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A Leap of Faith: Regenerative Agriculture as a Contested Worldview Rather Than as a Practice Change Issue

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Abstract: Regenerative agriculture (RA) is emerging as one alternative model for agricultural production. However, RA has not matured sufficiently for a clear definition to have emerged, or for claimed benefits to be rigorously tested. Thus, numerous competing discourses have emerged around what RA is, and its potential role in the future of farming, leading to a level of contention about its value. This research aimed to better understand RA as a social phenomenon by using Q methodology to explore and evaluate how common discourses around agricultural sustainability, the goals of farming, and RA resonated with different Australian beef farmers. Three perspectives emerged from the data, labelled as the regenerative, environmentally conscious, and productive perspectives and represented diverse views around the goals of agriculture, the role of RA in the future of Australian agriculture, and comfort level producers have with the term and approach to farming it represents. As RA continues to grow as a movement, worldview, and farming approach, understanding the differences in thinking and worldview of proponents will be important for better understanding the goals of RA, how to reach them and measure their impact, and improve communication around RA. This is important to avoid and resolve unnecessary or destructive tensions between the range of agricultural sustainability discourses.

Keywords: regenerative; agriculture; sustainability; farmer; worldview; Q methodology; cattle



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1. Introduction

Over the last few decades, there has been a growing interest in environmentally and socially sustainable food systems that move away from the dominant agricultural discourse of top down technical innovation and productivist practices [1,2]. While the growing dissatisfaction with the social and environmental impacts associated with modern industrialised agriculture has created space for the emergence of alternative models of food production [3], the emergence of multiple perspectives around the nature and urgency of the solutions required highlights the complexity of these issues [4]. Numerous alternative agriculture approaches have emerged (e.g., organics, sustainable agriculture) and one term gaining traction in this increasingly crowded space is Regenerative Agriculture (RA) [2,5].

While the term RA originally emerged in the 1970s and 80s, since 2010 there has been a resurgence of interest in the RA approach and the ideology around it [2,3,6,7]. The current interest in RA comes from a variety of sources including producers, consumers, researchers, policymakers, retailers, investors, and large corporations [2,3,6]. Despite this rapid interest and uptake—and likely partly because of it—RA has not yet matured sufficiently for a clear definition to have developed [8], nor for its claimed benefits or processes to have been empirically and rigorously tested and proven. These issues are compounded by an apparent image problem with the way the approach or its proponents are perceived particularly by farmers [2,9]. This has resulted in the emergence of numerous competing discourses—shared ways of perceiving and understanding the world [4]—around what RA is and the role it may have in the future of Australian farming.

The aim of this exploratory research is to better understand RA as a social phenomenon and worldview by exploring how common discourses around agricultural sustainability, the goals of farming, and RA resonate with different Australian beef farmers. The research aims to address knowledge gaps in understandings of RA and answering the following research question:

How do beef farmers respond to common narratives found in sustainable- and regenerative-agriculture discourses?

This research employs the semi-qualitative method of Q methodology to elicit beef farmer perceptions towards RA and group similar perspectives around this topic. It is postulated that differences between farmer perceptions could be represented on a continuum, rather than as binary modes of thinking or opposing camps in a debate. RA as a social phenomenon is currently understudied, and this research will improve understanding of the ways RA challenges the conventional agricultural production paradigm and dominant farmer worldviews. Additionally, insights generated from this research may also help to improve the understanding and communication of RA within and beyond the RA sector. Knowing the ways that people use, or do not use, these terms and language can help to clarify communication and understanding around these issues.

2. Literature Review

Contemporary agricultural production across most of the world is based on the industrial paradigm of the Green Revolution that emerged between 1940–1970. This paradigm of modern industrialised farming developed in Europe and North America and expanded to other parts of the world following WWII when agriculture became increasingly specialised, routinised, mechanised, and orientated towards productivism [10–13]. Productivism conceptualises farms and their components as production units to be used to maximise production efficiency and yield for human benefit [2,13,14]. The broad uptake of this way of farming and the underlying paradigm has been attributed with reduced ecological and biological resilience across agricultural systems and driving many adverse environmental, social, economic, and health impacts across the globe [2,12].

This thinking remains evident in Australian agriculture, where many farmers remain engaged in forms of ‘conventional’ agriculture that are shaped directly and indirectly by a productivist worldview and policy environment [15,16]. From the 1980s, this has been supported by increasingly neoliberal government policies that have fostered a shift from protectionism of primary industries to emphasise individualism and self-reliance [17–19]. The neoliberalisation of Australian agriculture coincided with the development of a ‘get big or get out’ mindset that relied upon, and reinforced, the need for very high levels of economic efficiency and reduced labour costs, thus further entrenching the dominant productivist paradigm [16]. Some authors argue that productivism encourages the exploitation of natural resources for human gain (and generally gains only for some of the human population) and reinforces a hierarchical relationship between humans and nature, which has contributed to conceptually separating humans from natural environments [15,20–22].

In recognition of agriculture’s contribution to greenhouse gas emissions and other environmental challenges, there is broad agreement about the need for enhanced sustainability in global agriculture systems [23]. Contemporary ideas of ‘sustainability’ relate to ensuring the ability of present and future generations to meet their needs, and has dimensions relating to social equity, human welfare (generally through economic means), and maintenance of a natural resource base [21,24,25]. Sustainable agriculture has also become an umbrella term for alternative models of agricultural production outside of the dominant paradigm based on productivism.

RA is one of these alternative agriculture models, but aims to go further than ‘sustaining’ the present system, instead aiming for radical and systemic changes to the way we farm [24]. RA is claimed to be a holistic approach to farming that mimics natural systems and includes the need to: prioritise soil health and increase on-farm biodiversity to deliver a range of benefits to the environment and enhance on-farm ecosystem function, as well

as foster improvements to social and economic factors such as farmer well-being, profits, and food security [3,5–8,15,26–30]. Discussions of RA in academic writing have tended to focus on biophysical factors, such as soil health and carbon sequestration, but increasingly discussions of RA goals acknowledge social factors, such as equity and justice, as intrinsic to ecological health and function [3,8]. As this research is exploring the diversity of farmer responses towards narratives around RA, we do not explicitly define the concept.

While RA and conventional approaches may employ some of the same practices the broad goals and outcomes of each approach are quite different, and Gordon et al. [2] (p. 812) discuss the ideological divergence of goals. This overlap of practices suggests that RA and more conventional approaches to agriculture are not binary approaches but can be represented on a continuum [31]. However, the divergence of goals between these two approaches suggest that they also have distinct worldviews in terms of thinking about managing farmland and the relationship between farmer and nature [2,3,15].

Differences in goals and worldviews between RA and conventional agriculture are highlighted in literature examining the transition pathways from conventional to RA. Given their differences, transitioning from conventional agriculture to RA generally requires a transformation in farmer worldview, mindset, values, beliefs, rules, practices, norms, and ideas about what being a ‘good’ farmer means in order to be sustained and successful [3,15].

