Farmer responses to climate change and sustainable agriculture. A review

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Farmer responses to climate change and sustainable agriculture. A review

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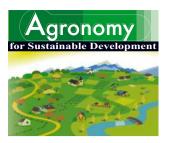# Farmer responses to climate change and sustainable agriculture.
A review

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Abstract – Climate change is a major issue for agricultural sustainability, and changes in farming practices will be necessary both to reduce emissions and to adapt to a changing climate and to new social expectations. A complicating factor is that the processes of behaviour change are complex and can be slow to occur. Discourse analysis is useful in understanding how the discourses farmers are embedded in contribute to resistance to change. Discourses are particular ways of using language in particular situations. They have wide ranging effects on beliefs, values and behaviours. Interviews were conducted in 2008 with 63 respondents, including 22 apple growers, 29 dairy farmers and 12 agricultural consultants in Tasmania, Australia. In undertaking a discourse analysis of the transcripts of these interviews utilising N-Vivo, four specific discourses were identified as being important in shaping farmers' perspectives of climate change and sustainability: Money, Earth, Human responsibility and Questioning. Each discourse contributes to resistance to changing behaviour in particular ways. An understanding of these discourses offers a new approach to facilitating behaviour change.

climate change / agriculture / sustainability / discourse analysis / discourses / behaviour change / resistance / barriers to adoption / Tasmania

Contents

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1. INTRODUCTION

'What's sustainable? You've got to look at our world as we know it. We're not in a sustainable position at the moment. That's why I say what is sustainable – I don't know.' Interviewee.

Sustainability is a concept that is relatively easy to understand but difficult to define in practice. At a simplistic level, it means good environmental management and farming communities that are profitable and prosperous, or put another way, that are viable and vital. But what this means in practice and what specific management practices it infers is open to much debate (Vanclay and Lawrence, 1994, 1995). While sustainability has typically been conceived in terms of land degradation issues, over time sustainable agriculture has had to address a range of other issues including energy use, artificial inputs such as fertilizers and agricultural chemicals, and now climate change.

Climate change is increasingly acknowledged and accepted in science and political arenas. The emerging reality of climate change potentially increases the level of concern about issues of sustainability generally. Many agricultural industries will be impacted by climate change, and agriculture in Australia is projected to be especially affected (ABARE, 2007). Agriculture is likely to face considerable pressure to change its practices to become more sustainable for climate change, both in terms of mitigating emissions of carbon dioxide, nitrous oxide and methane, as well as adapting to the consequences of changes in climate already set in place. The consequences of climate change will be wide ranging, including physical changes to the landscape as well as expected changes in government requirements and market demands. There is a perceived urgency for agriculture to change to mitigate current greenhouse gas emissions and to prepare for future climate scenarios (e.g. CSIRO, 2008; Garnaut, 2008).

Despite the demand for action, few in the agricultural community are actually changing their farming practices because of climate change, at least in Australia (Milne et al., 2008). Potential reasons for inaction are diverse – doubt, complexity, avoidance, and the belief that others are responsible are just some of the likely responses that can limit action. Understanding the causes of this wide variety of responses from a social perspective can reveal new and potentially beneficial insights into behaviour (Potter and Oster, 2008). Therefore, more social research into understanding the factors that limit action for climate change, and how to overcome them, is needed (Trumbo and Shanahan, 2000; Moser and Dilling, 2007).

Climate change occurs on a global scale and over a period that is so long that many people find it difficult to relate to. Thus, the actions needed to influence the climate may be difficult to accept (Flannery, 2005). Further, people have different interactions with climate and understand it to be different things, varying from the expected weather, to the number of extreme events, to the level of carbon dioxide in the atmosphere. Climate change is socially constructed differently in different contexts by different social groups based on the different understandings (Pettenger, 2007). Advocates of change need to be aware of the perceptions of climate change that are prevalent in their particular target groups, and need to be able to deal with a diversity of responses, because the ways in which problems are framed and perceived are crucial factors in determining what solutions are seen to be possible (Irwin, 2001). Yet, when it comes to issues of sustainability and climate change, how farmers' social understandings are constructed is not well understood (Lowe et al., 2006). Knowledge about how social responses are generated in agriculture offers a new perspective in how to create alternative, more positive responses and hence facilitate change (Vanclay, 1992, 2004; Vanclay et al., b).

