

## Using discourse analysis to improve extension practice

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**Abstract.** This paper aims to create awareness of the potential of discourse analysis to be a valuable contribution to agricultural extension. By way of example, it also reports on the discourses about climate change identified as being present in the Tasmanian agricultural community. The paper outlines the theories of discourse analysis and presents the results from interviews with 63 farmers and agricultural consultants undertaken in 2008. The steps of this analysis are presented in detail to provide instruction in the potential application of the method. Four distinct discourses about climate change were found. These all have practical implication for promoting action in response to climate change and in understanding community resistance. These discourses related to issues of Money, the Earth, Human Responsibility and Information. Each of the discourses values different information and sees possibilities about action for climate change differently from the others. The four discourses are described in order to provide new insight into how climate change is framed and understood, to demonstrate how discourses limit action and to inspire greater use of discourse analysis in agriculture and extension.

The key learnings of this paper are:

- discourse analysis is useful for extension and should be more widely used
- doing discourse analysis is relatively easy, as is demonstrated in this paper
- climate change is understood in a range of ways, because of different discourses.

**Keywords:** extension, climate change, agriculture, discourse analysis, farmers, behaviour change.

### Introduction

Climate change is now recognised by the Intergovernmental Panel on Climate Change as being 'unequivocal', as largely being caused by anthropogenic activity and as having unavoidable impacts already in place (IPCC 2007). Climate change creates a particular challenge for agriculture and agricultural extension as the impacts on agriculture are diverse, uncertain, potentially severe and with important consequences for wider society. Climate change raises many questions about how best to facilitate behaviour change and create a world that is more sustainable. Extension can be defined as 'the process of enabling change in individuals, communities and industries involved with primary industries and natural resource management' (SELN 2006, p.3). In order to respond to the challenge of climate change, there is an opportunity for extension practitioners to take greater responsibility and leadership in facilitating adaptation and mitigation in the agricultural sector, if given the required recognition, funding and support. This potential can only be realised if extension is more widely acknowledged as an agent of change, and if it is included in more diverse fields of theoretical discussion and practical application. In this way extension has the potential to be a significant contributor to the solutions of climate change, not just in agriculture, but also more widely.

This paper has two objectives. The first objective is to introduce the concept of discourse and how it might benefit extension practices in general and around climate change through describing some of the common responses to climate change that are likely to face those working in extension circles. The second objective is to show how a discourse analysis can be conducted. To explicate the methods of discourse analysis, some results of a discourse analysis of interviews with two agricultural industries are given. As the intention of this paper is not to present these result in any depth, readers interested in more detailed results are referred to Fleming and Vanclay (2009a).

### Discourse

One theoretical framework which could improve extension practice is the study of discourses and how discourses shape our social worlds. Discourses are particular ways of using language in particular situations but discourse goes beyond the level of conversation or discussion:

Words in isolation are not the issue. It is in discourse – the use of language in specific contexts – that words acquire meaning ... We cannot understand the significance of any word unless we attend closely to its relationship to other words and to the discourse (indeed, the competing discourses) in which words are always embedded (Cameron and Kulick 2003, p. 29).

The discourses in which words are embedded are the culturally and historically produced assumptions, values and shared beliefs that cluster around words (Cameron and Kulick 2003). This means that language use, embedded in discourse, is not separate to the social reality or behaviour in which it occurs, but actually co-constitutive of it.

Discourse, then, is both shaped by the world as well as shaping the world. Discourse is shaped by language as well as shaping language. It is shaped by the people who use the language as well as shaping the language people use. Discourse is shaped, as well, by the discourse that has preceded it as well [as] that which might follow it (Paltridge 2006, p. 9).

Discourses are social constructions, culturally and historically produced as a set of practices that shape people's behaviour, including language and thought. Discourses show how individuals think, how they are enabled, encouraged and normalised into seeing the world, themselves, problems and possible actions. 'Discourse is more than simply the use of language as a tool for communication' (Pettenger 2007, p. 10). Discourses shape what we can say, do and think, and therefore they determine the social consequences of our actions. Discourses are not hidden or unconscious, but are taken for granted ways of being, that, if examined, offer insights into social life and social relations (Cameron 2001). Analysis and reconsideration of discourse is a conceptually high-level, but highly effective point of action for change, because discourse is so pervasive and fundamental. Therefore, activities such as extension that focus on understanding human behaviour in order to facilitate social change should take discourses into account.

