Science of the Total Environment* 515-516, 12-19.

⁸ Greiner, R, L Patterson and O Miller (2009) Motivation, risk perceptions and adoption of conservation practices by farmers. *Agricultural Systems* 99, 86-104.

suggest that some farmers are looking for such a prescriptive approach, with known practices, inputs and outcomes. Curiously there seems to be some thought that conventional inputs must decrease to zero and with that a consequent reduction in productivity and profit if one is to practice RA.

- There are different levels of entry and willingness, and there is always room to start with an easily executable change which will result in success. This type of change will likely be different dependent upon different farm enterprises.
- A major difficulty lies where farmer expectations of change may be unrealistic, such as trying to change too quickly, with wholesale change rather than incremental change. Having said that, there is a real move among some to reduce fertilisers, improve FUE, build soil carbon, soil biological diversity, improve soil structure, rooting depth and water-holding capacity and improve food quality while maintaining yield and increasing overall farm diversity. The reduction of chemical pesticide use appears to remain the largest challenge. It is a bastion that is reinforced and bolstered by high fertiliser use and lack of overall diversity in growing systems, and because these systems are not “fixed” in one season, growers tend to fall back because “they can’t afford not to”.
- Successful proponents of RA appear to have chosen to gradually change, learning as they go, and it can take many years to change farm practices. Some farming sectors will likely be more difficult to transition, such as intensive vegetable cropping. Deeply entrenched ideas, extremely high quality parameters and dependence on chemicals and fertiliser make these enterprises a special challenge.
- There appear to be many misconceptions, such as having to completely cease using fertiliser and chemical inputs. Although some may wish to do so, there are many cases where “judicious” use is continued, at least in the short to medium term.
- There are many farmers who have made sorties into RA over the years, with varying levels of success. A major hurdle observed was the lack of any support. The listening has changed and perhaps now there will be some real impetus in helping and supporting those farmers who are prepared to give it a go.
- There will be the purists of RA through to those that dabble on the side and make changes that are not too challenging. A difficulty is going to be how to help these different levels. Additionally, the difference in farmer acuity can be quite challenging, although many continue to research the information available and implement new practices as they can.
- Most growers look for support and endorsement of their decisions and practices when going through change. Having the knowledge base ⁹ availability of peers and a sufficient volume of appropriately trained professionals to support them is important.

⁹ **Feedback from an agronomist reviewer:** There is a large amount of information and resources disseminated throughout Australia that relate to “regenag” which needs to be gathered and indexed as an information base onto which future work can be added for farmers who wish to foray into “regenag”. There is the potential for replication of good work already undertaken which delays new work and the currently available information getting to farmers. There are many websites, often farm enterprise specific, that have information that could contribute. This large information base needs to be reviewed to gather basic information for dissemination to farmers. Rather than links to many sites, a database of information could be developed which assists farmer decision making. Some example sites with relevant information and views:

- https://soilsforlife.org.au/wp-content/uploads/2019/12/Full_Report.pdf
- <https://soilsforlife.org.au/december-message-from-the-ceo/>
- <https://www.mla.com.au/news-and-events/industry-news/building-resilience-from-the-ground-up/>
- <https://bibbaringa.com/>

Appendix 1 – Quantitative research: list of survey questions

Regenerative Agriculture – Should you Adopt it? What's Missing?

Global trends are increasingly leading the way when it comes to consumers' food choices and today's consumers are increasingly focussed on sustainability, provenance, traceability, freshness and the quality and health properties of food. This presents huge opportunities for those in the food and agri-business sectors who can respond to these shifts, and a considerable challenge and even risk for those who do not.

Regenerative agriculture is one way in which farmers can remain profitable by ensuring their farm products meet these demands, which is why the Department of Primary Industries and Resource Development (DPIRD / DAFWA) has started looking into these practices. The seven regional natural resource management (Landcare) organisations in WA are conducting this survey to find out what the key barriers are that might stop farmers and others from actually taking up regenerative agriculture. The results will be provided to DPIRD to help guide their future priority research.

The survey is anonymous and does not ask for any personal or financial information. It is only two pages long and should not take more than 10 minutes to complete. Thank you in advance for your input into the survey, which will help inform State investment into the sector.

For info: Regenerative farming is a holistic concept that is proposed nationally and internationally to transition agriculture to becoming a truly sustainable industry. The term "regenerative" is more accurate than "sustainable" because the practice regenerates and stabilizes soils, increases biodiversity, captures carbon, improves the water cycle and provides ecosystem services, by reducing or eliminating many conventional/industrial farming practices such as excessive ploughing and the widespread over-use of inorganic fertilisers and pesticides (herbicides, insecticides, fungicides etc.).

Questions

Q1. What shire do you reside in?

Q2. Are you mainly a (tick one):

- *Farmer (Horticulture/Viticulture)*
- *Farmer (Mixed farming)*
- *Farmer (Small landholder)*
- *Grazier*
- *Pastoralist*
- *Fisheries/Aquaculture*
- *Landcare professional*
- *Government agency staff member*
- *Other*

-
- <https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/ag-food/publications/restore-soil-prosper.pdf>
 - <https://www.mla.com.au/research-and-development/search-rd-reports/final-report-details/Environment-On-Farm/Biodiversity-smart-profitable-red-meat-production-An-update/878>
 - <https://www.rcsaustralia.com.au/pasture-cropping-in-a-low-rainfall-season/>

Q3. As a land manager, do you implement sustainable farming / regenerative farming practices? (tick one)

- *I use these principles for all my farming practices*
- *I use these principles for some of my farming practices*
- *I don't use any of these practices*

Q4. As a land manager, should regenerative farming be a priority for support and research? (tick one)

- *The most important priority*
- *A top priority, but not the most important*
- *Not very important*
- *Not important at all*
- *Unsure*

Q5. As a land manager, I believe that a farm should prioritise the production of (tick one):

- *As much agricultural product as possible*
- *As high quality a product as is possible*
- *A combination of the two*

Q6. The phrase 'Regenerative Agriculture' is becoming more commonly used. Can you please let us know your opinion on the following statements about regenerative agriculture?