This paper aims to contribute to the social understanding of climate change by demonstrating how the discourses that all social groups are embedded in are crucially linked to the behaviours that are able to be enacted in that group. Discourses fundamentally shape how all concepts are spoken about, and thought about, and thus able to be acted on (cf. Foucault, 1972). Therefore, discourses provide important knowledge of the forces that shape public perceptions and reveal the processes by which climate change is socially constructed. Awareness of discourse is a practical approach because, if the ways that environmental problems are socially constructed are better understood, a range of solutions can be tailored to fit. This paper aims to link the literature advocating action for climate change with the theory around discourses, and argues for a more socially aware understanding of agriculture and farming. It is hoped that this will offer a new, more successful method for promoting change in farming practices towards sustainable agriculture (see also Fleming and Vanclay, 2009a, b).

2. DISCOURSES

The concept of discourse was introduced in the 1960s by the French philosopher, Michel Foucault. Foucault (1972) maintained that the way language is used has consequences for a whole range of things that go beyond the level of individuals or disciplines, to the very structures of society that shape and limit how people are able to speak, think, and act, and to the social structures that are developed accordingly. Discourses are particular ways of using language in particular situations. They exist at the level of a social group and serve to transmit and construct culture, pass on traditions, question the world, and are fundamentally important in the way we construct our identities.

'We speak with the voices of our communities and to the extent that we have individual voices, we fashion them out of the social voices already available to us, appropriating the words of others to speak a word of our own' (Lemke, 1995, 24–25).

Discourses shape the way we use language. Exposure to particular discourses over time creates perceptions about what is right and wrong, normal or abnormal, and thus significantly shapes how we think and act. This means that discourses are influential social constructions that should be examined, particularly in relation to behaviour change. While the study of discourse is a growing component of many academic fields including environmental studies (Harrison et al., 1996;

Darier, 1999; Dryzek, 1997; Hajer, 1995; Carvalho, 2007; Kurz et al., 2005; Bäckstrand and Lövbrand, 2007), the potential for studying discourses as a practical approach to facilitating behaviour change is yet to be realized.

Discourses work toward normalisation and act in opposition to other, competing discourses, and therefore are dynamic and in a state of constant change (Wetherell et al., 2001). However, discourses can be actively changed because the constraints that discourses impose are open to challenge (Darier, 1999). Conflict between discourses creates a point of opportunity for developing new discourses. With an awareness of how a discourse is operating, it becomes possible to conceive how that discourse might be different, or to consider that a different discourse should be adopted, or even to create a new discourse altogether. Therefore, resistance in discourses is a site for agency and transformation. An analysis of resistance in discourses can offer useful insights into behaviour change and it can help to demonstrate the points where new discourses, with new actions and possibilities, might begin.

3. METHODS

In 2008, interviews were conducted with 63 individuals from the apple, dairy and agricultural consultant communities in Tasmania, Australia. Sourced through personal contact with industry leaders, the interviews were conducted on-farm, or in-office, taking an average of 40 minutes. The interviews were conducted in a semi-structured manner suitable for recording people's feelings and perceptions. Indicative questions included: What do you think about climate change? What do you think are the causes? What are you doing about climate change on your farm? What do you think should be done by others? What is sustainable agriculture? How are you sustainable? What is your biggest risk? What do you think of the carbon pollution reduction scheme? What else would you like to see the government do?

The questions were intentionally open-ended to allow responses to be freely given and to limit the input (and potential bias) of the interviewer. The interviews were transcribed, entered on an N-Vivo database and examined using a constructivist grounded theory approach (Charmaz, 2006) and a discourse analysis methodology (Wetherell et al., 2001). The discourse analysis involved searching for themes relating to resistance to action for climate change. The analysis of these interviews and a corresponding literature survey are the basis of this paper.