This tension between RA and conventional approaches being two ends of a continuum but requiring a shift or transformation in worldview is not currently well researched, however White [32] identifies RA as both an attitude towards, and a suite of practices involved in, agricultural production. This idea that RA exists simultaneously as a set of practices, as a social movement, and as a worldview suggests that core concepts of RA—emphasising holism, environmental care and improvement, and social values like equity and justice—manifest in slightly different ways depending on how it is being invoked. Additionally, each form of RA challenges productivism to varying degrees [2].

Gibbons [21] argues that RA positions humans as part of nature—one component in the whole—whereas conventional paradigms and thinking conceptualises humans as being apart from nature, and in control of it. There is currently limited scholarly work on this area/idea, but Gibbons [21] exploration of three different sustainability paradigms is an interesting starting point. Gibbons [21] describes these as conventional, contemporary, and regenerative sustainability paradigms, and postulates that the key difference between these sustainability paradigms is the underlying thinking and thus extent of envisioned changes or transformations in society. The current research was informed by drawing on diverse discourses and language around agriculture and this idea that multiple paradigms exist in an area, and conflict between them stems from underlying differences in attitudes and values.

While there are many promising aspects of RA, the approach has attracted a range of criticisms. Most relevant to this research are the criticisms of the applicability of the approach and claims of its efficacy made by proponents, and the lack of an agreed-upon definition and the implications of this.

A prevalent critique is the ‘universal’ nature of the issues RA sets out to solve and the applicability and efficacy of the practices used to solve them. Many practices associated with RA are promoted without consideration of regional or individual farm context: yet the efficacy of many RA-promoted practices are highly context dependent and unlikely to lead to the same benefits in all contexts [2,6]. Thus, the proposition of a universal solution that could be applied in all agricultural contexts is potentially misleading given the significant diversity of global agri-ecosystems and farm systems, and the spatial and temporal variation of the environmental and social issues associated with agriculture [6].

A second critique of RA is concerned with the efficacy of practices associated with RA, the potential for RA practices to contribute to climate change mitigation, and the challenges of measuring the outcomes of practices (e.g., changes in soil carbon) [3,15,33]. Related are also questions about the scale at which RA is effective: currently the economic benefits

associated with RA are more evident on smallholder farms due to higher yields and reduced labour requirements, which potentially constrains its applicability on large farms [26].

A third critique is the lack of clarity and agreement in definitions of RA both in general use and in practitioner/research contexts. Conceptual ambiguity has led to a range of definitions of RA that variably emphasise elements of the biophysical, social, or economic factors associated with its processes and outcomes [5–7]. This can result in trade-offs between different objectives which exacerbate confusion and conceptual difficulty around the term [34] and hinder clear communication and development of RA as both an approach to farming and broader worldview. Ambiguous use in literature can add to challenges in evaluating claims made about RA as well as produce barriers to develop and advocate for laws, policies, research, and incentive programs around RA, and create consumer confusion and opportunities for the term to be watered down or greenwashed to erode credibility [6,7,28].

Formalised definitions of terms can mitigate these issues to some extent, but are not always desired by all actors [7]. The absence of a clear definition also allows space for multiple perspectives and interpretations of RA to coalesce into a workable definition as thinking and knowledge evolves [7]. Furthermore, the definition of some terms cannot be decisively established, and meaning emerges from ongoing social processes that include scientific measurement and investigation, policy development [35], and in the case of RA, communication with and influence of practitioners [8]. Understanding the emerging use of a term is critically important in policy and management settings where a term is used to represent a central concept, strategy, or goal [35] or when it is used to define the aims of a discipline or movement and justify the practices and objectives involved with meeting them [36].

Ultimately, the diversity of definitions, frequency of omission of a definition in academic and practitioner contexts, plus conflation with similar terms has led to significant confusion about what RA is, what is involved with doing it [7]. These issues surrounding the lack of clarity about RA are compounded by an apparent image problem with the way the approach or its proponents are perceived particularly by farmers [2,9].

Several authors also raise concerns about the rapid increase of interest in RA to the point of it becoming a buzzword and potentially co-opted for greenwashing [6,7]. Buzzwords are popular concepts with a strong performative aspect that combines a strong belief in the concept with the absence of a clear definition [36]. Buzzwords sound intellectual and scientific, but their vague meanings tend to suggest that the concept is beyond the reach and understanding of the average person and so is best left to ‘experts’ [36]. There is debate on whether buzzwords can be reclaimed for meaningful use, or whether they should be discarded: Cornwall [36] suggest this is best determined on a case by case basis.

While there is potential for buzzwords to dilute the meaning and power of terms, they can have useful applications if used as a boundary object to facilitate communication between groups. A boundary object is an “idea or concept that can be shared across disciplines and stakeholders” [35] (p. 2) that creates shared vocabulary and understanding [34]. Boundary objects can be tangible (e.g., a document, map or photograph) or intangible (e.g., a term or phrase) [1]. Boundary objects can be useful for fostering communication between groups, but can also obscure differing interests and values, as well as damage the conceptual meaning and practical relevance of scientific terms [34,35].

Other relevant terms and ideas that can act as boundary objects include ‘sustainability’, ‘resilience’ [32], and ‘organic farming/food’ [1]. Brand and Jax [34] argue that a clear and descriptive conceptual definition of resilience (that excludes normative dimensions on how things ought to be) is critical as a counterbalance between its operationalisation and application within ecological science, and its use as a boundary object with broader use as a perspective for analysing social-ecological systems. Favilli et al. investigated the role of organic farming as a boundary object that allowed actors to “develop common visions, languages, and goals to organise their activities” [1] (p. 235). Like these examples,

‘regenerative’ has become a concept with multiple meanings and uses that operate both as a descriptive scientific concept, and as a boundary object with a vague meaning [2,34].

These considerations regarding the complex and emergent nature of discourses around RA informed the development of the research question and selection of methods. Because of the ability of Q methodology to elicit perceptions towards an issue, it was selected as an appropriate method for eliciting and comparing the response of Australian beef farmers towards sustainable and regenerative farming discourses.

3. Materials and Methods

Q methodology is a semi-qualitative technique designed to elicit attitudes of participants towards a particular issue, topic, or theme [37–42]. It is a highly appropriate method for this research context as it provides a comprehensive insight into the range of farmer responses to discourses around RA and agricultural sustainability.

Originally developed in the 1930s by Stephenson and applied in the field of psychology to study human subjectivity [41,43], Q methodology was refined and popularised by Brown in the 1980s [42,44]. Now Q methodology is widely applied in social and environmental research [42,45–47], such as natural resource management [38] and rural research [40,44].

During the ‘Q sorting process’, participants rank a series of statements (or images) about the issue relative to the other statements and according to a defined dimension (e.g., level of agreement), and thus articulate their individual perspective on the issue [39,41,44,48]. Using inverted factor analysis that treats each participant’s Q sort as a variable [39], these perspectives can be grouped according to the different frameworks used by the participants to formulate their attitudes and make decisions [37,41,42,44]. The number of, and variation, between perspectives suggest whether there are numerous and complex ways of thinking about the issue, or whether ways of thinking are relatively homogenous and align to the dominant discourse around the issue [37]. Results also indicate areas of overlap, divergence, and disagreement between the attitudes of participants [38–40,44]. The most important difference between Q methodology and other survey methods (e.g., Likert scales) is that Q methodology allows a more complete perspective to emerge and aims to establish patterns within and across individual responses by ranking statements in relation to one another, rather than patterns across individual traits or demographic elements (sex, age, etc.) [41,42,45].