### **Discourses and the environment**

Discourses around the environment have been explored in several disciplines (see for example Ungar 1992, 2000; Litfin 1994; Hajer 1995; Darier 1999; Dryzek 1997; Carvalho 2005, 2007). These studies are usually undertaken through analysis of media texts, policy documents or environmental movements (Kurz et al., 2005). In agriculture and extension, studies of power relations and knowledge constructions have made significant contributions to social understandings of agriculture (e.g. Carolan 2006; Wynne 1992a, 1992b; Michael 1992; Vanclay 2004). However, these have so far been achieved without any overt references to discourse. Yet discourse is fundamentally linked to power, because discourses limit and create possibilities. Discourses enact power (Foucault 1979).

Discourses are intertwined with issues of power because to know the necessary practices of a particular discourse, and to have access to the discourses that have social legitimacy in society gives an individual power. Each discourse also enacts power by designating individuals who can and cannot participate, and by defining who, or what, is deemed powerful. Discourses 'impose constraints about the possible options open to individuals and groups' (Darier 1999, p. 19). Therefore, there is still a great deal more to be discovered in the construction of agricultural power relations and discourses, because the language used by social groups in agriculture is rarely studied. Language use is especially important for the processes of extension as extension incorporates aspects of communication, education and facilitation. As Dryzek (1997, p. 9) puts it: 'language matters ... the way we construct, interpret, discuss, and analyse environmental problems has all kinds of consequences'.

The consequences of language need to be explored more fully so that the relationships between language, thought and action can be brought to bear on understandings of behaviour change. Extension, as the nexus between academia and agriculture, education and farming, and information and practice, is a prime opportunity for both studying agricultural language and applying this information as a tool for facilitating change.

Extension is particularly well placed to work with discourse because extension works within the contextualised social practices which discourses describe. 'People live and act not just within one discourse ... They live among a number of discourses; and so they may be able to negotiate what position they will take up' (Morgan et al. 1996, p. 70). Understanding the particular discourses relevant to each problem is therefore empowering. It creates opportunity for human agency within, movement between, or direct influence on, possibilities for the future. In many ways, this is a form of capacity building which is exactly the purpose of extension (SELN 2006).

Although discourses do not necessarily solve environmental problems, people, informed by discourses, can (Litfin 1994). Therefore, extension informed by discourse analysis can be an empowering mechanism for facilitating change. Understanding the influences discourses have on behaviour is an important step towards this change.

## Climate change

Extension faces new challenges with climate change and a renewed demand for services as farmers and agricultural communities strive to learn about, prepare for, and build resilience to the projected impacts of climate change. It is considered that Australia will be 'one of the most adversely affected regions from future changes in climate in terms of reductions in agricultural production and exports' (ABARE 2007, p. 657). Agriculture is a significant producer of greenhouse gas emissions – in Australia in 2005, 17% of greenhouse gas emissions came from agriculture (Garnaut 2008). The impact of agriculture's contribution, however, is significantly increased when examining particular gasses, for example 84% of nitrous oxide emissions and 60% of methane emissions come from agriculture (Garnaut 2008). This will mean that agriculture is likely to face considerable pressure to mitigate emissions, as well as to adapt to the changes in climate already set in place. Climate change presents an urgent reason for action by farmers (Garnaut 2008; CSIRO 2008). Yet relevant information is scarce and there are many uncertainties. Extension, therefore, has a challenging task ahead and new tools to enhance understanding of the ways forward are required.

Farmers are likely to need to put changes in place before decisions about government regulations and international agreements are finalised and therefore before adequate support systems and chains of information are put in place. Indeed, some farmers may feel they are already facing climate changes worse than those projected for the future, because of current drought conditions, for example in the Murray-Darling basin. The carbon pollution reduction scheme, with or without agriculture's inclusion will have significant effects on agriculture, for which there will be winners and losers. Extension is likely to be placed under increasing pressure to help farmers cope with changes brought about by climate change that are not just bio-physical, but also social and political.

Climate change is continually being socially constructed (Pettenger 2007) and as such its 'meaning potential' (Gee 2004, p. 21) – i.e. whether climate change is taken as certain, uncertain, natural, anthropogenic, actionable, unactionable etc – changes depending on who is speaking about it, for what purpose, and in what context. This means that the discourses of climate change are complex, because competing interests and powers are still working at shifting them for their own advantage. Analysis of the discourses constructed about climate change is therefore a particularly rich site for research (see also Fleming and Vanclay 2009b; Vanclay, Leith and Fleming 2009).