4. FARMERS' THOUGHTS ABOUT CLIMATE CHANGE

Most interviewees thought that climate change was occurring, and about half believed that they had made personal observations of landscape change, or change on their farm, that they linked to climate change. Yet despite accepting that climate change was occurring, only some thought it was anthropogenic in origin and many were undecided about the cause.

Only some believed that it is necessary to mitigate the causes of climate change and/or are willing to do so. They believed that others had more responsibility to act. Some believed that the major responsibility for action lay with government, and that it is pointless for individuals to act without government leadership. Many were concerned about the inclusion of agriculture in the proposed carbon pollution reduction scheme. They were particularly distrustful of various intended government actions which they saw as penalizing farmers.

A small number were confused about the concepts of greenhouse gases, ozone depletion and weather, often conflating these with climate. This group was unable to name any greenhouse gases, and believed the hole in the ozone layer was related to climate change.

Most saw opportunities for Tasmania in a changed climate. They expected Tasmania to be sheltered from the worst effects of climate change and, therefore, compared to the rest of the nation and the rest of the world, to be relatively benefited. More broadly, however, many were worried about the future of the world for their children and grandchildren.

5. FOUR DISCOURSES OF CLIMATE CHANGE

Our analysis of the transcripts through subsequent levels from codes and categories to themes and discourses (Fleming and Vanclay, 2009b; Strauss and Corbin, 1998) resulted in four discourses being identified. Each of the four discourses shows a distinctly different way of talking and thinking about climate change. These are discussed below and, following these descriptions, are contrasted with each other in Table I.

5.1. The discourse of money

In the discourse of money, nature is understood as a resource to be monitored, controlled and maximized, and sustainability is about continuing productivity and profit. The main concerns of climate change are about the ongoing viability of business and consistency of action at an international level. Climate change, in the form of a major disruption, is not a concern because physical changes are assumed to be gradual and are expected to be overcome through adaptation. Therefore, how people, governments and other countries act is more important than how the environment changes. There is concern about the equity of actions that might be taken to address climate change. Fairness would demand that everyone acts equally, yet this is not practical as everyone has different capacities and responsibilities for action. The government is not trusted to manage these different capacities and responsibilities effectively, especially in terms of the financial restrictions or taxes they will impose. Finally, individual actions are not accepted as important enough to be contributing to the problem and therefore it is pointless for individuals to act alone.

The discourse of money is characterized by a focus on maximizing profit, maintaining economic growth, supporting technological and financial market fixes, and orchestrating opportunities to maintain competitive advantage into the future. This discourse sees climate change as being able to be overcome

Table I. Comparison of the four discourses that are influencing Tasmanian farmers.

	Money	Earth	Human responsibility	Questioning
What is nature?	A resource to be monitored, controlled and maximized	A gift to be left untouched and respected	A system that is fragile and needs protection	A system that is infinitely complex, but potentially knowable
What is sustainability?	Continuing productivity and profit	Preserving the purity of nature	Protecting nature for future generations	A better future made possible by ongoing technological and scientific progress
What is climate?	Expected conditions for production	Natural cycles	The experience of weather over time	A scientific understanding based on models and historical records
What is drought?	Exceptional circumstances, business risk	Unpredictable natural event	Reason for better land management	A separate, but compounding issue; climate change is not climate variability
What is climate change?	Future business risk, unfair financial cost in relation to mitigation and adaptation	Natural event	A justification for calling for major change	A complex process, which appears to be taking place. More knowledge needed
What is the cause of climate change?	Multiple causes. Anthropogenic causes often seen to be accelerating a natural trend	Natural process	Anthropogenic is typically accepted but not a defining feature of this discourse	Anthropogenic causes are cautiously accepted, with the complexity of multiple causes emphasised
What is climate change in Tasmania?	Sheltered from extremes, less affected than elsewhere	No different to anywhere else	An opportunity to lead and set an example	Uncertain; current information is inadequate and more detail is needed
What is farming?	A way for earning financial reward through hard work	A life close to nature	Providing an essential service	An application of skill, knowledge and technology
Who has responsibility for solutions to climate change?	Government, corporations, industry bodies, consumers	Gaia, God, the cosmos	All people equally	Future researchers will have a major role when we learn more; current research contributes to the knowledge base
How is science perceived?	Potentially useful, can be complex and may need translation to be practical	Often irrelevant	Science has a role in creating solutions	Science is useful, and skepticism is an important scientific trait
How are global concerns e.g. terrorism, financial crisis, perceived?	Increase business impacts and opportunities	Shows failure to respect nature	Shows need for social transformation	Adds another layer of complexity