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I know what regenerative agriculture is					
I like the concept of regenerative agriculture					
Regenerative agriculture ensures greater future sustainability					
Regenerative agriculture offers great marketing opportunities					
Regenerative agriculture can reduce costs of production					
Regenerative farming practices increase plant and soil health					
I see regenerative farming practices as being unacceptably risky for farmers					
Adopting such practices will change farming systems too much					
Adopting such practices will make farming less profitable					
Regenerative farming practices are not feasible under real farming conditions					
Regenerative farming it too complex and risky for farmers					

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The cost of implementing such practice changes will be too high for farmers					
Farmers would need more information on practices					
Farmers need more proof that these practices perform					
Local trials and demonstrations are needed					
Many farmers may not know how to make the transition to these new practices					
The economics of the new practices don't stack up					
It will cost a farmer too much to implement					
It would require financial support for farmers to transition					
Support is needed for farmers wanting to adopt these practices to cover potential losses					
Farmers need to know what practices are associated with regenerative agriculture					
Farmers need to know what works					
Regenerative farming practices increase profitability					
These practices make farming less susceptible to the changing climate					
I understand soil carbon and its benefits					
Farmers know if their soil carbon is declining					

Q7. What do you think are the key barriers that may stop farmers from adopting regenerative agriculture practices (please explain briefly)?

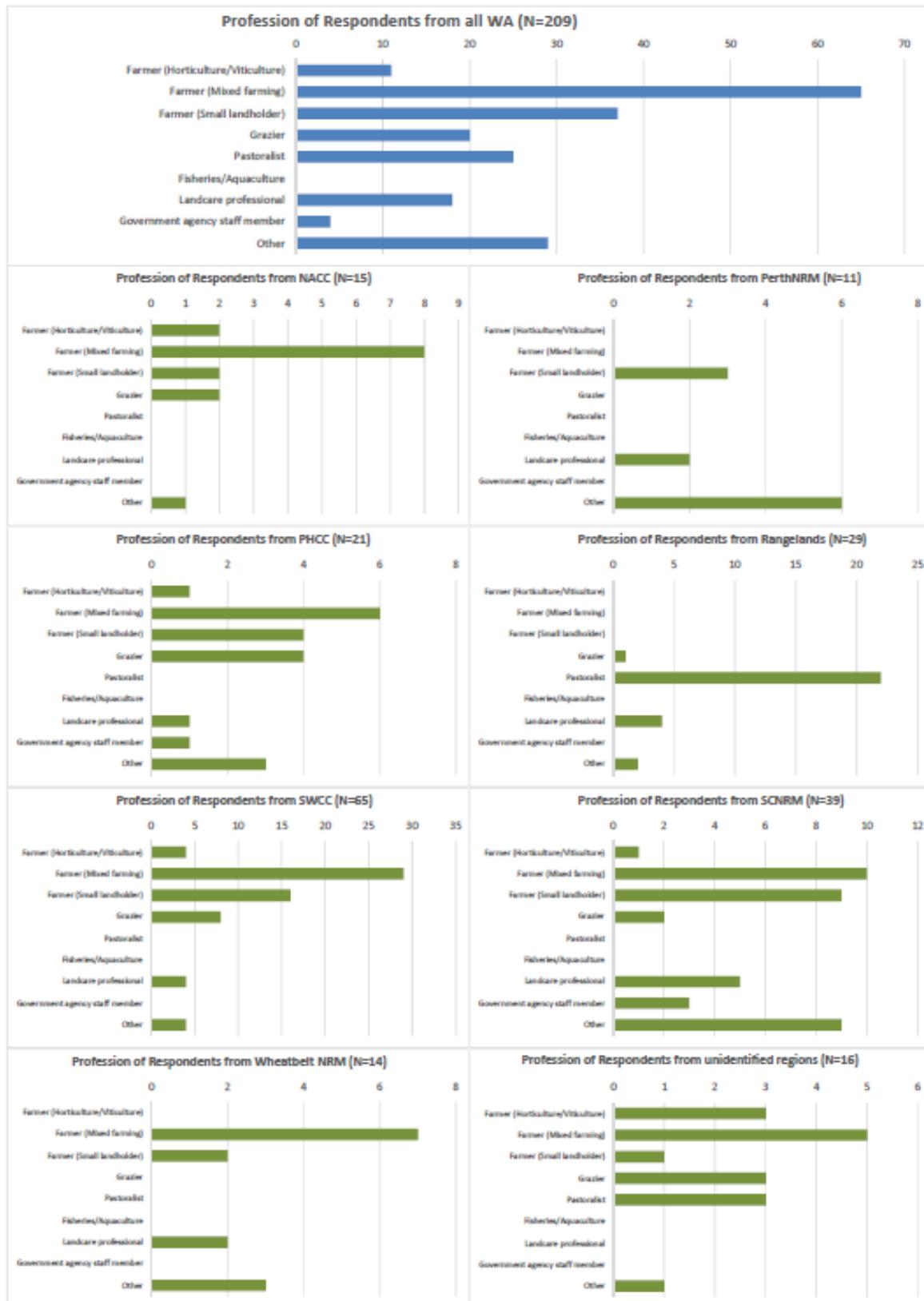
Q8. Thank you for completing this survey. If you wish to receive a copy of the final compiled results, please provide your contact details below.