One limitation associated with Q methodology is that results cannot be generalised to larger populations [38,40]. Results of this research will provide insights into the types and variety of farming worldviews held by participants, however, further studies using alternative methods will be necessary to determine how widespread and prevalent these worldviews may be among farmers and other populations. Additionally, Q methodology often involves interviews done in conjunction with the Q sort exercise [39], however conducting interviews was not possible in this case due to project constraints and the geographical spread of Australian producers. This is acknowledged as a limitation of this study.

3.1. Applying the Method

The steps of Q methodology were drawn from several sources [37,39,42,48] and are summarised as follows. Ethical approvals were obtained from The University of Queensland (ethics approval number: 2021/HE002202).

3.1.1. Developing the Concourse and Q Set

The concourse is a collection of discrete statements that capture the full spectrum of ideas, narratives and concepts relating to the topic [37,39]. These statements may come from a literature review, data collection (typically interviews), grey literature, or are developed specifically for the research (although this is less common) [43,44]. Ideally, the concourse undergoes several iterations until saturation is reached, and no additional views emerge.

The concourse is then refined, and the number of statements is reduced to produce a manageable list—this is the Q set.

In this research, the statements for the concourse were collected from a literature review of three types of sources: studies that use Q methodology for similar topics, papers specifically on the topic of RA, and grey literature that included information from farmer wellbeing surveys, and outcomes of qualitative interview research touching on discourses around agricultural sustainability and RA. Some statements also were drawn from one author’s professional research experience of over 30 years of undertaking both qualitative and quantitative research in grazing industry circles related to agricultural systems, sustainability and environmental change. The final number of statements in the Q set was 44 (see Table 1). These statements were developed around broad ideas relating to farming practice, the goals of farming, desirable outcomes of farming, and the relationship between humans and nature in order to capture the full spectrum of narratives and discourses around the topic of RA from these sources.

Table 1. Results table sorted by statement number to aid in comparison of Z scores across factors.

Statement	Statement Number	Factor 1 (Z Score)	Factor 2 (Z Score)	Factor 3 (Z Score)
I am proud of the way I farm	1	1.45	1.09	0.37
Inputs, such as artificial fertilisers, herbicides and/or pesticides are essential for my farm production	2	−1.93	0.2	0.62
Regenerative agriculture is just another word for sustainable agriculture	3	−0.6	0.52	0.69
I watch how successful farmers farm and often do what they do	4	−0.74	0.63	0.07
I wish I was more satisfied with the way I farm	5	−0.39	−1.16	0.19
My long-term goal is to farm in cooperation with nature	6	1.1	0.54	0.19
Regenerative agriculture lacks evidence and credibility	7	−1.59	1.01	−1.75
I feel supported by the community in the way I farm	8	−0.03	−0.39	−0.3
For me, the main joy in farming is the lifestyle	9	0.43	−0.36	1.75
I want to look after biodiversity on my farm, even if it takes some land out of production	10	1.02	0.9	−0.87
I’m interested in learning more about regenerative agriculture	11	0.51	−1.24	2.12
In my area, concerns about what other people might think does affect what some farmers do on their properties	12	−0.2	−0.41	0.5
I feel connected to my farm (emotionally and/or spiritually)	13	1.26	1.22	1.18
We should not expect to protect the environment and biodiversity on good agricultural land	14	−1.84	−1.74	−0.87
Regenerative agriculture represents my view of good farming	15	1.16	−1.55	0.19
It is important to be respected as a good farmer by other farmers	16	−0.55	−0.42	−0.76
On my farm I work with nature to produce food	17	1.26	1.19	0.87
Farming in Australia is sustainable because farmers are adopting the latest practices and technology	18	−0.98	0.17	−0.19
Regenerative agriculture is really only suited to small scale, niche farming	19	−1.49	−0.6	−1.87
Family farms are more focused on sustainability than large corporate ones	20	−0.18	−0.55	−0.25

Table 1. Cont.

Statement	Statement Number	Factor 1 (Z Score)	Factor 2 (Z Score)	Factor 3 (Z Score)
Farming sometimes requires controlling nature and the environment	21	−0.73	0.43	1.43
Modern agriculture is a source of some major environmental problems and needs significant modification	22	1.08	0.02	−0.62
I think regenerative agriculture has an important role in the future of farming	23	1.16	−1.34	1.68
An over-dominance of masculinity in Australian farming impedes change for the better	24	−0.8	−1.54	−0.56
When humans interfere with nature it often leads to disastrous consequences	25	0.6	−0.89	−1.68
Out-dated sentimental notions of farming have no place in modern agriculture	26	−0.55	−0.76	−1.24
I don't like to use the term 'regenerative agriculture'	27	−0.75	0.99	−0.13
I understand how environmental systems and processes function on my farm	28	0.71	1.09	0.19
I am generally happy with the production levels on my farm	29	0.28	1.06	0.76
We can't feed a growing global population without intensive agriculture	30	−1.49	1.36	0.69
Adapting farm practices needs to be based on reliable data and evidence	31	−0.01	1.56	−0.44
The way I farm is well suited to the place I am farming in (climate, weather, soils, etc.)	32	0.77	1.48	−0.07
Farmers have an obligation to maintain the environment on behalf of society	33	0.93	0.52	−1.93
Modern science and technology will solve agricultural and environmental problems	34	−1.46	−0.29	−0.44
I'm always learning new things about and on my farm	35	1.11	1.04	0.62
I am generally happy with the financial performance of my farming enterprise	36	0.52	0.99	0.57
I prefer not to use artificial fertilisers, herbicides and/or pesticides on my farm	37	1.2	−0.73	−1.06
When it comes to agriculture, science and technology are a threat to the human connection of producing food	38	−0.34	−2.38	−1.5
I benchmark my farm performance against what other producers are doing	39	−0.39	0.5	−0.44
Regenerative agriculture is best suited to people with additional or off-farm income	40	−1.2	−0.59	−0.12
I think people get too hung up on the definition of regenerative agriculture	41	0.18	−0.75	0.12
I work hard to restore and enhance ecosystem functions on my farm which helps improve overall production	42	1.72	0.55	0.37
Regenerative agriculture should be a conversation about improved practices	43	0.36	−0.52	1.87
Large corporate agriculture has the capacity to be sustainable, compared to small family farms	44	−0.59	−0.8	0.07

3.1.2. Participant Selection and Recruitment

Purposive sampling is used for Q methodology, and the participants are selected for their potential to articulate their viewpoint on the topic [37]. Because Q methodology cannot generalise conclusions to a larger population, it only requires a small sample size of 10–60 participants [39,44,45,47].

Participants in this research were recruited via gatekeepers (i.e., industry leaders that operate formal networks) who publicised the research through email communications or newsletters with their networks, thus allowing the participants to self-select to be involved. This was done to protect participants' privacy as RA can be a contentious issue and these networks may be small. Criteria for participation were that participants were based in Australia, identified primarily as livestock farmers, and practiced either regenerative or conventional methods of production. The research survey was advertised and open from December 2021 until August 2022.