through current cultural and social structures, namely market forces and innovation. As solutions to climate change are assumed to be possible, climate change is only perceived as a threat in terms of what decisions are made to inhibit production or penalise agriculture. The solutions are also assumed to be primarily technological and, therefore, agriculture as an industry needs to be especially careful to stay in line with what others do in order to remain competitive. Locally, Tasmania is seen to be particularly sheltered from major environmental impacts, and therefore there may be potential to benefit from climate change, if the only difference is a few degrees increase in temperature.

In the discourse of money, desirable farming practices centre on concerns about effectiveness, efficiency, market relation-ships, and industry positioning. Farmers' capacities to act for climate change are hindered because costs are perceived as being high, the effectiveness of action unproven, and action is seen as being detrimental to competitive ability. A wait and see approach is favoured, because how others act is crucial for positioning. These views inhibit those in this discourse from acting now, or in supporting Australia to act independently, despite arguments that the costs of inaction are likely to be greater than the costs of action (Garnaut, 2008), that Australia is likely to be particularly affected by climate change, that Australian farmers are particularly likely to suffer this burden financially (ABARE, 2007), and that adaptation is a finite process and unlikely to be sufficient to respond to climate change (Howden et al., 2009).

5.2. The discourse of earth

This discourse focuses on the earth and has as a key feature, 'Mother Nature', a divine metaphorical personification that embodies creative and restorative power. While there is concern for the negative effects on the environment that humans are causing, there is a belief that these are sufficiently insignificant to have any real effect and that the world will persist relatively unchanged. In other words, the earth has the power to endure. There is a strong sense that humans do not have dominion over the earth but that the earth has dominion over humans. There is also the sense that the earth is vast and beyond human comprehension.

In the discourse of earth there is a sense that because climate change is controlled by an external force, it might be part of a divine purpose and therefore not of any great concern. In this view, climate change will potentially provoke natural evolution of humans and other species, or humans may be wiped out but the earth will endure albeit in a different state, as occurred with the extinction of the dinosaurs and other major events.

Desirable farming practices in this discourse centre around respect for nature. Farmer's capacities to act for climate change are hindered because humans are not perceived to be able to influence the state of the planet, and the earth has a considerable capacity to withstand change, or homeostatic capacity. Climate change is seen as one aspect of 'the category of environmental insults deriving from industrial society' (Bulkeley, 2000, 319). Equally important problems are degradation, pollution, extinction and the use of environmentally-unfriendly products. While all of these problems are undesirable and even immoral, they are nevertheless not actually able to affect the earth's equilibrium. There is sufficient mystery and trust in the incomprehensible workings of the planet that human attempts to direct the future are naïve and inconsequential.

5.3. The discourse of human responsibility

This discourse demonstrates a fundamental difference from the two discourses already discussed because, instead of financial or environmental concerns, it focuses on social action. The discourse of human responsibility is about the necessity of acting for climate change and working together to communicate, collaborate and participate. This discourse has a strong sense of agency and responsibility for action. While it is positive and focused on social action, it is held back by a lack of clear direction in what actions to take.

This discourse is primarily about achieving more public engagement with climate change and about creating more equitable and desirable government policies and even a better world order. However, this is a grand plan and climate change can get lost amidst the focus on transformations of social structures that are demanded. Society is seen to be the problem in this discourse and the tools to change society are identified as being people collaborating and working together, demanding what needs to occur using the power of democracy, yet this process is not actually achieving the major changes required to allow all the actions that are yearned for.