Name

Email Address

Phone Number

Appendix 2 – Quantitative research: profession of respondents



Appendix 3 – Quantitative research: grouped verbatim comments

The following comments were received in response to the question “*What do you think are the key barriers that may stop farmers from adopting regenerative agriculture practices?*”

The responses have been grouped under a number of headings, as they deal with common issues, and have then be listed according to the number of respondents provided this feedback, as a form of prioritising their responses.

1. Lack of knowledge / Understanding – 105 responses

- 1.1 Knowledge of Regen Ag practises and their strengths & weaknesses.
- 1.2 Lack of knowledge of regenerative ag success, local application and transitions from traditional practices.
- 1.3 Lack of exposure to practices that are working.
- 1.4 Lack of knowledge, understanding and LOCAL evidence.
- 1.5 The belief that it is unprofitable/unviable. Which is a result of lack of knowledge and evidence-based research.
- 1.6 Lack of knowledge and wanting to stay with what they know.
- 1.7 Currently there is not much information on Regen Ag, most of the trial work/extension available from both Government and private enterprise has been based on industrial methods, chemicals, fertilisers to achieve maximum production with little regard for the environment. Most agronomists push /recommend high usage of chemicals fertilisers. To date the state government has not invested a lot in Regen ag trials (hoping this will change!). Good marketing by large chemical and fertilizer companies also inhibits farmers having the confidence to be brave and look at alternative farming practises.
- 1.8 Knowledge of the principles of Regenerative Agriculture and technical support the implement practises aligned with the principles in their unique context.
- 1.9 Lack of knowledge.
- 1.10 Knowledge.
- 1.11 Lack of knowledge.
- 1.12 Not having the right knowledge to transition.
- 1.13 Knowledge (lack of)
- 1.14 Lack of knowledge.
- 1.15 Not understanding how it works and the benefits that regenerative farming can have.
- 1.16 Lack of knowledge, lack of local examples, bias of agricultural consultants, habit.
- 1.17 Lack of knowledge and current working examples.
- 1.18 Knowledge (lack of)
- 1.19 Lack of knowledge and confidence (implementing vs knowing theory)
- 1.20 Lack of knowledge regarding adopting practices and cost to implement
- 1.21 Lack of Knowledge of the subject matter.
- 1.22 Lack of knowledge and lack of support from the agricultural community due to entrenched ideas and lack of accessible demonstration sites and research.
- 1.23 Lack of knowledge. Belief that the current practices are sustainable.
- 1.24 Fear of change, of the unknown.
- 1.25 Understanding how to gradually implement practices cost effectively.
- 1.26 Lack of information.
- 1.27 Awareness of what practices are available and how they will work on different soil types.
- 1.28 An understanding of what the practice is and the economics of the practice.

- 1.29 Poor proof of concept. A sense of radicalisation of regen ag sitting on the hocus pocus spectrum.
- 1.30 Regenerative agriculture is VERY poorly defined even in Wikipedia. If the wiki large scale definition is used, then it is a tendency to use less inputs which is precisely what most farming systems are aiming for but often cannot achieve easily. If it is to improve rotational grazing, then that has been available for decades and needs further encouragement. There is a very strong need to define 'it' and measure 'it' over a long time scale. Inputs are necessary if we continue to have outputs- exports overseas and exports out of the paddock. Balances are required because not many nutrients in exports can be created on-site and they run down with time and this may be masked by the current period of over-application of some elements.
- 1.31 Farmers need information to transition from 'not knowing what they don't know' to 'knowing what they don't know' and then some support to start the transition to regenerative practices. This has more to do with behaviour change than R&D or technology development. We don't need more trials we need more education and support services to help the farmer transition.
- 1.32 Lack of regen focused advice.
- 1.33 Perceived production losses, paradigm change, not knowing where to start.
- 1.34 Lack of understanding how to implement it, the cost of doing so and how this can benefit them.
- 1.35 Knowledge and large evidence base (lack of).
- 1.36 The initial set up, changing where fences go, water supply etc.
- 1.37 I do think that there does need to be some investigation into top conventional operators and how their economics and soil health etc. stacks up against a "regenerative farm". Conventional farmers in WA pioneered and adopted min and no-till which is a global benchmark now. Also - BMP is to test soils and manage from there. I think that the greatest barrier to regen ag is the terminology and that it can be offensive to claim that across the board all conventional farmers are not undertaking sustainable land use. Comparisons between production systems (including the science and the economics) is required and the terminology needs to be inclusive. I also think that it is difficult for growers to understand and see how a grain production is going to fit in a pasture/ livestock focused system.
- 1.38 Lack of understanding of how it works and fear of the unknown. It's easier to just keep doing what you know.
- 1.39 Clear understanding of practices. Access to alternative crop/pasture species. Support to get established.
- 1.40 Reliable, credible, relevant data on results. Community dynamics and 'acceptability' in their local context and environment.
- 1.41 Knowledge (of issues/costs). Understanding. Requirements.
- 1.42 Lack of knowledge & apathy.
- 1.43 Knowledge (lack of).
- 1.44 Time - time to undertake the practices.
- 1.45 Knowledge - knowing what practices to use and how to implement on their property.
- 1.46 Seed collection - Knowledge of species to plant on different land systems and seed application methods.
- 1.47 Farmers will adopt a system if it proves profitable. Reduction in input costs doesn't necessarily lead to more production or profit. Theory is fine but needs to be demonstrated

on a large scale across soil types and rainfall. Continual cropping and stubble retention, chaff carts etc is reducing weeds and cycling nutrients already.