Discourses demonstrate where barriers for changing behaviour exist at the wider social and cultural levels, not at the individual level or infrastructural level. As Kurz et al. (2005, pp. 616-7, emphasis in original) explain:

This barrier is not an individual, psychological one *per se*; it is not something that an individual has, like an attitude. It is also not an external, physical or structural barrier like lack of convenient infrastructure or monetary cost. Rather, it represents something that members of a society are able to *draw upon*, while interacting with other members of that society, to legitimate and justify their existing patterns of behaviour. Such discourses may also allow individuals to justify their own patterns of behaviour to *themselves*.

The following part of the paper discusses research that was conducted in a discourse analysis of farmers' concerns about climate change. Through this example, the ways in which discourses shape peoples' ideas and behaviour will become apparent so that the benefits of a discourse analysis for extension and behaviour change might be practically demonstrated and applied to other contexts.

## Methods

In 2008, 63 individuals were interviewed in Tasmania from the apple and dairy agricultural communities. These individuals consisted of 22 apple growers, 29 dairy farmers and 11 agricultural consultants. The apple growers were predominantly from the southern part of Tasmania, and the dairy farmers were predominantly situated in the north. The agricultural consultants were spread around the state, in a mix of university and private enterprise.

The interviews were predominantly face-to-face and held in the home or office of the interviewee. At times, other family members or business partners were present and where possible, included in the interview. The majority of the interviewees were middle aged, white and male, with only 13 women interviewed. There were no particular specifications for the interviewees, beyond identifying with either the apple or dairy industries (or both). The interviewees were sourced through personal contact with industry leaders, attendance at group meetings, conferences and field days. The interviews were conversational in style, and open

ended in order to ascertain interviewee's dominant concerns. The interview questions were related to issues discussed in the literature and designed to stimulate verbal reflection on the issue of climate change as relevant to all spheres of life. The interviews averaged 32 minutes and the number of questions asked varied for each individual. Fewer questions than those listed below were asked if the interviewee felt comfortable to talk, further questions were asked if the individual needed encouragement or clarification. A list of typical questions is included below:

- Tell me about yourself and your farm/business?
- What do you think about climate change?
- What is climate change?
- What do you think causes climate change?
- Is climate change something new?
- Where do you get information about climate change?
- How do you think climate change will affect you and your business?
- Are you doing anything personally?
- What is your industry doing?
- What do you think of the carbon pollution reduction scheme?
- What else would you like to see the government do?
- What is the biggest risk to your business?
- How do you feel about the future of farming?
- Do you have an image you associate with climate change, for example from the media?
- What do you think about the ozone layer?
- Can you name the greenhouse gases?
- What is sustainable agriculture?
- How are you sustainable?
- What do you think is the difference between weather and climate?
- Do you talk about climate change with family or friends?
- Do you have anything else you would like to say?

There was some initial resistance to the topic of climate change, however, as the interviewer had no prescriptions, limited experience in the industry, and little background in climate science, the responses usually became more comfortable and willing to discuss, explaining industry procedures, describing personal opinions and enjoying the opportunity to reflect about concerns that 'weren't usually thought about'.

In addition to the interview responses, pertinent observations and reflections made in the researcher's journal about interview elements not necessarily captured in the transcript, such as body language and contextual information, were also recorded. Qualitative methods of analysis were used to analyse the data and to generate codes, categories and discourses. Coding means the attachment of 'labels to segments of data that depict what each segment is about' (Charmaz 2006, p. 3). First, dominant meanings in the transcripts were described (coded) at the sentence level. Descriptions of codes used active verbs to keep the codes contextual and to capture the purpose behind the words (Charmaz 2006). NVivo software was used throughout the analysis to structure and store the data and to allow easy access, refinement, notations and connections at all points of the analysis.