Once participants had volunteered, they were sent printed copies of the research materials, and requested to return the completed Q sorts via mail or email. Two reminder emails were sent directly to participants. The research was undertaken in a mail survey style to try and maximise engagement and minimise risk and disruption related to restricted physical interactions due to the COVID-19 pandemic that was ongoing during the data-collection phase of the project. It was thought that doing a hard-copy mail study would increase engagement by making the survey personal, including a small token of appreciation (a teabag) [49] and reduce the potential for technology issues to occur. Several of the online platforms available for Q-sorting were either outside of the research budget or difficult to use for this purpose. Feedback that some participants would have preferred to do the survey online was received, and it was posited that the mail survey approach could have limited the response rate. Of the 45 surveys sent out, 28 responses were received.

3.1.3. Data Collection—Doing the Q Sort

Cards with statements from the Q set were sorted by participants in response to their level of agreement with the statements [42,44]. These statement cards were placed onto a fixed grid with quasi-normal distribution (Figure 1).

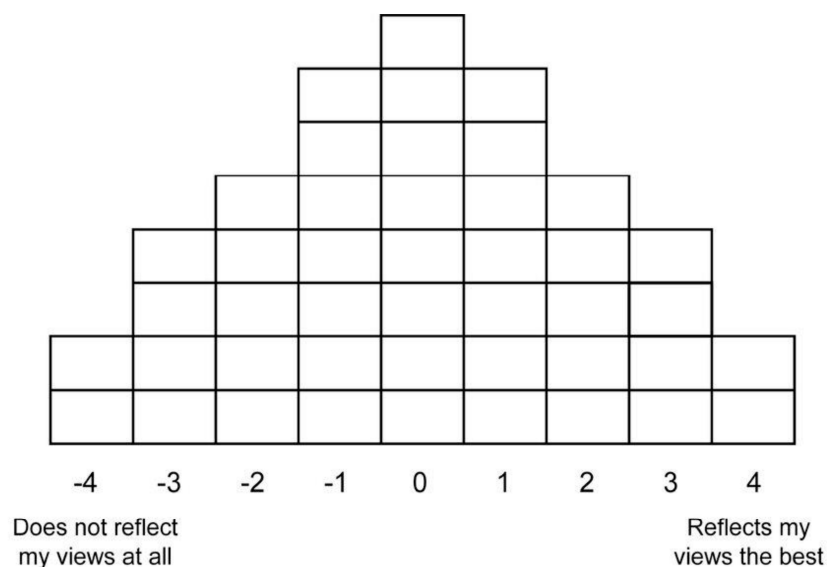


Figure 1. Grid with a quasi-normal distribution, used in the Q sort.

3.1.4. Analysis and Interpretation

Data from the Q sort exercise was analysed using Ken-Q software [50] to group farmer perceptions and ways of thinking about agricultural production. This analysis identified key elements and themes of participants viewpoints. These results were considered in

relation to the research question around elucidating farmer responses to common discourses of agricultural sustainability, RA, and approaches to farming in order to discuss the findings and their broader relevance to understanding and communication around RA and agricultural sustainability.

First the correlation matrix was generated. This reflects the relationship of each Q sort to every other Q sort and represents all of the meaning and variance in the research [39,48]. Next, factor analysis was undertaken to extract factors, or portions of shared meaning in the data [39,44,48]. Centroid factor analysis was performed and factors with an eigenvalue below 1.0 were rejected: three factors were retained for interpretation. According to the Kaiser-Guttman criterion this is a common cut-off point, as an eigenvalue of below 1.0 accounts for less variance than a single Q sort [48]. Eigenvalues are a measure of the strength and potential explanatory power of a given factor [48].

Next, the factors were rotated using varimax rotation. Factor rotation spatially repositions the factors so that they are most closely aligned with a clustered group of Q sorts, which represents a commonly held viewpoint amongst participants [48]. Varimax rotation involves repositioning the factors according to statistical criteria, and is an objective and reliable method of rotation, especially when using an inductive analysis strategy [48,51].

This analysis strategy resulted in three statistically significant factor arrays being generated from the data (Appendix A Figures A1–A3). Factor arrays are an idealised Q sort generated for each factor and they show what the data would look like if it were loaded 100% onto the factor; they must be interpreted holistically [37,39,48]. To aid holistic and systematic factor interpretation crib sheets were created and statement items were listed under the following four headings: items ranked highest (+4) in array; items ranked higher in this factor array than in other factor arrays; items ranked lower in this factor array than in other factor arrays; items ranked lowest (−4) in array. These categories enable identification of the important issues and statements that define the viewpoint of a given factor, or perspective [48]. A second pass was made through the entire factor array to identify any additional statements that may be important to the overall narrative expression of each perspective. Each item was individually appraised on where it was ranked, and possible reasons for this ranking from the participant's viewpoint [48].

4. Results

From the patterns of significant statements across groups, three factors—described here as perspectives to reflect a collection of views and ideas—were identified that show commonalities in thinking and worldview from farmer responses to dominant discourses around agricultural approaches. These factors were labelled the regenerative, environmentally conscious, and productive perspectives, and the final factor arrays can be found in the Appendices. The final three factor solution is detailed in Table 1 and represents the importance of a given statement relative to other statements and the Z-score for each factor. Overall, the three factor solution explained 55% of the common variance in this research, which is considered to be sound as it is above the 35–40% common variance threshold used in Watts and Stenner [48]. Narrative accounts of each factor in the three factor solution are provided below, in descending order of the research variance they explain. The statement card number and matrix position are also given (e.g., 14:−4 refers to statement card 14 in the −4 matrix rank position).

4.1. Factor 1—Regenerative

This factor has an eigenvalue of 9.21 and explains 29% of the study variance. Fourteen participants were significantly associated with this factor. Environmental protection and farming in cooperation with nature are important goals for participants associated with this perspective, and they feel that RA is an appropriate approach for meeting these goals.

This group agrees that goals of environmental protection and agricultural production are compatible (14:−4). They agree that farmers have an obligation to protect the environment (33:+1) and work hard to protect biodiversity (10:+2) and enhance ecosystem function

on their farm (42:+4). Participants aligning to this perspective agree that their long term goal is to farm in cooperation with nature (6:+2) in a way that is well suited to their local context (32:+1), and work with nature to produce food (17:+3).

RA is seen to represent their view of good farming (15:+2), and this group is comfortable with using the term (27:−2). This group sees RA as being distinct from sustainable agriculture (3:−1) and agrees that the approach has a role in the future of Australian farming (23:+3). This group is interested in learning more about RA (11:+1) and were relatively neutral about centering the RA conversation on improving practices (43:0) or defining the approach (41:0). RA was not perceived to lack evidence or credibility to this group (7:−3), nor did they agree that RA is best suited to people with additional off farm income (40:−2). Finally, inputs such as artificial fertilisers, herbicides, and/or pesticides are not seen as necessary for farm production (2:−4), and they prefer not to use them on their farm (37:+3).

Participants aligning to this perspective agree that modern agriculture is a significant source of environmental problems and needs significant modification (22:+2). Farming is not seen to require controlling nature (21:−1), and this group agrees that human interference with nature often leads to disastrous consequences (25:+1). Additionally, this group does not agree that intensive agriculture is needed to feed the growing global population (30:−3), or that modern science and technology will be able to solve all agricultural and environmental problems (34:−3). Instead, this group may perceive science and technology as a threat to the human connection of producing food (38:0) as this statement was ranked higher than in other groups.