- 1.48 Lack of proof that practices will work.
- 1.49 Lack of expertise.
- 1.50 Lack of real and detailed information. Need less fluffy feel good stories and instead need trials and local case studies.
- 1.51 Lack of clarity on what regenerative Ag really is.
- 1.52 There is no clear succinct definition of what regenerative agriculture is. Even though an attempt was made to define it at the start of this survey, it is way too vague and open to interpretation. How is it different to conventional practices such as no-till, or use of evidence such as soil testing to guide fertiliser decisions rather than using blanket fertiliser applications?
- 1.53 Lack of information, misleading information, culture, financial risk - no accessible modelling for transition.
- 1.54 Quality information. Work on broad acre scale.
- 1.55 Don't know enough on what and how to do it.
- 1.56 Lack of knowledge
- 1.57 Lack of information
- 1.58 Lack of knowledge
- 1.59 Lack of information.
- 1.60 Too many conflicting opinions mostly stemming from archaic govt funded trials ... the trials are being done on degraded soils. Stop doing them. Regen Ag is explained as a panacea to profit.
- 1.61 Lack of understanding of what is regenerative agriculture is compared to the current systems.
- 1.62 That regenerative agriculture might be "snake oil" i.e. not profitable, not increasing productivity, and not science based.
- 1.63 Having come from generations of old unsustainable practices of farming and don't know alternatives. Lack of knowledge of what regenerative farm practice means. Not knowing how to get started or where to get info.
- 1.64 There is no Definition of Regenerative Ag, one person's perspective is different to another person's perspective. For example, Controlled traffic, Liming, deep ripping, ploughing are all helping the soil, should this be under the regenerative banner vs the cover crop, compost fert, worm juice etc. There are some ok operations, but there are some terrible regenerative operations who say it is regenerative, but really, they are just farming badly. So, a definition would be good and all-inclusive of good farming practices.
- 1.65 Their current enterprise mix (i.e. v hard for total/majority of croppers to incorporate regen practices). Farmers need to see the market benefits as well as the environ ones.
- 1.66 The key barriers are a lack of scientific proof that these practices work, and this is partly because there is a reluctance of agricultural scientists to trial them because there is probably no funding to do so. It is left up to troubled farmers to pay and try what the gurus from this cult like movement promise with solve all their problems. From my experience it is feasible to replace 50 per cent of synthetic fertilisers with organic ones. To make a difference, large quantities of organic inputs are needed, and the cost of transport is a major barrier.
- 1.67 Lack of understanding. Fear of change and lost income in transition.
- 1.68 Fear of change; lack of knowledge; while carbon is being sequestered and soil biology is coming alive, there will be a loss of profit - farmers need a plan to transition.

- 1.69 Some lack of knowledge, hesitation to implement new things without proof.
- 1.70 Ignorance on how to do it. The time required to turn the farm around and subsequent costs. Pushiness of ag companies. Loss of good soils from previous poor farming practice.
- 1.71 Lack of knowledge. They need proof of feasibility.
- 1.72 Lack of knowledge, cost of change is risky with not allot to no evidence throughout the wheatbelt, cost of change to transition.
- 1.73 Ignorance, lack of information and support
- 1.74 Farmers have access and experience to large amounts of data, and most have trialed many options. I attended ANU's launch of sustainable ag in Melbourne and there was a large detach from reality and the desire to build another sector. This is one of the most damaging initiatives attempted to be launched, it is with the best intentions but needs a reality check. We have set up a trial on a site that has been regenerative ag for 60 years, preliminary results are showing just how far reg ag had degraded the soils productive capacity.
- 1.75 Lack of knowledge
- 1.76 Lack of knowledge and lack of support for extension services and Landcare.
- 1.77 Perception, paradigms, confidence, lack of proof.
- 1.78 Fear of change. Not knowing risks without working examples.
- 1.79 Fear of change and being labelled different. Spending more effort and study time on learning new ideas. Fear of financial stress.
- 1.80 There is a lack of science into the system in WA. Eastern states work has limited relevance to WA because our environment and soils are so different.
- 1.81 Lack of knowledge and labour costs
- 1.82 Fear of the unknown.
- 1.83 Not having the right information/proof to invest - it will cost a lot to implement and might seem too risky if they can't see the long term benefits.
- 1.84 Fear of change and the Unknown. Perceptions about practicality and understanding long term economic benefits, particularly in transition phase where things may already be tight financially.
- 1.85 Knowing what regenerative farming is. Is it a defined set of practices or just the latest in a long line of trendy synonyms? I suspect you could ask 20 people to list regenerative farming practices and you won't get 2 lists the same.
- 1.86 The paradigm that exists between their ears. Proof that long term prosperity lies with regeneration.
- 1.87 Lack of knowledge underlying the principles of regenerative agriculture; requires a new way of thinking about farming - such wholesale change is difficult; lack of moral and technical support; risk-aversion is strong in financially constrained times; strong vested interest opposition.
- 1.88 Not yet aware of what's involved. Concern re costs or potential losses during transition. The consumer market needs to continue to (and increase) demand for produce from regenerative farming practices to support farmers to transition. Evidence of improved pastures and produce. Access to research and reputable training / advice.
- 1.89 Lack of knowledge.
- 1.90 There is a lack of science into the system in WA. Eastern states work has limited relevance to WA because our environment and soils are so different.
- 1.91 Lack of knowledge and labour costs
- 1.92 Knowledge of practices and finance to implement