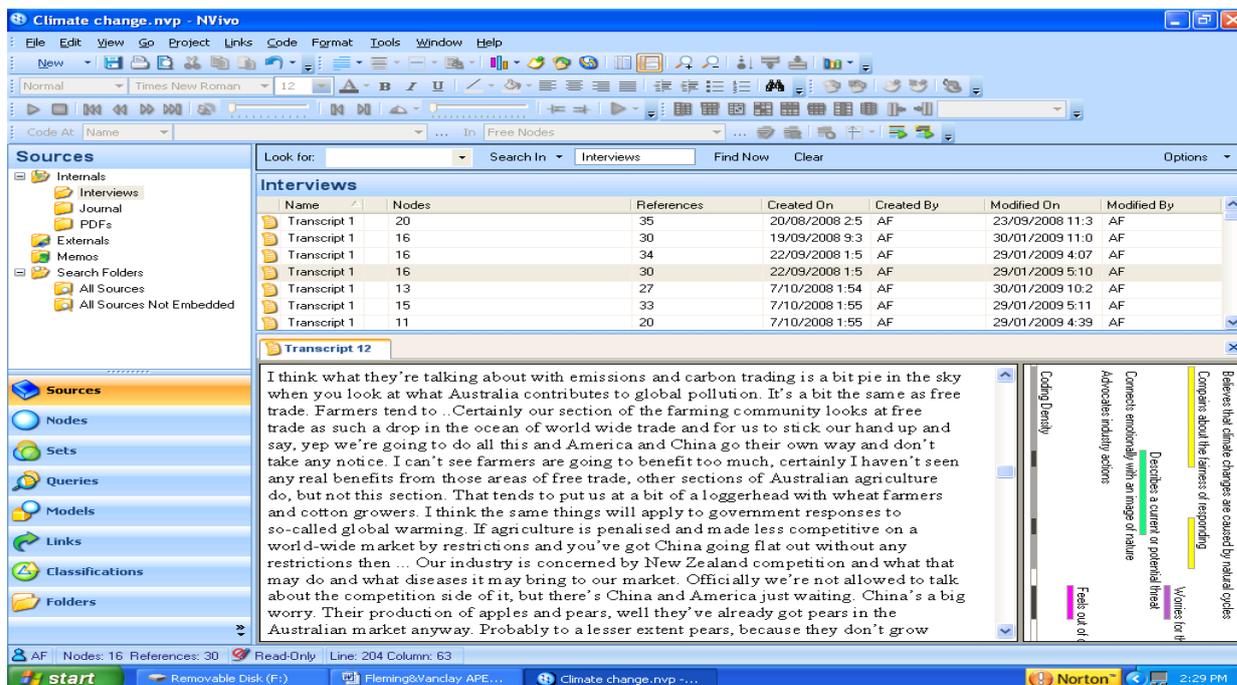
### **An example demonstration of coding**

As the procedures leading to a discourse analysis are relatively unused in the extension field, they are explained in some detail here in order to provide instruction to others who may wish to apply this method. Strauss and Corbin (1990) and Charmaz (2006) provide further explicit instructions for coding. Figure 1 is an example of how coding works using NVivo. The sections at the right-hand side are parallel with the segments that have been coded, i.e. the sentence beginning: 'If agriculture is penalised and made less competitive' has been coded at two codes: 'Describes a current or potential threat', and 'Complains about the fairness of responding to climate change'.

After all the interview transcripts had been coded, a list of all codes created was generated. This was then analysed in order to group the codes into 'categories' – 'concepts grouped together under a higher order, more abstract concept called a category' (Strauss & Corbin 1990, p. 61). Categories are made in order to draw out deeper connections between the codes. For example, codes that achieved the same purpose but in different ways, or focused on different aspects of the same concept, were grouped together. Descriptions of each category were written up and analysed. After successive stages of analysis, the categories were again grouped into 'discourses' – 'shared meaning of phenomena' (Bäckstrand and Lövbrand 2007, p. 125) – to provide a higher level description of the points of connection between the categories. The discourses were then described in detail and further analysed to explore the tensions,

contradictions and implications of the dominant ‘shared meanings’ (Bäckstrand and Lövbrand 2007, p. 125) they represented. In summary, coding breaks down and conceptualises the data at an individual language or sentence level; categories put these concepts back together in new ways that shed insight into the data, and discourses group multiple categories together to demonstrate the more complex, higher level, or ‘real world’ consequences of language use. Figure 2 shows the hierarchy of codes, categories and discourses in NVivo. The discourse shown is ‘Human Responsibility’ with four categories visible: ‘Action’, ‘Barriers to Action’, ‘People Power’ and ‘Responsibility’. The remaining icons belong to codes placed under their respective category.