Desirable farming practices in this discourse centre on concerns over the capacity of farmers to meet their responsibility to feed the world's increasing population. The ability of farmers to act for climate change is hindered because actions are inhibited by the need to continually increase output and because of the limitations of current infrastructure, social systems and social norms. Changing consumption patterns and environmental values are seen as being essential in this discourse, but this requires system level transformation, which at this stage is still only being talked about and not yet incorporated into action (see also Harrison et al., 1996).

5.4. The discourse of questioning

The discourse of questioning is created through the interplay of the hegemonic power science has, which is propagated by the media, but moderated by public opinion. This discourse is focused on issues of fact, truth, knowledge, information and trust. It emphasises aspects of uncertainty or incomplete knowledge, and the complexity of the issue. Vested interests are seen as being likely to exaggerate climate change, and while there is probably some element of truth in how humans cause negative environmental impacts, the extent to which this occurs and how these are best addressed is still unknown and unable to be discerned until the emotional hype has subsided.

The discourse of questioning has doubt and the quest for more knowledge as its key features. Controversial or emotional information is likely to be distrusted and rejected. In this discourse, nothing about climate change is black and white, and everything is arguable and contested. Information is likely to have been found too confusing, too complex, too distant, too tainted, or too difficult to understand. In this discourse, further attempts to engage with finding more information, talking about the issue, or thinking reflexively about it are avoided until such a time as the answer is made sufficiently clear and legitimated by more scientific endeavor. This involves waiting for others to synthesise the information and come up with a position that is generally accepted and supported. At the moment, the most easily adopted positions are either total rejection, or sitting on the fence.

Desirable farming practices in this discourse centre on specialist knowledge and skillful application of technology. Farmers' capacities to act for climate change are hindered because climate change is too uncertain to be actionable, too controversial to be entirely true, and the required changes too radical to be trusted. In this discourse, trust is a particularly important issue, especially trust in whose knowledge and whether that knowledge relates to personal contexts (see also Carolan, 2006).

6. DISCUSSION

The general perceptions about climate change of Tasmanian farmers as identified in this research are generally consistent

with those found by other studies into public responses to climate change (e.g. Moser and Dilling, 2007; Milne et al., 2008; Lorenzoni et al., 2007; Doulton and Brown, 2009). However, very little research has examined farmers' discourses surrounding climate change for us to compare with our results. This paper seeks to emphasise that responses to climate change are a product of social, rather than individual processes, and therefore more research that takes account of the operation of discourses should be undertaken. We believe that many of the root causes for inaction in the face of climate change are social and discursive. Only a wider account of these social discourses can explain behaviour and thus, resistance.

Many studies of public responses to climate change choose to focus on problems with information, or individual psychology, which are often named the 'barriers' to action (e.g. Bord et al., 2000; Stamm et al., 2000; Stoll-Kleeman et al., 2001; Leiserowitz, 2007; Bostrom and Lashof, 2007; Kollmuss and Agyeman, 2002). While this literature offers important insights into understandings of climate change at an individual level, we believe that there is no such thing as a barrier to change, only legitimate reasons not to change (Vanclay, 1992, 2004). The processes by which these reasons are deemed legitimate or otherwise can be made apparent through analysis of discourses. We argue that a social focus on behaviour change is more useful in relation to facilitating action for climate change than a focus on the specific barriers to change, because it is only through a social approach that the 'practical and discursive constraints of context, both locally and nationally' (Harrison et al., 1996, 215) can be properly addressed.

The many explanations as to why people do not change behaviour that are discussed in the literature can be generally categorized into groupings around conceptual, practical and information barriers. These are summarised below in order to restate our belief that it is not as useful to find out the barriers to action as it is to properly understand the legitimate reasons for inaction. By describing the large number of individual barriers below, we hope to show how overwhelming change can be, if each barrier is to be addressed individually. Instead, we advocate a focus on discourse that offers a more holistic and thus more effective way of understanding and addressing inaction and resistance.