Likely because they are farming in a way that meets their goals of environmental protection, participants aligning to this perspective feel proud of the way they farm (1:+4) and emotionally and/or spiritually connected to their farm (13:+3). This group agrees that for them, the main joy of farming is the lifestyle (9:+1).

This group does not agree that because Australian farmers are adopting the latest practices and technology, that Australian farming is sustainable (18:−2). Additionally, they are not particularly interested in what other farmers are doing, they do not watch and copy successful farmers (40:−2), benchmark their farm performance against others (39:−1), or feel that it is important to be respected as a good farmer by other farmers (16:−1).

4.2. Factor 2—Environmentally Conscious but Not Regenerative

This factor has an eigenvalue of 4.34 and explains 18% of the study variance. Eight participants were significantly associated with this factor. Participants aligning to this perspective see the importance of protecting the environment and farming in cooperation with nature similarly to those aligning to the regenerative perspective (factor 1). However, their opinions differ around the role of science and technology, data and evidence, and the consequences of human interference with nature. As such, they see the appropriateness and role of RA differently.

As with those participants aligning to the regenerative perspective, environmental outcomes are also important for this group, and they want to look after biodiversity (10:+1) and restore and enhance ecosystem functions on their farms (42:+1). Additionally, this group agrees that they farm in a way that is well suited to their local context (32:+4) and that they aim to (6:+1) and do farm in cooperation with nature (17:+3). This group also agrees that environmental protection and agricultural production are compatible goals (14:−4).

This is where the regenerative and environmentally conscious perspectives diverge. Participants aligning to the environmentally conscious perspective agree that feeding the growing global population requires intensive agriculture (30:+3), feel relatively neutral about whether modern agriculture is a source of major environmental problems and requires modification (22:0), and whether modern science and technology will be able to solve current agricultural and environmental problems (34:0). This group disagrees that an over dominance of masculinity in Australian farming is impeding change for the better (24:−3). Additionally, this group does not agree that modern science and technology pose

a threat to the human connection with food production (38:−4), that human interference leads to disastrous environmental consequences (25:−2), and were neutral about whether farming requires controlling nature (21:0).

This group is strongly driven by data, agreeing that adapting farm practices needs to be based on reliable data and evidence (31:+4). Because they perceive RA as lacking sufficient evidence and credibility (7:+2) and perceive it as being another word for sustainable agriculture (3:+1) participants in this group do not like the term RA (27:+1) or the approach it represents (15:−3) and do not think that it has a role in the future of Australian farming (23:−3). Additionally, they are not interested in learning more about RA (11:−3), and think people get too hung up on defining it (41:−2) or talking about how it should be about improving practices (43:−1).

This group is also proud of the way they farm (1:+3) and feel connected to their farm (13:+3). They do not wish they were more satisfied with the way that they farm (5:−2) and feel neutrally that the main joy of farming is the lifestyle (9:0), although both of these statements were ranked lower than in the other groups.

Finally, this group does not pay much attention to what other farmers are doing (39:0) or think of their approach (16:−1; 8:0) and do not agree that these factors influence other farmers in their area (12:−1).

4.3. Factor 3—Productive and Interested

This factor has an eigenvalue of 1.25 and explains 7% of the study variance. Two participants were significantly associated with this factor. This group also cares about environmental outcomes, but prioritises production values, and they may not be inclined to protect the environment if it puts these values at risk. While RA does not represent this group's idea of good farming, they are interested in learning more about the approach and think it may have a role in the future of Australian farming.

People aligning to this perspective do not agree that farmers have an obligation to maintain the environment on behalf of broader society (33:−4) or that human interference with nature leads to disastrous environmental consequences (25:−3). This group does not see modern agriculture as a major source of environmental problems (22:−2) and think that feeding the growing global population requires intensive agriculture (30:+2). Additionally, this group does not see modern science and technology as a threat to the human connection of producing food (38:−3) and agree that farming sometimes requires controlling nature (21:+3).

As with those participants aligning to the regenerative and environmentally conscious perspectives, participants aligning to the productive perspective also see themselves as working with nature to produce food (17:+2; 6:+1) and work to restore and enhance ecosystem functions on their farm (42:+1). However, unlike the other factors, they feel neutral about whether their approach is well suited to their local context (32:0). Additionally, while they do not see environmental protection and agricultural production as incompatible goals (14:−2), they are less interested in looking after biodiversity on their farm if it means taking land out of production (10:−2).

While RA does not necessarily represent this group's idea of good farming (15:0), they are interested in learning more about the approach (11:+4). Additionally, they think that RA has a role in the future of Australian farming (23:+3) but think that the conversation should be about improving practices (43:+4). They feel neutrally about the term RA (27:0) and whether or not people are getting too hung up on defining the term (41:0), likely because they perceive RA as being another word for sustainable agriculture (3:+2). Finally, this group does not agree that RA is lacking in evidence or credibility (7:−3) or that it is only suited to small scale or niche farming (19:−4).

While this group find joy in the lifestyle of farming (9:+3) and are proud of (1:+1) and feel connected to their farms (13:+3), they do wish they were more satisfied with the way that they farm (5:+1).

As was found in the other groups, while they agree that the perceptions of others might influence what some people in their local area do on their properties (12:+1), they are not particularly interested in what other farmers are doing (39:−1; 4:0) or think of the way they farm (16:−2; 8:−1).

5. Discussion

This exploratory research aimed to better understand how common discourses around RA, agricultural sustainability, and the goals of farming resonated with different Australian beef farmers.

This discussion section will explore the diversity of perspectives expressed in the results, before drawing on literature to situate insights and results within the broader context of agricultural sustainability and discourse around RA.

Results indicate that there is a diversity of viewpoints among participants around: what it means to be a good farmer, the role of science and technology in farming, the role of RA in the future of Australian farming, and the level of comfort producers have with the term ‘regenerative’ and the approach to farming that this represents. Areas of consensus were around most participants feeling proud of their approach and connected to their farms, most participants feeling relatively indifferent about what other farmers were doing, or thought about their approach, and most participants felt that they farmed in cooperation with nature. Results also suggest that environmental protection and sustainability are important outcomes for many producers, although they meet these goals with a variety of approaches. The diversity of perspectives aligned with sentiments in the literature that suggest RA requires a paradigm shift [3,21,27,31,32,52]. Diversity and overlap of perspectives in the results also confirmed the postulation that different approaches to farming are better represented along a continuum, rather than in distinct camps (Figure 2). The diversity of perspectives that emerged from the results suggests that multiple different worldviews and farming paradigms exist, however Q method is not designed to determine the prevalence of these views.

Results support conclusions in the literature that farmers aligning to the regenerative perspective reject productivism in favour of an alternative, regenerative paradigm [3,15,21]. Three aspects—the focus on environmental outcomes, preference for avoiding use of artificial inputs, and rejection of the need to control nature in order to farm—all align the regenerative perspective to descriptions of alternative agriculture or regenerative paradigms in the literature [2,3,10,27]. Additionally, the belief that technology-based solutions will be unable to fix all the problems in contemporary agricultural systems, suggests that this group rejects elements of Western scientific thinking inherent to the productivist paradigm, and embraces other ways of thinking and knowing [15,20,21,53]. From these results, it is unclear whether the regenerative perspective conceptualises humans as being equal to, and a part of nature, which is part of a regenerative agricultural paradigm [21].