Figure 1: Screenshot showing coding

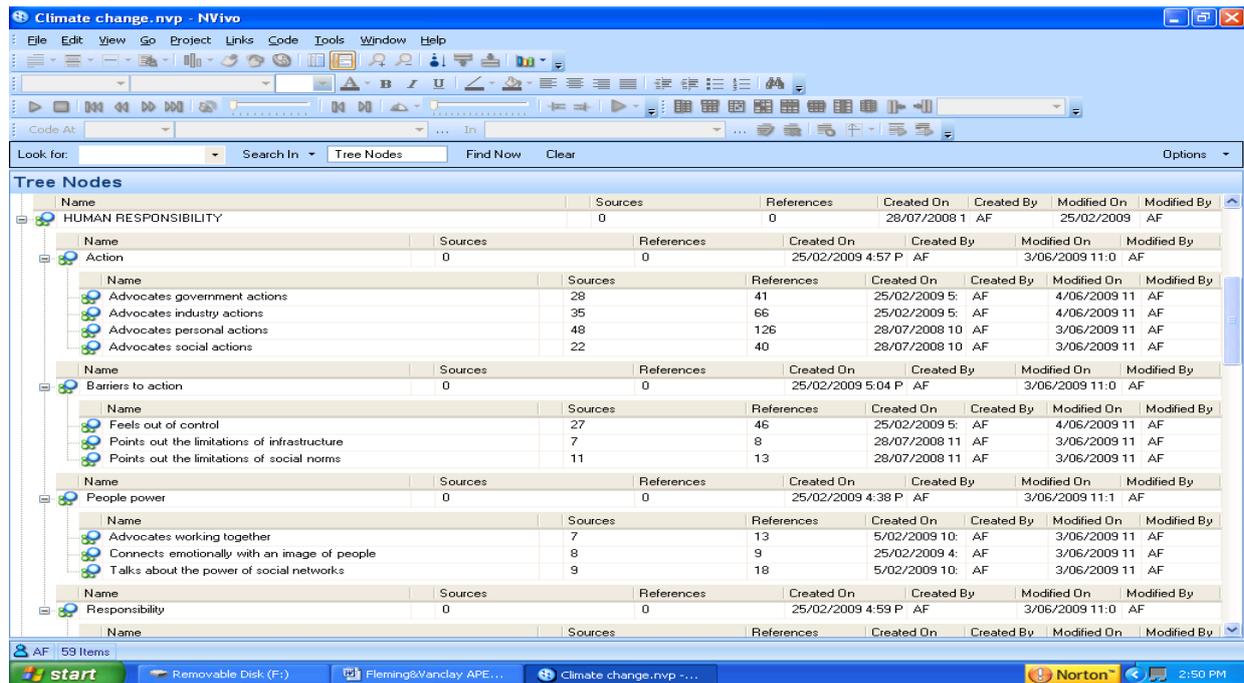


Source: NVivo 2009, personal file.

While the description above may sound relatively straightforward, it should be noted that generating discourses is a complex process, and analysis of the codes to form categories and discourses does not occur in a linear progression – it involves many stages of re-ordering, re-analysing and re-thinking to reach the level of discourses. However, even preliminary efforts of coding and constructing categories can create many useful insights into the consequences of language use and a full discourse analysis may not always be required to create benefits for extension.

Discourse analysis of this type is based on the researcher’s subjective interpretation of the data that is enhanced by research questions, literature concepts and personal experiences of the interview – termed ‘constructivist’ (Charmaz 2006). Analysis of this sort is intended to provide insight into the data that is closely connected to issues discussed in the relevant literature and to the context of the data collection. Familiarity with the literature is used to guide all stages of the research, from the types of questions asked, to the ‘lens’ through which the data is viewed, and the language used in naming of the codes, categories and discourses. The analysis is therefore continually ‘grounded’ in theory (cf. Glaser and Strauss 1967; Strauss and Corbin 1990). Interpretations come from the data, with the literature helping to frame what is being looked for, but not necessarily the answers that are found. Current theories from the literature are applied to the data to see whether the data supports, contradicts or is relevant to these theories, but if not wholly new interpretations can be made. In this way the data is not forced into any particular frame, but continually questioned and re-examined in order to condense and connect the underlying themes in the data. This approach requires an intense period of immersion with the data and with the literature, as well as records of insights, connections, questions, tensions, refinements and decisions made about the data to be recorded as ‘memos’ (Strauss and Corbin 1990; Charmaz 2006), which then justify and structure the movement of the analysis from the low level codes to the more abstracted discourses. This method is following a constructivist grounded theory (Charmaz 2006).

Figure 2: Screenshot showing the hierarchy of codes, categories and discourses



Source: NVivo 2009, personal file.