6.1. Conceptual barriers to climate change action

This grouping comprises the many arguments given as to why people can not comprehend climate change due to its complexity. In these arguments, climate is perceived to be a complex science created by multiple interactions between the oceans, land masses and the atmosphere. There are complex effects of climate on the environment, including, but not limited to, the weather. These effects occur over long time scales of years, decades and centuries, so cause and effect connections are difficult to establish and cycles are not often experienced by individuals and/or not accurately remembered. Climate systems and climate cycles are created on a scale that make it seem too distant and too abstract, or too vast and unalterable (Moser and Dilling, 2004). Public understanding of climate change is reliant on science to discover, monitor and potentially solve the problem (Demeritt, 1998), and the media is seen as the conduit for this information transfer from science to the public.

Conflicts between science and the media and the public about truth, values, knowledge, power, responsibility for action, and agency have been the focus of many studies about climate change and environmental sustainability (Potter and Oster, 2008; Boykoff, 2008; Carvalho, 2007; Lorenzoni et al., 2007; Kurz et al., 2005; Sarewitz, 2004; Jasanoff, 2004; Clover, 2003; Princen et al., 2002; Dryzek, 1997; Hajer, 1995; Ungar, 1992; Litfin, 1994). While some of this research does use discourse, it is our belief that this has so far been insufficient.

6.2. Practical barriers

Another category of barriers to change can be conceived as relating to the practical dimensions of the posited solutions. In the conventional diffusion of innovations literature, these include available time, money and social infrastructure, as well as considerations of convenience, ease, flexibility, divisibility, referring to the breakdown of a change in behaviour into the required steps (Rogers, 1983; Vanclay, 1992, 2004; McKenzie-Mohr and Smith, 1999; Pannell et al., 2006). The individual states of motivation, risk, resources, support, individual character traits and skills also play a part. In relation to climate change, Moser and Dilling (2007) have outlined similar barriers to action.

Some scholars advocate a different, more social level approach (Potter and Oster, 2008; Lorenzoni et al., 2007) to change the social structures that limit these behaviours, and to create social mores to normalise the desired behaviours (Griskevicius et al., 2008). We see these as being complementary aspects of the broader concepts of changing discourse. Discourses influence the language used to talk about issues, the types of institutions needed in society and the way these institutions are used (Phillips and Jorgensen, 2002). Therefore, discourses are fundamental in understanding behaviour.

6.3. Information barriers

The final category of barriers is problems of information and its communication. While the critique of the view that the provision of information alone does lead to behaviour change has been well-established since the rise of what is called the 'information deficit model' (see Potter and Oster for a review) some, for example, Sturgis and Allum (2004) still believe that the provision of information will change behaviour. They are not alone in this view as it is widely shared by many scientists.

In the view of those who think information will solve the problem, they see 'information' in simplistic, 'objective' terms, and not in its social context. The barriers to change that these people consider are the lack of information, the lack of access to information, problems in the targeting of information, and the lack of ability of people in understanding the information. There is the view, too, that in a society which is

potentially overloaded with information, many people lack the ability to find the information they need, or lack the necessary tools and intellectual resources to evaluate the competing information that is on offer.

In our view, behaviours are embedded within different contexts and situations, and are linked to institutions, social networks and the contexts of place. These must all be considered and adapted or transformed with the adoption of even seemingly simple behaviour changes. We consider that 'problems' or 'barriers' should not be addressed individually, but should be included in the overall account of the reasons for behaviour which we see as being discursive. Changing behaviour on an individual scale is slow and likely to be resisted at many points: 'behavior change is not a one-by-one persuasion task, but a social challenge' (Tribbia, 2007, 248). This is a challenge achievable through working to change the discourses that currently limit behaviour.

7. OPPORTUNITIES FOR CHANGE

From the four discourses we have found operating in agricultural circles in Tasmania, there are points of opportunity for change. By understanding the way issues are framed and understood in particular discourses, the ways forward can be framed in a corresponding fashion. This can minimize misunderstandings and tap into existing motivations for action. In this way, an understanding of which discourse is operating in which context can provide a social insight into farmers' characters and positions.