- 1.93 Knowledge of how and what to change, fear of loss of income, ego and acceptance that past practices may not be correct now
- 1.94 Very few organisations have an idea themselves on how to implement change they are too caught up in the flooded science and lack of knowledge
- 1.95 Lack of knowledge & understanding, 'rusted on' beliefs, opposition & mis-information from vested interests & key influencers (e.g. agronomists working for fertilizer/chemical companies), lack of knowledgeable extension support during transition, lack of financial support during transition.
- 1.96 Yields (not understood)
- 1.97 Decline in overall productivity.
- 1.98 Lack of enlightened consultants (agronomists). Lack of scientifically run commercial trials. Benefits not well promoted or explained.
- 1.99 Farmers not understanding technology behind regen.
- 1.100 Differing ideas of what is regen (some believe it is about zero inputs - which is not sustainable for production).
- 1.101 Regen is beyond input and output - lots of farm management training necessary.
- 1.102 Reg farming a top priority (multiple factors - nutrition, land condition, long-term land condition); cost is a short-term expense for long term gain; wish I knew more about soil carbon; Barriers include cost, old-fashioned thinking, conventional practices, time (working hard to keep status quo, hard to try new practices), knowledge (need to know how and have proof of it working)
- 1.103 Don't understand what regenerative agriculture actually is and there is no definition on this survey which would have been a good starting point.
- 1.104 I only know what I have read on the net, so until it is proven in the southern rangelands selling is going to be a battle.
- 1.105 Climate change in an area affected rainfall open irrigation channels and dams the loss of 40% of the water through evaporation, wind breaks - all these need to be taken on board. Note we in need of a new inventory on our best areas to farm future climate scenario, certain crops need to be moved to more favourable areas the natural environment takes precedents above all else.

2. Reluctance to change practices – 48 responses

- 2.1 Reluctance to change.
- 2.2 Old habits.
- 2.3 Climate of mind set - if the mind is focused and fixed on production of carbohydrate, or protein, then changing to a mindset of production of living soil (filled with carbon, nutrients, biodiversity and life).
- 2.4 Fear of change through debt levels, committed to banks (banks need to be trained too!).
- 2.5 Old habits die hard.
- 2.6 Tradition / 'business as usual'.
- 2.7 Stuck in status quo.
- 2.8 Stuck in the traditional practices in a country where the leaders are stuck in a small minded short term nightmare.
- 2.9 Do not want to change. Scared they will not make enough money.
- 2.10 Change. Change in practices, change in thinking, change from what was always done.
- 2.11 People being too set in their ways and resisting change too much.
- 2.12 Stuck in their ways or don't know where to start.

- 2.13 It is hard to change ingrained practices so much more evidence need to be put before them. It is likely to take some time.
- 2.14 It's easier to keep doing things the way you have done previously.
- 2.15 Set in their ways old ways have worked in the past why change. Have no prove, don't like change.
- 2.16 Older generation farmers are somewhat reluctant to change old habits and need help and re-education and showing benefits of change.
- 2.17 Old habits - not interested in change.
- 2.18 Old school attitudes resisting change.
- 2.19 Stuck in their way for something new.
- 2.20 Most farmers lack the ability to make positive change without being pushed or getting a "hand up"
- 2.21 Fear of change.
- 2.22 Fear of loss of production. Changing a mindset that they have held for several generations.
- 2.23 Fear of using different practices will cause farmers to be ostracised.
- 2.24 The fear of change and the commercial risks associated with the unknown, which favours the status quo.
- 2.25 Many farmers in our area do not like to make changes. unknown costings.
- 2.26 Convention (not how things have been done before)
- 2.27 They have been using their current methods for so long that it would be hard for them to change their operations without being shown the clear financial, lifestyle and environmental benefits of regenerative practices. They are also stuck in a cycle of high inputs where they cannot change practices for fear of a failed season. Regenerative practices also still have the stigma of being "rogue" practices and many landholders would prefer to stick with what they are doing then be seen as an outsider or "greenie". Also, the massive financial gains of good seasons with high input systems may prevent landholders thinking of the future benefits of regenerative practices.
- 2.28 Change is difficult. For anyone. Farmers in particular, believe that change from the 'norm' is risky. Current interests want to maintain the current systems - Agrochemical Industry as well as established farmer groups, banks, universities. DPIRD and so on. Change is hard for them, too. And of course, the current system returns a hefty profit to the agrochemical industry as well as farm machinery manufacturers, importers and retailers. The banks make a good deal off farm loans used to buy more land or further machinery. Current farming culture works by adhering to what has worked in the past, influenced by marketing of large corporations. DPIRD and Universities must lead in this case. Unfortunately, most current people working in this industry were trained under the old system, that is, get big or get out and spray to address any inadequacy.
- 2.29 Ignorance and inability to change. Fear of change. And for hobby farmers lack of equipment.
- 2.30 Lack of understanding of how it works and fear of the unknown. It's easier to just keep doing what you know.
- 2.31 They are too lazy, not prepared to use their money, they are not looking at the long term land occupation, we have always done it this way (thinking) and climate change believed to be a story/propaganda used for vote winning.
- 2.32 Fear of not being possible way to farm. Tradition for some generations of farming a certain way. Agronomists feeding information based on herbicides, pesticides and conventional agriculture.