Reflection at all levels of the analysis helps to enhance rigour as it demands a high level of interrogation of the data and justification of the conclusions made at all stages of the analysis. Emerging interpretations are continually tested against the data as they are being formed, to ensure the data supports the insights being drawn. Rigour is also enhanced by the analysis occurring over time, to allow ideas to settle and be re-examined afresh, as long as familiarity with the data is maintained. Objectivity is not the aim of a discourse analysis, but rather the goal is a subjective, relevant and contextual interpretation justified by the data, the literature and professional, systematic methods of data collection and analysis.

**Results**

In our analysis, 42 codes were decided on which were then aggregated into 13 categories and 4 discourses. It is important to emphasise that it is not the number of codes or their frequency of occurrence that is important, but rather the meanings gained from how the codes and categories are grouped. The four discourses identified as pertaining to the understandings of the Tasmanian agricultural community about climate change are explained below.

**(1) The Discourse of Money**

The discourse of Money is characterized by a focus on maximizing profit, maintaining economic growth, supporting technological and financial market fixes, and orchestrating opportunity through competitive advantage. This discourse sees the challenges of climate change being overcome through current cultural and social structures, namely capitalism, particularly from government and industry level led solutions. These solutions are assumed to be possible and while they may be initially expensive they represent the fairest, quickest and in the long term most cost-effective way of achieving change.

In this discourse the government is given the power of making important economic and political decisions, yet the government is not trusted to make these decisions fairly and equitably, especially in terms of industry profitability. There is a focus on the costs of action for climate change in this discourse, but the costs of inaction are ignored. Mitigating climate change is seen as too expensive and government, and society, should focus on fixing the financial crisis, and then adapt to whatever changes in climate may occur. This delay is not motivated by a sense of denial or avoidance but an assumption that predictions of extreme changes are hyped up by those with vested interests and that adaptation is an innate human capacity so that humans will 'naturally' respond to climate change. This is seen as particularly the case for farmers, who are already skilled at managing climate variability, so climate change poses nothing new, especially if the predictions that Tasmania will not have to cope with changes as significant as other areas are proven true. The perception of natural adaptation and relatively minor changes means that

the sensible path is waiting until the impacts of climate change become more apparent and then letting market forces create the necessary adjustments.

### ***(2) The Discourse of Earth***

The discourse of the Earth is about fatalism and a divine power especially Mother Nature and the cosmos. The strongest common element in this discourse is concern for the Earth and humans' negative impact on it. A simultaneous and contradictory view is that humans are so insignificant our worst efforts to pollute the world can never have a real effect. Volcanoes are often cited in this discourse as examples of how nature produces emissions for climate change that dwarf any human contributions. Climate change is seen as the culminating example of the blight of human beings on the Earth which is nevertheless insignificant compared to the ultimate power of the Earth and the universe. Climate change is a natural, inevitable process that is part of Gaia/God's ultimate plan, and whether or not humans are accelerating it, it is only because there is a divine purpose for climate change that humans cannot understand. Therefore, climate change will be fixed, if ordained, through natural cycles or other divine processes, or humans will be wiped out and the Earth will go on to an entirely different state and regain balance anew, like after the extinction of the dinosaurs. In this discourse, extinction of the human race is increasingly likely and not a source of great concern as it will occur in the far off future and the loss of the whole human race cannot be that important in the grand scheme of things, because who knows what other civilizations exist.

This discourse regards action for climate change as important for respecting the Earth and our place in it, but as largely irrelevant in the future path of the world. Climate change is seen as a positive tool for encouraging society to reconnect with nature and to live more respectfully and sustainably, not because it will change the outcome of the world, but because it is right to properly honour the sacred beauty and majesty of the Earth.

### ***(3) The Discourse of Human Responsibility***

The discourse of Human Responsibility is about the power of people. This discourse has a strong pattern of human agency and responsibility for action. While this discourse has a very positive element, about community engagement and social action driving more equitable and desirable government policies and eventually a better world order, it is held back by a lack of clear or unified sense of how to act. Stumbling blocks creating a sense of confusion or hopelessness include perceptions of the immovability of the limitations of current social structures, at the local and government levels. Central to this discourse is wanting to do something but not actually acting yet, because of feeling insecure about the actions, feeling alone in acting, feeling that there is insufficient support or because actions are too difficult. Trying to act and being unsuccessful or citing wholly unrelated actions as important are also indicators of this discourse. 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 yet achieving the major changes required to allow all the actions that are yearned for.