The discourse of money sees resistance to changing practices for climate change as the best way to avoid costs, to focus on other more important problems and to allow time to learn more and therefore increase the likelihood of being more competitive when implementing actions later. However, those who are influenced by this discourse can be motivated to support action by stimulating their need to maintain competitiveness and to be involved with climate solutions developed by industry. To increase the desire for, and adoption of, actions in this discourse, the potential financial benefits and future costs need to be clearly identified. Information about how others are responding, especially at government, industry and consumer levels, is especially important. In this discourse, emphasis on the human responsibility for the environment and emotionally-laden tactics are unlikely to be successful unless tightly connected to issues of financial concern. Therefore, explicitly highlighting the connections between financial problems and climate change, for example reducing input costs by addressing climate change, is of more use than describing other general impacts, no matter how catastrophic, that have financial consequences merely implied.

The discourse of earth resists action for climate change because it sees any action humans can take as being too small and/or irrelevant to make a difference. This discourse sees that other forces are in ultimate control of the earth, and humans cannot affect the outcome of the future path of the planet, or the future of the species. However, this discourse supports action by wanting to promote the value, goodness and wonder of nature and caring for it in a way that is properly respectful and grateful. The best way forward for increasing action in this discourse is by highlighting the multiple environmental benefits of climate change action and emphasising the cultural shift toward sustainability, that is, respect for the earth, that is required. Promotion of the anthropogenic origins of climate change will not be an effective, or necessary, way to promote action in this discourse.

The discourse of human responsibility resists action for climate change because there is confusion about what to do and how to practically implement actions, especially because of concerns about major barriers that are seen to be impossible to fix, like social and governmental structures. However, there is a great deal of willingness to act and therefore significant untapped potential for action is demonstrated in this discourse. If given the resources, those in this discourse are likely to take action up quickly and this is also the most likely discourse to create new forms of action. In this discourse, emphasising the practical information about climate change actions, particularly those involving community or group interaction is the best way forward. Highlighting the reasons for action, or the urgency of action, will not be effective in this discourse as the desire to act is already present and further emphasis can overwhelm. Instead, demonstration of practical ways forward and providing social contacts and the framework for networks will be the most beneficial.

The discourse of questioning resists action for climate change because of distrust or dissatisfaction with information or perceptions of the inability of people to understand or relate to information. This discourse advocates avoidance, denial and delay. However, it has the potential to support action because it accepts that some knowledge is already available for how to proceed. It trusts scientific pursuit to eventually provide the answers and accepts that progress is achieved incrementally, so some action is advisable now. In this discourse, information about the potential benefits of actions needs to be highlighted, rather than information aimed at overcoming scepticism about the causes. In effect, showing this discourse that they too have a vested interest in acting on climate change, and a role to play in producing relevant, 'on-the-ground' knowledge about action for climate change, is the best way forward.

8. CONCLUSION

Each of the discourses identified through our interviews with members of the Tasmanian agricultural community shows a distinctly different way of framing the issues of climate change and sustainability. These are: as an issue of business viability; as an environmental concern; as a call for social action; or as a problem of trust and information. Knowledge of which of these discourses is at work within different social settings allows for different approaches for facilitating behaviour change to be implemented. Each of the discourses provides points of opportunity for action by focusing on the particular aspects that are central to the discourse and that would therefore motivate change by highlighting issues of financial

benefit, environmentalism, social action or trusted knowledge respectively.

Climate change means that sustainability is more important than ever, but still understood in a diverse range of ways. Australian agriculture is going to be under significant pressure to implement a wide range of changes in practice for adaptation, mitigation and social responsibility. A social consideration of the agricultural community's behaviours and perspectives is now even more important to consider. More effective approaches to understanding behaviour change are needed because of the urgency of action for climate change. The diversity of social understandings and responses to climate change and sustainability mean that a new method for facilitating change is required. In order to cope with diversity, this new method needs to be focused on a social level of change in order to have a meaningful and significant effect. Awareness of discourse is the most appropriate tool for achieving this level of change.

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