- 2.33 Fear of change. Social incarceration in small communities for being a hippie/greenie/weirdo. Not enough mainstream information to make economic decisions.
- 2.34 Fear of unknown and old-school prevalence of "that's the way we've always done it" e.g. "roundup is safe enough to drink".
- 2.35 Farmers are typically stuck in their ways and will continue to practice things that have been done for decades.
- 2.36 Long standing practices based on 'old-style' reliance on chemicals and automation.
- 2.37 Fear of change. Negative advertising produced by those selling the products of industrial agriculture.
- 2.38 Fear of changing and gaining no better results. Need proof. Lack of knowledge on how to start in their region.
- 2.39 The perception that it is difficult and costly to implement, as well as poor understanding of the benefits and increased marketing opportunities it provides. It has, however the potential if approached from a collaborative perspective to be able to be implemented and nurtured in a better way.
- 2.40 Lack of Knowledge and stubbornness in sticking to the "OLD" way. Many people do NOT like change.
- 2.41 People do what they know works when they are under financial strain, most primary producers are under that strain due to low food prices. Limited proven local models and farms. Limited selling models for value adding to offset extra costs. A lack of clarity on soil carbon value and crediting farmers that are increasing it to offset transition costs.
- 2.42 "What I am doing works"; \$ proof that it is more profitable by demonstration farms/open days/information.
- 2.43 Lack of courage, information, example, support and understanding of the possibilities and procedures.
- 2.44 The "but we've always done it this way" mentality. Lack of awareness and understanding, perception of increased cost or work and perhaps worrying what the neighbours might think.
- 2.45 Fear of change and being labelled different. Spending more effort and study time on learning new ideas. Fear of financial stress.
- 2.46 Stubbornness worked this long why change, head in sand attitude. Supermarkets squeezing farmers for every cent.
- 2.47 General conservative nature of farmers.
- 2.48 Entrenched, multi-generational practices. The potential time (and profit conversion) lag between adopting the practices and the increased productivity and landscape function arising from more regenerative practices.

3. Costs, benefits and risks not well understood / Fear of the unknown – 35 responses

- 3.1 Fear of the unknown costs and risks, and the dangers of climate change and continued chemical and soil damage.
- 3.2 Fear of the unknown.
- 3.3 Cost of change and confidence in the outcome.
- 3.4 Adopting a new philosophy on and getting the results without making all the mistakes and access to new markets and letting go old tried habits It will be seen as a large leap of faith.
- 3.5 Not being convinced of the benefits.
- 3.6 It will be the change over from traditional farming to "regenerative farming" when productivity will be lower thus profits lower. An understanding that it will be successful in

the long term as costs of production will be lower. Convincing farmers will be the key issue. Five years ago, we brought Colin Seis over who at the time was Landcare Farmer of the Year. His practices would be considered regenerative farming. He stated at the time that it would be difficult to implement fully in Western Australia due to different climate and soil conditions.

- 3.7 Perception of more expense/effort.
- 3.8 Unknown costs.
- 3.9 Start-up cost and lack of guidance on where to begin.
- 3.10 Cost (short term loss of production) Lack of understanding about long term decline in productivity.
- 3.11 Capital, both financial and personal, invested in the current system
- 3.12 Costs, Proven benefits of past practices to give confidence, Length of time to see benefits
- 3.13 The cost will determine which way is best
- 3.14 Cost of implementation.
- 3.15 Concerns about cost. They need to see a viable return.
- 3.16 Initial financial outlay - Fear.
- 3.17 Unknown costs.
- 3.18 Fear of costs
- 3.19 Cost and profitability not understood.
- 3.20 Evidence that regen Ag will increase profitability
- 3.21 Cost of establishment of perennial pastures, lower stocking rate therefore lower productivity and profitability, not easily being able to prove benefits (e.g. cheap and simple EMS scheme) for marketing benefit, high labour requirement to constantly move stock
- 3.22 The cost to transition and implement on a broad scale. The willingness to be involved and implement.
- 3.23 The transition and the potential loss of income during the transition. Many farmers are locked in with heavy repayments for machinery and therefore the need to grow lots at minimum costs, in the safest way they know how.
- 3.24 High inputs with the potential for high income against moderate income with low inputs and sustainable practices.
- 3.25 Concern about cost, loss of profit
- 3.26 Cost, adoption of change and new practices without any evidence of benefit.
- 3.27 The cost of current practices and inputs. The uncertainty of acceptable profitability. Lack of quantifiable proof the practices work as promised.
- 3.28 Cost and productivity
- 3.29 The conception that they will not be profitable.
- 3.30 Certainly, cost is most significant factor, but also fear of risking reduction in yields and quality.
- 3.31 Cost and knowing how to implement.
- 3.32 Fear of change. Not knowing risks without working examples.
- 3.33 In this area... financial sustainability and other priorities.
- 3.34 Making money.
- 3.35 Profitability.

4. Current agronomic model based on Western model (market-based solutions above all, nature to be dominated) – 27 responses

- 4.1 The industrial farming mindset that is promoted as dogma by all those businesses that depend on that model of farming for their existence.
- 4.2 The mindset within agriculture created by the corporate businesses that control the current input in agriculture. An information bubble has been created around farmers, research and education institutions. There is no university in WA teaching regenerative agriculture. Also, the Neoliberalism economic policy developed after world war two changed the practises of traditional agriculture. The Green Revolution was started which introduced farmers to inorganic fertilizers and chemicals pulling them away from their inborn connection to nature and the land. Knowledge passed down from previous generations lost. Experts have evolved advising farmers on almost every aspect of their operations. Experts educated under the Neoliberalism model. 'Get big or get out' has been the catch cry since the 1970's. Country communities have been decimated by loss of population, skills and an increase in mental health is prevalent in rural communities. 'Small is Beautiful' by E F Schumacher, a study of economics as if people mattered, published in the early 1970's is a blueprint on how to decentralise and protect agriculture, natural resources and the importance of sustainability at all levels. Charles Messy publication of "Call of the Reed Warbler" in 2018 has opened the way for real conversation and examples of farmers working successfully with nature. Dr Maarten Stapper, Dr Christine Jones, Dr Walter Jehne, just to name a few have been working for years educating the interested farmers to change farming practises. Who has been supporting them? A Finer Future by Logins, Wallis, Wijkman and Fullerton, published 2018, describes Neoliberalism model as creating greed, selfishness, corruption and the exploitation of natural resources as if there is no tomorrow. We have been mining our soil, lowering our carbon levels, reducing the nutritional value of our agricultural products and undermining the general health and wellbeing of our nation. Farmers have done this guided by the experts. Add banks into the equation and Australian farmers now carry the highest level of debt per farmers in the history of agriculture. Plus, farmers now have to outlay more capital each year for a narrower profit margin. This same model is shown up in Canada. Hence conventional farming is not sustainable, and NOW is the time for change to sustainable agricultural practises. If the ship is not turned around, and quickly, we will be witnessing tragedy after tragedy in the environment and personal lives of people on the land. Mindset is the biggest hurdle. Good luck on how you can change such an entrenched system.
- 4.3 The current bubble farmers are kept in by big business who sells them products and services. Hence more information and field days on operating regen farms who are getting it right. Call of the Reed Warbler by Charles Messy covers it well. Mindset of farmers is the biggest challenge.
- 4.4 Admission that past and current desertification practices have led to declining soil quality.
- 4.5 Misleading information from Dept of Ag, misleading science from Agri-chemical corporations, government policy on GM crops and how this adversely affects organic agriculture
- 4.6 Agriculture department policies, such as restrictions on growing of hemp - why is a license payment required - just a lot of red tape.
- 4.7 The big industrial chemical companies' fake news, lack of knowledge/understanding of RF practices, too set in their ways.
- 4.8 Farmers who are indebted to conventional supply chains.
- 4.9 Disempowering style of technical support consolidates department and blocks innovation and knowledge networking.