The productive perspective that emerged from the data is the one most closely aligned to what the literature describes as productivism. The productive perspective and descriptions of productivism share several beliefs about the goals of agriculture and the relationship between humans and nature [12,14]. While environmental protection is important to this group, they are less willing to look after biodiversity on their farm if it means taking land out of production. Additionally, they believe that we cannot feed a growing global population without intensive agriculture. Both of these beliefs reflect elements of productivism and the idea that the primary goal of agricultural land should be to produce agricultural products and increase production efficiency [5,12,13]. Furthermore, the beliefs among this group that human interference in nature does not often lead to adverse environmental consequences, and that farming sometimes requires controlling the environment suggest that this group views the relationship between humans and nature as hierarchical, in accordance with the dominant Western scientific thinking often linked to productivism [10,15,20,21].

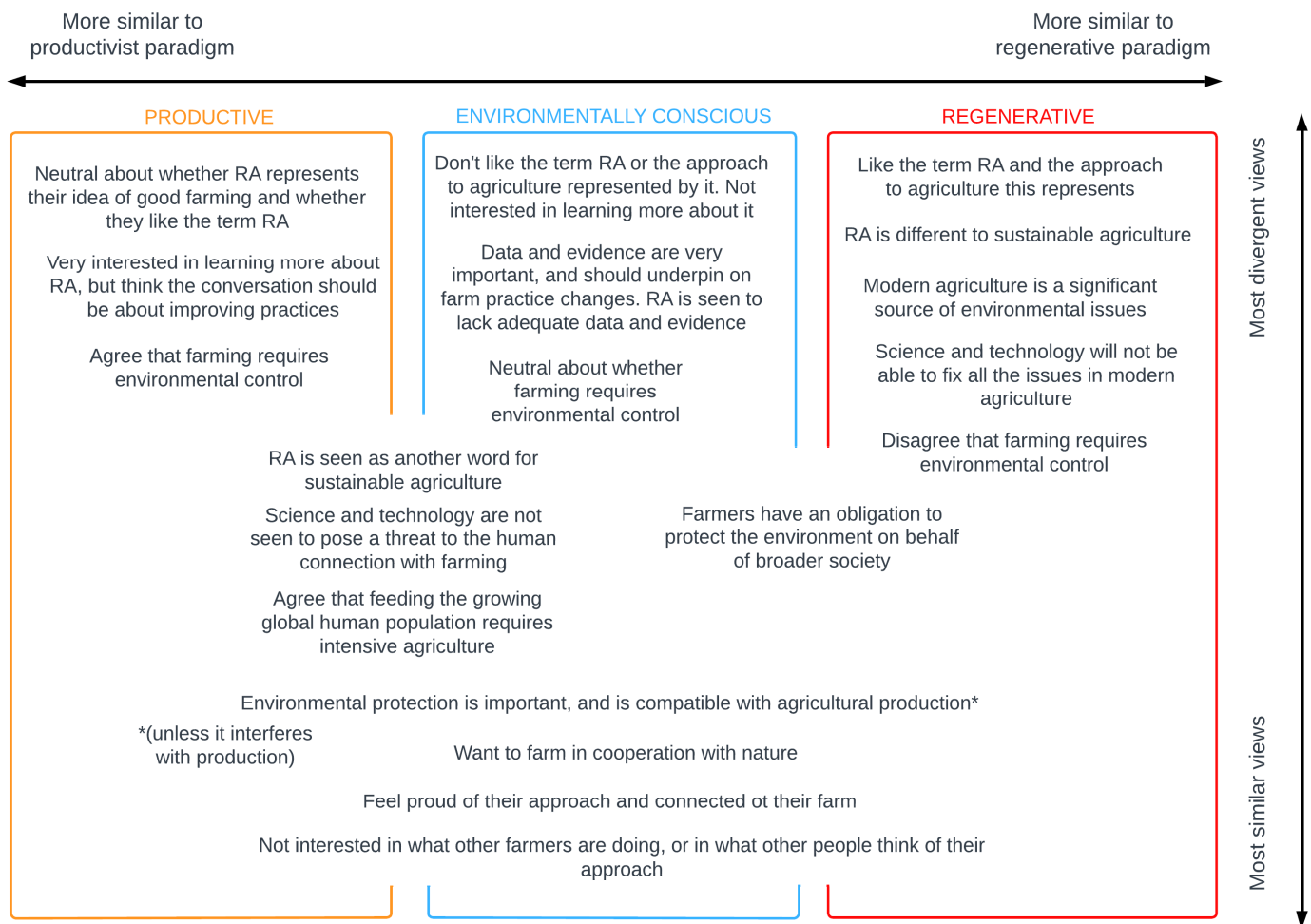


Figure 2. Schematic of a continuum showing the main points of overlap and disagreement between the three perspectives: productive (yellow), environmentally conscious (blue), and regenerative (red). Overlap between important elements are shown by statements that cross multiple boxes. Views are arranged from most divergent (top) to most shared views (bottom). An asterisk (*) indicates a caveat to an idea that is otherwise generally agreed upon.

The environmentally conscious perspective, and the importance placed on data and evidence, also shares elements involved with the productivist paradigm [10,12,14]. However, the importance of environmental outcomes to this group and their desire to farm in cooperation with nature also share some similarities with alternative agricultural paradigms, or a more regenerative approach to farming. This suggests that this perspective is more aligned to ideas of contemporary sustainability identified in Gibbons (2020), rather than wholly productivist or regenerative paradigms.

Furthermore, despite the environmentally conscious group holding similar intentions to farmers aligning to the regenerative perspective to farm in environmentally sensitive ways, they reject both the term RA and the approach to farming that it represents. This rejection is primarily because they see it as lacking adequate data and evidence but other reasons for this discomfort or hesitancy around the term RA may stem from a perceived cultural or social stigma associated with the approach, or the approach may challenge their sense of identity or idea of what it means to be a ‘good farmer’ using a proven and sensible evidence based approach [15]. This perception may stem from a variety of sources, but there seems to be a hesitancy to use the term ‘regenerative’ among many producers and people working in the industry. This suggests that, while legitimate criticisms of the approach exist, there is a broader image and communication problem around RA.

Other potential sources of tension around RA may stem from unclear definitions of the approach [6,7], multiple meanings of terms like ‘sustainability’ and their use as boundary objects [34,35,54], scepticism from people in the farming and academic communities [15], the hype and ideology of some proponents of RA [2], the sudden wave of interest and a perception of it being a buzzword or ‘the flavour of the month’ in sustainable agriculture circles. There may also be potential legacy issues from the wave of interest in the 1980s, which may be especially problematic for older farmers who remember this time. All of these potential sources of tension require further investigation to clarify whether they influence present perceptions of RA and to what extent they contribute to the image problem of RA. Additionally, another interesting area of future research lies in clarifying whether or not it is an issue that some people strongly reject the term ‘regenerative’ and whether this rejection inhibits some people from learning about or trialing the approach.