An interesting aspect of this discourse is the positive experiences people highlight, even when targeted objectives are not achieved. Forming closer relationships with local communities and being involved with a diverse range of people brings enjoyment to many, even if the desired end result for climate change is not yet being achieved. This discourse has potential to become a larger social movement, simply because it is rewarding for people in its own right. However, there is a long way to go if it is to grow in size sufficiently. Humans as the central cause of the problem is accepted by many in this discourse, but not all, as it is not an essential belief in this discourse that humans had to create the problem if they are to be part of the solution. This discourse builds on other less dominant, potentially growing discourses already in society that do not necessarily have any connection to climate change, including a sense of wanting to feel empowered to act to create a better world, a sense of wanting to overcome alienation, loneliness and redundancy and wanting to feel connected to what is really important in life, including the environment, but more especially, other people.

### ***(4) The Discourse of Information***

The discourse of Information is about indecision and avoidance. It is also about focusing on aspects of uncertainty, and the need for more knowledge about climate change. There is commonly a rejection of responsibility and/or ability to understand or adequately judge and implement information. Confusion and doubt are key features of this discourse. Distrust in information is likely to be actively cultivated so that denial and avoidance can be justified. Nothing in climate change is black and white and everything is arguable and contested. Information is likely to have been sourced and either found too confusing, too complex, too

distant, 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 that the answer is sufficiently clear and simple and legitimated by someone else. This involves waiting for others to synthesise the information and come up with a position that is generally accepted and supported and can then be taken up, thus avoiding the difficult process of personally evaluating all the information. At the moment the most easily adopted positions about climate change are either total rejection or sitting on the fence.

Also included in the discourse of Information is the belief that climate change will not have very negative effects until far into the future and so there is time to act later, when Australia can be more favourably positioned in relation to the political and economic situation in the rest of the world, for example, after carbon trading has been trialled in other places, after the economic crisis is over or after the impacts have become more obvious etc. In this way, other issues are seen to be more important and act as excuses that justify delay. Delay is encouraged in this discourse so that personal actions are not required, because needing to act involves facing further uncertainties and decision making. In this discourse there is a strong hope that climate change will go away, that it will be disproven, the hype will die down and everyone will forget about it, or it will not create any major changes until the distant future and so will not have to be dealt with personally. It is common for this discourse to involve a negative reaction from some other issue, like the Y2K phenomenon, and past experiences with failed trust are likely to make neutral thinking about climate change difficult.

### Conclusion

This paper described four discourses that were present in discussions about climate change in an agricultural community in Tasmania. These discourses surrounded issues of Money, the Earth, Human Responsibility and Information and each framed the issue of climate change in different ways, with significant implications for how climate change was understood, what actions for climate change were seen as important, and how barriers to action were created.

Through this analysis, this paper has aimed to highlight the importance of language in shaping behaviour. Through this, it has aimed to make apparent the benefits of awareness of discourse for agricultural extension and to give some instructions for the methods of examining language more closely. This paper argues that examining language is a useful technique for extension in order to enable engagement with different community perceptions and understandings about climate change, which are essential to address when aiming to facilitate change.

The complexity of the issue of climate change, in cause, effect and social response, is fertile ground for other explorations of discourse in agriculture. Extension has an opportunity, and perhaps a responsibility, to use its theories, skills and practices to help agriculture respond to the challenge of climate change and to expand into new directions that offer fruitful theoretical and practical applications. Discourse analysis offers one such new direction.

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### References

- ABARE 2007, 'December quarter', *Australian Commodities*, 14(4): 657-576.
- Bäckstrand, K and Lövbrand, E 2007, 'Climate Governance Beyond 2012: Competing Discourses of Green Governmentality, Ecological Modernization and Civic Environmentalism', in M Pettenger (ed.), *The Social Construction of Climate Change: Power, Knowledge, Norms, Discourses*, Ashgate, Hampshire, pp. 123-147.
- Cameron D 2001, *Working with Spoken Discourse*, SAGE, London.
- Cameron D and Kulick D 2003, *Language and Sexuality*, Cambridge University Press, Cambridge.
- Carolan M 2006, 'Social change and the adoption and adaptation of knowledge claims: Whose truth do you trust in regard to sustainable agriculture?', *Agriculture and Human Values*, (23)3: 325-339.
- Carvalho A 2007, 'Ideological cultures and media discourses on scientific knowledge: re-reading news on climate change', *Public Understanding of Science*, 7(2): 223-243.
- Carvalho A 2005, 'Representing the politics of the greenhouse effect: Discursive strategies in the British media', *Critical Discourse Studies*, 2(1): 1-29.
- Charmaz K 2006, *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*, Sage, London.
- Climate Futures for Tasmania 2008, [http://www.acecrc.org.au/drawpage.cgi?pid=climate\\_futures](http://www.acecrc.org.au/drawpage.cgi?pid=climate_futures)