- 4.10 Government barriers.
- 4.11 The practise of growing GMO food and cereals is still legal and allowed to be encouraged - this means that it's a way out of having to deal with the real problems of farming.
- 4.12 The needless demonization of biodynamic-organic-permaculture etc due to lack of govt and academic support has left a bitter bias amongst traditional farmers who hang on a failing economy. The science is now crystal clear- leaders have no time to waste in incentivizing truly regenerative practices if they want food on their own tables.
- 4.13 Complete change of their 'mono-cropping, ploughing and fertilising' culture.
- 4.14 The current farming paradigm is strongly industrial within our consumer culture & the collective memory doesn't seem go back to pre-war/chemical methods.
- 4.15 The 'old school' way of thinking inhibits a lot of farmers from trying out new things - the fear of being different.
- 4.16 Brainwashing by chemical companies making farmers believe that they need herbicides and heavy use of fertilisers in order to be profitable
- 4.17 The pressure to produce as such as you can on any available site, regardless of consequences.
- 4.18 Chemical and fertilizer salesmen.
- 4.19 Agricultural input companies successfully maintain the current industrial agricultural systems in WA.
- 4.20 Entrenched ideas about what is 'modern' and good practice, but mainly the fact that they are constantly bombarded with very skilled marketing by companies selling products that are counterproductive. These guys are very good at bypassing farmers discernment by presenting their products as best practice, when often it is the opposite. Understandably there is many times more information put in publications etc from vested commercial interests and this swamps farmers with what is essentially anti-regenerative farming propaganda. Most of what is being promoted is unnecessary, but the average farmer cannot tell that.
- 4.21 Lack of understanding. Large chemical and agricultural companies with money pushing a model.
- 4.22 Misinformation and market confusion from chemical industry.
- 4.23 Rewards/acceptance of poor management.
- 4.24 Farmers reluctance to reduce pesticide use.
- 4.25 Association with advisors and public servants.
- 4.26 Another barrier is the isolation from conventional farming support and practices.
- 4.27 Lack of accountability for poor land management and degradation and contribution to greenhouse gas emissions.

5. Need for support – 17 responses

- 5.1 Many would require financial assistance to move away from their current to regenerative practices.
- 5.2 Lack of WA gov and associated agencies support.
- 5.3 It's overwhelming to shift such a big property with limited resources (time and money).
- 5.4 Funding (lack of).
- 5.5 Transparent support from Shire (lack of).
- 5.6 \$ (cost of transitioning)
- 5.7 Short term private cost for long term public benefit
- 5.8 Finance - to buy materials and machinery to implement regenerative practices.

- 5.9 Smart Farm grants are competitive in nature and thus a small venture like proving the viability of drought proofing a small part of the station will not attract the approval of a grants, yet is very much needed.
- 5.10 Lack of funds in tight economic times which seem to be getting tighter.
- 5.11 Farmers are time poor and don't have the resources to implement such practices.
- 5.12 Lack of support
- 5.13 Infrastructure - for us it is fencing costs - we are reducing our paddock sizes by installing significant amounts of internal fencing to allow for more concentrated, shorter grazing rotations, but it's very expensive. Long cycle times are also a barrier - making a change and then waiting one or more seasons to see the result before changing something else.
- 5.14 The short term loss of income that usually accompanies such a large change. Some are not in a position to take this loss before the benefits become evident.
- 5.15 Not current market incentives (higher price). On-farm trials/R&D need to demonstrate increased profitability.
- 5.16 We tried to practice Biodynamic practices, but we were not able to find used machinery which was not contaminated by chemicals. The few things we did buy used were in very bad condition and only lasted one season and were dangerously repaired. The cost of buying everything new crippled - bankrupted us. We also needed to have a product to offer to the market and then we could not find enough buyers to pay for the more labour intensive biodynamic food.
- 5.17 To get a holistic framework developed takes some serious thinking , and if the local bioregion watershed is to be considered then a mass co-operation is needed amongst land managers -therefore a system of encouraging desired behaviour (such as tax benefits) needs to be implemented - is that desired by the ATO and State Treasury? - see Alan Savory talk on what he did in Zimbabwe to encourage farmers. you tube - #1Climate - Allan Savory at Polyface Farm - 2014 <https://www.youtube.com/watch?v=iPOF9ijyhvM> in particular 20 min onwards.