The results show that the diversity of perspectives around the goals of and approaches to agricultural production were best represented on a continuum. Yet, there is potential for this to exacerbate issues regarding the clarity of which different approaches can be differentiated for legislation or accreditation purposes [6,7]. Such a spectrum of perspectives—in lieu of a clear definition—may also compound existing confusion about what RA is and how it is different to other more conventional or sustainable approaches to agriculture. Vaguely defined terms can become buzzwords that dilute the meaning and power of the original concept [36] and yet terms with vague meanings can be useful as a boundary object that facilitate communication between different groups [34,35]. As a vaguely defined term ‘RA’ could be used as an intangible boundary object. Some qualities that may be beneficial for this use as a boundary object are that RA seems to exist in slightly different forms, or manifestations of core concepts (i.e., as a set of practices, as a social movement, and as a worldview), and that it aims to encompass environmental, economic, and social aspects of agricultural production, the current challenges in this space, and imaginative solutions. However, the strong rejection of the term ‘regenerative’ among some people working in the agriculture industry may reduce the appropriateness and usefulness of the RA concept as a boundary object. To clear up this confusion and reduce tension around the term, producers and other industry members will need to have a conversation about what RA is, what it means, and how they would like both the approach and the term to be used. Clarifying the meaning of the term and the approach to agriculture that ‘regenerative’ represents could also help to improve measurements of the claims of RA, and assess the extent to which it can resolve the environmental and social issues it claims to address.

Results also suggest that participants do not place much importance on what other producers and community members think about their approaches to farming and are relatively uninterested in what other farmers are doing. This was a surprising result, as some literature suggested that social networks and farmer groups were important for establishing a sense of community and distributing information [15]. As RA is primarily a farmer-led movement and development of the approach is primarily happening at this level, the general ambivalence of participants around what other producers are doing and thinking raises questions about where these farmers source their information and how they learn about developments in agriculture, if not from this grassroots level.

6. Conclusions

This research aimed to better understand RA as a social phenomenon by exploring and evaluating how common discourses around agricultural sustainability, the goals of farming, and RA resonate with different Australian beef farmers. Q methodology was effective at eliciting farmer perspectives and results from the survey were used to create narrative expressions of participant’s perspectives, thus allowing for comparison between the worldviews of the different approaches.

Three perspectives emerged from the data, and were labelled regenerative, environmentally conscious, and productive perspectives, and represented the variation in viewpoints among the data. These resulting perspectives were best represented along

a continuum, rather than as distinct camps, and represented a diversity of viewpoints around the goals of modern agriculture and the approach to farming best suited to reaching them. There was also significant diversity around the credibility of RA, its role in the future of Australian agriculture, and the overall level of comfort different groups have with the term and the approach to farming that it represents. As RA continues to grow as a movement, and continues to develop as a worldview and approach to farming, understanding the differences in thinking and worldview of producers practising it, compared to those practising more conventional approaches to agriculture, will be important for better understanding the goals of RA, how to reach them, how to measure their impact, and improve communication around RA.

As RA remains a poorly defined and contested approach to farming, the tension around the term 'regenerative' may stem from unclear definitions or general issues with the image and communication around the term. Issues with the clarity of the definition of RA share similarities to issues surrounding similar terms like 'sustainability' and 'resilience'. Debates around the usefulness of having well defined terms to aid in measuring outcomes and overall clarity of communication, versus keeping definitions somewhat vague to aid in negotiation and flexibility of the concept and facilitate it to be used as a boundary object to facilitate cross group communication. These debates and issues highlight the importance of definitions in some, but not all, contexts, and the importance of term users to define concepts for their own uses. Dialogue around these issues that acknowledges and speaks to people's underlying values, is likely to improve engagement with the challenges and transitions occurring across agriculture. This research has demonstrated the importance of underlying values and how they affect how farmers respond to, and engage with, the narratives of sustainable and regenerative agriculture.

If RA is to be meaningfully utilised as an approach to farming that drives improved environmental, social, and economic outcomes for individual farmers, their communities, and broader society, then there is a need to address gaps in present understandings, descriptions, and definitions of RA. Addressing these research gaps must include investigation of the social dimensions of RA, as they are critical to understanding the roles played by individuals, including their identity and worldview, in broader agricultural transformations. The present study has implications for better understanding RA as a social phenomenon, including changes to farmer mindset following transitioning to RA from a social values perspective rather than an economic perspective, and to inform communications and networking around alternative and sustainable agriculture approaches.

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Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ethical restrictions.

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Appendix A

Consensus statements (highlighted in green) show statements that participants agreed on and ranked similarly across factors.

Composite Q sort for Factor 1

-4	-3	-2	-1	0	1	2	3	4
14. We should not expect to protect the environment and biodiversity on good agricultural land	**◀ 34. Modern science and technology will solve agricultural and environmental problems	*◀ 4. I watch how successful farmers farm and often do what they do	5. I wish I was more satisfied with the way I farm	** 43. Regenerative agriculture should be a conversation about improved practices	33. Farmers have an obligation to maintain the environment on behalf of society	**▶ 15. Regenerative agriculture represents my view of good farming	13. I feel connected to my farm (emotionally and/or spiritually)	**▶ 42. I work hard to restore and enhance ecosystem functions or my farm which helps improve overall production
**◀ 2. Inputs, such as artificial fertilisers, herbicides and/or pesticides are essential for my farm production	19. Regenerative agriculture is really only suited to small scale, niche farming	27. I don't like to use the term 'regenerative agriculture'	39. I benchmark my farm performance against what other producers are doing	29. I am generally happy with the production levels on my farm	* 32. The way I farm is well suited to the place I am farming in (climate, weather, soils, etc.)	35. I'm always learning new things about and on my farm	17. On my farm I work with nature to produce food	1. I am proud of the way I farm
	**◀ 30. We can't feed a growing global population without intensive agriculture	24. An over-dominance of masculinity in Australian farming impedes change for the better	26. Out-dated sentimental notions of farming have no place in modern agriculture	41. I think people get too hung up on the definition of regenerative agriculture	28. I understand how environmental systems and processes function on my farm	**▶ 6. My long-term goal is to farm in cooperation with nature	**▶ 37. I prefer not to use artificial fertilisers, herbicides and/or pesticides on my farm	
7. Regenerative agriculture lacks evidence and credibility	*◀ 18. Farming in Australia is sustainable because farmers are adopting the latest practices and technology	16. It is important to be respected as a good farmer by other farmers	31. Adapting farm practices needs to be based on reliable data and evidence	**▶ 25. When humans interfere with nature it often leads to disastrous consequences	**▶ 22. Modern agriculture is a source of some major environmental problems and needs significant modification	23. I think regenerative agriculture has an important role in the future of farming		
	**◀ 40. Regenerative agriculture is best suited to people with additional or off-farm income	44. Large corporate agriculture has the capacity to be sustainable, compared to small family farms	8. I feel supported by the community in the way I farm	36. I am generally happy with the financial performance of my farming enterprise	10. I want to look after biodiversity on my farm, even if it takes some land out of production			
	**◀ 3. Regenerative agriculture is just another word for sustainable agriculture	20. Family farms are more focused on sustainability than large corporate ones	** 11. I'm interested in learning more about regenerative agriculture					
	**◀ 21. Farming sometimes requires controlling nature and the environment	12. In my area, concerns about what other people might think does affect what some farmers do on their properties	** 9. For me, the main joy in farming is the lifestyle					
		**▶ 38. When it comes to agriculture, science and technology are a threat to the human connection of producing food						

Legend

- * Distinguishing statement at P < 0.05
- ** Distinguishing statement at P < 0.01
- ▶ z-Score for the statement is higher than in all the other factors
- ◀ z-Score for the statement is lower than in all the other factors
- Consensus statement

Figure A1. Factor array for factor 1—the regenerative perspective.