- CSIRO 2008, *An Overview of Climate Change Adaptation in the Australian Agricultural Sector: Impacts, Options and Priorities*, Australian Government Department of Land and Water, Canberra.
- Darier E (ed.) 1999, *Discourses of the Environment*, Blackwell, Oxford.
- Dryzek J 1997, *The Politics of the Earth: Environmental Discourses*, Oxford University Press, Oxford.
- Fleming A and Vanclay F 2009a, 'Farmer responses to climate change and sustainable agriculture' *Agronomy for Sustainable Development* in press ([doi:10.1051/agro/2009028](https://doi.org/10.1051/agro/2009028)).
- Fleming A and Vanclay F 2009b, 'Discourses of climate change: Understanding farmer resistance' in J Martin and C Winter (eds.), *Climate Change Responses across Regional Australia: Social Learning and Adaptation*, Victorian Universities Regional Research Network Press, Ballarat.
- Glaser B and Strauss A 1967, *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Aldine, Chicago.
- Foucault M 1979, *The History of Sexuality Vol. 1: An Introduction*, trans. R. Hurley, Penguin Books, London.
- Garnaut R 2008, *Issue Paper 1 Climate Change: Land use – Agriculture and Forestry*, viewed 12 June, 2008, <http://www.garnautreview.org.au/CA25734E0016A131/pages/reports-and-papers>.
- Gee J 2004, 'Discourse analysis: What makes it critical?', in R Rogers (ed.), *An Introduction to Critical Discourse Analysis in Education*, Laurence Erlbaum, New Jersey, pp. 19-50.
- Hajer M 1995, *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*, Oxford University Press, London.
- IPCC 2007, 'Summary for Policymakers', in S Solomon, D Qin, M Manning, Z Chen, M Marquis, KB Averyt, M Tignor, and HL Miller (eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, pp. 1-18.
- Kurz T, Donaghue N, Rapley M and Walker I 2005, 'The ways that people talk about natural resources: Discursive strategies as barriers to environmentally sustainable practices', *British Journal of Social Psychology*, 44(4): 603-620.
- Litfin K 1994 *Ozone Discourses: Science and Politics in Global Environmental Cooperation*, Colombia University Press, New York.
- Michael M 1992, 'Lay discourses of science, science-in-general, science-in-particular and self', *Science, Technology and Human Values*, 17(3): 313-333.
- Morgan W, Gilbert P, Lankshear C, Werba S and Williams L (eds.) 1996, *Critical Literacy: Readings and Resources*. South Australia: Australian Association for the teaching of English.
- Paltridge B 2006, *Discourse Analysis*, Continuum, London.
- Pettenger M 2007, *The Social Construction of Climate Change: Power, Knowledge, Norms, Discourses*, Ashgate, Hampshire.
- SELN 2006, *Enabling Change in Rural and Regional Australia: The role of extension in achieving sustainable and productive futures*, viewed 20 February 2008, <http://www.seln.org.au>.
- Strauss A and Corbin J 1990, *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage, Thousand Oaks.
- Ungar S 2000, 'Knowledge, ignorance and the popular culture: Climate change versus the ozone hole', *Public Understanding of Science*, 9(3): 297-312.
- Ungar S 1992, 'The rise and (relative) decline of global warming as a social problem', *The Sociological Quarterly*, 33(4): 483-501.
- Vanclay F 2004, 'Social principles for agricultural extension to assist in the promotion of natural resource management', *Australian Journal of Experimental Agriculture*, 44(3): 213-223.
- Vanclay F, Leith P and Fleming A 2009, 'Understanding farming community concerns about adapting to a changed climate', in W Filho and F Mannke (eds.), *Interdisciplinary Aspects of Climate Change*, vol. 29, Environmental Education, Communication and Sustainability, Peter Lang, Frankfurt am Main, pp. 229-244, available from <http://www.climate2008.net/?a1=pap&cat=3&e=32>.
- Wynne B 1992a, 'Misunderstood misunderstandings: Social identities and the public uptake of science', *Public Understanding of Science*, 1(3): 281-304.
- Wynne B 1992b, 'Public understanding of science research: New horizons or hall of mirrors?', *Public Understanding of Science* 1(1): 37-43.