6. Consumer backlash / activism / politics – 13 responses

- 6.1 Activism against agriculture, too much political interference.
- 6.2 Too many conflicting opinions mostly stemming from archaic govt funded trials ... the trials are being done on degraded soils. Stop doing them. Regen Ag is explained as a panacea to profit
- 6.3 Farmers aren't exposed to the benefits of these practices and the supply chain doesn't demand these practices (yet).
- 6.4 Creation of us and them behaviours and attitudes with misinformation, how RA has been represented, disagreement over what RA is, peer pressure and big chemical and machinery companies.
- 6.5 The problem with "regenerative" or "sustainable" titles is that they unintentionally belittle those that don't "embrace the philosophy" even if they practise it themselves. I'm not a "regenerative" farmer, but my management ethos is one of constant improvement, strengthening resilience to tough conditions, flexibility in management decisions and land use, all done with an eye on the environment that I farm in. Most profitable farms re-invest in their major asset, their land. DPIRD focus should be on R&D into our problem areas of production. Good businesses will naturally incorporate "sustainability" into our systems without a feelgood government program.

- 6.6 Lack of integrity...Regenerative practices need an audit base system to scale the transition i.e. some farmers use industrial fertilisers and 'die-a-cides' [weed/insect/fungi etc] as part of their production system and claim to be 'regenerative'. This is a shortcoming of the word and its integrity like 'sustainable' will be bastardised.
- 6.7 We do need to be careful that this term 'regen ag' doesn't get greenwashed like sustainability within so many industries. For example, if you're not organic then you cannot be regenerative. If you're using BIOCIDES (i.e. killers of life) then it's an oxymoron to suggest you're REGENERATING life. We need standards & benchmarks for bona fide practices, otherwise the semantics will just be abused as another marketing ploy, and the land will never benefit.
- 6.8 Too many old wrinkles on an old idea makes the issue confusing and, in this case, political. Switching off to such new innovation ideas as a real threat to sustainable farming practise.
- 6.9 Hostility to city slickers. Lack of farmers teaching farmers. Lack of concise info/definition. Not enough case studies. No commercial approach seen.
- 6.10 Society now wants to rule over the farmers and reduce us to peasant status, supplying farmer's markets for a living.
- 6.11 Maybe regenerative Agriculture is considered a bunch of hippie new age thinking that does not work in a broadscale.
- 6.12 Ill-informed enthusiasm. Looney statements.

7. Need for trials and demonstrations – 10 responses

- 7.1 Lack of trial examples across all regions which demonstrate it at a local level.
- 7.2 Lack of practical demonstration.
- 7.3 Lack of local examples, and technical advice
- 7.4 Lack of evidence based research at local level. It is different. Current mindset mostly production focussed over quality. Not enough people to support adoption.
- 7.5 Hasn't been implemented in all farming practices yet. Visual demonstrations are key.
- 7.6 Lack of good trial data & clear guidelines on what defines regenerative practices.
- 7.7 Lack of local trials and scientific/economic study about costs and potential for profit.
- 7.8 Education. Lack of demonstration sites
- 7.9 Perception that only hobby farmers are doing it - need profit orientated case studies.

8. We're already doing it – 8 responses

- 8.1 Regenerative farming is just a marketing term to explain a reduction in yield and production due to lack of knowledge about real farming. Farmers don't need to adopt regenerative farming as they already run with a system that 'regenerates' each year. Crops are planted, cared for and then harvested, part of this harvest is kept for the following year seeding (or regeneration) and the excess sold. this process happens year after year. Due to the fact Australia doesn't have all the resources in the country some supplies need to be brought in weather from our areas of the country or imported. Yes, we could reduce production and not use these imports, however we still need to feed the world. If 'regenerative agriculture' actually worked then the world wouldn't have moved to current practise. What we need to do is get smarter with our inputs, utilise technology better and stop all the marketing / social media hype.
- 8.2 All agriculture is regenerative. This is a warm and fuzzy term of recent times. Farmers will adopt new practices if they are demonstrated to be profitable.

- 8.3 Farmers are already doing the right thing. It is just a way to get more funding and for some farmers to justify the poor job they are doing.
- 8.4 It is based on soils with high natural fertility and is not economically extrapolatable. It is a feel good fad.
- 8.5 Don't see how regen ag can produce enough quantities of wheat/barley/oats for export markets that we need.
- 8.6 Most farmers have already adopted "regenerative farming" practices, but because they haven't adopted ALL practices considered to be "regenerative" agriculture, producers that are considered to be regenerative don't think these partial adopters are doing any regenerative practices
- 8.7 Most farmers already use regenerative agriculture practices. This survey has no clear definition as to what they think regenerative agriculture is so it is impossible to accurately give answers and will lead to bias in the results.
- 8.8 Working together to combine efforts of science and coal face operations, COMMUNICATION. My observation is that everyone is endeavouring to achieve the same outcome of preserving and enhancing natural resources.

9. Farm environment – 6 responses

- 9.1 Low rainfall, low prices
- 9.2 Access to land - many who want to do regenerative agriculture cannot because of access to land, that is, the land is now so expensive or large parcel, that its more difficult for younger people to get into without first having a large debt or having to creating a large off farm income first.
- 9.3 Landscape illiteracy.
- 9.4 Uncertain season weather events.
- 9.5 Cost of repairing the damage that has already been done by pastoralist. Ecological illiteracy cause by collapse or extension services for pastoralists, bureaucracy inhibiting diversification on pastoral leases.
- 9.6 Short term outlook -year to year survival rather than long term view.

10. Outside interference – 2 responses

- 10.1 Red & green tape. Currently, Environmental Protection Act prevents me from rehabilitating parts of this station as I am not allowed to push over and burn dead vegetation which is needed in some areas to assist in regenerating native vegetation.
- 10.2 Restrictive land use options and massive hurdles (\$\$\$ and admin) facing innovators.

END REPORT