Composite Q sort for Factor 2

-4	-3	-2	-1	0	1	2	3	4
14. We should not expect to protect the environment and biodiversity on good agricultural land	**◀ 11. I'm interested in learning more about regenerative agriculture	**◀ 41. I think people get too hung up on the definition of regenerative agriculture	12. In my area, concerns about what other people might think does affect what some farmers do on their properties	**▶ 39. I benchmark my farm performance against what other producers are doing	**▶ 27. I don't like to use the term 'regenerative agriculture'	28. I understand how environmental systems and processes function on my farm	30. We can't feed a growing global population without intensive agriculture	**▶ 31. Adapting farm practices needs to be based on reliable data and evidence
**◀ 36. When it comes to agriculture, science and technology are a threat to the human connection of producing food	**◀ 23. I think regenerative agriculture has an important role in the future of farming	26. Out-dated sentimental notions of farming have no place in modern agriculture	16. It is important to be respected as a good farmer by other farmers	** 21. Farming sometimes requires controlling nature and the environment	10. I want to look after biodiversity on my farm, even if it takes some land out of production	29. I am generally happy with the production levels on my farm	13. I feel connected to my farm (emotionally and/or spiritually)	**▶ 32. The way I farm is well suited to the place I am farming in (climate, weather, soils, etc.)
**◀ 24. An over-dominance of masculinity in Australian farming impedes change for the better	44. Large corporate agriculture has the capacity to be sustainable, compared to small family farms	**◀ 43. Regenerative agriculture should be a conversation about improved practices	2. Inputs, such as artificial fertilisers, herbicides and/or pesticides are essential for my farm production	4. I watch how successful farmers farm and often do what they do	35. I'm always learning new things about and on my farm	17. On my farm I work with nature to produce food		
**◀ 15. Regenerative agriculture represents my view of good farming	* 25. When humans interfere with nature it often leads to disastrous consequences	20. Family farms are more focused on sustainability than large corporate ones	18. Farming in Australia is sustainable because farmers are adopting the latest practices and technology	42. I work hard to restore and enhance ecosystem functions on my farm which helps improve overall production	**▶ 7. Regenerative agriculture lacks evidence and credibility	1. I am proud of the way I farm		
	**◀ 5. I wish I was more satisfied with the way I farm	40. Regenerative agriculture is best suited to people with additional or off-farm income	22. Modern agriculture is a source of some major environmental problems and needs significant modification	6. My long-term goal is to farm in cooperation with nature	36. I am generally happy with the financial performance of my farming enterprise			
		**▶ 19. Regenerative agriculture is really only suited to small scale, niche farming	34. Modern science and technology will solve agricultural and environmental problems	3. Regenerative agriculture is just another word for sustainable agriculture				
		37. I prefer not to use artificial fertilisers, herbicides and/or pesticides on my farm	**◀ 9. For me, the main joy in farming is the lifestyle	33. Farmers have an obligation to maintain the environment on behalf of society				
			8. I feel supported by the community in the way I farm					

Legend

- * Distinguishing statement at P < 0.05
- ** Distinguishing statement at P < 0.01
- ▶ z-Score for the statement is higher than in all the other factors
- ◀ z-Score for the statement is lower than in all the other factors
- Consensus statement

Figure A2. Factor array for factor 2—the environmentally conscious perspective.

Composite Q sort for Factor 3

-4	-3	-2	-1	0	1	2	3	4
19. Regenerative agriculture is really only suited to small scale, niche farming	26. Out-dated sentimental notions of farming have no place in modern agriculture	22. Modern agriculture is a source of some major environmental problems and needs significant modification	18. Farming in Australia is sustainable because farmers are adopting the latest practices and technology	** 15. Regenerative agriculture represents my view of good farming	35. I'm always learning new things about and on my farm	17. On my farm I work with nature to produce food	**▶ 9. For me, the main joy in farming is the lifestyle	**▶▶ 11. I'm interested in learning more about regenerative agriculture
**◄ 33. Farmers have an obligation to maintain the environment on behalf of society	* 38. When it comes to agriculture, science and technology are a threat to the human connection of producing food	16. It is important to be respected as a good farmer by other farmers	20. Family farms are more focused on sustainability than large corporate ones	28. I understand how environmental systems and processes function on my farm	36. I am generally happy with the financial performance of my farming enterprise	29. I am generally happy with the production levels on my farm	23. I think regenerative agriculture has an important role in the future of farming	**▶▶ 43. Regenerative agriculture should be a conversation about improved practices
	**◄ 25. When humans interfere with nature it often leads to disastrous consequences	**◄ 10. I want to look after biodiversity on my farm, even if it takes some land out of production	8. I feel supported by the community in the way I farm	41. I think people get too hung up on the definition of regenerative agriculture	**▶ 12. In my area, concerns about what other people might think does affect what some farmers do on their properties	3. Regenerative agriculture is just another word for sustainable agriculture	**▶▶ 21. Farming sometimes requires controlling nature and the environment	
	7. Regenerative agriculture lacks evidence and credibility	**▶ 14. We should not expect to protect the environment and biodiversity on good agricultural land	31. Adapting farm practices needs to be based on reliable data and evidence	4. I watch how successful farmers farm and often do what they do	1. I am proud of the way I farm	30. We can't feed a growing global population without intensive agriculture	13. I feel connected to my farm (emotionally and/or spiritually)	
		37. I prefer not to use artificial fertilisers, herbicides and/or pesticides on my farm	34. Modern science and technology will solve agricultural and environmental problems	44. Large corporate agriculture has the capacity to be sustainable, compared to small family farms	42. I work hard to restore and enhance ecosystem functions on my farm which helps improve overall production	2. Inputs, such as artificial fertilisers, herbicides and/or pesticides are essential for my farm production		
			39. I benchmark my farm performance against what other producers are doing	**◄ 32. The way I farm is well suited to the place I am farming in (climate, weather, soils, etc.)	5. I wish I was more satisfied with the way I farm			
			24. An over-dominance of masculinity in Australian farming impedes change for the better	40. Regenerative agriculture is best suited to people with additional or off-farm income	6. My long-term goal is to farm in cooperation with nature			
				27. I don't like to use the term 'regenerative agriculture'				

Legend

- ※ Distinguishing statement at $P < 0.05$
- ** Distinguishing statement at $P < 0.01$
- ▶ z-Score for the statement is higher than in all the other factors
- ◄ z-Score for the statement is lower than in all the other factors
- Consensus statement

Figure A3. Factor array for factor 3—the productive perspective.

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